Switches

Single Pole Single Throw – Single Pole 6 Throw, Transfer, Broadband and High Power Switches

Data Sheet Revision Date 10/26/17

The most important thing we build is trust

SPST – SP6T Switches

Description

PIN diode switches span the frequency range of 10MHz to 18GHz and are available with absorptive or reflective inputs. The switches are available in a wide variety of standard frequency ranges from cost-effective narrowband to high-performance broadband. Each switch incorporates a TTL-compatible driver for convenient system integration and operates from +5V and -12V to -18V DC power supplies. All switches incorporate DC blocks at the RF ports. Standard screened switches incorporate epoxy sealed lids and undergo a stringent yet cost effective screening cycle. The switches are also available with hermetic seal and high-rel screening for military and aerospace applications.

	Switch, Reflective, SP1T				Switch, Absorptive, SP1T						
Frequency Range (GHz)	Part Number	Insertion Loss (dB max)	VSWR (max) (50Ω)	Isolation (dB min)	Part Number	Insertion Loss (dB max)	VSWR (max)	Isolation (dB min)	Switching Speed (nsec max)	Max RF (W CW)	P1dB*
0.01 - 0.10	S1H3R	1.2	1.5	75	S1H3	1.3	1.5	80	250	30	27
0.1 - 1.0	S1V2R	1.2	1.5	80	S1V2	1.3	1.5	80	250	30	27
0.5 - 18.0	S1U6R	2.8	2.0	60	S1U6	3.0	1.9	65	100	30	27
1.0 - 2.0	S1L1R	0.8	1.5	80	S1L1	0.9	1.5	85	100	30	27
2.0 - 4.0	S1S1R	1.0	1.6	70	S1S1	1.1	1.6	75	100	30	27
4.0 - 8.0	S1C1R	1.1	1.6	70	S1C1	1.8	1.6	75	100	30	27
8.0 - 18.0	S1X3R	2.0	2.0	60	S1X3	2.8	2.0	65	100	30	27

*Standard bias configuration

NOTES	
DC Bias (Standard)	+5V ± 0.5V @ 50mA max -15V ± 3V @ 50mA max
DC Bias (-5 Option)	+5V ± 0.5V @ 60mA max -5V ± 0.5V @ 60 mA max
DC Bias (-12 Option)	+15V ± 0.5V @ 50mA max +15V ± 3V @ 50mA max
Control	TTL 0 – Low Loss TTL 1 – Isolation
Absorptive Switch	50 ohm terminations at both RF ports (in isolation mode)
Switching speed is defined as 50% TTL to 90% (t-on) and 50% TTL to 10% RF (t-off)	

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	Switch, Reflective, SP2T				Switch, Absorptive, SP2T						
Frequency Range (GHz)	Part Number	Insertion Loss (dB max)	VSWR (max) (50Ω)	Isolation (dB min)	Part Number	Insertion Loss (dB max)	VSWR (max)	Isolation (dB min)	Switching Speed (nsec max)	Max RF (W CW)	P1dB*
0.01 - 0.10	S2H3R	1.2	1.5	75	S2H3	1.3	1.5	80	250	30	27
0.1 - 1.0	S2V2R	1.2	1.5	80	S2V2	1.3	1.5	80	250	30	27
0.5 - 18.0	S2U6R	3.0	2.0	65	S2U6	3.2	2.0	65	100	30	27
1.0 - 2.0	S2L1R	0.9	1.5	80	S2L1	1.0	1.5	85	100	30	27
2.0 - 4.0	S2S1R	1.1	1.6	70	S2S1	1.2	1.6	75	100	30	27
4.0 - 8.0	S2C1R	1.7	1.6	70	S2C1	1.9	1.6	75	100	30	27
8.0 - 18.0	S2X3R	2.8	2.0	60	S2X3	3.0	2.0	66	100	30	27

