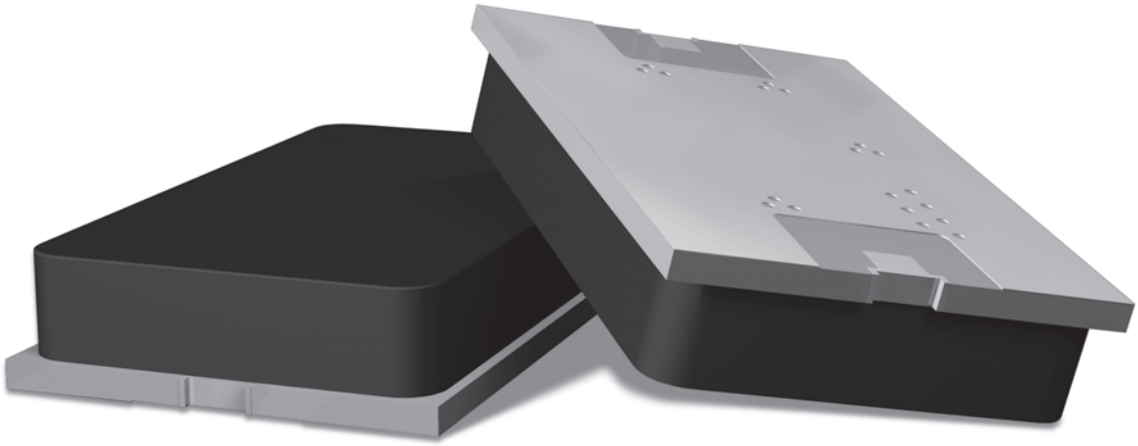
AEROFLEX
METELICS

Microwave Diodes, Passive Semiconductors, & Hybrid Devices

Short Form Catalog

Dedicated to today's programs and tomorrow's challenges

Aeroflex / Metelics is familiar with the rapidly changing RF/Microwave landscape. With our Product Lifeline Assurance program as a cornerstone to our commitment to providing you the utmost in customer service, we're also investing millions in research and development to deliver the solutions to your next challenges. They're designed and produced in one of two Centers of Excellence located on the east and west coast of the USA. You'll find these products in greater detail inside, but check our web site often for our latest releases and detailed data sheets and design tools.



High Power Surface Mount Limiter Modules

Our high power surface mount limiters are making your receiver/protector sections a whole lot easier to design. These drop-in devices include 11 completely integrated components that have been optimized for S and C band radar systems.

In comparison to silicon and GaAs MMICs, which lack thermal capacity and thermal conductivity, these devices offer stable peak power handling through 8 GHz.

- **Frequency bands from 20 to 8000 MHz**
- **100 W C.W. and 1 KW Peak Power Handling**
- **Flat Leakage Power of 20 dBm**
- **8 x 5 x 2.5 mm SMT Packaging**

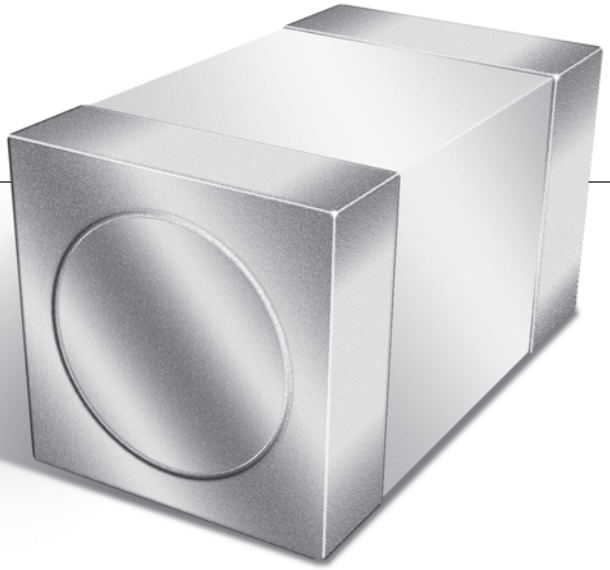
We've put our semiconductor experience to work in developing a variety of broadband and octave band models.

Surface Mount PIN Diode Switches

New, surface mount PIN diode switches are the preferred alternative to lower power QFN packaged MMICs. These SP2T T-R and symmetrical SP2T and SP3T switches provide:

- **150 W C.W. incident power handling @ +25° C**
- **650 W @ 10 µS, 1% duty incident power handling @ +25° C**
- **0.15 dB insertion loss**
- **50 dB isolation**
- **Class 1C HBM ESD rating**

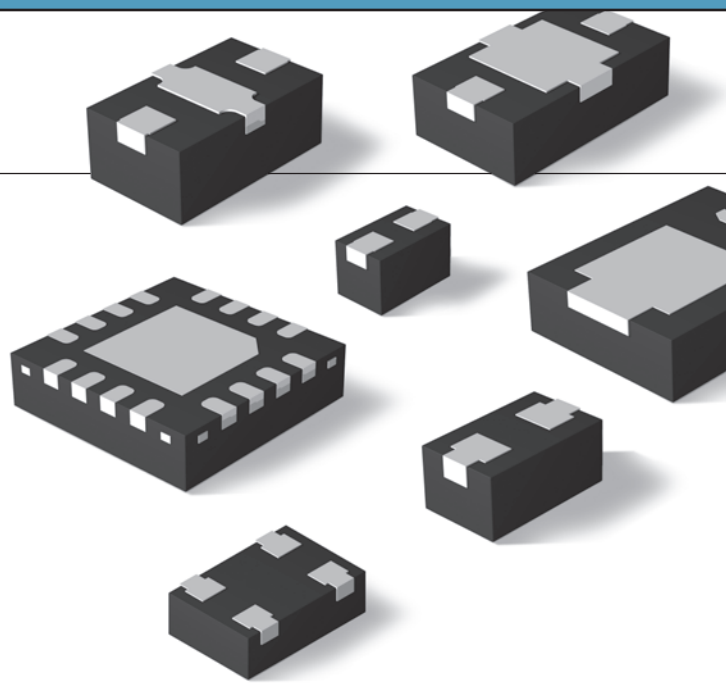
Compare this superior performance to the average QFN MMIC switch, which offers just 20 W C.W. or 100 W peak input power, and see how your military radio, WiMAX, IED and MRI designs excel.



High Power MELF Diodes

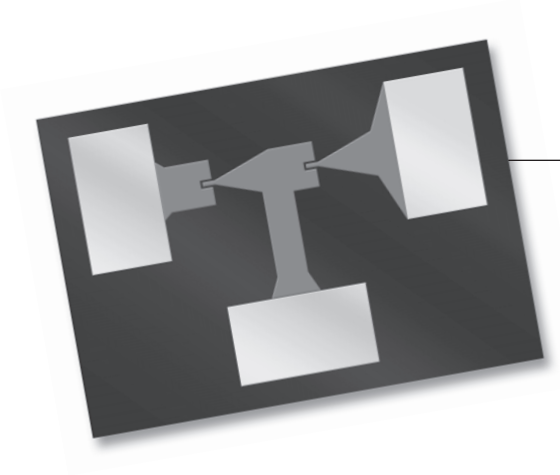
These high power MELF PIN diodes are produced with a propriety glassing process. This creates large, full-face bonding surfaces on the anode and cathode, delivers low electrical and thermal resistance, and allows for power handling up to 100 Watts. Models are available with:

- **Voltage breakdowns up to 1,000 Volts**
- **Typical lifetime speeds of 1.0 to 8.0 µsec**
- **Resistances at 100 mA of 0.5 to 2.0 ohms**



Surface Mount Control Elements

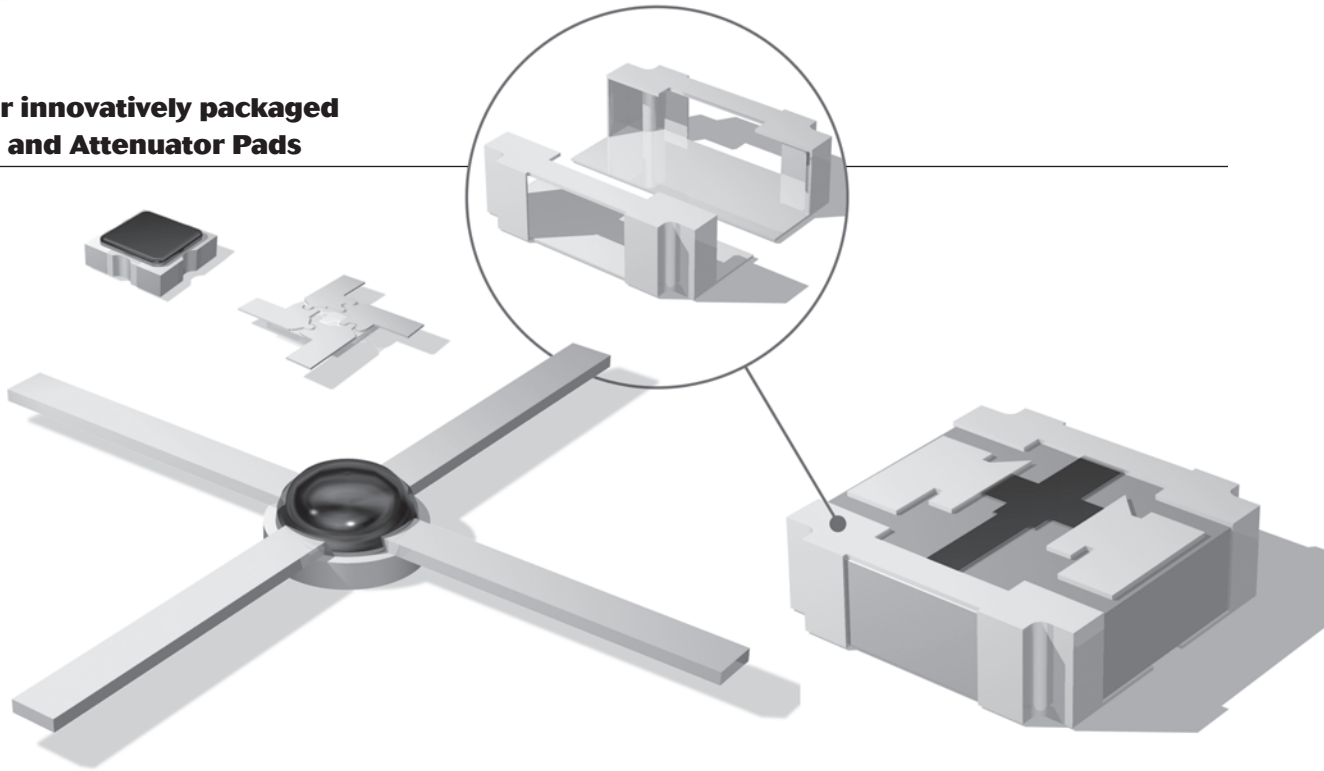
We have created a suite of versatile control elements designed to move your next switch to another level of efficiency. The core component of the group is an integrated SPDT switch in a 3x3 mm QFN package. MSW2T-1001 gives you 0.3 dB of insertion loss and 24 dB of isolation up to 6 GHz. Five other SPST components offer a broad range of high power, low inductance, low capacitance choices that also deliver through 6 GHz, while 2 complimentary Schottky's give you detection solutions you can push to 18 GHz. They're all efficiently priced for high volume commercial applications.



GaAs Flip Chips

The MGS Series of GaAs Schottky diodes are designed for optimum performance in millimeter wave components operating to 60 GHz. They are available in many different configurations and feature passivated mesa construction and Aeroflex / Metelics' tri-metallization for ultra-reliable operation in the most demanding environments.

See also our innovatively packaged Ring Quads and Attenuator Pads



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Silicon Schottky P-Type Diodes: Zero Bias


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

- Very low 1/f Noise
- Detector applications to 40 GHz
- Chip, beam lead or packaged devices

The Aeroflex / Metelics diodes are fabricated on P-Type substrates for low 1/f noise and are optimized for zero-bias operation. Zero-biased devices are processed to yield two distinct video impedance classes, one 1,500 Ohms typical and the other 4,000 Ohms typical. Applications requiring maximum stability and sensitivity will favor the higher video impedance. Biased detector operation offers the designer improved temperature stability and video impedance flexibility via bias current selection.

V_{BR} @ 100 μA = 0.8 V min. Chip and Beam Lead

Model	C_J		γ	R_V		T_{SS}	Frequency	Package
	TYP pF	MAX pF	TYP mV / mW	TYP Ω	MAX Ω	TYP dBm	TYP GHz	
MSS20,046-C15	0.08	0.10	5,000	1,500	2,000	-58	18	C15p
MSS20,047-C15	0.08	0.10	8,000	4,000	6,000	-59	18	C15p
MSS20,050-C15	0.12	0.15	5,000	1,500	2,000	-58	12	C15p
MSS20,051-C15	0.12	0.15	8,000	4,000	6,000	-59	12	C15p
MSS20,054-C15	0.18	0.20	5,000	1,500	2,000	-58	8	C15p
MSS20,055-C15	0.18	0.20	8,000	4,000	6,000	-59	8	C15p
MSS20,140-B10D	0.06	0.08	5,000	1,500	2,000	-58	40	B10D
MSS20,141-B10D	0.06	0.08	8,000	4,000	6,000	-59	40	B10D
MSS20,142-B10D	0.08	0.10	5,000	1,500	2,000	-58	26	B10D
MSS20,143-B10D	0.08	0.10	8,000	4,000	6,000	-59	26	B10D
MSS20,145-B10D	0.10	0.12	5,000	1,500	2,000	-58	18	B10D
MSS20,146-B10D	0.10	0.12	8,000	4,000	6,000	-59	18	B10D
Test Conditions	V_R = 0.5 V F = 1 MHz		F = 10 GHz P_{IN} = -30 dBm R_L = 1 MΩ Video BW = 500 KHz NF = 3 dB					

Maximum Ratings	Parameters	Rating
	Reverse Voltage	Rated V_{BR}
	Forward Current	35 mA
	Operation Temperature	-65° C to + 150° C
	Storage Temperature	-65° C to + 150° C
	C.W. Power Dissipation	100 mW, derated linearly to zero at T_A = +150° C
	Soldering Temperature (Packaged)	+230° C for 5 sec.
	Absolute Maximum Power Rating	150 mW per junction

Silicon Schottky P-Type Diodes: Zero Bias


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

V_{BR} @ 100 μA = 0.8 V min. — Packaged

Model	C_T		γ	R_V		T_{SS}	C_P	L_P	Frequency	Package
	TYP pF	MAX pF	TYP mV / mW	TYP Ω	MAX Ω	TYP dBm	TYP pF	TYP nH	MAX GHz	
MSS20,140-0402	0.12	0.15	5,000	1,500	2,000	-58	0.05	0.25	26	0402
MSS20,141-0402	0.12	0.15	8,000	4,000	6,000	-59	0.05	0.25	26	0402
MSS20,142-0402	0.15	0.18	5,000	1,500	2,000	-58	0.05	0.25	20	0402
MSS20,143-0402	0.15	0.18	8,000	4,000	6,000	-59	0.05	0.25	20	0402
MSS20,145-0402	0.18	0.20	5,000	1,500	2,000	-58	0.05	0.25	18	0402
MSS20,146-0402	0.18	0.20	8,000	4,000	6,000	-59	0.05	0.25	18	0402
MSS20,046-H27	0.20	0.25	5,000	1,500	2,000	-58	0.12	0.4	18	H27
MSS20,046-E25	0.15	0.20	5,000	1,500	2,000	-58	0.07	0.4	18	E25
MSS20,046-T86	0.26	0.31	5,000	1,500	2,000	-58	0.18	1.0	12	T86p
MSS20,046-0805-2	0.14	0.20	5,000	1,500	2,000	-58	0.06	0.4	20	0805-2
MSS20,047-H27	0.20	0.25	8,000	4,000	6,000	-59	0.12	0.4	18	H27
MSS20,047-E25	0.15	0.20	8,000	4,000	6,000	-59	0.07	0.4	18	E25
MSS20,047-T86	0.26	0.31	8,000	4,000	6,000	-59	0.18	1.0	12	T86p
MSS20,047-0805-2	0.14	0.20	8,000	4,000	6,000	-59	0.06	0.4	20	0805-2
MSS20,050-H27	0.24	0.30	5,000	1,500	2,000	-58	0.12	0.4	12	H27
MSS20,050-E25	0.20	0.25	5,000	1,500	2,000	-58	0.07	0.4	12	E25
MSS20,050-T86	0.30	0.36	5,000	1,500	2,000	-58	0.18	1.0	12	T86p
MSS20,050-0805-2	0.18	0.25	5,000	1,500	2,000	-58	0.06	0.4	18	0805-2
MSS20,051-H27	0.24	0.30	8,000	4,000	6,000	-59	0.12	0.4	12	H27
MSS20,051-E25	0.20	0.25	8,000	4,000	6,000	-59	0.07	0.4	12	E25
MSS20,051-T86	0.30	0.36	8,000	4,000	6,000	-59	0.18	1.0	12	T86p
MSS20,051-0805-2	0.18	0.25	8,000	4,000	6,000	-59	0.06	0.4	18	0805-2
MSS20,054-H27	0.30	0.35	5,000	1,500	2,000	-58	0.12	0.4	8	H27
MSS20,054-E25	0.25	0.30	5,000	1,500	2,000	-58	0.07	0.4	8	E25
MSS20,054-T86	0.36	0.41	5,000	1,500	2,000	-58	0.18	1.0	8	T86p
MSS20,054-0805-2	0.24	0.30	5,000	1,500	2,000	-58	0.06	0.4	12	0805-2
MSS20,055-H27	0.30	0.35	8,000	4,000	6,000	-59	0.12	0.4	8	H27
MSS20,055-E25	0.25	0.30	8,000	4,000	6,000	-59	0.07	0.4	8	E25
MSS20,055-T86	0.36	0.41	8,000	4,000	6,000	-59	0.18	1.0	8	T86p
MSS20,055-0805-2	0.24	0.30	8,000	4,000	6,000	-59	0.06	0.4	12	0805-2
Test Conditions	V_R = 0.5 V F = 1 MHz		F = 10 GHz P_{IN} = -30 dBm R_L = 1 MΩ Video BW = 500 KHz NF = 3 dB							

Silicon Schottky Diodes: Zero Bias Detector

Plastic SMT

- Small footprint, only 50 x 30 mils.
- Simplest broadband detector as no dc bias required
- Very low barrier height, good sensitivity (-54 dBm typical) and low flick noise
- Very low parasitic package inductance and low package capacitance

The Aeroflex / Metelics SMS Series are silicon Schottky diodes in a molded 0503 plastic DFN package designed for a broadband zero bias detector.

The SMS201 has a high cutoff frequency and can be used beyond 26.5 GHz for power detection up to 10 dBm.

The SMS202 can be used up to 18 GHz and power detection up to 10 dBm.

T_c = +25°C Electrical Specifications

Model	Configuration	V_{BR}	V_f			C_T			R_V			T_{SS}	γ	Package
		MIN V	MIN mV	TYP mV	MAX mV	MIN pF	TYP pF	MAX pF	MIN Ω	TYP Ω	MAX Ω	TYP dBm	TYP mV/mW	
SMS201	Single	1	60	80	120	-	.08	.1	2000	4000	8000	-54	8000	0503
SMS202	Single	1	60	80	120	-	.17	.20	2000	4000	8000	-54	8000	0503
SMS202LP	Pair	1	60	80	120	-	.17	.20	2000	4000	8000	-54	8000	0406
Test Conditions		I_R = 100µA	I_F = 100µA			V = 0V F = 1 MHz			I_F = 50mA			NF -3dB F = 10 GHz	PIN = -30dBm Video BW = 500 KHz F = 10 GHz	

Maximum Ratings	Parameters	Rating	Units
	V_R	1.0	V
	I_F	20	mA
	P_{DISS}	100 de-rated to zero at 175°C	mW
	T_J	+175	°C
	T_{STG}	-65 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	
	ESD	Class 0 (Human Body Model)	

Plastic SMT

- Small footprint, only 40 x 24 mils
- Cost effective choice for high volume production
- Very low parasitic package inductance and low package capacitance.

The Aeroflex / Metelics SMS302S is a silicon Schottky diode in a molded plastic DFN package. It is designed for a broadband biased detector. It can be used up to 26 GHz and power detection up to 10 dBm.

SMS302S

Model	V_{BR}	V_f			C_T			R_D		
	MIN V	MIN mV	TYP mV	MAX mV	MIN pF	TYP pF	MAX pF	MIN Ω	TYP Ω	MAX Ω
SMS302S	2.0	250	300	350	-	0.16	0.22	-	-	15
Test Conditions	I_R = 10µA	I_F = 1mA			V = 0V F = 1 MHz			I_F = 5mA		

Maximum Ratings	Parameters	Rating	Units
	V_R	2.0	V
	I_F	50	mA
	P_{DISS}	100 de-rated to zero at 150°C	mW
	T_J	+150	°C
	T_{STG}	-65 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	
	ESD	Class 0 (Human Body Model)	

Silicon Schottky P-Type Diodes: Low Barrier


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

- Superior 1/f noise
- Better temperature stability than zero bias Schottky diode
- Low barrier height
- Passivated with silicon nitride

The Aeroflex / Metelics Schottky diodes are optimized for superior 1/f noise on P-type silicon epitaxial substrate with proprietary process. In general they require a small forward bias (5 ~ 50 µA) for small power levels below -20dm when used as microwave detectors.

V_F @ 1 mA = 220 ~ 330 mV, V_{BR} @ 10 µA = 3 V min. Chip and Beam Lead

Model	V_F		C_J		R_D	F opt	Package
	TYP	MAX	TYP	MAX	MAX	MAX	
MSS25,047-C15c	260	300	0.08	0.10	65	18	C15c
MSS25,049-C15c	220	260	0.10	0.12	52	12	C15c
MSS25,141-B10D	280	330	0.06	0.08	65	40	B10D
MSS25,143-B10D	260	300	0.08	0.10	60	26	B10D
MSS25,145-B10D	220	260	0.10	0.12	52	18	B10D
Test Conditions	I_F = 1 mA		V_R = 0.2 V F = 1 MHz		I_F = 5 mA	GHz	

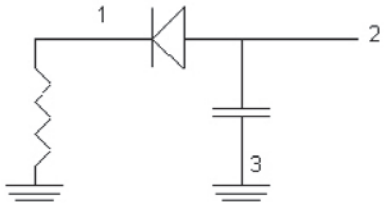
Maximum Ratings	Parameters	Rating
	Operation Temperature	-65° C to 150° C
	Storage Temperature	-65° C to 150° C
	Power Dissipation	150 mW per junction at 25° derate linearly to zero at T_A = +150° C
	Soldering Temperature	230° C for 5 sec.

Schottky Diode: Zero Bias Schottky Detector Module

Plastic SMT

- Small footprint, only 80 x 50 mils
- Simplest broadband detector as no DC bias required
- Very low barrier height, good sensitivity, -54 dBm typical. Also low flick noise
- Very low parasitic package inductance and low package capacitance
- Cost effective choice for high volume production

The Aeroflex / Metelics MSDM20-0118 is a Silicon Zero Bias Schottky Detector module in a molded plastic DFN 2012 package. It can be used up to 18 GHz and power detection up to 10 dBm. This is a complete detector module with a Port 1 RF in and Port 2 DC out.



T_C = +25°C MSDM20-0118

Model	V_{BR}	V_F			C_T		R_V			T_{SS}	V
	MIN V	MIN mV	TYP mV	MAX mV	TYP pF	MAX pF	MIN Ω	TYP Ω	MAX Ω	TYP dBm	TYP Mv/mW
MSDM20-0118	1.0	60	80	120	0.17	0.20	2000	4000	8000	-54	8000
Test Conditions	I_R = 100µA	I_F = 100µA			V_R = 0V F = 1 MHz		Zero Bias			N_F = 3dB F = 10 GHz	PIN = -30dBm Video BW = 500 KHz Un-match input F = 10 GHZ

Maximum Ratings	Parameters	Rating	Units
	V_R	1.0	V
	I_F	20	mA
	P_{DISS}	100 de-rated to zero at 150°C	mW
	T_J	+175	°C
	Storage Temperature	-65 to +150	°C
	Solder Temperature	+260 °C per JEDEC J-STD-20C	
	ESD	Class 0 HBM	

Silicon Schottky P-Type Diodes: Medium Barrier


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

- Very low 1/f Noise
- Detector applications to 40 GHz
- Chip, beam lead or packaged devices

The Aeroflex / Metelics MSS39,000 series of Schottky diodes is fabricated on P-Type epitaxial substrates for superior 1/f noise performance in microwave based-detector applications up to 40 GHz.

V_F @ 1 mA = 380 ~ 480 mV — Chip and Beam Lead

Model	V_{BR}	C_J		γ	T_{SS}	Frequency	Package
	MIN V	TYP pF	MAX pF	TYP mV / mW	TYP dBm	TYP GHz	
MSS39,045-C15	5.0	0.08	0.10	5,000	-58	18	C15p
MSS39,048-C15	5.0	0.12	0.15	5,000	-58	12	C15p
MSS39,144-B10B	3.5	0.06	0.08	5,000	-58	40	B10Bp
MSS39,146-B10B	3.5	0.08	0.10	5,000	-58	26	B10Bp
MSS39,148-B10B	3.5	0.10	0.12	5,000	-58	20	B10Bp
MSS39,152-B10B	3.5	0.15	0.18	5,000	-58	18	B10Bp
Test Conditions	I_R = 10 μA	V_R = 0 V F = 1 MHz		F = 10 GHz DC BIAS = 20 μA Video BW = 2 MHz R_L = 100 kΩ			

Maximum Ratings	Parameters	Rating
	Reverse Voltage	Rated V_{BR}
	Forward Current	50 mA
	Operation Temperature	-65° C to +150° C
	Storage Temperature	-65° C to +150° C
	Power Dissipation	150 mW, derated linearly to zero at T_A = +150° C
	Soldering Temperature (Packaged)	+230° C for 5 sec.
	Beam Lead Pull Strength, Min	4 grams

Silicon Schottky P-Type Diodes: Medium Barrier


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

V_F @ 1 mA = 380 ~ 480 mV — Packaged

Model	C_T		γ	T_{SS}	C_P	L_P	Package
	TYP pF	MAX pF	TYP mV / mW	TYP dBm	TYP pF	TYP nH	
MSS39,045-P55	0.21	0.26	5,000	-58	0.13	0.35	P55p
MSS39,045-P86	0.23	0.23	5,000	-58	0.15	1.0	P86p
MSS39,048-P55	0.25	0.31	5,000	-58	0.13	0.35	P55p
MSS39,048-P86	0.27	0.33	5,000	-58	0.15	1.0	P86p
MSS39,144-H27	0.18	0.24	5,000	-58	0.12	0.4	H27
MSS39,144-0402	0.11	0.16	5,000	-58	0.05	0.25	0402
MSS39,144-0805-2	0.12	0.17	5,000	-58	0.06	0.4	0805-2
MSS39,146-H27	0.20	0.25	5,000	-58	0.12	0.4	H27
MSS39,146-0402	0.13	0.18	5,000	-58	0.05	0.25	0402
MSS39,146-0805-2	0.14	0.20	5,000	-58	0.06	0.4	0805-2
MSS39,148-E25	0.17	0.22	5,000	-58	0.07	0.4	E25
MSS39,148-H20	0.28	0.33	5,000	-58	0.18	0.5	H20
MSS39,148-0402	0.15	0.20	5,000	-58	0.05	0.25	0402
MSS39,148-0805-2	0.16	0.22	5,000	-58	0.06	0.4	0805-2
MSS39,152-E25	0.22	0.28	5,000	-58	0.07	0.4	E25
MSS39,152-H20	0.33	0.39	5,000	-58	0.18	0.5	H20
MSS39,152-0402	0.20	0.25	5,000	-58	0.05	0.25	0402
MSS39,152-0805-2	0.21	0.27	5,000	-58	0.06	0.4	0805-2
Test Conditions	V_R = 0 V F = 1 MHz		F = 10 GHz DC BIAS = 20 μA Video BW = 2 MHz R_L = 100 kΩ				

Silicon Schottky N-Type Diodes: Low Barrier


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

- V_F, R_D and C_J matching options
- Chip, beam lead or packaged devices
- Hi-Rel screening per MIL-PRF-19500 and MIL-PRF-38534 available

The Aeroflex / Metelics MSS30,000 Series of Schottky diodes are fabricated on N-Type epitaxial substrates using proprietary processes that yield the highest FCOs in the industry. Optimum mixer performance is obtained with LO power of -3 dBm to +3 dBm per diode. These can also be used in doubler, limiter, detector and sampler applications.

VF @ 1 mA = 230 ~ 350 mV, VBR @ 10 μA = 2 V min. Chip and Beam Lead

Model	Configuration	C_J TYP pF	C_J MAX pF	R_D MAX Ω	R_S TYP Ω	F_{CO} TYP GHz	Package
MSS30,046-C15	Single Junction	0.10	0.12	18	10	160	C15
MSS30,050-C15	Single Junction	0.15	0.18	15	6	175	C15
MSS30,142-B10B	Single Junction	0.07	0.10	22	13	175	B10B
MSS30,148-B10B	Single Junction	0.12	0.15	15	7	190	B10B
MSS30,154-B10B	Single Junction	0.22	0.25	12	3	240	B10B
MSS30,242-B20	Series Tee	0.07	0.10	22	13	175	B20
MSS30,248-B20	Series Tee	0.12	0.15	15	7	190	B20
MSS30,254-B20	Series Tee	0.22	0.25	12	3	240	B20
MSS30,346-B21	Anti-Parallel Pair	0.27	0.30	16	11	55	B21
MSS30,442-B42	Ring Quad	0.07	0.10	22	13	175	B42
MSS30,448-B42	Ring Quad	0.12	0.15	15	7	190	B42
MSS30,454-B40	Ring Quad	0.22	0.25	12	3	240	B40
MSS30,B46-B45	Bridge Quad	0.10	0.125	25	15	80	B45
MSS30,B53-B45	Bridge Quad	0.20	0.25	15	5	80	B45
MSS30,CR46-B49	Crossover Ring Quad	0.09	0.125	22	10	118	B49
MSS30,CR53-B49	Crossover Ring Quad	0.15	0.250	15	5	106	B49
MSS30,PCB46-B48	Coplanar Bridge Quad	0.08	0.12	20	7	166	B48
MSS30,PCR46-B47	Coplanar Ring Quad	0.07	0.13	22	10	152	B47
MSS30,PCR53-B47	Coplanar Ring Quad	0.15	0.25	15	5	106	B47
Test Conditions		$V_R = 0$ V, F = 1 MHz		$I_F = 5$ mA			

Maximum Ratings	Parameters	Rating
	Reverse Voltage	Rated V_{BR}
	Forward Current	50 mA
	Operation Temperature	-65° C to +150° C
	Storage Temperature	-65° C to +150° C
	Power Dissipation	150 mW per junction at $T_A = 25°$ C, derate linearly to zero at $T_A = +150°$C
	Soldering Temperature (Packaged)	+260° C for 5 sec.
	Beam Lead Pull Strength	4 grams minimum


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

V_F @ 1 mA = 230 ~ 350 mV, V_{BR} @ 10 µA = 2 V min. Packaged

Model	Configuration	C_T TYP pF	C_T MAX pF	R_D MAX Ω	C_P TYP pF	L_P MAX nH	Package
MSS30,046-P55	Single Junction	0.23	0.30	18	0.13	0.35	P55
MSS30,046-P86	Single Junction	0.25	0.33	18	0.15	1.0	P86
MSS30,050-P55	Single Junction	0.28	0.35	15	0.13	0.35	P55
MSS30,050-P86	Single Junction	0.30	0.38	15	0.15	1.0	P86
MSS30,142-E25	Single Junction	0.14	0.26	22	0.07	0.4	E25
MSS30,142-H20	Single Junction	0.25	0.31	22	0.18	0.5	H20
MSS30,148-E25	Single Junction	0.21	0.31	15	0.07	0.4	E25
MSS30,148-H20	Single Junction	0.30	0.36	15	0.18	0.5	H20
MSS30,154-E25	Single Junction	0.30	0.41	12	0.07	0.4	E25
MSS30,154-H20	Single Junction	0.40	0.46	12	0.18	0.5	H20
MSS30,242-E35	Series Tee	0.15	0.21	22	0.07	0.4	E35
MSS30,242-H30	Series Tee	0.25	0.31	22	0.18	0.5	H30
MSS30,248-E35	Series Tee	0.20	0.25	15	0.07	0.4	E35
MSS30,248-H30	Series Tee	0.30	0.36	15	0.18	0.5	H30
MSS30,254-E35	Series Tee	0.30	0.35	12	0.07	0.4	E35
MSS30,254-H30	Series Tee	0.40	0.46	12	0.18	0.5	H30
MSS30,346-E25	Anti-Parallel Pair	0.35	0.40	16	0.07	0.4	E25
MSS30,346-H20	Anti-Parallel Pair	0.45	0.50	16	0.18	0.5	H20
MSS30,442-E45	Ring Quad	0.15	0.21	22	0.07	0.4	E45
MSS30,442-H40	Ring Quad	0.25	0.33	22	0.18	0.5	H40
MSS30,448-E45	Ring Quad	0.20	0.26	15	0.07	0.4	E45
MSS30,448-H40	Ring Quad	0.30	0.35	15	0.18	0.5	H40
MSS30,454-E45	Ring Quad	0.30	0.35	12	0.07	0.4	E45
MSS30,454-H40	Ring Quad	0.40	0.46	12	0.18	0.5	H40
MSS30,B46-E45	Bridge Quad	0.17	0.25	25	0.07	0.4	E45
MSS30,B46-H40	Bridge Quad	0.28	0.35	25	0.18	0.5	H40
MSS30,B53-E45	Bridge Quad	0.27	0.35	15	0.07	0.4	E45
MSS30,B53-H40	Bridge Quad	0.38	0.46	15	0.18	0.5	H40
MSS30,CR46-E45	Crossover Ring Quad	0.16	0.22	22	0.07	0.4	E45
MSS30,CR46-H40	Crossover Ring Quad	0.27	0.33	22	0.18	0.5	H40
MSS30,CR53-E45	Crossover Ring Quad	0.22	0.35	15	0.07	0.4	E45
MSS30,CR53-H40	Crossover Ring Quad	0.33	0.45	15	0.18	0.5	H40
Test Conditions		V_R = 0 V F = 1 MHz		I_F = 5 mA			

Silicon Schottky N-Type Diodes: Medium Barrier


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

- V_F, R_D and C_J matching options
- Chip, beam lead or packaged devices
- Hi-Rel screening per MIL-PRF-19500 and MIL-PRF-38534 available

The Aeroflex / Metelics MSS40,000 Series of Schottky diodes are fabricated on N-Type epitaxial substrates using proprietary processes that yield the highest FCOs in the industry. Optimum mixer performance is obtained with LO power of 0 dBm to +6 dBm per diode. These can also be used in doubler, limiter, detector and sampler applications.

V_F @ 1 mA = 350 ~ 450 mV, V_{BR} @ 10 μA = 3 V min. — Chip and Beam Lead

Model	Configuration	C_J TYP pF	C_J MAX pF	R_D MAX Ω	R_S TYP Ω	F_{CO} TYP GHz	Package
MSS40,045-C15	Single Junction	0.09	0.12	15	7	253	C15
MSS40,048-C15	Single Junction	0.12	0.15	15	7	190	C15
MSS40,141-B10B	Single Junction	0.06	0.10	22	10	265	B10B
MSS40,148-B10B	Single Junction	0.12	0.15	17	7	190	B10B
MSS40,155-B10B	Single Junction	0.25	0.30	13	5	127	B10B
MSS40,244-B20	Series Tee	0.08	0.12	22	19	105	B20
MSS40,248-B20	Series Tee	0.12	0.15	17	10	133	B20
MSS40,255-B20	Series Tee	0.25	0.30	15	5	127	B20
MSS40,448-B42	Ring Quad	0.12	0.15	17	7	190	B42
MSS40,455-B40	Ring Quad	0.25	0.30	17	5	127	B40
MSS40,B46-B45	Bridge Quad	0.10	0.13	25	15	106	B45
MSS40,B53-B45	Bridge Quad	0.20	0.25	15	5	160	B45
MSS40,CR46-B49	Crossover Ring Quad	0.09	0.125	22	10	177	B49
MSS40,CR53-B49	Crossover Ring Quad	0.15	0.25	15	5	212	B49
MSS40,PCR46-B47	Coplanar Ring Quad	0.07	0.13	22	10	227	B47
MSS40,PCR53-B47	Coplanar Ring Quad	0.15	0.25	15	5	212	B47
MSS40,PCB46-B48	Coplanar Bridge Quad	0.08	0.12	20	7	190	B48
Test Conditions		V_R = 0 V, F = 1 MHz		I_F = 5 mA			

Maximum Ratings	Parameters	Rating
	Reverse Voltage	Rated V_{BR}
	Forward Current	50 mA
	Operation Temperature	-65° C to +150° C
	Storage Temperature	-65° C to +150° C
	Power Dissipation	150 mW per junction at T_A = 25° C, derate linearly to zero at T_A = +150°C
	Soldering Temperature (Packaged)	+260° C for 5 sec.
	Beam Lead Pull Strength	4 grams minimum

Silicon Schottky N-Type Diodes: Medium Barrier


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

V_F @ 1 mA = 350 ~ 450 mV, V_{BR} = @ 10 μA 3 V min. Packaged

Model	Configuration	C_T TYP pF	C_T MAX pF	R_D MAX Ω	C_P TYP pF	L_P TYP nH	Package
MSS40,045-P55	Single Junction	0.22	0.28	15	0.13	0.35	P55
MSS40,045-P86	Single Junction	0.24	0.30	15	0.15	1.0	P86
MSS40,048-P55	Single Junction	0.25	0.30	15	0.13	0.35	P55
MSS40,048-P86	Single Junction	0.27	0.33	15	0.15	1.0	P86
MSS40,141-E25	Single Junction	0.13	0.22	18	0.07	0.4	E25
MSS40,141-H20	Single Junction	0.24	0.30	18	0.18	0.5	H20
MSS40,141-0402	Single Junction	0.11	0.18	18	0.05	0.25	0402
MSS40,148-E25	Single Junction	0.19	0.28	15	0.07	0.4	E25
MSS40,148-H20	Single Junction	0.30	0.36	15	0.18	0.5	H20
MSS40,148-0402	Single Junction	017	0.24	15	0.05	0.25	0402
MSS40,155-E25	Single Junction	0.32	0.41	14	0.07	0.4	E25
MSS40,155-H20	Single Junction	0.43	0.51	14	0.18	0.5	H20
MSS40,155-0402	Single Junction	030	0.38	14	0.05	0.25	0402
MSS40,244-E35	Series Tee	0.15	0.24	28	0.07	0.4	E35
MSS40,244-0805-4	Series Tee	0.29	0.36	28	0.06	0.4	0805-4
MSS40,248-E35	Series Tee	0.19	0.28	18	0.07	0.4	E35
MSS40,248-0805-4	Series Tee	0.18	0.25	18	0.06	0.4	0805-4
MSS40,255-E35	Series Tee	0.32	0.41	14	0.07	0.4	E35
MSS40,255-0805-4	Series Tee	0.17	0.40	14	0.06	0.4	0805-4
MSS40,448-E45	Ring Quad	0.19	0.25	15	0.07	0.4	E45
MSS40,448-H40	Ring Quad	0.30	0.36	15	0.18	0.5	H40
MSS40,455-E45	Ring Quad	0.32	0.40	14	0.07	0.4	E45
MSS40,455-H40	Ring Quad	0.42	0.52	14	0.18	0.5	H40
MSS40,B46-E45	Bridge Quad	0.17	0.24	25	0.07	0.4	E45
MSS40,B53-E45	Bridge Quad	0.27	0.36	15	0.07	0.4	E45
MSS40,CR46-E45	Crossover Ring Quad	0.16	0.23	15	0.07	0.4	E45
MSS40,CR46-H40	Crossover Ring Quad	0.27	0.35	15	0.18	0.5	H40
MSS40,CR53-E45	Crossover Ring Quad	0.22	0.35	15	0.07	0.4	E45
MSS40,CR53-H40	Crossover Ring Quad	0.33	0.46	15	0.18	0.5	H40
Test Conditions		V_R = 0 V F = 1 MHz		I_F = 5 mA			

Silicon Schottky N-Type Diodes: High Barrier


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

- V_F, R_D and C_J matching options
- Chip, beam lead or packaged devices
- Hi-Rel screening per MIL-PRF-19500 and MIL-PRF-38534 available

The Aeroflex / Metelics MSS50,000 Series of Schottky diodes are fabricated on N-Type epitaxial substrates using proprietary processes that yield the highest FCOs in the industry. Optimum mixer and detector performance is obtained with LO power of +2 dBm to +8 dBm per diode. These can also be used in doubler, limiter, detector and sampler applications.

V_F @ 1 mA = 450 ~ 550 mV, V_{BR} @ 10 μA = 4 V min. Chip and Beam Lead

Model	Configuration	C_J TYP pF	C_J MAX pF	R_D MAX Ω	R_S TYP Ω	F_{CO} TYP GHz	Package
MSS50,046-C26	Single Junction	0.10	0.12	20	10	190	C26
MSS50,048-C15	Single Junction	0.12	0.15	15	7	190	C15
MSS50,062-C16	Single Junction	0.50	0.55	12	2	160	C16
MSS50,146-B10B	Single Junction	0.07	0.12	18	9	253	B10B
MSS50,155-B10B	Single Junction	0.25	0.30	15	7	90	B10B
MSS50,244-B20	Series Tee	0.15	0.20	16	7	183	B20
MSS50,341-B21	Anti-Parallel Pair	0.20	0.26	16	7	114	B21
MSS50,448-B43	Ring Quad	0.20	0.25	14	6	133	B40
MSS50,B46-B45	Bridge Quad	0.10	0.13	20	10	159	B45
MSS50,B53-B45	Bridge Quad	0.20	0.25	15	5	159	B45
MSS50,CR46-B49	Crossover Ring Quad	0.09	0.125	22	10	177	B49
MSS50,CR53-B49	Crossover Ring Quad	0.15	0.25	15	5	212	B49
MSS50,PCB46-B48	Coplanar Bridge Quad	0.08	0.12	20	7	284	B48
MSS50,PCR46-B47	Coplanar Ring Quad	0.07	0.13	22	10	227	B47
MSS50,PCR53-B48	Coplanar Ring Quad	0.15	0.25	15	5	212	B47
Test Conditions		$V_R = 0$ V, F = 1 MHz		$I_F = 5$ mA			

Maximum Ratings	Parameters	Rating
	Reverse Voltage	Rated V_{BR}
	Forward Current	50 mA
	Operation Temperature	-65° C to +150° C
	Storage Temperature	-65° C to +150° C
	Power Dissipation	150 mW per junction at Ta = 25° C, derate linearly to zero at Ta = +150°C
	Soldering Temperature (Packaged)	+260° C for 5 sec.
	Beam Lead Pull Strength	4 grams minimum

Silicon Schottky N-Type Diodes: High Barrier


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

V_F @ 1 mA = 450 ~ 550 mV, V_{BR} @ 10 μA = 4 V min. Packaged

Model	Configuration	C_T TYP pF	C_T MAX pF	R_D MAX Ω	C_P TYP pF	L_P MAX nH	Package
MSS50,046-P55	Single Junction	0.23	0.28	20	0.13	0.35	P55
MSS50,046-P86	Single Junction	.025	0.30	20	0.15	1.0	P86
MSS50,048-P55	Single Junction	0.25	0.31	15	0.13	0.35	P55
MSS50,048-P86	Single Junction	0.27	0.33	15	0.15	1.0	P86
MSS50,062-P55	Single Junction	0.63	0.75	12	0.13	0.35	P55
MSS50,062-P86	Single Junction	0.65	0.78	12	0.15	1.0	P86
MSS50,146-E25	Single Junction	0.14	0.24	18	0.07	0.4	E25
MSS50,146-H20	Single Junction	0.25	0.34	18	0.18	0.5	H20
MSS50,146-0402	Single Junction	0.11	0.20	18	0.05	0.25	0402
MSS50,146-0805-2	Single Junction	0.12	0.22	18	0.06	0.4	0805-2
MSS50,155-E25	Single Junction	0.32	0.41	15	0.07	0.4	E25
MSS50,155-H20	Single Junction	0.43	0.51	15	0.18	0.5	H20
MSS50,155-0402	Single Junction	0.30	0.38	15	0.05	0.25	0402
MSS50,155-0805-2	Single Junction	0.31	0.40	15	0.06	0.4	0805-2
MSS50,244-E35	Series Tee	0.22	0.31	16	0.07	0.4	E35
MSS50,244-H30	Series Tee	0.33	0.42	16	0.18	0.5	H30
MSS50,244-0805-4	Series Tee	0.34	0.44	16	0.06	0.4	0805-4
MSS50,341-E25	Anti-Parallel Pair	0.27	0.36	16	0.07	0.4	E25
MSS50,341-H20	Anti-Parallel Pair	0.38	0.48	16	0.18	0.5	H20
MSS50,448-E45	Ring Quad	0.27	0.36	10	0.07	0.4	E45
MSS50,448-H40	Ring Quad	0.38	0.48	10	0.18	0.5	H40
MSS50,448-0805-4	Ring Quad	0.26	0.35	10	0.06	0.4	0805-4
MSS50,B46-E45	Bridge Quad	0.17	0.25	20	0.07	0.4	E45
MSS50,B46-H40	Bridge Quad	0.28	0.35	20	0.18	0.5	H40
MSS50,B53-E45	Bridge Quad	0.27	0.36	15	0.07	0.4	E45
MSS50,B53-H40	Bridge Quad	0.38	0.48	15	0.18	0.5	H40
MSS50,CR46-E45	Crossover Ring Quad	0.16	0.25	22	0.07	0.4	E45
MSS50,CR46-H40	Crossover Ring Quad	0.27	0.36	22	0.18	0.5	H40
MSS50,CR53-E45	Crossover Ring Quad	0.22	0.36	15	0.07	0.4	E45
MSS50,CR53-H40	Crossover Ring Quad	0.33	0.46	15	0.18	0.5	H40
Test Conditions		$V_R = 0$ V, F = 1 MHz		$I_F = 5$ mA			

Silicon Schottky N-Type Diodes: Extra High Barrier


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

- V_F, R_D and C_J matching options
- Chip, beam lead or packaged devices
- Hi-Rel screening per MIL-PRF-19500 and MIL-PRF-38534 available

The Aeroflex / Metelics MSS60,000 Series of Schottky diodes are fabricated on N-Type epitaxial substrates using proprietary processes that yield the highest FCOs in the industry. Optimum mixer and detector performance is obtained with LO power of +6 dBm to +12 dBm per diode. These can also be used in doubler, limiter, detector and sampler applications.

V_F @ 1 mA = 550 ~ 700 mV, V_{BR} @ 10 μA = 3.5 V min. Chip and Beam Lead

Model	Configuration	C_J		R_D	R_S	F_{CO}	Package
		TYP pF	MAX pF	MAX Ω	TYP Ω	TYP GHz	
MSS60,046-C26	Single Junction	0.10	0.12	18	10	190	C26
MSS60,048-C26	Single Junction	0.12	0.15	16	8	190	C26
MSS60,144-B10B	Single Junction	0.08	0.10	25	15	153	B10B
MSS60,148-B10B	Single Junction	0.12	0.15	18	10	133	B10B
MSS60,153-B10B	Single Junction	0.20	0.25	12	5	159	B10B
MSS60,244-B20	Series Tee	0.08	0.10	25	15	133	B20
MSS60,248-B20	Series Tee	0.12	0.15	18	7	133	B20
MSS60,253-B20	Series Tee	0.20	0.25	12	5	159	B20
MSS60,444-B42	Ring Quad	0.08	0.10	25	15	133	B42
MSS60,448-B42	Ring Quad	0.12	0.15	18	7	133	B42
MSS60,453-B41	Ring Quad	0.25	0.30	12	5	159	B41
MSS60,841-B80	8 Junction Ring Quad	0.06	0.08	28	18	133	B80
MSS60,846-B80	8 Junction Ring Quad	0.10	0.12	23	12	106	B80
MSS60,848-B80	8 Junction Ring Quad	0.12	0.15	18	7	133	B80
MSS60,B46-B45	Bridge Quad	0.10	0.13	25	15	106	B45
MSS60,B53-B45	Bridge Quad	0.20	0.25	18	7	114	B45
MSS60,CR46-B49	Crossover Ring Quad	0.09	0.125	22	10	177	B49
MSS60,CR53-B49	Crossover Ring Quad	0.15	0.25	15	7	152	B49
MSS60,PCB46-B48	Coplanar Bridge Quad	0.08	0.12	20	7	284	B48
MSS60,PCR46-B47	Coplanar Ring Quad	0.07	0.13	22	10	227	B47
MSS60,PCR53-B47	Coplanar Ring Quad	0.15	0.25	15	7	152	B47
Test Conditions		$V_R = 0$ V, F = 1 MHz		$I_F = 5$ mA			

Maximum Ratings	Parameters	Rating
	Reverse Voltage	Rated V_{BR}
	Forward Current	50 mA
	Operation Temperature	-65° C to +150° C
	Storage Temperature	-65° C to +150° C
	Power Dissipation	150 mW per junction at Ta = 25° C, derate linearly to zero at Ta = +150°C
	Soldering Temperature (Packaged)	+260° C for 5 sec.
	Beam Lead Pull Strength	4 grams minimum

Silicon Schottky N-Type Diodes: Extra High Barrier


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

V_F @ 1 mA = 550 ~ 700 mV, V_{BR} @ 10 μA = 3.5 V min. Packaged

Model	Configuration	C_T TYP pF	C_T MAX pF	R_D MAX Ω	C_P TYP pF	L_P TYP nH	Package
MSS60,046-P55	Single Junction	0.23	0.28	18	0.13	0.35	P55
MSS60,046-P86	Single Junction	0.25	0.30	18	0.15	1.0	P86
MSS60,048-P55	Single Junction	0.25	0.31	16	0.13	0.35	P55
MSS60,048-P86	Single Junction	0.27	0.33	16	0.15	1.0	P86
MSS60,144-E25	Single Junction	0.15	0.22	25	0.07	0.4	E25
MSS60,144-H20	Single Junction	0.26	0.31	25	0.18	0.5	H20
MSS60,148-E25	Single Junction	0.19	0.28	18	0.07	0.4	E25
MSS60,148-H20	Single Junction	0.30	0.38	18	0.18	0.5	H20
MSS60,153-E25	Single Junction	0.27	0.36	12	0.07	0.4	E25
MSS60,153-H20	Single Junction	0.38	0.48	12	0.18	0.5	H20
MSS60,244-E35	Series Tee	0.15	0.22	25	0.07	0.4	E35
MSS60,244-H30	Series Tee	0.26	0.36	25	0.18	0.5	H30
MSS60,248-E35	Series Tee	0.19	0.28	18	0.07	0.4	E35
MSS60,248-H30	Series Tee	0.30	0.40	18	0.18	0.5	H30
MSS60,253-E35	Series Tee	0.27	0.37	12	0.07	0.4	E35
MSS60,253-H30	Series Tee	0.38	0.48	12	0.18	0.5	H30
MSS60,444-E45	Ring Quad	0.15	0.22	25	0.07	0.4	E45
MSS60,444-H40	Ring Quad	0.26	0.33	25	0.18	0.5	H40
MSS60,448-E45	Ring Quad	0.19	0.27	18	0.07	0.4	E45
MSS60,448-H40	Ring Quad	0.30	0.38	18	0.18	0.5	H40
MSS60,453-E45	Ring Quad	0.32	0.42	12	0.07	0.4	E45
MSS60,453-H40	Ring Quad	0.43	0.53	12	0.18	0.5	H40
MSS60,841-E45	8 Junction Ring Quad	0.13	0.20	28	0.07	0.4	E45
MSS60,841-H40	8 Junction Ring Quad	0.24	0.31	28	0.18	0.5	H40
MSS60,846-E45	8 Junction Ring Quad	0.17	0.24	23	0.07	0.4	E45
MSS60,846-H40	8 Junction Ring Quad	0.28	0.35	23	0.18	0.5	H40
MSS60,848-E45	8 Junction Ring Quad	0.19	0.27	18	0.07	0.4	E45
MSS60,848-H40	8 Junction Ring Quad	0.30	0.38	18	0.18	0.5	H40
MSS60,B46-E45	Bridge Quad	0.17	0.25	25	0.07	0.4	E45
MSS60,B46-H40	Bridge Quad	0.28	0.36	25	0.18	0.5	H40
MSS60,B53-E45	Bridge Quad	0.27	0.37	18	0.07	0.4	E45
MSS60,B53-H40	Bridge Quad	0.38	0.48	18	0.18	0.5	H40
MSS60,CR46-E45	Crossover Ring Quad	0.16	0.25	22	0.07	0.4	E45
MSS60,CR53-E45	Crossover Ring Quad	0.22	0.37	15	0.07	0.4	E45
Test Conditions		$V_R = 0$ V, F = 1 MHz		$I_F = 5$ mA			

Silicon Schottky Diodes: General Purpose


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

- Fast switching
- High breakdown voltage
- Low cost

The Aeroflex / Metelics MGR-700 Series are general purpose Schottky Barrier diodes specially designed to achieve a high voltage breakdown. This series of diodes can be used in the UHF and VHF frequency bands for pulse shaping, sampling and as fast logic gates.

Chip

Model	Breakdown Voltage I_R10 µA	Forward Voltage 1mA	Junction Capacitance @0 Vdc 1 MHz	Leakage Current 80% V_B
	MIN V	TYP V	MAX pF	MAX nA
MGR700	8.0	0.34	1.2	100.0
MGR701	8.0	0.34	1.0	100.0
MGR702	20.0	0.55	1.2	100.0
MGR703	20.0	0.41	1.0	100.0
MGR704	70.0	0.41	2.0	200.0
MGR705	70.0	0.41	1.2	200.0
1N5711	70.0	0.41	1.2	200.0
1N5712	20.0	0.41	1.0	100.0

Maximum Ratings	Parameters	Rating
	Operating Temperature	-55° C to + 150° C
	Storage Temperature	-65° C to + 200° C
	Reverse Voltage	See Voltage Ratings

Plastic SMT

SOT23 & SOD323

Model	Configuration	V_{BR} MIN V	V_F TYP mV	C_T MAX pF	R_D MAX Ω	Package
SMST3012-SOT23	-0S, 1S, 2ST, 3CA, 4CC	2.0	270	0.25	15	SOT23
SMST4012-SOT23	-0S, 1S, 2ST, 3CA, 4CC	2.0	350	0.25	15	SOT23
SMST6012-SOT23	-0S, 1S, 2ST, 3CA, 4CC	2.0	630	0.25	15	SOT23
SMST3004-SOT23	-0S, 1S, 2ST, 3CA, 4CC	2.0	270	0.60	10	SOT23
SMST4004-SOT23	-0S, 1S, 2ST, 3CA, 4CC	2.0	350	0.60	10	SOT23
SMST6004-SOT23	-0S, 1S, 2ST, 3CA, 4CC	2.0	600	0.60	10	SOT23
SMSD3012-SOD323	–	2.0	270	0.25	15	SOD323
SMSD4012-SOD323	–	2.0	350	0.25	15	SOD323
SMSD6012-SOD323	–	2.0	630	0.25	15	SOD323
SMSD3004-SOD323	–	2.0	270	0.60	10	SOD323
SMSD4004-SOD323	–	2.0	350	0.60	10	SOD323
SMSD6004-SOD323	–	2.0	600	0.60	10	SOD323
Test Conditions		$I_R = 10\ \mu A$	$I_F = 1$ mA	$V_R = 0$ V F = 1 MHz	$I_F = 10$ mA	

SOT143

Model	Configuration	V_{BR} MIN V	V_F TYP mV	C_T MAX pF	R_D MAX Ω	Package
SMSP3012-SOT143	Split Pair	2	270	0.40	15.0	SOT143
SMSP3004-SOT143	Split Pair	2	270	0.65	10.0	SOT143
SMSRQ1200-SOT143	Ring Quad	2	270	0.40	15.0	SOT143
SMSCQ1200-SOT143	Crossover Quad	2	270	0.40	15.0	SOT143
SMSRQ1500-SOT143	Ring Quad	2	270	0.65	8.0	SOT143
SMSCQ1500-SOT143	Crossover Quad	2	270	0.65	8.0	SOT143
SMSRQ2500-SOT143	Ring Quad	2	400	0.65	10.0	SOT143
SMSCQ2500-SOT143	Crossover Quad	2	400	0.65	10.0	SOT143
SMSRQ4500-SOT143	Ring Quad	3	600	0.65	8.0	SOT143
SMSCQ4500-SOT143	Crossover Quad	3	600	0.65	8.0	SOT143
SMSRQ5500-SOT143	Ring Quad	3	1,100	0.55	16.0	SOT143
SMSCQ5500-SOT143	Crossover Quad	3	1,100	0.55	16.0	SOT143
Test Conditions		$I_R = 10\ \mu A$	$I_F = 1$ mA	$V_R = 0$ V F = 1 MHz	$I_F = 10$ mA	

Tunnel Diodes: MBD Series


Bare Die


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

- Rugged Germanium Planar Construction
- Excellent temperature stability
- No DC Bias Required
- Wide Video Bandwidth
- MIL-STD-19500 & 883 Capability

The Aeroflex / Metelics MBD series of Planar Back (Tunnel) Diodes are fabricated on germanium substrates with passivated, planar construction and all gold metallization for reliable operation up to +110 °C. Unlike the standard tunnel diode I_P is minimized for detector operation and binned in five values offering varying degrees of sensitivity and video impedance. The back detector is generally operated with zero bias and is known for its excellent temperature stability and fast video rise times.

