MA4SPS552

SURMOUNT™ PIN Diode
RoHS Compliant

Rev. V1

Features

Surface Mount Device
No Wirebonds Required
Rugged Silicon-Glass Construction
Silicon Nitride Passivation
Polymer Scratch Protection
Ultra-Low Parasitic Capacitance and Inductance
Higher Power Handling (Efficient Heat sinking)

Description

This device is a silicon-glass PIN diode chip fabricated with M/A-COM Technology Solutions patented HMIC process. This device features two silicon pedestals embedded in a low loss glass. The diode is formed on the top of one pedestal and connections to the backside of the device are facilitated by making the pedestal sidewalls conductive. Selective backside metalization is applied producing a surface mount device. The topside is fully encapsulated with silicon nitride and has an additional polymer layer for scratch protection. These protective coatings prevent damage to the junction and the anode air-bridge during handling and assembly.

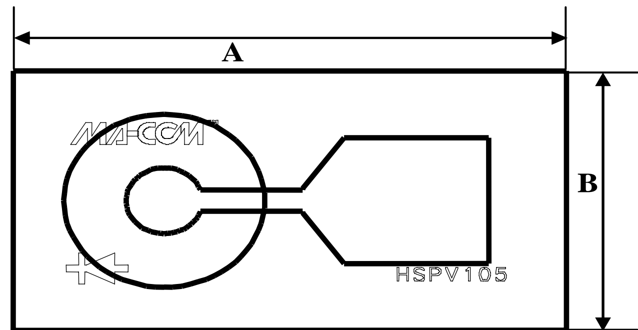
Absolute Maximum Ratings

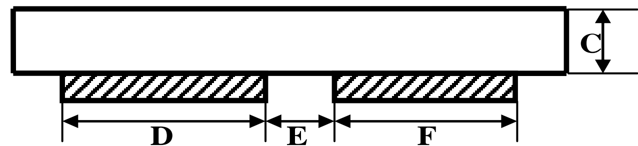
TA = +25°C (unless otherwise specified)

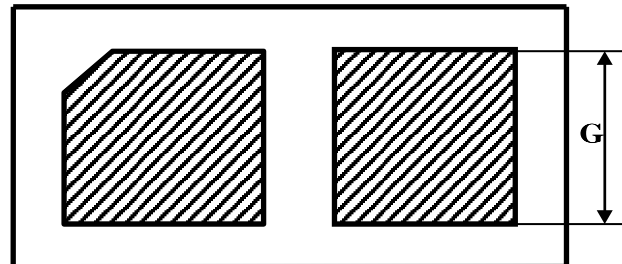
Parameter	Absolute Maximum
Forward Current	100 mA
Reverse Voltage	-200 V
Operating Temperature	-65°C to +150°C
Storage Temperature	-65°C to +150°C
Junction Temperature	+175°C
Dissipated RF & DC Power	1W
Mounting Temperature	+235°C for 10 seconds

Applications

These packageless devices are suitable for usage in Moderate Incident Power (5 W C.W.) or Higher Incident Peak Power (200 W, 1 uS, 0.001 Duty) Series, Shunt, or Series-Shunt Switches. Small Parasitic Inductance, 0.7 nH, and Excellent RC Constant, 0.20 pS, make the devices ideal for TR Switch and Accessory Switch Circuits, where higher P1db and IP3 values are required.
These diodes can also be used in π, T, Tapered Resistance, and Switched-Pad Attenuator Control Circuits for 50Ω or 75Ω systems







dim.	in		mm	
	min.	max.	min.	max.
A	0.0207	0.0226	0.525	0.575
B	0.0108	0.0128	0.275	0.325
C	0.0040	0.0080	0.102	0.203
D	0.0069	0.0089	0.175	0.225
E	0.0018	0.0037	0.045	0.095
F	0.0061	0.0081	0.155	0.205
G	0.0069	0.0089	0.175	0.225

