

Stripline PIN Diode Switch Modules

V5

Features

- ◆ Broadband 50 Ohm Design Through X Band
- ◆ High Power Handling
- ◆ Voltage Ratings to 1000V
- ◆ Fast Switching Speeds
- ◆ Hermetically Sealed Package
- ◆ RoHS Compliant

Description

These M/A-Com Technology Solutions switch modules consist of a shunt mounted, passivated, PIN diode chip in a hermetically sealed strip-line package. These modules are optimized for use in a 50 ohm micro-strip or strip-line circuit. By incorporating the appropriate series inductance to produce a matched low pass filter structure in a zero or reverse bias condition, no external matching is required. To achieve high isolation, a forward bias current between +10mA to +100mA is applied to the center conductor which changes the module's inductive impedance from a high to a low-impedance state causing the RF power to be reflected.

Applications

The M/A-COM Technology Solutions MA47200 series modules maybe operated as a SPST reflective switch or as an attenuator by applying the appropriate forward or reverse DC bias. These broadband modules are designed to operate at frequencies from VHF through X Band. A variety of modules are available which offer a choice of breakdown voltages and switching speeds.

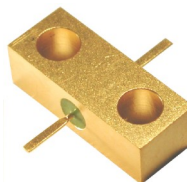
Specifications subject to change without prior notification.

Absolute Maximum Rating¹ @ T_A = +25°C (unless otherwise specified)

Parameter	Rating
Voltage	Voltage rating per pg. 2 table
Operating Temperature	- 65°C to +150°C
Storage Temperature	-65°C to +175°C
Power Dissipation	$P_{DISS} = \frac{150^{\circ}\text{C} - T_{\text{AMBIENT}}}{\text{Thermal Resistance}}$

1. Operation of the device above any one of these parameters may cause permanent damage.

Available Stripline Packages

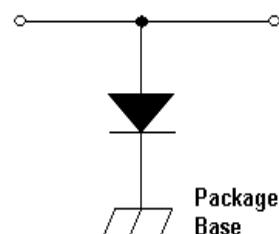


ODS-144



ODS-114

Internal Wiring Diagram



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All Specifications ($T_{AMB} = +25^{\circ}\text{C}$)

Part Number	Maximum Reverse Voltage ¹ @ $I_R < 10\mu\text{A}$ Volts	Maximum Chip Capacitance $f = 1\text{MHz}$ pF	Maximum Series Resistance Ω	Maximum Series Resistance Ω	Maximum Thermal Resistance $^{\circ}\text{C/W}$	Nominal Characteristics	
						Carrier Lifetime ² nS	I-Region Width Microns μm
MA47208	1000	$V_R = -100\text{V}$ $C_J \leq 1.3\text{pF}$	$I_F = 50\text{mA}$ Freq. = 100MHz $R_S \leq .400\ \Omega$	$I_F = 100\text{mA}$ Freq. = 100MHz $R_S \leq .300\ \Omega$	10	1300	125
MA47222	150	$V_R = -10\text{V}$ $C_J \leq .09\text{pF}$	$I_F = 10\text{mA}$ Freq. = 500MHz $R_S \leq 1.6\ \Omega$	$I_F = 100\text{mA}$ Freq. = 500MHz $R_S \leq 1.2\ \Omega$	40	160	13
MA47223	500	$V_R = -50\text{V}$ $C_J \leq .20\text{pF}$		$I_F = 100\text{mA}$ Freq. = 500MHz $R_S \leq .6\ \Omega$	20	1000	50

Notes:

1. The maximum specified V_R (reverse voltage) is sourced and the resultant reverse leakage current, I_r , is measured to be $<10\mu\text{A}$.
2. Nominal carrier life time specified with diode biased at $I_F = +10\text{mA}$, $I_{REV} = -6\text{mA}$

Part Number ¹	Package Style	Test Frequency GHz	Maximum Insertion ³ Loss dB	Minimum Isolation dB	Nominal Switching Speed (nS)	
					RF Off to RF On	RF On to RF Off
MA47208	114	1	$V_R = 20\text{V}$ Loss $\leq 0.25\text{dB}$	$I_F = 25\text{mA}$ Isolation $\leq 30\text{dB}$	300	150
MA47222	144	8	$V_R = 0\text{V}$ Loss $\leq 0.50\text{dB}$	$I_F = 100\text{mA}$ Isolation $\leq 20\text{dB}$	100	30
MA47223	144	4-8 ²	$V_R = 0\text{V}$ Loss $\leq 0.50\text{dB}$	$I_F = 100\text{mA}$ Isolation $\leq 20\text{dB}$	150	30

