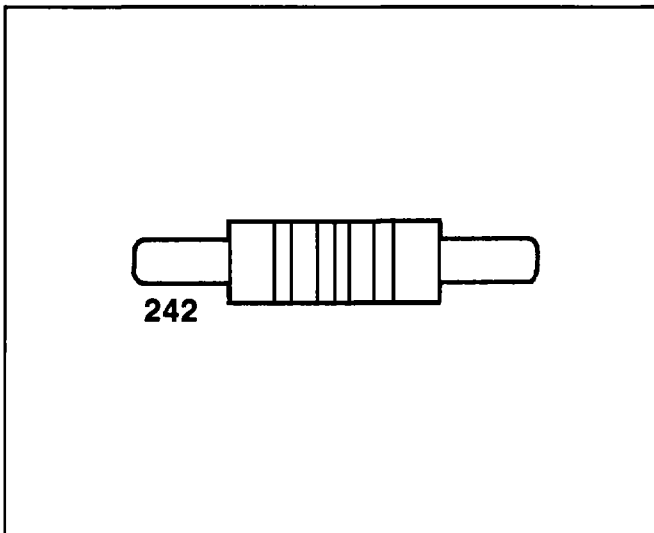


MA44700A Series

Stackpack™ & Super Stackpack™ Multiplier Diodes



Description

M/A-COM Semiconductor Products' Stackpack™ and Super Stackpack™ Multiplier Diodes are a family of Step Recovery diodes with several junctions in series in the same package. These diodes have substantially higher reverse voltage than single junction diodes with the same transition time.

The Stackpack™ and Super Stackpack™ multiplier diodes are intended for use in high power, low multiplication ratio multipliers with output frequencies from L through X band.

The higher breakdown voltage allows for larger input power. This results in output power as large as 60 watts in L band and 5-7 watts in X band.

Features

- HIGH REVERSE VOLTAGE
- LOW TRANSITION TIME
- LOW CAPACITANCE
- LOW THERMAL RESISTANCE

Each device in this family of diodes contains individually packaged Step Recovery diodes in a beryllia package. The individual diodes are soldered in series and encased in low loss packages. This assembly allows for closer matching of the individual chips. Each chip is then thermally heat sunk in parallel, resulting in a high voltage, low thermal resistance diode.

The Stackpack™ family of diodes has two junction chips in series per diode. The Super Stackpack family of diodes has three junction chips in series per diode.

Specifications $T_A = 25^\circ\text{C}$

STACKPACK™ (2 CHIP DIODES)

Model Number ¹	Case Style	Minimum ² Breakdown Voltage V_b (Volts)	Junction ³ Capacitance Min./Max. C_j (pF)	Minimum ⁴ Cutoff Frequency (GHz)	Maximum Transition Time T_s , -10V 10mA, (ps)	Maximum ⁷ Thermal Resistance (C/W)
MA44710A-2	242	280	18.0-26.0	*	6000	3
MA44711A-2	242	160	8.0-10.0	50	2000	7
MA44712A-2	242	160	4.0-4.5	70	2000	11
MA44713A-2	242	120	2.5-3.5	120	600	13
MA44714A-2	242	120	1.5-2.5	120	500	15
MA44715A-2	250	120	1.0-1.5	140	600	18
MA44716A-2	250	90	0.8-1.3	150	300	22
MA44724A-2	250	90	1.0-1.5	145	200	20
MA44725A-2	250	80	1.0-1.5	145	180	25
MA44705A-2	250	80	0.5-0.7	160	120	40
MA44706A-2	250	60	0.3-0.5	180	100	50

* f_c is not specified. R_s is measured at -12 volts and 1 GHz and is equal to .40 ohms maximum.