1. Backside metal: 0.1 micron thk.

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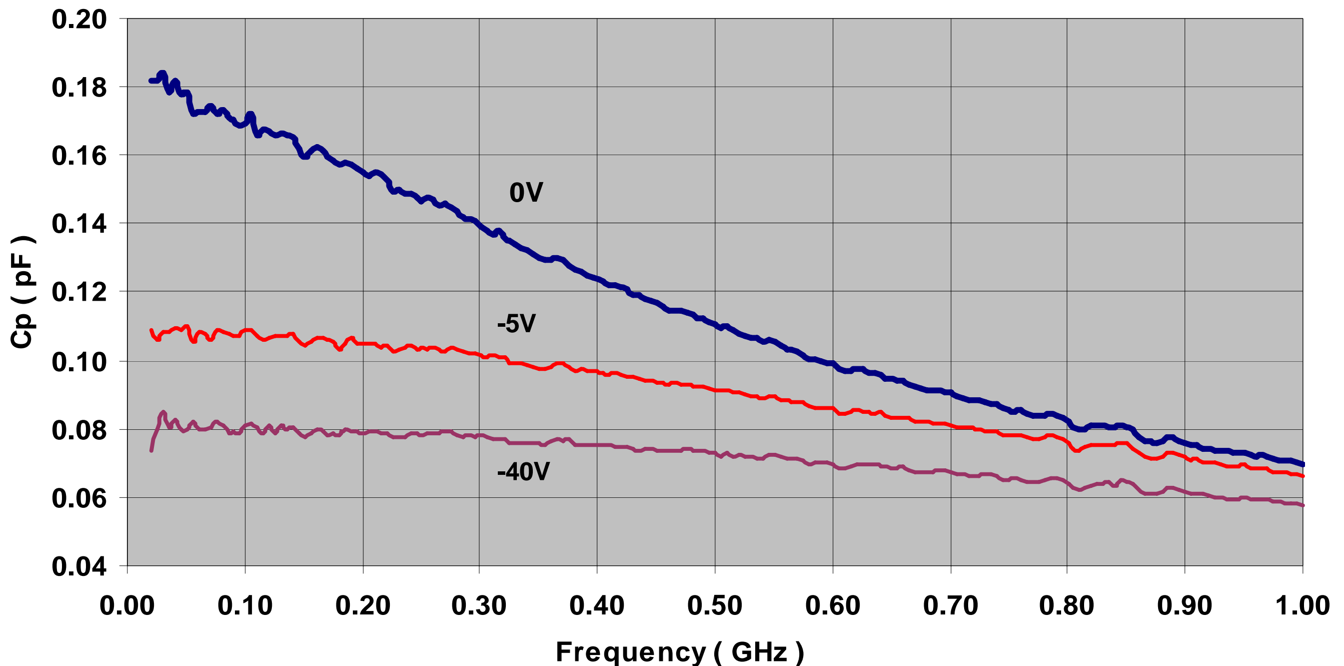
Electrical Specifications at +25°C

Symbol	Parameter	Conditions	Units	Min. Value	Typ. Value	Max. Value
C_T	Total Capacitance	-40V, 1MHz	pF		0.08	0.14
C_T	Total Capacitance	-40V, 1GHz	pF		0.06	
R_S	Series Resistance	100mA, 100MHz	Ω		1.7	
R_S	Series Resistance	20mA, 100MHz	Ω		2.4	
V_F	Forward Voltage	100mA	V		1.00	1.25
V_F	Forward Voltage	10mA	V		0.88	1.00
V_R	Reverse Voltage	-10 µA	V	| - 200 |	| -275 |	
I_R	Reverse Leakage Current	-40 V	nA		| - 10 |	
R_{qJL}	Thermal Resis-tance	Steady State	°C/W		30	
TL	Minority Carrier Lifetime	(50 % - 90 % V) +10mA / -6mA	µs		2.5	



