MA47200 Series

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.

Absolute Maximum Rating[1] @ 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	$P_{DISS} = \frac{150°C - T_{AMBIENT}}{\text{Thermal Resistance}}$

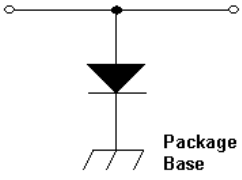
1. Operation of the device above any one of these parameters may cause permanent damage.

Available Stripline Packages

ODS-144

ODS-114

Internal Wiring Diagram



Specifications subject to change without prior notification.

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All Specifications (T_{AMB} = +25°C)

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

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

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 = 20V Loss ≤ 0.25dB	I_F = 25mA Isolation ≤ 30dB	300	150
MA47222	144	8	V_R = 0V Loss ≤ 0.50dB	I_F = 100mA Isolation ≤ 20dB	100	30
MA47223	144	4-8[2]	V_R = 0V Loss ≤ 0.50dB	I_F = 100mA Isolation ≤ 20dB	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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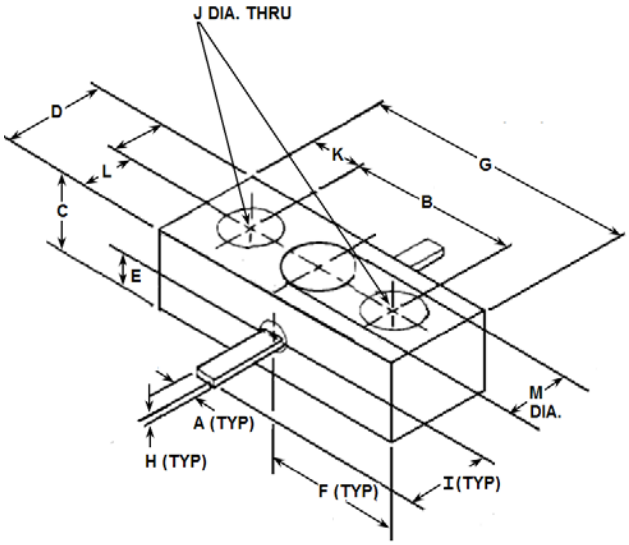
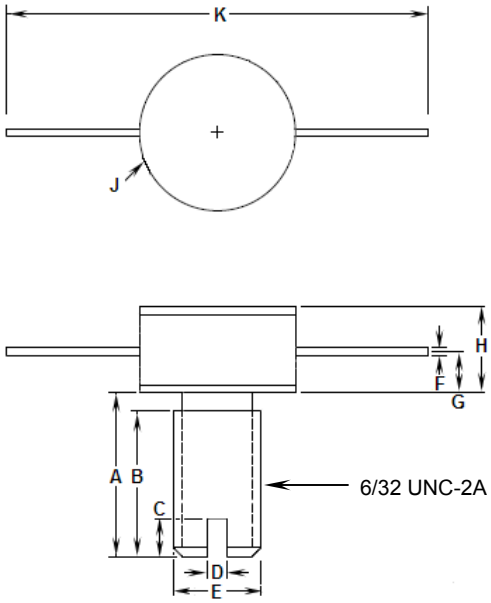
Outline Drawing

Package Style 144



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	

Package Style 114



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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