NOMINAL CHARACTERISTICS

Model Number ¹	Minor Carrier Lifetime T_L 10 mA/6 mA (ns)	Available ⁶ Output Power Range (Watts)	X3 Efficiency ⁶ (%)	Suggested Output ⁵ Frequency Range (GHz)
MA44710A-2	450	60	60	0.5-1.0
MA44711A-2	160	35	65	1.0-2.5
MA44712A-2	130	20	55	2.0-4.0
MA44713A-2	60	10	50	3.0-5.0
MA44714A-2	60	7	50	5.0-8.0
MA44715A-2	50	6	50	5.5-9.0
MA44716A-2	30	5	45	7.0-9.0
MA44724A-2	30	5	45	7.0-10.0
MA44725A-2	20	4	45	7.0-10.0
MA44705A-2	18	2	40	8.0-12.0
MA44706A-2	10	2 ⁸	50 ⁸	9.0-13.0

NOTES:

- Standard case styles are listed for each model number. Other case styles can be furnished upon request. Consult the factory for additional information.
- Breakdown voltage is specified at a reverse current of 10 microamperes.
- Junction capacitance is specified at -12 volts bias and measured at a frequency of 1 MHz. Capacitance tolerance is nominally $\pm 10\%$. Tolerances of $\pm 5\%$ are available on request at a nominal charge.
- R_s is measured at 1 GHz. Cutoff frequency is calculated from R_s measurements at 1 GHz and capacitance measurements at -12 volts at a frequency of 1 MHz.
- This is operable output frequency range and does not imply instantaneous bandwidth.
- These are typical values at the midpoint of the specified frequency range. Stackpack diodes and Super Stackpack diodes can be operated at full efficiency over a broad range of drive power.
- Thermal resistance is specified with an infinite heat sink on the cathode end only.
- Typical power output and efficiency for the MA44706-A2 are specified in X2 multiplier.

Specifications $T_A = 25^\circ\text{C}$

STACKPACK™ (3 CHIP DIODES)

Model Number ¹	Case Style	Minimum ² Breakdown Voltage V_b (Volts)	Junction ³ Capacitance Min./Max. C_j (pF)	Minimum ⁴ Cutoff Frequency (GHz)	Maximum Transition Time T_s , - 10V 10mA, (ps)	Maximum ⁷ Thermal Resistance (C/W)
MA44711A-3	243	240	8.0-10.0	50	2000	6
MA44712A-3	243	240	4.0-5.0	70	2000	10
MA44713A-3	243	180	1.5-2.5	120	700	11
MA44714A-3	243	180	1.5-2.5	120	500	13
MA44715A-3	247	180	1.0-1.5	140	400	16
MA44716A-3	247	135	0.8-1.3	150	300	19

NOMINAL CHARACTERISTICS

Model Number ¹	Minor Carrier Lifetime T_L 10 mA/6 mA (ns)	Available ⁶ Output Power Range (Watts)	X3 Efficiency ⁶ (%)	Suggested Output ⁵ Frequency Range (GHz)
MA44711A-3	160	50	65	1.0-2.5
MA44712A-3	130	30	55	2.0-4.0
MA44713A-3	60	15	50	3.0-5.0
MA44714A-3	60	10	50	5.0-8.0
MA44715A-3	50	8	50	5.5-9.0
MA44716A-3	30	7	45	7.0-9.0

NOTES:

- Standard case styles are listed for each model number. Other case styles are available upon request. Consult the factory for additional information.
- Breakdown voltage is specified at a reverse current of 10 microamperes.
- Junction capacitance is specified at - 18 volts bias and measured at a frequency of 1 MHz. Capacitance tolerance is nominally $\pm 10\%$. Tolerances of $\pm 5\%$ are available upon request at a nominal charge.
- R_s is measured at 1 GHz. Cutoff frequency is calculated from R_s measurements at 1 GHz and capacitance measurements at - 18 volts at a frequency of 1 MHz.
- This is an operable output frequency range and does not imply instantaneous bandwidth.
- These are typical values at the midpoint of the specified frequency range. Stackpack diodes and Super Stackpack diodes can be operated at full efficiency over a broad range of drive power.
- Thermal resistance is specified with an infinite heat sink on the cathode end only.