*Standard bias configuration

NOTES	
DC Bias (Standard)	+5V ± 0.5V @ 80mA max -15V ± 3V @ 50mA max
DC Bias (-5 Option)	+5V ± 0.5V @ 100mA max -5V ± 0.5V @ 60 mA max
DC Bias (-12 Option)	+15V ± 0.5V @ 80mA max +15V ± 3V @ 50mA max
Control Standard	TTL 0 – Low Loss TTL 1 – Isolation E1 controls J2 – J1 E2 controls J3 – J1
Single Bit Control (-1 Option) (E2-N/C)	E1 – 0: J2 – J1 low loss J3 – J1 isolation E1 – 1: J3 – J1 low loss J2 – J1 isolation
Absorptive Switch	50 ohm terminations at both RF ports (in isolation mode)
Switching speed is defined as 50% TTL to 90% (t-on) and 50% TTL to 10% RF (t-off)	

	Switch, Reflective, SP3T				Switch, Absorptive, SP3T						
Frequency Range (GHz)	Part Number	Insertion Loss (dB max)	VSWR (max) (50Ω)	Isolation (dB min)	Part Number	Insertion Loss (dB max)	VSWR (max)	Isolation (dB min)	Switching Speed (nsec max)	Max RF (W CW)	P1dB*
0.01 - 0.10	S3H3R	1.3	1.5	75	S3H3	1.4	1.5	80	250	30	27
0.1 - 1.0	S3V2R	1.3	1.5	80	S3V2	1.4	1.5	80	250	30	27
0.5 - 18.0	S3U6R	3.2	2.0	60	S3U6	3.4	2.0	65	100	30	27
1.0 - 2.0	S3L1R	1.0	1.5	80	S3L1	1.1	1.5	85	100	30	27
2.0 - 4.0	S3S1R	1.2	1.6	70	S3S1	1.4	1.6	75	100	30	27
4.0 - 8.0	S3C1R	1.8	1.6	70	S3C1	2.0	1.6	75	100	30	27
8.0 - 18.0	S3X3R	3.0	2.0	60	S3X3	3.2	2.0	65	100	30	27

NOTES	
DC Bias (Standard)	+5V ± 0.5V @ 120mA max -15V ± 3V @ 50mA max
DC Bias (-5 Option)	+5V ± 0.5V @ 150mA max -5V ± 0.5V @ 60 mA max
DC Bias (-12 Option)	+15V ± 3V @ 120mA max -15V ± 3V @ 50mA max
Control	TTL 0 – Low Loss TTL 1 – Isolation E1 controls J2 – J1 E2 controls J3 – J1 E3 controls J4 –J1
Absorptive Switch	Internal 50Ω terminations at J2, J3, and J4 (In isolation mode)
Switching speed is defined as 50% TTL to 90% (t-on) and 50% TTL to 10% RF (t-off)	

	Switch, Reflective, SP4T				Switch, Absorptive, SP4T						
Frequency Range (GHz)	Part Number	Insertion Loss (dB max)	VSWR (max)	Isolation (dB min)	Part Number	Insertion Loss (dB max)	VSWR (max)	Isolation (dB min)	Switching Speed (nsec max)	Max RF (W CW)	P1dB*
0.01 - 0.10	S4H3R	1.4	1.5	75	S4H3	1.5	1.5	80	250	30	27
0.1 - 1.0	S4V2R	1.4	1.5	80	S4V2	1.5	1.5	80	250	30	27
0.5 - 18.0	S4U6R	3.4	2.0	60	S4U6	3.6	2.0	65	100	30	27
1.0 - 2.0	S4L1R	1.1	1.5	80	S4L1	1.2	1.5	85	100	30	27
2.0 - 4.0	S4S1R	1.3	1.6	70	S4S1	1.4	1.6	75	100	30	27
4.0 - 8.0	S4C1R	1.9	1.6	70	S4C1	2.2	1.6	75	100	30	27
8.0 - 18.0	S4X3R	3.2	2.0	60	S4X3	3.4	2.0	65	100	30	27

*Standard bias configuration

NOTES	
DC Bias (Standard)	+5V ± 0.5V @ 160mA max -15V ± 3V @ 50mA max
DC Bias (-5 Option)	+5V ± 0.5V @ 200mA max -5V ± 0.5V @ 60 mA max
DC Bias (-12 Option)	+15V ± 3V @ 160mA max -15V ± 3V @ 50mA max
Control Standard	TTL 0 – Low Loss TTL 1 – Isolation E1 controls J2 – J1 E2 controls J3 – J1 E3 controls J4 – J1 E4 controls J5 – J1
Two-Line Control (-2 Option)	E2 E1 Low loss path 0 0 J2 – J1 0 1 J3 – J1 1 0 J4 – J1 1 1 J5 – J1
Absorptive Switch	Internal 50Ω terminations at J2, J3, J4 and J5 (In Isolation Mode)
Switching speed is defined as 50% TTL to 90% (t-on) and 50% TTL to 10% RF (t-off)	