Chips

Model	I_P		C_J	γ	R_V	I_P / I_V	V_R	V_F	Package
	MIN μA	MAX pF	MAX pF	TYP mV / mW	TYP Ω	MIN	MIN mV	MAX mV	
MBD1057-C18	100	200	0.30	1,000	180	2.5	420	135	C18
MBD2057-C18	200	300	0.30	750	130	2.5	410	130	C18
MBD3057-C18	300	400	0.30	500	80	2.5	400	125	C18
MBD4057-C18	400	500	0.30	275	65	2.5	400	120	C18
MBD5057-C18	500	600	0.30	250	60	2.5	400	110	C18
Test Conditions			$V_R = V_V$ F=100 MHz	P_{IN} = -20 dBm R_L = 10 KΩ F = 10 GHz			I_R = 500 μA	I_F = 3 mA	

Packaged

Model	I_P		C_T	γ	R_V	I_P / I_V	V_R	V_F	Package
	MIN μA	MAX pF	MAX pF	TYP mV / mW	TYP Ω	MIN	MIN mV	MAX mV	
MBD1057-E28 / 28X	100	200	0.40	1,000	180	2.5	420	135	E28 / 28X
MBD1057-H20	100	200	0.50	1,000	180	2.5	420	135	H20
MBD1057-T54	100	200	0.55	1,000	180	2.5	420	135	T54p
MBD1057-T80	100	200	0.65	1,000	180	2.5	420	135	T80p
MBD1057-0805-2	100	200	0.40	1,000	180	2.5	420	135	0805-2
MBD2057-E28 / 28X	200	300	0.40	750	130	2.5	410	130	E28 / 28X
MBD2057-H20	200	300	0.50	750	130	2.5	410	130	H20
MBD2057-T54	200	300	0.55	750	130	2.5	410	130	T54p
MBD2057-T80	200	300	0.65	750	130	2.5	410	130	T80p
MBD2057-0805-2	200	300	0.40	750	130	2.5	410	130	0805-2
MBD3057-E28 / 28X	300	400	0.45	500	80	2.5	400	125	E28 / 28X
MBD3057-H20	300	400	0.55	500	80	2.5	400	125	H20
MBD3057-T54	300	400	0.60	500	80	2.5	400	125	T54p
MBD3057-T80	300	400	0.70	500	80	2.5	400	125	T80p
MBD3057-0805-2	300	400	0.45	500	80	2.5	400	125	0805.2
MBD4057-E28 / 28X	400	500	0.50	275	65	2.5	400	120	E28 / 28X
MBD4057-H20	400	500	0.60	275	65	2.5	400	120	H20
MBD4057-T54	400	500	0.65	275	65	2.5	400	120	T54p
MBD4057-T80	400	500	0.75	275	65	2.5	400	120	T80p
MBD4057-0805-2	400	500	0.5	275	65	2.5	400	120	0805-2
MBD5057-E28 / 28X	500	600	0.55	250	60	2.5	400	110	E28 / 28X
MBD5057-H20	500	600	0.65	250	60	2.5	400	110	H20
MBD5057-T54	500	600	0.70	250	60	2.5	400	110	T54p
MBD5057-T80	500	600	0.80	250	60	2.5	400	110	T80p
MBD5057-0805-2	500	600	0.55	250	60	2.5	400	110	0805-2
Test Conditions			$V_R = V_V$ F = 30 MHz	P_{IN} = -20 dBm R_L = 10 KΩ F = 10 GHz			I_R = 500 μA	I_F = 3 mA	

Tunnel Diode Detectors: MTD Series

Ceramic Epoxy SMT

Specialty Packages

- Low temperature drift
- Excellent flatness
- High sensitivity
- Low VSWR

The Aeroflex / Metelics MTD series of Planar Back (Tunnel) Diode Detectors include a variety of options for your commercial and broadband applications. Commercial products operate between 0.5 to 14.5 GHz and offer low temperature drift, high sensitivity, low VSWR, and excellent flatness. Both positive and negative output polarities are available. Broadband products offer high sensitivity and low VSWR.

Commercial

Model	Frequency Range	Sensitivity	MAX VSWR	Flatness	TYP R_V	Output Capacitance
	GHz	MIN mV / mW		dB		TYP Pf
MTDL-8015P	0.8 – 14.5	600	3.50:1	± 1.0	250	50
MTDL-8015N	0.8 – 14.5	600	3.50:1	± 1.0	250	50
MTDH-8015P	0.8 – 14.5	700	2.75:1	± 0.75	250	50
MTDH-8015N	0.8 – 14.5	700	2.75:1	± 0.75	250	50
MTDL-8007P	0.8 – 7.0	600	1.75:1	± 0.5	250	50
MTDL-8007N	0.8 – 7.0	600	1.75:1	± 0.5	250	50
MTDH-8007P	0.8 – 7.0	700	1.50:1	± 0.3	250	50
MTDH-8007N	0.8 – 7.0	700	1.50:1	± 0.3	250	50
MTDL-0611P	6.0 – 11.0	700	2.50:1	± 0.5	250	50
MTDL-0611N	6.0 – 11.0	700	2.50:1	± 0.5	250	50
MTDH-0611P	6.0 – 11.0	800	2.25:1	± 0.3	250	50
MTDH-0611N	6.0 – 11.0	800	2.25:1	± 0.3	250	50
MTDL-1015P	10.0 – 14.5	700	3.50:1	± 0.5	250	50
MTDL-1015N	10.0 – 14.5	700	3.50:1	± 0.5	250	50
MTDH-1015P	10.0 – 14.5	700	2.75:1	± 0.35	250	50
MTDH-1015N	10.0 – 14.5	700	2.75:1	± 0.35	250	50

Package
(contact factory)
2514T / 2540T

Broadband

Model	Frequency Range	Sensitivity	MAX VSWR	Flatness	TYP R_V	Output Capacitance
	GHz	MIN mV / mW		dB		TYP Pf
MTD-1002N	0.1 – 2.0	700	2.0:1	± 0.5	200	100
MTD-0208N	2.0 – 8.0	700	2.0:1	± 0.8	130	20
MTD-0818N	8.0 – 18.0	400	2.3:1	± 1.2	100	10
MTD-0218N	2.0 – 18.0	400	2.5:1	± 1.5	100	10

Ka Band Point Contact Mixer Diodes

Specialty Packages

- Mechanical Reliability
- Low Noise Figure

The Aeroflex / Metelics 1N series of Point Contact Mixer Diodes are designed for applications through Ka-Band. Each device in this series is in a coaxial package specially designed for low noise figure performance. These diodes employ epitaxial silicon optimized for low noise figure and uniformity. These devices are suitable for use in waveguide, coaxial and stripline applications

Electrical Characteristics

Part Number	Noise Figure 34.860 GHz L0=1.0 mW RI=100 Ohms MAX (db)	VSWR 34.860 GHz L0=1.0 mW RI=100 Ohms MAX (Ratio)	IF Impedance 34.860 GHz L0=1.0 mW RI=100 Ohms MIN/MAX (Ohms)	Conversion Loss 34.860 GHz L0=1.0 mW RI=100 Ohms MAX (db)	Case Style
1N53	-	-	350 - 800	-	CS103
1N53A	11.0	-	350 - 800	-	CS103
1N53B	10.0	1.6	350 - 800	9.0	CS103
1N53C	9.5	1.6	350 - 800	8.5	CS103
1N53D	8.5	1.6	350 - 800	7.5	CS103

Part Number	Noise Figure 16.0 GHz L0=1.0 mW RI=100 Ohms MAX (db)	VSWR 16.0 GHz L0=1.0 mW RI=100 Ohms MAX (Ratio)	IF Impedance 16.0 GHz L0=1.0 mW RI=100 Ohms MIN/MAX (Ohms)	Conversion Loss 16.0 GHz L0=1.0 mW RI=100 Ohms MAX (db)	Case Style
1N78	12.0	-	325 - 650	-	CS102
1N78A	12.0	-	325 - 650	-	CS102
1N78B	10.0	1.6	325 - 650	9.0	CS102
1N78C	9.5	1.6	325 - 650	8.5	CS102
1N78D	8.5	1.6	325 - 650	7.5	CS102
1N78E	8.0	1.5	325 - 650	7.0	CS102
1N78F	7.5	1.5	325 - 650	6.5	CS102
1N78G	7.0	1.5	325 - 650	6.0	CS102

Maximum Ratings	Parameters	Rating
	Operating Temperature	-55°C to +150°C
	Storage Temperature	-65°C to +200°C

X Band Point Contact Mixer Diodes

Glass Axial Leaded

- Mechanical Reliability
- Low Noise Figure
- Wide Bandwidth

The Aeroflex / Metelics 1N series of Point Contact Mixer Diodes are designed for applications through X-Band. These diodes employ epitaxial silicon optimized for low noise figure, wide bandwidth and are specifically designed for use in stripline, microstrip and coaxial environments. Each device in this series is in an axial lead glass package.

Applications

This 1N Series of Point Contact Mixers are suitable for use in waveguide, coaxial and stripline applications.

Electrical Characteristics

Part Number	Noise Figure 3.060 GHz L0 =1.0 mW RI =100 Ohms MAX (db)	VSWR 3.060 GHz L0 =1.0 mW RI =100 Ohms MAX (Ratio)	IF Impedance 3.060 GHz L0 =1.0 mW MIN/MAX (Ohms)	Conversion Loss 3.060 GHz L0 =1.0 mW RI =100 Ohms MAX (db)	Case Style
1N831	8.5	-	300 - 500	-	CS85
1N831A	7.0	-	300 - 500	-	CS85
1N831B	6.5	-	300 - 500	-	CS85
1N831C	6.0	-	300 - 500	-	CS85

Part Number	Noise Figure 9.375 GHz L0 =1.0m W RI =100 Ohms MAX (db)	VSWR 9.375 GHz L0 =1.0 mW RI =100 Ohms MAX (Ratio)	IF Impedance 9.375 GHz L0 =1.0 mW MIN/MAX (Ohms)	Conversion Loss 9.375 GHz L0 =1.0 mW RI =100 Ohms MAX (db)	Case Style
1N832	9.5	-	250 - 550	-	CS85
1N832A	7.5	-	250 - 550	-	CS85
1N832B	7.0	-	250 - 550	-	CS85
1N832C	6.5	-	250 - 550	-	CS85

Maximum Ratings	Parameters	Rating
	Operating Temperature	-55°C to +150°C
	Storage Temperature	-65°C to +200°C

S-X Band Point Contact Mixer Diodes

Specialty Packages

- Mechanical Reliability
- Low Noise Figure
- Wide Bandwidth

The Aeroflex / Metelics 1N series of Point Contact Mixer Diodes are designed for applications S-Band through X-Band. Each device in this series is in a cartridge package specially designed for low noise figure performance.These diodes employ epitaxial silicon optimized for low noise figure, wide bandwidth and are used in single or multiple device mixer applications.

Electrical Characteristics

Part Number	Noise Figure 3.060 GHz L0 = 1.0 mW RI = 100 Ohms MAX (db)	VSWR 3.060 GHz L0 = 1.0mW RI = 100 Ohms MAX (Ratio)	IF Impedance 3.060 GHz L0 = 1.0 mW MIN/MAX (Ohms)	Conversion Loss 3,060 GHz L0 = 1.0 mW RI = 100 Ohms MAX (db)	Case Style
1N21C	8.5	-	325 - 465	-	CS100
1N21D	7.5	-	325 - 465	-	CS100
1N21E	7.0	1.5	350 - 450	-	CS100
1N21WE	7.0	1.5	350 - 450	-	CS101
1N21F	6.0	1.3	350 - 450	-	CS100
1N21G	5.5	1.3	350 - 450	5.0	CS100
1N21WG	5.5	1.3	350 - 450	5.0	CS101
1N416C	8.5	1.5	335 - 465	--	CS101
1N416D	7.5	1.3	335 - 465	-	CS101
1N416E	7.0	1.3	335 - 465	7.0	CS101
1N416F	6.5	1.3	335 - 465	6.5	CS101
1N416G	6.0	1.3	335 - 465	6.0	CS101

Part Number	Noise Figure 9.375 Ghz L0 = 1.0 mW RI = 100 Ohms MAX (db)	VSWR 9.375 GHz L0 = 1.0 mW RI = 100 Ohms MAX (Ratio)	IF Impedance 9.375 GHz L0 = 1.0 mW RI = 100 Ohms MIN/MAX (Ohms)	Conversion Loss 9.375 GHz L0 = 1.0 mW RI = 100 Ohms MAX (db)	Case Style
1N23	12.0	-	200 - 600	-	CS100
1N23A	11.0	-	200 - 600	-	CS100
1N23B	10.0	1.5	335 - 465	-	CS100
1N23C	9.0	1.5	335 - 465	-	CS100
1N23D	8.5	1.3	335 - 465	-	CS100
1N23E	7.5	1.3	335 - 465	7.0	CS100
1N23WE	7.5	1.3	335 - 465	7.0	CS101
1N23F	7.0	1.3	335 - 465	6.5	CS100
1N23G	6.5	1.3	335 - 465	6.0	CS100
1N23WG	6.5	1.3	335 - 465	6.0	CS101
1N23H	6.0	1.3	335 - 465	5.5	CS100
1N415C	9.0	1.5	335 - 465	-	CS101
1N415D	8.5	1.3	335 - 465	-	CS101
1N415E	7.5	1.3	335 - 465	7.0	CS101
1N415F	7.0	1.3	335 - 465	6.5	CS101
1N415G	6.5	1.3	335 - 465	6.0	CS101
1N415H	6.0	1.3	335 - 465	5.5	CS101

Maximum Ratings	Parameters	Rating
	Operating Temperature	-55°C to +150°C
	Storage Temperature	-65°C to +200°C

Notes:
For matched Fwd pair use suffix M after P/N.
For reverse device use suffix R
For matched Fwd. and Rev. use suffix MR.

Ka Band Point Contact Detector Diodes

Glass Axial Leaded

Specialty Packages

- Broadband Operations
- Bias Not Required

The Aeroflex / Metelics 1N series of Point Contact Detector Diodes are designed for applications through Ka-band. These diodes employ epitaxial silicon optimized for high tangential signal sensitivity (TSS), and are suitable for use in waveguide, coaxial and stripline, applications. Being point contact diodes, they are efficient detectors not requiring the use of bias. Devices in this series are available in glass or cartridge packaging.

APPLICATIONS
This 1N series of Point Contact Detectors are suitable for use in waveguide, coaxial and stripline applications.

Electrical Characteristics

Part Number	Rectification Efficiency MIN	Tangential Signal Sensitivity (-dbm)	Video Resistance MAX (K Ohms)	Operating Frequency (MHz)	Case Style
1N830	65%	-	-	100	CS85
1N830A	65% @ 5Vdc	-	-	100	CS85
1N32	-	49	22	3000	CS100
1N32A	-	47	17	3000	CS100
1N833	-	40	18	9375	CS85
1N833A	-	45	18	9375	CS85
1N1611	-	51	3.1	9000	CS100
1N1611A	-	53	3.1	9000	CS100
1N1611B	-	53	3.1	9000	CS100
1N3778	-	50	10	9375	CS101

Maximum Ratings	Parameters	Rating
	Operating Temperature	-55°C to +150°C
	Storage Temperature	-65°C to +200°C

GaAs Schottky Diodes

Beam Lead Chips

Ceramic Epoxy SMT

- Passivated mesa construction
- Tri-metallization
- Supports limiter, mixer, multiplier and sampler designs

Millimeter wave performance in twelve configurations featuring passivated mesa construction and Aeroflex / Metelics' tri-metallization for ultra-reliable operation in the most demanding environments. Topologies supporting limiter, mixer, multiplier and sampler designs operating to 60+ GHz are available in flip chip, beam lead and packaged form. Screening per MIL-PRF-19500 and MIL-PRF-38534 is available.

Flip Chip

Model	Configuration	V_F MIN mV	V_F MAX mV	ΔV_F MAX mV	V_{BR} MIN V	C_J MAX pF	ΔC_J MAX pF	R_S MAX Ω	Package
MGS801	Single Junction	650	750	N/A	5	0.06	N/A	7	GC110
MGS801A	Single Junction	650	750	N/A	5	0.075	N/A	5	GC110
MGS802	Anti-parallel Pair	650	750	20	–	0.10	N/A	7	GC210
MGS802A	Anti-Parallel Pair	650	750	20	–	0.15	N/A	5	GC210
MGS803	Series Tee	650	750	20	5	0.06	0.02	7	GC310
Test Conditions		$I_F = 1$ mA			$I_R = 10\ \mu A$	$V_R = 0$ V, F = 1 MHz		$I_F = 5$ mA	

Beam Lead

Model	Configuration	V_F MIN mV	V_F MAX mV	ΔV_F MAX mV	V_{BR} MIN V	C_J MAX pF	ΔC_J MAX pF	R_S MAX Ω	Package
MGS901	Single Junction	650	750	N/A	5	0.06	N/A	7	GB110
MGS902	Anti Parallel Pair	650	750	20	–	0.10	N/A	7	GB210
MGS903	Series Tee	650	750	20	5	0.06	0.02	7	GB310
MGS904	4 Junction Ring Quad	650	750	20	–	0.06	0.02	7	B85
MGS904A	4 Junction Ring Quad	650	750	20	–	0.08	0.02	5	B85
MGS905	4 Junction Bridge Quad	650	750	20	5	0.06	0.02	7	B86
MGS906	4 Junction Series Tee	1300	1500	40	10	0.04	0.02	14	B90
MGS907	8 Junction Ring Quad	1300	1500	40	–	0.04	0.02	14	B85
MGS907A	8 Junction Ring Quad	1300	1500	40	–	0.06	0.02	12	B85
MGS907B	8 Junction Ring Quad	1300	1500	40	–	0.08	0.02	10	B85
MGS908	8 Junction Bridge Quad	1300	1500	40	10	0.04	0.02	14	B86
MGS909	6 Junction Series Tee	1800	2100	60	15	0.10	0.03	21	B90
MGS910	12 Junction Ring Quad	1800	2100	60	–	0.10	0.03	21	B87
MGS911	12 Junction Bridge Quad	1800	2100	60	15	0.10	0.03	21	B88
MGS912	Four Junction	2500	2900	N/A	20	0.03	N/A	28	B89
Test Conditions		$I_F = 1$ mA			$I_R = 10\ \mu A$	$V_R = 0$ V, F = 1 MHz		$I_F = 5$ mA	

GaAs Abrupt Varactor Diodes

Bare Die | Beam Lead Chips | Ceramic Microwave Pill | Ceramic Epoxy SMT | Ceramic Hermetic SMT | Glass Axial Leaded

- Passivated mesa construction
- Applications in tunable filters and oscillators up to 40 GHz

The Aeroflex / Metelics MGV series of abrupt varactor diodes feature passivated mesa construction for low leakage and excellent post tuning drift. These diodes will find application in tunable filters and oscillators up to 40 GHz. Optimum performance is obtained using die however packaged devices are available as well diodes screened per MIL-PRF-19500 and MIL-PRF-38534. Contact your representative for these and other options.

V_{BR} = 22 V min. — Chips

Model	Γ TYP	C_J MIN pF	C_J TYP pF	C_J MAX pF	Tuning Ratio MIN	Tuning Ratio TYP	Tuning Ratio MAX	Q MIN	Package
MGV050-18	0.50	0.25	0.30	0.35	4.0	4.7	5.5	4,000	C01A
MGV050-20	0.50	0.50	0.55	0.61	4.0	4.7	5.5	4,000	C01A
MGV050-22	0.50	0.90	1.00	1.10	4.0	4.7	5.5	3,000	C01A
MGV050-24	0.50	1.35	1.50	1.65	4.0	4.7	5.5	3,000	C01A
MGV050-26	0.50	1.80	2.00	2.20	4.0	4.7	5.5	3,000	C01A
Test Conditions	V_R=2to 22V	V_R = 4 V F = 1 MHz			V_R = 0 to 22 V			V_R = 4 V F = 50 MHz	

V_{BR} = 22 V min. — Packaged

Model	Γ TYP	C_J MIN pF	C_J TYP pF	C_J MAX pF	Tuning Ratio MIN	Tuning Ratio TYP	Tuning Ratio MAX	Q MIN	Package
MGV050-18-E28 / 28X	0.50	0.31	0.38	0.45	3.0	3.4	3.9	4,000	E28 / 28X
MGV050-18-H20	0.50	0.41	0.48	0.55	2.0	2.6	3.2	4,000	H20
MGV050-18-0805-2	0.50	0.29	0.36	0.43	3.0	3.6	4.2	4,000	0805-2
MGV050-20-E28 / 28X	0.50	0.55	0.63	0.71	3.3	3.9	4.5	4,000	E28 / 28X
MGV050-20-H20	0.50	0.64	0.73	0.82	2.8	3.2	3.7	4,000	H20
MGV050-20-0805-2	0.50	0.53	0.61	0.69	3.4	4.0	4.8	4,000	0805-2
MGV050-22-E28 / 28X	0.50	0.95	1.08	1.21	3.6	4.2	5.0	3,000	E28 / 28X
MGV050-22-H20	0.50	1.04	1.18	1.32	3.2	3.7	4.4	3,000	H20
MGV050-22-0805-2	0.50	0.93	1.06	1.19	3.7	4.3	5.1	3,000	0805-2
MGV050-24-E28 / 28X	0.50	1.40	1.58	1.76	3.7	4.2	5.3	3,000	E28 / 28X
MGV050-24-H20	0.50	1.49	1.68	1.87	3.4	3.7	4.7	3,000	H20
MGV050-24-0805-2	0.50	1.38	1.56	1.74	3.8	4.3	5.3	3,000	0805-2
MGV050-26-E28 / 28X	0.50	1.85	2.08	2.31	3.8	4.4	5.3	3,000	E28 / 28X
MGV050-26-H20	0.50	1.94	2.18	2.42	3.5	4.0	4.9	3,000	H20
MGV050-26-0805-2	0.50	1.83	2.06	2.29	3.8	4.5	5.4	3,000	0805-2
Test Conditions	V_R=2to 22V	V_R = 4 V F = 1 MHz			V_R = 0 to 22 V			V_R = 4 V F = 50 MHz	

GaAs Hyperabrupt Varactor Diodes


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT


Glass Axial Leaded

- Passivated mesa construction
- Available in three constant gamma families
- Applications in tunable filters and oscillators up to 40 GHz

The Aeroflex / Metelics MGV series of hyperabrupt varactor diodes feature passivated mesa construction for low leakage and excellent post tuning drift. Available in three constant gamma families of 0.75, 1.0 and 1.25. These diodes will find application in tunable filters and oscillators up to 40 GHz. Optimum performance is obtained using die however packaged devices are available as well diodes screened per MIL-PRF-19500 and MIL-PRF-38534. Contact your representative for these and other options.

Chips

Model	Γ TYP	C_J			Tuning Ratio			Q	Package
		MIN pF	TYP pF	MAX pF	MIN	TYP	MAX	MIN	
MGV075-08*	0.75	0.25	0.30	0.35	2.2	2.8	3.5	4,000	C01A
MGV075-09*	0.75	0.35	0.40	0.45	2.2	2.8	3.5	4,000	C01A
MGV075-10*	0.75	0.45	0.50	0.55	2.2	2.8	3.5	3,000	C01A
MGV075-11*	0.75	0.63	0.70	0.77	2.2	2.8	3.5	3,000	C01A
MGV075-12*	0.75	0.72	0.80	0.88	2.2	2.8	3.5	3,000	C01A
MGV075-13*	0.75	0.90	1.00	1.10	2.2	2.8	3.5	3,000	C01A
MGV075-14*	0.75	1.08	1.20	1.32	2.2	2.8	3.5	3,000	C01A
MGV075-15*	0.75	1.35	1.50	1.65	2.2	2.8	3.5	3,000	C01A
MGV075-16*	0.75	1.62	1.80	1.98	2.2	2.8	3.5	3,000	C01A
MGV075-17*	0.75	1.80	2.00	2.20	2.2	2.8	3.5	3,000	C01A
MGV100-08	1.00	0.30	0.35	0.40	2.7	3.4	5.0	4,000	C01A
MGV100-09	1.00	0.40	0.45	0.50	2.7	3.4	5.0	4,000	C01A
MGV100-20	1.00	0.50	0.55	0.61	2.7	3.4	5.0	4,000	C01A
MGV100-21	1.00	0.58	0.65	0.72	2.7	3.4	5.0	4,000	C01A
MGV100-22	1.00	0.72	0.80	0.88	2.7	3.4	5.0	3,000	C01A
MGV100-23	1.00	0.90	1.00	1.10	2.7	3.4	5.0	3,000	C01A
MGV100-24	1.00	1.08	1.20	1.32	2.7	3.4	5.0	3,000	C01A
MGV100-25	1.00	1.35	1.50	1.65	2.7	3.4	5.0	3,000	C01A
MGV100-26	1.00	1.53	1.70	1.87	2.7	3.4	5.0	3,000	C01A
MGV100-27	1.00	1.80	2.00	2.20	2.7	3.4	5.0	3,000	C01A
MGV125-08	1.25	0.25	0.30	0.35	4.0	5.0	8.4	4,000	C01A
MGV125-09	1.25	0.35	0.40	0.45	4.0	5.0	8.5	4,000	C01A
MGV125-20	1.25	0.45	0.50	0.55	4.0	5.0	8.6	4,000	C01A
MGV125-21	1.25	0.63	0.70	0.77	4.0	5.0	8.8	4,000	C01A
MGV125-22	1.25	0.90	1.00	1.10	4.0	5.0	9.0	3,000	C01A
MGV125-23	1.25	1.08	1.20	1.32	4.0	5.0	9.5	3,000	C01A
MGV125-24	1.25	1.35	1.50	1.65	4.0	5.0	10	3,000	C01A
MGV125-25	1.25	1.53	1.70	1.87	4.0	5.0	10	3,000	C01A
MGV125-26	1.25	1.80	2.00	2.20	4.0	5.0	10	3,000	C01A
Test Conditions	V_R = 2 to 20 V * Vr = 2 to 18 V	V_R = 4 V F = 1 MHz			V_R = 2 to 12 V		V_R = 2 to 20 V * Vr = 2 to 18 V	V_R = 4 V F = 50 MHz	

Note: MGV075 Series is Vbr = 18 V min. and MGV100 and MGV125 Series are Vbr = 22 V min.

Beam Lead Chips

- Low junction capacitance
- Lower temperature coefficient than silicon
- Operation to 110 GHz

The Aeroflex / Metelics MZBD-9161 is a GaAs beam lead detector diode. This diode is designed for zero bias detecting applications at frequencies through 110 GHz.

T_A = 25° C — Beam Lead

Model	C_L	R_V		γ
	TYP pF	MIN K Ω	MAX K Ω	mV / μW
MZBD-9161	.035	2.5	7.5	0.5
Test Conditions	Juncition Capacitance F = 1 MHz	Video Reisistance Zero Bias		Voltage Sensitivity Zero Bias, 10GHz shunt 50 Ω input matching resistor

Maximum Ratings	Parameters	Rating
	Operating Temperature	-65° C to + 175° C
	Storage Temperature	-65° C to + 200° C
	Burnout Power	20 dBm
	Beam Lead Strength	3 grams

Parameter	Units	D1	D2
B_V	V	10	10
C_{JO}	pF	0.030	0.030
E_G	eV	1.42	1.42
I_{BV}	A	10E-12	10E-12
I_S	A	12 x 10E-6	84 x 10E-6
N		1.2	40.0
R_S	OHM	50	10
$P_S(V_J)$	V	0.26	0.26
P_T(XTI)		2	3
M		0.5	0.5

Note: D1 represents the characteristic of the MZBD-9161 under forward bias and D2 (in the forward direction) gives the V-I curve of the MZBD-9161 under reverse bias.

GaAs Detector/Mixer Diodes

Ceramic Epoxy SMT

- Low capacitance and low resistance
- Passivated with silicon dioxide
- Protected with polyimide

The Aeroflex / Metelics low cost surface mount single and anti-parallel pairs of gallium arsenide Schottky diodes in QFN package 0503 (1.37 x 0.86 mm) can be used through millimeter wave frequencies as they have low capacitance and low resistance. They are passivated with silicon nitride and protected with polyimide for high reliability. Typical applications include detectors and single ended mixer on SMGS11 and single balanced and subharmonic pumped mixers and limiters on SMGS21 in instruments, microwave radios, VSAT, and police radar detectors.

Surface Mount

Model	Configuration	V_F		ΔV_F	C_T		R_D	R_S	V_{BR}
		MIN mV	MAX mV	MAX mV	TYP pF	MAX pF	MAX Ω	TYP Ω	MIN V
SMGS11	single	620	760	N/A	0.10	0.13	13	4	4.5
SMGS21	anti-parallel pairs	620	760	20	0.15	0.18	13	4	4.5
Test Conditions		@ 1mA		@ 1mA	@ 0V, 1MHz		@ 5mA		@ 10 μA

Maximum Ratings	Parameters	Rating
	Operating Temperature	-40° C to + 85° C
	Storage Temperature	-65° C to + 125° C
	Incident Power	20 dBm (at 25° C)
	Soldering Temperature	260° C for 5 seconds

Bare Die

- Nanosecond switching speed can be achieved with low-cost TTL buffer logics
- Low series resistance
- No reverse bias required for low loss

The Aeroflex / Metelics MGPN series GaAs PIN diodes are used for high frequency (>26GHz) switch and high speed modulation applications.

T_C= +25° Electrical Characteristics

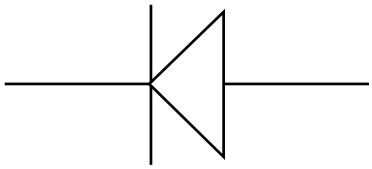
Model	V_{BR}		V_F	Cj		R_S		T_L	
	V		mV	pF		Ohms		nsec	
	TYP	MIN	TYP	TYP	MAX	TYP	MAX	TYP	MAX
MGPN0515-C12	68	50	1300	0.13	0.15	0.85	1.0	6	9
MGPN0518-C12	68	50	1300	0.16	0.18	0.75	1.0	6	9
MGPN1506-C12	150	205	1300	0.05	0.06	1.6	2.0	15	20
MGPN1504-C01A	150	205	1350	0.036	0.04	2.0	3.0	8	10
MGPN1503-C01A	150	205	1350	0.027	0.03	2.0	3.0	8	10
Test Conditions	I_R = 10µA		I_F = 10mA	V_R = 10v F = 1 MHz		I_F = 20mA F = 1 GHz		I_F = 10mA I_R = 6mA	

Maximum Ratings	Rating	Limits	Units
	V_R	V_{BR}	V
	I_F	150	mA
	P_{DISS}	100 de-rated to zero at 150°C	mW
	T_J	+175	°C
	T_{STG}	-65 to +200	°C
	$T_{Die\ Attach}$	<320°C for 5_{sec}	
	Electrostatic Discharge (ESD)	Class 0 (Human Body Model)	

- 23 GHz to 25 GHz tuning range
- 10dBm minimum output power
- Lower operating voltage, 4.2V

The Aeroflex / Metelics MGDAH-24-10 is a GaAs EPI up (anode heatsink) GUNN diode that is suitable for 23 GHz to 25 GHz local oscillators with ultra-low phase and 1/f noise. Typical applications include motion detectors, radar detectors, low power transmitters, radars, beacons, and other ISM band applications.

Package T86P (Anode Heatsink)



MGDAH-24-10, Ta = +25°C, F = 24.125 GHz

Model	I_{th}			V_{th}			V_{start}		V_{pk}			P_{pk}	I_{op}		P	
	MIN mA	TYP mA	MAX mA	MIN V	TYP V	MAX V	TYP V	MAX V	MIN V	TYP V	MAX V	TYP dBm	TYP mA	MAX mA	MIN dBm	TYP dBm
MGDAH-24-10	170	260	350	1.40	1.70	2.2	2.35	3.00	4.30	4.50	6.00	11.8	210	250	10	11.3
Test Conditions													V_R = 4.2V		V_R = 4.2V Undercoupled cavity	

Maximum Ratings	Parameters	Rating	Units
	V_{BK}	10	V
	θ_{JC}	100(1)	°C/W
	T_J	+175	°C
	T_{STG}	-55 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

Note:
1. Derate 10mW/°C for heatsink temp greater than 85°C

Step Recovery Diodes


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT


Plastic SMT

- Wide Selection of Tightend Capacitance Ranges
- Low Transition Times
- High Efficiencies

The Aeroflex / Metelics MSD-700 Series Step Recovery Diodes are epitaxial silicon varactors which provide high output power and efficiencies in harmonic generator applications. Strict material and process controls result in high reproducibility. A unique silicon dioxide passivation process assures greater stability, reliability and low leakage currents at high temperatures.

Diodes are available in various capacitance ranges for each of the 4 voltage ratings. These diodes represent the lowest transition times (snap time) available for each voltage rating. Unless otherwise specified, capacitance will be within the range shown above for each type. A capacitance tolerance of ± 10% is available at an additional charge. Diodes can be optimized for custom electrical or mechanical specifications. Custom parameters for capacitance, voltage, transition time, series resistance, etc. are available upon request.

Chips

Model	C_J	V_B	T_L	T_T	R_S	ΘC_J
	MIN V	MIN V	MIN nS	MAX pS	MAX OHMS	MAX °C/W
MSD700	0.2 - 0.4	15	8	60	1.20	125
MSD701	0.4 - 0.6	15	8	60	1.00	100
MSD702	0.6 - 0.8	15	8	60	0.70	100
MSD703	0.8 - 1.0	15	8	60	0.50	75
MSD704	1.0 - 1.4	15	8	60	0.40	75
MSD705	1.4 - 2.0	15	8	60	0.30	60
MSD706	2.0 - 3.0	15	8	60	0.25	60
MSD710	0.2 - 0.4	20	11	70	1.00	100
MSD711	0.4 - 0.6	20	11	70	0.70	75
MSD712	0.6 - 0.8	20	11	70	0.60	75
MSD713	0.8 - 1.0	20	11	70	0.50	75
MSD714	1.0 - 1.4	20	11	70	0.40	75
MSD715	1.4 - 2.0	20	11	70	0.30	60
MSD716	2.0 - 3.0	20	11	70	0.25	60
MSD720	0.2 - 0.4	30	17	100	0.80	75
MSD721	0.4 - 0.6	30	17	100	0.60	60
MSD722	0.6 - 0.8	30	17	100	0.50	60
MSD723	0.8 - 1.0	30	17	100	0.40	60
MSD724	1.0 - 1.4	30	17	100	0.30	60
MSD725	1.4 - 2.0	30	17	100	0.25	50
MSD726	2.0 - 3.0	30	17	100	0.20	50
MSD730	0.2 - 0.4	40	21	150	0.80	50
MSD731	0.4 - 0.6	40	21	150	0.60	50
MSD732	0.6 - 0.8	40	21	150	0.50	50
MSD733	0.8 - 1.0	40	21	150	0.40	50
MSD734	1.0 - 1.4	40	21	150	0.30	50
MSD735	1.4 - 2.0	40	21	150	0.25	40
MSD736	2.0 - 3.0	40	21	150	0.20	40
Test Conditions	@ -6 V, 1 MHz	@ 10 µA	IF 6 mA / IR 10mA		@ 25 mA	pulsed

Maximum Ratings	Parameters	Rating
	Storage Temperature	-65° C to + 200° C
	Operating Temperature	-55° C to + 150° C
	Minimum Voltage Breakdown	15, 20, 30 and 40 V at 10 µA

Beam Lead Step Recovery Diodes

Beam Lead Chips

Ceramic Epoxy SMT

Plastic SMT

- Low Inductance
- Rugged Beam Lead construction
- Transition times down to 30 picoseconds in 50 Ω system
- Oxide and polymide passivation

The Aeroflex / Metelics Silicon Mesa Beam Lead Step Recovery diodes provide low capacitance, very fast transition times, and low inductance along with low parasitic capacitance compared to packaged or chip devices.

The fast transition times make these devices useful for fast sampling gate drivers, frequency multipliers and comb generators to 40 GHz and beyond.

Beam Lead

Model	V_{BR} Volts		C_T pF		τ nS	T_T pS	
	MIN	MAX	TYP	MAX	TYP	TYP	MAX
MMDB30-B11	14	25	0.15	0.25	4	30	38
MMDB35-B11	16	30	0.13	0.20	4	35	45
MMDB45-B11	25	40	0.11	0.20	8	45	58
Test Conditions	$I_R = 10\ \mu A$		$V_R = 6V$ $F = 1\ MHz$		$I_F = 10\ mA$ $I_R = 6\ mA$	$I_F = 3\ mA$ $V_R = 7\ V$	

Packaged

Model	V_{BR} Volts	C_T pF		τ nS		T_T pS		C_P pF	L_P nH	Package
	MIN	MIN	MAX	MIN	TYP	TYP	MAX	TYP	TYP	
MMDB30-E28 / 28X	14	0.28	0.36	1.0	4.0	30	38	0.08	0.4	E28 / 28X
MMDB30-0402	14	0.25	0.32	1.0	4.0	30	38	0.05	0.2	0402
MMDB30-0805-2	14	0.26	0.33	1.0	4.0	30	38	0.06	0.4	0805-2
MMDB35-E28 / 28X	16	0.25	0.31	1.0	4.0	35	45	0.08	0.4	E28 / 28X
MMDB35-0402	16	0.22	0.28	1.0	4.0	35	45	0.05	0.2	0402
MMDB35-0805-2	16	0.23	0.29	1.0	4.0	35	45	0.06	0.4	0805-2
MMDB45-E28 / 28X	25	0.24	0.31	3.0	8.0	45	58	0.08	0.4	E28 / 28X
MMDB45-0402	25	0.21	0.28	3.0	8.0	45	58	0.05	0.2	0402
MMDB45-0805-2	25	0.22	0.29	3.0	8.0	45	58	0.06	0.4	0805-2
Test Conditions	$I_R = 10\ \mu A$	$V_R = 6V$ $F = 1\ MHz$		$I_F = 10\ mA$ $I_R = 6\ mA$ measured at 50% recovery		$I_F = 3\ mA$ $V_R = 7\ V$				

Sampling Phase Detector

Ceramic Epoxy SMT

Ceramic Hermetic SMT

- Phase locking to 22 GHz
- Broadband capability
- Fully integrated module
- Phase locks DRO's and VCO's

The Aeroflex / Metelics MSPD Series Integrates an SRD reference frequency multiplier, coupling capacitors and a Schottky diode microwave sampler / phase detector in a 0.075" by 0.100" hybrid. They are used to phase lock microwave oscillators up to 22 GHz to a much lower reference frequency by deriving a locking voltage from the sampled RF and the multiplied reference.

Packaged

Model	Step Recovery Diode				Cap.	Schottky Diode			F_{MW}	Package
	V_{BR}	C_J	τ	T_T	C_T	C_J	V_F	R_D		
	MIN V	TYP pF	TYP ns	MAX ps	TYP pF	TYP pF	TYP mV	TYP Ω	TYP GHz	
MSPD1011-121	15	.22	10	100	.5	.08	300	20	20	121
MSPD1012-121	15	.22	10	100	.5	.08	450	20	20	121
MSPD1013-121	15	.22	10	100	.5	.08	550	20	20	121
MSPD1000-E50 / E50SM	15	1.0	35	95	20	0.4	270	7.0	0.50	E50 / E50SM
MSPD1000-H50	15	1.0	35	95	20	0.4	270	7.0	0.50	H50
MSPD1002-E50 / E50SM	15	0.5	20	70	3.5	0.22	270	8.0	2.0	E50 / E50SM
MSPD1002-H50	15	0.5	20	70	3.5	0.22	270	8.0	2.0	H50
MSPD1012-E50 / E50SM	15	0.5	10	70	2.5	0.18	270	9.0	12	E50 / E50SM
MSPD1012-H50	15	0.5	10	70	2.5	0.18	270	9.0	12	H50
MSPD2018-E50 / E50SM*	15	0.35	5	55	0.6	0.10	430	16.0	22	E50 / E50SM
MSPD2018-H50*	15	0.35	5	55	0.6	0.10	430	16.0	22	H50
Test Conditions	$I_R = 10\ \mu A$	$V_R = 6V$ $F = 1$ MHz	$I_F = 10$ mA $I_R = 6$ mA	$I_F = 10$ mA $V_R = 10$ V *$I_F = 3$ mA $V_R = 7$ V	F = 1 MHz	$V_R = 0$ V F = 1 MHz	$I_F = 1$ mA	$I_F = 5$ mA		

Maximum Ratings	Parameters	Rating
	Storage Temperature	-65 to +150° C
	Operating Temperature	-65 to +150° C
	Soldering Temperature	230° C for 5 sec.

Silicon PIN Diodes

Bare Die

Plastic SMT

- High Temperature Passivation for Reliability
- Grown Junction for sharp "I" Region Interface
- Full Area Gold Contact for the Lowest Capacitance and Largest Bonding Pad Available
- Lot Traceability and Lot Control, Assuring High Reproducibility

The Aeroflex / Metelics MPN-7000 Series and MMP-7000 Series PIN diodes are manufactured using very high resistivity silicon epitaxial material grown on a highly doped low resistivity substrate. Combined with a grown junction P++ layer, MMP-7000 Series PIN diodes yield a very abrupt structured "I" region with minimum outdoping and low voltage punch-through characteristics.

Our high temperature passivation and state-of-the-art metallization produce diodes that are designed to cover a wide range of applications that fall into the general categories of switching, phase switching, attenuating and limiting. These devices are rugged and able to meet all visual criteria in space and military applications.

High Power Switching and Attenuation — Chips

Model	V_{BR}	C_J		R_S		τ	I-layer	Contact	θ_{JC}	Package
	MIN V	TYP pF	MAX pF	TYP Ω	MAX Ω	TYP μs	NOM microns	MIN mils	MAX °C / W	
MPN7330	300	0.30	0.40	0.3	0.5	0.5	30	10	10	C40
MPN7345	300	0.30	0.40	0.3	0.5	0.5	45	10	10	C40
MPN7453A	300	0.10	0.15	0.7	1.0	0.7	60	8	20	C22
MPN7453B	400	0.15	0.2	0.6	0.9	2.5	60	8	20	C22
MPN7453C	300	0.18	0.25	0.4	0.7	1.0	60	8	15	C22
MPN7360	600	0.80	1.0	0.2	0.4	2.5	60	20	7	C37
MPN7370	700	2.00	2.3	0.2	0.3	5.0	70	40	5	C39
MPN7380	800	0.40	0.60	0.3	0.5	2.5	80	24	7	C38
MPN7420	400	0.06	0.08	1.0	1.5	1.0	100	5	30	C12
MPN73100	600	0.20	0.30	0.5	0.8	2.2	100	12	10	C32
MPN73120	700	0.30	0.40	0.5	0.8	3.5	120	15	10	C32
Test Conditions	I_R = 10 μA	V_R = 50 V F = 1 MHz		I_F = 100 mA F = 100 MHz		I_F = 10 mA I_R = 6 mA				

SOT23 & SOD323 — Surface Mount

Model	Configuration	V_{BR}	C_T		R_S		TYP	Package
		MIN V	TYP pF	MAX pF	TYP Ω	MAX Ω	ns	
SMPN7453-SOT23	-0S, 1S, 2ST, 3CA, 4CC	200	0.25	0.35	4.0	4.5	2500	SOT23
SMPN7380-SOT23	-0S, 1S, 2ST, 3CA, 4CC	200	0.25	0.35	4.0	4.5	1500	SOT23
SMPN7310-SOT23	-0S, 1S, 2ST, 3CA, 4CC	100	**0.40**	**0.50**	0.60	1.2	120	SOT23
SMPN7316-SOT23	-0S, 1S, 2ST, 3CA, 4CC	100	**0.25**	**0.55**	0.60	1.0	200	SOT23
SMPN7335-SOT23	-0S, 1S, 2ST, 3CA, 4CC	200	0.30	0.40	1.50	2.0	500	SOT23
SMPN7320-SOT23	-0S, 1S, 2ST, 3CA, 4CC	100	0.20	0.30	2.00	4.5	170	SOT23
SMPN7453-SOD323	–	200	0.25	0.35	4.0	4.5	2500	SOD323
SMPN7380-SOD323	–	200	0.25	0.35	4.0	4.5	1500	SOD323
SMPN7310-SOD323	–	100	**0.40**	**0.50**	0.60	1.2	120	SOD323
SMPN7316-SOD323	–	100	**0.25**	**0.55**	0.60	1.0	200	SOD323
SMPN7335-SOD323	–	200	0.30	0.40	1.50	2.0	500	SOD323
SMPN7320-SOD323	–	100	0.20	0.30	2.00	4.5	170	SOD323
Test Conditions		I_R = 10 μA	**V_R = 10 V** V_R = 50 V F = 1 MHz		I_F = 10 mA F = 100 MHz		I_F = 10 mA I_R = 6 mA	

Silicon PIN Diodes


Bare Die


Beam Lead Chips


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT


Plastic SMT


Glass Axial Leaded

MicroStrip PIN Diodes

Model	Configurations	I_R	V_{BR}	Insertion Loss	Return Loss	Isolation	Package
		MAX nA	MIN V	MAX	TYP	MIN	
MMPN080150	MicroStrip PIN	100	200	4.0	12	-50	C51
MMPN080045	MicroStrip PIN	100	200	**1.0**	**12**	**-30**	C50
Test Conditions		$V_R = 30$ V	$I_R = 10\ \mu A$	$V_R = 30$ V F = 2 – 35 GHz **F = 2 – 20 GHz**		$I_F = 40$ mA F = 2 – 35 GHz **F = 2 – 20 GHz**	

Low Capacitance, Fast Switching

Chips

Model	V_{BR}	C_J		R_S		τ	Contact	θ_{JC}	Package
	MIN V	TYP pF	MAX pF	TYP Ω	MAX Ω	TYP ns	MIN mils	MAX °C / W	
MPN7302	20	0.08	0.12	1.2	1.5	8	1.5	60	C11
MPN7304	40	0.06	0.08	2.2	2.7	15	1.5	60	C11
MPN7304A	40	0.12	0.15	1.0	1.5	30	2.0	50	C12
MPN7306	70	0.08	0.10	1.2	1.2	50	2.0	50	C12
MPN7310	100	0.05	0.07	1.5	2.0	100	2.0	50	C12
MPN7310A	100	0.18	0.25	0.6	1.0	200	4.0	35	C12
MPN7312A	120	0.08	0.10	1.2	1.5	150	2.0	50	C12
MPN7312B	120	0.18	0.25	0.8	1.0	250	4.0	35	C12
MPN7315	150	0.08	0.12	1.2	1.5	180	2.0	50	C12
MPN7320*	150	0.02	0.03	3.0	4.0	120	1.5	60	C01
Test Conditions	$I_R = 10\ \mu A$	$V_R = 10$ V F = 1 MHz *$V_R = 50$ V		$I_F = 10$ mA F = 500 MHz		$I_F = 10$ mA $I_R = 6$ mA			

Maximum Ratings	Parameters	Rating
	Power Dissipation	0.5 Watts at 25° C derate to zero at +175° C
	Operating Temperature	-65° C to +175° C
	Storage Temperature	-65° C to +200° C
	Voltage	V_{BR} Rating

Bare Die

- Supports up to 40 Watts of power
- Low insertion loss, 0.4 dB typical up to 40 GHz
- High Isolation, 58 dB typical at 10 GHz

The Aeroflex / Metelics MMSPN050-C53 broadband, medium power Microstrip PIN diode is designed as a 50 Ohm microstrip when biased at zero or a negative voltage. This device is usable up to 40 GHz.

Electrical Specification, TC = +25°C

Model	Configuration	V_{BR}	T_L	R_{MIN}	I_L				IRL			I_{Sol}			Package
		MIN V	TYP nS	TYP Ω	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	TYP dB	MIN dB	TYP dB	TYP dB	
MMSPN050	Microstrip PIN	200	4000	0.6	0.15	0.30	0.20	0.40	20	25	15	55	50	50	C53
Test Conditions		I_R = 10µA	I_F = 10mA I_R = 6mA 10% / 90%	I_F = 100mA F = 500 MHz	V_R = -50V F = 10 GHz		V_R = -50V F < 40 GHz		F = 10 GHz		F < 40 GHz	I_F = 40mA F = 10 GHz		I_F = 40mA F = 5 – 40 GHz	

Maximum Ratings	Parameters	Rating	Units
	V_R	100	V
	I_F	500	mA
	θ_{JC}	65	°C/W
	T_J	+150	°C
	T_{STG}	-65 to +125	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

Silicon PIN Diodes


Bare Die


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT


Plastic SMT


Glass Axial Leaded

Low Capacitance, Fast Switching — Packaged

Model	V_{BR}	C_J		R_S		τ	C_P	L_p	Package
	MIN V	TYP pF	MAX pF	TYP Ω	MAX Ω	TYP ns	TYP pF	MAX nH	
MPN7302-E28 / 28X	20	0.16	0.24	1.2	1.5	8	0.08	0.4	E28 / 28X
MPN7302-H20	20	0.26	0.35	1.2	1.5	8	0.18	0.5	H20
MPN7302-0805-2	20	0.14	0.22	1.2	1.5	8	0.06	0.4	0805-2
MPN7304-E28 / 28X	40	0.14	0.22	2.2	2.7	15	0.08	0.4	E28 / 28X
MPN7304-H20	40	0.24	0.30	2.2	2.7	15	0.18	0.5	H20
MPN7304-0805-2	40	0.18	0.26	2.2	2.7	15	0.06	0.4	0805-2
MPN7304A-E28 / 28X	40	0.20	0.27	1.0	1.5	30	0.08	0.4	E28 / 28X
MPN7304A-H20	40	0.30	0.38	1.0	1.5	30	0.18	0.5	H20
MPN7304A-0805-2	40	0.18	0.23	1.0	1.5	30	0.06	0.4	0805-2
MPN7306-E28 / 28X	70	0.16	0.22	1.2	1.2	50	0.08	0.4	E28 / 28X
MPN7306-H20	70	0.26	0.33	1.2	1.2	50	0.18	0.5	H20
MPN7306-0805-2	70	0.14	0.20	1.2	1.2	50	0.06	0.4	0805-2
MPN7310-E28 / 28X	100	0.13	0.18	1.5	2.0	100	0.08	0.4	E28 / 28X
MPN7310-H20	100	0.23	0.29	1.5	2.0	100	0.18	0.5	H20
MPN7310-0805-2	100	0.11	0.17	1.5	2.0	100	0.06	0.4	0805-2
MPN7310A-E28 / 28X	100	0.26	0.36	0.6	1.0	200	0.08	0.4	E28 / 28X
MPN7310A-H20	100	0.36	0.57	0.6	1.0	200	0.18	0.5	H20
MPN7310A-0805-2	100	0.24	0.35	0.6	1.0	200	0.06	0.4	0805-2
MPN7312A-E28 / 28X	120	0.16	0.21	1.2	1.5	150	0.08	0.4	E28 / 28X
MPN7312A-H20	120	0.26	0.32	1.2	1.5	150	0.18	0.5	H20
MPN7312A-0805-2	120	0.14	0.20	1.2	1.5	150	0.06	0.4	0805-2
MPN7312B-E28 / 28X	120	0.26	0.36	0.8	1.0	250	0.08	0.4	E28 / 28X
MPN7312B-H20	120	0.36	0.57	0.8	1.0	250	0.18	0.5	H20
MPN7312B-0805-2	120	0.24	0.35	0.8	1.0	250	0.06	0.4	0805-2
MPN7315-E28 / 28X	150	0.16	0.23	1.2	1.5	180	0.08	0.4	E28 / 28X
MPN7315-H20	150	0.26	0.34	1.2	1.5	180	0.18	0.5	H20
MPN7315-0805-2	150	0.14	0.21	1.2	1.5	180	0.06	0.4	0805-2
MPN7320-E28 / 28X*	150	0.10	0.14	3.0	4.0	120	0.08	0.4	E28 / 28X
MPN7320-H20*	150	0.20	0.24	3.0	4.0	120	0.18	0.5	H20
MPN7320-0805-2*	150	0.08	0.12	3.0	4.0	120	0.06	0.4	0805-2
Test Conditions	$I_R = 10\ \mu A$	$V_R = 10$ V F = 1 MHz *$V_R = 50$ V		$I_F = 10$ mA F = 500 MHz		$I_F = 10$ mA $I_R = 6$ mA			

Ultra Fast Switching

Model	V_{BR}	C_J	T_L	Øjc	T_S	R_s	R_s
	MIN V	MAX pF	TYP nS	MAX °C/W	MAX nS	MAX Ohms	TYP Ohms
MMP7010	25	0.1	10	60	1.5	0.7	1.0
MMP7011	25	0.15	10	50	1.5	0.55	0.8
MMP7012	25	0.2	10	40	1.5	0.45	0.7
MMP7013	25	0.25	10	35	1.5	0.4	0.6
Test Conditions	@ 10 µA	@ -10 V, 1 MHz	IF = 10 mA IR = 6 mA	pulsed	90% to 10% and 10% to 90% transmission. Drive output = +2- mA and -4 V, 200 mA spike with a rise time of 2 nS	50 mA @ 1 GHz	10 mA @ 1 GHz


Bare Die


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT


Plastic SMT


Glass Axial Leaded

Fast Switching, Low Power

Model	V_{BR} MIN V	C_J MAX pF	T_L TYP nS	Δjc MAX °C/W	TS MAX nS	R_s MAX Ohms	R_s TYP Ohms
MMP7020	70	0.05	60	80	5	0.9	1.2
MMP7021	70	0.1	60	70	5	0.7	1.0
MMP7022	70	0.15	60	60	5	0.6	0.9
MMP7023	70	0.2	60	55	5	0.5	0.7
MMP7024	70	0.25	60	50	5	0.45	0.5
MMP7025	100	0.03	100	90	10	1.2	1.9
MMP7026	100	0.07	100	80	10	0.9	1.5
MMP7027	100	0.1	100	70	10	0.7	1.2
MMP7028	100	0.15	100	60	10	0.6	1.0
MMP7029	100	0.2	100	55	10	0.5	0.9
MMP7030	100	0.3	100	50	15	0.45	0.8
MMP7031	200	0.03	225	90	15	1.9	3.0
MMP7032	200	0.07	225	80	15	1.2	2.2
MMP7033	200	0.1	225	70	15	0.9	1.6
MMP7034	200	0.15	225	60	15	0.8	1.0
MMP7035	200	0.2	225	55	15	0.7	0.8
MMP7036	200	0.3	225	50	15	0.6	0.7
Test Conditions	@ 10 μA	@ -10 V, 1 MHz	IF = 10 mA IR = 6mA	pulsed	90% to 10% and 10% to 90% transmission. Drive output = +2- mA and -4 volts, 200 mA spike with a rise time of 2 nS	75 mA @ 1 GHz	20 mA @ 1 GHz

Maximum Ratings	Parameters	Rating
	Operating Temperature	-55° C to + 150° C
	Storage Temperature	-65° C to + 200° C
	Reverse Breakdown	from 25 volts to 500 volts
	Voltage	volts at 10 mA
	Junction Capacitance	(C_J- 10) from 0.03 pF to 0.5 pF at 10 volts
	Switching Speed	from 1 nS to 25 nS
	Lifetime	from 5 nS to 6.0 μS
	Chip Thickness	.004 – .007" thick

Silicon PIN Diodes


Bare Die


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT


Plastic SMT


Glass Axial Leaded

High Power Switching & Attenuation

Model	V_{BR}	C_J	T_L	RS	RS	RS	Øjc
	MIN V	MAX pF	TYP µs	MAX Ohms	MAX Ohms	MAX Ohms	MAX °C/W
MMP7060	250	0.05	1.0	25	10.0	2.0	20
MMP7061	250	0.08	1.0	20	8.0	1.5	20
MMP7062	250	0.1	1.0	15	6.0	1.2	20
MMP7063	250	0.2	1.0	8	3.5	1.0	15
MMP7064	250	0.3	1.5	6	2.0	0.8	15
MMP7065	500	0.08	1.5	40	8.0	1.5	15
MMP7066	500	0.1	1.5	15	5.0	1.2	15
MMP7067	500	0.2	1.5	10	4.0	1.0	12
MMP7068	500	0.3	2.0	8	3.5	0.8	10
MMP7069	500	0.5	2.0	6	2.0	0.7	10
Test Conditions	@ 10 µA	@ 50V 1 MHz	IF = 10 mA IR = 10 mA	@ 1 mA 100 MHz	@ 10 mA 100 MHz	@ 100 mA 100 MHz	pulsed

High Average Power PIN Diode

Model	V_B	C_T	T_L	RS	VF	Reverse Leakage Current	R_P
	MIN	MAX	MIN usec	MAX Ohms	TYP	TYP nA	MIN Ohms
MMP7070	100	2.20	6.00	0.50	1.00	100	20k
MMP7071	100	2.00	8.00	1.00	1.20	100	50k
MMP7072	100	0.7	3.00	0.8	1.00	100	200k
MMP7073	100	1.0	2.50	0.5	1.00	100	100k
MMP7074	200	2.20	6.00	0.5	1.00	100	20k
MMP7075	200	2.0	8.00	1.00	1.20	100	50k
MMP7076	200	0.7	3.00	0.8	1.00	100	200k
MMP7077	200	1.0	2.50	0.5	1.00	100	100k
MMP7078	400	1.0	2.50	0.5	1.00	100	100k
MMP7079	600	2.20	6.00	0.5	1.00	100	20k
MMP7080	600	0.7	3.00	0.8	1.00	100	200k
Testing Conditions	@ 10 µA	@ 100 V F = 1 MHz	IF = 10 mA IR = 6 mA	100 mA 100 MHz	@ 100 mA		@ 0 V, 100 MHz

Maximum Ratings	Parameters	Rating
	Operating Temperature	-55° C to + 150° C
	Storage Temperature	-65° C to + 200° C
	Reverse Breakdown	from 25 volts to 1500 volts
	Voltage	volts at 10 µA

Silicon PIN Diodes


Bare Die


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT


Plastic SMT


Glass Axial Leaded

Medium Power, General Purpose

Model	V_{BR} MIN V	C_J MAX pF	T_L TYP nS	Δjc MAX °C/W	TS MAX NS	RS OHMS MAX	RS OHMS TYP
MMP7040	200	0.03	400	65	20	2.6	3.5
MMP7041	200	0.07	400	60	20	1.5	2.2
MMP7042	200	0.1	400	55	20	1.3	2.0
MMP7043	200	0.15	400	50	20	1.0	1.9
MMP7044	200	0.2	400	45	20	0.8	1.7
MMP7045	200	0.3	400	40	20	0.7	1.4
MMP7046	200	0.5	400	20	20	0.6	1.2
MMP7047	200	0.03	600	60	25	2.6	3.5
MMP7048	200	0.07	600	55	25	1.6	3.2
MMP7049	200	0.1	600	50	25	1.2	2.0
MMP7050	200	0.15	600	45	25	0.9	1.9
MMP7051	200	0.2	600	40	25	0.8	1.7
MMP7052	200	0.3	600	35	25	0.7	1.4
MMP7053	200	0.5	600	15	25	0.6	1.2
Test Conditions	@ 10 µA	@ 40 V 1 MHz	IF = 10 mA IR = 6 mA	pulsed	RF Switching speed measured from 90% to 10% and 10% to 90% transmission	@ 75 mA, 1 GHz	@ 20 mA, 1 GHz

PIN Chips

Model	V_B MIN	C_T MAX pF	T_L MIN usec	RS MAX Ohms	Thermal Resistance TYP C/W
MMP7092	500	0.20	1.00	0.60	20
MMP7093	500	0.35	2.00	0.45	15
MMP7094	500	0.70	3.00	0.30	10
MMP7095	1000	0.30	3.00	1.00	15
MMP7096	1000	0.60	4.00	0.70	10
MMP7097	1000	1.30	5.00	0.40	7
Test Conditions	@ 10 µA	@ -100 V 1 MHz	IF = 10 mA IR = 6 mA	@ 100 mA, 100 MHz	

Kilovolt Pin Pill pkg

Model	V_B MIN Volts	C_T MAX pF	T_L MIN usec	RS MAX Ohms	Thermal Resistance TYP C/W	Thermal Resistance TYP C/W
MMP7098	2000	3.20	10	0.20	1.20	1.00
MMP7099	3000	4.00	20	0.25	1.20	1.00
Test Conditions	@ 10 µA	@ -100 V 1 MHz	IF = 10 mA IR = 6 mA	@ 500 mA, 4 MHz		

Maximum Ratings	Parameters	Rating
	Operating Temperature	-55° C to + 150° C
	Storage Temperature	-65° C to + 200° C
	Reverse Breakdown	from 25 volts to 1500 volts
	Voltage	volts at 10 µA

Silicon MELF PIN Diodes

Ceramic MELF

- Voltage breakdowns up to 1,000 Volts
- Typical lifetime speeds of 1.0 to 8.0 μsec
- Resistances at 100 mA of 0.5 to 2.0 ohms

The Aeroflex / Metelics high power MELF PIN diodes are produced with a propriety glassing process. This creates large, full-face bonding surfaces on the anode and cathode, delivers low electrical and thermal resistance, and allows for power handling up to 100 Watts. Available in non-magnetic package, denote -128.