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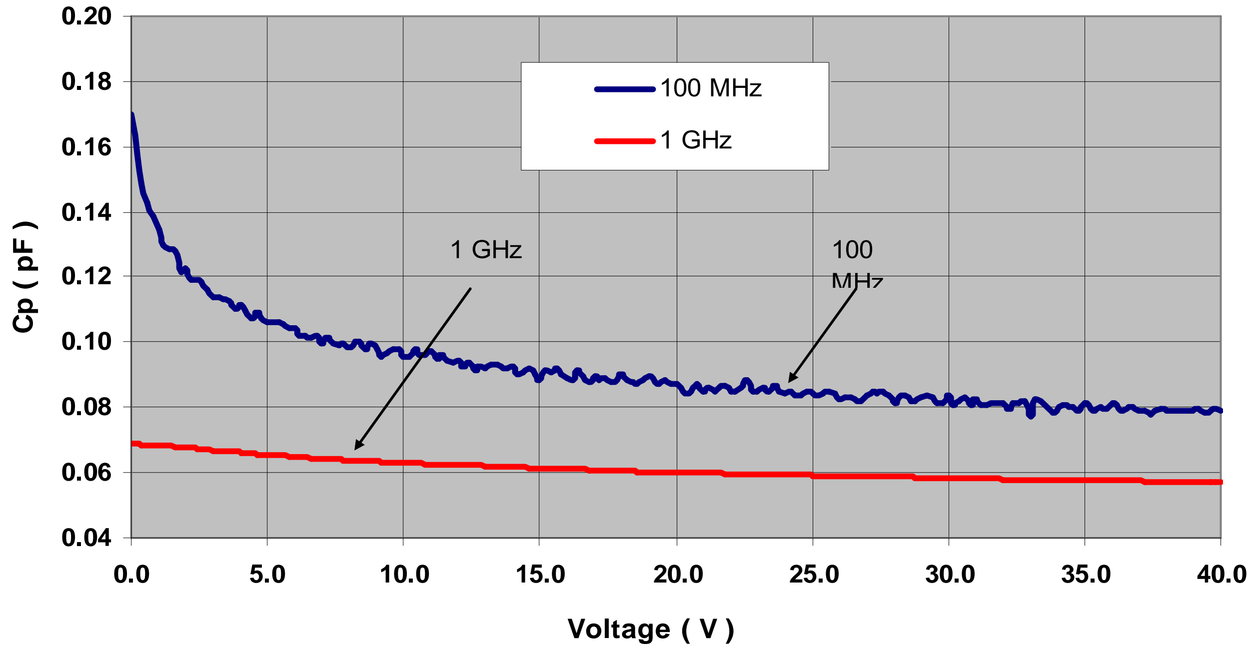