Notes:

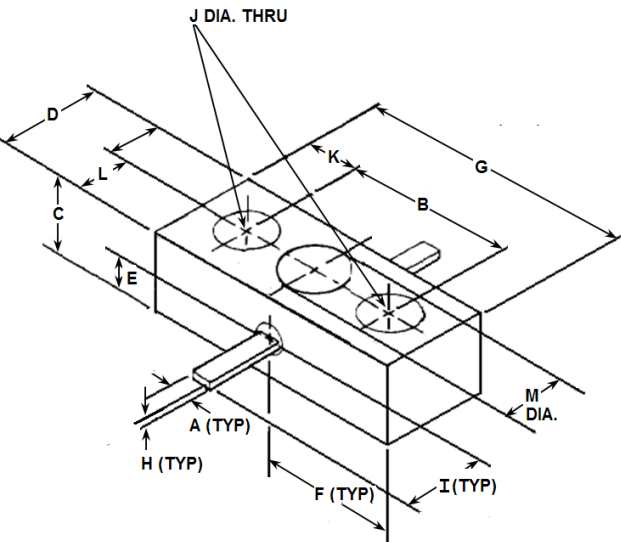
1. All models have cathode heatsink
2. Swept frequency measurement
3. Maximum VSWR is 1.5:1 at specified insertion loss condition.

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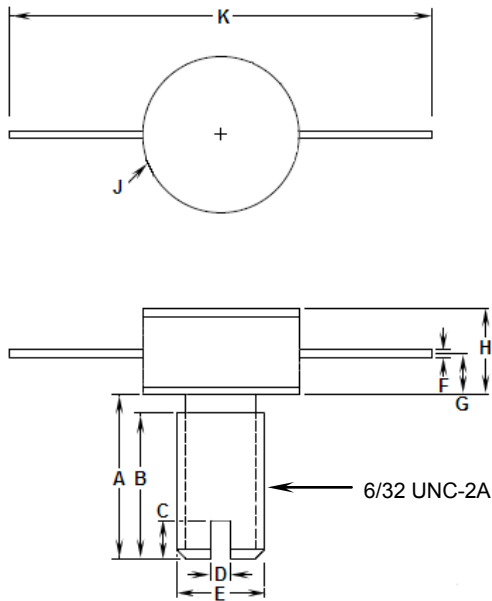
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Outline Drawing

Package Style 144



Package Style 114



DIMS.	MILS		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	22 NOMINAL		.558 NOMINAL	
B	250 NOMINAL		6.35 NOMINAL	
C	125 NOMINAL		3.175 NOMINAL	
D	155	165	3.937	4.191
E	65 NOMINAL		1.651 NOMINAL	
F	195	215	4.953	5.461
G	405	415	10.287	10.541
H	3		0.076	
I	120		3.048	
J	96 NOMINAL		2.438 NOMINAL	
K	75	85	1.905	2.159
L	80 NOMINAL		2.032 NOMINAL	
M	125 NOMINAL		3.175 NOMINAL	

DIMS.	MILS		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	255	265	6.48	6.73
B	205		5.21	
C	60 NOMINAL		1.52 NOMINAL	
D	30 NOMINAL		0.76 NOMINAL	
E	131	137	3.33	3.51
F	11	13	0.28	0.33
G	58	72	1.47	1.73
H	120	140	3.05	3.56
J		255 DIA.		6.48 DIA.
K	670 NOMINAL		17.02 NOMINAL	

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Environmental Ratings (Per MIL-STD 750)

The following table is recommended for Group B & C testing for TX and TXV level screening.

Inspection	Method	Condition
Storage Temperature	1031	- 65°C to +175°C
Operating Temperature	—	- 65°C to +150°C
Temperature Cycling	1051	5 cycles - 65° to + 150°C
Shock	2016	500 g's
Vibration	2056	15 g's
Constant Acceleration	2006	20,000 g's
Humidity	1021	10 days

Screened Diodes (Per MIL-STD 750)

Suggested 100% preconditioning and screening for TX level and TXV level screening.

Inspection	Method	Condition
Internal Visual	2074	See Note 1
High Temp. Storage	1032	48 hours minimum @ max. storage temp.
Thermal Shock	1051	10 Cycles
Constant Acceleration	2006	20,000 g's, Y1
Fine Leak	1071	H
Gross Leak	1071	C or E
Electrical	—	See Note
Burn-In	1038	See Note

1. Conditions and details of test depend on specific model number. Information available upon request.

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