Axial Lead PIN Diodes

V 2.00

Features

- Glass Hermetic Sealed Packages
- Screenable to JAN-TXV and Military Specifications
- General Purpose Switch Diodes
- Low Distortion Attenuator Diodes
- Tape and Reel Packaging Available

Description

M/A-COM's series of glass, hermetically sealed axial lead PIN diodes are designed for switch and attenuator applications from HF through S-Band. The manufacturing methods employed to construct these devices are suitable to meet high volume production requirements.

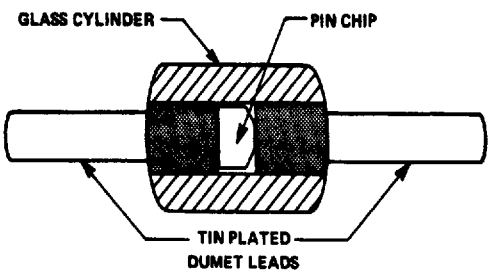
These PIN diodes are applicable for use in industrial and military applications. Their inherent ruggedness and reliability allows them to be screened to JAN-TX level and to meet other military standards.

Applications for M/A-COM's axial lead PIN diode products include electrically tuned digital filter circuits, AGC attenuators, antenna switches as well as general purpose PIN diode applications. These PIN diodes are particularly useful in distortion sensitive circuit environments.

This series of PIN diodes are available in three glass packages. The case style 54 is the most suitable to meet low total capacitance requirements for high isolation in series connected switches at VHF frequencies. The case style 139 and case style 146 are most suitable for moderate power applications requiring lower package inductance.

Case Style 54

Case Styles 139, 146*



* Enlarged to show detail.

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Specifications @ T_A = +25°C
General Purpose PIN Diodes

Model Number	Case[1] Style	Minimum Reverse Voltage V_R (Volts)	Maximum Series Resistance R_S @ I_F (mA) (Ohms)	Maximum Total Capacitance C_T @ V_R (Volts) (pF)	Nominal Characteristics	
					Carrier Lifetime (µs)	I-Region Thickness (mils)
MA47120	54	35	0.5 @ 10	1.00 @ 20	0.3	0.4
MA4P270	139	35	0.5 @ 10	1.20 @ 20	0.3	0.4
MA4PH401	54	50	1.5 @ 10	0.30 @ 20	0.2	0.4
MA4PH151	139	100	0.6 @ 10	1.20 @ 50	1.0	0.8
1N5719	54	100	1.5 @ 50	0.25 @ 50	1.0	2.0
MA47047	54	200	3.0 @ 10	0.30 @ 50	1.0	2.0
MA47123	139	200	3.0 @ 10	0.50 @ 50	1.0	2.0
MA47266	146	200	0.6 @ 50	1.50 @ 50	3.0	3.0

Note: 1. See Appendix for full dimensions.

Low Distortion Attenuator PIN Diodes

Model Number	Case[1] Style	Minimum Reverse Voltage V_R (Volts)	Maximum Series Resistance R_S @ I_F - 10 mA (Ohms)	Maximum Total Capacitance C_T @ 50V (pF)	Nominal Characteristics			
					R_S		Carrier Lifetime (µs)	I-Region Thickness (mils)
					I_F = 1 mA (Ohms)	I_F = 10 µA (Ohms)		
MA47600	54	200	6	0.30	30	2,000	2	4
MA47110	139	200	6	0.50	30	2,000	2	4
MA47100	54	200	8	0.30	50	3,000	2.5	7
MA4P208	139	100	20	0.35	100	6,500	1.5	9
MA47111	146	200	25	0.80	75*	4,000	4.0	14

*75 Ohms @ I_F = 1.5 to 2.5 mA.

Note: 1. See Appendix for full dimensions.

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Maximum Ratings

Parameter	Absolute Maximum
Operating Temp.	- 65°C to +175°C
Storage Temp.	- 65°C to +175°C
Voltage	Voltage Rating
Power Dissipation	(derate linearly to zero at +175°C)
Case Style 54	250 mW (Free Air)
Case Style 139	500 mW (Free Air)
Case Style 146	1.0 W (Free Air) 1.5 W (0.5 inch total length to +25°C contact)

Environmental Capability (Per MIL-STD-750 and MIL-S-202)

	Method	Level
Storage Temperature	1031	See Maximum Ratings
Operating Temperature	—	See Maximum Ratings
Temperature Cycling	1051	5 cycles, - 65°C 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

Typical 100% Preconditioning and Screening Program for TX Level Screening Per MIL-S-202

Inspections	Method	Conditioning
Internal Visual and/or X-ray	2072/2076	See note 1
High Temperature Life	1032	48 hours minimum at maximum storage temperature
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 2
Burn-In	1038	See note 2

Notes:
1. Internal visual on TXV screening programs only. X-ray is optional for any screening plan.
2. Conditions and details of test depend on specific part number. Information available on request.