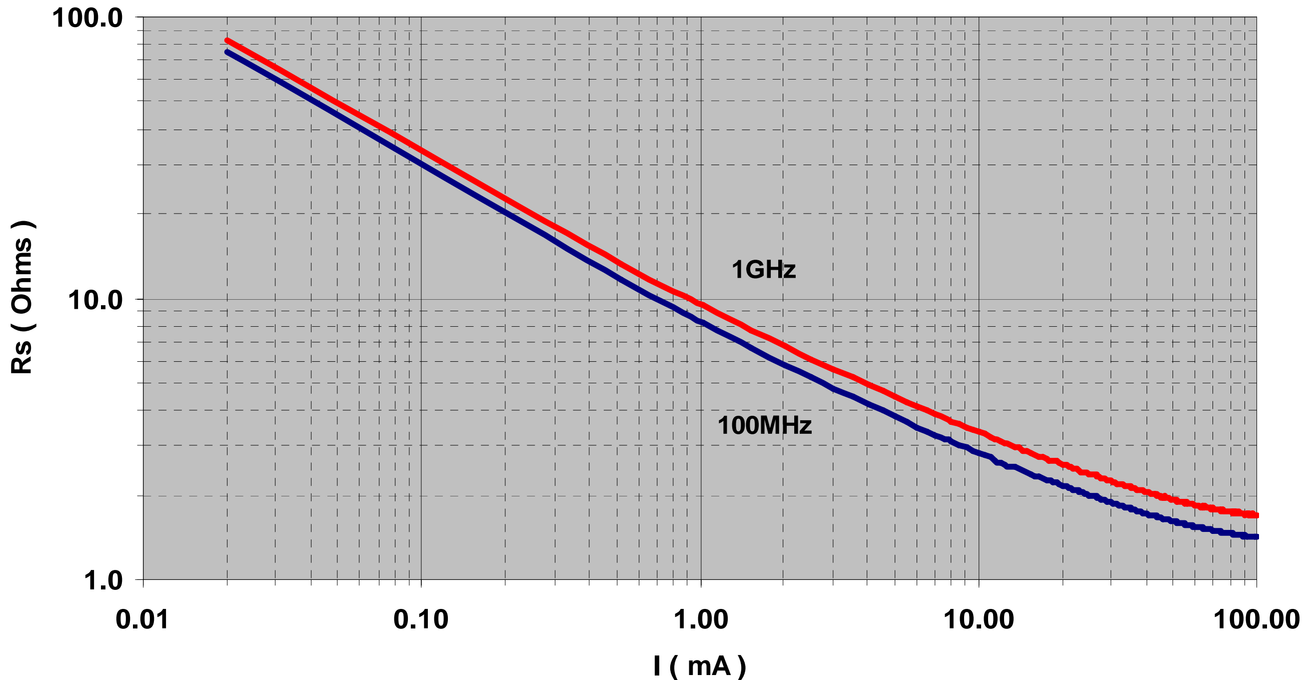

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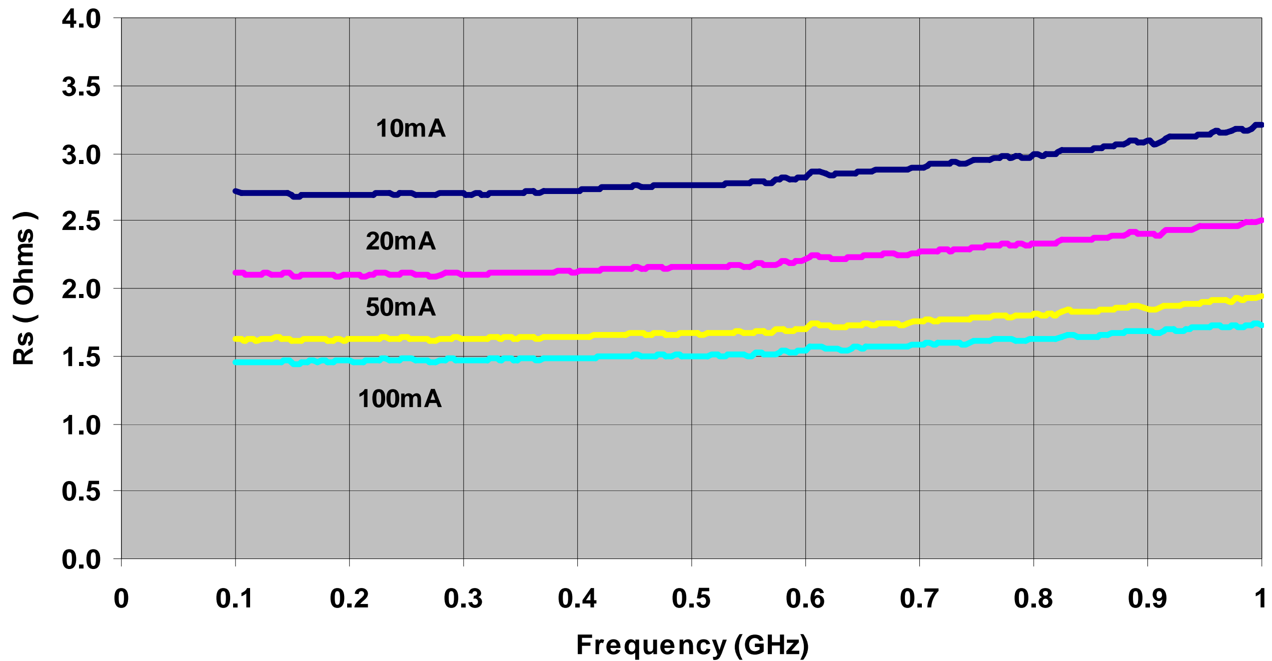

