

Product Overview

This line of MELF high-power PIN diodes are hermetically sealed surface-mount packaged devices with full face bonded chips for low inductance construction. The MELF ceramic package has square end terminations which are ideal for surface-mount and pick and place operations. The PIN diode chips are coated with a special hard glass passivation which is required for high power applications and enhances the reliability resulting in MTBFs of greater than one million hours. RoHS compliant versions of these products meet RoHS requirements per EU directive.

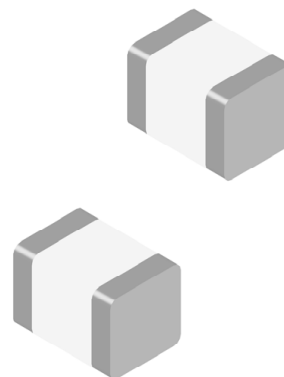
Key Features

- Non-magnetic¹ versions ideal for MRI applications
- Very low inductance, full face bonding
- Hi-Rel hermetic design
- Surface-mount devices available in tape and reel
- RoHS compliant² versions available

Applications

- Designed for low loss and low distortion applications
- Switch-filter bank
- T/R control
- Attenuators
- MRI switching

Package Style



Performance Overview

Parameters	Conditions	Values	Units
V_b	$I_R = 10 \mu A$	35, 50, 500	V
C_T	at 50V	0.5, 0.6, 0.9, 1.2, 1.25, 1.5	pF
R_s	at 100 mA	0.25, 0.3, 0.35, 0.4, 0.5, 0.6, 0.7	Ω
R_s	at 200 mA	0.1, 0.12, 0.15, 0.2, 0.25, 0.45, 0.55	Ω
T_L	—	0.6, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0	μs
θ_p	—	15, 20, 25, 35	$^{\circ}C/W$

¹Non-magnetic refers to any products that are designed with low and ultra low magnetic materials for use in MRI systems.

²RoHS versions are supplied with a matte tin finish.

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1. Electrical Specifications

1.1 Typical Electrical Specifications

Table 1-1. Electrical Parameters at 25 °C (Unless Otherwise Specified)

PN	V_b at $I_R = 10 \mu A$ (V) (Min.)	C_T^1 at 50V (pF) (Max)	R_s^2 at 100 mA (Ω) (Max)	R_s^2 at 200 mA (Ω) (Typ.)	T_L (μs) (Typ.)	Thermal Resistance (θ_P) (°C/W) (Max)
SM0502	500	0.5	0.7	0.55	1.0	35
SM0504	500	0.6	0.6	0.45	1.5	20
SM0508	500	0.9	0.4	0.25	2.0	15
SM0509	500	1.2	0.35	0.2	2.5	15
SM0511	500	1.25	0.3	0.15	3.0	15
SM0512	500	1.5	0.25	0.12	3.5	15
SM1002	50	1.2	0.75 at 50 mA	0.2	4.0	15
SM1003	35	1.2 at 20V	0.5 at 10 mA	0.1	0.6	25

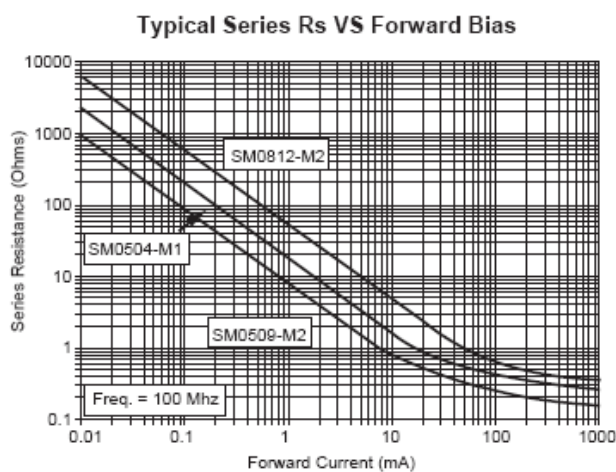
Notes:

1. Capacitance (C_T) is measured at $F = 1$ MHz.
2. Series resistance (R_s) is measured at $F = 100$ MHz.

1.2 Typical Performance Curves

The following graphs show the typical performance curves of the SM0502-SM1000 at 25 °C (unless otherwise indicated).