Low Loss Switching

Model	V_B	C_T	T_L	RS	V_F	Reverse Leakage Current	R_P
	MIN Volts	MAX pF	MIN usec	MAX Ohms	TYP Volts	TYP	MIN Ohms
MMP7081-127	50	1.20	4.00	0.75	1.00	1.00	5k
MMP7082-127	50	1.50	4.00	0.75	1.00	1.00	6k
MMP7083-127	50	2.50	4.00	0.75	1.00	1.00	5k
Test Conditions	@ 10 μA	@ 50 V 1 MHz	IF = 10 mA IR = 6 mA	@ 50 mA 100 MHz	@100mA	@80 of rated V_B	

General Purpose Switching Diodes

Model	V_B	C_T	T_L	RS	Power Dissipation Rating Watts
	MIN	MAX pF	MIN usec	MAX Ohms	
MMP7084-127	35	1.20	0.30	0.50	1.00
MMP7085-127	200	0.50	1.50	3.00	1.00
MMP7086-127	200	1.50	3.00	0.60	2.00
MMP7087-127	200	0.50	2.00	6.00	1.00
MMP7088-127	200	0.80	6.00	25.00	2.00
Test Conditions	@ 10 μA	@ -50, 1MHz	IF = 10 mA IR = 6 mA	@ 50 mA 100 MHz	

High Voltage Pin

Model	V_B	C_T	T_L	RS	Power Dissipation Rating Watts
	MIN Volts	MAX pF	MIN usec	MAX Ohms	
MMP7089-127	500	0.50	1.00	0.60	1.50
MMP7090-127	500	0.65	2.00	0.45	1.50
MMP7091-127	500	1.00	3.00	0.30	1.50
Test Conditions	@ 10 μA	@ -100, 1 MHz	@ 10 mA 100 MHz	@ 10 mA 100 MHz	

Maximum Ratings	Parameters	Rating
	Operating Temperature	-55° C to + 150° C
	Storage Temperature	-65° C to + 200° C
	Reverse Breakdown	from 25 volts to 1500 volts
	Voltage	volts at 10 μA

Silicon NIP Diodes


Bare Die


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

- Four different I-layers
- Fully passivated
- Low leakage and reliability

The Aeroflex / Metelics MNP00XX series of NIP diodes are offered in four different I-layers and feature fully passivated, mesa construction for low leakage and reliability. Screening per MIL-PRF-19500 and MIL-PRF-3534 are available.

Chips

Model	V_{BR}	C_J		R_S		τ	Contact	I-Layer	θ_{JC}	Outline
	MIN V	TYP V	MAX pF	TYP Ω	MAX Ω	TYP ns	MIN mils	NOM microns	MAX °C/W	
MNP0008	100	0.08	0.12	2.0	2.5	150	2.0	10	50	C12p
MNP0010	150	0.08	0.12	2.0	2.5	300	3.0	20	50	C12p
MNP0012	300	0.08	0.12	3.5	4.0	350	4.0	40	40	C12p
MNP0012A	350	**0.18**	**0.22**	**0.55**	**0.80**	650	6.0	40	25	C22p
MNP0014	500	**0.12**	**0.18**	**1.3**	**1.6**	750	8.0	80	20	C22p
MNP0014A	500	**0.18**	**0.22**	**0.8**	**1.2**	1,400	10.0	80	10	C32p
Test Conditions	$I_R = 10\ \mu A$	$V_R = 10$ V **VR = 50 V** * F = 1 MHz		$I_F = 10$ mA **IF = 100 mA** F = 500 MHz		$I_F = 10$ mA $I_R = 6$ mA 50% rec.				

Packaged

Model	V_{BR}	C_T		R_S		τ	C_P	L_P	Outline
	MIN V	TYP pF	MAX pF	TYP Ω	MAX Ω	TYP ns	TYP pF	TYP nH	
MNP0008-ET47P	100	0.48	0.60	2.0	2.5	150	2 x 0.20	2 x 0.25	ET47p
MNP0008-T54P	100	0.28	0.37	2.0	2.5	150	0.20	0.4	T54p
MNP0008-T55P	100	0.21	0.29	2.0	2.5	150	.013	0.25	T55p
MNP0008-T89P	100	0.33	0.43	2.0	2.5	150	0.25	0.4	T89p
MNP0010-ET47P	150	.048	0.60	2.0	2.5	300	2 x 0.20	2 x 0.25	ET47p
MNP0010-T54P	150	0.28	0.37	2.0	2.5	300	0.20	0.4	T54p
MNP0010-T55P	150	0.21	0.29	2.0	2.5	300	.013	0.25	T55p
MNP0010-T89P	150	0.33	0.43	2.0	2.5	300	.025	0.4	T89p
MNP0012-ET47P	300	0.48	0.60	3.5	4.0	350	2 x 0.20	2 x 0.25	ET47p
MNP0012-T54P	300	0.28	0.37	3.5	4.0	350	0.20	0.4	T54p
MNP0012-T55P	300	0.21	0.29	3.5	4.0	350	0.13	0.25	T55p
MNP0012-T89P	300	0.33	0.43	3.5	4.0	350	0.25	0.4	T89p
MNP0012A-ET47P	350	**0.58**	**0.72**	**0.55**	**0.8**	650	2 x 0.20	2 x 0.25	ET47p
MNP0012A-T54P	350	**0.36**	**0.47**	**0.55**	**0.8**	650	0.20	0.4	T54p
MNP0012A-T55P	350	**0.31**	**0.39**	**0.55**	**0.8**	650	0.13	0.25	T55p
MNP0012A-T89P	350	**0.43**	**0.53**	**0.55**	**0.8**	650	0.25	0.4	T89p
MNP0014-ET47P	450	**0.52**	**0.58**	**0.8**	**1.2**	750	2 x 0.20	2 x 0.25	ET47p
MNP0014-T54P	450	**0.32**	**0.48**	**0.8**	**1.2**	750	0.20	0.4	T54p
MNP0014-T55P	450	**0.25**	**0.35**	**0.8**	**1.2**	750	0.13	0.25	T55p
MNP0014-T89P	450	**0.37**	**0.50**	**0.8**	**1.2**	750	0.25	0.4	T89p
Test Conditions	$I_R = 10\ \mu A$	$V_R = 10$ V **VR = 50 V** F = 1 MHz		$I_F = 10$ mA **IF = 100 mA** F = 500 MHz		$I_F = 10$ mA $I_R = 6$ mA 50% rec.			

Planar Silicon PIN / NIP Attenuator & Switching Diodes

Bare Die

- Lower series resistance for switching applications
- Lower harmonic distortion for attenuators
- Silicon Nitride / Silicon Oxide passivation

The Aeroflex / Metelics MSAT-0XXX PIN / MSAT-1XXX NIP series of diodes are Planar PIN / NIP diodes used for switching and attenuator applications. The attenuator line of PIN / NIP diodes offers a predictable R_S vs. I_F curve and low harmonic distortion.

Electrical Characteristics $T_C = +25°C$

Model	V_{BR}	V_F	Cj		R_S				T_L	
	V	mV	pF		Ohms				nS	
	MIN	TYP	TYP	MAX	TYP	MAX	TYP	MAX	MIN	TYP
MSAT-0010-C19	100	925	0.09	0.15	195	250	1.0	1.5	150	215
MSAT-0011-C19	100	870	0.25	0.30	100	150	0.6	1.0	200	325
MSAT-0020-C19	100	880	0.13	0.15	200	300	1.0	1.5	400	620
MSAT-0021-C19	100	920	0.06	0.08	255	350	1.85	2.2	350	500
MSAT-1020-C19P	100	890	0.13	0.15	215	300	1.0	1.5	400	620
MSAT-0040-C12	150	880	0.10	0.15	535	700	1.7	2.2	900	1300
MSAT-0041-C12	150	930	0.06	0.08	720	900	2.4	3.0	500	700
MSAT-1040-C12P	200	860	0.09	0.15	1000	1500	2.3	3.0	800	1000
MSAT-1041-C12P	200	905	0.045	0.06	1500	1700	3.0	3.8	800	1000
MSAT-0080-C22	200	820	0.13	0.15	920	1200	2.0	2.8	1500	2300
MSAT-0081-C12	200	850	0.045	0.06	1750	2200	4.1	5.0	750	1000
MSAT-1080-C22P	250	840	0.13	0.15	1700	2000	3.0	4.0	1100	1600
MSAT-0120-C22-8	250	905	0.10	0.15	1475	1900	3.3	4.2	1800	2600
MSAT-0140-C22-8	300	820	0.10	0.15	2200	2800	5.0	6.0	1500	2000
MSAT-1140-C22P-8	350	840	0.10	0.15	2900	3300	5.0	6.0	2000	3300
Test Conditions MSAT-0XXX PIN MSAT-1XXX NIP	Voltage where I_R < 10µA	I_F = 50mA	V_R = 10V F = 1 MHz		I_F = 10µA F = 100 MHz		I_F = 10mA F = 100 MHz		I_F = 10mA I_R = 6mA 10 - 50%	

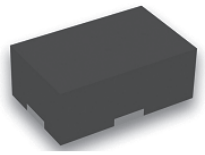
Maximum Ratings	Rating	Limits	Units
	V_R	V_R	V
	I_F	150	mA
	P_{DISS}	250 de-rated to zero at 150°C	mW
	T_J	+175	°C
	T_{STG}	-65 to +200	°C
	$T_{Die\ Attach}$	<400°C for 5_{sec}	
	Electrostatic Discharge (ESD)	Class 0 (Human Body Model)	

*Exceeding any of the above limits can permanently damage the part.

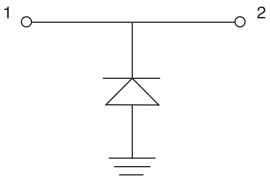
NIP Diode: Medium Power Shunt Attenuator Element

- Low Distortion Harmonics at 85dBc Typical
- Broadband performance, beyond 10 GHz
- Low Insertion loss & high attenuation range, 27dB

The Aeroflex / Metelics MSAT-N25 is a broadband, High Linearity medium power shunt NIP Attenuator element in 1.9 x 1.1 mm DFN package is designed for wireless Telecommunication infrastructure and test instrument applications. It is also suited for other applications in 0.1 ~ 10 GHz range.



Package 2012



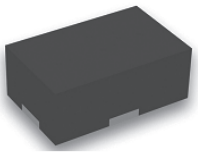
MSAT-N25, T_C = +25°C

Model	V_{BR}	T_L			Rs Min		Rs Low			Rs High		
	MIN V	MIN nS	TYP nS	MAX nS	TYP Ω	MAX Ω	MIN Ω	TYP Ω	MAX Ω	MIN Ω	TYP Ω	MAX Ω
MSAT-N25	200	2000	3000	5000	1.5	2.5	30	40	50	2000	3000	4000
Test Conditions	I_R = 10µA	I_F = 10mA, I_R = 6mA, 10% / 90%			I_F = 100mA, F = 500 MHz		I_F = -1mA, F = 500 MHz			I_F = 10mA, F = 500 MHz		

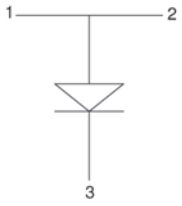
Maximum Ratings	Rating	Limits	Units
	V_{BR}	200	V
	I_F	200	mA
	θ_{JC}	20	°C/W
	P_{DIS}	2 (C.W.)	Watts
	T_J	+175	°C
	T_{STG}	-65 to +125	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Low Distortion Harmonics at 85 dBc Typical
- Broadband performance, beyond 10 GHz
- Low Insertion loss & high attenuation range, 27dB

The Aeroflex / Metelics MSAT-P25 broadband, High Linearity medium power shunt PIN Attenuator element 1.9 x 1.1 mm DFN package is designed for wireless Telecommunication infrastructure and test instrument applications. It is also suited for other applications in 0.1 ~ 10 GHz range.



Package 2012



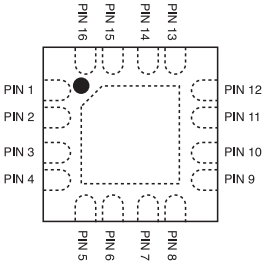
MSAT-P25, T_C = +25°C

Model	V_{BR}	T_L			Rs Min		Rs Low			Rs Low		Rs High		
	MIN V	MIN nS	TYP nS	MAX nS	TYP Ω	MAX Ω	Min Ω	TYP Ω	MAX Ω	MIN dB	TYP dB	MIN Ω	TYP Ω	MAX Ω
MSAT-P25	200	2000	3000	5000	1.5	2.5	20	30	40	28	35	1200	2200	3000
Test Conditions	I_R = 10µA	I_F = 10mA I_R = 6mA 10% / 90%			I_F = 100mA F = 500 MHz		I_F = -50mA F = 500 MHz			I_F = -50mA F = <10.0 GHz		I_F = -10mA F = 500 MHz		

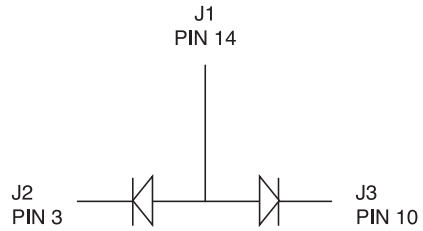
Maximum Ratings	Rating	Limits	Units
	V_R	200	V
	I_F	200	mA
	θ_{JC}	20	°C/W
	T_J	+175	°C
	T_{STG}	-65 to +125	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Supports up to 20 watts power
- Low insertion loss typical 0.3dB up to 6 GHz
- High Isolation 24dB typical up to 6 GHz

The Aeroflex / Metelics MSW2T-1001 is a SPDT switch in a plastic 16L 3x3 QFN package. Each pole is Electrical Series and Thermal direct to Ground. This device is designed for wireless infrastructure, test instruments and other RF & microwave applications from 100 MHz to 6 GHz.



Plastic Molded 16L
3x3 QFN Package



MSW2T-1001, T_C = +25°C

Model	V_{BR}	T_L	C_T	R_{lim}	I_L		I_L	IRL/ORL		IRL/ORL		I_{So}		I_{So}	
	MIN V	TYP nS	TYP pF	TYP Ω	TYP dB	MAX dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB
MSW2T-1001	125	50	0.05	2	0.2	0.3	0.3	21	25	15	18	26	30	19	23
Test Conditions	I_R = 10µA	I_F = 10mA IR = 6mA 10% / 90%	V_R = -20V F = 1MHz	I_F = 100mA F = 500MHz	I_F = 100mA J1 – J2, J1 – J3 F = 2.3 – 2.7 GHz		I_F = 100mA J1 – J2, J1 – J3 F < 6.0 GHz	I_F = 100mA J1 – J2, J1 – J3 F = 2.3 – 2.7 GHz		I_F = 100mA J1 – J2, J1 – J3 F < 6.0 GHz		V_R = -10 v J1 – J2, J1 – J3 F = 2.3 – 2.7 GHz		V_R = -10 v J1 – J2, J1 – J3 F < 6.0 GHz	

Maximum Ratings	Rating	Limits	Units
	V_R	125	V
	I_F	200	mA
	θ_{JC}	130	°C/W
	T_J	+175	°C
	T_{STG}	-65 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

Typical RF performance on Demo Board at T_A = 25°C, Z_O = 50Ω, 10dBm small signal

Broadband, Mesa & Planar Beam Lead PIN Diodes

Beam Lead Chips

Plastic SMT

- Fast Switching Speed
- Low Capacitance
- Low Resistance
- Rugged Construction

The Aeroflex / Metelics MMP-1000 Series Beam Lead PIN diodes features a unique glass and beam construction which allows for mechanical strength and stability during assembly. They are designed for low resistance, low capacitance and fast switching time.

The Aeroflex / Metelics Mesa Beam Lead PINs are suitable for microstrip or stripline circuits and for circuits requiring high isolation from series mounted diodes as in broadband multi-throw switches, phase shifters, attenuators, limiters and modulators.

Mesa Beam Lead PIN Diodes

Model	V_B	C_J	Rs	Rs	T_L	Ts
	MIN V	MAX pF	MAX Ohms	MAX Ohms	TYP nS	MAX nS
MPN1000-12	100	.020	6.5	4.0	80	5
MPN1001-12	100	.027	6.0	3.5	80	5
MPN1002-12	100	.030	5.5	3.2	80	5
MPN1003-12	100	.035	5.0	2.9	80	5
MPN1004-12	100	.040	5.0	2.7	80	5
MPN1005-12	100	.048	5.0	2.5	80	5
MPN1006-12	100	.055	4.0	2.3	80	5
MPN1007-12	100	.065	4.0	2.1	80	5
MPN1100-12	50	.025	6.0	3.7	50	3
MPN1101-12	50	.030	5.0	3.5	50	3
MPN1102-12	50	.040	4.5	2.9	50	3
MPN1103-12	50	.060	4.0	2.5	50	3
Test Conditions	@ 10 μA	@ -10 V, 1 MHz	@ 10 mA, 1 GHz	@ 50 mA, 1 GHz	IF = 10 mA IR = 6 mA	20% - 80%

Maximum Ratings	Parameters	Rating
	Operating Temperature	-55° C to + 150° C
	Storage Temperature	-65° C to + 200° C
	Power Dissipation	250 mW
	Typical Lead Strength	6 grams

Planar Beam Lead

Model	V_{BR}	C_J		R_S		τ	T_{RR}	P_{DISS}	Package
	MIN V	TYP pF	MAX pF	TYP Ω	MAX Ω	TYP ns	TYP ns	MAX MW	
MPND4005-B15	100	0.018	0.020	5.5	6.5	125	–	250	B15
MPND4005-B16	100	0.018	0.020	5.5	6.5	125	–	250	B16
MPND4005-0402	100	**0.070**	**0.090**	5.5	6.5	125	–	250	0402
Test Conditions	I_R = 10 μA	V_R = 10 V F = 15 GHz **C_T**		I_F = 20 mA F = 3 GHz		I_F = 10 mA I_R = 6 mA	I_F = 10 mA V_R = 10 V	T_C = +25 °C, Derate Linearly to +175 °C	

Silicon Limiter Diodes


Bare Die


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT


Plastic SMT

- Low Loss
- Greater Bandwidth
- Fast Turn on Time

The Aeroflex / Metelics MLP-7100 Series Limiter diodes are specially processed PIN diodes with a thin intrinsic region designed for use in passive or active limiters over the entire range of frequencies from 100 MHz to beyond 20 GHz. The different "I" region thicknesses and capacitances provide variable threshold and leakage power levels and power handling capability.

MLP7130 – MLP7122

DC PARAMETERS

Model	V_B	C_J	C_J	R_S	R_S	T_L	Pulsed Thermal Resistance	Thermal Resistance
	TYP V	TYP pF	MAX pF	TYP Ω	TYP Ω	TYP nS	TYP C/W	MAX °C/W
MLP7130	15-30	0.12	0.10	2.0	4.0	5	30.0	120
MLP7131	15-30	0.20	0.15	1.5	3.0	5	20.0	80
MLP7100	20-45	0.20	0.15	1.5	5.0	5	20.0	100
MLP7101	20-45	0.50	0.30	1.2	4.5	10	12.0	80
MLP7102	20-45	0.70	0.50	1.0	4.0	10	10.0	55
MLP7140	30-60	0.12	0.10	2.0	4.0	7	20.0	100
MLP7141	30-60	0.20	0.15	1.5	4.0	7	15.0	70
MLP7110	45-75	0.20	0.15	1.5	4.0	10	15.0	80
MLP7111	45-75	0.50	0.30	1.2	3.5	15	10.0	60
MLP7112	45-75	0.70	0.50	1.0	3.0	20	6.0	40
MLP7120	120-180	0.20	0.15	1.5	3.5	50	1.2	40
MLP7121	120-180	0.60	0.30	1.0	3.0	50	0.5	20
MLP7122	120-180	0.80	0.50	0.5	3.0	100	0.3	15
Test Conditions	@ 10 μA	@ 0 V, 1 MHz	@ -6 V, 1 MHz	@ 10 mA 1 GHz	@ 1 mA 1 GHz	IF = 10 MA IR = 6 MA	1 usec pulse	

Maximum Ratings	Parameters	Rating
	Operating Temperature	-55° C to + 150° C
	Maximum Leakage Current	0.5 mA at 88% of minimum rated breakdown


Bare Die


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT


Plastic SMT

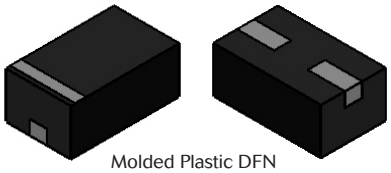
MLP7130 – MLP7122

RF CHARACTERISTICS						
Model continued	Peak Power In	Threshold	Leakage Pout	Insertion Loss	C.W. Power In	Recovery Time
	MAX dBm	TYP dB	TYP dBm	TYP dB	MAX W	TYP nS
MLP7130	+47	+7	+19	0.1	2	5
MLP7131	+50	+7	+22	0.1	3	5
MLP7100	+50	+10	+22	0.1	2	10
MLP7101	+53	+10	+24	0.2	3	10
MLP7102	+56	+10	+25	0.2	4	10
MLP7140	+47	+12	+24	0.1	3	10
MLP7141	+50	+12	+27	0.1	4	10
MLP7110	+53	+15	+27	0.1	3	20
MLP7111	+56	+15	+29	0.2	4	20
MLP7112	+59	+15	+31	0.2	5	20
MLP7120	+60	+20	+39	0.1	5	50
MLP7121	+63	+20	+41	0.2	10	50
MLP7122	+66	+20	+44	0.2	15	50
Test Conditions	Pulsed thermal impedance is given for 1 μ pulse. C.W. thermal impedance presumes infinite heat sink.	Threshold input power produces 1 dB increase in insertion loss. 1 GHz	Threshold input power produces 1 dB increase in insertion loss. 1 GHz	Chip loss can be respresented as a resistance in shunt with the junction capacitance. 3 GHz, zero Bias. Loss data shown for 10 GHz for 0.15 and 0.30 pF chips, 5 CHz for 0.50 pF chips. Measured at -10 dBm input.	Note that C.W. power and average power are not synonymous. Power ratings are computed in terms of a peak junction temperature of 200° C, for short pulses, an average junction temperature of 125° C, and an ambient of 25° C. Duty factor 0.001 assumed for maximum pulse power input.	Recovery time is measured with ground return (less than 1.0 Ohms) to 1 dB excess loss, at 1 GHz.

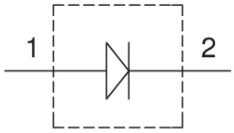
Maximum Ratings	Parameters	Rating
	Operating Temperature	-55° C to + 150° C
	Maximum Leakage Current	0.5 mA at 88% of minimum rated breakdown

- Small size (50 mils x 30 mils)
- Broadband performance up to 6.0 GHz
- Supports up to 4 watts power when cold switched.
- Low insertion loss 0.5 dB typical up to 6.0 GHz
- Cost effective choice for switch applications

The Aeroflex / Metelics MSWSE-005-15 is a PIN diode SPST switch element designed for medium incident power applications, up to 4W C.W. It has low insertion loss and medium isolation below 6.0 GHz.



Molded Plastic DFN
Package 0503



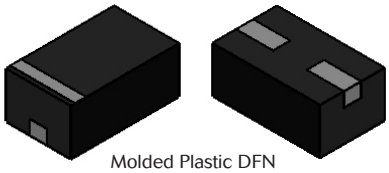
MSWSE-005-15, TC = +25°C

Model	V_{BR}	V_F		C_J		C_T		R_S		R_S		T_L		I_L		I_L	I_{SO}		I_{SO}
	MIN V	TYP mV	MAX mV	TYP pF	MAX pF	TYP pF	MAX pF	TYP Ω	MAX Ω	TYP Ω	MAX Ω	TYP nS	MAX nS	TYP dB	MAX dB	TYP dB	MIN dB	TYP dB	TYP dB
MSWSE-005-15	200	980	1050	0.035	.05	0.11	.15	2.0	2.5	1.4	1.8	180	300	0.25	0.40	0.5	13	16	10
Test Conditions	I_R = 10µA	I_F = 50mA		V_R = -50V F = 1 MHz		V_R = -50V F = 1 MHz		I_F = 30mA F = 500 MHz		I_F = 100mA F = 500 MHz		I_F = 10mA IR = 6mA Measured @ 50%		I_F = 50mA F < 2.7 GHz		I_F = 50mA F < 6.0 GHz	V_R = 50V F < 2.7 GHz		V_R = 50V F < 6.0 GHz

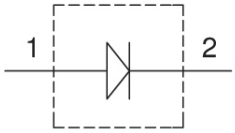
Maximum Ratings	Rating	Limits	Units
	V_R	200	V
	I_F	200	mA
	θ_{JC}	50	°C/W
	T_J	+175	°C
	T_{STG}	-55 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Small size (50 mils x 30 mils)
- Broadband performance up to 3.0 GHz
- Supports up to 10 watts power when cold switched
- Low insertion loss 0.25 dB typical up to 3.0 GHz
- Cost effective choice for switch applications

The Aeroflex / Metelics MSWSE-010-15 is a PIN diode SPST switch element designed for medium incident power applications, up to 10W C.W. It has low insertion loss and medium isolation below 3.0 GHz.



Molded Plastic DFN
Package 0503



MSWSE-010-15, T_C = +25°C

Model	V_{BR}	V_F		C_J	C_T		R_S		R_S		T_L		I_L	I_L	I_{SO}		I_{SO}
	MIN V	TYP mV	MAX mV	TYP pF	TYP pF	MAX pF	TYP Ω	MAX Ω	TYP Ω	MAX Ω	TYP nS	MAX nS	TYP dB	MAX dB	MIN dB	TYP dB	TYP dB
MSWSE-010-15	200	870	950	0.14	0.21	0.25	0.8	1.0	0.6	0.8	500	900	0.25	0.30	13	17	11
Test Conditions	I_R = 10µA	I_F = 50mA		V_R = -50V F = 1 MHz	V_R = -50V F = 1 MHz		I_F = 30mA F = 500 MHz		I_F = 100mA F = 500 MHz		I_F = 10mA I_R = 6mA Measured @ 50%		I_F = 50mA F < 1.0 GHz	I_F = 50mA F < 2.0 GHz	V_R = 50V F < 1.0 GHz		V_R = 50V F < 2.0 GHz

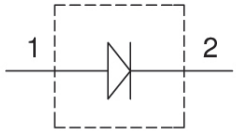
Maximum Ratings	Rating	Limits	Units
	V_R	200	V
	I_F	200	mA
	θ_{JC}	50	°C/W
	T_J	+175	°C
	T_{STG}	-55 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

PIN Diode: Medium Power Series Switch Element

Plastic SMT

- Small size (40 mils x 24 mils)
- Broadband performance up to 3.0 GHz
- Supports up to 10 watts power
- Low insertion loss 0.25 dB typical up to 3.0 GHz
- Cost effective choice for switch applications

The Aeroflex / Metelics MSWSE-010-16S is a PIN diode SPST switch element designed for medium incident power applications, up to 10W C.W. It has low insertion loss and medium isolation below 3.0 GHz.



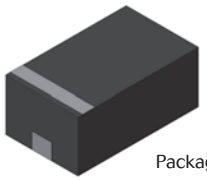
MSWSE-010-16S, T_C = +25°C

Model	V_{BR}	V_F		C_J	C_T		R_S		R_S		T_L		I_L	I_L	I_{SO}		I_{SO}
	MIN V	TYP mV	MAX mV	TYP pF	TYP pF	MAX pF	TYP Ω	MAX Ω	TYP Ω	MAX Ω	TYP nS	MAX nS	TYP dB	MAX dB	MIN dB	TYP dB	TYP dB
MSWSE-010-16S	250	870	950	0.11	0.15	0.2	1.0	1.3	0.6	0.8	1000	1500	0.25	0.30	13	17	11
Test Conditions	I_R = 10µA	I_F = 50mA		V_R = -50V F = 1 MHz	V_R = -50V F = 1 MHz		I_F = 30mA F = 500 MHz		I_F = 100mA F = 500 MHz		I_F = 10mA I_R = 6mA Measured @ 50%		I_F = 50mA F < 1.0 GHz	I_F = 50mA F < 2.0 GHz	V_R = 50V F < 1.0 GHz		V_R = 50V F < 2.0 GHz

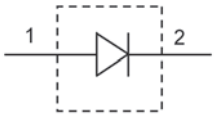
Maximum Ratings	Rating	Limits	Units
	V_R	200	V
	I_F	200	mA
	θ_{JC}	30	°C/W
	T_J	+175	°C
	T_{STG}	-55 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Small size (50 mils x 30 mils)
- Broadband performance up to 1.0 GHz
- Supports up to 20 watts power when cold switched
- Low insertion loss 0.05dB typical up to 1.0 GHz
- Cost effective choice for switch applications

The Aeroflex / Metelics MSWSE-020-05 is a PIN diode SPST switch element designed for medium incident power applications, up to 20W C.W. It has low insertion loss and medium isolation below 0.5 GHz.



Package 0503



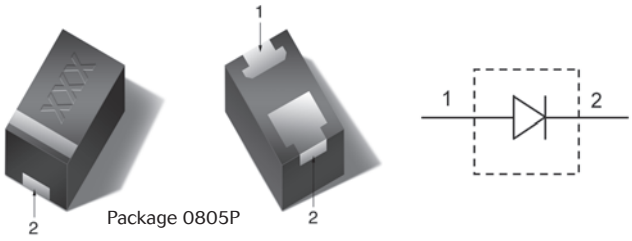
MSWSE-020-05, T_C = +25°C

Model	V_{BR}	V_F		C_J		C_T		R_S		R_S		T_L		I_L		I_{SO}		I_{SO}
	MIN V	TYP mV	MAX mV	TYP pF	MAX pF	TYP pF	MAX pF	TYP Ω	MAX Ω	TYP Ω	MAX Ω	TYP nS	MAX nS	TYP dB	MAX dB	MIN dB	TYP dB	TYP dB
MSWSE-020-05	250	850	950	0.53	0.65	0.62	0.75	0.3	0.5	0.1	0.3	600	1000	0.05	0.15	11	14	8
Test Conditions	I_R = 10µA	I_F = 50mA		V_R = -50V F = 1 MHz		V_R = -50V F = 1 MHz		I_F = 10mA F = 500 MHz		I_F = 100mA F = 500 MHz		I_F = 10mA I_R = 6mA Measured at 50%		I_F = 50mA F < 1.00 GHz		V_R = 50V F < 0.50 GHz		V_R = 50V F < 1.00 GHz

Maximum Ratings	Rating	Limits	Units
	V_R	250	V
	I_F	500	mA
	θ_{JC}	15	°C/W
	T_J	+175	°C
	T_{STG}	-55 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Supports up to 40 watts power when cold switched
- Low insertion loss 0.25 dB typical up to 2.7 GHz
- Medium isolation 11 dB typical up to 2.7 GHz

The Aeroflex / Metelics' broadband, high linearity, medium power series switch element in a 2.0 X 1.3 mm to QFN package 0805P. This device is designed for WiMax, Wibro, WLAN, TD-SCDMA and other wireless infrastructure applications. It is also suited for 0.1 ~ 3 GHz applications with up to 40 watts of power.



Package 0805P

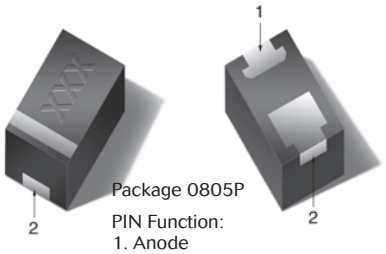
MSWSE-040-10, T_A = +25° C

Model	V_{BR}	V_F	C_J	R_S	R_S		T_L	IL		IL		IRL		IRL		Iso		Iso	
	MIN V	TYP mV	MAX pF	TYP Ω	TYP Ω	MAX Ω	MAX µS	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB
MSWSE-040-10	300	900	0.12	3.0	1.2	2.0	1.0	0.12	0.20	0.25	0.35	15	25	15	20	10	14	9	11
Test Conditions	I_R = 10 µA	V_F = 50 mA	V_R = 50 V	I_F = 10 mA, F = 500 MHz	I_F = 50 mA F = 500 MHz		I_F = 10 mA I_R = 6 mA	I_F = 50 mA F = 2.025 GHz		I_F = 50 mA F = 2.3 ~ 2.7 GHz		I_F = 50 mA F = 2.025 GHz		I_F = 50 mA F = 2.3 ~ 2.7 GHz		V_R = 10 V F= 2.025 GHz		V_R = 10 V F= 2.3 ~ 2.7 GHz	

Maximum Ratings	Rating	Limits
	V_R	300 V
	I_F	100 mA
	Θ_{JC}	20° C/W
	T_J	+150° C
	Storage Temperature	-65° C to +125° C
	Soldering Temperature	+260° C per JEDEC J-STD-20C

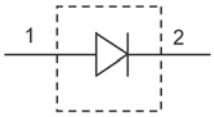
- Broadband performance up to 2.0 GHz
- Cost effective choice for switch applications

The Aeroflex / Metelics MSWSE-044-10 is a PIN diode SPST switch element designed for medium incident power applications, up to 40W C.W. It has low insertion loss and medium isolation below 2.0 GHz.



Package 0805P

PIN Function:
1. Anode
2. Cathode



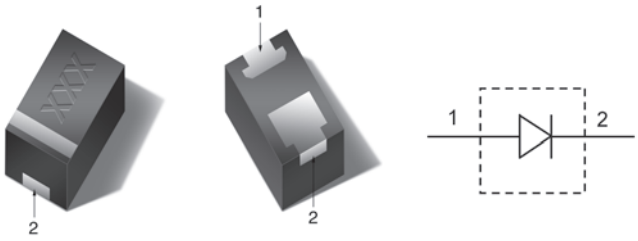
MSWSE-044-10, T_C = +25°C

Model	V_{BR}	V_F		C_T		R_S		T_L	I_L		I_L		Iso		Iso
	MIN V	TYP mV	MAX mV	TYP dB	MAX dB	TYP Ω	MAX Ω	TYP nS	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	TYP dB
MSWSE-044-10	300	900	1000	0.30	0.40	0.5	0.70	1200	0.20	0.30	0.25	0.35	11	14	10
Test Conditions	I_R = 10µA	I_F = 50mA		V_R = 10 V F = 1 MHz		I_F = 100mA F = 500 MHz		IF = 10mA I_R = 6 mA Measured @ 50%	I_F = 50mA F < 1.0 GHz		I_F = 50mA F < 2.0 GHz		V_R = 50V F < 1.0 GHz		V_R = 50V F < 2.0 GHz

Maximum Ratings	Rating	Limits
	V_R	300V
	I_F	200mA
	θ_{JC}	20°C/W
	T_J	+175°C
	T_{STG}	-55 to +150°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C

- Broadband performance up to 3.0 GHz
- Low insertion loss
- Cost effective choice for switch applications

The Aeroflex / Metelics MSWSE-050-17 is a PIN diode SPST switch element designed for medium incident power applications, up to 60W C.W. It has low insertion loss.



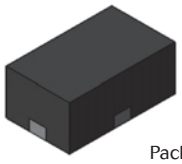
MSWSE-050-17, T_C = +25°C

Model	V_{BR}	V_F		C_T		R_S		T_L	I_L		I_L		I_{SO}		I_{SO}	
	MIN V	TYP mV	MAX mV	TYP P_F	MAX P_F	TYP Ω	MAX Ω	TYP nS	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB
MSWSE-050-17	500	850	950	0.20	0.25	0.25	0.30	1000	0.1	0.2	0.1	0.2	22	24	10	12
Test Conditions	I_R = 10µA	I_F = 50mA		V_R = 50V F = 1 MHz		I_F = 100mA F = 100 MHz		I_F = 10mA I_R = 6mA Measured @ 50%	I_F = 50mA F < 0.5 GHz		I_F = 50mA F < 2.0 GHz		V_R = 50V F < 0.5 GHz		V_R = 50V F < 2.0 GHz	

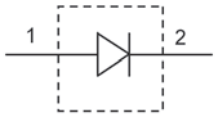
Maximum Ratings	Rating	Limits	Units
	V_R	500	V
	I_F	500	mA
	θ_{JC}	10	°C/W
	T_J	+175	°C
	T_{STG}	-55 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Broadband performance up to 0.8 GHz
- Low insertion loss
- Cost effective choice for switch applications

The Aeroflex / Metelics MSWSER-070-10 is a PIN diode SPST switch element designed for medium incident power applications, up to 80W C.W. It has low insertion loss.



Package 3023



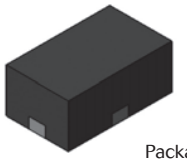
MSWSER-070-10, TC = +25°C

Model	V_{BR}	V_F		C_T		R_S		T_L	R_P		I_L		I_L		I_{SO}		I_{SO}	
	MIN V	TYP mV	MAX mV	TYP pF	MAX pF	TYP Ω	MAX Ω	TYP nS	MIN Ω	TYP Ω	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB
MSWSER-070-10	500	850	950	0.9	1.0	0.20	0.30	5000	20K	30K	0.1	0.2	0.15	0.30	14	16	8	10
Test Conditions	I_R = 10µA	I_F = 50mA		V_R = 50V F = 1 MHz		I_F = 100mA F = 100 MHz		I_F = 10mA I_R = 6mA Measured at 50%	V_R = 40V F = 0.5 GHz		I_F = 50mA F < 0.4 GHz		I_F = 50mA F < 8.0 GHz		V_R = 50V F < 0.4 GHz		V_R = 50V F < 8.0 GHz	

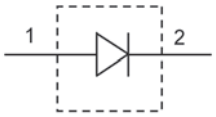
Maximum Ratings	Rating	Limits	Units
	V_R	500	V
	I_F	500	mA
	θ_{JC}	10	°C/W
	T_J	+175	°C
	T_{STG}	-55 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Broadband performance up to 0.8 GHz
- Low insertion loss
- Cost effective choice for switch applications

The Aeroflex / Metelics MSWSER-100-05 is a PIN diode SPST switch element designed for medium incident power applications, up to 80W C.W. It has low insertion loss.



Package 3023



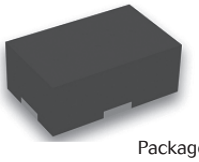
MSWSER-100-05, T_C = +25°C

Model	V_{BR}	V_F		C_T		R_S		T_L	R_P		I_L		I_L		I_{SO}		I_{SO}	
	MIN V	TYP mV	MAX mV	TYP pF	MAX pF	TYP Ω	MAX Ω	TYP nS	MIN dB	TYP dB	MIN dB	TYP dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB
MSWSER-100-05	500	850	950	0.65	0.75	0.28	0.40	4000	20K	52K	0.10	0.20	0.15	0.30	14	16	8	10
Test Conditions	I_R = 10µA	I_F = 50mA		V_R = 50V F = 1 MHz		I_F = 100mA F = 100 MHz		I_F = 10mA I_R = 6mA Measured at 50%	V_R = 40V F = 0.5 GHz		I_F = 50mA F < 0.4 GHz		I_F = 50mA F < 8.0 GHz		V_R = 50V F < 0.4 GHz		V_R = 50V F < 8.0 GHz	

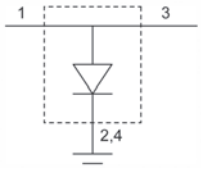
Maximum Ratings	Rating	Limits	Units
	V_R	500	V
	I_F	500	mA
	θ_{JC}	10	°C/W
	T_J	+175	°C
	T_{STG}	-55 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Supports up to 20 watts power when cold switched
- Low insertion loss 0.25 dB typical out to 2.7 GHz
- High Isolation 31 dB typical up to 2.7 GHz

The Aeroflex / Metelics' broadband, high linearity, medium power shunt switch element in a 1.9 X 1.1 mm QFN package. This device is designed for WiMax, Wibro, WLAN, TD-SCDMA and other wireless infrastructure applications. It is also suited for 0.1 ~ 6 GHz applications with up to 20 watts of power.



Package 2012



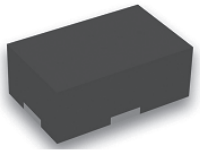
MSWSH-020-30, T_C = +25° C

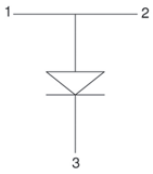
Model	V_{BR}	C_J	R_S		T_L	IL		IL		IRL		IRL		Iso		Iso	
	MIN V	TYP pF	TYP Ω	MAX Ω	MAX nS	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB
MSWSH-020-30	100	0.13	0.6	0.9	500	0.25	0.35	0.35	0.45	15	19	10	14	26	31	25	27
Test Conditions	I_R = 10 µA	V_R = 10 V, F = 1 MHz	I_F = 50 mA F = 500 MHz		I_F = 10 mA I_R = 6 mA	**V_R** = 10 V F = 2.3 ~ 2.7 GHz		**V_R** = 10 V F = 6.0 GHz		**V_R** = 10 V F = 2.3 ~ 2.7 GHz		**V_R** = 10 V F = 6.0 GHz		I_F = 50 mA F = 2.3 ~ 2.7 GHz		I_F = 50 mA F = 6.0 GHz	

Maximum Ratings	Rating	Limits
	V_R	100 V
	I_F	100 mA
	Θ_{JC}	30° C/W
	T_J	+150° C
	Storage Temperature	-65° C to +125° C
	Soldering Temperature	+260° C per JEDEC STD-J-20C

- Supports up to 40 watts power
- Low Insertion loss typical 0.10 dB to 2.7 GHz
- Low Insertion loss typical 0.25 dB typical out to 6.0 GHz
- High Isolation 25 dB typical to 6.0 GHz

The Aeroflex / Metelics MSWSH-040-30 is a broadband, high linearity, medium power shunt switch element in a 1.9 x 1.1 mm DFN package. This device is designed for wireless telecommunications infrastructure and test instrument applications. It is also suited for other applications in 0.05-6 GHz.





Package 2012

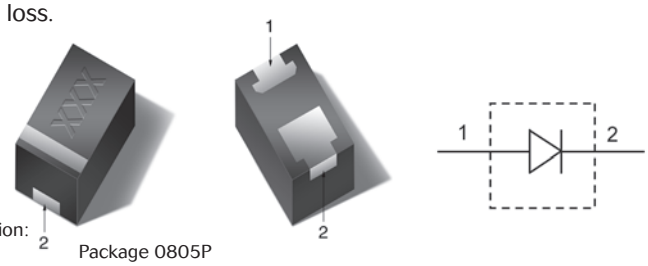
MSWSH-040-30, T_C = + 25°C

Model	V_{BR}	T_L	R_S	C_T	IL		IL		IRL/ORL				Iso		Iso	
	MIN V	TYP ns	TYP Ω	TYP pF	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB
MSWSH-040-30	500	1000	0.36	0.42	0.10	0.30	0.30	0.50	18	22	13	15	29	32	24	26
Test Conditions	I_R = 10µA	I_F = 10mA I_R = 6 mA Measured @ 50%	I_F = 100mA F = 500 MHz	Vr = -50V 1 MHz	Vr = 10V F=2.7 GHz		Vr = 10V F<6.0 GHz		Vr = 10V F=2.7 GHz		Vr = 10V F<6.0 GHz		I_F = 100mA F = 2.7 GHz		I_F = 100mA F<6.0 GHz	

Maximum Ratings	Rating	Limits
	V_R	500V
	I_F	500mA
	θ_{JC}	10°C/W
	T_J	+175°C
	T_{STG}	-55 to +150°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C

- Broadband performance up to 2.0 GHz
- Low Insertion Loss
- Cost effective choice for switch applications

The Aeroflex / Metelics MSWSH-050-10 is a PIN diode SPST switch element designed for medium incident power applications, up to 70W C.W. It has low insertion loss.



PIN Function:
1. Anode
2. Cathode

Package 0805P

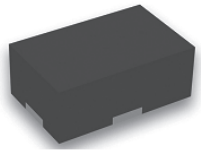
MSWSH-050-10, T_C = +25°C

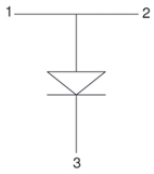
Model	V_F		V_{BR}	C_T		R_S		T_L	I_L		I_L		I_{so}		I_{so}	
	TYP mV	MAX mV	MIN V	TYP dB	MAX dB	TYP Ω	MAX Ω	TYP nS	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB
MSWSH-050-10	850	950	500	0.53	0.65	0.4	0.60	3200	0.1	0.2	0.1	0.2	12	15	-	10
Test Conditions	I_F = 50mA		I_R = 10µA	V_R = 50V F = 1 MHz		I_F = 100mA F = 500 MHz		I_F = 10mA I_R = 6mA Measured @ 50%	I_F = 50mA F < 0.5 GHz		I_F = 50mA F < 1.0 GHz		V_R = 50V F < 0.5 GHz		V_R = 50V F < 1.0 GHz	

Maximum Ratings	Rating	Limits
	V_R	500V
	I_F	500mA
	θ_{JC}	10°C/W
	T_J	+175°C
	T_{STG}	-55 to +150°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C

- Supports up to 40 watts power
- Low Insertion loss typical 0.2dB to 2.7 GHz
- Low Insertion loss typical 0.4dB to 10.0 GHz
- High Isolation 30dB typical to 10.0 GHz

The Aeroflex / Metelics MSWSHB-020-30 is a broadband, high linearity, medium power shunt switch element in a 1.9 x 1.1 mm DFN package. This device is designed for wireless telecommunications infrastructure and test instrument applications in 0.05 ~ 10 GHz.





Package 2012

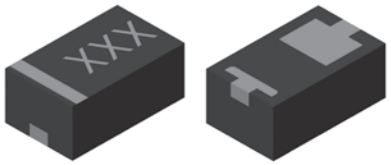
MSWSHB-020-30, $T_C = 25°C$

Model	V_{BR}	T_L	I_L		I_L		IRL/ORL		IRL/ORL		Iso		Iso	
	MIN V	TYP nS	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB
MSWSHB-020-30	200	4000	0.08	0.2	0.4	0.5	25	28	15	20	33	40	28	32
Test Conditions	I_R = 10µA	I_F = 10mA I_R = 6mA Measured @ 50%	V_R = 10V F = 2.7 GHz		V_R = 10V F < 10.0 GHz		V_R = 10V F=2.7 GHz		V_R = 10V F < 10.0 GHz		I_F = 20mA F = 2.7 GHz		I_F = 20mA F < 10.0 GHz	

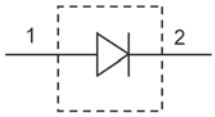
Maximum Ratings	Rating	Limits	Units
	V_R	200	V
	I_F	200	mA
	θ_{JC}	15	
	T_J	+175	°C
	T_{STG}	-65 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Supports up to 40 watts power
- Low Insertion loss typical 0.2 dB to 2.7 GHz
- Low Insertion loss typical 0.4 dB to 8.0 GHz
- High Isolation 55 dB typical to 2.7 GHz

The Aeroflex / Metelics MSWSHC-040-40 is a broadband, high linearity, medium power shunt switch element in a 2.6 x 1.5 mm DFN package. This device is designed for wireless telecommunications infrastructure and test instrument applications in 0.05 ~ 10 GHz.



Package 2615



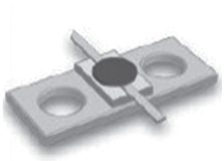
MSWSHC-040-40, T_C = +25°C

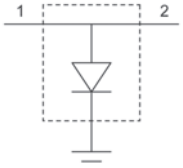
Model	V_{BR}	T_L	I_L		I_L		IRL/ORL				Iso		Iso	
	MIN V	TYP nS	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB
MSWSHC-040-40	300	3000	0.2	0.3	0.4	0.5	20	25	14	16	50	55	35	40
Test Conditions	I_R = 10µA	I_F = 10mA I_R = 6MA Measured @ 50%	Vr = 50V F = 2.3 - 2.7 GHz		Vr = 50V F<8.0 GHz		Vr=50V F=2.3 - 2.7 GHz		Vr = 50V F<8.0 GHz		If = 100mA F=2.3 - 2.7 GHz		If=100mA F<8.0 GHz	

Maximum Ratings	Rating	Limits
	V_R	300V
	I_F	200mA
	θ_{JC}	9°C/W
	TJ	+175°C
	T_{STG}	-65 to +150°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C

- Supports up to 100 watts power when hot switched
- Supports up to 300 watts power when cold switched
- Low insertion loss 0.15 dB typical up to 2.7 GHz
- High isolation 31 dB typical up to 2.7 GHz

The Aeroflex / Metelics' broadband, high linearity, high power shunt switch element in a 10 X 4 mm bolt channel metal package CM22. This device is designed for WiMax, Wibro, WLAN, TD-SCDMA and other wireless infrastructure applications. It is also suited for 0.1 ~ 6 GHz applications with up to 100 watts of power.





Package CM22

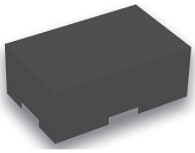
MSWSH-100-30, T_A = +25° C

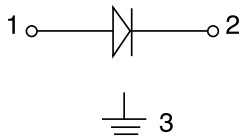
Model	V_{BR}	V_F	C_J	R_S		T_L	IL		IL		IRL		IRL		Iso		Iso	
	MIN V	TYP mV	TYP pF	TYP Ω	MAX Ω	MAX µS	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB
MSWSH-100-30	700	850	0.4	0.4	0.6	1.0	0.15	0.25	0.35	0.45	15	22	10	15	28	31	23	26
Test Conditions	I_R = 10 µA	I_F = 100 mA	V_R = 50 V, F = 1 MHz	I_F = 100 mA F = 500 MHz		I_F = 10 mA I_R = 6 mA	V_R = 50 V F = 2.3 ~ 2.7 GHz		V_R = 50 V F = 6.0 GHz		V_R = 50 V F = 2.3 ~ 2.7 GHz		V_R = 50 V F = 6.0 GHz		I_F = 100 mA F = 2.3 ~ 2.7 GHz		I_F = 100 mA F = 6.0 GHz	

Maximum Ratings	Rating	Limits
	I_F	1 Amp
	Θ_{JC}	5.0° C/W
	T_J	+175° C
	Storage Temperature	-65° C to +150° C
	Soldering Temperature	+230° C for 30 seconds

- Supports up to 20 watt
- Low insertion loss typical 0.3dB @ 2.7GHz
- Low insertion typical loss typical 0.4dB @ 10.0GHz
- High Isolation typical 55dB @ 2.7GHZ
- High Isolation typical 33dB @ 10.0GHZ

The Aeroflex / Metelics MSWSSB-020-30 broadband, high linearity medium power series shunt switch element in a 1.9 x 1.1 mm DFN package. This device is designed for a wireless Telecommunications infrastructure and test instrument applications. It is also suited for other applications in 0.1 - 10GHz.





Package 2012

MSWSSB-020-30, T_C = +25°C

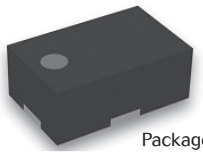
Model	V_{BR}	T_L	I_L		I_L		IRL/ORL		IRL/ORL		Iso		Iso		C_T	C_T	R_S	R_S
	MIN V	TYP nS	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	TYP pF	TYP pF	TYP Ω	TYP Ω
MSWSSB-020-30	200	1000	0.3	0.5	0.6	0.8	20	25	15	20	45	55	28	35	0.26	0.48	0.40	1.22
Test Conditions	I_R = 10µA	I_F = 10mA I_R = 6mA Measured @ 50%	I = -50mA* F= 2.3 ~ 2.7 GHz		I = -50mA* F<10.0 GHz		I = -50mA* F = 2.3 ~ 2.7 GHz		I = -50mA* F<10.0 GHz		I = +50mA* F = 2.3 ~ 2.7 GHz		I = +50mA* F = 6.0 GHz		V_R = 50V F = 1 MHz Shunt Diode	V_R = 50V F = 1 MHz Series Diode	IF = 100mA F = 500 MHz Shunt Diode	IF = 100mA F = 500 MHz Shunt Diode

* Positive current is defined as current going into PIN 2

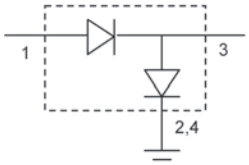
Maximum Ratings	Rating	Limits	Units
	V_R	200	V
	I_F	200	mA
	θ_{JC}	20	°C/W
	T_J	+175	°C
	T_{STG}	-65 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Supports up to 20 watts power when cold switched
- Low insertion loss 0.4 dB typical out to 2.7 GHz
- High isolation 45 dB typical up to 2.7 GHz

The Aeroflex / Metelics' broadband, high linearity, medium power series shunt integrated switch element in a 1.9 X 1.1 mm QFN package. This device is designed for WiMax, Wibro, WLAN, TD-SCDMA and other wireless infrastructure applications. It is also suited for 0.1 ~ 6 GHz applications with up to 20 watts of power.