	Switch, Reflective, SP5T				Switch, Absorptive, SP5T						
Frequency Range (GHz)	Part Number	Insertion Loss (dB max)	VSWR (max)	Isolation (dB min)	Part Number	Insertion Loss (dB max)	VSWR (max)	Isolation (dB min)	Switching Speed (nsec max)	Max RF (W CW)	P1dB*
0.01 - 0.10	S5H3R	1.5	1.5	75	S5H3	1.6	1.5	80	250	30	27
0.1 - 1.0	S5V2R	1.5	1.5	80	S5V2	1.6	1.5	80	250	30	27
0.5 - 18.0	S5U6R	3.6	2.0	60	S5U6	3.8	2.0	65	100	30	27
1.0 - 2.0	S5L1R	1.2	1.5	80	S5L1	1.3	1.5	85	100	30	27
2.0 - 4.0	S5S1R	1.4	1.6	70	S5S1	1.5	1.6	75	100	30	27
4.0 - 8.0	S5C1R	2.0	1.6	70	S5C1	2.3	1.6	75	100	30	27
8.0 - 18.0	S5X3R	3.4	2.0	60	S5X3	3.6	2.0	65	100	30	27

*Standard bias configuration

NOTES	
DC Bias (Standard)	+5V ± 0.5V @ 200mA max -15V ± 3V @ 50mA max
DC Bias (-5 Option)	+5V ± 0.5V @ 250mA max -5V ± 0.5V @ 60 mA max
DC Bias (-12 Option)	+15V ± 0.5V @ 200mA max -15V ± 3V @ 50mA max
Control Standard	TTL 0 – Low Loss TTL 1 – Isolation E1 controls J2 – J1 E2 controls J3 – J1 E3 controls J4 – J1 E4 controls J5 – J1 E5 controls J6 – J1
Three-line Control (-3 Option)	E3 E2 E1 Low loss path 0 0 0 J2 – J1 0 0 1 J3 – J1 0 1 0 J4 – J1 0 1 1 J5 – J1 1 0 0 J6 – J1 1 0 1 All off 1 1 0 All off 1 1 1 All off
Absorptive Switch	Internal 50Ω terminations at J2, J3, J4, J5 and J6 (In Isolation Mode)
Switching speed is defined as 50% TTL to 90% (t-on) and 50% TTL to 10% RF (t-off)	

	Switch, Reflective, SP6T				Switch, Absorptive, SP6T						
Frequency Range (GHz)	Part Number	Insertion Loss (dB max)	VSWR (max)	Isolation (dB min)	Part Number	Insertion Loss (dB max)	VSWR (max)	Isolation (dB min)	Switching Speed (nsec max)	Max RF (W CW)	P1dB*
0.01 - 0.10	S6H3R	1.6	1.5	75	S6H3	1.7	1.5	80	250	30	27
0.1 - 1.0	S6V2R	1.6	1.5	80	S6V2	1.7	1.5	80	250	30	27
0.5 - 18.0	S6U6R	3.8	2.0	60	S6U6	4.1	2.0	65	100	30	27
1.0 - 2.0	S6L1R	1.3	1.5	80	S6L1	1.4	1.5	85	100	30	27
2.0 - 4.0	S6S1R	1.5	1.6	70	S6S1	1.6	1.6	75	100	30	27
4.0 - 8.0	S6C1R	2.1	1.6	70	S6C1	2.4	1.6	75	100	30	27
8.0 - 18.0	S6X3R	3.6	2.0	60	S6X3	3.9	2.0	65	100	30	27