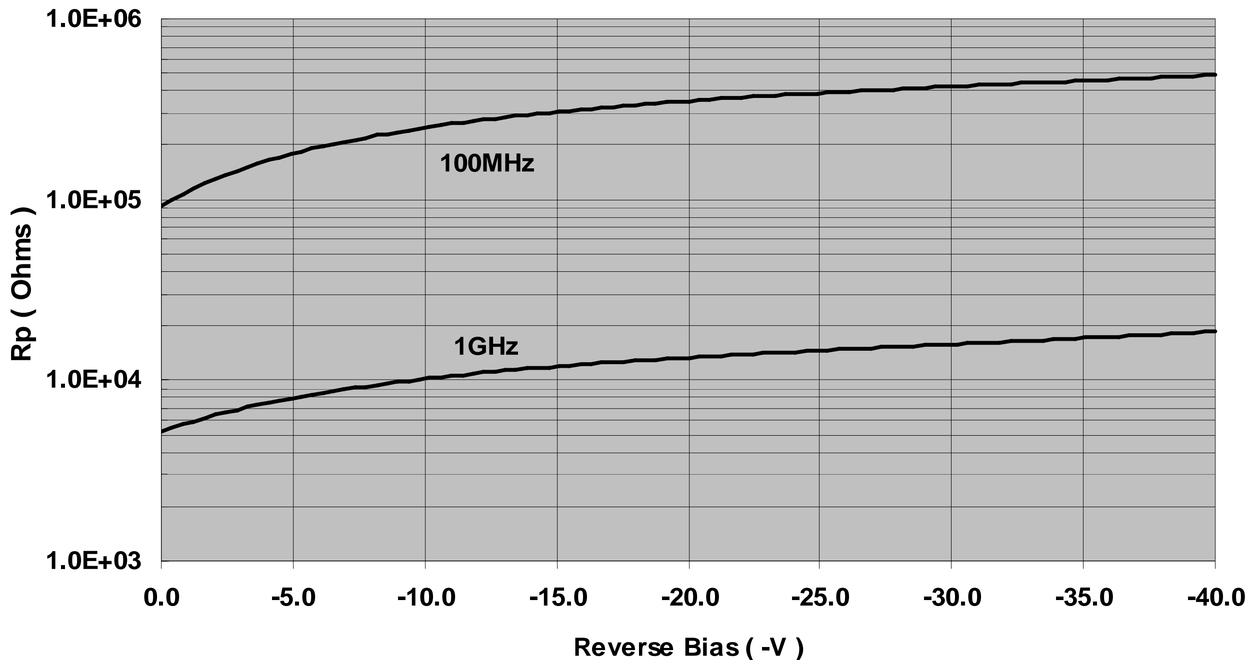

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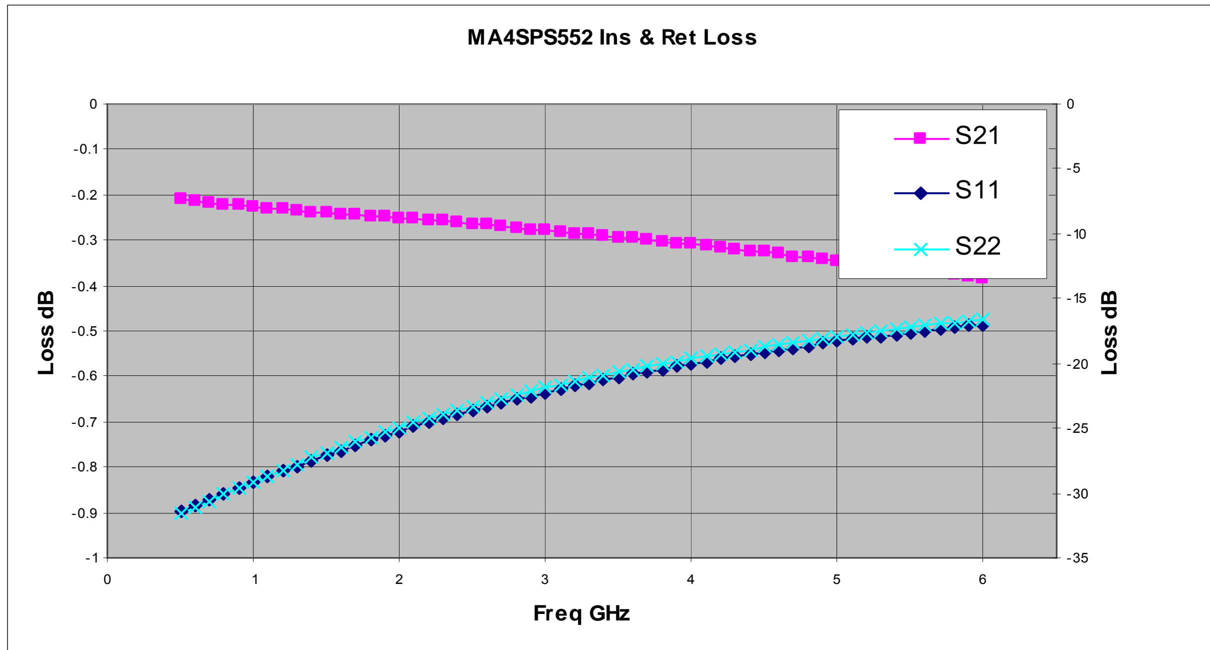