Package 2012



MSWSS-020-40, T_C = +25° C

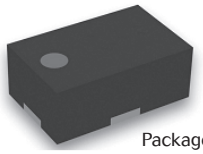
Model	V_{BR}	T_L	IL		IL		IRL		IRL		ORL		ORL		Iso		Iso	
	MIN V	MAX µS	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB
MSWSS-020-40	100	1.0	0.3	0.5	0.6	0.8	15	21	10	13	15	22	10	13	40	50	30	35
Test Conditions	I_R = 10 µA	I_F = 10 mA I_R = 6 mA	**I** = -50 mA* F = 2.3 ~ 2.7 GHz		**I** = -50 mA* F = 6.0 GHz		**I** = -50 mA* F = 2.3 ~ 2.7 GHz		**I** = -50 mA* F = 6.0 GHz		**I** = -50 mA* F = 2.3 ~ 2.7 GHz		**I** = -50 mA* F = 6.0 GHz		**I** = +50 mA* F = 2.3 ~ 2.7 GHz		**I** = +50 mA* F = 6.0 GHz	

Maximum Ratings	Rating	Limits
	V_R	100 V
	I_F	100 mA
	Θ_{JC}	30° C/W
	T_J	+150° C
	Storage Temperature	-65° C to +125° C
	Soldering Temperature	+260° C per JEDEC STD-J-20C

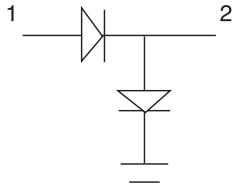
* Positive current is defined as current going into PIN 3.

- Surface mountable series shunt switch
- Low insertion loss <0.5dB to 3 GHz
- High Isolation dB typical >40dB out to 3 GHz

The Aeroflex / Metelics MSWSS-040-30 is a surface mount medium power series shunt switch. The shunt device is based on Metelics Stripline PIN™ which gives broadband high isolation. This device can be surface mounted onto a PC board to give a Low insertion loss and high Isolation switch. The device can handle up to 20 watts of power. Hot switching will depend on the speed of switch power.



Package 2012



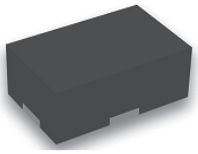
MSWSS-040-30, T_C = +25° C

Model	V_{BR}	I_R	V_F	C_J	R_S		T_L		I_L		I_L		I_{SO}		I_{SO}	
	MIN V	MAX nA	MAX mV	TYP pF	TYP Ω	MAX Ω	MIN nS	TYP nS	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB
MSWSS-040-30	500	100	1000	0.15	0.8	1.0	1000	1500	0.3	0.5	0.6	0.8	-45	-55	-30	-35
Test Conditions	I_R = 10µA	V_R = 80V	I_F = 100mA	V_R = 10V F = 1 MHz Series/Shunt Diode	I_F = 100mA F = 100 MHz Series/Shunt Diode		I_F = 10mA I_R = 6mA Series/Shunt Diode		Bias = -50mA F <3.0 GHz		Bias = -50mA F <8.0 GHz		Bias = -50mA F <3.0 GHz		Bias = -50mA F <8.0 GHz	

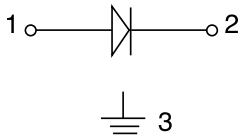
Maximum Ratings	Rating	Limits	Units
	V_R	125	V
	I_F	200	mA
	θ_{JC}	130	°C/W
	T_J	+175	°C
	T_{STG}	-65 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Supports up to 10 watts power
- Low Insertion loss typical 0.5dB up to 2.7 GHz
- High Isolation typical 23dB typical up to 2.7 GHz

The Aeroflex / Metelics MEST²G-010-20 is a broadband medium power switch element in a 1.9 x 1.1 mm DFN package. This device is Electrical Series and Thermal direct to Ground (EST²G), and can be designed for wireless infrastructure applications and test instruments. It is also suited for other applications from 100 MHz up to 10 GHz.



Package 2012



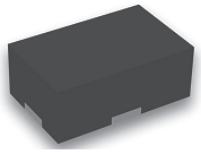
MEST²G-010-20, T_C = +25°C

Model	V_{BR}	T_L	I_L		I_L		IRL		IRL		I_S		I_S	
	MIN V	TYP nS	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB
MEST²G-010-20	125	50	0.4	0.6	0.75	1.0	20	25	12	15	20	23	11	14
Test Conditions	I_R = 10µA	I_F = 10mA, I_R = 6mA 10% / 90%	I_F = 50mA F = 2.3 ~ 2.7 GHz		I_F = 50mA F< 8.0 GHz		I_F = 50mA F = 2.3 ~ 2.7 GHz		I_F = 50mA F< 8.0 GHz		V_R = -10V F = 2.3 ~ 2.7 GHz		V_R = -10V F< 8.0 GHz	

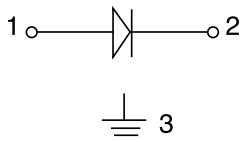
Maximum Ratings	Rating	Limits	Units
	V_R	125	V
	I_F	100	mA
	θ_{JC}	130	°C/W
	T_J	+175	°C
	T_{STG}	-65 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Supports up to 20 watts power
- Low Insertion loss typical 0.2dB up to 2.7 GHz
- High Isolation typical 18dB up to2.7 GHz

The Aeroflex / Metelics MEST²G-020-15 is a broadband medium power switch element in a 1.9 x 1.1 mm DFN package. This device is Electrical Series and Thermal direct to Ground (EST²G). This device can be designed for wireless infrastructure applications and test instruments. It is also suited for other applications from 100 MHz up to 6 GHz.



Package 2012



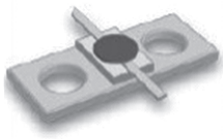
MEST²G-020-15, T_C = +25°C

Model	V_{BR}	T_L	I_L		I_L	IRL		IRL		I_{So}		I_{So}	
	MIN V	TYP nS	TYP dB	MAX dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB
MEST²G-020-15	125	50	0.2	0.3	0.3	23	27	18	22	15	18	10	12
Test Conditions	I_R = 10µA	I_F = 10mA I_R = 6mA 10% / 90%	I_F = 50mA F = 2.3 ~ 2.7 GHz		I_F = 50 mA F <6.0 GHz	I_F = 50mA F = 2.3 ~ 2.7 GHz		I_F = 50mA F <6.0 GHz		V_R = -10V F = 2.3 ~ 2.7 GHz		V_R = -10V F <6.0 GHz	

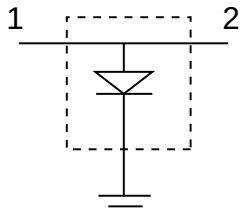
Maximum Ratings	Parameters	Rating	Units
	V_R	125	V
	I_F	100	mA
	θ_{JC}	65	°C/W
	T_J	+175	°C
	T_{STG}	-65 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Low Insertion Loss <0.40 dB at 2.0 GHz
- Low Insertion Loss <0.85 dB at 6.0 GHz
- Medium Isolation >20 dB at 2.0 GHz
- Medium Isolation >10 dB at 6.0 GHz
- High Power Handling 150 watts

The Aeroflex / Metelics MEST²G-150-020-CM26 is an Electrical Series Thermal to Ground Series diode Switch Element in a bolt down Copper package. This part is designed for a reliable high power switch application up to 150 watts. Usable up to 10 GHz.



Package CM26



MEST²G-150-020-CM26, T_C = +25°C

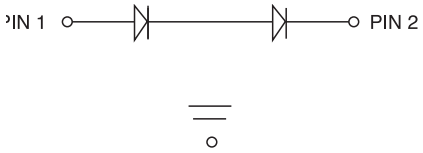
Model	V_{BR}	I_R	V_F	R_S	T_L	VSWR		VSWR		I_L		I_L		I_{SO}		I_{SO}	
	MIN V	MAX nA	MAX mV	TYP Ω	TYP ns	TYP dB	MAX dB	TYP dB	MAX dB	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB
MEST²G-150-020-CM26	600	100	1850	1.8	1800	1.30:1	1.40:1	1.45:1	1.70:1	0.25	0.40	0.60	0.75	20.0	23	10.0	12.0
Test Conditions	I_R = 10µA	V_R = 100V	I_F = 50mA	I_F = 100mA; F = 100 MHz 2 Diodes	I_F = 10mA; I_R = 6mA Measured @ 50%	I_F = 100mA F <2.0 GHz		I_F = 100mA F <6.0 GHz		I_F = 100mA F <2.0 GHz		I_F = 100mA F <6.0 GHz		V_R = 10V F <2.0 GHz		V_R = 10V F <6.0 GHz	

Maximum Ratings	Rating	Limits	Units
	V_R	600	V
	I_{FDC}	250	mA
	θ_{JC}	8	°C/W
	T_J	-40 to +175	°C
	T_{STG}	-55 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Low Insertion Loss <0.35 dB at 2.0 GHz
- Low Insertion Loss <0.60 dB at 6.0 GHz
- Medium Isolation >22 dB at 2.0 GHz
- Medium Isolation >14 dB at 6.0 GHz
- High Power Handling 80 watts at 2 GHz or less

The Aeroflex / Metelics MEST²G-080-25-CM27 is an Electrical Series Thermal To Ground Series diode Switch Element in a bolt down Copper package. This part is designed for a reliable high power switch application up to 80 watts. Usable up to 10 GHz.

Package CM27



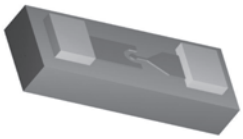
MEST²G-080-25-CM27, TC = +25°c

Model	V_{BR}	I_R		V_F		C_J	R_S	T_L	IRL / ORL		IRL / ORL		I_L		I_L		I_{SO}		I_{SO}	
	MIN V	TYP nS	MAX nS	TYP mV	MAX mV	TYP pF	TYP Ω	TYP nS	TYP dB	MAX dB	TYP dB	MAX dB	TYP dB	MAX dB	TYP dB	MAX dB	MIN dB	TYP dB	MIN dB	TYP dB
MEST²G-080-25-CM27	500	40	100	0.93	1.05	0.90	0.97	1550	27	31	13	16	0.20	0.35	0.45	0.60	22	25	14	17
Test Conditions	I_R = 10µA Single Diode	V_R = 100V Single Diode		I_F = 100mA Single Diode		V_R = 50V, F = 1 MHz Single Diode	I_F = 100mA, F = 100 MHz Single Diode	I_F = 10mA, I_R = 6 mA Measured at 50%	I_F = 100 mA F <2.0GHz		I_F = 100mA F <6.0 GHz		I_F = 100 mA F <2.0 GHz		I_F = 100 mA F <6.0 GHz		V_R = 10V F <2.0 GHz		V_R = 10V F <6.0 GHz	

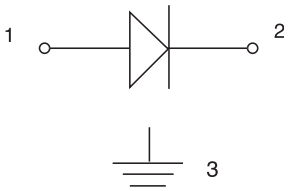
Maximum Ratings	Rating	Limits	Units
	V_R	500	V
	I_{FDC}	200	mA
	θ_{JC}	30	°C/W
	T_J	-40 to +175	°C
	T_{STG}	-55 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Supports up to 10 watts power
- Low Insertion loss typical 0.4 dB up to 40 GHz
- High Isolation typical 12 dB typical at 10 GHz

The Aeroflex / Metelics MEST²GFC-010-25 broadband medium power series switch element in chip form (26 x 12 mils). This is an Electrical Series device with a direct Thermal path to Ground (EST2G). It can be used in place of beam lead devices for medium power (up to 10 watts) series switching. It is also suited for other applications from 100 MHz up to 40 GHz.



Chip



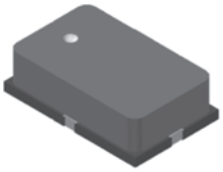
MEST²GFC-010-25, TC = +25°c

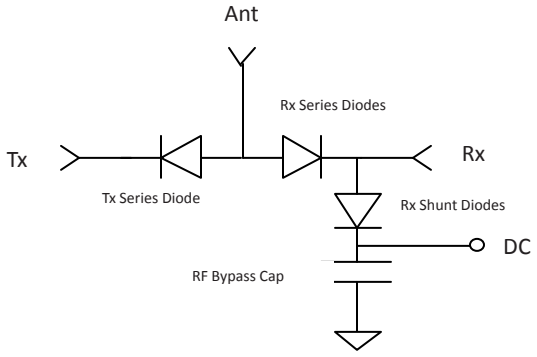
Model	V_{BR}	T_L	R_{min}	I_L		I_L	IRL		IRL		I_{So}		I_{So}	
	MIN V	TYP nS	TYP Ω	TYP dB	MAX dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB	MIN dB	TYP dB
MEST²GFC-010-25	125	50	2.0	0.3	0.4	0.4	-25	-28	-	-15	10	12	15	18
Test Conditions	I_R = 10µA	I_F = 10mA I_R = 6mA 10% / 90%	IF = 100mA F = 500 MHz	I_F = 50mA F = 10 GHz		I_F = 100mA F <40 GHz	I_F = 50mA F = 10 GHz		I_F = 50mA F <40 GHz		V_R = -10V F = 10 GHz		V_R = -10V F <6.0 GHz	

Maximum Ratings	Rating	Limits	Units
	V_R	100	V
	I_{FDC}	100	mA
	θ_{JC}	65	°C/W
	T_J	+150	°C
	T_{STG}	-65 to +150	°C
	T_{SOLDER}	+260°C per JEDEC J-STD-20C	

- Surface Mount SP2T Switch in Compact Outline: 8mm L x 5mm W x 2.5mm H
- Higher Average Power Handing than Plastic (125W C.W. Power)
- Higher Voltage >500 Volts for a Higher RF Peak Power (500W Peak Power)
- Lower Insertion Loss (0.25db) & Higher IIP3 (65dBm)
- Operates from + Voltage Only (+5V & +28V to +125V)
- RoHS Complaint

The Aeroflex / Metelics MSW2000-200, MSW2001-200 and MSW2002-200 series of Surface Mount Silicon PIN Diode SP2T T-R Switches are manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating High Voltage PIN Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 5mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The SP2T switches are designed in an asymmetrical topology to optimize Tx-Ant Loss and Tx-Rx Isolation performance.





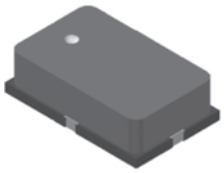
MSW2000-200, MSW2001-200, MSW2002-200 Electrical Characteristics

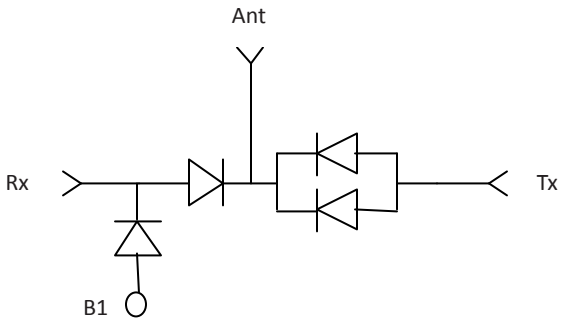
Part Number	Configuration	DC Power	Frequency (MHz)	Loss (dB)	VSWR	Isolation (dB)	C.W. Incident Power (dBm)
MSW2000-200	SP2T T-R Switch	+ V Only	20 - 1000	0.2	1.2:1	52	+50
MSW2001-200	SP2T T-R Switch	+ V Only	200 - 4000	0.3	1.3:1	36	+50
MSW2002-200	SP2T-T-R Switch	+ V Only	2000 - 6000	0.6	1.5:1	34	+50

Maximum Ratings	Parameters	Rating
	Operating Temperature	-55°C to +150°C
	Storage Temperature	-65°C to +200°C

- Surface Mount SP2T Switch in Compact Outline: 8mm L x 5mm W x 2.5mm H
- Higher Average Power Handing than Plastic (158W C.W. Power)
- Higher Voltage >800 Volts for a Higher RF Peak Power (500W Peak Power)
- Lower Insertion Loss (0.3db) & Higher IIP3 (60dBm)
- Operates from +5V & -200V for Lower Linear Frequency Operation
- RoHS Complaint

The Aeroflex / Metelics MSW2020-202 Silicon PIN Diode, SP2T T-R Switch is manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating High Voltage PIN Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 5mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The SP2T switches are designed in an asymmetrical Series & Series–Shunt topology to optimize Tx & Rx performance. The MSW2020-202 operates from 10MHz - 1,000MHz to provide broadband performance for low and high signal superior operation.



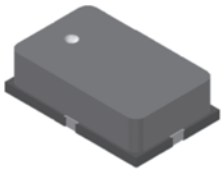


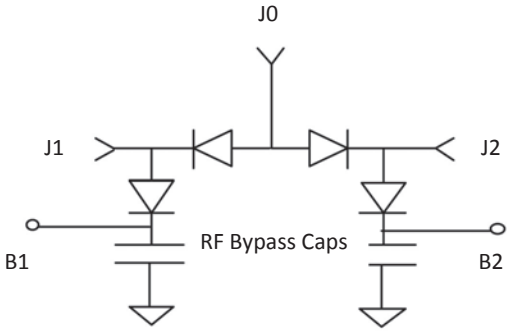
MSW2000-202 Electrical Characteristics

Part Number	Configuration	DC Power	Frequency (MHz)	Loss (dB)	VSWR	Isolation (dB)	C.W. Incident Power (dBm)
MSW2020-202	SP2T T-R Switch	+ V & - V	10 - 1000	0.2	1.2:1	52	+52

- Surface Mount SP2T Switch in Compact Outline: 8mm L x 5mm W x 2.5mm H
- Higher Average Power Handing than Plastic (100W C.W. Power)
- Higher Voltage >500 Volts for a Higher RF Peak Power (500W Peak Power)
- Lower Insertion Loss (0.30db) & Higher IIP3 (65dBm)
- Operates from + Voltage Only (+5V & +28V to +125V)
- RoHS Complaint

The Aeroflex / Metelics MSW2030-203, MSW2031-203 and MSW2032-203 series of Surface Mount Silicon PIN Diode SP2T Switches are manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating High Voltage PIN Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 5mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The SP2T switches are designed in a symmetrical topology to optimize Insertion Loss and Isolation performance.



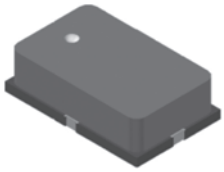


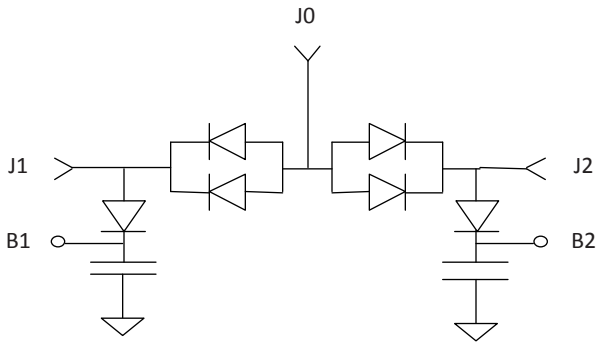
MSW2030-203, MSW2031-203, & MSW2032-203 Electrical Characteristics

Part Number	Configuration	DC Power	Frequency (MHz)	Loss (dB)	VSWR	Isolation (dB)	C.W. Incident Power (dBm)
MSW2030-203	Symmetrical SP2T	+ V Only	20 - 1000	0.3	1.2:1	52	+50
MSW2031-203	Symmetrical SP2T	+ V Only	200 - 4000	0.5	1.3:1	35	+50
MSW2032-203	Symmetrical SP2T	+ V Only	2000 - 6000	0.6	1.5:1	35	+50

- Surface Mount SP2T Switch in Compact Outline: 8mm L x 5mm W x 2.5mm H
- Higher Average Power Handing than Plastic (158W C.W. Power)
- Higher Voltage >500 Volts for a Higher RF Peak Power (500W Peak Power)
- Lower Insertion Loss (0.25db) & Higher IIP3 (65dBm)
- Operates from + Voltage Only (+5V & +28V to +125V)
- RoHS Complaint

The Aeroflex / Metelics MSW2040-204 and MSW2041-204 series of Surface Mount Silicon PIN Diode SP2T Switches are manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating High Voltage PIN Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 5mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The SP2T switches are designed in a symmetrical topology to optimize Insertion Loss and Isolation performance.



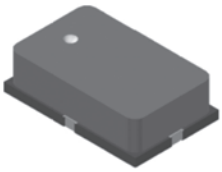


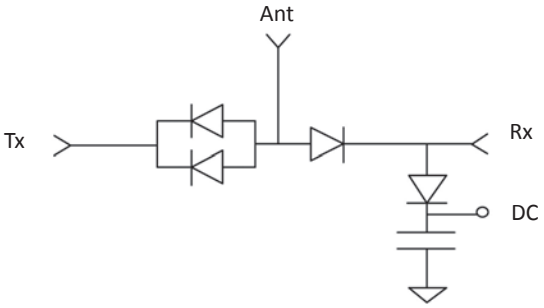
MSW2040-204 & MSW2041-204 Electrical Characteristics

Part Number	Configuration	DC Power	Frequency (MHz)	Loss (dB)	VSWR	Isolation (dB)	C.W. Incident Power (dBm)
MSW2040-204	Symmetrical SP2T	+ V Only	20 - 1000	0.2	1.2:1	50	+52
MSW2041-204	Symmetrical SP2T	+ V Only	200 - 4000	0.5	1.3:1	33	+52

- Surface Mount SP2T Switch in Compact Outline: 8mm L x 5mm W x 2.5mm H
- Higher Average Power Handing than Plastic (158W C.W. Power)
- Higher Voltage >500 Volts for a Higher RF Peak Power (500W Peak Power)
- Lower Insertion Loss (0.25db) & Higher IIP3 (65dBm)
- Operates from + Voltage Only (+5V & +28V to +125V)
- RoHS Complaint

The Aeroflex / Metelics MSW2050-205 and MSW2051-205 series of Surface Mount Silicon PIN Diode SP2T Switches are manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating High Voltage PIN Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 5mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The SP2T switches are designed in an asymmetrical topology to optimize Tx-Ant Loss and Tx-Rx Isolation performance.



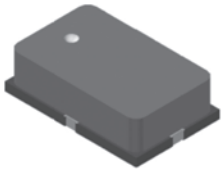


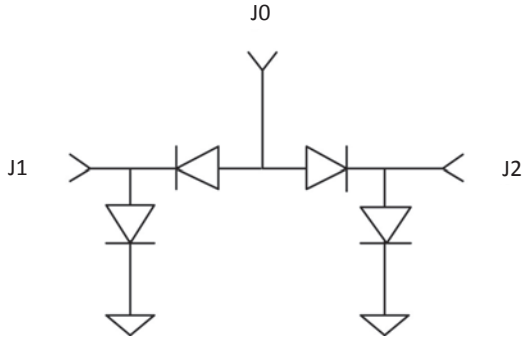
MSW2050-205 & MSW2051-205 Electrical Characteristics

Part Number	Configuration	DC Power	Frequency (MHz)	Loss (dB)	VSWR	Isolation (dB)	C.W. Incident Power (dBm)
MSW2050-205	SP2T T-R Switch	+ V Only	20 - 1000	0.2	1.2:1	52	+52
MSW2051-205	SP2T T-R Switch	+ V Only	200 - 4000	0.3	1.3:1	40	+52

- Surface Mount SP2T Switch in Compact Outline: 8mm L x 5mm W x 2.5mm H
- Higher Average Power Handing than Plastic (100W C.W. Power)
- Higher Voltage >500 Volts for a Higher RF Peak Power (500W Peak Power)
- Lower Insertion Loss (0.25db) & Higher IIP3 (65dBm)
- Operates from -5V & -180V for High Linearity
- RoHS Complaint

The Aeroflex / Metelics MSW2060-206, MSW2061-206 and MSW2062-206 series of Surface Mount Silicon PIN Diode SP2T Switches are manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating High Voltage PIN Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 5mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The SP2T switches are designed in a symmetrical topology to optimize Insertion Loss and Isolation performance.



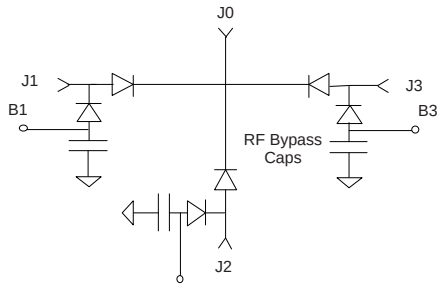


MSW2060-206, MSW2061-206, & MSW2062-206 Electrical Characteristics

Part Number	Configuration	DC Power	Frequency (MHz)	Loss (dB)	VSWR	Isolation (dB)	C.W. Incident Power (dBm)
MSW2060-206	Symmetrical SP2T	+ V & - V	20 - 1000	0.25	1.2:1	53	+50
MSW2061-206	Symmetrical SP2T	+ V & - V	400 - 4000	0.5	1.3:1	35	+50
MSW2062-206	Symmetrical SP2T	+ V & - V	2000 - 6000	0.7	1.5:1	34	+50

- Surface Mount SP3T Switch in Compact Outline: 8mm L x 8mm W x 2.5mm H
- Higher Average Power Handing than Plastic (100W C.W. Power)
- Higher Voltage >1000 Volts for a Higher RF Peak Power (500W Peak Power)
- Lower Insertion Loss (0.45db) & Higher IIP3 (65dBm)
- Operates From + Voltage Only (+5V & +28V to +125V)
- RoHS Complaint

The Aeroflex / Metelics MSW3100-310 and MSW3101-310 series of Surface Mount Silicon PIN Diode SP3T Switches are manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating High Voltage PIN Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 8mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The SP3T switches are designed in a symmetrical topology to optimize Insertion Loss and Isolation performance.

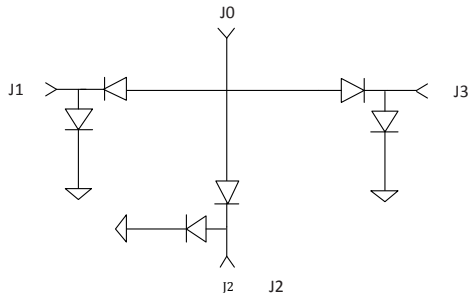


MSW3100-310 & MSW3101-310 Electrical Characteristics

Part Number	Configuration	DC Power	Frequency (MHz)	Loss (dB)	VSWR	Isolation (dB)	C.W. Incident Power (dBm)
MSW3100-310	Symmetrical SP3T	+ V only	20 - 1000	0.4	1.2:1	57	+50
MSW3101-310	Symmetrical SP3T	+ V only	200 - 4000	0.6	1.4:1	43	+50

- Surface Mount SP3T Switch in Compact Outline: 8mm L x 5mm W x 2.5mm H
- Higher Average Power Handing than Plastic (100W C.W.)
- Higher Voltage > 1000 Volts for a Higher RF Peak Power (500W)
- Lower Insertion Loss (0.4db) & Higher IIP3 (65dBm)
- Faster Switching Speed (1µS)
- Operates from +5V & -180V for Higher Linearity
- RoHS Complaint

The Aeroflex / Metelics MSW3200-320 and MSW3201-320 series of Surface Mount Silicon PIN Diode SP3T Switches are manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating High Voltage PIN Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 5mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The SP3T switches are designed in a symmetrical topology to optimize Insertion Loss and Isolation performance.



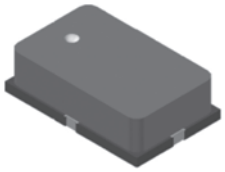
MSW3200-320 & MSW3201-320 Electrical Characteristics

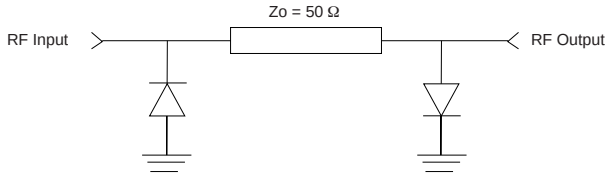
Part Number	Configuration	DC Power	Frequency (MHz)	Loss (dB)	VSWR	Isolation (dB)	C.W. Incident Power (dBm)
MSW3200-320	Symmetrical SP3T	+ V & - V	20 - 1000	0.4	1.2:1	47	+50
MSW3201-320	Symmetrical SP3T	+ V & - V	400 - 4000	0.6	1.4:1	35	+50

Surface Mount PIN Diode Limiter

- Surface Mount Limiter in Compact Outline: 8mm L x 5mm W x 2.5mm H
- Incorporates Anti-Parallel Limiter Diodes
- Broadband Performance (20MHz - 8GHz)
- Higher Average Power Handling than Plastic (44dBm Avg. Power)
- Lower Insertion Loss (1.4dB) & Lower Flat Leakage Power (20dBm)
- RoHS Compliant

The Aeroflex / Metelics LM200802-M-A-300 Surface Mount Silicon PIN Diode Limiter is manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating Silicon NIP and PIN Diodes integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 5mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The Limiter Modules are designed to optimize small signal insertion loss, (N.F.) and high signal flat leakage performance in a compact, surface mount package.



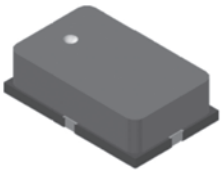


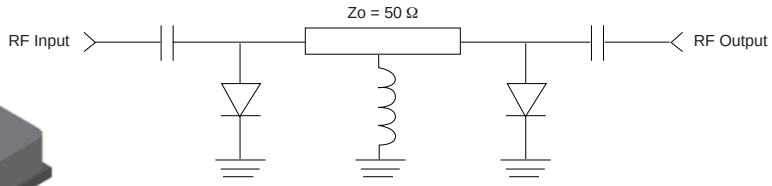
High Power Surface Mount Limiters

Part Number	Type	Frequency (MHz)	Loss (dB)	C.W. Power (W)
LM200802-M-A-300	Medium Power, Broadband	20 - 8000	1.4	20

- Surface Mount Limiter in Compact Outline: 8mm L x 5mm W x 2.5mm H
- Incorporates PIN Limiter Diodes, D.C. Blocks & D.C. Return
- Higher Peak Power Handling than Plastic (125W Peak Power)
- Higher Average Power Handling than Plastic (5W C.W. Power)
- Lower Insertion Loss (0.4dB) & Lower Flat Leakage Power (21dBm)
- RoHS Compliant

The Aeroflex / Metelics LM501202-L-C-300 Surface Mount Silicon PIN Diode Limiter is manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating PIN Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 5mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The Limiter Modules are designed to optimize small signal insertion loss, (N.F.) and high signal flat leakage performance in a compact, surface mount package from 0.5GHz - 2.0GHz.





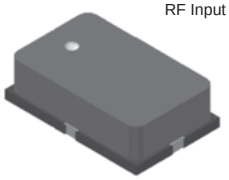
High Power Surface Mount Limiters

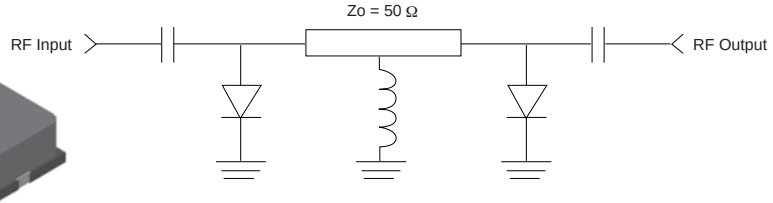
Part Number	Type	Frequency (MHz)	Loss (dB)	C.W. Power (W)
LM501202-L-C-300	Octave Band, Low Power	500 - 2000	0.4	5

Surface Mount PIN Diode Limiter

- Surface Mount Limiter in Compact Outline: 8mm L x 5mm W x 2.5mm H
- Incorporates PIN Limiter Diodes, D.C. Blocks & D.C. Return
- Higher Peak Power Handling than Plastic (200W Peak Power)
- Higher Average Power Handling than Plastic (30W C.W. Power)
- Lower Insertion Loss (0.4dB) & Lower Flat Leakage Power (21dBm)
- RoHS Compliant

The Aeroflex / Metelics LM501202-M-C-300 Surface Mount PIN Diode Limiter is manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating PIN Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 5mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The Limiter Modules are designed to optimize small signal insertion loss, (N.F.) and high signal flat leakage performance in a compact, surface mount package from 0.5GHz - 2.0GHz.



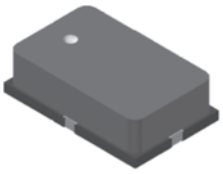


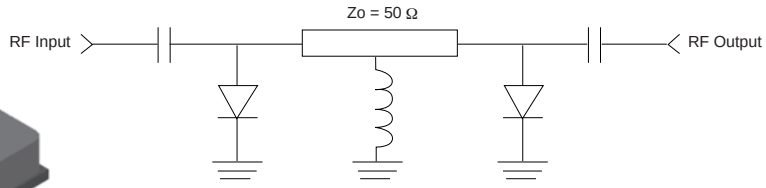
High Power Surface Mount Limiters

Part Number	Type	Frequency (MHz)	Loss (dB)	C.W. Power (W)
LM501202-M-C-300	Octave Band, Med Power	500 - 2000	0.4	30

- Surface Mount Limiter in Compact Outline: 8mm L x 5mm W x 2.5mm H
- Incorporates PIN Limiter Diodes, D.C. Blocks & D.C. Return
- Higher Peak Power Handling than Plastic (100W Peak Power)
- Higher Average Power Handling than Plastic (4W C.W. Power)
- Lower Insertion Loss (1.1dB) & Lower Flat Leakage Power (19dBm)
- RoHS Compliant

The Aeroflex / Metelics LM202802-L-C-300 Surface Mount Silicon PIN Diode Limiter is manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating PIN Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 5mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The Limiter Modules are designed to optimize small signal insertion loss, (N.F.) and high signal flat leakage performance in a compact, surface mount package from 2GHz - 8GHz.



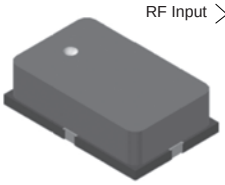


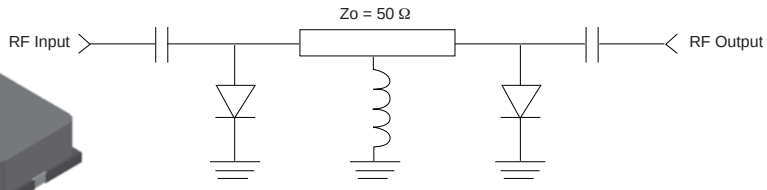
High Power Surface Mount Limiters

Part Number	Type	Frequency (MHz)	Loss (dB)	C.W. Power (W)
LM202802-L-C-300	Octave Band, Low Power	2000-8000	1.1	4

- Surface Mount Limiter in Compact Outline: 8mm L x 5mm W x 2.5mm H
- Incorporates PIN Limiter Diodes, D.C. Blocks & D.C. Return
- Higher Peak Power Handling than Plastic (200W Peak Power)
- Higher Average Power Handing than Plastic (30W C.W. Power)
- Lower Insertion Loss (1.2dB) & Lower Flat Leakage Power (20dBm)
- RoHS Compliant

The Aeroflex / Metelics LM202802-M-C-300 Surface Mount Silicon PIN Diode Limiter is manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating PIN Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 5mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The Limiter Modules are designed to optimize small signal insertion loss, (N.F.) and high signal flat leakage performance in a compact, surface mount package from 2GHz - 8GHz.



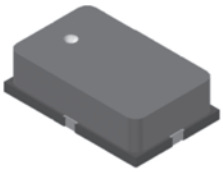


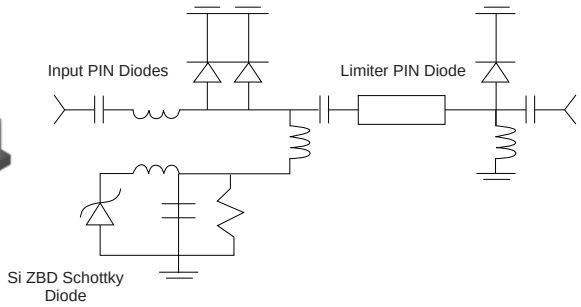
High Power Surface Mount Limiters

Part Number	Type	Frequency (MHz)	Loss (dB)	C.W. Power (W)
LM202802-M-C-300	Octave Band, Med Power	2000 - 8000	1.2	30

- Surface Mount Limiter in Compact Outline: 8mm L x 5mm W x 2.5mm H
- Incorporates PIN Limiter & Schottky Diodes, D.C. Blocks & D.C. Return
- Higher Average Power Handling than Plastic (100W C.W. Peak Power)
- Lower Insertion Loss (0.3dB) & Lower Flat Leakage Power (18dBm)
- RoHS Compliant

The Aeroflex / Metelics LM401102-Q-C-301 Surface Mount Silicon PIN Diode Limiter is manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating PIN Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 5mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The Limiter Modules are designed to optimize small signal insertion loss, (N.F.) and high signal flat leakage performance in a compact, surface mount package.



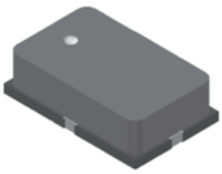


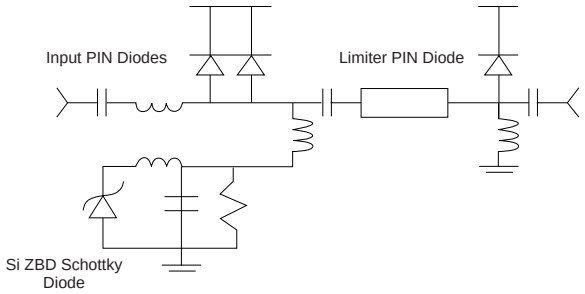
High Power Surface Mount Limiters

Part Number	Type	Frequency (MHz)	Loss (dB)	C.W. Power (W)
LM401102-Q-C-301	Octave Band, High Power, "Quasi-Active"	400 - 1000	0.3	100

- Surface Mount Limiter in Compact Outline: 8mm L x 5mm W x 2.5mm H
- Incorporates PIN Limiter & Schottky Diodes, D.C. Blocks & D.C. Return
- Higher Average Power Handling than Plastic (100W C.W. Power)
- Lower Insertion Loss (0.35dB) & Lower Flat Leakage Power (17dBm)
- RoHS Compliant

The Aeroflex / Metelics LM102202-Q-C-301 Surface Mount Silicon PIN Diode Limiter is manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating PIN Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 5mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The Limiter Modules are designed to optimize small signal insertion loss, (N.F.) and high signal flat leakage performance in a compact, surface mount package.



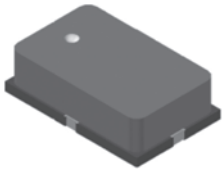


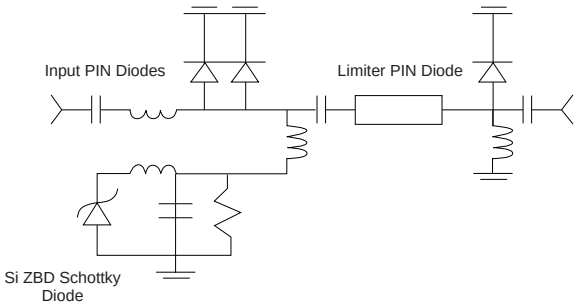
High Power Surface Mount Limiters

Part Number	Type	Frequency (MHz)	Loss (dB)	C.W. Power (W)
LM102202-Q-C-301	Octave Band, High Power, "Quasi-Active"	1000 - 2000	0.35	100

- Surface Mount Limiter in Compact Outline: 8mm L x 5mm W x 2.5mm H
- Incorporates PIN Limiter & Schottky Diodes, D.C. Blocks & D.C. Return
- Higher Average Power Handling than Plastic (100W C.W. Power)
- Lower Insertion Loss (1.1dB) & Lower Flat Leakage Power (21dBm)
- RoHS Compliant

The Aeroflex / Metelics LM202802-Q-C-301 Surface Mount Silicon PIN Diode Limiter is manufactured using Aeroflex / Metelics proven hybrid manufacturing process incorporating PIN Diodes and passive devices integrated within a ceramic substrate. This low profile, compact, surface mount component, (8mm L x 5mm W x 2.5mm H) offers superior low and high signal performance to comparable MMIC devices in QFN packages. The Limiter Modules are designed to optimize small signal insertion loss, (N.F.) and high signal flat leakage performance in a compact, surface mount package.





High Power Surface Mount Limiters

Part Number	Type	Frequency (MHz)*	Loss (dB)	C.W. Power (W)
LM202802-Q-C-301	Octave Band, High Power, "Quasi-Active"	2000 - 8000	1.1	100

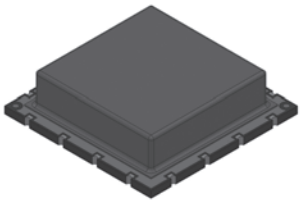
MPD2T28125-700 PIN Diode Driver

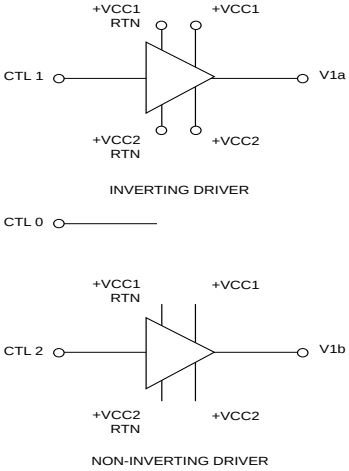
- Higher Output Voltage and Higher Output Current PIN Diode Driver in Surface Mount Package
- Usable with MSW2000,2010,2030,2040, and 2050 Series T-R and Symmetrical High Power SP2T Switches.
- Operates from Positive Voltage Only: +5V and (+28V to +125V)
- Higher Output Currents (200mA) for Lower Switch Loss and Higher Isolation
- Single or Separate TTL Input Controls, 2 Complementary Outputs
- RoHS Complaint

The MPD2T28125-700 2 Channel Surface Mount PIN Diode Driver is designed to provide higher voltage and higher current operation for higher power PIN Diode Switches. In particular, this PIN Diode Driver is intended to operate with Aeroflex / Metelics MSW2000,2010,2030,2040, and 2050 Series of Surface Mount, Higher Power SP2T Transmit-Receive and Symmetrical Surface Mount Switches.

This PIN Diode Driver can supply voltages from +10V to +125V for reverse biasing to successfully operate the MSW2000,2010,2030,2040,2050 Series PIN Diode Switches from 20MHz – 6,000MHz for 100W C.W. or peak power levels. In addition, the Driver can supply current of 200mA for the Series PIN Diode to provide lower insertion loss and higher isolation. Single or dual TTL control is available in the design. The Driver provides (2) complementary outputs that can drive (4) bias ports in the SP2T PIN diode Switch. Switching Speed is on the order of 1µS and can be improved with external RC, current spiking network.

The PIN Diode Driver is designed in a 1.3" square x 0.33" H (33mm sq x 8.4mm H) surface mount package. This device is available in tube and tape-reel packaging for high volume pick and place automated assembly and are fully RoHS compliant.





CS 700 Outline I/O Table

I/O Port	Description
PIN_1 (J_1)	TTL Input Control (CTL_1)
PIN_2 (J_2)	$+VCC_1$ & $+VCC_2$ RTN
PIN_3 (J_3)	TTL Input Control (CTL_2)
PIN_4 (J_4)	CTL_0 (Optional Connection)
PIN_5 (J_5)	$+VCC_1$ & $+VCC_2$ RTN
PIN_6 (J_6)	V_{18} (Voltage/Current Output #1)
PIN_7 (J_7)	$+VCC_1$ & $+VCC_2$ RTN
PIN_8 (J_8)	V_{1b} (Voltage/Current Output #2)
PIN_9 (J_9)	$+VCC_1$ & $+VCC_2$ RTN
PIN_{10} (J_{10})	$+VCC_1$ & $+VCC_2$ RTN
PIN_{11} (J_{11})	$+VCC_1$ & $+VCC_2$ RTN
PIN_{12} (J_{12})	$+VCC_1$ & $+VCC_2$ RTN
PIN_{13} (J_{13})	$+VCC_2$ ($+_{28}$V to $+_{125}$V High Voltage Input)
PIN_{14} (J_{14})	$+VCC_1$ & $+VCC_2$ RTN
PIN_{15} (J_{15})	$+VCC_1$ ($+_5$V Input)
PIN_{16} (J_{16})	$+VCC_1$ & $+VCC_2$ RTN

Silicon Abrupt Tuning Varactors

Plastic SMT

- Available in Tape and Reel
- Small and High Volume Commercial Applications
- High Q
- Wide Selection of Capacitance Ranges

The Aeroflex / Metelics abrupt tuning varactors provide extremely high Q and low series resistance available in a 30 volt Silicon diode. These devices are available in single junction, common anode and common cathode configurations. Consult factory for availability.

Single and Common Cathode

Model	C_T pF		Capacitance Ratio	R_S Ω	Q
	MIN	MAX	MIN	MAX	MIN
MSV1400-08-001	1.62	1.98	4.1	0.60	2900
MSV1400-108-004	1.62	1.98	4.1	0.60	2900
MSV1400-09-001	1.98	2.42	4.1	0.50	2800
MSV1400-109-004	1.98	2.42	4.1	0.50	2800
MSV1400-10-001	2.43	2.97	4.2	0.45	2600
MSV1400-110-004	2.43	2.97	4.2	0.45	2600
MSV1400-11-001	2.97	3.63	4.2	0.40	2500
MSV1400-111-004	2.97	3.63	4.2	0.40	2500
MSV1400-13-001	3.51	4.29	4.2	0.35	2400
MSV1400-113-004	3.51	4.29	4.2	0.35	2400
MSV1400-14-001	4.23	5.17	4.2	0.30	2200
MSV1400-114-004	4.23	5.17	4.2	0.30	2200
MSV1400-15-001	5.04	6.16	4.3	0.27	2100
MSV1400-115-004	5.04	6.16	4.3	0.27	2100
MSV1400-16-001	6.12	7.48	4.3	0.24	2000
MSV1400-116-004	6.12	7.48	4.3	0.24	2000
MSV1400-17-001	7.38	9.02	4.3	0.22	1800
MSV1400-117-004	7.38	9.02	4.3	0.22	1800
MSV1400-19-001	9.00	11.0	4.4	0.20	1600
MSV1400-20-001	10.8	13.2	4.4	0.18	1500
MSV1400-21-001	13.5	16.5	4.4	0.18	1200
MSV1400-22-001	16.2	19.8	4.4	0.18	1000
Test Conditions	@ 4 V, 1 MHz		C_T0/C_T30	@ -4 V, 50 MHz	@ -4 V, 50 MHz

Plastic SMT

Single and Common Cathode

Model	Capacitance pF	Quality Factor Q	Capacitance Ratio
		MIN	MIN
SMV2101	6.8	450	2.5
SMV2102	8.2	450	2.5
SMV2103	10.0	400	2.5
SMV2104	12.0	400	2.5
SMV2105	15.0	400	2.5
SMV2106	18.0	350	2.5
SMV2107	22.0	350	2.5
SMV2108	27.0	300	2.5
SMV2109	33.0	200	2.5
SMV2110	39.0	150	2.5
SMV2111	47.0	150	2.5
SMV2112	56.0	150	2.6
SMV2113	68.0	150	2.6
SMV2114	82.0	100	2.6
SMV2115	100.0	100	2.6
Test Conditions	@ -4V, 1 MHz	@ -4V, 50 MHz	C_J 2V / C_J 30V, 1 MHz

Maximum Ratings	Parameters	Rating
	DC Power Dissipation	@T_A = 25° C 250 mW
	Reverse Breakdown Voltage	@10mA 30 V Min
	Max Reverse Current	@T_A = 25° C 0.1 mA @25 Vdc
	Operating Temperature	-55 to + 125° C
	Storage Temperature	-65 to + 150° C
	Capacitance Tolerance	±10%

Silicon Abrupt Tuning Varactors: 30 Volt


Bare Die


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT


Plastic SMT


Glass Axial Leaded

- Low Series Resistance-High Q
- Extensive Selection of Capacitance Values

The Aeroflex / Metelics MTV-4030 Series Tuning Varactors are silicon abrupt junction devices. They offer the highest Q and lowest resistance available in 30 volt tuning diodes.

A unique silicon dioxide passivation process assures greater stability, reliability and low leakage currents at higher temperatures.

Model	Junction Capacitance C_T	Capacitance Ratio	Quality Factor Q
	pF	MIN	MIN
MTV4030-01	0.4	5.0	5000
MTV4030-02	0.6	5.0	5000
MTV4030-03	0.8	5.0	4800
MTV4030-04	1.0	5.0	4800
MTV4030-05	1.2	5.0	4600
MTV4030-06	1.4	5.0	4400
MTV4030-07	1.6	5.0	4400
MTV4030-08	1.8	5.0	4200
MTV4030-09	2.2	5.0	4000
MTV4030-10	2.7	5.0	3800
MTV4030-11	3.3	5.0	3600
MTV4030-12	3.6	5.0	3400
MTV4030-13	3.9	5.0	3400
MTV4030-14	4.7	5.0	3200
MTV4030-15	5.6	5.0	3000
MTV4030-16	6.8	5.0	2800
MTV4030-17	8.2	5.0	2600
MTV4030-18	10.0	5.0	2400
MTV4030-19	12.0	5.0	2200
MTV4030-20	15.0	5.0	2000
MTV4030-21	18.0	5.0	1800
MTV4030-22	22.0	5.0	1600
MTV4030-23	27.0	5.0	1400
MTV4030-24	33.0	5.0	1400
MTV4030-25	39.0	5.0	1200
MTV4030-26	47.0	5.0	1000
Test Conditions	@ -4 V, 1MHz	C_T0/C_T 30 V	@ -4V, 50 MHz

Maximum Ratings	Parameter	Rating
	Operating Temperature	-55 to + 150 °C
	Storage Temperature Range	-65 to + 200 °C
	Reverse Voltage	30 V
	Device Dissipation at T_A = 25°C	250 mW

Silicon Abrupt Tuning Varactors: 45 Volt

Bare Die | Ceramic Microwave Pill | Ceramic Epoxy SMT | Ceramic Hermetic SMT | Plastic SMT | Glass Axial Leaded

- Low Series Resistance-High Q
- Extensive Selection of Capacitance Values

The Aeroflex / Metelics MTV-4045 Series Tuning Varactors are silicon abrupt junction devices. They offer the highest Q and lowest resistance available in 45 volt tuning diodes.

A unique silicon dioxide passivation process assures greater stability, reliability and low leakage currents at higher temperatures.

Model	Junction Capacitance	Capacitance Ratio	Quality Factor, Q
	pF	MIN	MIN
MTV4045-01	0.4	7.0	3000
MTV4045-02	0.6	7.0	3000
MTV4045-03	0.8	7.0	2800
MTV4045-04	1.0	7.0	2800
MTV4045-05	1.2	7.0	2600
MTV4045-06	1.4	7.0	2400
MTV4045-07	1.6	7.0	2400
MTV4045-08	1.8	7.0	2300
MTV4045-09	2.2	7.0	2200
MTV4045-10	2.7	7.0	2200
MTV4045-11	3.3	7.0	2100
MTV4045-12	3.6	7.0	2000
MTV4045-13	3.9	7.0	2000
MTV4045-14	4.7	7.0	2000
MTV4045-15	5.6	7.0	1900
MTV4045-16	6.8	7.0	1800
MTV4045-17	8.2	7.0	1700
MTV4045-18	10.0	7.0	1600
MTV4045-19	12.0	7.0	1500
MTV4045-20	15.0	7.0	1400
MTV4045-21	18.0	7.0	1300
MTV4045-22	22.0	7.0	1200
Test Conditions	@ -4 V, 1MHz	C_T0/C_T 45 V	@ -4V, 50 MHz

Maximum Ratings	Parameter	Rating
	Operating Temperature	-55 to + 150 °C
	Storage Temperature Range	-65 to + 200 °C
	Reverse Voltage	45 V
	Device Dissipation at TA = 25ºC	250 mW

Silicon Abrupt Tuning Varactors: 60 Volt


Bare Die


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT


Plastic SMT


Glass Axial Leaded

- Low Series Resistance-High Q
- Extensive Selection of Capacitance Values

The Aeroflex / Metelics MTV-4060 Series Tuning Varactors are silicon abrupt junction devices. They offer the highest Q and lowest resistance available in 60 volt tuning diodes.

A unique silicon dioxide passivation process assures greater stability, reliability and low leakage currents at higher temperatures.

Model	Junction Capacitance	Capacitance Ratio	Quality Factor
	pF	MIN	MIN
MTV4060-01	0.8	8.0	2100
MTV4060-02	1.0	8.0	2100
MTV4060-03	1.2	8.0	2100
MTV4060-04	1.4	8.0	2000
MTV4060-05	1.6	8.0	2000
MTV4060-06	1.8	8.0	2000
MTV4060-07	2.2	8.0	2000
MTV4060-08	2.7	8.0	1900
MTV4060-09	3.3	8.0	1800
MTV4060-10	3.6	8.0	1700
MTV4060-11	3.9	8.0	1700
MTV4060-12	4.7	8.0	1600
MTV4060-13	5.6	8.0	1500
MTV4060-14	6.8	8.0	1400
MTV4060-15	8.2	8.0	1300
MTV4060-16	10.0	8.0	1200
MTV4060-17	12.0	8.0	1100
MTV4060-18	15.0	8.0	1000
Test Conditions	@ -4 V, 1MHz	C_T0/C_T 60 V	@ -4 V, 50 MHz

Maximum Ratings	Parameter	Rating
	Operating Temperature	-55 to + 150 °C
	Storage Temperature Range	-65 to + 200 °C
	Reverse Voltage	60 V
	Device Dissipation at TA = 25°C	250 mW

Silicon Abrupt Tuning Varactors: 90 Volt


Bare Die


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT


Plastic SMT


Glass Axial Leaded

- Low Series Resistance-High Q
- Extensive Selection of Capacitance Values

The Aeroflex / Metelics MTV-4090 Series Tuning Varactors are silicon abrupt junction devices. They offer the highest Q and lowest resistance available in 90 volt tuning diodes.

A unique silicon dioxide passivation process assures greater stability, reliability and low leakage currents at higher temperatures.