*Standard bias configuration

NOTES	
DC Bias (Standard)	+5V ± 0.5V @ 240mA max -15V ± 3V @ 50mA max
DC Bias (-5 Option)	+5V ± 0.5V @ 300mA max -5V ± 0.5V @ 60 mA max
DC Bias (-12 Option)	+15V ± 3V @ 240mA max -15V ± 3V @ 50mA max
Control Standard	TTL 0 – Low Loss TTL 1 – Isolation E1 controls J2 – J1 E2 controls J3 – J1 E3 controls J4 – J1 E4 controls J5 – J1 E5 controls J6 – J1 E6 controls J7 – J1
Three-Line Control (-2 Option)	E3 E2 E1 Low loss path 0 0 0 J2 – J1 0 0 1 J3 – J1 0 1 0 J4 – J1 0 1 1 J5 – J1 1 0 0 J6 – J1 1 0 1 All off 1 1 0 All off 1 1 1 All off
Absorptive Switch	Internal 50Ω terminations at J2, J3, J4, J5, J6, and J7 (In Isolation Mode)
Switching speed is defined as 50% TTL to 90% (t-on) and 50% TTL to 10% RF (t-off)	

Transfer Switches

Frequency Range (GHz)	Part Number	Insertion Loss (dB max)	VSWR (max) (50Ω)	Isolation (dB min)	Switching Speed (nsec max)	CW RF Power, Survival	P1dB*
0.01 - 0.1	XFH1	0.8	1.5	80	250	30	27
0.5 - 18.0	XFU6	3.3	2.0	65	100	30	27
1.0 - 2.0	XFL1	1.0	1.5	80	100	30	27
2.0 - 4.0	XFS1	1.2	1.6	75	100	30	27
4.0 - 8.0	XFC1	1.9	1.6	75	100	30	27
8.0 - 18.0	XFX3	3.0	2.0	65	100	30	27

*Standard bias configuration

NOTES	
DC Bias (Standard)	+5V ± 0.5V @ 100mA max -15V ± 3V @ 50mA max
DC Bias (-5 Option)	+5V ± 0.5V @ 120mA max -5V ± 0.5V @ 60 mA max
DC Bias (-12 Option)	+15V ± 3V @ 100mA max -15V ± 3V @ 50mA max
Control	TTL 0 = Low Loss TTL 1 = Isolation J1-J2, J3-J4 Low Loss J1-J4, J2-J3 Isolation J1-J4, J2-J3 Low Loss J1-J2, J3-J4 Isolation
Switching speed is defined as 50% TTL to 90% (t-on) and 50% TTL to 10% RF (t-off)	

Ultra-Broadband Pin Diode Switches

Description

The SWM Series pin diode switches operate over the full range 0.5GHz to 18GHz in a single unit. The housing is epoxy sealed to meet the gross leak requirements of MIL-STD-883. The SMA connectors are removable.

	Reflective				Absorptive					
Frequency Range (GHz)	Part Number	Insertion Loss (dB max)	VSWR (max) On Only	Isolation (dB min)	Part Number	Insertion Loss (dB max)	VSWR (max)	Isolation (dB min)	Switching Speed (nsec max)	Max RF (W CW)
0.5 – 18.0	SWM-1100	2.6	1.8:1	50	SWM-1100A	2.6	1.8:1	50	100	1
0.5 – 18.0	SWM-1200	2.5	1.8:1	50	SWM-1200A	3.0	2:1	50	100	1
0.5 – 18.0	SWM-1300	3.0	2:1	60	SWM-1300A	3.5	2:1	60	100	1
0.5 – 18.0	SWM-1400	3.0	2:1	60	SWM-1400A	3.7	2:1	60	100	1