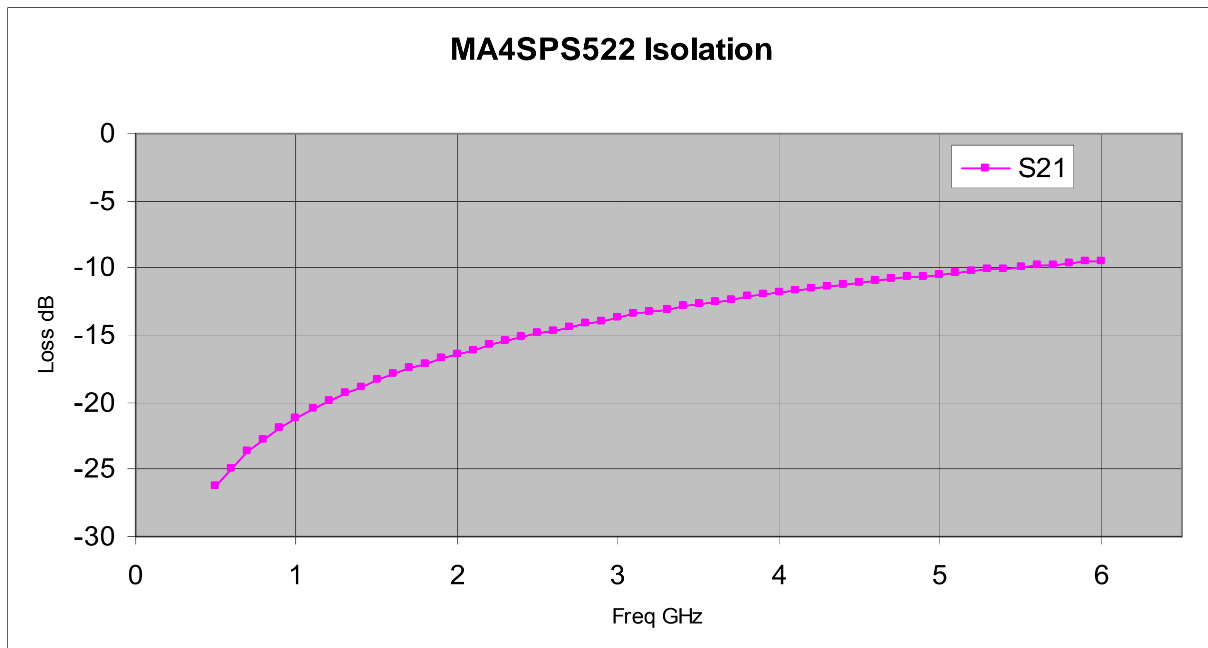

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Handling
All semiconductor chips should be handled with care to avoid damage or contamination from perspiration and skin oils. The use of plastic tipped tweezers or vacuum pickups is strongly recommended for individual components. Bulk handling should insure that abrasion and mechanical shock are minimized.

Die Attach
Attachment to a circuit board is made simple through the use of surface mount technology. Mounting pads are conveniently located on the bottom surface of these devices and are removed from the active junction locations. These devices are well suited for solder attachment onto hard and soft substrates. The use of 80Au/20Sn and 60Sn/40Pb solder is recommended. Conductive epoxy for attachment may also be used.

When soldering these devices to a hard substrate, hot gas die bonding is preferred. We re-commend utilizing a vacuum tip and force of 60 to 100 grams applied normal to the top surface of the device.

When soldering to soft substrates, it is recommended to use a lead-tin interface at the circuit board mounting pads. Position the die so that its mounting pads are aligned with the circuit board mounting pads and reflow the solder by heating the circuit trace near the mounting pad while applying 60 to 100 grams of force perpendicular to the top surface of the die. Equal Heat must be applied to both ohmic contacts. Since the HMIC glass is transparent, the edges of the mounting pads closest to each other can be visually inspected through the die after attach is completed.

Recommended temperature and re-flow profiles for 60/40, Sn/Pb and RoHS compliant solders are provided in Application Note M538 , “Surface Mounting Instructions“.

MA4SPS552 SURMOUNTS may be ordered in either gel packs or tape and reeled by adding the appropriate suffix per the table below. Tape and reel dimensions are provided in Application Note M513 located on the M/A-COM website at www.macomtech.com.

Ordering Information

Part Number	Package
MA4SPS552	Die in Carrier
MA4SPS552-T	Tape/Reel
MA4SPS552-W	Wafer on Frame

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