Model	Total Capacitance	Capacitance Ratio	Quality Factor
	pF	MIN	MIN
MTV4090-01	0.8	8.0	1000
MTV4090-02	1.0	8.0	1000
MTV4090-03	1.2	8.0	900
MTV4090-04	1.4	8.0	900
MTV4090-05	1.6	8.0	850
MTV4090-06	1.8	8.0	850
MTV4090-07	2.2	8.0	850
MTV4090-08	2.7	8.0	850
MTV4090-09	3.3	8.0	800
MTV4090-10	3.6	8.0	800
MTV4090-11	3.9	8.0	800
MTV4090-12	4.7	8.0	800
MTV4090-13	5.6	8.0	800
MTV4090-14	6.8	8.0	750
MTV4090-15	8.2	8.0	750
MTV4090-16	10.0	8.0	750
Test Conditions	@ -4 V, 1MHz	C_T0/C_T 90 V	@ -4V, 50 MHz

Maximum Ratings	Parameter	Rating
	Operating Temperature	-55 to + 150 °C
	Storage Temperature Range	-65 to + 200 °C
	Reverse Voltage	90 V
	Device Dissipation at TA = 25° C	250 mW

Bare Die

Glass Axial Leaded

Ultra-Low Leakage

Model	Total Capacitance pF	Capacitance Ratio	Working Voltage Vdc	Breakdown Voltage Vdc
		TYP	MAX	MIN
V907	7	4.1	25	28
V910	10	4.1	25	28
V912	12	4.2	25	28
V915	15	4.2	25	28
V920	20	3.9	20	22
V927	27	4.0	20	22
V933	33	4.1	20	22
V939	39	4.1	20	22
V947	47	3.9	20	22
V956	56	3.5	15	17
V968	68	3.5	15	17
V982	82	3.5	15	17
V900	100	3.5	15	17
V907E	7	6.9	100	110
V910E	10	6.9	100	110
V912E	12	7.5	100	110
V915E	15	7.5	100	110
V920E	20	7.9	90	99
V927E	27	7.4	65	72
V933E	33	6.5	60	66
V939E	39	6.3	55	61
V947E	47	6.1	50	55
V956E	56	5.7	40	44
V968E	68	4.6	30	33
V982E	82	4.0	20	22
V900E	100	4.0	20	22
Test Conditions	@ -4 V, 1MHz	C•0.5V / C•MWV		I_R = 100 µA

Maximum Ratings	Parameter	Rating
	Forward Voltage Drop	1.0 Vdc
	DC Power Dissipation	400 mW
	Max Reverse Current	5 nA
	Operating Temperature	-65° to +150 °C
	Storage Temperature	-65° to +200 °C
	Capacitance Tolerance	+20%

Glass Axial Leaded

KSV2101 – KSV2115

Glass Axial Leaded

Model	Total Capacitance	Quality Factor Q	Capacitance Ratio	
	pF	MIN	MIN	MAX
KSV2101	6.8	450	2.5	3.2
KSV2102	8.2	450	2.5	3.2
KSV2103	10.0	400	2.5	3.2
KSV2104	12.0	400	2.5	3.2
KSV2105	15.0	400	2.5	3.2
KSV2106	18.0	350	2.5	3.2
KSV2107	22.0	350	2.5	3.2
KSV2108	27.0	300	2.5	3.2
KSV2109	33.0	200	2.5	3.2
KSV2110	39.0	150	2.5	3.2
KSV2111	47.0	150	2.5	3.2
KSV2112	56.0	150	2.6	3.3
KSV2113	68.0	150	2.6	3.3
KSV2114	82.0	100	2.6	3.3
KSV2115	100.0	100	2.6	3.3
Test Conditions	@ -4 V, 1MHz	@ -4 V, 50 MHz	C_T 2 / C_T 30 V, 1 MHz	

Maximum Ratings	Parameters	Rating
	DC Power Dissipation	400 mW
	Reverse Breakdown Voltage	30 V min
	Max Reverse Current @ Ta = 25° C	0.1 µA @ 25 Vdc
	Operating Temperature Topr	-65° to 175° C
	Storage Temperature Tstg	-65° to 200° C
	Capacitance Tolerance:	+10%

Glass Axial Leaded

MV830 – MV840 — Glass Axial Leaded

Model	C_T Diode Capacitance pF			Quality Factor Q		Tuning Ratio T_R	
	MIN	TYP	MAX	MIN	TYP	MIN	TYP
MV830	13.5	15.0	16.5	30	35	1.8	2.00
MV831	6.2	18.0	19.8	25	30	1.8	2.00
MV832	19.8	22.0	24.2	25	30	1.8	2.10
MV833	24.3	27.0	29.7	25	30	1.8	2.10
MV834	29.7	33.0	36.3	20	25	1.9	2.12
MV835	35.1	39.0	42.9	20	25	1.9	2.12
MV836	42.3	47.0	51.7	15	20	1.9	2.15
MV837	50.4	56.0	61.6	15	20	1.9	2.15
MV838	61.2	68.0	74.8	15	20	2.0	2.18
MV839	73.8	82.0	90.2	10	15	2.0	2.18
MV840	90.0	100.0	10.0	10	15	2.0	2.18
Test Conditions	@ -4 V, F= 1MHz			@ -4 V, 50 MHz		C_T 4V / C_T 25V, 1 MHz	

Maximum Ratings	Parameters	Value	Rating
	DC Power Dissipation	400 mW	
	Min Reverse Breakdown Voltage	30 Vdc	
	Max Reverse Current	@ 25 Vdc	0.2 µA
	Operating Temperature		-65° to +150° C
	Storage Temperature		-65° to +200° C
	Junction Temperature	+175° C	

Glass Axial Leaded

MV1620 – MV1650

Model	Diode Capacitance C_T pF			Quality Factor Q	Tuning Ratio T_R	
	MIN	TYP	MAX	MIN	MIN	TYP
MV1620	6.1	6.8	7.5	300	2.0	3.2
MV1622	7.4	8.2	9.0	300	2.0	3.2
MV1624	9.0	10.0	11.0	300	2.0	3.2
MV1626	10.8	12.0	13.2	300	2.0	3.2
MV1628	13.5	15.0	16.5	250	2.0	3.2
MV1630	16.2	18.0	19.8	250	2.0	3.2
MV1632	18.0	20.0	22.0	250	2.0	3.2
MV1634	19.8	22.0	24.2	250	2.0	3.2
MV1636	24.3	27.0	29.7	200	2.0	3.2
MV1638	29.7	33.0	36.3	200	2.0	3.2
MV1640	35.1	39.0	42.9	200	2.0	3.2
MV1642	42.3	47.0	51.7	200	2.0	3.2
MV1644	50.4	56.0	61.6	150	2.0	3.2
MV1646	61.2	68.0	74.8	150	2.0	3.2
MV1648	73.8	82.0	90.2	150	2.0	3.2
MV1650	90.0	100.0	110.0	150	2.0	3.2
Test Conditions	$V_R = 4$ Vdc, F = 1 MHz			@ 4 Vdc, F = 50 MHz	C_T 2 V / C_T 20V, 1 MHz	

Maximum Ratings	Parameters	Value	Rating
	DC Power Dissipation	@ TA = 25° C	400 mW
	Min Reverse Breakdown Voltage	@ Ir = 10 µA	20 Vdc
	Max Reverse Current	@ 15 Vdc	0.1 µA Max
	Operating Temperature		-65° to +150° C
	Storage Temperature		-65° to +200° C
	Junction Temperature		175° C

MV1652 – MV1666

Model	Diode Capacitance C_T pF			Quality Factor Q	Capacitance Ratio		Reverse Voltage Vdc
	MIN	TYP	MAX	MIN	TYP	TYP	MIN
MV1652	108	120	135	250	2.6		20
MV1654	132	150	165	250	2.6		20
MV1656	162	180	198	200	2.6		20
MV1658	180	200	220	200	2.6		20
MV1660	198	220	242	200	2.6		20
MV1662	225	250	275	150		2.3	15
MV1664	243	270	300	100		2.3	15
MV1666	297	330	363	100		2.3	15
Test Conditions	$V_R = 4$ Vdc, F = 1 MHz			$V_R = 4$ Vdc, F = 20 MHz	C_T 2 V / C_T 20 V	C_T 2 V / C_T 15 V	@ 10 µA

Maximum Ratings	Parameters	Value	Rating
	DC Power Dissipation	@ TA = 25° C	475 mW
	Max Reverse Current	@ 15 Vdc	0.1 µA (MV1652-MV1660)
	Max Reverse Current	@ 10 Vdc	0.1 µA (MV1662-MV1666)
	Operating Temperature		-65° to +150° C
	Storage Temperature		-65° to +200° C
	Junction Temperature		175° C

Glass Axial Leaded

1N5139 – 1N5148, 1N5139A – 1N5148A

Model	Capacitance pF			Capacitance Ratio	Quality Factor Q
	MIN	TYP	MAX	MIN	MIN
1N5139	6.12	6.8	7.48	2.7	350
®1N5139A	6.46	6.8	7.14	2.7	350
1N5140	9.0	10.0	11.0	2.8	300
®1N5140A	9.5	10.0	10.5	2.8	300
1N5141	10.8	12.0	13.2	2.8	300
®1N5141A	11.4	12.0	12.6	2.8	300
1N5142	13.5	15.0	16.5	2.8	250
®1N5142A	14.3	15.0	15.7	2.8	250
1N5143	16.2	18.0	19.8	2.8	250
®1N5143A	17.1	18.0	18.9	2.8	250
1N5144	19.8	22.0	24.2	3.2	200
®1N5144A	20.9	22.0	23.1	3.2	200
1N5145	24.3	27.0	29.7	3.2	200
®1N5145A	25.7	27.0	28.3	3.2	200
1N5146	29.7	33.0	36.3	3.2	200
®1N5146A	31.4	33.0	34.6	3.2	200
1N5147	6.1	39.0	42.9	3.2	200
®1N5147A	37.1	39.0	40.9	3.2	200
1N5148	42.3	47.0	51.7	3.2	200
®1N5148A	44.7	47.0	49.3	3.2	200
Test Conditions	@ -4 Vdc, 1 MHz			C_T 2 V / C_T 60 V	@ 4 Vdc F = 50 MHz

Maximum Ratings	Parameters	Value	Rating
	DC Power Dissipation	400 mW	
	Forward Current	250 mA	
	Min Reverse Breakdown Voltage	@ I_R = 10 µAdc	65 Vdc
	Max Reverse Current	@ V_R = 55 Vdc	20 µAdc
	Max Reverse Current	@ V_R = 55 Vdc; Ta = 150° C	20 µAdc
	Temp Coefficient of Capacitance	@ V_R = 4 Vdc; Ta -40 to +85° C	03% / °C
	Operating Temperature Range	-65° to +175° C	
	Storage Temperature Range	-65° to +200° C	
	Voltage Tolerance	Standard Device	+10%
	Suffix A	+5%	

® Denotes Military approval for JAN - JANTX - JANTXV

Glass Axial Leaded

1N5441 – 1N5456

Model	Capacitance pF	Tuning Ratio		Quality Factor Q
		MIN	MAX	MIN
1N5441	6.8	2.5	3.1	450
1N5442	8.2	2.5	3.1	450
1N5443	10.0	2.6	3.1	400
1N5444	12.0	2.6	3.1	400
1N5445	15.0	2.6	3.1	400
1N5446	18.0	2.6	3.1	350
1N5447	20.0	2.6	3.1	350
1N5448	22.0	2.6	3.2	350
1N5449	27.0	2.6	3.2	350
1N5450	33.0	2.6	3.2	350
1N5451	39.0	2.6	3.2	300
1N5452	47.0	2.6	3.2	250
1N5453	56.0	2.6	3.3	200
1N5454	68.0	2.7	3.3	175
1N5455	82.0	2.7	3.3	175
1N5456	100.0	2.7	3.3	175
Test Conditions	@ 4 Vdc, 1 MHz	C_T 2 V / C_T 30 V F=1-MHz		@ 4 Vdc F = 50 MHz

Glass Axial Leaded

1N5461– 1N5476

Model	Capacitance pF	Tuning Ratio		Quality Factor Q
		MIN	MAX	MIN
®1N5461	6.8	2.7	3.1	600
®1N5462	8.2	2.8	3.1	600
®1N5463	10.0	2.8	3.1	550
®1N5464	12.0	2.8	3.1	550
®1N5465	15.0	2.8	3.1	550
®1N5466	18.0	2.9	3.1	500
®1N5467	20.0	2.9	3.1	500
®1N5468	22.0	2.9	3.2	500
®1N5469	27.0	2.9	3.2	500
®1N5470	33.0	2.9	3.2	500
®1N5471	39.0	2.9	3.2	450
®1N5472	47.0	2.9	3.2	400
®1N5473	56.0	2.9	3.3	300
®1N5474	68.0	2.9	3.3	250
®1N5475	82.0	2.9	3.3	225
®1N5476	100.0	2.9	3.3	200
Test Conditions	@ 4 Vdc, 1 MHz	C_T 2 V / C_T 30 V F = 1 -MHz		@ 4 Vdc F = 50 MHz

Maximum Ratings	Parameters	Value	Rating
	DC Power Dissipation (Pd)	@ Ta = 25° C	400 mW
	Min Reverse Breakdown Voltage	@ Ir = 10 µA	30 V
	Max Reverse Current	@ 25 Vdc	0.02 µA
	Max Reverse Current	@ 25 Vdc 150° C	20 µA
	Temp Coefficient of Capacitance	@ Vr = 4 Vdc; Ta -65 to +85° C	.04%/°C
	Operating Temperature Range		-65° to +175° C
	Storage Temperature Range		-65° to +200° C
	Capacitance Tolerance	Standard Device	+20%
	Suffix A	+10%	
	Suffix B	+5%	
	Suffix C	+2%	

® Denotes Military Approval For JAN - JANTX - JANTXV (B&C Tolerance only)

Glass Axial Leaded

1N5681– 1N5709

Model	Capacitance pF	Quality Factor Q	Capacitance Ratio				Working Voltage Vdc	Reverse Breakdown Voltage
		MIN	MIN	TYP	MIN	TYP	MAX	MIN
1N5681	6.8	600	3.1	3.3			40	45
1N5682	8.2	600	3.1	3.3			40	45
1N5683	10.0	550	3.2	3.4			40	45
1N5684	12.0	550	3.2	3.4			40	45
1N5685	15.0	550	3.2	3.4			40	45
1N5686	18.0	500	3.2	3.4			40	45
1N5687	22.0	500	3.3	3.5			40	45
1N5688	27.0	500	3.3	3.5			40	45
1N5689	33.0	500	3.3	3.5			40	45
1N5690	39.0	450	3.3	3.5			40	45
1N5691	47.0	400	3.3	3.5			40	45
1N5692	56.0	300	3.3	3.5			40	45
1N5693	68.0	250	3.3	3.5			40	45
1N5694	82.0	225	3.3	3.5			40	45
1N5695	100.0	200	3.3	3.5			40	45
1N5696	6.8	450			2.7	2.9	60	65
1N5697	8.2	450			2.7	2.9	60	65
1N5698	10.0	400			2.8	3.0	60	65
1N5699	12.0	400			2.8	3.0	60	65
1N5700	15.0	400			2.8	3.0	60	65
1N5701	18.0	375			2.8	3.0	60	65
1N5702	22.0	375			3.2	3.4	60	65
1N5703	27.0	350			3.2	3.4	60	65
1N5704	33.0	350			3.2	3.4	60	65
1N5705	39.0	325			3.2	3.4	60	65
1N5706	47.0	300			3.2	3.4	60	65
1N5707	56.0	225			3.2	3.4	60	65
1N5708	68.0	175			3.2	3.4	60	65
1N5709	82.0	150			3.2	3.4	60	65
Test Conditions	@ 4Vdc 1 MHz	@ 4 Vdc F = 50 MHz	C_T 2 V / C_T 40 V		C_T 4 V / C_T 60 V			@ 10μA

Maximum Ratings	Parameters	Value	Rating
	DC Power Dissipation	400 mW	
	Max Reverse Current	@ Ta = 25° C	20 nA @ MWV
	Max Reverse Current	@ Ta = 150° C	20 μA @ MWV
	Operating Temperature Range	-65° to +175° C	
	Storage Temperature Range	-65° to +200° C	
	Capacitance Tolerance:	Standard Device	+20%
	Suffix A	+10%	
	Suffix B	+5%	

Low Cost Silicon Hyperabrupt Tuning Varactors

Glass Axial Leaded

- Low Inductance
- Wide Capacitance Swing
- High Q
- Superior Reproducibility

The Aeroflex / Metelics Low Cost Hyperabrupts offer high Qs. These diodes are excellent for octave tuning up to 800 MHZ and for straight-line frequency tuning between 3 and 8 Volt of bias. They achieve high Q values when tuned between 9 and 20 volts.

TV3201, TV3901, TV 3902

Model	C_T Diode Capacitance pF		T_R Tuning Ratio		Q		V_{BR} Vdc	I_R nA	Cathode Strip	Case Style
	MIN/MAX	MIN/MAX	MIN	MAX	MIN	TYP	MIN	MAX		
TV3201	9/13	2.0/2.3	4.5	5.8	300	415	30	50	White	DO34
TV3901	26/32	4.5/6.0	5.0	6.5	200	280	30	50	Yellow	DO34
TV3902	22.5/27.5	2.9/3.5	6.8	8.9	115	160	30	50	Green	DO34
Test Conditions	@ -3 Vdc F = 1 MHz	@ -25 Vdc F = 1 MHz	C_T -3 / C_T -25 F = 1 MHz		@ -3 Vdc F = 50 MHz		@ 10 µA	@ -28 Vdc		

Maximum Ratings	Parameter	Value
	Reverse Voltage	30 Vdc
	Forward Current	200 mAdc
	Power Dissipation at TA = 25° C	400 mW
	Derate Above 25° C	4.0 mW / °C
	Maximum Junction Temperature	+125 °C
	Storage Temperature	-65 to +200 °C

KSV1401–KSV1412

Model	Diode Capacitance C_T pF				Tuning Ratio T_R		Quality Factor Q
	MIN	MAX	MIN	MAX	MIN	MIN	MIN
KSV1401	440	660			14:1		200
KSV1402			45	69		10:1	200
KSV1403			140	210		10:1	200
KSV1404			96	144		10:1	200
KSV1405			200	300		10:1	200
KSV1406			80	120		10:1	200
KSV1407			54	82		10:1	200
KSV1408			37	57		10:1	200
KSV1409			26	40		10:1	200
KSV1410			17	27		9.5:1	200
KSV1411			12	18		8.5:1	200
KSV1412			8	12		7.5:1	200
Test Conditions	@ -1 V, F =1 MHz		@ -2 V, F = 1 MHz		C_T 1V / C_T 10V @ F = 1 MHz	C_T 2V / C_T 10V @ F = 1 MHz	@ -2 V F = 1 MHz

Maximum Ratings	Parameter	Value
	Device Dissipation TA = 25° C	400 mW
	Junction Temperature	175 °C
	Reverse Breakdown Voltage	10 µAdc, 12 Vdc Min
	Max Reverse Leakage Current	Vr = 10 Vdc, 0.1 µVdc
	Operating Temperature	-55° to + 150 °C
	Storage Temperature	-65° to + 200 °C
	Capacitance Tolerance	+ 20%
	Suffix A	+ 10%
	Suffix B	+ 5%

To order devices screened to MIL-PRF-19500 JANTX level, Appendix E, Table IV add suffix H.

Silicon Hyperabrupt Tuning Varactors: Portable

Plastic SMT

- Available in Tape and Reel
- Small and High Volume Commercial Applications
- Wide Selection of Capacitance Ranges

The Aeroflex / Metelics Hyperabrupt Varactors come in a wide variety of capacitance values and high capacitance ratios. These devices are available in single junction, common anode and common cathode configurations.

Single and Common Cathode — Surface Mount

Model	Capacitance pF		Capacitance RATIO		Capacitance RATIO		RS Ω	Q
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
MSV1104-33-323	3.00	3.60	1.40	1.90	2.60	3.30	1.20	1200
MSV1204-33-001	3.00	3.60	1.40	1.90	2.60	3.30	1.20	1200
MSV1204-133-004	3.00	3.60	1.40	1.90	2.60	3.30	1.20	1200
MSV1104-34-323	5.8	7.15	1.60	2.00	2.80	3.40	0.80	1000
MSV1204-34-001	5.85	7.15	1.60	2.00	2.80	3.40	0.80	1000
MSV1204-134-004	5.85	7.15	1.60	2.00	2.80	3.40	0.80	1000
MSV1104-35-323	10.35	12.65	1.60	2.00	2.90	3.40	0.60	750
MSV1204-35-001	10.35	12.65	1.60	2.00	2.90	3.40	0.60	750
MSV1204-135-004	10.35	12.65	1.60	2.00	2.90	3.40	0.60	750
MSV1104-36-323	15.50	18.50	1.60	2.00	3.00	3.50	0.50	700
MSV1204-36-001	15.50	18.50	1.60	2.00	3.00	3.50	0.50	700
MSV1204-136-004	15.50	18.50	1.60	2.00	3.00	3.50	0.50	700
MSV1204-37-001	45.00	54.00	1.60	2.00	3.00	3.50	0.25	500
Test Conditions	C_T @ -1 Vdc, F = 1 MHz		C_T 1 V / C_T 3 V		C_T 1 V / C_T 6 V		@ 50 MHz	@ 3 V, 50 MHz

Maximum Ratings	Parameters	Rating
	Reverse Breakdown Voltage	10 mA: 15 V MIN
	Reverse Leakage Current	12 V: 50 nA MAX

Plastic SMT

- Available in Tape and Reel
- Small and High Volume Commercial Applications
- Wide Selection of Capacitance Ranges

The Aeroflex / Metelics Hyperabrupt Varactors come in a wide variety of capacitance values and high capacitance ratios. These devices are available in single junction, common anode and common cathode configurations.

Single and Common Cathode Super Hyperabrupt Varactors For VCXOs

DESIGNED FOR 3 AND 5 VOLT CIRCUITS

Model	C_T pF	C_T pF		C_T pF	RS
	MIN	MIN	MAX	MAX	MAX
SMV30222	18	5	7	2.4	4.0 Ω
SMV30223	36	10	14	4.8	2.3 Ω
SMV30224	54	15	21	7.2	1.9 Ω
SMV30225	72	20	28	9.6	1.5 Ω
Test Conditions	@ -1 Vdc, F = 1 MHz	@ 2.5 Vdc, F = 1 MHz		@ -4 Vdc, F = 1 MHz	@ 50 Vdc, F = 50 MHz

DESIGNED FOR 3 VOLT CIRCUITS

Model	C_T RATIO		C_T pF		C_T RATIO		RS
	MIN	TYP	MIN	MAX	MIN	TYP	MAX
SMV30332	3.0	4.0	5.5	7.0	3.0	4.0	16.0 Ω
SMV30333	3.0	4.0	11.0	14.0	3.0	4.0	9.0 Ω
Test Conditions	C_T @ 0.3 V / C_T @1.65 V		C_T @ 1.65 V		C_T @ 1.65 V / C_T @ 3.0 V		@ 1.65 V 50 MHz

Maximum Ratings	Parameters	Value	Rating
	Reverse Breakdown Voltage	10µAdc	8 Volt MIN
	Max Reverse Leakage Current	V_R = 6 Volts	0.1 µAdc
	Device Dissipation	Ta = 25° C	250 mW
	Operating Temperature		-55° to 125° C
	Storage Temperature		-65° to 150° C

Plastic SMT

Model	C_T pF		C_T pF		RATIO	Q @ V_R 1, 50 MHz	V_R 1 V	V_R 2 V
	MIN	MAX	MIN	MAX	MIN	MIN	TYP	TYP
MSV1200-04-001	10.5	12.5	2.1	2.50	4.60	400	3.0	20
MSV1200-104-004	10.5	12.5	2.1	2.50	4.60	400	3.0	20
MSV1200-07-001	25.0	31.0	4.5	5.30	4.80	300	3.0	20
MSV1200-107-004	25.0	31.0	4.5	5.30	4.80	300	3.0	20
MSV1204-04-001	02.5	03.3	0.6	0.85	3.00	500	4.0	20
MSV1204-104-004	02.5	03.3	0.6	0.85	3.00	500	4.0	20
MSV1204-05-001	04.5	05.5	0.9	1.20	4.20	500	4.0	20
MSV1204-105-004	04.5	05.5	0.9	1.20	4.20	500	4.0	20
MSV1202-03-001	18.0	22.0	3.1	3.90	4.60	300	4.0	20
MSV1202-08-001	45.0	55.0	7.3	9.20	5.00	200	4.0	20
MSV1202-12-001	100	125	15.0	20.00	5.20	125	4.0	20
Test Conditions	@ -1 V_R 1, F = 1 MHz		C_T -2 @ V_R 2, F = 1 MHz		C_T 1V / C_T 2V	@ -1 Vdc, F = 50 MHz		

Model	V_B	I_R nA	C_T pF		C_T pF		C_T		Q
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	TYP	MIN
MSV1204-99-001	12	50	11	14	4.0	16.5	1.2	1.9	250
MSV1204-199-004	12	50	11	14	4.0	16.5	1.2	1.9	250
Test Conditions	@ 10µA	-8 Vdc	C_T @ -0.2 Vdc, F = 1 MHz		C_T @ -2 Vdc, F = 1 MHz		@ -6 Vdc, F = 50 MHz		@ -2 Vdc, F = 50 MHz

Model	C_T pF		C_T pF		C_T pF		Q
	MIN	TYP	MIN	TYP	MIN	TYP	MIN
MSV1204-11-001	95.0	100	40.0	65.0	20.0	25.0	80
MSV1204-12-001	42.0	50.0	18.0	27.0	09.0	12.0	150
MSV1204-13-001	17.0	22.0	08.5	10.5	04.0	05.5	200
MSV1204-14-001	14.5	16.0	06.5	07.8	03.0	04.8	300
MSV1204-15-001	8.7	09.5	04.3	5.50	02.0	02.9	350
MSV1201-97-001	85.0	—	—	—	15.0	30.0	500*
Test Conditions	@ -1 Vdc, F = 1 MHz		@ -2.5 Vdc, F = 1 MHz		@ -4 Vdc, F = 1 MHz		@ -4 Vdc, F = 50 MHz

Model	C_T pF		C_T RATIO		C_T RATIO		Q
	MIN	MAX	MIN	MAX	MIN	MAX	MIN
MSV1204-22-001	18.0	27.0	01.5	02.0	1.50	2.00	150
MSV1204-23-001	09.0	13.0	01.5	02.0	1.50	2.00	200
MSV1204-24-001	06.0	80.0	01.5	02.0	1.50	2.00	300
MSV1204-25-001	04.2	05.6	01.5	02.0	1.50	2.00	350
Test Conditions	@ 2.5 Vdc, F = 1 MHz		C_T 1 V / C_T 2.5 V		C_T 2.5 V / C_T 4 V		@ -4 V, F = 50 MHz

Silicon Hyperabrupt Tuning Varactors: Wideband

Plastic SMT

- High Capacitance Ratios
- Linear Tuning Between 2 and 8 Volts
- Available Over a Broad Range of Junction Capacitances
- Satisfies a Large Number of Wideband Applications through the VHF Frequency Band

Model	Diode Capacitance C_T pF		Diode Capacitance C_T pF		Tuning Ratio T_R		Quality Factor Q
	MIN	MAX	MIN	MAX	MIN	MIN	MIN
SMV1401	440	660			14:1		200
SMV1402			45	69		10:1	200
SMV1403			140	210		10:1	200
SMV1404			96	144		10:1	200
SMV1405			200	300		10:1	200
SMV1406			80	120		10:1	200
SMV1407			54	82		10:1	200
SMV1408			37	57		10:1	200
SMV1409			26	40		10:1	200
SMV1410			17	27		9.5:1	200
SMV1411			12	18		8.5:1	200
SMV1412			8	12		7.5:1	200
Test Conditions	@ 1 Vdc, F = 1 MHz		@ 2 Vdc, F = 1 MHz		C_T 1V/C_T 10V	C_T 2V/C_T 10V	@ -2V, F = 50 MHz

Maximum Ratings	Parameters	Value	Rating
	Device Dissipation	Ta - 25° C	250 mW
	Reverse Breakdown Voltage	10 µAdc	12 Volt Vdc Min
	Max Reverse Leakage Current	VR = 10 Vdc	0.1 µAdc
	Junction Temperature		125° C
	Operating Temperature		-55° to + 125° C
	Storage Temperature		-65° C to + 150° C
	Capacitance Tolerance		Standard Device + 20%

Silicon Hyperabrupt Tuning Varactors: VHF/UHF

Plastic SMT

- Superior Performance in Highly Stable Oscillator Designs
- Uniform Capacitance / Temperature Coefficient
- Highly Reproducible Ion Implanted Structure

Model	C_T pF		C_T RATIO		C_T RATIO		Q
	MIN	MAX	MIN	MAX	MIN	MAX	MIN
SMV20422	18.0	27.0	1.8	2.5	1.8	2.5	150
SMV20423	9.0	13.0	1.8	2.5	1.8	2.5	200
SMV20424	6.0	8.0	1.8	2.5	1.8	2.5	300
SMV20425	4.2	5.6	1.8	2.5	1.8	2.5	350
Test Conditions	@ 2.5 Vdc, F = 1 MHz		C_T @ 1 V / C_T 2.5 V		C_T 2.5 V / C_T 4 V		@ -4 Vdc, F = 50 MHz

Model	C_T pF		C_T pF		C_T pF		Q
	MIN	TYP	MIN	MAX	TYP	MAX	MIN
SMV20411	95.0	100.0	40.0	65	20.0	25.0	80
SMV20412	42.0	54.0	18.0	27	8.7	12.0	150
SMV20413	17.0	22.0	8.5	10.5	4.0	5.5	200
SMV20414	14.5	16.0	6.5	7.8	3.0	4.8	300
SMV20415	8.7	11.3	4.3	5.5	2.2	2.9	350
Test Conditions	@ -1 Vdc, F = 1 MHz		@ -2.5 Vdc, F = 1 MHz		@ -4 Vdc, F = 1 MHz		@ -4 Vdc, F = 50 MHz

Maximum Ratings	Parameters	Value	Rating
	Reverse Breakdown Voltage	10 µAdc	12 Volt Min
	Max Reverse Leakage Current	Vr = 8 Volts	20 nAdc
	Power Dissipation	@ Ta = 25° C	250 mW
	Junction Temperature	125° C	
	Operating Temperature	-55° to + 125° C	
	Storage Temperature	-65° C to + 150° C	

Silicon Hyperabrupt Tuning Varactors: HF

Bare Die

Ceramic Epoxy SMT

Glass Axial Leaded

- High Reliability, Silicon Planar
- Large Capacitance Ratios
- High Q
- Straight-Line Frequency Performance Over a 1.5 to 4 Volt Tuning Range

The Aeroflex / Metelics High Frequency Hyperabrupt Diodes feature ion implanted epi construction. They are ideal for tuning LC resonant circuits up to 100 MHz with frequency ratios as high as 4:1. Capacitance values range from 46 pF to 270 pF at -2 Vdc.

Model	Total Capacitance pF								Tuning Ratio				Q				V_{BR} Vdc		I_R nAdc	
	MIN	TYP	MAX	TYP	MIN	TYP	MAX	TYP	TYP	MIN	TYP	MAX	MIN	TYP	MIN	TYP	MIN	TYP	TYP	MAX
TV1401	46	57	68	6.1	4.2	4.7	5.2	81.5	13	10	12.0	17.0	–	–	75	140	12	20	10	50
TV1402	46	57	68	6.1	4.2	4.7	5.2	81.5	13	10	12.0	17.0	200	700	–	–	12	20	50	100
TV1403	46	57	–	6.1	–	4.7	5.2	81.5	13	10	12.0	–	200	700	–	–	12	20	100	1000
TV1501	100	125	150	13.0	8.6	9.6	10.6	180	14	10	13.0	17.5	–	–	50	130	12	20	10	50
TV1502	100	125	150	13.0	8.6	9.6	10.6	180	14	10	13.0	17.5	200	500	–	–	12	20	50	100
TV1503	100	125	–	13.0	–	9.6	10.6	180	14	10	13.0	–	200	500	–	–	12	20	100	1000
TV1601	140	175	210	18.5	12.6	14.0	15.4	255	14	10	12.5	17.0	–	–	50	120	12	20	10	50
TV1602	140	175	210	18.5	12.6	14.0	15.4	255	14	10	12.5	17.0	200	500	–	–	12	20	50	100
TV1603	140	175	–	18.5	–	14.0	15.4	255	14	10	12.5	–	200	500	–	–	12	20	100	1000
TV1701	180	225	270	24.0	16.2	18.0	19.8	325	14	10	12.5	17.0	–	–	50	115	12	20	10	50
TV1702	180	225	270	24.0	16.2	18.0	19.8	325	14	10	12.5	17.0	200	500	–	–	12	20	50	100
TV1703	180	225	–	24.0	–	18.0	19.8	325	14	10	12.5	–	200	500	–	–	12	20	100	1000
TV1801	–	350	–	30.5/35/37.5	–	26.5	–	400/500/550	12/14/18	–	13.0	–	–	–	–	–	12	20	10	50
TV1802	–	350	–	30.5/35/37.5	–	26.5	–	400/500/550	12/14/18	–	13.0	–	–	–	–	–	12	20	50	100
Test Conds.	@ 2.0 Vdc, F=1 MHz			@ -7 Vdc, F=1 MHz	@ -10Vdc, F = 1 MHz			@ 1.25 Vdc, F = 1 MHz	C_T 1.25V/ C_T 7V	C_T 2V / C_T 10V			@ -2 Vdc, F=1 MHz		@ -2 Vdc, F= 10 MHz		@10 µA		@ VR -10Vdc	

Maximum Ratings	Parameter	Value
	Reverse Voltage	Same as V_{BR} (Volts)
	Forward Current	100 mA
	Power Dissipation	250 mW
	Operating Temperature	-55 to + 150 °C
	Storage Temperature	-65 to + 200 °C

Silicon Hyperabrupt Tuning Varactors: VHF


Bare Die


Ceramic Epoxy SMT


Glass Axial Leaded

- High Reliability, Silicon Planar Hermetically Sealed
- Octave Tuning or Ultra-High Q Applications
- Straight-Line Frequency Applications Over a 3 to 8 Volt Bias Range
- Low Cost Applications

The Aeroflex / Metelics VHF Tuning Varactors are Ion-implanted highly reproducible hyperabrupt diodes which allow octave tuning of LC tanks up to 500 MHZ or, with a reduced 1.5 to 1 frequency ratio, straight-line frequency tuning over a 3 to 8 volt tuning range. These UHF diodes give a full capacitance range of 20 to 200pF at 4 volts bias, ultra high Q and excellent large signal handling capabilities, along with a 2 to 1 capacitance ratio by tuning from 9 to 20 volts of reverse bias. Closely matched sets of all VHF diodes are available along with "A" suffix versions having ± 5% capacitance tolerance at 4 volts of reverse bias.

Model	Total Capacitance pF						Tuning Ratio				Q		V_{BR} Vdc		I_R nAdc					
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	TYP	MIN	TYP	TYP	MAX	TYP	MAX	TYP	MAX
TV2001	18	22	7.5	10.5	3.1	3.9	–	–	5.4	6.6	160	220	22	30	–	–	–	–	15	100
TV2001A	19	21	7.8	9.2	3.1	3.9	–	–	5.4	6.6	160	230	22	30	–	–	–	–	15	15
TV2002	18	22	7.5	10.5	–	–	1.8	2.7	–	–	160	220	15	18	–	–	15	100	–	–
TV2002A	19	21	7.8	9.2	–	–	2.0	2.7	–	–	160	220	15	18	–	–	15	100	–	–
TV2004	18	22	7	11	–	–	–	–	–	–	80	120	8	12	50	250	–	–	–	–
TV2201	45	55	18	25	7.3	9.2	–	–	5.6	6.9	125	165	22	30	–	–	–	–	20	100
TV2201A	47.5	52.5	18.4	21.6	7.3	9.2	–	–	5.6	6.9	125	165	22	30	–	–	–	–	20	100
TV2202	45	55	18	25	–	–	1.8	2.8	–	–	125	165	15	18	–	–	20	100	–	–
TV2202A	47.5	52.5	18.4	21.6	–	–	2.2	2.8	–	–	125	165	15	18	–	–	20	100	–	–
TV2204	45	55	17	26	–	–	–	–	–	–	65	100	8	12	50	250	–	–	–	–
TV2301	100	120	39	55	15	19	–	–	5.9	7.3	80	110	22	30	–	–	–	–	30	100
TV2301A	105	115	41.5	48.6	15	19	–	–	5.9	7.3	80	110	22	30	–	–	–	–	30	100
TV2302	100	120	39	55	–	–	1.8	2.8	–	–	80	110	15	18	–	–	30	100	–	–
TV2302A	105	115	41.5	48.6	–	–	2.15	2.8	–	–	80	110	15	18	–	–	30	100	–	–
TV2304	100	120	36	58	–	–	–	–	–	–	40	60	8	12	50	250	–	–	–	–
TV2401	140	170	55	80	22.5	28	–	–	5.8	7.1	70	90	22	30	–	–	–	–	50	500
TV2401A	147	163	59.8	70.2	22.5	28	–	–	5.8	7.1	70	90	22	30	–	–	–	–	50	500
TV2402	140	170	55	80	–	–	1.8	2.8	–	–	70	90	15	18	–	–	50	500	–	–
TV2402A	147	163	59.8	70.2	–	–	2.1	2.7	–	–	70	90	15	18	–	–	50	500	–	–
TV2404	140	170	50	85	–	–	–	–	–	–	35	50	8	12	50	500	–	–	70	500
TV2501	180	220	70	105	29	36	–	–	5.8	7.1	60	80	22	30	–	–	–	–	–	–
TV2501A	190	210	78	92	29	36	–	–	5.8	7.1	60	80	22	30	–	–	–	–	70	500
TV2502	180	220	70	105	–	–	1.8	2.8	–	–	60	80	15	18	–	–	70	500	–	–
TV2502A	190	210	78	92	–	–	2.0	2.7	–	–	60	80	15	18	–	–	70	500	–	–
TV2504	180	220	65	110	–	–	–	–	–	–	30	45	8	12	50	500	–	–	–	–
Test Conditions	@ -4 Vdc, F=1MHz		@ -8 Vdc, F=1MHz		@ -20 Vdc, F= 1 MHz		C_T 4 / C_T 8		C_T 4 / C_T 20		@ -4 V, F = 50 MHz		@ 10 µA		@ -6 V		@ -10 V		@ -20 V	

Maximum Ratings	Parameter	Value
	Reverse Voltage	Same as V_{BR} (Volts)
	Forward Current	100 mA
	Power Dissipation	250 mW
	Operating Temperature	-55 to + 150 °C
	Storage Temperature	°C

Silicon Hyperabrupt Tuning Varactors: UHF


Bare Die


Ceramic Epoxy SMT


Glass Axial Leaded

- High Reliability, Silicon Planar
- Octave Tuning at UHF
- Octave Tuning at VHF
- Straight-Line Frequency Applications Over a 3 to 8 Volt Bias Range
- Low Cost Applications

The Aeroflex / Metelics UHF Tuning Varactors offer higher Qs than their VHF counterparts, but have slightly lower capacitance ratios. These diodes are excellent for octave tuning up to 800 MHz and for straight-line-frequency tuning between 3 and 8 volts of bias. They also achieve exceptionally high Q values and large signal capabilities when tuned between 9 and 20 volts, which extends their useful range to over 1 GHz. Closely matched sets are available, designed by suffix "A".

Model	Total Capacitance pF						Tuning Ratio				Q		V_{BR}		I_R nAdc					
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	TYP	MIN	TYP	TYP	MAX	TYP	MAX	TYP	MAX
TV2101	10.5	12.5	4.3	5.7	2.0	2.3	5.0	5.8	–	–	300	350	22	30	–	–	–	–	10	100
TV2101A	10.9	12.1	4.6	5.4	2.0	2.3	5.0	5.8	–	–	300	350	22	30	–	–	–	–	10	100
TV2102	10.5	12.5	4.3	5.7	2.0	2.4	4.7	5.5	–	–	200	300	22	30	–	–	–	–	10	100
TV2102A	10.9	12.1	4.6	5.4	2.0	2.4	4.7	5.5	–	–	200	300	22	30	–	–	–	–	10	100
TV2103	10.5	12.5	4.3	5.7	–	–	–	–	1.9	2.7	200	300	15	18	–	–	50	500	–	–
TV2103A	10.9	12.1	4.6	5.4	–	–	–	–	2.0	2.6	200	300	15	18	–	–	50	500	–	–
TV2104	10.5	12.5	–	–	–	–	–	–	–	–	100	150	8	12	50	500	–	–	–	–
TV2801	25.0	31.0	10.0	13.5	4.5	5.1	5.2	6.1	–	–	200	250	22	30	–	–	–	–	20	100
TV2801A	26.5	29.5	11.0	13.0	4.5	5.1	5.2	6.1	–	–	200	250	22	30	–	–	–	–	20	100
TV2802	25.0	31.0	10.0	13.5	4.5	5.3	4.9	5.8	–	–	150	200	22	30	–	–	–	–	20	100
TV2802A	26.5	29.5	11.0	13.0	4.5	5.3	4.9	5.8	–	–	150	200	22	30	–	–	–	–	20	100
TV2803	25.0	31.0	10.0	13.5	–	–	–	–	1.9	2.8	150	200	15	18	–	–	50	500	–	–
TV2803A	26.5	29.5	11.0	13.0	–	–	–	–	2.0	2.7	150	200	15	18	–	–	50	500	–	–
TV2804	25.0	31.0	–	–	–	–	–	–	–	–	75	100	8	12	50	500	–	–	–	–
Test Conds.	@ -3 Vdc, F = 1 MHz		@ -8 Vdc, F = 1 MHz		@ -20 Vdc, F = 1 MHz		C_T 3 / C_T 20		C_T 3 / C_T 8		@ -3 Vdc, F = 50 MHz		@ 10 µA		@ -6 V		@ -10 V		@ -20 V	

Maximum Ratings	Parameter	Value
	Reverse Voltage	Same as V_{BR} (Volts)
	Forward Current	100 mA
	Power Dissipation	250mW
	Operating Temperature	-55 to + 150 °C
	Storage Temperature	-65 to + 200 °C

Silicon Hyperabrupt Varactors: Microwave


Bare Die


Ceramic Microwave Pill


Ceramic Epoxy SMT


Ceramic Hermetic SMT

- All EPI Mesa Construction
- High Reliability
- Frequency Linear Profiles
- Glass Passivation
- High Q
- Wide Tuning Ratios

The Aeroflex / Metelics MHV-500 Series Microwave Hyperabrupt Tuning Varactors are silicon epitaxial mesa devices with high reliability glass passivation which ensures optimum VCO settling time and flat post tuning drift response. They offer Q values well above ion-implanted hyperabrupt diodes. These diodes offer octave tuning through 9 GHz. They are available in a wide variety of case styles for surface mount and/or cavity requirements. Chip devices are recommended for wide bandwidth performance and frequency response.

Model	Junction Capacitance pF									Ratio		Q
	MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	MIN	MAX	
MHV500	2.25	2.5	2.75	.70	.80	.90	.13	.20	.30	3.0	5.5	2600
MHV501	2.8	3.1	3.4	.90	1.0	1.1	.16	.24	.36	3.0	5.5	2500
MHV502	3.3	3.7	4.1	.98	1.2	1.32	.18	.28	.44	3.0	5.5	2400
MHV503	4.2	4.7	5.2	1.35	1.5	1.65	.24	.36	.55	3.0	5.5	2300
MHV504	5.0	5.6	6.2	1.63	1.8	1.98	.30	.43	.66	3.0	5.5	2200
MHV505	6.1	6.8	7.5	1.98	2.2	2.42	.36	.52	.80	3.0	5.5	2000
MHV506	7.2	8.4	9.2	2.43	2.7	2.97	.44	.64	1.0	3.0	5.5	1800
MHV507	9.0	10.0	11.0	2.97	3.3	3.63	.54	.78	1.21	3.0	5.5	1500
MHV508	10.8	12.0	13.2	3.51	3.9	4.29	.64	.93	1.43	3.0	5.5	1200
MHV509	13.1	14.6	16.1	4.23	4.7	5.17	.77	1.12	1.72	3.0	5.5	1000
MHV510	15.7	17.4	19.1	5.04	5.6	6.16	.91	1.33	2.05	3.0	5.5	800
MHV511	18.9	21.0	23.1	6.12	6.8	7.48	1.11	1.62	2.5	3.0	5.5	700
MHV512	22.9	25.4	28.0	7.38	8.2	9.02	1.34	1.95	3.0	3.0	5.5	650
MHV513	27.9	31.0	34.1	9.0	10.0	11.0	1.64	2.38	3.67	3.0	5.5	600
Test Conds.	$V_R = 0$ V, F = 1MHz			$V_R = 4$ V, F = 1 MHz			$V_R = 20$ V, F = 1 MHz			C_J 4 / C_J 20		

Maximum Ratings	Parameter	Value	Units
	Operating Temperature	-55 to + 150 °C	°C
	Storage Temperature Range	-65 to + 200 °C	°C
	Minimum Voltage Breakdown	22 Volts	Volts
	Maximum Leakage Current	50 nA	nA

Silicon Zener Diodes

Glass Axial Leaded

- Sharper Breakdown
- Lower Leakage Current Characteristics in the 4–10 Volt range and the 5–9 Volt range

The family of Aeroflex / Metelics Silicon Zener Avalanche Diodes includes a variety of models in various voltage ranges. They feature sharp breakdown and low leakage LVA regulators. Certain models also feature exceptionally low noise, low impedance and sharp knees for high performance, low current applications.

Sharp Breakdown, Low Leakage LVA Regulator, 4–10 Volt Range

Model	Voltage Vz @ Izt Vdc	Test Current Izt mA	Zener Impedance Zzt @ Izt Ω	Reverse Leakage Current MAX		Noise Density @ 250 µA
	TYP		MAX	I_R µAdc	V_R Vdc	MAX
LVA43A	4.3	20	18	4.0	1.5	4
LVA47A	4.7	10	15	4.0	2.0	4
LVA51A	5.1	5	15	0.1	2.0	4
LVA56A	5.6	1	40	0.05	3.0	4
LVA62A	6.0	1	50	0.05	4.0	4
LVA68A	6.8	1	50	0.05	5.0	4
LVA75A	7.5	1	100	0.01	6.0	4
LVA82A	8.2	1	100	0.01	6.5	4
LVA91A	9.1	1	100	0.01	8.0	4
LVA100A	10.0	1	100	0.01	9.0	4

Maximum Rating	Parameters	Value	Rating
	Package style	CS85 (DO-7)	
	Forward Voltage	@ If = 200 mAdc	1.5 Vdc
	Noise Density	@ Iz = 250 µAdc	4.0µ V / √Hz
	Power Dissipation	@ Ta = 25° C	400 mW
	Operating Temperature		-65° C to + 175° C
	Storage Temperature		-65° C to + 200° C
	Voltage Tolerance	Standard Device	±10%
	Suffix A	±5%	
	Suffix B	±2%	

Noise Density measured from 1000 to 3000 Hz.

Glass Axial Leaded

Sharp Breakdown, Low Leakage LVA Regulator, 5–9 Volt Range

Model	Voltage	Zener Impedance[1]	Reverse Leakage		Regulation Factor			T_C	Noise Density
	TYP	TYP	µAdc MAX	Vdc MAX	DVz Vdc MAX	Izh mAdc MAX	IzL µAdc MAX	TYP	MAX
LVA450A	5.0	700	10.0	4.00	0.40	1.0	100	0.75	1
LVA453A	5.3	250	5.0	4.24	0.20	1.0	100	1.33	1
LVA456A	5.6	100	1.0	4.48	0.10	1.0	50	1.96	1
LVA459A	5.9	100	0.5	4.72	0.10	1.0	10	2.30	1
LVA462A	6.2	100	0.1	4.96	0.10	1.0	10	2.67	1
LVA465A	6.5	100	0.05	5.20	0.10	1.0	10	3.06	1
LVA468A	6.8	100	0.01	5.44	0.10	1.0	10	3.40	1
LVA471A	7.1	175	0.01	5.68	0.10	1.0	10	3.76	1
LVA474A	7.4	175	0.01	5.92	0.10	1.0	10	4.07	1
LVA477A	7.7	175	0.01	6.16	0.10	1.0	10	4.47	1
LVA480A	8.0	175	0.01	6.40	0.10	1.0	10	4.80	1
LVA483A	8.3	175	0.01	6.64	0.10	1.0	10	5.15	1
LVA486A	8.6	175	0.01	6.88	0.10	1.0	10	5.50	1
LVA489A	8.9	175	0.01	7.12	0.10	1.0	10	5.87	2
LVA492A	9.2	175	0.01	7.36	0.10	1.0	10	6.16	2
LVA495A	9.5	175	0.01	7.60	0.10	1.0	10	6.46	2
LVA498A	9.8	175	0.01	7.84	0.10	1.0	10	6.86	2
Test Conditions	@ 250 µA	@ 250 µAdc	I_R @ V_R					@ 250 µAdc MV/°C	@ 250 µA

Maximum Rating	Parameters	Value	Rating
	Package style	CS85 (DO-7)	
	Forward Voltage	@ If=200 mAdc	1.5Vdc
	Noise Density	@ Iz=250 µAdc[2]	1.0 µV / √Hz
	Power Dissipation	@ Ta=25° C	400 mW
	Operating Temperature	-65° C to + 175° C	
	Storage Temperature	-65° C to + 200° C	
	Voltage Tolerance:	Standard Device	+0.20 Vdc

Notes:
1. Impedance measured with 10% 60 Hz AC superimposed on Izt.
2. Noise Density on devices LVA489 to LVA498 increases to 2.0 max. Noise Density measured from 1000 to 3000 Hz.

Silicon Zener Diodes

Glass Axial Leaded

- Designed for Use at Low Current Levels
- Low Leakage
- Low Impedance
- Low Noise
- Sharp Knees

IN5000 Series, Low Voltage, High Performance, Low Noise, Low Leakage

Model	Zener Voltage Vz	Test Current Izt mA	Zener Impedance[2] Ω	Reverse Leakage Current			Noise Density[3]	Regulation Factor[4]		Regulator Current Izm mAdc
	TYP		MAX	Ir μAdc MAX	V_R[1] MAX	V_R[2] Volts MAX	MAX	Δ Vz Volts MAX	IzL mAdc MAX	MAX
1N5518	3.3	20	26	5.0	0.9	1.0	0.5	0.90	2.0	115
1N5519	3.6	20	24	3.0	0.9	1.0	0.5	0.90	2.0	105
1N5520	3.9	20	22	1.0	0.9	1.0	0.5	0.85	2.0	98
1N5521	4.3	20	18	3.0	1.0	1.5	0.5	0.75	2.0	88
1N5522	4.7	10	22	2.0	1.5	2.0	0.5	0.60	1.0	81
1N5523	5.1	5	26	2.0	2.0	2.5	0.5	0.65	0.25	75
1N5524	5.6	3	30	2.0	3.0	3.5	1.0	0.30	0.25	68
1N5525	6.2	1	30	1.0	4.5	5.0	1.0	0.20	0.01	61
1N5526	6.8	1	30	1.0	5.5	6.2	1.0	0.10	0.01	56
1N5527	7.5	1	35	0.5	6.0	6.8	2.0	0.05	0.01	51
1N5528	8.2	1	40	0.5	6.5	7.5	4.0	0.05	0.01	46
1N5529	9.1	1	45	0.1	7.0	8.2	4.0	0.05	0.01	42
1N5530	10.0	1	60	0.05	8.0	9.1	4.0	0.10	0.01	38
1N5531	11.0	1	80	0.05	9.0	9.9	5.0	0.20	0.01	35
1N5532	12.0	1	90	0.05	9.5	10.8	10.0	0.20	0.01	32
1N5533	13.0	1	90	0.01	10.5	11.7	15.0	0.20	0.01	29
1N5534	14.0	1	100	0.01	11.5	12.6	20.0	0.20	0.01	27
1N5535	15.0	1	100	0.01	12.5	13.5	20.0	0.20	0.01	25
1N5536	16.0	1	100	0.01	13.0	14.4	20.0	0.20	0.01	24
1N5537	17.0	1	100	0.01	14.0	15.3	20.0	0.20	0.01	22
1N5538	18.0	1	100	0.01	15.0	16.2	20.0	0.20	0.01	21
1N5539	19.0	1	100	0.01	16.0	17.1	20.0	0.20	0.01	20
1N5540	20.0	1	100	0.01	17.0	18.0	20.0	0.20	0.01	19
1N5541	22.0	1	100	0.01	18.0	19.8	25.0	0.25	0.01	17
1N5542	24.0	1	100	0.01	20.0	21.6	30.0	0.30	0.01	16
1N5543	25.0	1	100	0.01	21.0	22.4	35.0	0.35	0.01	15
1N5544	28.0	1	100	0.01	23.0	25.2	40.0	0.40	0.01	14
1N5545	30.0	1	100	0.01	24.0	27.0	45.0	0.45	0.01	13
1N5546	33.0	1	100	0.01	28.0	29.7	50.0	0.50	0.01	12
Test Conditions	@ Izt (Volts)		Zzt @ Izt				@ Iz = 250 μA ND μV / √Hz			

Notes
1. Package style CS85 (DO-7)
2. Suffix denotes Vz tolerance: non suffix +20%, A suffix +10%: I_R @ V_R1, Vz, + Vf only. Suffix B +5%: Ir @ Vr2, Vz, DVz, Vf, ND.
3. Measured with 10%, 60 Hz AC superimposed on Izt.
4. Measured from 1000 to 3000 Hz.
5. Difference between Vz as Izt and IzL
6. Forward Voltage (Vf): If = 200 mA, Ta = 25° C, mA = 1.1 Vdc.

MILITARY SCREENING AVAILABLE

Glass Axial Leaded

1N6000 Series Low Voltage, High Performance, Low Noise, Low Leakage

Model	Zener Voltage	Test Current Izt mA	Zener Impedance[2]	Reverse Leakage Current		Noise Density[3]	Regulation Factor[4]		LVA TYPE[1]
	TYP		Ω MAX	Ir µAdc MAX	Vr[2] Volts MAX	MAX	Δ Vz Volts MAX	IzL mAdc MAX	
1N6082	4.3	20	18	2.0	1.5	1.0	0.75	2.0	LVA343A
1N6083	4.7	10	10	2.0	2.0	1.0	0.50	1.0	LVA347A
1N6084	5.1	5	10	2.0	3.0	1.0	0.30	0.25	LVA351A
1N6085	5.6	1	40	2.0	4.5	1.0	0.10	0.05	LVA356A
1N6086	6.2	1	45	0.5	5.6	1.0	0.10	0.01	LVA362A
1N6087	6.8	1	50	0.05	6.2	1.0	0.10	0.01	LVA368A
1N6088	7.5	1	50	0.01	6.8	1.0	0.10	0.01	LVA375A
1N6089	8.2	1	60	0.01	7.5	1.0	0.10	0.01	LVA382A
1N6090	9.1	1	60	0.01	8.2	2.0	0.10	0.01	LVA391A
1N6091	10.0	1	60	0.01	9.1	2.0	0.10	0.01	LVA3100A
Test Conditions	Vz @ Izt Volts		Zzt @ Izt			@ Iz = 250 µA (ND µV / √Hz)			

Notes:
1. Suffix denotes Vz tolerance: non suffix +20%, A suffix +10%.
2. Measured with 10%, 60 Hz AC superimposed on Izt.
3. Measured from 1000 to 3000 Hz.
4. Difference between Vz as Izt and IzL.
5. VF @ 200mA = 1.2V max.
6. Power rating is 400 mW @ 25° C, derate linearly to zero @ 175° C.