High Power T/R Switches

Description

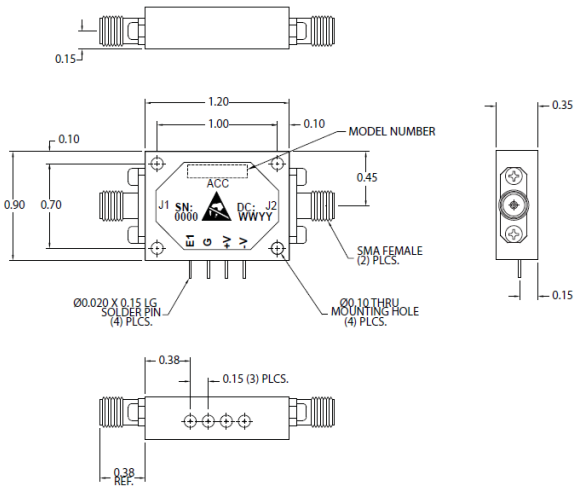
High Power T/R diode switches span the frequency range of 5MHz to 6GHz and are available with absorptive output on the RX port and reflective port on the TX side. Each switch incorporates a TTL-compatible driver for convenient system integration and operates from +5V to +12v and -50V to -150V DC power supplies (depending on RF power requirements). All switches incorporate DC blocks at the RF ports. Some switches are also available with hermetic seal and high-rel screening for military and aerospace applications.

		Insertion Loss		VSWR		Isolation					
Frequency Range (GHz)	Part Number	(dB max) RX Mode	(dB max) TX Mode	(Max) RX Mode	(Max) TX Mode	(dB max) RX Mode	(dB max) TX Mode	Switching Speed (µsec max)	RF Power Max RF (W CS[2])	Outline	Plating
.005 - .05	ACSW-5729	1.2	1.0	1.8:1	1.8:1	60	20	10	50	A	1
.05 - 0.5	ACSW-5730	1.2	1.0	1.8:1	1.8:1	60	20	10	50	A	1
0.5 - 1.0	ACSW-5731	0.8	0.6	1.75:1	1.75:1	60	20	10	100	A	1
1.0 - 2.0	ACSW-5732	0.8	0.4	1.75:1	1.75:1	60	20	10	100	A	2
2.0 - 4.0	ACSW-5733	2.0	0.5	2:1	1.5:1	70	17	8	100	B	2
2.0 - 6.0	ACSW-5734	1.5	0.5	2:1	1.5:1	70/50[1]	15	8	100	B	2

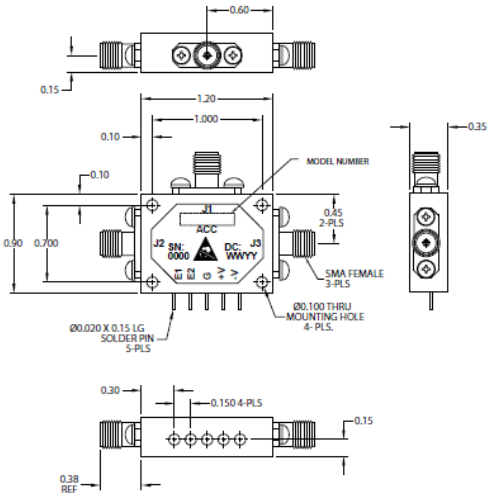
NOTES
1. 70 dB @ 2-4 GHz, 50 dB @ 4-6 GHz 2. Units are cold switching