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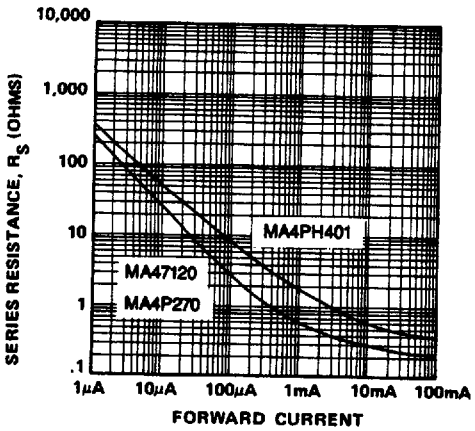
Typical Resistance Curves at 100 MHz

SERIES RESISTANCE vs FORWARD CURRENT FOR GENERAL PURPOSE PIN DIODES



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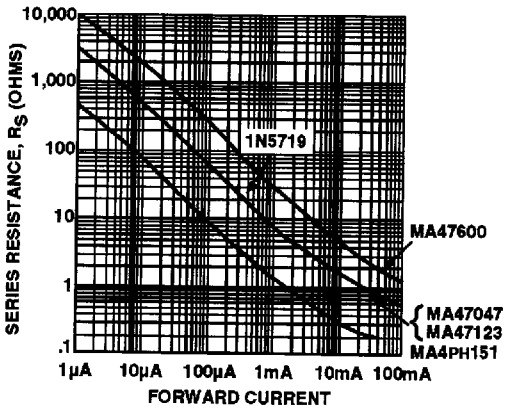
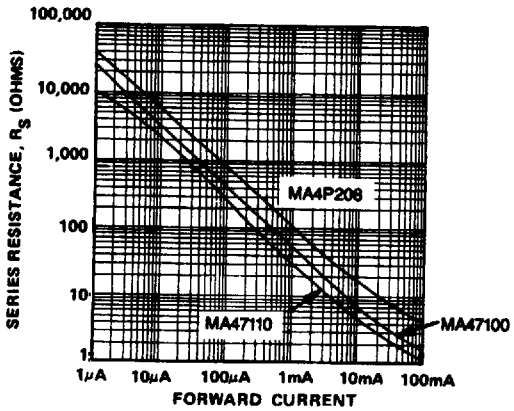


SERIES RESISTANCE vs FORWARD CURRENT FOR LOW DISTORTION ATTENUATOR PIN DIODES



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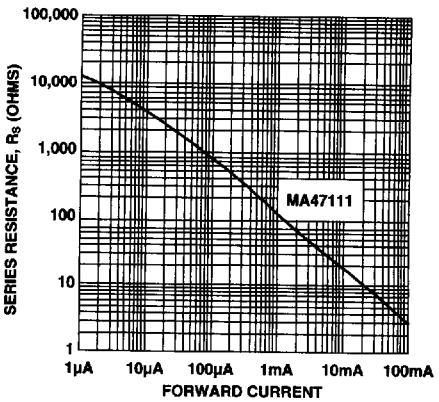
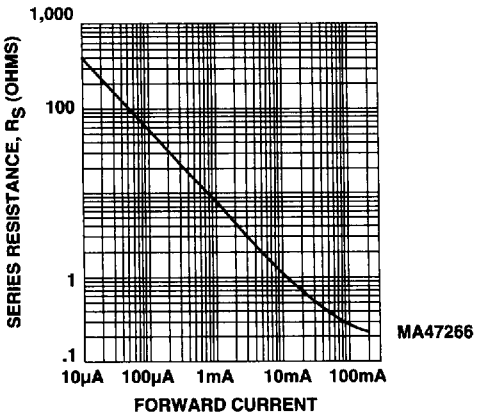


Typical Resistance Curves at 100 MHz

SERIES RESISTANCE vs FORWARD CURRENT FOR LARGE SIGNAL SWITCH PIN DIODES



Cross Reference

Many of M/A-COM's axial lead, hermetic surface mount (SMQ) and SOT-23 PIN diodes use similar chips and, therefore, have the same electrical characteristics except for package parasitics.

The following table lists the axial lead PIN diode by model number and the equivalent square surface mount (SMQ) PIN and SOT-23 PIN diodes.

Axial Lead PIN Diodes	SMQ PIN Diodes	SOT-23 Diodes
MA47100	—	MA4P278
MA47110	MA4PH238	MA4P277
MA47111	MA4PH239	—
MA47123	MA4PH236	MA4P274
MA47266	MA4PH237	—
MA4P270	MA4PH235	MA4P275
MA4PH151	—	MA4P282
MA4PH401	—	MA4P789

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