

# Limiter PIN Diodes

## MA4L Series

V 2.00

### Features

- Low Turn On Power
- High Peak Power Diodes
- Chips and Packaged Diodes

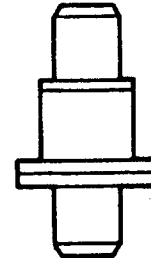
### Description

M/A-COM produces a series of PIN diodes specifically designed for limiter applications. Each of these diodes is designed for low insertion loss at zero bias, rapid turn on and high isolation. This series of diodes is available as passivated chips and in hermetic ceramic packages such as M/A-COM's style 30.

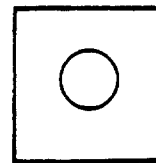
### Applications

The MA4L series of PIN limiter diodes is designed for use as passive limiters to protect sensitive receiver components such as low noise amplifiers mixers and detectors.

### Case Styles



30



134

# Electrical Specifications @ T<sub>A</sub> = +25°C<sup>1</sup>

Model <sup>1</sup> Number	Minimum <sup>2</sup> Reverse Voltage V <sub>R</sub> (Volts)	Maximum <sup>3</sup> C <sub>j</sub> @ 0 Volts (pF)	Maximum <sup>4</sup> R <sub>s</sub> @ 10 mA (Ohms)	Nominal Characteristics			
				Carrier Lifetime @ 10 mA (ns)	I-Region Width (μm)	Contact Diameter (mils)	Thermal <sup>5</sup> Resistance (°C/W)
MA4L011-134	20	0.20	2.0	7	2	1.5	70
MA4L021-134	30	0.20	1.5	10	3	2.0	60
MA4L022-134	30	0.15	2.0	10	3	2.0	60
MA4L031-134	40	0.20	1.5	15	5	1.5	40
MA4L032-134	40	0.15	2.0	15	5	1.5	40
MA4L101-134	100	0.15	2.0	90	10	2.5	30
MA4L301-134	200	0.20	2.0	200	20	3.0	30
MA4L302-134	200	0.25	1.5	250	20	5.0	30
MA4L401-132	250	0.30	1.2	800	25	4.0	25

## Notes:

- The passivated chips, case style 134, (15X15 mils) or case style 132 (20X20 mils) are the standard case style for the MA4L series. The devices are also available in case style 30 (i.e., model number MA4L011-30) and other ceramic packages. Consult the factory.
- Breakdown voltage is specified at 10 microamperes reverse current.
- Capacitance is specified at 1 MHz. For diodes in case style 30, add 0.20 pF.
- Resistance is specified at 500 MHz.
- Nominal thermal resistance is derived from diode geometry and is equivalent to case style 30 diode mounted to a heat sink.

# Nominal Limiting Characteristics<sup>6</sup>

Model Number	Incident <sup>6</sup> Peak Power 1 dB Limiting @ 6 GHz (dBm)	Incident <sup>6</sup> Peak Power For 10 dB Limiting 6 GHz (dBm)	Incident <sup>6</sup> Peak Power For 20 dB Limiting @ 6 GHz (dBm)	Recovery <sup>8</sup> Time (ns)	Maximum <sup>7</sup> Incident Peak Power (Watts)	Maximum CW Input Power (Watts)
MA4L011-134	7	25	40	10	100	2
MA4L021-134	10	30	43	10	400	4
MA4L022-134	10	30	43	10	200	3
MA4L031-134	16	36	49	20	800	5
MA4L032-134	16	36	49	20	600	3
MA4L101-134	19	42	52	10	900	4
MA4L301-134	23	46	59	50	1000	5
MA4L302-134	23	46	59	50	1500	7
MA4L401-132	29	52	65	100	2000	10

## Notes:

- Nominal microwave performance is the expected performance of the MA4L series shunt connected in a 6 GHz, 50 ohm transmission line.
- The nominal maximum incident peak power is the suggested maximum safe operation peak power for a 1 microsecond pulse width and at 1% duty cycle.
- The nominal recovery time is from isolation to within 3 dB of the insertion loss state.

Specifications Subject to Change Without Notice.

## Maximum Ratings

Parameter	Absolute Maximum
Temperature Range	
Storage	-65°C to +200°C
Operating	-65°C to +125°C
Power Dissipation	$P_{diss} = \frac{175^{\circ}\text{C} - T_{\text{ambient}}}{\text{Thermal Resistance}}$

## Environmental Performance

The MA4L series of diodes is capable of meeting the 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.

## Environmental Ratings (Packaged Diodes) (PER MIL-STD-750)

	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 (Packaged Diodes)

Table 1. Typical 100% Preconditioning and Screening Program for TX Level Screening

Inspection	Method	Condition
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 upon request.

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