Case Styles

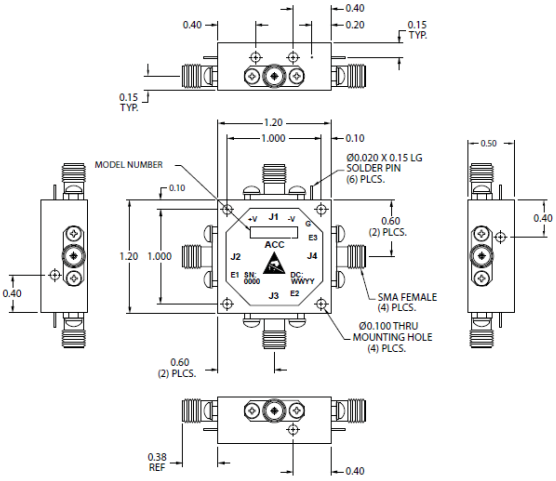
OUTLINE CASE STYLE S1



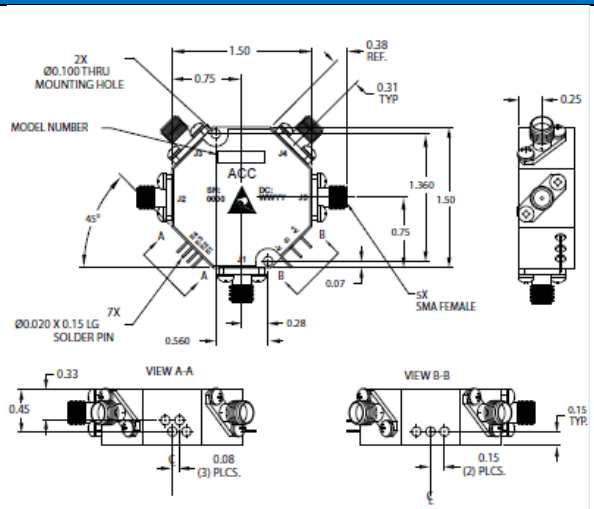
OUTLINE CASE STYLE S2



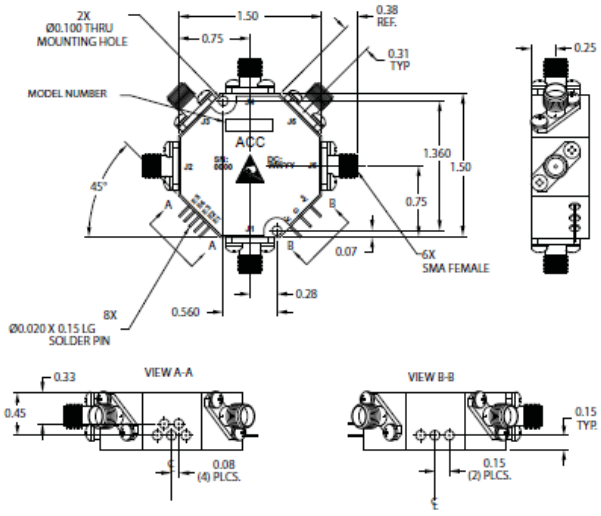
OUTLINE CASE STYLE S3



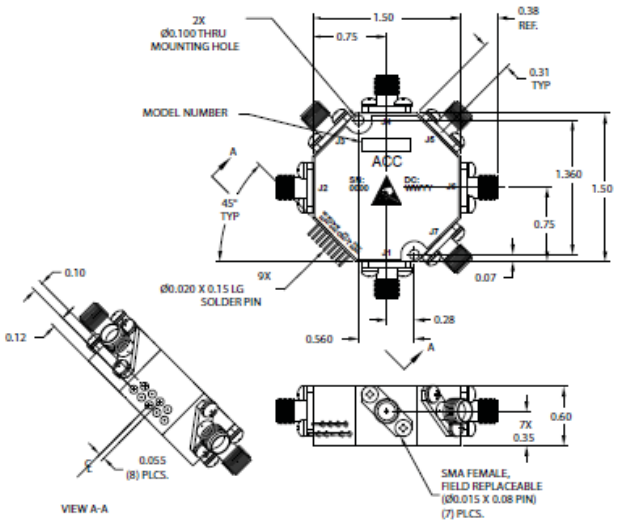
OUTLINE CASE STYLE S4



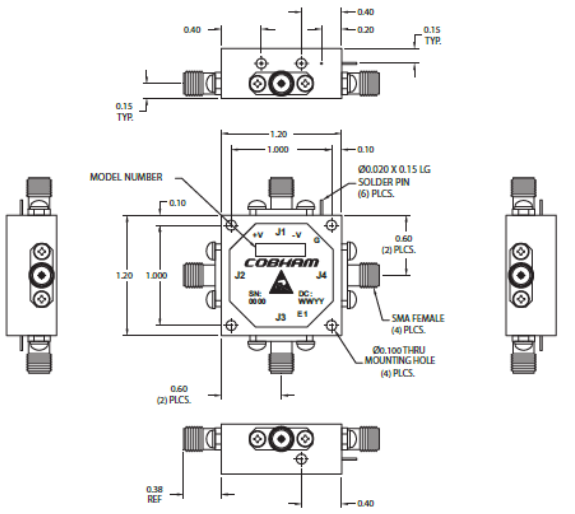
OUTLINE CASE STYLE S5



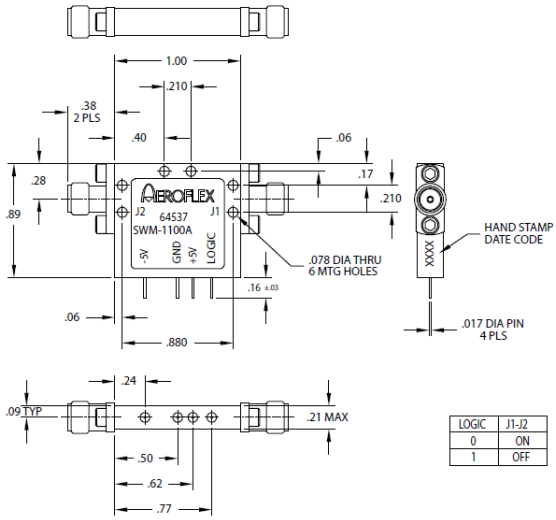
OUTLINE CASE STYLE S6



OUTLINE CASE STYLE XF

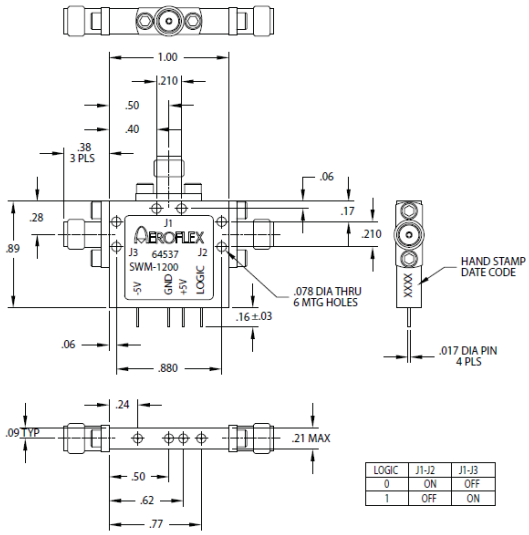