MAXIMUM RATINGS

Reverse Voltage	Same as Breakdown Voltage
Operating Temperature	- 65°C to + 150°C
Storage Temperature	- 65°C to + 150°C
Temperature Coefficient of Capacitance	300 ppm/°C

ENVIRONMENTAL PERFORMANCE

All multiplier varactors in the MA44700 series are capable of meeting the performance tests dictated by the methods and procedures of the latest revisions of MIL-S-19500, MIL-STD-202 and MIL-STD-750 which specify mechanical, electrical, thermal and other environmental tests common to semiconductor products.

HIGH RELIABILITY

All diodes in the MA44700 series may be screened to TX, TXV specifications. For further high reliability information, contact the factory.

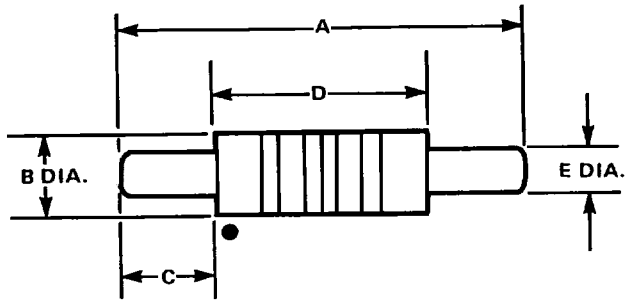
Ordering Information

Orders for products from M/A-COM Semiconductor Products, Inc. should be placed with our local sales office. Should there be a need for factory sales or applications engineering assistance, contact M/A-COM.

Case Styles

● DENOTES CATHODE NOT TO SCALE

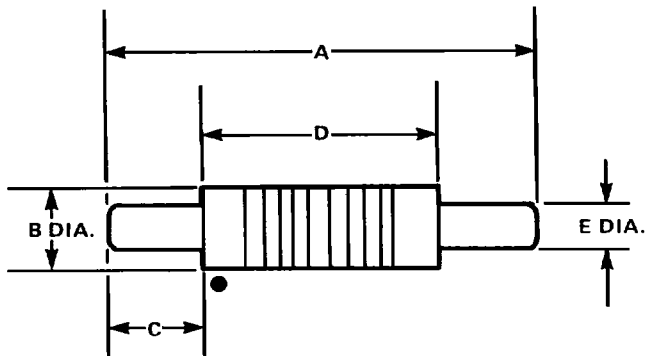
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DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.760	0.800	19,31	20,31
B	0.155	0.165	3,93	4,19
C	0.180	0.190	4,57	4,83
D	0.390	0.430	9,91	10,91
E	0.091	0.095	2,31	2,41

C_p = .18 pF Typical
L_s = .5 nH Typical

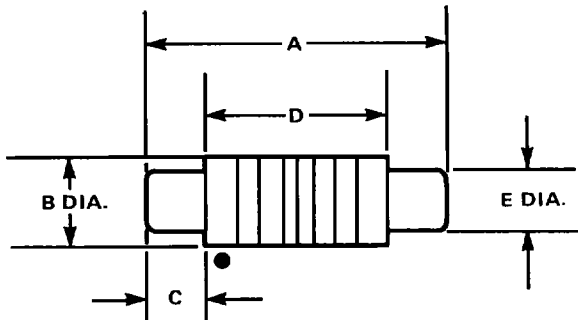
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DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.755	0.805	19,18	20,45
B	0.155	0.165	3,93	4,19
C	0.180	0.190	4,57	4,83
D	0.405	0.415	10,29	10,53
E	0.091	0.095	2,31	2,41

C_p = .18 pF Typical
L_s = .5 nH Typical

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DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.290	0.330	7,37	8,38
B	0.085	0.095	2,16	2,42
C	0.060	0.064	1,53	1,63
D	0.180	0.190	4,58	4,82
E	0.060	0.064	1,53	1,63

C_p = 0.21 pF Typical
L_s = 0.60 nH Typical

All specifications are subject to change without notice.