Figure 1-1. Typical R_s Curves



1.3 Absolute Maximum Ratings

The following table shows the absolute maximum ratings at 25 °C unless otherwise specified.

Table 1-2. Absolute Maximum Ratings

Ratings	Symbol	Value	Unit
Maximum leakage current at 80% of minimum rated V_B	I_R	500	nA
Forward current (1 μ s pulse)	I_F	1	A
Storage temperature	T_{STG}	–55 to +150	°C
Operating temperature	T_{OP}	–55 to +150	°C



ESD Sensitive Device

2. Outline Drawings

Figure 2-1. Package Style – M1

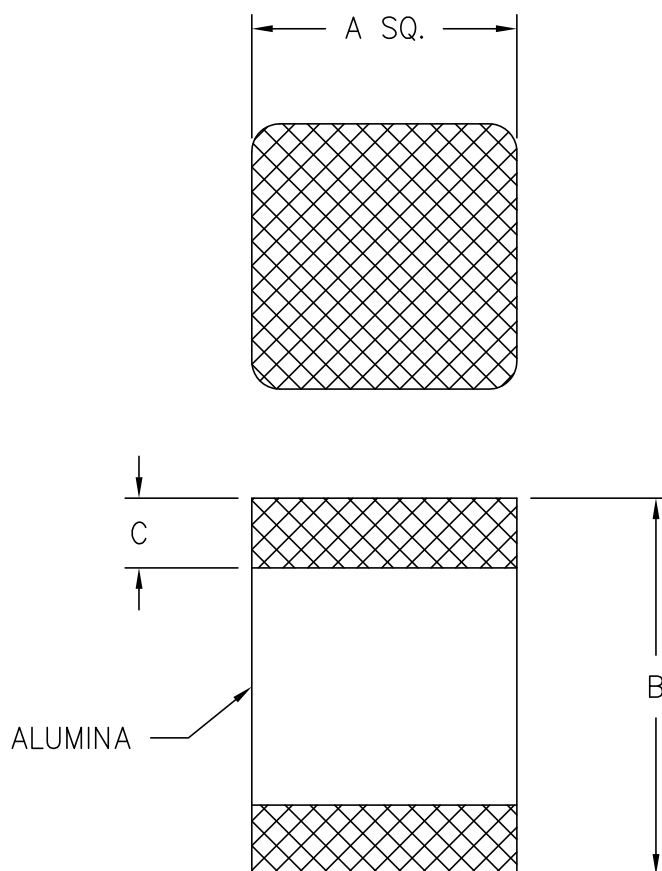


Table 2-1. Package Style – M1 Dimensions

Dim.	Inches			Millimeters		
	Min.	Typ.	Max	Min.	Typ.	Max
A	0.080	—	0.095	2.032	—	2.413
B	0.115	—	0.135	2.921	—	3.429
C	0.008	—	0.030	0.203	—	0.762

3. Ordering Information

For additional ordering information, contact your Microchip sales representative.

Table 3-1. RoHS and MRI Models¹

Base Model	RoHS Compliant PN	Non-Mag. / RoHS PN
SM0502-M1	SMX0502-M1	SMX0502MR-M1
SM0504-M1	SMX0504-M1	SMX0504MR-M1
SM0508-M1	SMX0508-M1	SMX0508MR-M1
SM0509-M1	SMX0509-M1	SMX0509MR-M1
SM0511-M1	SMX0511-M1	SMX0511MR-M1
SM1002-M1	SMX1002-M1	SMX1002MR-M1
SM1002-M1	SMX1002-M1	SMX1002MR-M1
SM1003-M1	SMX1003-M1	SMX1003MR-M1

Note:

1. For tape and reel, add /TR at the end, for example, SM0502-M1/TR.

4. Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

Revision	Date	Description
A	09/2023	Initial revision.

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ISBN: 978-1-6683-3168-2

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