OUTLINE CASE STYLE SWM-1100



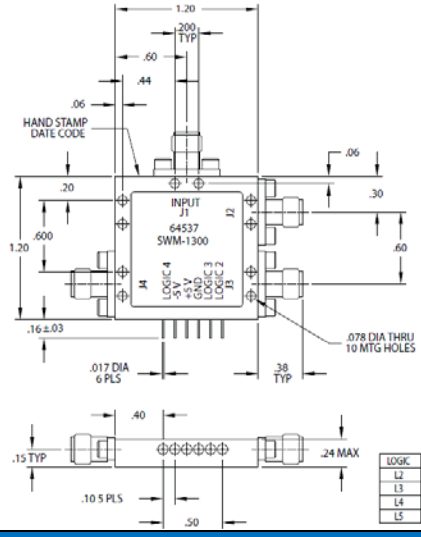
LOGIC	J1-J2
0	ON
1	OFF

OUTLINE CASE STYLE SWM-1200



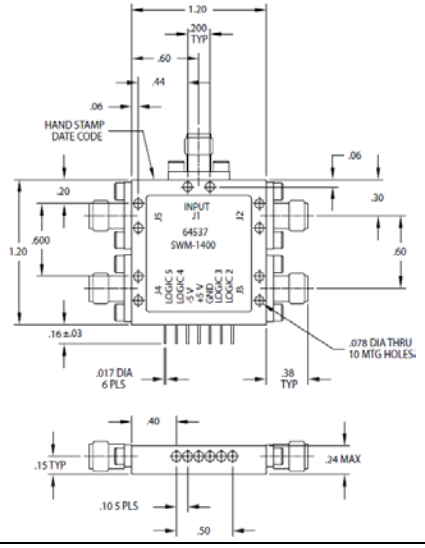
LOGIC	J1-J2	J1-J3
0	ON	OFF
1	OFF	ON

OUTLINE CASE STYLE SWM-1300



LOGIC	ON	OFF
L2	J1-J2	J3,J4,J5
L3	J1-J3	J2,J4,J5
L4	J1-J4	J2,J3,J5
L5	J1-J5	J2,J3,J4

OUTLINE CASE STYLE SWM-1400



OUTLINE CASE STYLE A/B

Dimensions for Outline B in blue

CONNECTOR I/O CHART	
PIN#	DESCRIPTION
1	TTL
2	GND
3	+12V
4	NC
5	-100V
6	NC
7	NC
8	NC
9	NC