Glass Axial Leaded

Low Level, Very Low Voltage, Low Leakage

Model	Zener Voltage Vdc	Dynamic Impedance Ω		Reverse Current	
				Ir μAdc	Vr Vdc
	TYP	MAX	MAX	MAX	
K120	1.2	20	125	.05	0.4
K150	1.5	20	125	.05	0.5
K180	1.8	20	125	.05	0.6
K210	2.1	20	125	.05	0.9
K240	2.4	20	125	.05	1.2
K270	2.7	20	125	.05	1.7
K300	3.0	20	125	.05	1.9
K330	3.3	20	125	.05	2.2
K360	3.6	20	125	.05	2.5
K390	3.9	20	125	.05	2.7
K430	4.3	25	135	.05	3.1
K470	4.7	25	135	.05	3.5
K510	5.1	25	135	.05	3.8
Test Conditions	Vz @ Iz = 10 mA	Zz @Iz = 10 mA	ZK @ Iz = 1 mA	@25° C	

Maximum Rating	Parameters	Value	Rating
	DC Power Dissipation	@ Ta = 50° C	250 mW
	Operating Temperature (T_{OPR})	-65 to + 175° C	
	Storage Temperature (T_{STG})	-65 to + 200° C	
	Voltage Tolerance:	Standard Device	+10%
	Other package styles available		

Silicon Zener Diodes

Glass Axial Leaded

Low Level Zener Diodes, Sharp Knee, Low Impedance

Model	Zener Voltage Vz Vdc	Dynamic Impedance		Reverse Current	
	TYP	Zz Ω MAX	Zzk Ω	Ir μA MAX	Vr Vdc
K511	5.1	50	15	.05	2.5
K561	5.6	45	15	.05	3.5
K621	6.2	35	18	.05	5.6
K681	6.8	25	18	.05	6.4
Test Conditions	@ Iz = 250 μA	@ Iz = 250 μA	@ Iz = 1 mA	@ 25° C	

Maximum Rating	Parameters	Value	Rating
	DC Power Dissipation	@Ta = 50° C	250 mW
	Derate above 50° C		2 mW/° C
	Forward Voltage Drop	@ If = 100 mA	1.3 Vdc
	Operating Temperature		-65 to + 175° C
	Storage Temperature		-65 to + 200° C
	Voltage Tolerance:	Standard Device	+10%

Glass Axial Leaded

Low Level Zener Diodes, Low Current: 250 µA - Low Noise

Model	Zener Impedance Zzt Ω	Zener Impedance Zzt Ω	Reverse Leakage Current		Zener Vol Max Noise Density Volts	Regulator Current Izm mAdc
	TYP	MAX	Ir µAdc MAX	Vr Vdc MAX	TYP	MAX
1N4099	6.8	200	10.0	5.17	40	35.0
1N4100	7.5	200	10.0	5.70	40	31.8
1N4101	8.2	200	1.0	6.24	40	29.0
1N4102	8.7	200	1.0	6.61	40	27.4
1N4103	9.1	200	1.0	6.92	40	26.2
1N4104	10.0	200	1.0	7.60	40	24.8
1N4105	11.0	200	0.05	8.44	40	21.6
1N4106	12.0	200	0.05	9.12	40	20.4
1N4107	13.0	200	0.05	9.87	40	19.0
1N4108	14.0	200	0.05	10.65	40	17.5
1N4109	15.0	100	0.05	11.40	40	16.3
1N4110	16.0	100	0.05	12.15	40	15.4
1N4111	17.0	100	0.05	12.92	40	14.5
1N4112	18.0	100	0.05	13.67	40	13.2
1N4113	19.0	150	0.05	14.44	40	12.5
1N4114	20.0	150	0.01	15.20	40	11.9
1N4115	22.0	150	0.01	16.72	40	10.8
1N4116	24.0	150	0.01	18.25	40	9.9
1N4117	25.0	150	0.01	19.00	40	9.5
1N4118	27.0	150	0.01	20.46	40	8.8
1N4119	28.0	200	0.01	21.28	40	8.5
1N4120	30.0	200	0.01	22.80	40	7.9
1N4121	33.0	200	0.01	25.08	40	7.2
Test Conditions	@ 250 µA	@ 250 µA			@ Iz = 250 µA µVz / √Hz tage Vz @ = 250 µA	

Maximum Rating	Parameters	Value	Rating
	DC Power Dissipation	@ Ta = 50° C	250 mW
	Operating Temperature (T_{OPR})	-65 to + 175° C	
	Storage Temperature (T_{STG})	-65 to + 200° C	
	Voltage Tolerance:	Standard Device	+10%
	Other package styles available		

Glass Axial Leaded

Low Level Zener Diodes, Low Current: 250 μA - Low Noise

Model	Zener Voltage Vz Volts	Zener Impedance Zzt Ω	Reverse Leakage Current		Noise Density	Regulator Current Izm mAdc
	TYP	MAX	Ir μAdc MAX	Vr Vdc MAX	MAX	MAX
1N4614	1.8	1200	7.5	1.0	1	120.0
1N4615	2.0	1250	5.0	1.0	1	110.0
1N4616	2.2	1300	4.0	1.0	1	100.0
1N4617	2.4	1400	2.0	1.0	1	95.0
1N4618	2.7	1500	1.0	1.0	1	90.0
1N4619	3.0	1600	0.8	1.0	1	85.0
1N4620	3.3	1650	7.5	1.5	1	80.0
1N4621	3.6	1700	7.5	2.0	1	75.0
1N4622	3.9	1650	5.0	2.0	1	70.0
1N4623	4.3	1600	4.0	2.0	1	65.0
1N4624	4.7	1550	10.0	3.0	1	60.0
1N4625	5.1	1500	10.0	3.0	2	55.0
1N4626	5.6	1400	10.0	4.0	4	50.0
1N4627	6.2	1200	10.0	5.0	5	45.0
Test Conditions	@ 250 μA	@ 250 μA			@ Iz = 250 μA μVz / √Hz	

Maximum Rating	Vz Tolerance ±5%.
	Forward Voltage (VF) Maximum 1.0 Vdc (1N4614-1N4627 IF = 100 mA; 1N4099-1N4121 IF = 200mA).
	Noise Density measured from 1000 to 3000 Hz.

MILITARY SCREENING AVAILABLE

Glass Axial Leaded

Low Level Zener Diodes, Ultra-Low Current: 50 µA – Low Leakage

Model	Zener Voltage Vz Volts	Reverse Leakage Current		Regulation Factor Volts	Regulator Current Izm mAdc
	TYP	Ir µAdc MAX	Vr Vdc MAX	MAX	MAX
1N4678	1.8	7.5	1.0	0.70	120.0
1N4679	2.0	5.0	1.0	0.70	110.0
1N4680	2.2	4.0	1.0	0.75	100.0
1N4681	2.4	2.0	1.0	0.80	95.0
1N4682	2.7	1.0	1.0	0.85	90.0
1N4683	3.0	0.8	1.0	0.90	85.0
1N4684	3.3	7.5	1.5	0.95	80.0
1N4685	3.6	7.5	2.0	0.95	75.0
1N4686	3.9	5.0	2.0	0.97	70.0
1N4687	4.3	4.0	2.0	0.99	65.0
1N4688	4.7	10.0	3.0	0.99	60.0
1N4689	5.1	10.0	3.0	0.97	55.0
1N4690	5.6	10.0	4.0	0.96	50.0
1N4691	6.2	10.0	5.0	0.95	45.0
1N4692	6.8	10.0	5.1	0.90	35.0
1N4693	7.5	10.0	5.7	0.75	31.8
1N4694	8.2	1.0	6.2	0.50	29.0
1N4695	8.7	1.0	6.6	0.10	27.4
1N4696	9.1	1.0	6.9	0.08	26.2
1N4697	10.0	1.0	7.6	0.10	24.8
1N4698	11.0	0.05	8.4	0.11	21.6
1N4699	12.0	0.05	9.1	0.12	20.4
1N4700	13.0	0.05	9.8	0.13	19.0
1N4701	14.0	0.05	10.6	0.14	17.5
1N4702	15.0	0.05	11.4	0.15	16.3
1N4703	16.0	0.05	12.1	0.16	15.4
1N4704	17.0	0.05	12.9	0.17	14.5
1N4705	18.0	0.05	13.6	0.18	13.2
1N4706	19.0	0.05	14.4	0.19	12.5
1N4707	20.0	0.01	15.2	0.20	11.9
1N4708	22.0	0.01	16.7	0.22	10.8
1N4709	24.0	0.01	18.2	0.24	9.9
1N4710	25.0	0.01	19.0	0.25	9.5
1N4711	27.0	0.01	20.4	0.27	8.8
1N4712	28.0	0.01	21.2	0.28	8.5
1N4713	30.0	0.01	22.8	0.30	7.9
1N4714	33.0	0.01	25.0	0.33	7.2
Test Conditions	@ 50 µA			100 µAdc To 10 µAdc DVz	

Maximum Rating	**Vz Tolerance** ±5%.

Current Limiter Field Effect Diodes

Bare Die

Glass Axial Leaded

- Mechanical Reliability
- Low Noise Figure

Model	Regulator Current Ip mA			Regulator Impedance Zs M Ω	Knee Impedance Zk M Ω	Limiting Voltage VL MIN Volts
	TYP	MIN	MAX	MIN	MIN	MAX
1N5283	0.22	0.198	0.242	25.00	2.750	1.00
1N5284	0.24	0.216	0.264	19.00	2.350	1.00
1N5285	0.27	0.243	0.297	14.00	1.950	1.00
1N5286	0.30	0.270	0.330	9.00	1.600	1.00
1N5287	0.33	0.297	0.363	6.60	1.350	1.00
1N5288	0.39	0.351	0.429	4.10	1.000	1.05
1N5289	0.43	0.387	0.473	3.30	0.870	1.05
1N5290	0.47	0.423	0.517	2.70	0.750	1.05
1N5291	0.56	0.504	0.616	1.90	0.560	1.10
1N5292	0.62	0.558	0.682	1.55	0.470	1.13
1N5293	0.68	0.612	0.748	1.35	0.400	1.15
1N5294	0.75	0.675	0.825	1.15	0.335	1.20
1N5295	0.82	0.738	0.902	1.00	0.290	1.25
1N5296	0.91	0.819	1.00	0.88	0.240	1.29
1N5297	1.00	0.900	1.100	0.80	0.205	1.35
1N5298	1.10	0.990	1.210	0.70	0.180	1.40
1N5299	1.20	1.080	1.320	0.640	0.155	1.45
1N5300	1.30	1.170	1.430	0.580	0.135	1.50
1N5301	1.40	1.260	1.540	0.540	0.115	1.55
1N5302	1.50	1.350	1.650	0.510	0.105	1.60
1N5303	1.60	1.440	1.760	0.457	0.092	1.65
1N5304	1.80	1.620	1.980	0.420	0.074	1.75
1N5305	2.00	1.800	2.200	0.395	0.061	1.85
1N5306	2.20	1.980	2.420	0.370	0.052	1.95
1N5307	2.40	2.160	2.640	0.345	0.044	2.00
1N5308	2.70	2.430	2.970	0.320	0.035	2.15
1N5309	3.00	2.700	3.300	0.300	0.029	2.25
1N5310	3.30	2.970	3.630	0.280	0.024	2.35
1N5311	3.60	3.240	3.960	0.265	0.020	2.50
1N5312	3.90	3.510	4.290	0.255	0.017	2.60
1N5313	4.30	3.870	4.730	0.245	0.014	2.75
1N5314	4.70	4.230	5.170	0.235	0.012	2.90
Test Conditions	@ Vs = 25V			@ Vs = 25 V	@ Vk = 6 V	@ IL = 0.8 Ip

Maximum Rating	Parameters	Rating
	Operating Temperature	-55° C to + 175° C
	Storage Temperature	-55° C to + 175° C
	Package style	DO-7
	DC Power Dissipation	500 mW
	Peak Operating Voltage	100 V

Bare Die

- Low leakage current
- Low insertion loss
- Excellent long-term stability

The Aeroflex / Metelics MIS capacitors utlize a silicon nitride dielectric over a thermally grown silicon dioxide base. The resultant composite dielectric exhibits low leakage current and insertion loss with excellent long-term stability. The temperature coefficient of capcitance is typically +55 ppm / ºC.

Chips

Model	Capacitance Range		DWV	IR	T_{CC}	Dimensions	
	MIN pF	MAX pF	MIN V	MIN MΩ	TYP ppm / ºC	D1 mils	D2 mils
MC2D**XXX**010-010	0.10	5.0	50	1,000	+55	10	10
MC2D**XXX**015-015	1.5	15	50	1,000	+55	15	15
MC2D**XXX**020-020	5.0	50	50	1,000	+55	20	20
Test Conditions	F = 1 MHz			V = 25 V	-55 ºC to +200 ºC		

See Figure 1 in Outline Drawings
(**XXX** = Three digit capacitance code, ex. 005 = 5 pF , 082 = 82 pF, 1.5 = 1.5 pF)

Chips

Model	Capacitance Range		DWV	IR	T_{CC}	Dimensions	
	MIN pF	MAX pF	MIN V	MIN MΩ	TYP ppm / ºC	D1 mils	D2 mils
MC2R**XXX**010-015	2.0	20	50	1,000	+55	10	15
MC2R**XXX**015-020	5.0	42	50	1,000	+55	15	20
MC2R**XXX**015-032	5.0	62	50	1,000	+55	15	32
MC2R**XXX**022-042	15	120	50	1,000	+55	22	42
MC2R**XXX**097-107	100	999	50	1,000	+55	97	107
MC2R**XXX**099-138	100	999	50	1,000	+55	99	138
MC2R**XXXX**127-145	200	1,800	50	1,000	+55	127	145
MC2R**XXXX**142-160	200	2,200	50	1,000	+55	142	160
Test Conditions	F = 1 MHz			V = 25 V	-55 ºC to +200 ºC		

See Figure 2 in Outline Drawings
(**XXX** = Three or four digit capacitance code, ex. 005 = 5 pF , 082 = 82 pF, 2.5 = 2.5 pF)

Bare Die

Chips

Model	Capacitance Range		DWV	IR	T_{CC}	Dimensions	
	MIN pF	MAX pF	MIN V	MIN MΩ	TYP ppm / °C	D1 mils	D2 mils
MC2S**XXX**010-010	0.25	8.0	50	1,000	+55	10	10
MC2S**XXX**011-011	1.0	12	50	1,000	+55	11	11
MC2S**XXX**015-015	3.0	30	50	1,000	+55	15	15
MC2S**XXX**016-016	3.0	35	50	1,000	+55	16	16
MC2S**XXX**020-020	5.0	55	50	1,000	+55	20	20
MC2S**XXX**022-022	5.0	60	50	1,000	+55	22	22
MC2S**XXX**025-025	10	100	50	1,000	+55	25	25
MC2S**XXX**030-030	10	120	50	1,000	+55	30	30
MC2S**XXX**035-035	15	150	50	1,000	+55	35	35
MC2S**XXX**040-040	20	200	50	1,000	+55	40	40
MC2S**XXX**050-050	25	250	50	1,000	+55	50	50
MC2S**XXX**055-055	25	300	50	1,000	+55	55	55
MC2S**XXX**060-060	35	375	50	1,000	+55	60	60
MC2S**XXX**070-070	50	550	50	1,000	+55	70	70
MC2S**XXX**080-080	70	700	50	1,000	+55	80	80
MC2S**XXX**100-100	100	999	50	1,000	+55	100	100
Test Conditions	F = 1 MHz			V = 25 V	-55 °C to +200 °C		

See Figure 3 in Outline Drawings
(**XXX** = Three digit capacitance code, ex. 005 = 5 pF , 082 = 82 pF)

Binary Chips

Model	Capacitance Range					DWV MIN V	IR MIN MΩ	T_{CC} TYP ppm / °C	Package
	C_T ±20% pF	C1 NOM pF	C2 NOM pF	C3 NOM pF	C4 NOM pF				
MC2B0.8020-020	1.5	0.1	0.2	0.4	0.8	50	1,000	+55	C20
MC2B002020-020	3.75	0.25	0.5	1.0	2.0	50	1,000	+55	C20
MC2B004020-020	8.0	0.5	1.0	2.0	4.0	50	1,000	+55	C20
MC2B008020-020	15	1.0	2.0	4.0	8.0	50	1,000	+55	C20
MC2B016020-020	30	2.0	4.0	8.0	16	50	1,000	+55	C20
Test Conditions	F = 1 MHz						V = 25 V	-55 °C to +200 °C	

See Figure 4 in Outline Drawings

Beam Lead Chips

Beam Lead					
Model	C_T ±20% pF	DWV MIN V	IR MIN mΩ	T_{CC} TYP ppm / °C	Package
MBC50-1B12	1.0	50	1,000	+55	B12
MBC50-2B12	2.0	50	1,000	+55	B12
MBC50-3B12	3.0	50	1,000	+55	B12
MBC50-4B12	4.0	50	1,000	+55	B12
MBC50-6B12	6.0	50	1,000	+55	B12
MBC50-8B12	8.0	50	1,000	+55	B12
MBC50-10B12	10	50	1,000	+55	B12
MBC50-15B12	15	50	1,000	+55	B12
MBC50-20B12	20	50	1,000	+55	B12
MBC50-33B13	33	50	1,000	+55	B13
MBC50-47B13	47	50	1,000	+55	B13
MBC50-68B13	68	50	1,000	+55	B13
MBC50-82B13	82	50	1,000	+55	B13
MBC50-100B13	100	50	1,000	+55	B13
MBC50-0.2B14	0.2	50	1,000	+55	B14
MBC50-1.0B14	1.0	50	1,000	+55	B14
MBC50-1.5B14	1.5	50	1,000	+55	B14
MBC50-2.0B14	2.0	50	1,000	+55	B14
Test Conditions	F = 1 MHz		V = 25 V	-55 °C to +200 °C	

- High Reliability Silicon Nitride/Oxide Dielectric
- Low Loss and High Q
- Long Term Reliability and Stability
- Gold Metallization Front and Back

The Aeroflex / Metelics MMI-9000 and 9100 Series Chip Capacitors feature high stand-off voltage and low dielectric loss due to our use of nitride/oxide dielectric layers. Gold bonding surfaces, top and bottom provide ease of bonding and minimum contact resistance. MIS capacitors have high insulation resistance, low dissipation factor, and low temperature coefficient, which are features that produce devices with excellent long term stability.

HOW TO ORDER:

- Go to CHART 1 (9100 Series > 100 Volt Working Voltage). Select capacitance range required. Check CHIP size for compatibility with your circuit.
- Go to CHART 2 (9000 Series > 50 Volt Working Voltage) for smaller chip size with lower working voltage.
- Go to CHART 3 for Beam Lead product
- Specify part number.

CAPACITANCE (10PF)

100V WORKING VOLTAGE

The first two digits are the SERIES

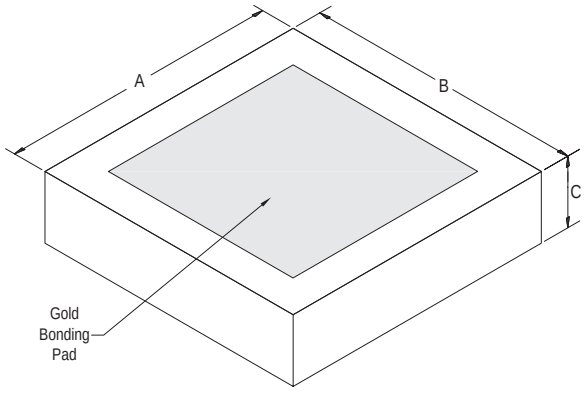
91 **10R** **K**

TOLERANCE K (+10%)

TOLERANCE — SEE CHART 4

The next three digits are the value of capacitance with R used as a decimal point.

EXAMPLES:
9110RK => 100 WVDC 10 pF + 10% with a .020" CHIP SIZE.
902ROJ => 50 WVDC 2.0 pF + 5% with a .010" CHIP SIZE



Chip Outline

Bare Die

Beam Lead Chips

9100 Series Capacitors Working Voltage > 100V

Model	Capacitance Range	Chip Size + .002" Dim A x Dim B x Dim C
910R1 thru 911R9	.1 pF thru 1.9 pF	.010" x .010" x .005"
912R0 thru 919R9	2.0 pF thru 9.9 pF	.015" x .015" x .005"
9110R thru 9129R	10.0 pF thru 29 pF	.020" x .020" x .006"
9130R thru 9149R	30.0 pF thru 49 pF	.030" x .030" x .006"
9150R thru 9199R	50.0 pF thru 99 pF	.040" x .040" x .008"
91100 thru 91199	100 pF thru 199 pF	.050" x .050" x .008"
91200 thru 91399	200 pF thru 399 pF	.070" x .070" x .008"

Chart 2 9000 Series Capacitors Working Voltage > 50V

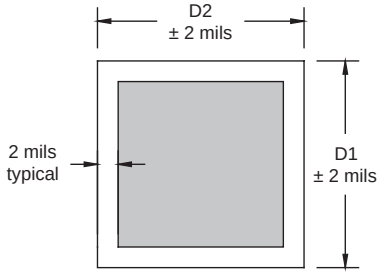
Model	Capacitance Range	Chip Size + .002" Dim A x Dim B x Dim C
902R0 thru 9010R	2.0 pF thru 10.0 pF	.010" x .010" x .005"
901R thru 9029R	10.0 pF thru 29 pF	.015" x .015" x .005"
9030R thru 9049R	30.0 pF thru 49 pF	.020" x .020" x .006"
9050R thru 9099R	50.0 pF thru 99 pF	.030" x .030" x .006"
90100 thru 90199R	100 pF thru 199 pF	.040" x .040" x .008"
90200 thru 90399R	200 pF thru 399 pF	.050" x .050" x .008"
90400 thru 90600R	400 pF thru 600 pF	.070" x .070" x .008"

Chart 3 Beam Lead Capacitors 9000 Series VB > 50V

Model	Capacitance Range	Pkg Style
90R1 thru 90R9	.1 to .9 pF	14-1
901R0 thru 901R5	1.0 to 1.5 pF	14-1
90R5 thru 901R0	.5 to 1.0 pF	14-2
901R0 thru 902R2	1.0 to 2.2 pF	14-2
902R2 thru 904R7	2.2 to 4.7 pF	14-2
905R6M	5.6 + 20% pF	14-2
906R8M	6.8 + 20% pF	14-2
908R2M	8.2 + 20% pF	14-2
9010R0M	10 + 20% pF	14-3
9015R0M	15 + 20% pF	14-3
9022R0M	22 + 20% pF	14-3
9033R0M	33 + 20% pF	14-3
9047R0M	47 + 20% pF	14-4
9068R0M	68 + 20% pF	14-4
9082R0M	82 + 20% pF	14-4
90100R0M	100 + 20% pF	14-4

Chart 4

Tolerance +	
A = .05 pF	G = 2%
B = .1 pF	J = 5%
C = .25 pF	K = 10%
D = .5 pF	M = 20%
F = 1%	
Standard Tolerance is +10%	



Maximum Ratings	Parameters	Rating
	Operating Temperature	-55° C to + 150° C
	Storage Temperature	-65° C to + 200° C
	Temperature Coefficient	190 ppm/ °C Max 40 ppm/ °C typical
	Voltage Breakdown	Varies according

- High Reliability Silicon Nitride/Oxide Dielectric
- Low Loss and Very High Q
- Long Term Reliability and Stability

The Aeroflex / Metelics Mounting Capacitors are designed for transient protection for MICs and FETs. Since the capacitor substrate is silicon, it provides an optimum match both thermally and mechanically with the device to be mounted. A wide range of sizes and capacitance values are available as standard products. Our design flexibility and fast turn-around allow us to offer a custom design service with a two to four week delivery of prototypes. There is virtually no limit to size or capacitance value available.

HOW TO ORDER:

Capacitance (100 pF)
91100RK-SP = 100 WVDC 100 pF + 10% With a chip size of .070 x .070

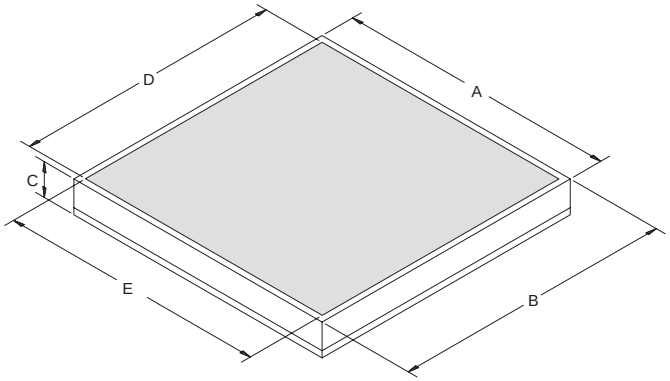
The first two digits are the SERIES

CHIP SIZE see chart

91 100R K – SPXXX

TOLERANCE see chart 4 on page 132

The next three digits are the value of capacitance with R used as a decimal point.



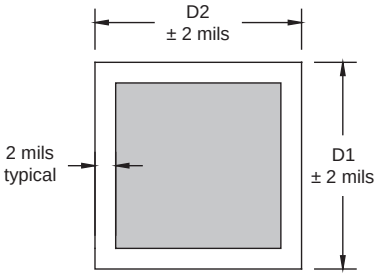
Chip Outline

Bare Die

MIC Mounting Capacitors: Special Capacitance and Chip Sizes

Model Suffix	Capacitance Range	Chip Size		Pad Size		Customer Specified
		A	B	D	E	C
-SP87	15.0 – 150	0.013	0.120	0.009	16	.005 – .0207
-SP49	5.0 – 50.0	0.014	0.034	0.011	0.031	.005 – .020
-SP06	10.0 – 100.0	0.014	0.055	0.012	0.053	.005 – .020
-SP51	8.0 – 80.0	0.015	0.045	0.013	0.043	.005 – .020
-SP81	17.0 – 170.0	0.015	0.090	0.013	0.088	.005 – .020
-SP80	13.0 – 130	0.016	0.065	0.014	0.063	.005 – .020
-SP14	9.0 – 90.0	0.020	0.040	0.016	0.036	.005 – .020
-SP84	7.0 – 70.0	0.020	0.040	0.016	0.030	.005 – .020
-SP12	14.0 – 140	0.020	0.055	0.018	0.053	.005 – .020
-SP89	12.0 – 120	0.020	0.060	0.014	0.055	.005 – .020
-SP88	25.0 – 250	0.021	0.121	0.015	0.115	.005 – .020
-SP34	9.0 – 90.0	0.024	0.034	0.020	0.030	.005 – .020
-SP22	24.0 – 240	0.025	0.080	0.021	0.075	.005 – .020
-SP48	29.0 – 290	0.035	0.065	0.031	0.061	.005 – .020
-SP64	75.0 – 750	0.055	0.102	0.051	0.098	.005 – .020
-SP120	90.0 – 900	0.055	0.120	0.050	0.115	.005 – .020
-SP07	100 – 1000	0.085	0.085	0.081	0.081	.005 – .020
-SP38	200 – 2000	0.094	0.152	0.091	0.148	.005 – .020
-SP05	200 – 1000	0.100	0.100	0.095	0.095	.005 – .020
-SP68	175 – 1750	0.101	0.124	0.097	0.120	.005 – .020
-SP40	200 – 2000	0.107	0.134	0.103	0.130	.005 – .020
-SP02	150 – 1500	0.110	0.110	0.100	0.100	.005 – .020
-SP01	200 – 2000	0.110	0.140	0.100	0.130	.005 – .020
-SP55	360 – 3600	0.117	0.220	0.113	0.216	.005 – .020
-SP77	300 – 3000	0.118	0.175	0.114	0.171	.005 – .020
-SP39	200 – 2000	0.120	0.134	0.110	0.130	.005 – .020
-SP20	200 – 2000	0.120	0.140	0.110	0.130	.005 – .020
-SP29	200 – 2000	0.121	0.121	0.115	0.115	.005 – .020
-SP52	300 – 3000	0.130	0.170	0.124	0.164	.005 – .020
-SP44	350 – 3500	0.140	0.170	0.135	0.165	.005 – .020
-SP104	350 – 3500	0.142	0.171	0.138	0.167	.005 – .020
-SP111	350 – 3500	0.143	0.180	0.138	0.167	.005 – .020
-SP37	350 – 3500	0.151	0.168	0.147	0.164	.005 – .020

Maximum Ratings	Parameters	Rating
	Operating Temperature	-55° C to + 150° C
	Storage Temperature	-65° C to + 200° C
	Voltage Breakdown	>100V Dropping the working voltage to >50V will double the high capacitance range No.



Binary Chip Capacitors

Capacitor Chips

- High Reliability Silicon Nitride-Oxide Dielectric
- Low Loss
- Long Term Reliability and Stability

The Aeroflex / Metelics BOO and BSP Series Capacitors are designed to facilitate bread-boarding or to use where a trimming capability is required. These devices feature the same dielectric layer and bonding surfaces as our 9000 and 9100 Series chip capacitors. By connecting the pads in parallel, the capacitance values are add tive, so many combinations are possible.

The BSP-1 chip offers the same capacitance values as BOO and BSP-3, but in a slightly larger chip with a more accommodating layout for ease of bonding.

.015 x .015	911R5K-BSP-3	913R0K-BSP-3	913R7K-BSP-3	915R6K-BSP-3
PAD 1	0.1 pF	0.2 pF	0.25 pF	0.35 pF
PAD 2	0.2 pF	0.4 pF	0.5 pF	0.75 pF
PAD 3	0.4 pF	0.8 pF	1.0 pF	1.5 pF
PAD 4	0.8 pF	1.6 pF	2.0 pF	3.0 pF
TOTAL	1.5 pF	3.0 pF	3.75 pF	5.6 pF

.020 x .020	913R7K-BOO	917R5K-BOO	9115ROK-BOO	9122R5K-BOO
PAD 1	0.25 pF	0.5 pF	1.0 pF	1.5 pF
PAD 2	0.5 pF	1.0 pF	2.0 pF	3.0 pF
PAD 3	1.0 pF	2.0 pF	4.0 pF	6.0 pF
PAD 4	2.0 pF	4.0 pF	8.0 pF	12.0 pF
TOTAL	3.75 pF	7.5 pF	15 pF	22.5 pF

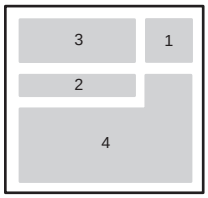
.030 x .020	913R7K-BSP-1	917R5K-BSP-1	9115ROK-BSP-1	9122R5K-BSP-1
PAD 1	0.25 pF	0.5 pF	1.0 pF	1.5 pF
PAD 2	0.5 pF	1.0 pF	2.0 pF	3.0 pF
PAD 3	1.0 pF	2.0 pF	4.0 pF	6.0 pF
PAD 4	2.0 pF	4.0 pF	8.0 pF	12.0 pF
TOTAL	3.75 pF	7.5 pF	15 pF	22.5 pF

Maximum Ratings	Parameters	Rating
	Operating Temperature	-55° C to + 150° C
	Storage Temperature	-65° C to + 200° C
	Temperature Coefficient	190 ppm/°C Max
	40 ppm/°C Typical	
	Voltage Breakdown	100 Volts

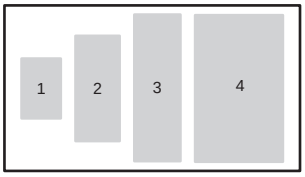
Insulation Resistance: 1012 Ohms Typ.
Thermal Conductivity: 1.2°C/cm/W
Capacitance Range: 0.1 pF to 600 pF

SIZES
BSP-3 = .015" x .015"
BOO = .020" x .020"
BSP-1 = .020" x .030"

BSP-3 and BOO



BSP-1



High "Q", Thin Film, Spiral Inductors

Inductor Chips

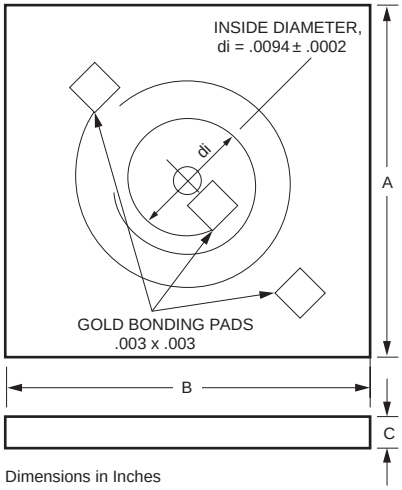
- NO need for "Staking" Coil
- Passivated Protective Coating Over Coil
- Dimensional Uniformity
- Planar Solid Structure Coil

The Aeroflex / Metelics MMI-300 Series of Spiral Inductors are formed by photolithography and plating techniques on quartz substrates. They eliminate the need for hand forming and "staking" of coil in hybrid circuits.

They provide uniformity, durability and repeatability in circuit fabrication. The coils are polyimide coated to protect from ambient contaminants, and to eliminate the need for conformal coating. Quartz substrates are rugged and reduce dielectric losses. Chips may be bonded using either conductive or non conductive epoxies, and wire bonded with gold wire or ribbon by thermocompression bonding.

Dimensions: Inches

Model	DIM "A" MAX	DIM "B" MAX	DIM "C" MAX
MMI297	.030	.030	.012
MMI298	.030	.030	.012
MMI299	.040	.040	.012
MMI300	.040	.040	.012
MMI301	.040	.040	.012
MMI302	.045	.045	.012
MMI303	.055	.055	.012
MMI304	.065	.065	.012
MMI305	.075	.075	.012
MMI306	.085	.085	.012



Dimensions in Inches

Spiral Inductors

Model	# of Turns	Inductance Ls(nH) MIN/ TYP/MAX	R_S DC Ω	R_S 1GHz Ω	Q @ F_T MIN/ MAX	Test Frequency, F_T (GHz)	Resonant Frequency, F_R (GHz)
MMI297	1.5	1.0/1.5/2.0	8.5	1.0	60/75	1.5	4.0
MMI298	2.5	2.0/2.3/2.6	1.0	1.4	50/60	1.5	3.6
MMI299	3.5	3.6/4.2/5.0	1.15	2.0	40/45	1.5	3.2
MMI300	4.5	5.0/7.5/9.0	1.75	3.5	37/43	1.5	2.3
MMI301	5.5	8.0/10/12.0	1.85	3.75	33/38	1.0	2.05
MMI302	7.5	15/20/25	2.4	4.25	27/33	0.5	1.85
MMI303	9.5	32/40/48	4.0	70	23/27	0.5	1.4
MMI304	12.5	80/90/100	9.5	22	18/24	0.5	0.975
MMI305	15.5	150/200/250	16.5	36	14/18	0.5	0.460
MMI306	18.5	250/300/350	20	42	10/15	0.5	0.250

Design Notes:
Other Values and sizes available on request. Custom design services also available.

Thin Film Resistor Chips

Resistor Chips

- Low Noise
- Excellent TCR
- Small Size
- Tight Tolerance to + .1%

The Aeroflex / Metelics Thin Film Resistors offer proven stability, low noise and excellent TCR of Tantalum Nitride in a large selection of resistance values and tolerances.

Parameter	Test Condition		
TCR	-55° C to +125° C	+150 ppm/°C (Standard value)	MAX
TCR	-55° C to +125° C	+100 ppm/°C	MAX
TCR	-55° C to +125° C	+50 ppm/°C	MAX
TCR	-55° C to +125° C	+10 ppm/°C (Special Request, NiCR only)	MAX
Operating Voltage	-55° C to 125° C	00 Vdc	MAX
Power Rating (RTotal)	@ 70° C (derate linearly to zero @ 150° C)	250 mW	MAX
Single Series	@ 70° C (derate linearly to zero @ 150° C)	250 mW	MAX
Center-Tap	@ 70° C (derate linearly to zero @ 150° C)	250 mW	MAX
Multi-Tap	@ 70° C (derate linearly to zero @ 150° C)	250 mW	MAX
Thermal Shock	Method 107 MIL-STD-202 F	+0.5%@DR	MAX
High Temperature Exposure	100 Hrs @ 150° C Ambient	+0.25%@DR	MAX
Moisture Resistance	Method 106 MIL-STD-202 F	+0.5%@DR	MAX
Life	Method 108 MIL-STD-202 F (125∞C/1000 hr)	+0.5%@DR	MAX
Noise	Method 308 MIL-STD-202 F	-20 dB	MAX
Insulation Resistance	@25° C	1 X 1012 Ohms	MIN

Mechanical Specification for Silicon Body Only (all others to customer requirements)		
	Substrate	Silicon 10 + 2 mils thick
	Isolation Layer	Si02 10,000Å thick, min
	Backing	Lapped surface only (no metal)
	Solderable	Gold Plated Backside (optional)
	Metallization	Gold 10,000Å thick, min, Front Contacts
	Gold Bonding Pads	Front Contact (> .0035" Sq.)

Resistor Ordering System

Example

1	2	3	4	5	6	7	8
MTR -	2R2K -	SR2 -	K -	NA -	G -	1 -	T

1) Is the three letter device type designation

MTR	Single Value through Chip Resistor (Resistance top to bottom)
MIR	Single Value Pad to Pad Chip Resistor (Resistance Top pad to Top pad)
MCR	Dual Value Center Tap Ratio Chip Resistor (Res. #1 = Prime Value / Res. #2 = Ratio Value)
MMR	MultiTap Chip Resistor.
XXX	as needed.

2) Is the resistance value in ohms

2R2K	2,200 Ohms
200R	200 Ohms
20R	20 Ohms
2R2M	2,200,000 Ohms
20R2K	20,200 Ohms
200RK	200,000 Ohms
2R	2.0 Ohms

3) is the chip substrate material and chip outline dimensions (case style) R1 thru R8

S	Silicon Body	R1	20 Tap Multi Tap	.038"X.038" SR1
C	Ceramic (99.6% Alumina)	R2	Dual Value	.030"X.030" CR2
B	Berilium Oxide	R3	Single Value	.020"X.020" BR3
Q	Quartz	R3A*	Single Low Value	.020"X.020" QR3A
N	Aluminum Nitride	R4	Six Value Ladder	.020"X.060" NR4
SP	Special Material	R5	12 Tap Multi Tap	.030"X.030" SPR5
		R6	Single Low Value	.030"X.030" XR6
		R7	Single Value	.020"X.040" XR7
		R8		XR8

Please consult factory for special substrate materials (SP)
*R3A outline for resistances < 250 Ohms

4) Is the resistor value total % + tolerance See chart below

5) Is the 2nd resistor value total % ±tolerance (if applicable)

A	+ 0.5 Ohm	F	+ 1%
B	+ 1.0 Ohm	G	+ 2%
C	+ 2.5 Ohm	J	+ 5%
D	+ .01%	K	+ 10%
E	+ .1%	M	+ 20%
NA	Not applicable		

A) On Dual Value Resistors, (MCR), this is the res. ratio of the 2nd resistor (Ratio Res.) To value of the 1st resistor (Prime Res.).
B) On Multi Tap Resistors (MMR). This is the tolerance of each of the small value Resistor Taps. The large value Resistor Taps are called out on (4)

6) Backing

G	Solderable Gold
GS	Gold Silicon eutectic attachment
B	Bare

7) The temperature coefficient (TCR) of the resistor, in PPM

0	+ 150 PPM
1	+ 100 PPM
2	+ 50 PPM
3	+ 10 PPM

8) Resistor Material

T	Tantalum Nitride TaN (Self Passivating)
N	NiChrome NiCr

Example: Aeroflex / Metelics part no. MTR-200RK-SR3-F-NA-G-0-T
This would be a silicon body .020" x .020" x .010" single value through chip resistor with a total resistance tolerance of + 1%, a Solderable gold back, and Tantalum Nitride as the resistor layer and a TCR of + 150PPM.

Example: Aeroflex / Metelics part no. MCR-10RK-SR2-F-E-B-1-T
This would be a silicon body .030" x .030" x .010" two value ratio resistor with the first value resistance tolerance of + 1%, and the second, ratio resistor, tolerance being + .1% of the first value. Resistance would be the total value of the two resistor. A Bare lapped silicon back, and Tantalum Nitride as the resistor layer and a TCR of + 100PPM.

Example: Aeroflex / Metelics part no. MIR-2R5K-SR3-J-NA-B-2-N
This would be a silicon body .020" x .020" x .010" single value Top pad to Top pad chip resistor with a total resistance tolerance of + 5%, a bare silicon back, with NiChrome as the resistor layer and a TCR of + 50PPM.

Example: Aeroflex / Metelics part no. MMR-11RK-SR1-F-K-G-1-T
This would be a silicon substrate device .038" x .038" x .010". It would have a total resistance of 11KOhms + 1%. It would have ten large tops of 1KOhm + 1% each and ten small tops of 100 Ohms + 10% each. It would have a solderable gold back with a TCR of + 100ppm and a Tantalum Nitride resistive layer.

Thin Film Attenuator Pads

Attenuator Pads

- Dissipated Power Handling 2W C.W.
- Flat Response From DC to 40 GHZ
- Return Loss > 18 dB DC to 12 GHZ
- Return Loss > 16 dB 13 to 40 GHZ
- Space Saving Footprint .030" X .030" (.762 X .762mm)
- Very Good Stability Over Temperature (TCR < 100 PPM)
- Ground Wrap to Top (No ground bonding required)

The Aeroflex / Metelics fixed attenuator chips are fabricated using our state of the art thin film metallization and advanced photolithography technology.

All devices are available in chip form with a metallized ground connection on the back. This ground is wrapped around on the four corners of the chip so additional ground bonding ribbon is not required.

The chips may be attached using conductive epoxy or solder preform. Gold contacts on the input and output pads make assembly, using standard bonding equipment, fast and reliable.

Custom values and configuration available on request.

Attenuator Pads

Model	Attn. (dB)	IL (dB)	RL (dB)
MAT10010	1.0	+/- .30	>18
MAT10020	2.0	+/- .30	>18
MAT10030	3.0	+/- .30	>18
MAT10040	4.0	+/- .30	>18
MAT10050	5.0	+/- .30	>18
MAT10060	6.0	+/- .35	>18
MAT10070	7.0	+/- .35	>18
MAT10080	8.0	+/- .35	>18
MAT10090	9.0	+/- .35	>18
MAT10100	10.0	+/- .35	>18
MAT10110	11.0	+/- .40	>18
MAT10120	12.0	+/- .40	>18
MAT10130	13.0	+/- .40	>18
MAT10140	14.0	+/- .40	>18
MAT10150	15.0	+/- .40	>18
MAT10160	16.0	+/- .50	>18
MAT10170	17.0	+/- .50	>18
MAT10180	18.0	+/- .50	>18
MAT10190	19.0	+/- .50	>18
MAT10200	20.0	+/- .50	>18
MAT10210	21.0	+/- .60	>18
MAT10220	22.0	+/- .60	>18
MAT10230	23.0	+/- .60	>18
MAT10240	24.0	+/- .60	>18
MAT10250	25.0	+/- .60	>18
MAT10260	26.0	+/- 1.0	>18
MAT10270	27.0	+/- 1.0	>18
MAT10280	28.0	+/- 1.0	>18
MAT10290	29.0	+/- 1.0	>18
MAT10300	30.0	+/- 1.0	>18

Notes:
Resistor pattern may vary from one value to another.
Specifications are subject to change without notice or obligation.

Aeroflex / Metelics Custom Fabricated Devices and Device Networks

In support of your ongoing device integration requirements, Aeroflex / Metelics is pleased to offer the following turnkey device fabrication services. A wide variety of substrate materials are available.

- Resistor networks
- Inductor networks
- Capacitor networks
- Integrated Resistor, Inductor and Capacitor networks and circuit layouts

We continually improve our service in these areas by building on our state of the art wafer fabrication labs, extensive device experience, and worldwide assembly capabilities.

Our application engineering team is available to assist you with integrating our products into ever smaller and more economical packages. In fact, we've made it our mission to offer unsurpassed engineering support and unrivaled customer service to offer you a total solution to your complex device integration requirements.

Please contact your Aeroflex / Metelics sales professional for a complete review of your custom application.

InGaP HBT Amplifiers: Darlington Gain Blocks


Ceramic Epoxy SMT


Plastic SMT


Specialty Package

- Flat gain response from 100 MHz up to 12 GHz
- High linearity
- RoHS compliant
- Also available as bare die and in hermetic package
- Hi-Rel screening available in accordance with MIL-PRF-38534

The Aeroflex / Metelics InGaP Heterojunction Bipolar Transistor (HBT) MMIC amplifiers are specially designed as broadband Darlington gain blocks for instruments, CATV, and wireless infrastructure applications. These gain blocks combines different levels of small signal gain, noise and bandwidth for applications where signal gain is necessary. They are also ideal for buffer IF amplifier.

50 Ω Input / Output Darlington Amplifiers: RF Specifications @ 2 GHz

Model	Frequency Range MHz	SS Gain dB	Pout @ -1dB dBm	OIP3 dBm TYP	Noise Figure dB	VSWR		Device Voltage V	Ic mA	Package
						INPUT	OUTPUT			
MMA500	DC – 2000	20	+17	+28	3.0	1.30:1	1.30:1	4.0	45	SOT89
MMA504	DC-2000	19.5	+15.5	+28	4.5	1.25:1	1.25:1	5.0	48	2012
MMA703	DC – 4000	18	+17	+28	3.5	1.30:1	1.20:1	5.0	45	2012
MMA704	DC – 3000	17	+17	+28	3.5	1.50:1	1.50:1	5.0	45	SOT89
MMA705	DC – 4000	14	+14	+27	4.0	1.50:1	1.50:1	5.0	45	SOT89
MMA706	DC – 6000	15	+15	+27	4.0	1.40:1	1.40:1	5.0	45	2012
MMA708	DC – 4000	13	+20	+38	6.0	1.40:1	2.00:1	7.0	95	2012
MMA710	DC – 4000	13	+20	+38	6.5	1.40:1	1.90:1	7.0	95	SOT89
MMA712	DC – 12000	12	+11	+26	5.5	1.50:1	1.40:1	5.0	45	2012 CM22

InGap HBT Amplifiers: Low and Medium Power

Ceramic Epoxy SMT

Plastic SMT

- High gain from 100 MHz up to 2650 GHz
- Superior MTTF resulting from low thermal resistance.
- RoHS compliant
- Also available as bare die and in hermetic package
- Hi-Rel screening available in accordance with MIL-PRF-19500

The Aeroflex / Metelics InGaP Heterojunction Bipolar Transistor (HBT) low and medium power amplifiers are specifically designed for high efficiency, Class A driver devices in wireless infrastructure applications. Their high spur free dynamic range is ideal for multi-carrier (OFDM) and digital applications. Their output power ranges from 0.25 to 4 watts. They are also ideal for high efficiency, high linearity narrow bandwidth IF amplifiers.

Medium Power Amplifiers (MPA)

Model	Frequency MHz	Gain dB	P1dB dBm	OIP3 dBm	NF dB	Bias Condition V/mA	Package
MMA701A	1930~1990	12.5	+27	+47	4.5	7/130	SOT89
	2110~2170	12.0	+27	+47	4.5		
MMA707	1930~1990	12.0	+31	+50	6.0	7/350	3030 SOIC8
	2110~2170	11.5	+31	+50	6.0		
MMA709	1930~1990	11.0	+34	+54	6.5	7/700	3030 SOIC8
	2110~2170	10.0	+34	+54	6.5		

Silicon Epitaxial Wafers

Aeroflex / Metelics is a supplier of silicon epitaxial wafers. We offer a wide range of capabilities to serve manufacturers of discrete Si devices. Our epi wafers are grown to customer-furnished specifications, based upon the following capabilities.

Epi Capabilities

Wafer Diameter:
3", 100mm, 125mm

Silicon substrate:
Bulk Czochralski, bulk floatzone or SOI

Substrate Dopant:
FZ: Boron or Phosphorus
Cz: Boron, Phosphorus, Arsenic or Antimony

Epi Layer Dopant:
Boron, Phosphorus or Arsenic

Number of Epi Layers:
1, 2 or 3

Epi Layer Resistivity Available Range:
p-type: .009 to 1000 ohm-cm (thickness dependent)
n-type: .005 to 2000 ohm-cm (thickness dependent)

Epi Layer Thickness Available Range:
0.5 to 500 m

Epi for a Variety of Devices

Aeroflex / Metelics is an experienced manufacturer of epi wafers tailored for the following discrete silicon devices:

- PIN diodes (RF and photodiode)
- Varactor diodes
- Schottky diodes
- Bipolar transistors
- MOSFETs
- JFETs
- IGBTs
- MEMs

Quality Assurance

Aeroflex / Metelics is an ISO 9001 facility. Epi wafers are inspected per the relevant SEMI standards. Our in-house epi measurement equipment includes:

- FTIR for measurement of epi layer thickness;
- C-V Hg-probe for measurement of epi resistivity;
- Spreading resistance profile (SRP) for measurement of epi resistivity vs depth;
- Four point probe for measurement of epi resistivity atop a p-n junction;
- 100% visual inspection using a high intensity Yamada inspection lamp.

Capacity

Aeroflex / Metelics can grow small quantity, one-time orders as well as high volume blanket orders. We can rapidly add production shifts in order to fulfill surge demand for epi wafers.

Experience

Aeroflex / Metelics silicon epi group is comprised of highly skilled and experienced technical staff, some with over 25 years of experience in the silicon epi industry. Like the rest of Aeroflex / Metelics, we are highly customer focused. We conduct production / planning meetings daily in order to promote on time delivery.

Aeroflex / Metelics is committed to quality through interactions between engineering, manufacturing, and quality assurance groups at design, development, manufacture, test, and environmental screening levels for all Aeroflex / Metelics products.

Aeroflex / Metelics is firmly committed to producing and providing the highest level of quality products free of defects and deviations. Our primary goal is to achieve consistently high standards and Customer satisfaction based on internal and Customer expectations and requirements by:

- Documenting procedures and specifications used in the manufacturing, testing, and environmental screening of all Aeroflex / Metelics products
- Calibrating equipment with standards traceable to National Institute of Standards and Technology (NIST)
- Adhering to Aeroflex / Metelics internal Electrostatic Discharge (ESD) program requirements based on ANSI/ESD S20.20. All Aeroflex / Metelics Semiconductor and Thin Film products are treated to the most sensitive product ESDS threshold level Class 1 per MIL-STD-19500.
- Assuring all incoming materials conform to documented specifications
- Verifying process controls at fabrication, manufacturing, and test levels
- Performing environmental screening and conformance inspection up to and including space level per MIL-PRF-19500 and/or Customer specific requirements

Aeroflex / Metelics Sunnyvale, CA facility is ISO 9001 registered achieving certification to ISO9001:2008 in March of 2010. A copy of our ISO certificate is available upon request.

Aeroflex / Metelics Londonderry, NH facility, is ISO 9001 registered achieving certification to ISO9001:2008 in July 2009. A copy of our ISO certificate is available upon request.

Element Evaluation, Environmental Screening, and Conformance Inspection

Aeroflex / Metelics provides standard high reliability test programs for our Semiconductor and Thin Film products. Element Evaluations are performed in accordance with MIL-PRF-38534 Class H and Class K levels for passive components and semiconductor die. Environmental Screening and Conformance Inspection are performed in accordance with MIL-PRF-19500 JAN, JANTX, JANTXV, and JANS requirements and/or per Customer specified requirements.

Tables 1 and Table 2 represent Aeroflex / Metelics standard Element Evaluation, Environmental Screening, and Conformance Inspection testing. Certain process steps may be omitted or modified due to device performance restraints, package styles, or screening levels.

Table 1 - MIL-PRF-38534 Element Evaluation for Passive Components

Step	Class		Process	Conditions	Comments
	K	H			
1			Subgroup 1		
2	X	X	Die Electrical	Rs(Resistors) Vr, Cj (Capacitors)	100% electrical, remove rejects
3			Subgroup 2		
4	X	X	Die Visual	MIL-STD-883, Meth 2032	100% visual inspection, remove rejects
5			Subgroup 3		
6	X		Temperature Cycling	MIL-STD-883, Meth 1010, Cond C	10 Cycles, t= 10 minutes min, Ta= -65∞ C to +150∞ C
7	X		Constant Acceleration	MIL-STD-883, Meth 2001, Cond D	20,000 g's, Y1 direction
8	X		Aging (Capacitors only)	MIL-STD-883, Meth 1015, Cond A	t= 240 hrs min, Ta= +125∞ C, Vr= _____V
9	X	X	Visual Inspection	MIL-STD-883, Meth 2017	
10	X	X	End-point Electricals	Rs (Resistors) Vr, Ir, Ct (Capacitors)	Read & Record
11			Subgroup 4		
12	X	X	Bond Strength	MIL-STD-883, Meth 2011 Bond strength= 3.0g min	.001" Au wire or equivalent, 10(0) wires or 20 (1) wires

Table 2 - MIL-PRF-38534 Element Evaluation for Semiconductor Die

Step	Class		Process	Conditions	Comments
	K	H			
1			Subgroup 1		
2	X	X	Die Electrical		100% electrical, remove rejects
3			Subgroup 2		
4	X	X	Die Visual	MIL-STD-883, Meth 2010	100% visual inspection, remove rejects
5			Subgroup 3		
6	X	X	Internal Visual	MIL-STD-883,Meth 2010 or MIL-STD-750, Meth 2072 or 2073	
7			Subgroup 4		
8	X		Temperature Cycling	MIL-STD-883, Meth 1010, Cond C	10 Cycles, t= 10 minutes min, Ta= -65° C to +150° C
9	X	X	Constant Acceleration	MIL-STD-883, Meth 2001, Cond D	20,000 g's Y1 direction
10	X	X	Pre Burn-In Electrical		Go/No Go
11	X		HTRB	MIL-STD-883, Meth 1015, Cond A	t= 240 hrs min, Ta= +125° C, Vr= _____V
12	X	X	Post Burn-In Electrical		Go/No Go
13	X		Steady State Life (when conditions provided)	MIL-STD-883, Meth 1005, Cond B	t= 1000 hrs min, Ta= +125° C, Vr= __V or If=__mA
14	X	X	Final Electricals		Read & Record
15			Subgroup 5		
16	X	X	Bond Strength	MIL-STD-883, Meth 2011 Bond strength= 3.0g min	.001" Au wire or equivalent, 10(0) wires or 20 (1) wires
17			Subgroup 6		
18	X		SEM	MIL-STD-883, Meth 2018 or MIL-STD-750, Meth 2077	

Table 3 - MIL-PRF-19500 100% Environmental Screening Semiconductor Packaged Diodes

Step	Process	Conditions	Comments	JANS	JANTXV	JANTX
1	Visual Inspection	MIL-STD-750, Meth 2073	Performed at chip level prior to assembly	X	when specified	N/A
2	Pre-cap Visual	MIL-STD-750, Meth 2074		X	X	N/A
3	Temperature Storage	MIL-STD-750 Meth 1032	t=___ hrs, Ta= +150° C	X	X	X
4	Temperature Cycling	MIL-STD-750 Meth 1051, Cond F	20 Cycles, t(ext)= 10 min Ta= -65∞ C to +150° C	X	X	X
5	Constant Acceleration	MIL-STD-750 Meth 2006	20,000 G's min Y1 axis only (Au ribbon/wire bond only)	X	X	X
6	PIND	MIL-STD-750 Meth 2052, Cond A	Shock Pulse= 1000 +200 g's, Noise= +20mV peak to peak	X	N/A	N/
7	FIST / BIST (axial lead diodes only)	MIL-STD-750 Meth 2081(FIST), 2082(BIST)	Acc=_, Pulse=_, t=_ms, f=_Hz _blows in_direction, V=_V,I=_A	X	N/A	N/A
8	Fine Leak	MIL-STD-750 Meth 1071, Cond H	$5x10^{-8}$ atm cc^3/s max	N/A	X	X
9	Gross Leak	MIL-STD-750 Meth 1071, Cond C		N/A	X	X
10	Inital Electricals	Ir (or as specified)	Read & Record serialize diode	X	X	X
11	HTRB[1]	MIL-STD-750 Meth 1038, Cond A	t= 48 hrs min, Ta= +150° C, Vr= _____V	X	X	X
12	Interim Electricals	Ir (or as specified)	Read & Record w/in 16 hrs from removal of applied bias	X	X	X
13	Delta HTRB Measurements	Delta Ir= + _nA or 100% whichever is greater	Read & Record delta Ir from Initial to Interim electricals	X	X	X
14	PDA[2]	PDA = 5% max, Actual PDA = ___	PDA = (qty rej delta Ir/qty acc delta Ir) x 100	X	X	X
15	Forward Burn In1	MIL-STD-750 Meth 1038, Cond B	t= 240 hrs min, Ta= + __°C, If=___ mA	X	X	X
16	Final Electricals	Ir (or as specified)	Read & Record w/in 96 hrs from removal of applied bias	X	X	X
17	Delta Forward B Measurements	Delta Ir= + __nA or 100% whichever is greater	Read & Record delta Ir from Interim to Final electricals	X	X	X
18	PDA[2]	PDA = 5% max, Actual PDA = ___	PDA = (qty rej delta Ir/qty acc delta Ir) x 100	X	X	X
19	Fine Leak	MIL-STD-750 Meth 1071, Cond H	$5x10^{-8}$ atm cc^3/s max	X	N/A	N/A
20	Gross Leak	MIL-STD-750 Meth 1071, Cond C		X	N/A	N/A
21	Radiography	MIL-STD-750, Meth 2076	2 views, X and Y	X	N/A	N/A
22	External Visual Inspection	MIL-STD-750 Meth 2071		X	N/A	N/A

Notes:
1 - Burn-In methods and conditions to be provided by Customer and agreed upon by Aeroflex / Metelics engineering.
2 - PDA for JANTX & JANTXV level screening is +10%; PDA for JANS level screening is +5%.

