

Features

- Reverse Voltage up to 3000 V
- 25 A Maximum Current Rating
- Low Loss, Low Distortion
- Designed for HF, Multi-Throw Kilowatt Switches
- Non Magnetic for MRI Applications
- RoHS* Compliant

Applications

- Filter Switches
- Antenna Couplers
- Power Amplifier By-pass Switches
- MRI Switches

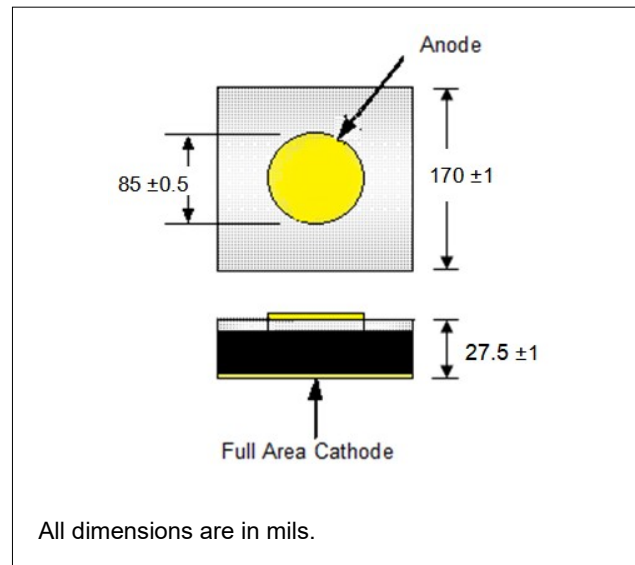
Description

The MA4PK3000-1252 is a 3000 volt PIN diode chip that utilizes advanced processing technologies which assures exceptional and reliable performance in multi-kilowatt switch applications. This PIN diode chip is designed to have low resistance, low loss, low distortion and is capable of dissipating very high power. The chip is manufactured using ultra high resistivity, long carrier lifetime, float zone material onto which the P+ and N+ regions are deposited. The epitaxial process is specifically designed and optimized for high voltage PIN diodes and results in better preservation of the carrier lifetime and superior layer to layer interface when compared to a conventional double diffused process. The formation of the I-region thickness is precisely monitored using modern measurement techniques and controls.

The MA4PK3000-1252 chip utilizes MACOM's proprietary Cermachip process which has a hard glass surface that covers all exposed junction and intrinsic surfaces. The result is a hermetically sealed, passivated chip that has been used in many high reliability military and commercial programs. The electrical and thermal properties have been extensively characterized to assure predictable performance.

Designed for use as a high power switching element in multi-kilowatt HF and VHF applications.

Outline: ODS 1252



Ordering Information

Part Number	Packaging
MA4PK3000-1252	Die in Gel Pack

* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

Electrical Specifications @ $T_A = 25^\circ\text{C}$

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Reverse Voltage ⁷	3000 V	μA	—	—	10
Forward Voltage	$I_F = 1 \text{ A}$	V	—	—	1.2
Series Resistance	0.5 A, 4 MHz 0.5 A, 1 - 100 MHz	Ω	—	— 0.15	0.25 —
Parallel Resistance	0 V, 100 MHz	k Ω	—	10	—
Thermal Resistance	—	$^\circ\text{C/W}$	—	—	2
Junction Capacitance	100 V, 1 MHz	pF	—	2.2	2.5
Lifetime	$I_F = +10 \text{ mA}$	μs	—	65	—
I-Region Width	—	μm	—	325	—

Absolute Maximum Ratings^{5,6}

Parameter	Absolute Maximum
Forward Current	25 A
Reverse Voltage ⁷	3000 V
Power Dissipation ⁸	75 W
Operating Temperature ⁹	-65°C to $+175^\circ\text{C}$
Storage Temperature	-65°C to $+175^\circ\text{C}$
Mounting Temperature	$+350^\circ\text{C}$ for 30 seconds

5. Exceeding any one or combination of these limits may cause permanent damage to this device.
6. MACOM does not recommend sustained operation near these survivability limits.
7. Upon completion of circuit installation, the chip must be covered with a dielectric conformal coating such as SYLGARD 527® to prevent voltage arcing.
8. Diode attached to infinite heat sink at case temperature.
9. Maximum junction temperature $+175^\circ\text{C}$.

Handling Procedures

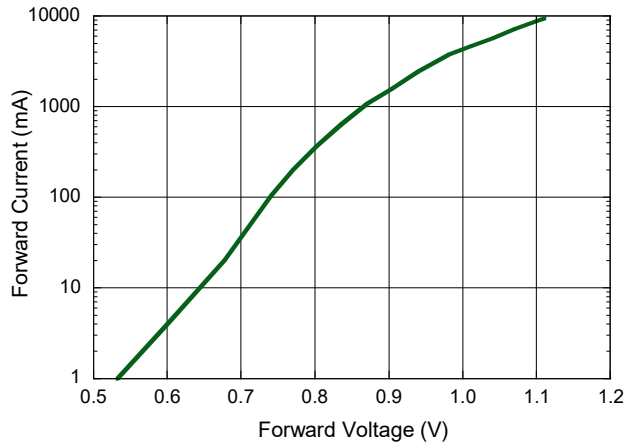
Please observe the following precautions to avoid damage:

Static Sensitivity

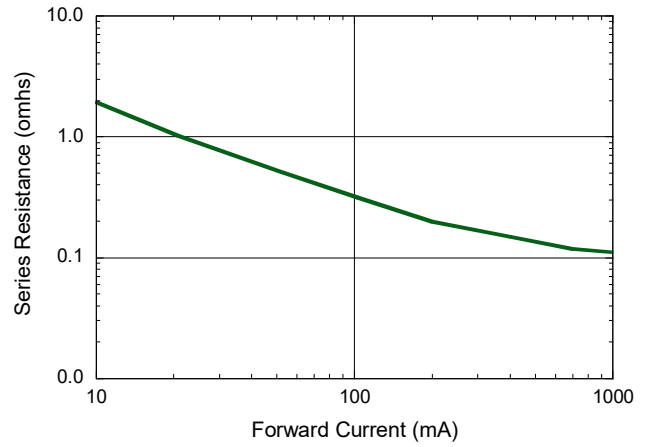
These electronic devices are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these Class 1C devices.

Typical Performance Curves

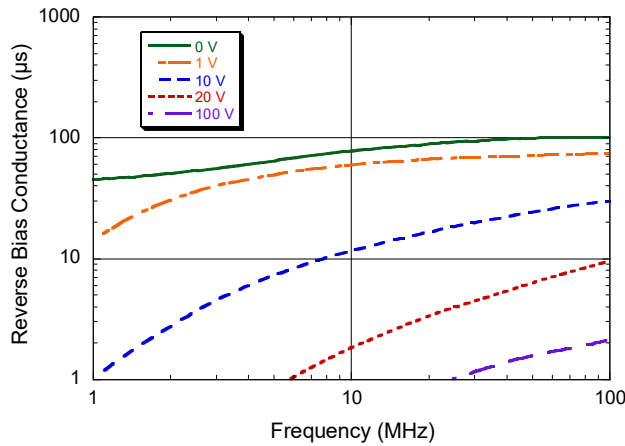
DC Forward Voltage vs. Forward Current



Series Resistance vs. Forward Current, 100 MHz



Reverse Bias Conductance vs. Frequency over Voltage



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