

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

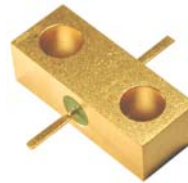
The M/A-COM Technology Solutions MA47200 series modules maybe operated as a SPST reflective switch or as an attenuator by applying the appropriate forward or reverse DC bias. These broadband modules are designed to operate at frequencies from VHF through X Band. A variety of modules are available which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

Absolute Maximum 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

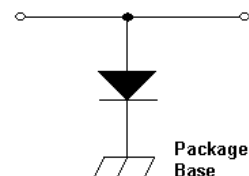


ODS-144



ODS-114

Internal Wiring Diagram



Specifications subject to change without prior notification.

1

ADVANCED: Data Sheets contain information regarding a product MA-COM Technical Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.
PRELIMINARY: Data Sheets contain information regarding a product MA-COM Technical Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

• **North America** Tel: 800.366.2266 / Fax: 978.366.2266
 • **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
 • **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298
 Visit www.macom.com for additional data sheets and product information.

MA-COM Technical Solutions and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

Stripline PIN Diode Switch Modules

V5

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, I_r, 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.

2

ADVANCED: Data Sheets contain information regarding a product MA-COM Technical Solutions is considering for development. Performance is based on target specifications, simulated results, and/or prototype measurements. Commitment to develop is not guaranteed.
PRELIMINARY: Data Sheets contain information regarding a product MA-COM Technical Solutions has under development. Performance is based on engineering tests. Specifications are typical. Mechanical outline has been fixed. Engineering samples and/or test data may be available. Commitment to produce in volume is not guaranteed.

• **North America** Tel: 800.366.2266 / Fax: 978.366.2266
 • **Europe** Tel: 44.1908.574.200 / Fax: 44.1908.574.300
 • **Asia/Pacific** Tel: 81.44.844.8296 / Fax: 81.44.844.8298
 Visit www.macom.com for additional data sheets and product information.

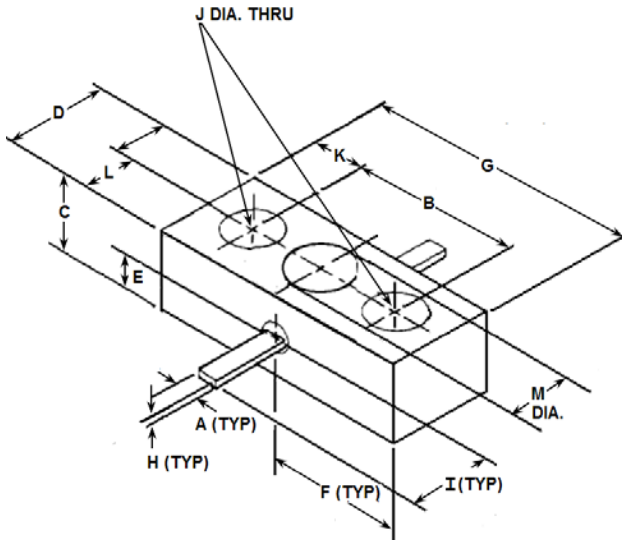
MA-COM Technical Solutions and its affiliates reserve the right to make changes to the product(s) or information contained herein without notice.

Stripline PIN Diode Switch Modules

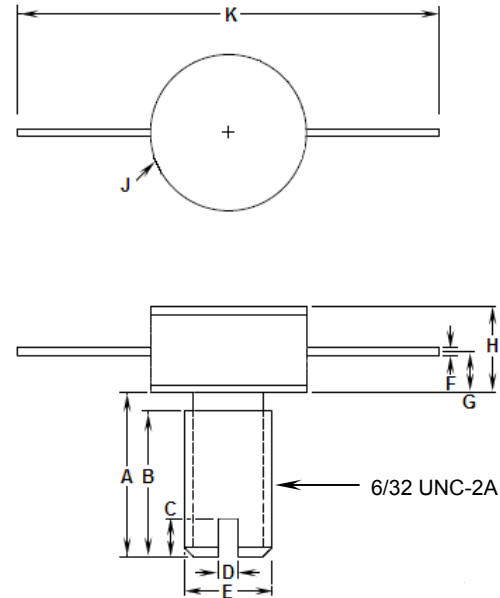
V5

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	

Stripline PIN Diode Switch Modules

V5

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.