Table 4 - MIL-PRF-19500 Group A Conformance Inspection (all levels)

Group A Inspection	Sample size[1]	Conditions	Comments
Subgroup 1			
Visual & Mechanical Inspection	15	MIL-STD-750, Meth 2071	
Subgroup 2			
Electrical Tests	116 (45)[2]	Ta= +25˚ C	Read & Record (satisfied with 100% Post BI data)
Subgroup 3			
DC (static) tests	116 (45)[2]	Ta= -_____˚ C	Read & Record Ta= min rated operating temperature
DC (static) tests	116 (45)[2]	Ta= +_____˚ C	Read & Record Ta= max rated operating temperature
Subgroup 4			
Dynamic tests	116 (45)[2]	Ta= +25˚ C	

Table 5 - MIL-PRF-19500 Group B Conformance Inspection

Group B Inspection	Sample size[1,2]	Conditions	Comments	JANS	JANTXV	JANTX
Subgroup 1[4]			Electrical rejects may be used			
Physical Dimensions	22 (8)	MIL-STD-750 Meth 2066	Specified case outline dimensions	X	N/A	N/A
Subgroup 2[4]			Electrical rejects may be used			
Solderability	15 (6) leads	MIL-STD-750 Meth 2026	Leads from a minimum of 3 devices shall be tested	X	X	X
Resistance to Solvents	15 (6)	MIL-STD-750 Meth 1022		X	X	X
Subgroup 3[4]						
Temperature Cycling	22 (6)	MIL-STD-750 Meth 1051, Cond F	45 Cycles including screening, t(ext)= 10 min Ta= -65° C to +150° C (JANS 100 cycles)	X	X	X
Thermal Shock	22 (6)	MIL-STD-750 Meth 1056, Cond B	10 Cycles (JANS 25 cycles) (glass axial lead only)	X	X	X
Surge	22 (6)		only when specified	X	X	X
Fine Leak	22(6)	MIL-STD-750, Meth 1071, Cond H	$5x10^{-8}$ atm cc^3/s max	X	X	X
Gross Leak	22 (6)	MIL-STD-750 Meth 1071, Cond C		X	X	X
Electrical Tests[3]	22 (6)		Read & Record	X	X	X
Intermittent Operating Life	22 (12)	MIL-STD-750 Meth 1037, 2000 cycles	submit to 6000 cycles to satisfy Grp C Subgrp 6 requirement	N/A	X	X
Electrical Tests[3]	22 (12)		Read & Record	N/A	X	X
De-cap Internal Visual	6 (6)	MIL-STD-750 Meth 2075	Decap devices	X	X	X
Bond Strength	22 (12) wires or 1 (6) devices	MIL-STD-750 Meth 2037	use for die shear	X	X	X
SEM	22 (12)	MIL-STD-750, METH 2077	when specified	X	X	X
Die Shear	11 (6)	MIL-STD-750, METH 2017	use bond pull samples	X	N/A	N/A
Subgroup 4[4]						
Intermittent Operating Life	22 (12)	MIL-STD-750 Meth 1037, 2000 cycles	submit to 6000 cycles to satisfy Grp C Subgrp 6 requirement	X	N/A	N/A
Electrical Tests	22 (12)		Read & Record satisfy w/Grp C Subgrp 6	X	N/A	N/A
Subgroup 5[4]						
Accelerated Steady State Life	22 (12)	MIL-STD-750, Meth 1027 *Schottky= Tj max, 240 hrs	t= 96 hrs, Ta= +275° C Vr=__V(pk), Io=__mA, f=__Hz	X	N/A	N/A
Electrical Tests[3]	22 (12)		Read & Record	X	N/A	N/A
Subgroup 6[4]						
Thermal Resistance	22 (8)	MIL-STD-750 Meth 408 (Meth 3101 option JANS)	Read & Record	X	X	X
High Temp Life (Non-operating)	22 (12)	MIL-STD-750 Meth 1032	t= 340 hrs, Ta= T STG(MAX)	N/A	X	X
Electrical Tests[3]	22 (12)		Read & Record	N/A	X	X

Notes:
1 - Small lot sample size defined in parentheses ( ). Inspection lot quantity shall not exceed 2,500 pcs for JANTX & JANTXV Group A small lot sampling; inspection lot quantity shall not exceed 1,000 pcs for JANS Group A small lot sampling. Group B small lot sampling: inspection lot quantity shall not exceed 1,000 pcs for JANS Group B small lot sampling.
2 - Electrical test parameters shall be defined by product type and specific requirements; test limits at temperature may vary from those published in this catalog.
3 - Endpoint electricals tests parameters shall be defined by product type and specific requirements.
4 - Test sequence may differ according to JAN screening level.

Table 6 - MIL-PRF-19500 Group C Conformance Inspection (all levels)

Group C Inspection	Sample size[1,2]	Conditions	Comments
Subgroup 1			
Physical Dimensions	15 (6)	MIL-STD-750, Meth 2066	
Subgroup 2			
Thermal Shock	22 (6)	MIL-STD-750 Meth 1056, Cond A	glass axial lead only
Terminal Strength	22 (6)	MIL-STD-750 Meth 2036, Cond E	leaded packages only, w=___oz, t=___sec
Fine Leak	22 (6)	MIL-STD-750 Meth 1071, Cond H	5x10-8 atm cc3/s max
Gross Leak	22 (6)	MIL-STD-750 Meth 1071, Cond C	
Moisture Resistance	22 (6)	MIL-STD-750, Meth 1021	Omit initial conditioning
End-point Electricals[2]	22 (6)		Read & Record
Subgroup 3			
Shock	22 (6)	MIL-STD-750 Meth 2016	Non-operating, 1500G, 0.5ms, 5 blows X1, Y1, Z1
Variable Frequency	22 (6)	MIL-STD-750 Meth 2056	
Acceleration	22 (6)	MIL-STD-750 Meth 2006	1 minute min, 20K G X1, Y1, Z1
End-point Electricals[2]	22 (6)		Read & Record
Subgroup 4			
Salt Atmosphere	15 (6)	MIL-STD-750, Meth 1041	Electrical rejects may be used
Subgroup 5			
Thermal Resistance	15 (6)	MIL-STD-750, Meth 4081	Read & Record
Subgroup 6			
Intermittent Operating Life	22 (12)	MIL-STD-750, Meth 1037 6000 cycles	Units from Group B-2000 cycle test may be used to complete the 6000 cycles
End-point Electricals[2]	22 (12)		Read & Record
Bond Strength	11 wires	MIL-STD-750 Meth 2037	Only when Group B units continue to satisfy Group C requirement, Read & Record
Subgroup 7			
Internal Water Vapor	3	MIL-STD-750, Meth 1018	3 devices c= 0 or 5 devices c= 1

Notes:
1 - Small lot sample size defined in parentheses ( ). Inspection lot quantity shall not exceed 2,500 pcs for JANTX & JANTXV Group A small lot sampling; inspection lot quantity shall not exceed 1,000 pcs for JANS Group A small lot sampling.
2 - Electrical test parameters shall be defined by product type and specific requirements; test limits at temperature may vary from those published in this catalog.

Orders

Orders may be placed with your local sales representative or directly with our sales team at:

Aeroflex / Metelics, Inc.
East Coast Operations
54 Grenier Field Road
Londonderry, NH 03053
Tel: (603) 641-3800
Fax: (603) 641-3500

Sales: (888) 641-SEMI (7364)
Email: metelics-sales@aeroflex.com

Aeroflex / Metelics, Inc.
West Coast Operations
975 Stewart Drive
Sunnyvale, CA 94085
Tel: (408)737-8181
Fax: (408) 733-7645

Price and Delivery Information

The price and delivery of any items listed in this catalog ordered directly from the factory are quoted in U.S. Dollars, F.O.B. factory origin and are subject to change without notice. All quoted prices are exclusive of any federal, state or local taxes, and are the sole responsibility of the buyer. Terms are NET 30 days if credit has been established. Foreign payments and terms are arranged on an individual basis.

Warranty

Aeroflex / Metelics warrants their products to be free of defects in material and workmanship for one year from the date of original shipment. Our obligation at Metelics is limited to repair, replace, or credit. This warranty shall not apply to any products which have been subjected to accident, misuse, improper installation, alteration or abuse. Metelics shall have the final determination in regard to the cause and existence of any defect under warranty.

Applications

If you should have any application questions related to the products outlined in this catalog please contact our engineering staff. We gladly offer consultations on circuit design or application problems. We also offer special product design.

Returned Material

When returning material for repair or replacement, it is necessary to first contact the factory for an approval and authorization number. Complete information must be included with the return shipment stating reason for return, purchase order on which the product was originally purchased, new purchase order if applicable, and address where material is to be returned.

Specifications

Aeroflex / Metelics reserves the right to discontinue products and change specifications without notice.

Federal Supply Code

Aeroflex / Metelics, Inc. Federal Supply Code for for manufactures assigned number is:

61322 Londonderry
59365 Sunnyvale

Bare Die

Fig. 1

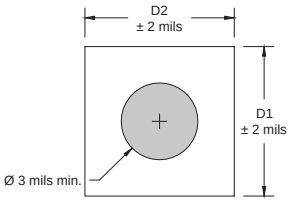


Fig. 2

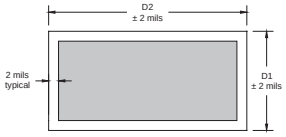


Fig. 3

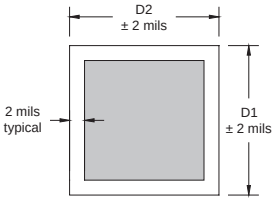
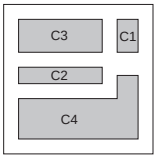
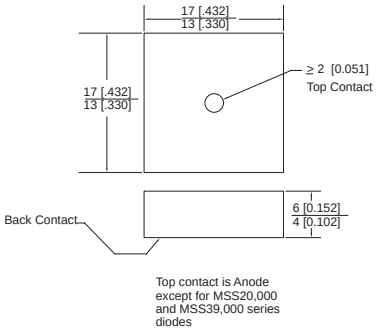


Fig. 4



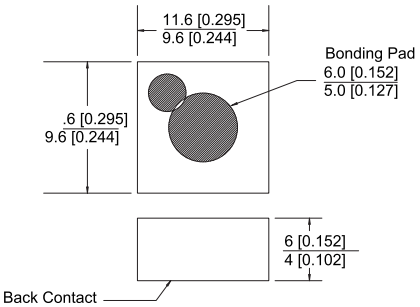
C11/C12



mils (mm)

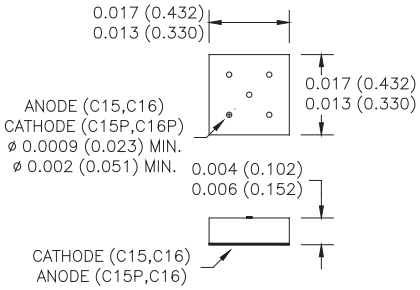
C13

Bonding Pad is Anode



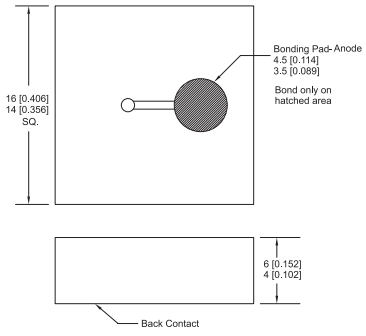
mils (mm)

C15



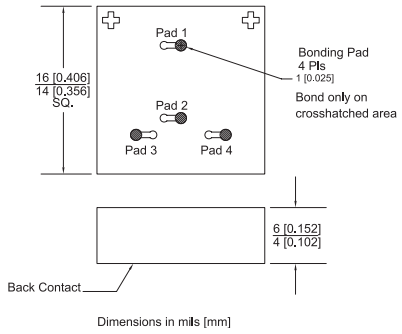
inches (mm)

C16



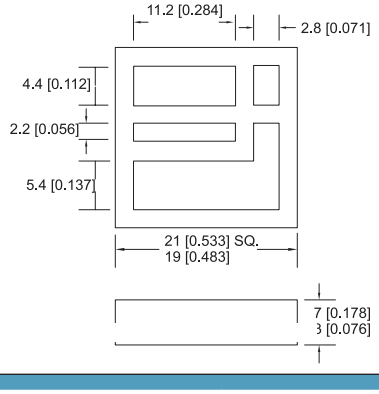
inches (mm)

C18



mils (mm)

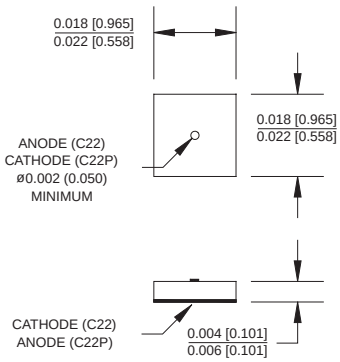
C20



mils (mm)

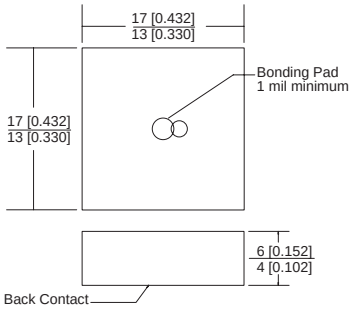
Bare Die

C22



inches (mm)

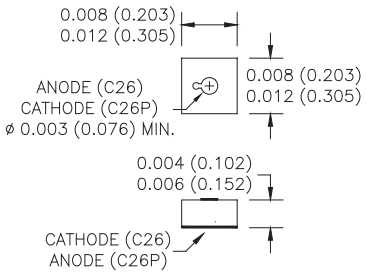
C24



Bonding Pad is Anode

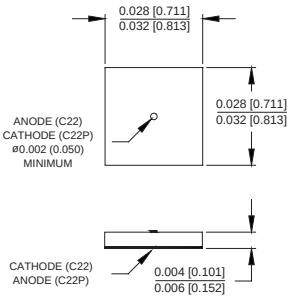
inches (mm)

C26



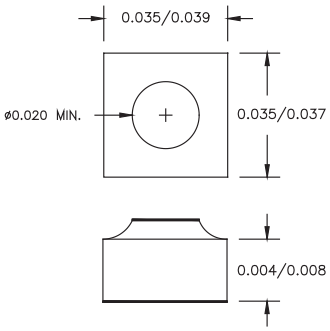
inches (mm)

C32



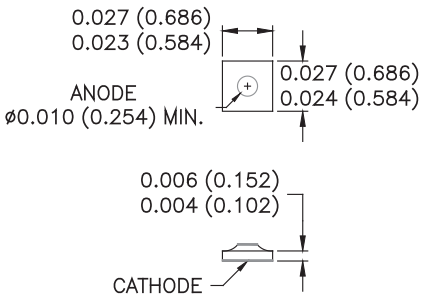
inches (mm)

C37



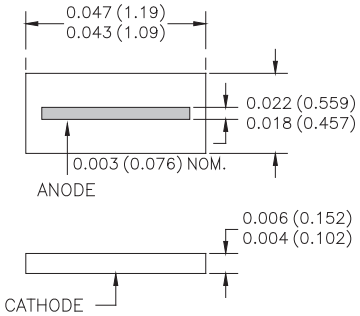
inches (mm)

C40



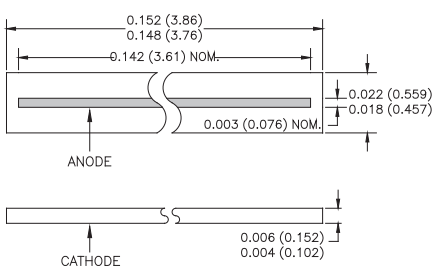
inches (mm)

C50



inches (mm)

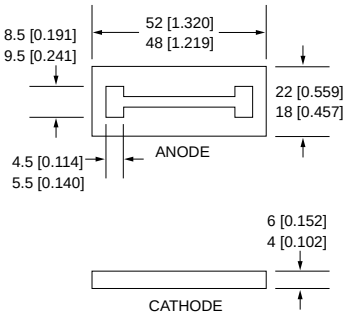
C51



inches (mm)

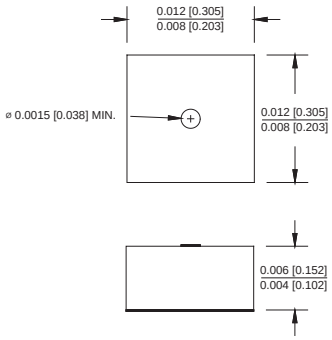
Bare Die

C54



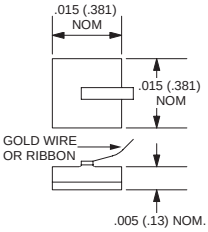
inches (mm)

C01A



inches (mm)

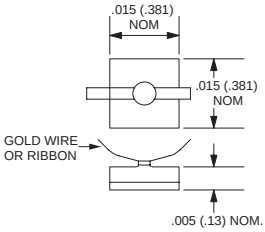
CS08



NOTES:
1. TOP CONTACT & CHIP SIZE DEPENDS ON DIODE PARAMETERS
2. TOP AND BOTTOM CONTACTS GOLD
3. CONSULT FACTORY

inches (mm)

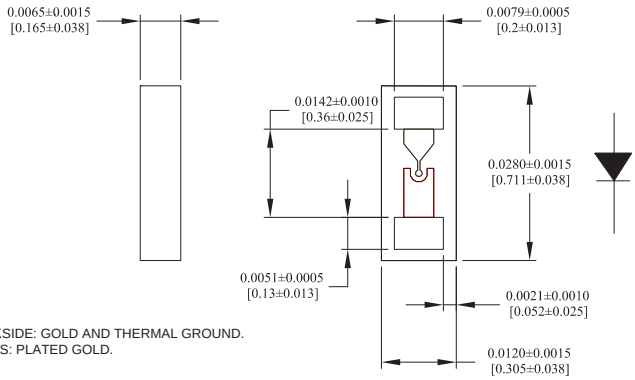
CS09



NOTES:
1. TOP CONTACT & CHIP SIZE DEPENDS ON DIODE PARAMETERS
2. TOP AND BOTTOM CONTACTS GOLD
3. CONSULT FACTORY

inches (mm)

SC110

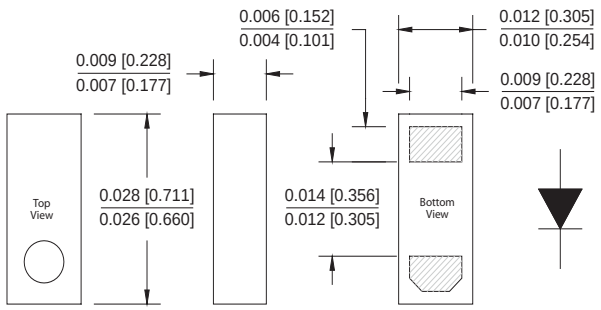


NOTES:
1. CHIP BACKSIDE: GOLD AND THERMAL GROUND.
2. BOND PADS: PLATED GOLD.

inches (mm)

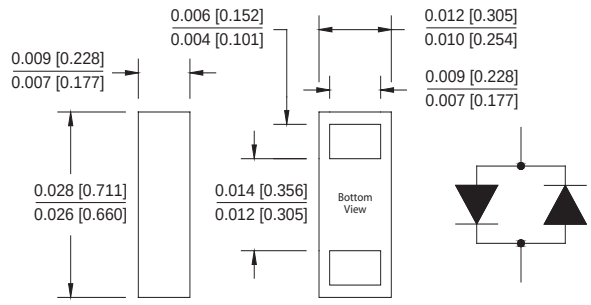
Flip Chip

GC110



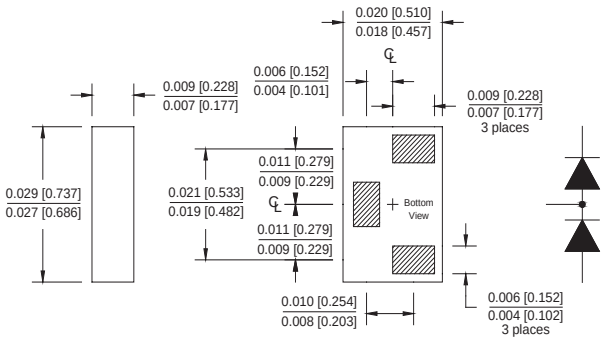
inches (mm)

GC210



inches (mm)

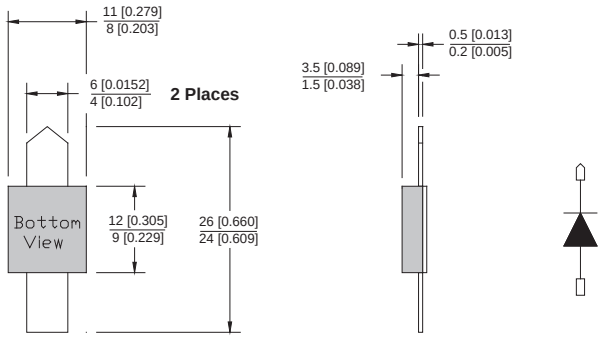
GC310



inches (mm)

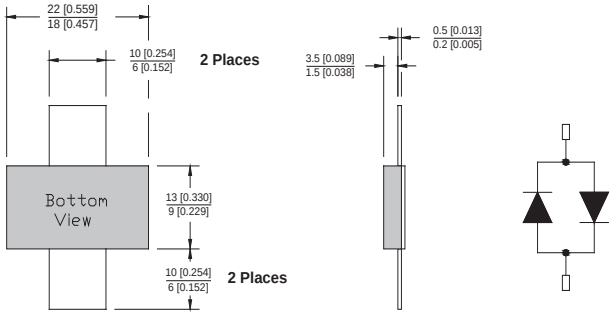
Beam Lead

GB110



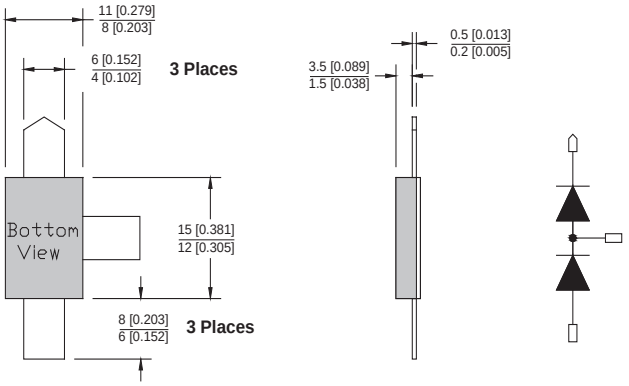
mils (mm)

GB210



mils (mm)

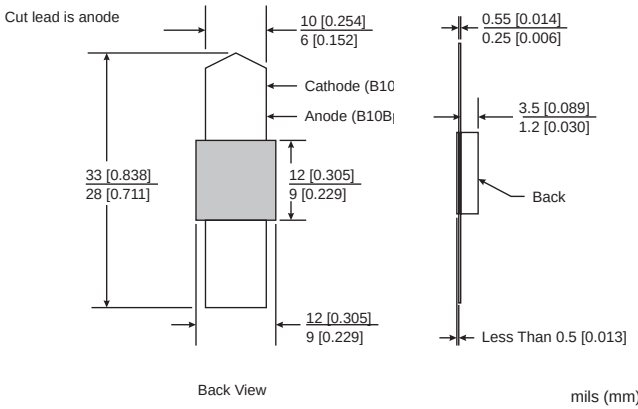
GB310



mils (mm)

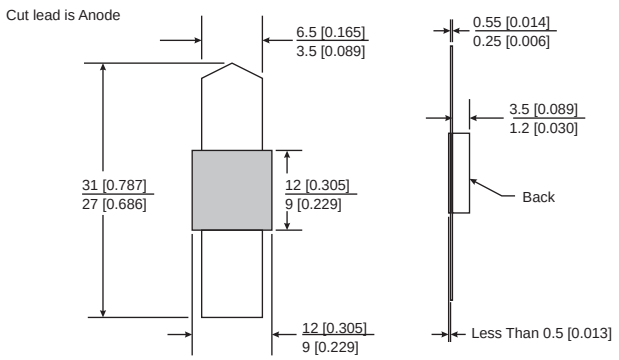
Beam Lead

B10B



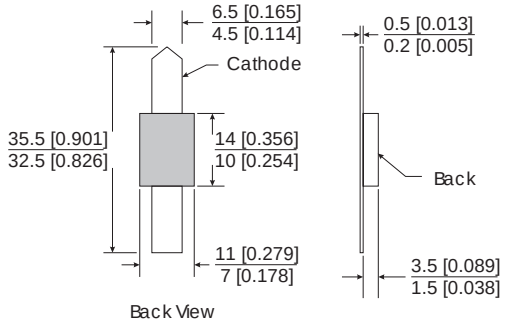
mils (mm)

B10D



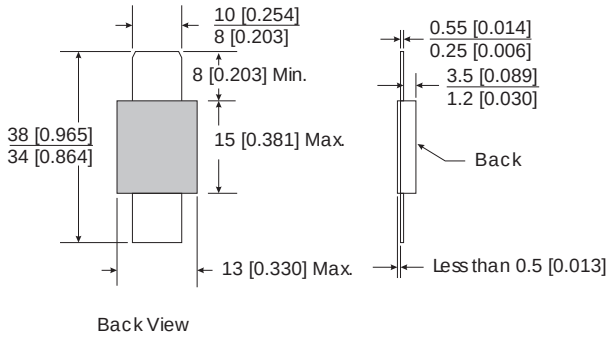
mils (mm)

B11



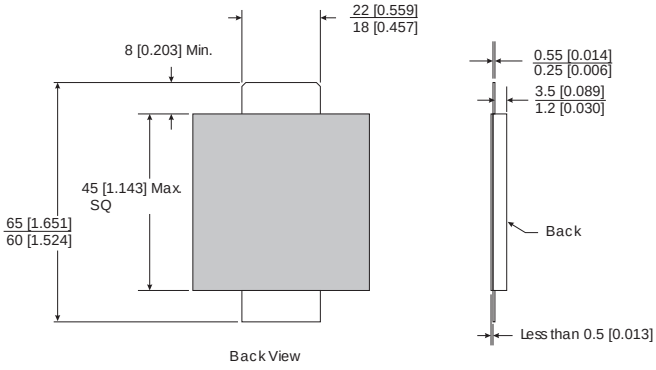
mils (mm)

B12



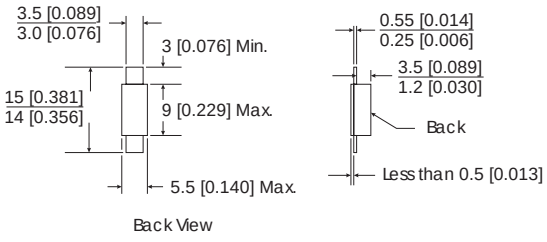
mils (mm)

B13



mils (mm)

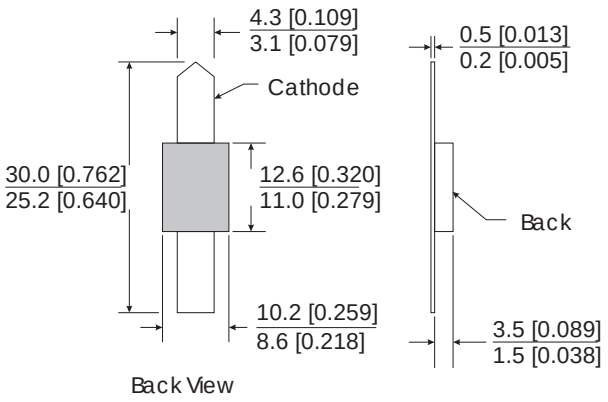
B14



mils (mm)

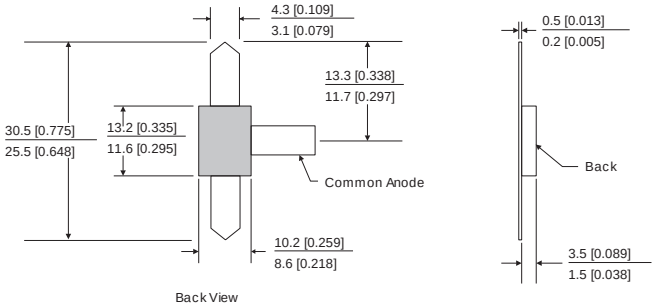
Beam Lead

B15



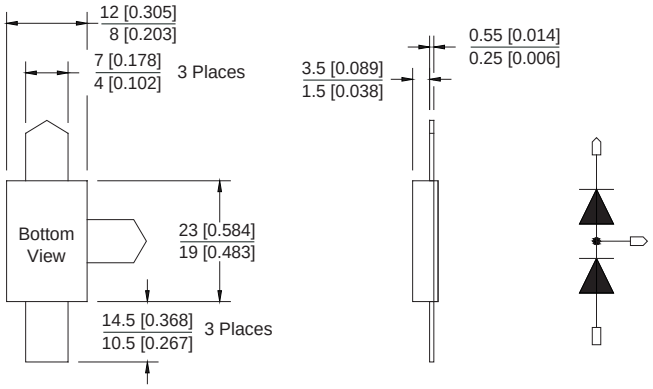
mils (mm)

B16



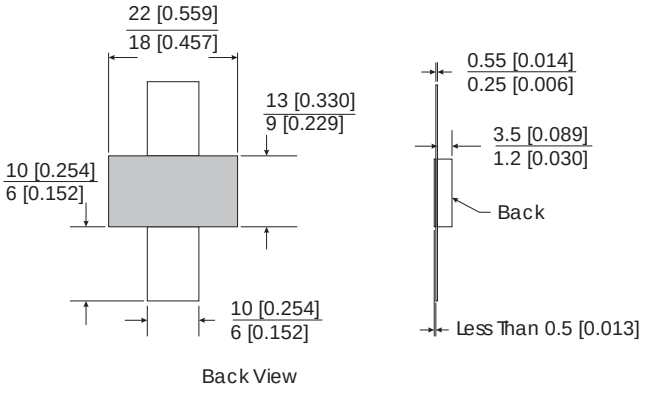
mils (mm)

B20



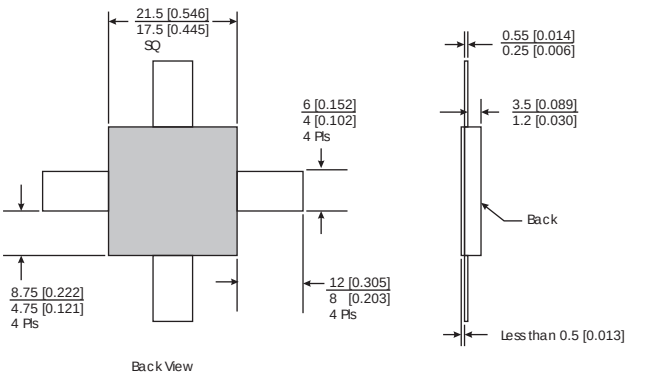
mils (mm)

B21



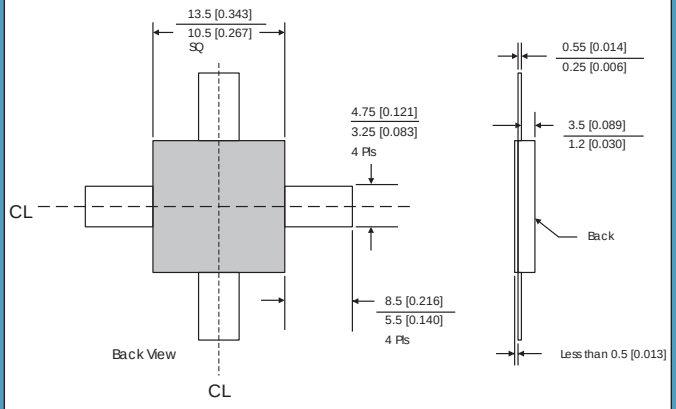
mils (mm)

B40



mils (mm)

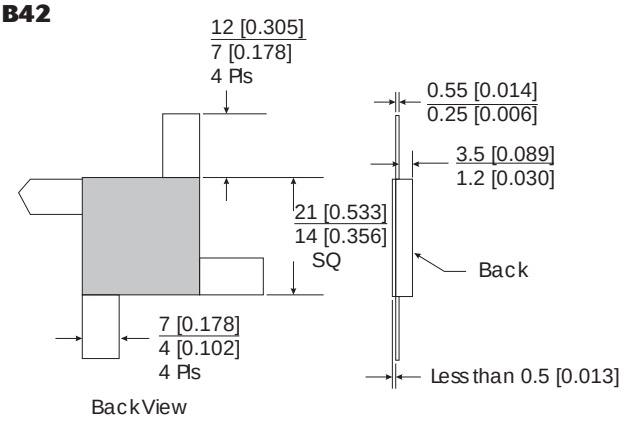
B41



mils (mm)

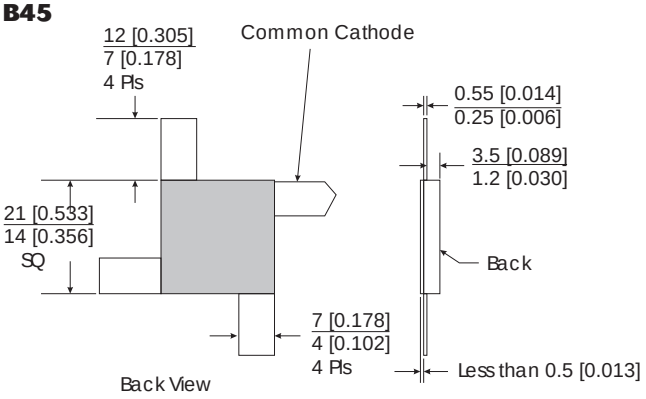
Beam Lead

B42



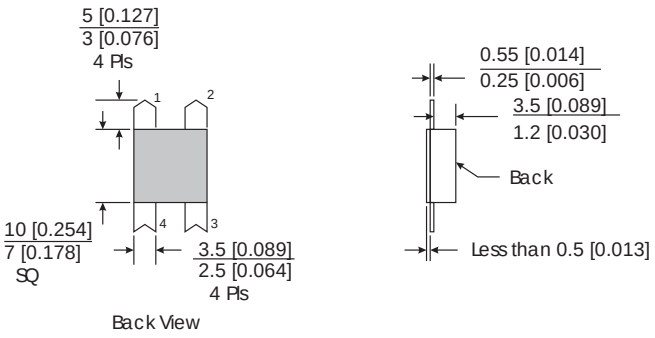
mils (mm)

B45



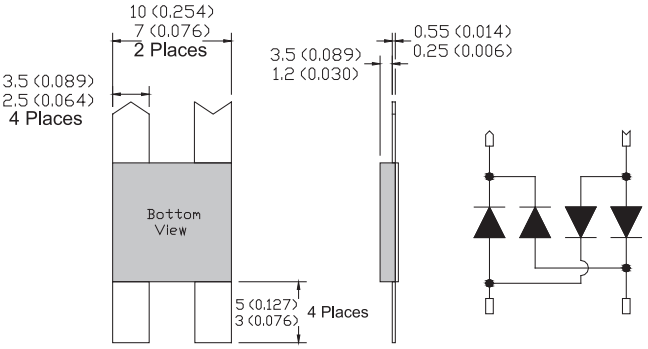
mils (mm)

B47



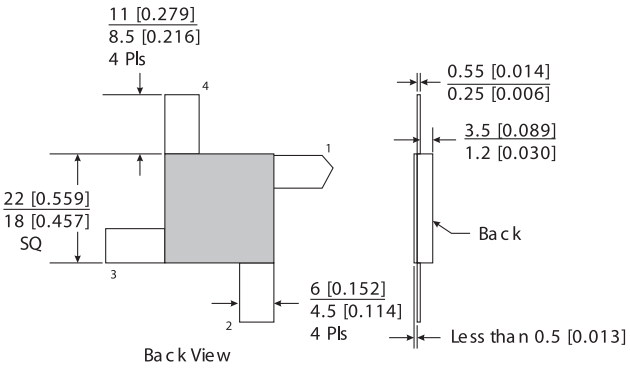
mils (mm)

B48



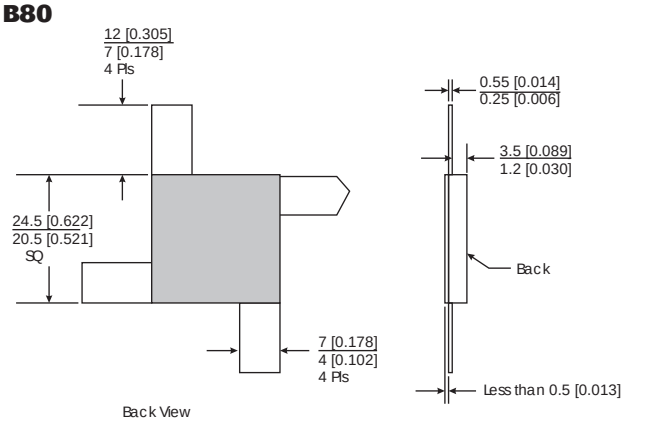
mils (mm)

B49



mils (mm)

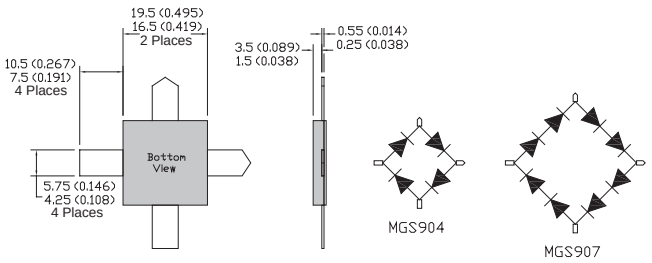
B80



mils (mm)

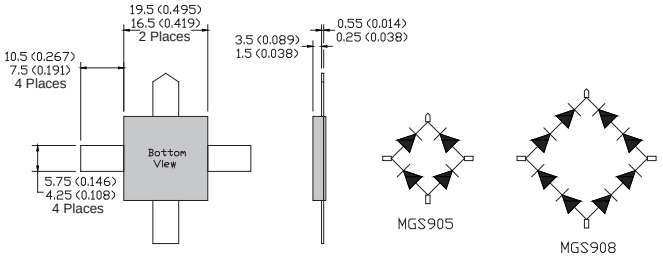
Beam Lead

B85



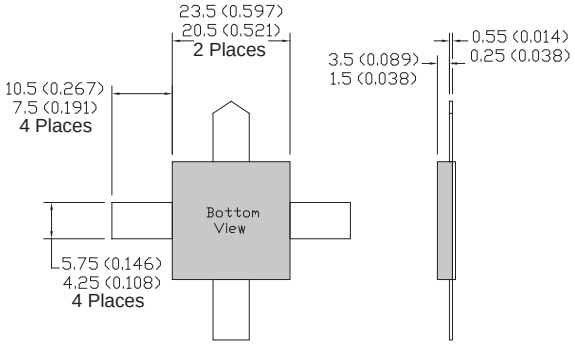
mils (mm)

B86



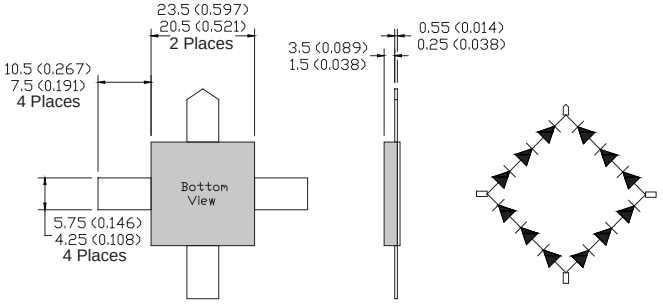
mils (mm)

B87



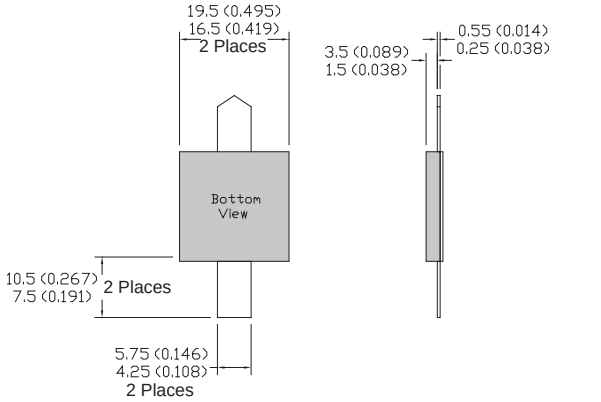
mils (mm)

B88



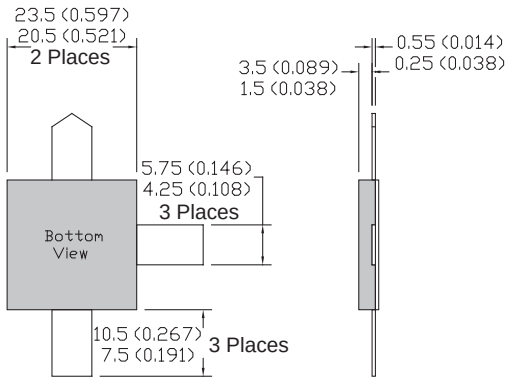
mils (mm)

B89



mils (mm)

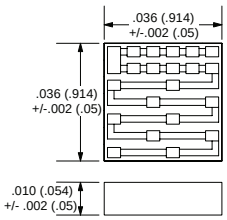
B90



mils (mm)

Resistors

R1

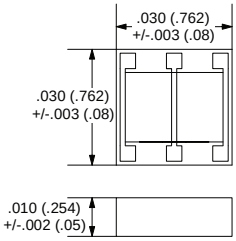


notes:
1. The top gold bonding pads are .004" Square Typ. (.0035 Min and 15000 A thick Min)

2. There is a min separation between the edge of the chip and any top bonding pads of .001"

inches (mm)

R2

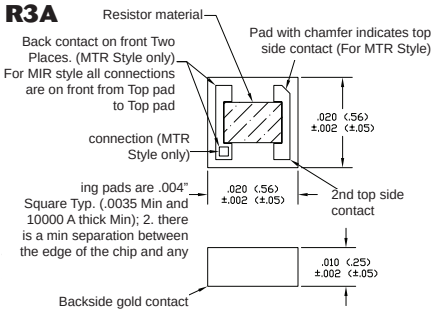


notes:
1. The top gold bonding pads are .004" Square Typ. (.0035 Min and 15000 A thick Min)

2. There is a min separation between the edge of the chip and any top bonding pads of .001"

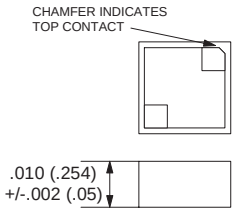
inches (mm)

R3A



inches (mm)

R3



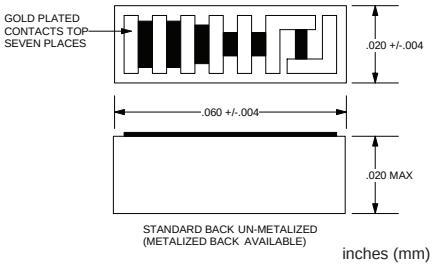
notes:
1. The top gold bonding pads are .004" Square Typ. (.0035 Min and 15000 A thick Min)

2. There is a min separation between the edge of the chip and any top bonding pads of .001"

3. Available as thru-chip

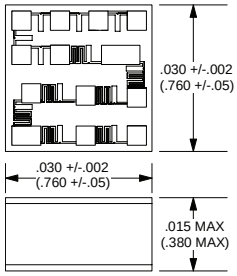
inches (mm)

R4



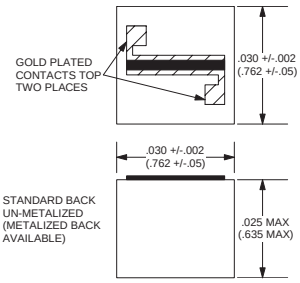
inches (mm)

R5



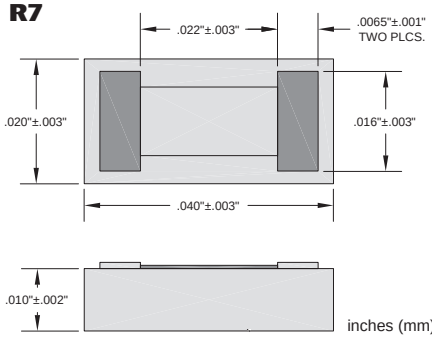
inches (mm)

R6



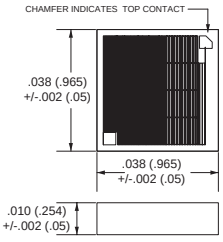
inches (mm)

R7



inches (mm)

R8



notes:
1. The top gold bonding pads are .004" Square Typ. (.0035 Min and 15000 A thick Min)

2. There is a min separation between the edge of the chip and any top bonding pads of .001"

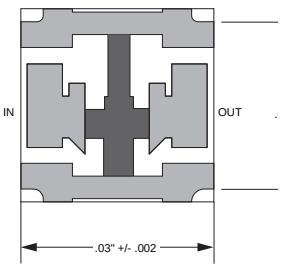
3. Available as thru-chip

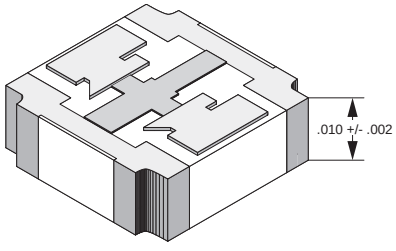
inches (mm)

Attenuator Pad

CS07

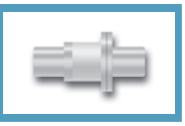
Front to Back Metallization in Four Places Bonding Pad Sizes and Resistor Outline may differ from value to value



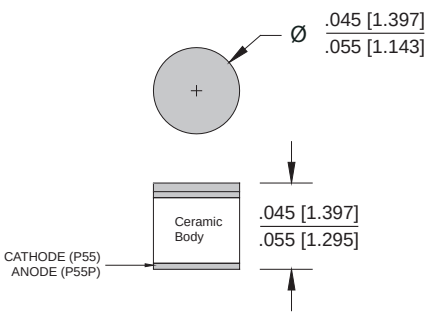


Front to Back Metallization in Four Places

Ceramic Microwave Pill (Hermetic)

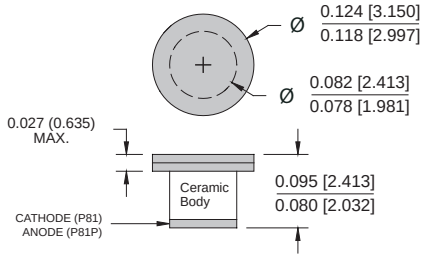


P55 / P55p



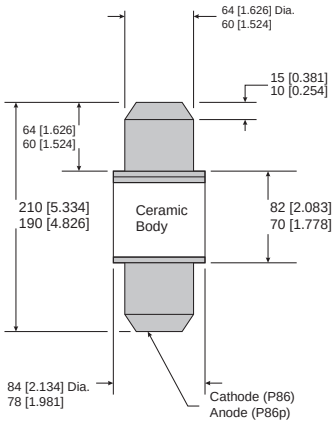
inches (mm)

P81 / P81p



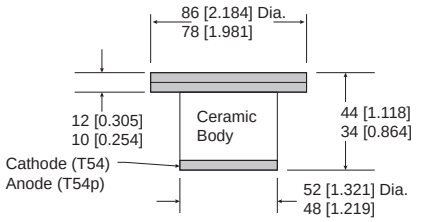
inches (mm)

P86 / P86p



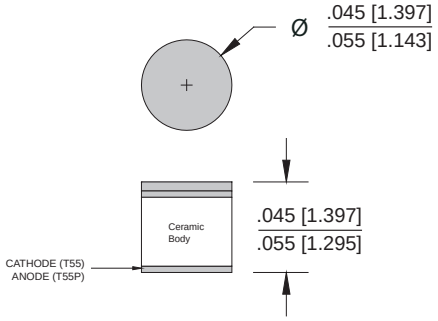
mils (mm)

T54 / T54p



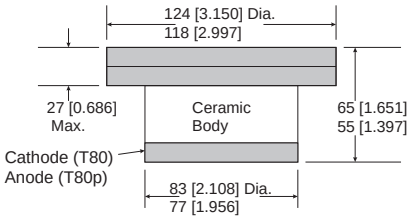
mils (mm)

T55 / T55p



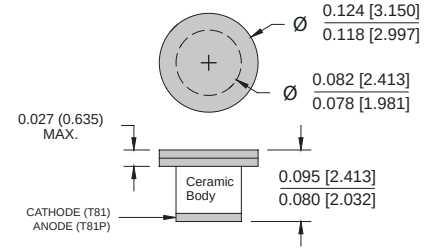
inches (mm)

T80 / T80p



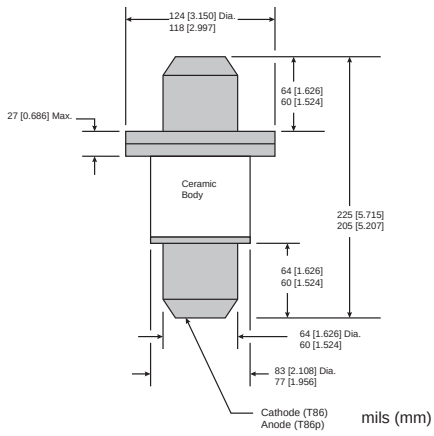
mils (mm)

T81 / T81p



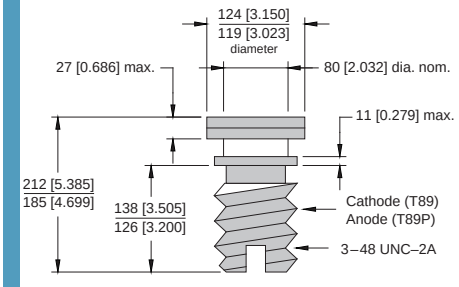
inches (mm)

T86 / T86p



mils (mm)

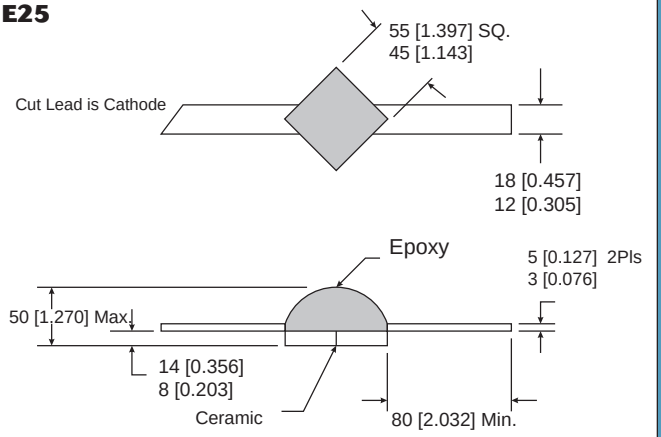
T89 / T89p



mils (mm)

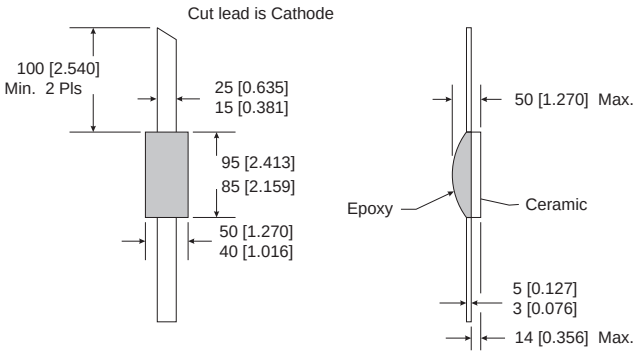
Ceramic Epoxy SMT

E25



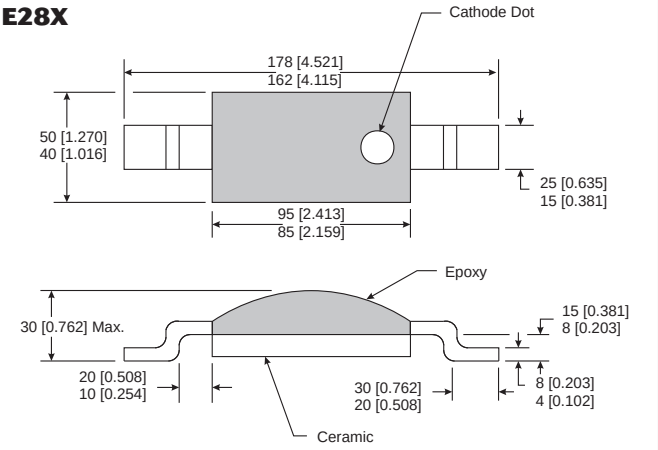
mils (mm)

E28



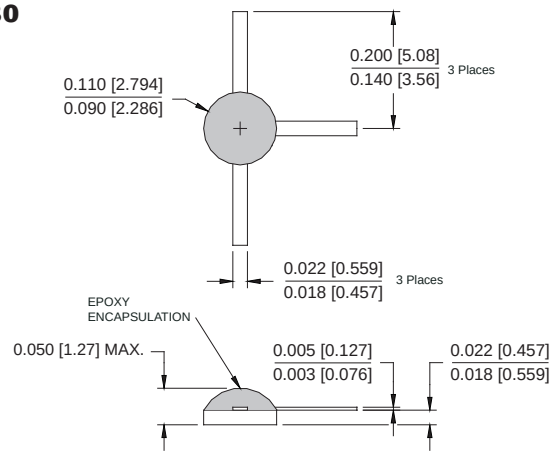
mils (mm)

E28X



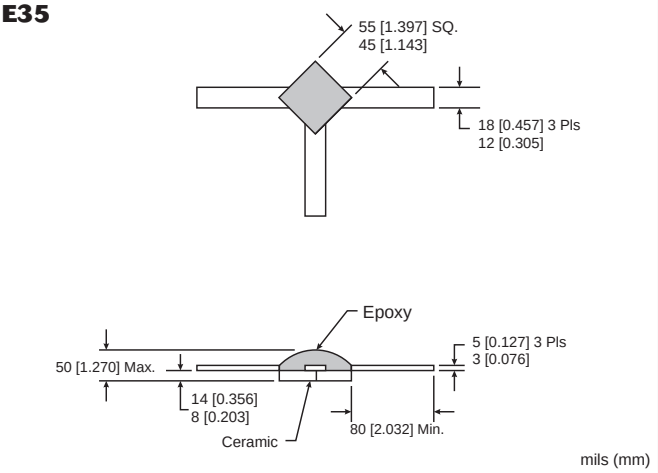
mils (mm)

E30



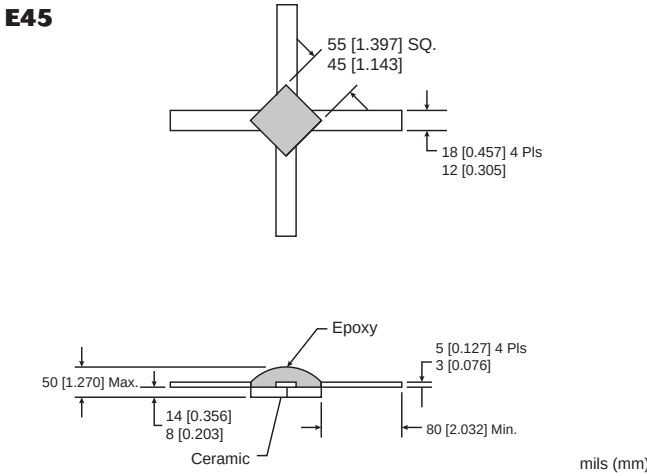
inches (mm)

E35



mils (mm)

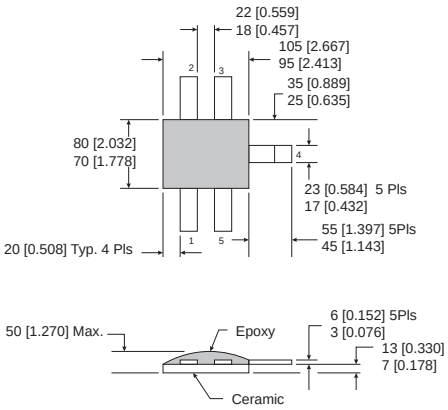
E45



mils (mm)

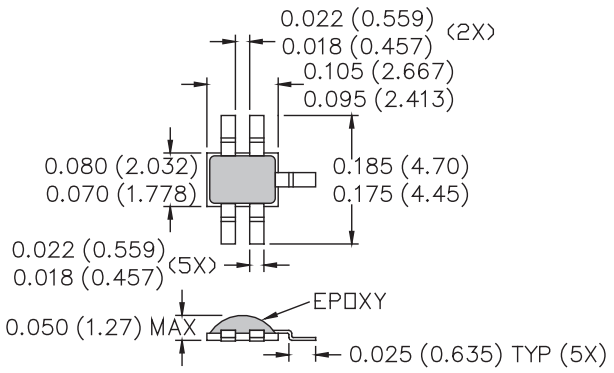
Ceramic Epoxy SMT

E50



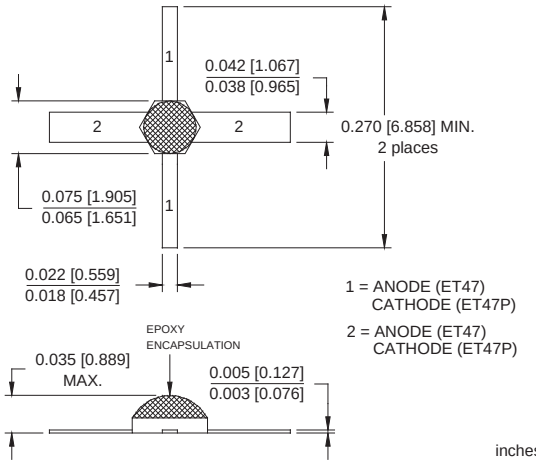
mils (mm)

E50SM



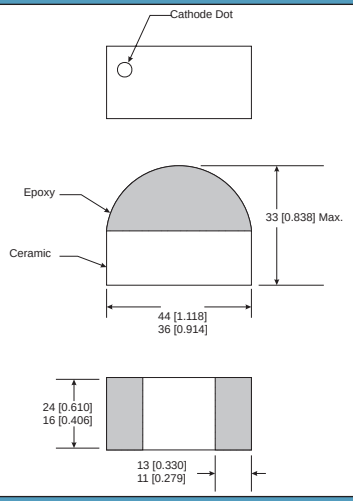
inches (mm)

ET47



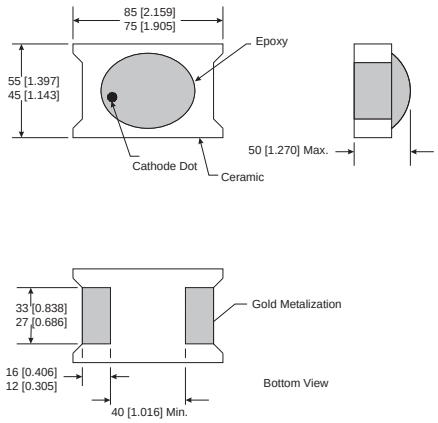
inches (mm)

O402



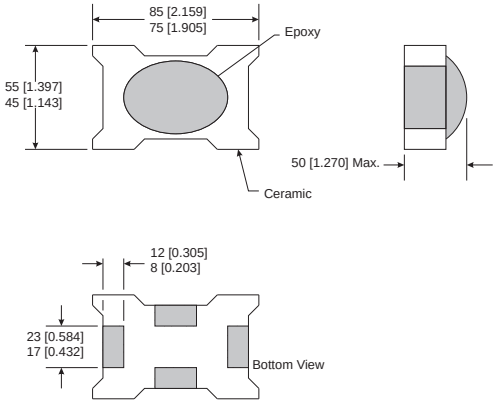
mils (mm)

O805-2



mils (mm)

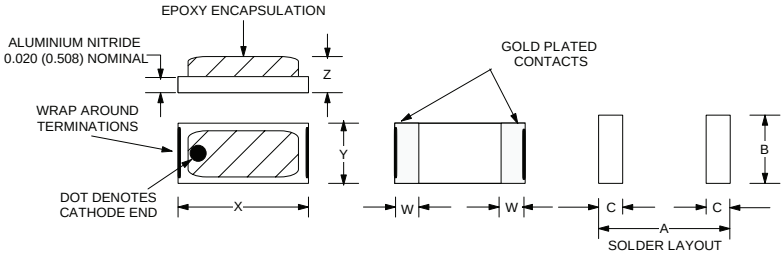
O805-4



mils (mm)

Ceramic Epoxy SMT

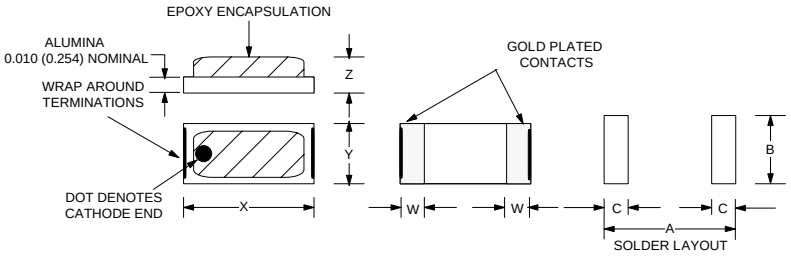
CS16



PKG STYLE	DIMENSIONS				SOLDER LAYOUT (TYP.)			PACKAGE CP AND LP
	W DIM.	X DIM.	Y DIM.	Z DIM.	A	B	C	
CS16-1	.012 (.304)	.060 (1.52)	.040 (1.01)	.050 (1.27)	.072 (1.83)	.040 (1.01)	.020 (.508)	.09 pF .35 nH
CS16-2	.012 (.304)	.075 (1.91)	.050 (1.27)	.050 (1.27)	.087 (2.21)	.070 (1.78)	.020 (.508)	.11 pF .4 nH
CS16-3	.012 (.304)	.100 (2.54)	.050 (1.27)	.050 (1.27)	.112 (2.84)	.070 (1.78)	.020 (.508)	.14 pF .4 nH
CS16-4	.012 (.304)	.120 (3.05)	.060 (1.52)	.050 (1.27)	.132 (3.35)	.080 (2.03)	.020 (.508)	.09 pF .4 nH
CS16-5	.012 (.304)	.200 (5.08)	.100 (2.54)	.050 (1.27)	.212 (5.38)	.120 (3.05)	.020 (.508)	.09 pF .5 nH
CS16-6	.010 (.254)	.040 (1.01)	.020 (.508)	.050 (1.27)	.050 (1.27)	.030 (.762)	.018 (.457)	.06 pF .35 nH
CS16-7	.010 (.254)	.060 (1.52)	.020 (.508)	.050 (1.27)	.070 (1.78)	.030 (.762)	.018 (.457)	.08 pF .35 nH
TOL. ±	.002 (.051)	.003 (.076)	.003 (.076)	MAX	NOM.	NOM.	NOM.	NOM.

inches (mm)

CS19

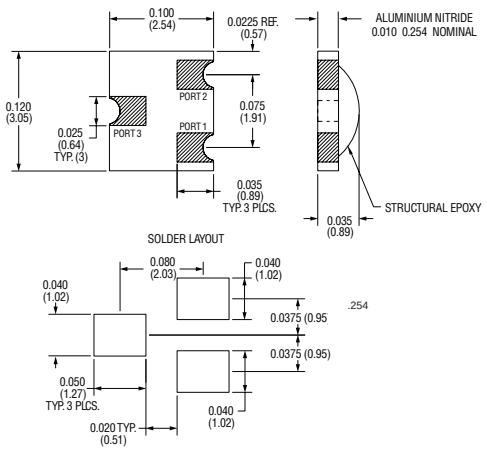


PKG STYLE	DIMENSIONS				SOLDER LAYOUT (TYP.)			PACKAGE CP AND LP
	W DIM.	X DIM.	Y DIM.	Z DIM.	A	B	C	
CS19-1	.012 (.304)	.060 (1.52)	.040 (1.01)	.030 (.762)	.072 (1.83)	.040 (1.01)	.020 (.508)	.09 pF .35 nH
CS19-2	.012 (.304)	.075 (1.91)	.050 (1.27)	.035 (.889)	.087 (2.21)	.070 (1.78)	.020 (.508)	.11 pF .4 nH
CS19-3	.012 (.304)	.100 (2.54)	.050 (1.27)	.035 (.889)	.112 (2.84)	.070 (1.78)	.020 (.508)	.14 pF .4 nH
CS19-4	.012 (.304)	.120 (3.05)	.060 (1.52)	.035 (.889)	.132 (3.35)	.080 (2.03)	.020 (.508)	.09 pF .4 nH
CS19-5	.012 (.304)	.200 (5.08)	.100 (2.54)	.035 (.889)	.212 (5.38)	.120 (3.05)	.020 (.508)	.09 pF .5 nH
CS19-6	.010 (.254)	.040 (1.01)	.020 (.508)	.030 (.762)	.050 (1.27)	.030 (.762)	.018 (.457)	.06 pF .35 nH
CS19-7	.010 (.254)	.060 (1.52)	.020 (.508)	.030 (.762)	.070 (1.78)	.030 (.762)	.018 (.457)	.08 pF .35 nH
TOL. ±	.002 (.051)	.003 (.076)	.003 (.076)	MAX	NOM.	NOM.	NOM.	NOM.

inches (mm)

Ceramic Epoxy SMT

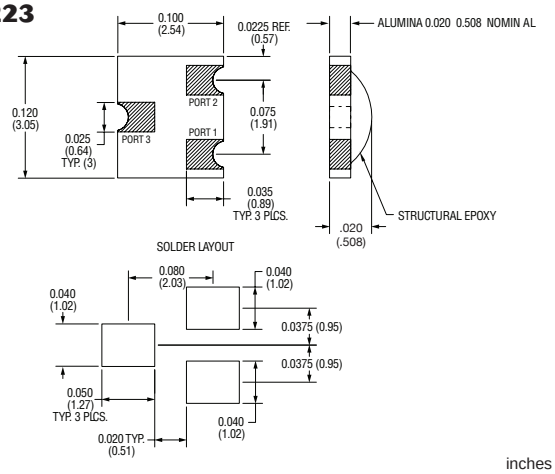
CS23



See SOT 23 Configuration Code on page 113

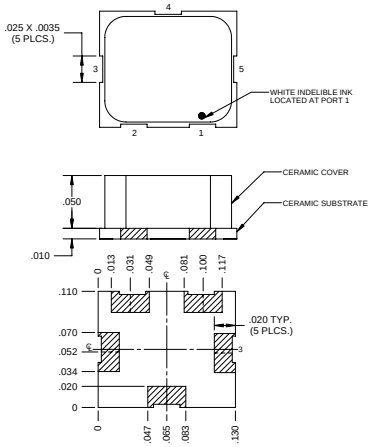
inches (mm)

CS223

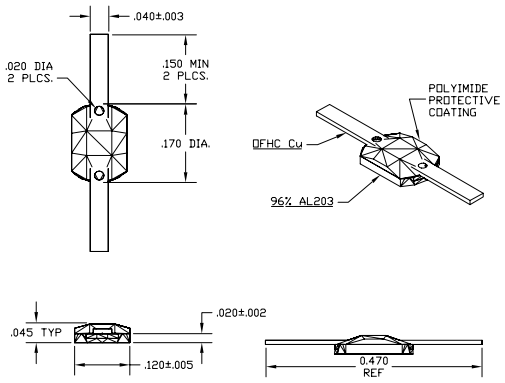


inches (mm)

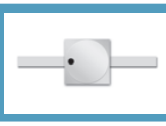
CS121



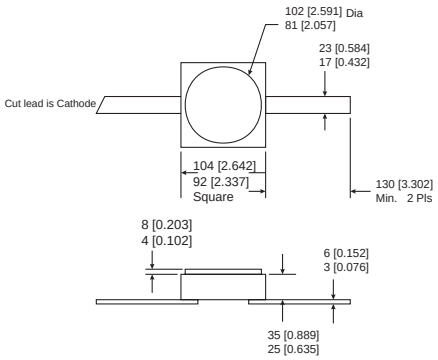
CS145



Ceramic Hermetic SMT

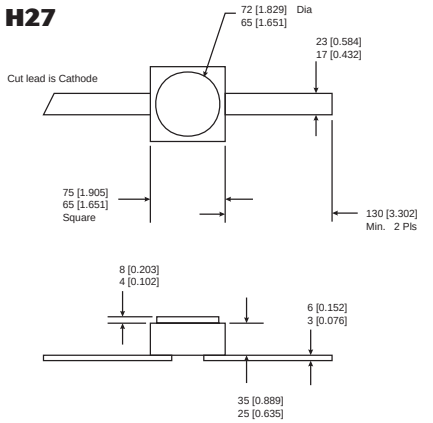


H20



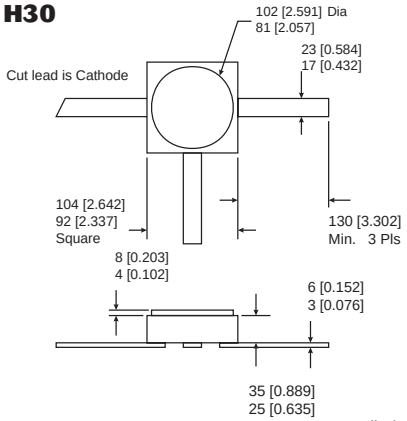
mils (mm)

H27



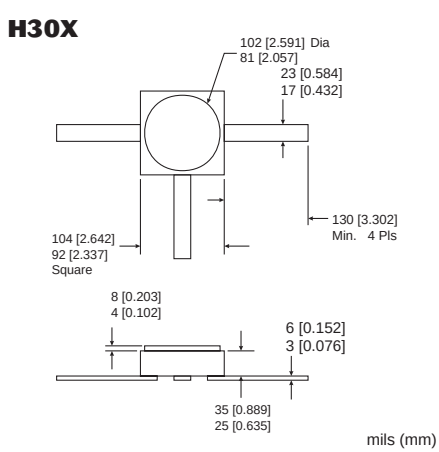
mils (mm)

H30



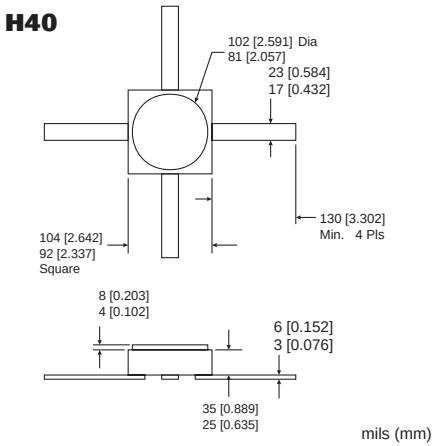
mils (mm)

H30X



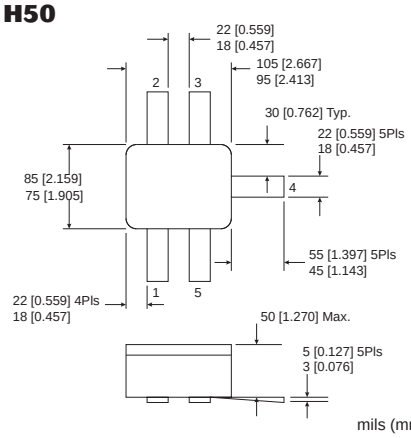
mils (mm)

H40



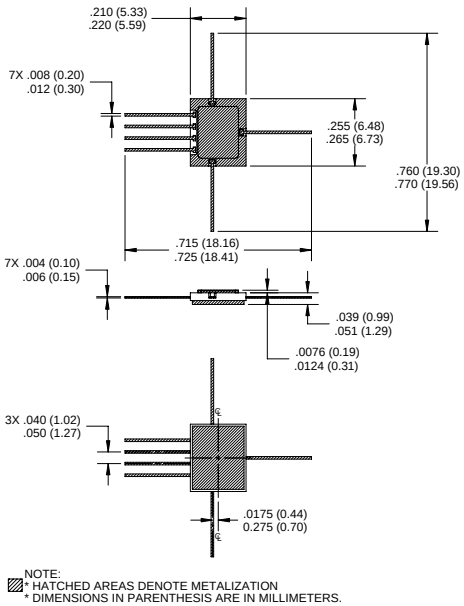
mils (mm)

H50



mils (mm)

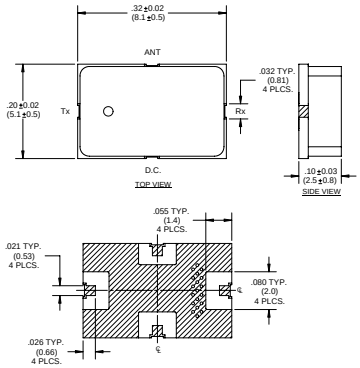
CS270



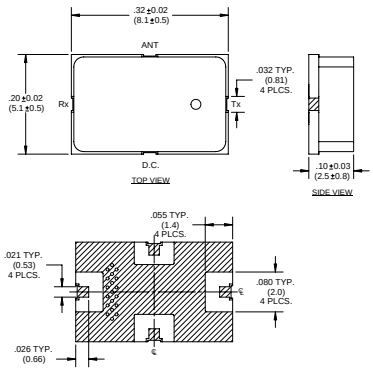
NOTE:
* HATCHED AREAS DENOTE METALIZATION
* DIMENSIONS IN PARENTHESIS ARE IN MILLIMETERS.

Ceramic Module SMT

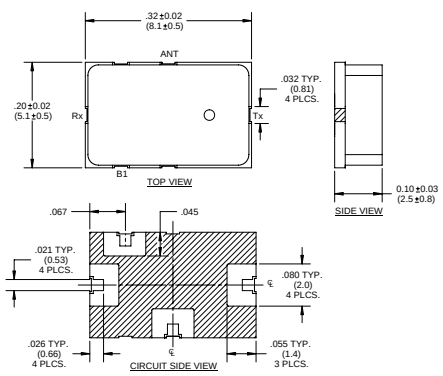
CS200



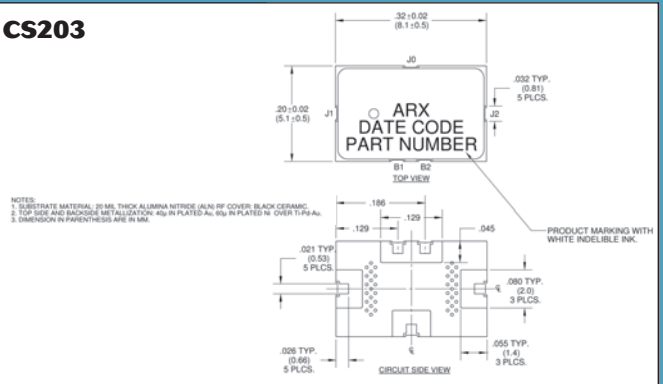
CS201



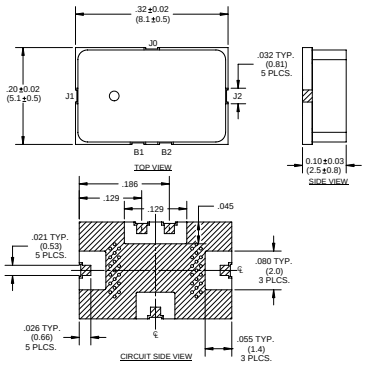
CS202



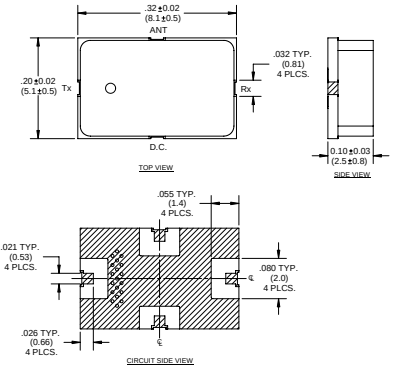
CS203



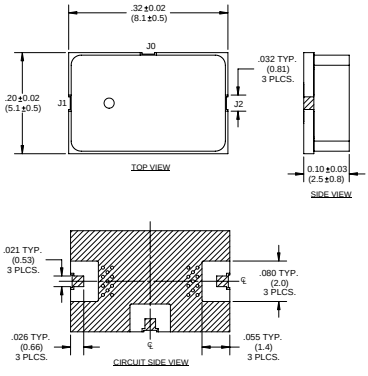
CS204



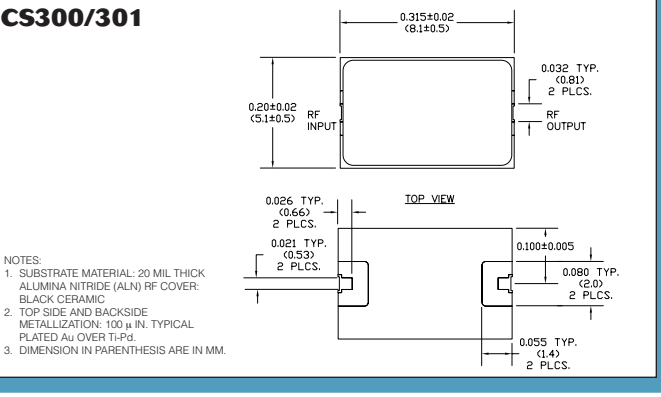
CS205



CS206



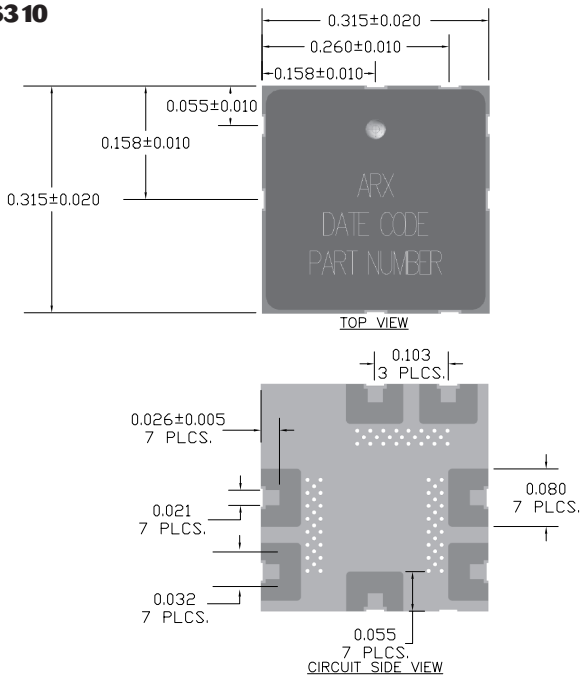
CS300/301



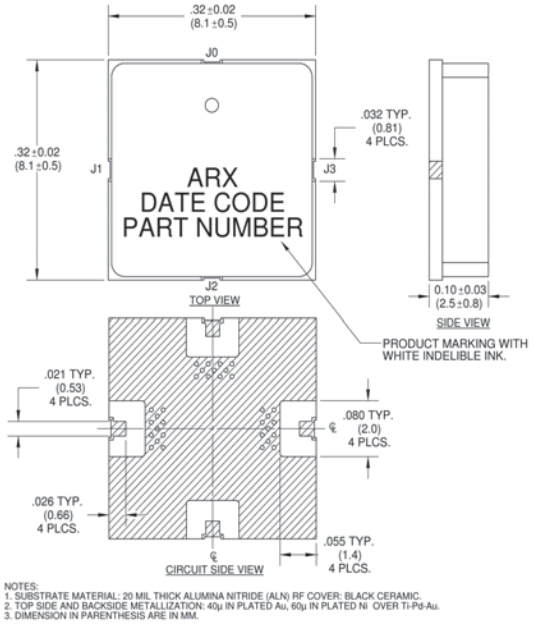
NOTES:
1. SUBSTRATE MATERIAL: 20 MIL THICK ALUMINA NITRIDE (ALN) RF COVER: BLACK CERAMIC
2. TOP SIDE AND BACKSIDE METALLIZATION: 100 μ IN. TYPICAL PLATED Au OVER Ti-Pd.
3. DIMENSION IN PARENTHESIS ARE IN MM.

Ceramic Module SMT

CS310



CS320

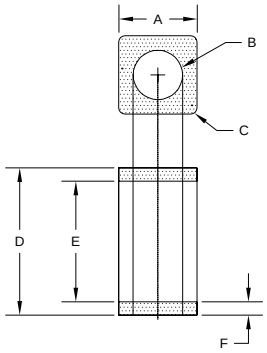


NOTES:
1. SUBSTRATE MATERIAL: 20 MIL THICK ALUMINA NITRIDE (ALN) RF COVER: BLACK CERAMIC.
2. TOP SIDE AND BACKSIDE METALLIZATION: 40µ IN PLATED Au, 60µ IN PLATED Ni OVER Ti-Pd-Au.
3. DIMENSION IN PARENTHESIS ARE IN MM.

Ceramic MELF

CS127

magnetic

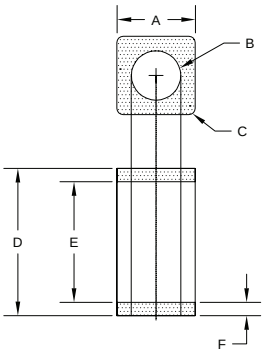


CS	A	B	C	D	E	F
127-1	.080"+.004 -.002	Ø .050" ±.002	R.003/.005	.112"+.003 -.002	.096"MIN	.008"/.025 TYP.
127-2	.080"+.004 -.002	Ø .050" ±.002	R.003/.007	.158"+.003 -.002	.142"MIN	.008"/.025 TYP.
127-3	.100"+.006 -.004	Ø .063" ±.002	R.008/.012	.188"+.003 -.004	.155"MIN	.017"/.008 TYP.
127-4	.143"+.005 -.004	Ø .097" ±.002	R.008/.012	.181"+.003 -.002	.165"MIN	.025"/.008 TYP.

mils (mm)

CS128

non-magnetic

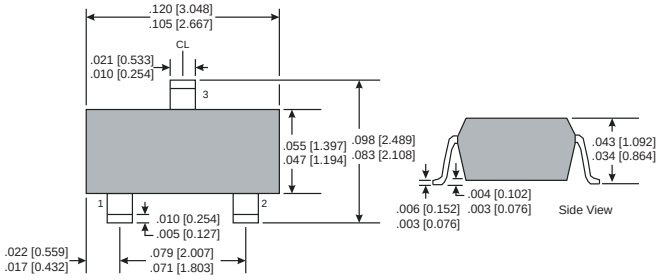


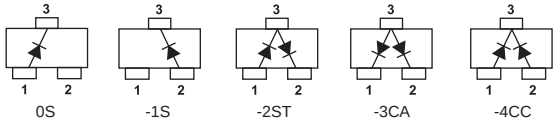
CS	A	B	C	D	E	F
128-1	.080" +.004 -.002	Ø .050" ±.002	R .003/.005	.112" +.003 -.002	.096" MIN	.008"/.025 TYP.
128-2	.080" +.004 -.002	Ø .050" ±.002	R .003/.007	.158" +.003 -.002	.142" MIN	.008"/.025 TYP.
128-3	.100" +.006 -.004	Ø .063" ±.002	R .008/.012	.188" +.003 -.004	.155" MIN	.017"/.008 TYP.
128-4	.143" +.005 -.004	Ø .097" ±.002	R .008/.012	.181" +.003 -.002	.165" MIN	.025"/.008 TYP.

mils (mm)

Plastic SMT

SOT23

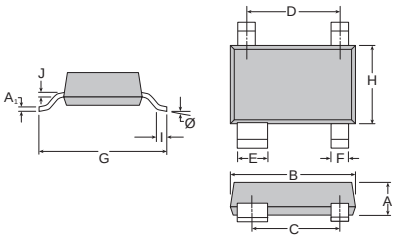


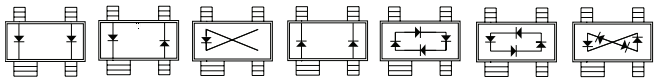


inches (mm)

SOT143

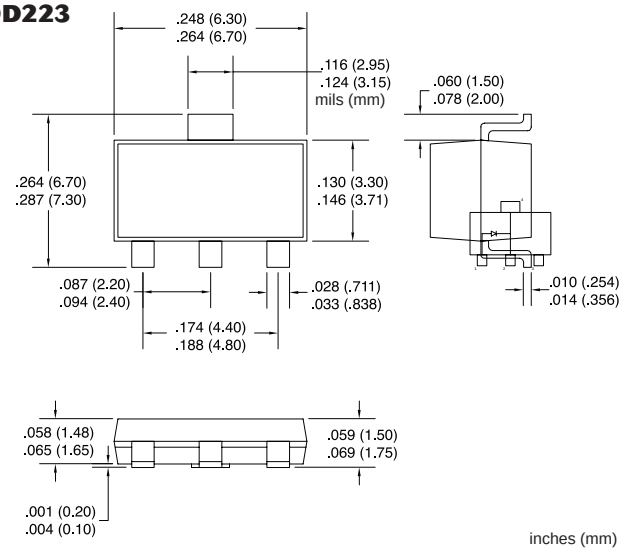
	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.79	1.02	0.031	0.040
A_1	0.02	0.10	0.001	0.004
B	2.67	3.05	0.105	0.120
C	1.78	2.03	0.070	0.080
D	1.80	2.00	0.071	0.079
E	0.77	0.94	0.030	0.037
F	0.38	0.54	0.015	0.021
G	2.10	2.50	0.083	0.098
H	1.20	1.40	0.047	0.065
I	0.13	0.25	0.005	0.010
J	0.89	0.15	0.0035	0.0059
Ø	0.0	8.0	0.0	0.8





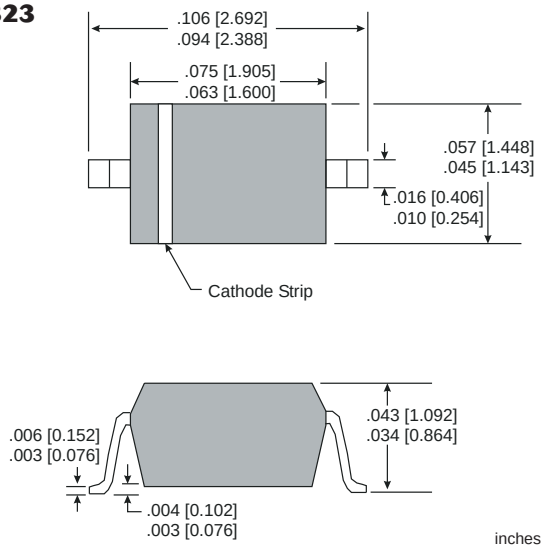
inches (mm)

SOD223



inches (mm)

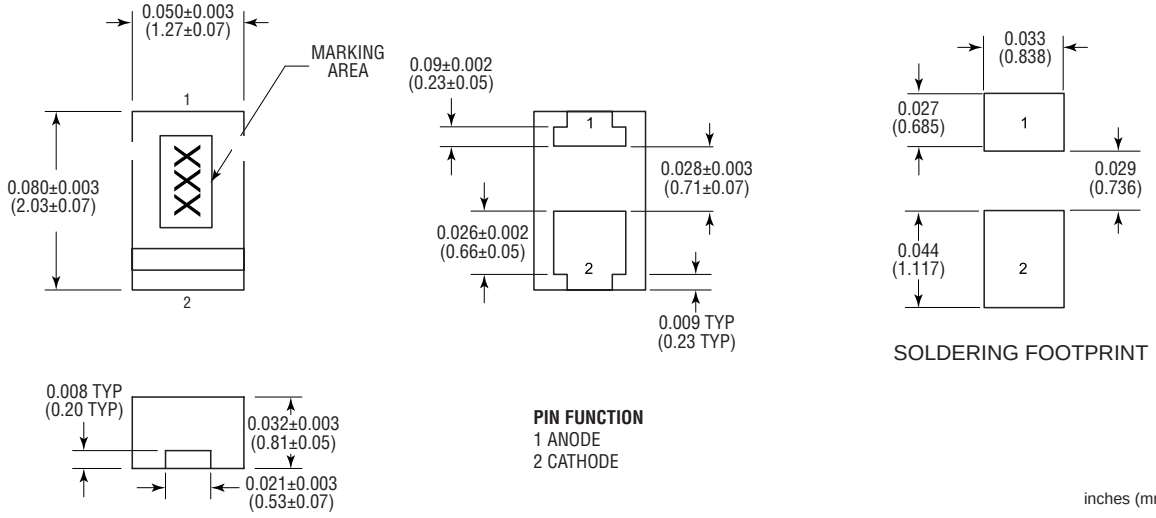
SOD323



inches (mm)

Plastic SMT

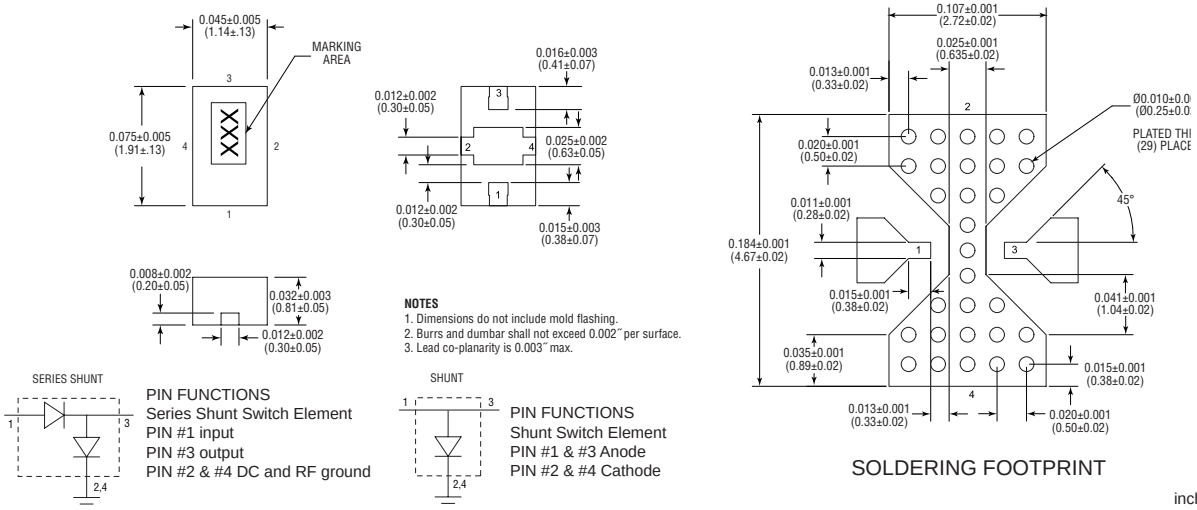
0805P



PIN FUNCTION
1 ANODE
2 CATHODE

inches (mm)

2012



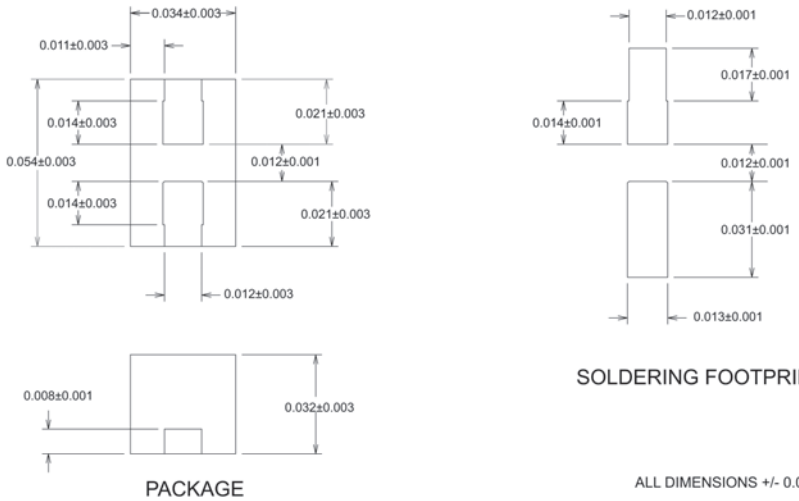
NOTES
1. Dimensions do not include mold flashing.
2. Burrs and dumbar shall not exceed 0.002″ per surface.
3. Lead co-planarity is 0.003″ max.

PIN FUNCTIONS
Series Shunt Switch Element
PIN #1 input
PIN #3 output
PIN #2 & #4 DC and RF ground

PIN FUNCTIONS
Shunt Switch Element
PIN #1 & #3 Anode
PIN #2 & #4 Cathode

inches (mm)

0503

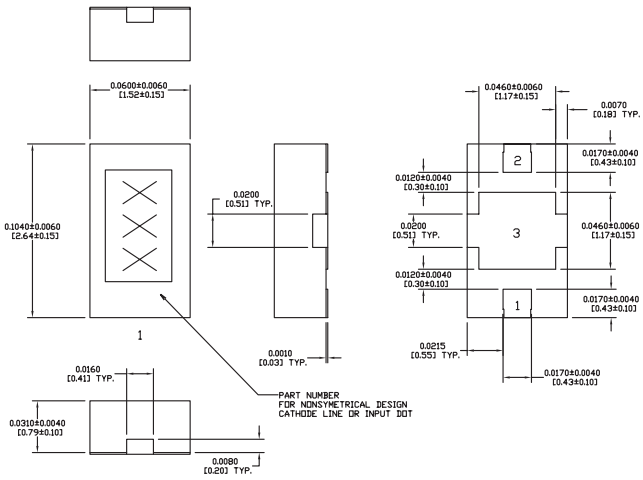


ALL DIMENSIONS +/- 0.001 INCH

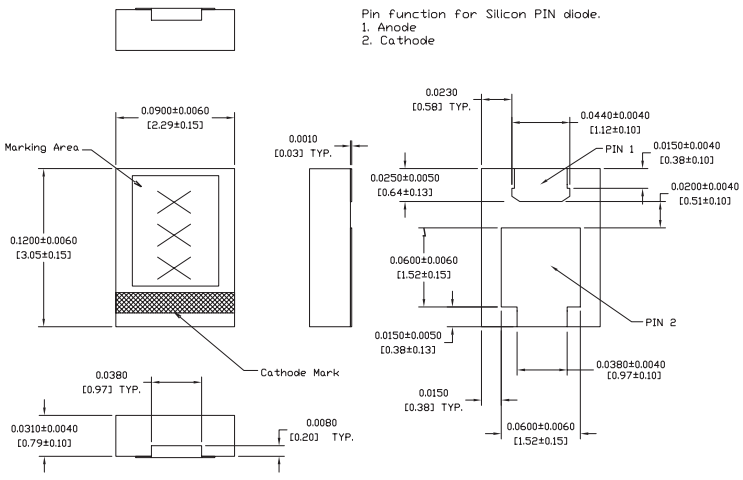
inches (mm)

Plastic SMT

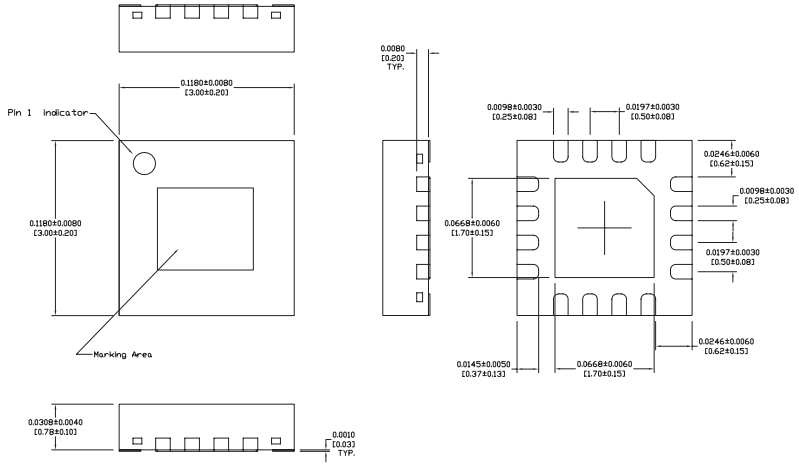
2615



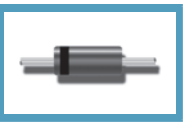
3023



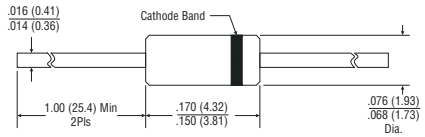
16L 3x3 mm



Glass Axial Leaded

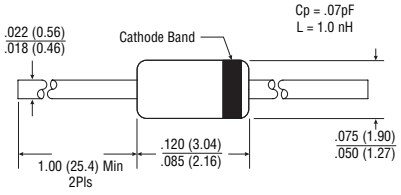


A15
(hermetic)



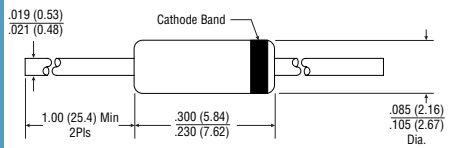
inches (mm)

CS65



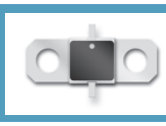
inches (mm)

CS85

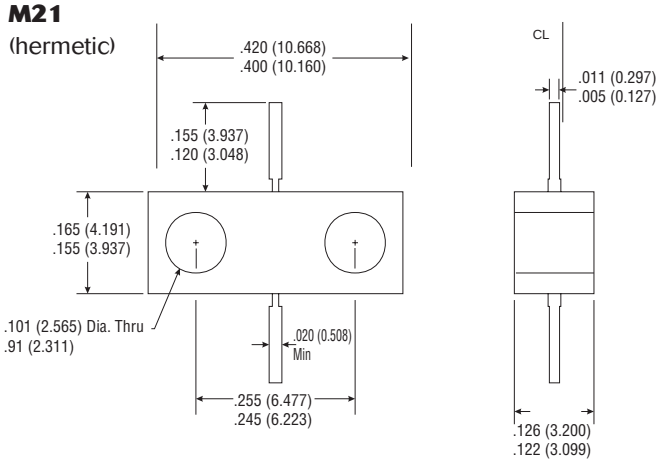


inches (mm)

Specialty

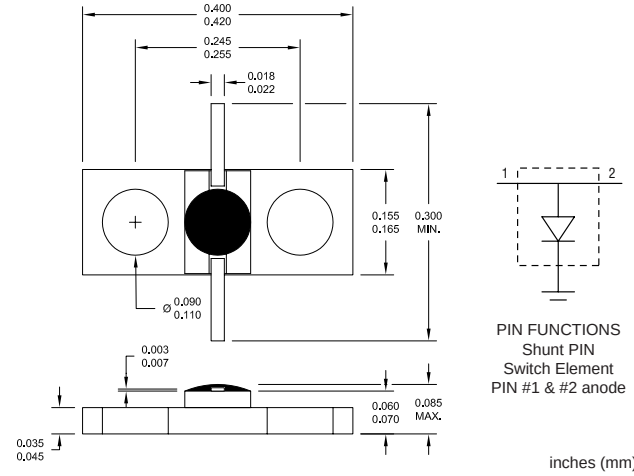


M21
(hermetic)



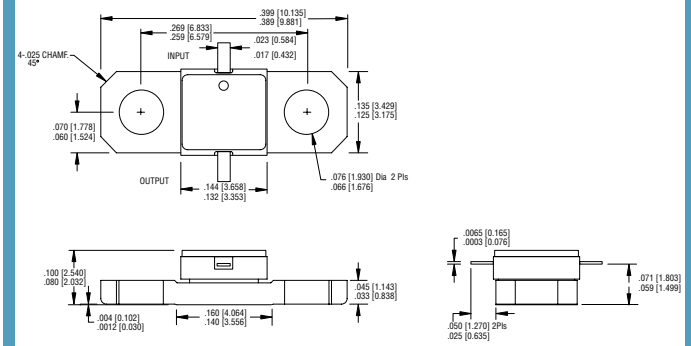
inches (mm)

CM22



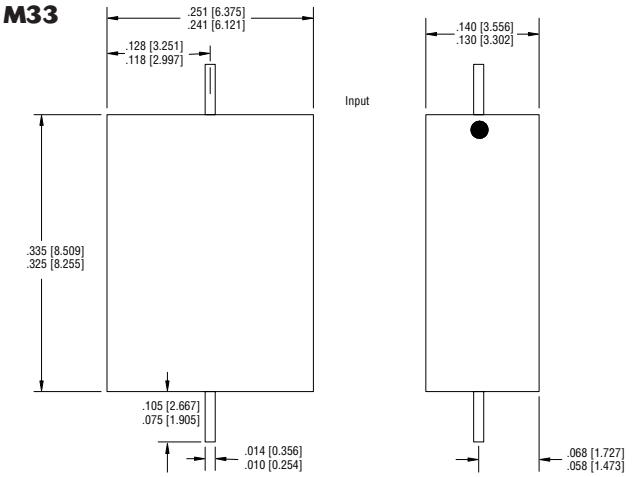
inches (mm)

M23



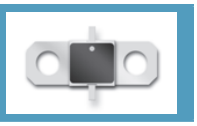
inches (mm)

M33

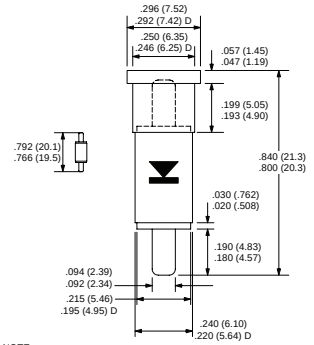


inches (mm)

Specialty

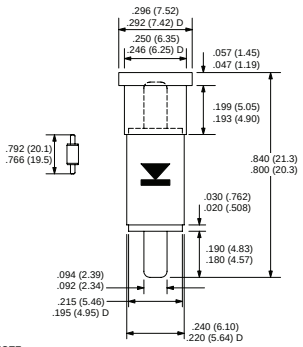


CS100



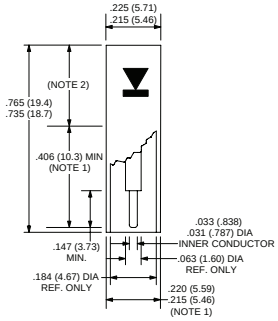
NOTE:
BASE NON-REMOVABLE, ENCLOSING PRONG WITH DIMENSIONS SAME AS OTHER PRONG.

CS101



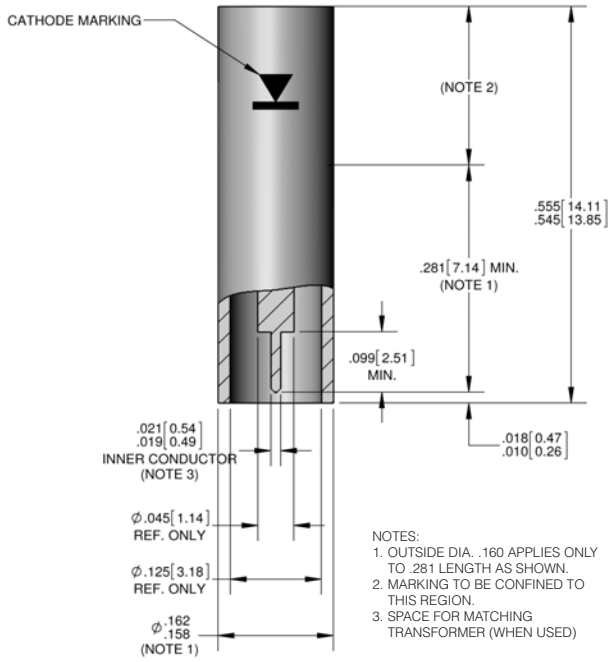
NOTE:
BASE REMOVABLE, ENCLOSING PRONG WITH DIMENSIONS SAME AS OTHER PRONG.

CS102



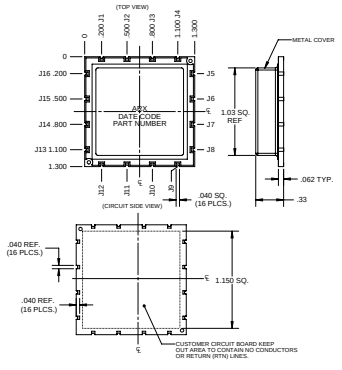
NOTES:
1. OUTSIDE DIA .220/.215 APPLIES ONLY TO 0.406 LENGTH AS SHOWN.
2. MARKING TO BE CONFINED TO THIS REGION.

CS103

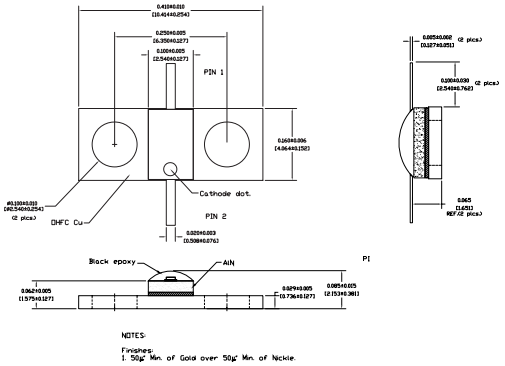


NOTES:
1. OUTSIDE DIA. .160 APPLIES ONLY TO .281 LENGTH AS SHOWN.
2. MARKING TO BE CONFINED TO THIS REGION.
3. SPACE FOR MATCHING TRANSFORMER (WHEN USED)

CS700

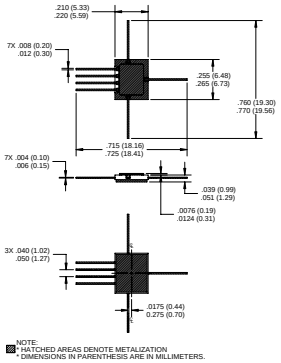


CM26



NOTES:
Finishes:
1. 50µ" Min. of Gold over 50µ" Min. of Nickle.

CM27



NOTE:
* HATCHED AREAS DENOTE METALIZATION
* DIMENSIONS IN PARENTHESIS ARE IN MILLIMETERS.

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Package Number Cross Reference

Metelics	Device Description	Micrometrics
B 10B	Single Junction, Si, BL Schottky	CS12
B 10Bp	"P" Type Single J, Si, BL Schottky	CS12
B 10D	Zero Bias, Single J, Si, BL Schottky	CS12
B 11	Beam Lead PIN & SRD	CS12
B 12	Beam Lead Capacitor	CS14-1
B 13	Beam Lead Capacitor	CS14-2
B 14	Beam Lead Capacitor	CS14-3
B 15	Beam Lead PIN Diode	CS12,
B 16	Series Tee Beam Lead PIN Diode	NA
B 20	Series Tee, Beam Lead Schottky	NA
B 21	Anti Parallel Pair, B L Schottky	NA
B 40	Ring Quad, BL Schottky	CS12-4
B 41	Small, Ring Quad, BL Schottky	NA
B 42	Large, Ring Quad, BL Schottky	CS12-4
B 45	Bridge Quad, BL Schottky	NA
B 47	Coplanar Bridge Quad, BL Schottky	NA
B 48	Coplanar Ring Quad, BL Schottky	NA
B 49	Crossover Ring Quad, BL Schottky	NA
B 80	8 Junction Ring Quad Schottky BL	NA
B 85	4 Junction Ring Quad Schottky BL	NA
B 86	4 Junction Bridge Quad Schottky BL	NA
B 87	12 Junction Ring Quad Schottky	NA
B 88	12 Junction Bridge Quad Schottky	NA
B 89	4 Junction Schottky BL	NA
B 90	6 Junction Series Tee Schottky BL	NA
GB1 10	GaAs, Single Junction, Beam Lead	NA
GB2 10	GaAs, Anti Parallel Pair, Beam Lead	NA

Metelics	Device Description	Micrometrics
GB3 10	GaAs, Series Tee, Beam Lead	NA
GC1 10	GaAs, Single Junction, Flip Chip	NA
GC2 10	GaAs, Anti Parallel Pair, Flip Chip	NA
GC2 10	GaAs, Series Tee, Flip Chip	NA
2012	MSWSH-020-30 Shunt Switch Element	NA
C11	15X15 Diode chip Anode up, .0009" Min. Anode Size	CS11
C11P	15X15 Diode chip Cathode up, .0009" Min. Anode Size	CS11
C12	15X15 Diode chip Anode up, .002" Min. Anode Size	CS11
C12P	15X15 Diode chip Cathode up, .002" Min. Anode Size	CS11
C15	5 Anode, 15X15 Schottky Chip, Anode up, .0009" Min. Anode Size	CS10
C15P	5 Anode, 15X15 Schottky Chip, Cathode up, .0009" Min. Size	CS10
C18	5 Anode, 15X15 Tunnel Chip	NA
C20	20X20, Binary Chip Capacitor	B00
C22	20X20 Diode Chip, Anode up, Min. anode size .002"	CS11
C20P	20X20 Diode Chip, Cathode up, Min. anode size .002"	CS11
C26	20X20 off set bonding pad Schottky	CS11
C32	30X30 Diode Chip, Anode up, Min. anode size .002"	CS11
C32P	30X30 Diode Chip, Cathode up, Min. anode size .002"	CS11
C37	37X37 Diode Chip, Cathode up, Min. anode size .020"	CS11
C40	30X30 Diode Chip, Cathode up, Min. anode size .010"	CS11
C01A	10X10 Diode Chip, Anode up, Min. anode size .0015"	CS11
NA	Chip with Lead (Series)	CS08
NA	Chip with Lead (Shunt)	CS09
C50	20 X45 Micro Strip PIN Diodes	NA
C51	20 X150 Micro Strip PIN Diodes	NA
NA	100 X65 Glass Axial Lead Pkg.	CS65
A15	160 X70 Glass Axial Lead Pkg.	CS75 DO-35

Package Number Cross Reference

Metelics	Device Description	Micrometrics
NA	250 X95 Glass Axial Lead Pkg.	CS85 DO-7
M21	400X160 Hermetic Bolt Channel Pkg.	CS111
SOD323	Two Lead 90X50 Plastic, Injection Molded Pkg.	SOD323
SOT23	Three Lead 110X90 Plastic, Injection Molded Pkg.	SOT23
NA	Epoxy Top, SM, 3, Lead, Alumina, SOT23 Footprint	CS23
NA	Epoxy Top, SM, 3,Lead, Aluminum Nitride, SOT23 Footprint	CS223
SOT143	Four Lead 110X55 Plastic, Injected Molded Pkg.	SOT143
H20	Two Lead, 100X100, Hermetic, Ceramic, Strip line Pkg.	CS20
H27	Two Lead, 70X70, Hermetic, Ceramic, Strip line Pkg.	NA
H30	Three Lead, 100X100, Hermetic, Ceramic, Strip line Pkg.	CS21
H30X	Three Lead, 100X100, Hermetic, Heat Sink Strip line Pkg.	CS21
H40	Four Lead, 100X100, Hermetic, Ceramic, Strip line Pkg.	CS22
H50	Five Lead, 100X80, Hermetic, Ceramic, Strip line Pkg.	CS99H
E25	Two Lead, 50 Sq, Epoxy Top, Strip line Pkg.	CS28
E28	Two Lead, 45X90, Epoxy Top, Strip line Pkg.	NA
E28X	Two Lead, 45X90, Epoxy Top, Gull Wing, Strip line Pkg.	NA
E30	Three Lead, 100 Round, Epoxy Top, Strip line Pkg.	CS30
E35	Three Lead, 50 Sq, Epoxy Top, Strip line Pkg.	CS29
E45	Four Lead, 50 Sq, Epoxy Top, Strip line Pkg.	CS26
E50	Five Lead, 100X75, Epoxy Top, Ceramic, Pkg.	CS99
E50SM	Five Lead, 100X75, Epoxy Top, Ceramic, Gull Wing, Pkg.	NA
ET47	Five Lead, 70 Round, Epoxy Top, Ceramic, Transistor Pkg.	NA
0402	SM, Epoxy top, .040"X.020"X.033" 2 lead Ceramic Body	NA
0805-2	SM, Epoxy top, .080"X.050"X.050" 2 lead Ceramic Body	NA
0805-4	SM, Epoxy top, .080"X.050"X.050" 4 lead Ceramic Body	NA
NA	SM, Epoxy top, .7 Sizes, 2 lead Aluminum Nitride Body	CS16 7 Sizes
NA	SM, Epoxy top,. 7 Sizes, 2 lead Alumina Body	CS19 7 Sizes

Metelics	Device Description	Micrometrics
P55	0.050" Dia. Solder Cap, Metal Ceramic Pkg., Anode up	CS32
P55p	0.050" Dia. Solder Cap, Metal Ceramic Pkg., Cathode up	NA
P81	0.120" Dia. Weld Cap, Metal Ceramic Pkg., Anode up	CS35
P81p	0.120" Dia. Weld Cap, Metal Ceramic Pkg., Cathode up	NA
P86	0.080" Dia. Solder Prong Cap, Metal Ceramic Pkg., Anode up	CS50
P86p	0.080" Dia. Solder Prong Cap, Metal Ceramic Pkg., Cathode up	NA
T54	.080" Dia. Weld Cap, Metal Ceramic Pkg., Cu Base, Anode up	CS34sp
T54p	.080" Dia. Weld Cap, Metal Ceramic Pkg., Cu Base, Cathode up	NA
T55	.050" Dia. Solder Cap, Metal Ceramic Pkg., Cu Base, Anode up	CS32sp
T55p	.050" Dia. Solder Cap, Metal Ceramic Pkg., Cu Base, Cathode up	NA
T80	0.120" Dia. Weld Cap, Metal Ceramic Pkg., Cu Base, Anode up	CS40sp
T80p	0.120" Dia. Weld Cap, Metal Ceramic Pkg., Cathode up	NA
T81	0.120" Dia. Weld Cap, Metal Ceramic Pkg., Cu Base, Anode up	CS35sp
T81P	0.120" Dia. Weld Cap, Metal Ceramic Pkg., Cu Base, Cathode up	NA
T86	0.120" Dia. Weld Cap, Metal Ceramic Pkg., Cu Base, Anode up	CS37sp
T86P	0.120" Dia. Weld Cap, Metal Ceramic Pkg., Cu Base, Cathode up	NA
T89	0.120" Dia. Weld Cap, Metal Ce. Pkg., Cu Screw Base, Anode up	CS106
T89p	0.120" Dia. Weld Cap, Metal Ce. Pkg., Cu Screw Base, Cathode up	NA
NA	0.080" Dia. Weld Cap, Cathode up	CS31
NA	0.080" Dia. Weld Cap, Cathode up	CS33
NA	0.080" Dia. Weld Cap, Cathode up	CS34
NA	0.120" Dia.Weld Cap, Cathode up	CS36
NA	0.120" Dia. Weld Cap, Cathode up	CS38
NA	0.120" Dia. Weld Cap, Cathode up	CS39
NA	0.120" Dia. Weld Cap, Cathode up	CS41
NA	0.120" Dia. Weld Cap, Cathode up	CS42
NA	0.120" Dia. Weld Cap, Cathode up	CS43

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Discrete Integrated Technologies (DIT)

One of the significant advantages of utilizing discrete components in designs is the inherent superior availability and variety of semiconductor and passive device selection. The ability to select devices that are parametrically optimized for a particular circuit allows greater design control that is not always possible with a MMIC process.

Using individual devices to design and build a circuit initially appears to be cumbersome compared to employing a MMIC device. However, there are certainly cases where MMICs are not the practical solution because of the nature of the monolithic process itself.

Take the example where different types of semiconductors are required for a circuit application. If more than one species of semiconductor is required in circuit design, discrete semiconductors become the practical solution. This is especially true if the circuit design integrates a number of circuit functions.

Herein lies the advantage of using discrete integrated technologies (DIT). This simply means using a variety of discrete silicon, gallium arsenide or gallium nitride devices in conjunction with passive R, L, C devices and available microwave packaging to provide a more complete and optimized solution.

Using the DIT process, Metelics is able to provide multi-function, modular, control component design solutions that incorporate Silicon and GaAs semiconductors with their passive R, L, C elements into compact, surface mount ceramic microwave packages.

These DIT devices are superior to MMICs in terms of high signal power handling, high signal linearity and small signal loss and VSWR performance. This DIT approach allows surface mount control component designs to push the frequency and power spectrums, especially for unique integrated designs spanning 10 MHz to 10 GHz.

The DIT design approach provides the customer with design hardware solutions in timeframes about four times faster than a similar MMIC approach.

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AEROFLEX
A passion for performance.

Our passion for performance is defined by three attributes represented by these three icons: solution-minded, performance-driven and customer–focused.

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