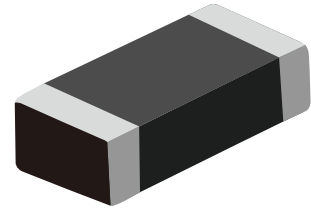


FEATURES

- | Fast response, instantly clamping the transient over voltage.
- | High surge current handling capability.
- | High energy absorption capability.
- | Low clamping voltages, providing better surge protection.
- | Low capacitance values, providing digital switching circuitry protection.
- | High insulation resistance, preventing electric arcing to the adjacent devices or circuits.



APPLICATIONS

- | Universal Serial Bus (USB).
- | Mobile communication.
- | Computer/DSP product.
- | Video and audio ports.
- | Portable/Hand-Held Products.
- | Data, Diagnostic I/O ports.

APPROVALS

RoHS	Compliance with 2011/65/EU
HF	Compliance with IEC61249-2-21:2003

ELECTRICAL SPECIFICATION

	Test condition
Varistor voltage	$I_n = 1 \text{ mA DC}$
Leakage current	$V_{dc} = 24 \text{ V DC}$
Maximum clamping voltage	$I_c = 1 \text{ A}$
Rated peak single pulse transient current	8 / 20 μs waveform, +/- each 1 time induce
Capacitance	10/1000 μs waveform
Insulation resistance after reflow soldering	$f = 1 \text{ MHz}, V_{rms} = 0.5 \text{ V}$

ELECTRICAL SPECIFICATION

Electrical specification			
Maximum allowable continuous DC voltage	24	V	
trigger voltage / Varistor voltage / breakdown voltage	300	V	
Maximum clamping voltage	50	V	Maximum
Rated peak single pulse transient current	1	A	Maximum
Nonlinearity coefficient	> 12		
Leakage current at continuous DC voltage	< 0.1	uA	
Response time	< 0.5	ns	
Varistor voltage temperature coefficient	< 0.05	%/°C	
Capacitance measured at 1MHz	0.15	pF	Typical
Capacitance tolerance	-30 to +30	%	
Insulation resistance after reflow soldering on PCB	> 10	MΩ	
Operating ambient temperature	-55 to +125	°C	
Storage temperature	-55 to +125	°C	

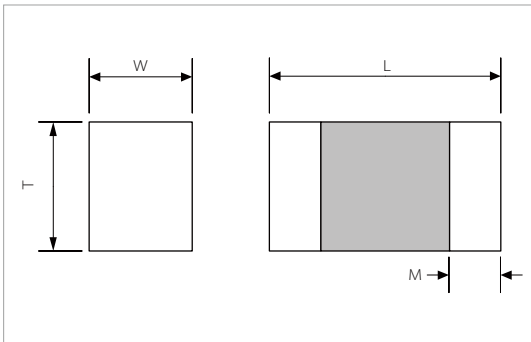
RELIABILITY TESTING PROCEDURES

Reliability parameter		Test methods and remarks	Test requirement
Pulse current capability	I_{max} 8/20 μs	IEC 1051-1, Test 4.5. 10 pulses in the same direction at 2 pulses per minute at maximum peak current	$d V_n /V_n \leq 10\%$ no visible damage
Electrostatic discharge capability	ESD C=150 pF, R=330 Ω	IEC 1000-4-2 Each 10 times in positive/negative direction in 10 sec at 8KV contact discharge (Level 4)	$d V_n /V_n \leq 10\%$ no visible damage
Environmental reliability	Thermal shock	IEC 68-2-14 Condition for 1 cycle Step 1 : Min. -40 C, 30 \pm 3 min. Step 2 : Max. +125 C, 30 \pm 3 min. Number of cycles: 30 times	$d V_n /V_n \leq 5\%$ no visible damage
	Low temperature	IEC 68-2-1 Place the chip at -40 \pm 5 C for 1000 \pm 12hrs. Remove and place for 24 \pm 2hrs at room temp. condition, then measure	$d V_n /V_n \leq 5\%$ no visible damage
	High temperature	IEC 68-2-2 Place the chip at 125 \pm 5 C for 1000 \pm 24hrs. Remove and place for 24 \pm 2hrs at room temp. condition, then measure	$d V_n /V_n \leq 5\%$ no visible damage
	Heat resistance	IEC 68-2-3 Apply the rated voltage for 1000 \pm 48hrs at 85 \pm 3 C. Remove and place for 24 \pm 2hrs at room temp. condition, then measure	$d V_n /V_n \leq 5\%$ no visible damage
	Humidity resistance	IEC 68-2-30 Place the chip at 40 \pm 2 C and 90 to 95% humidity for 1000 \pm 24hrs. Remove and place for 24 \pm 2hrs at room temp. condition, then measure	$d V_n /V_n \leq 10\%$ no visible damage
	Pressure cooker test	Place the chip at 2 atm, 120 C, 85%RH for 60 hrs. Remove and place for 24 \pm 2hrs at room temp. condition, then measure	$d V_n /V_n \leq 10\%$ no visible damage
	Operating life	Apply the rated voltage for 1000 \pm 48hrs at 125 \pm 3 C. Remove and place for 24 \pm 2hrs at room temp. condition, then measure	$d V_n /V_n \leq 10\%$ no visible damage
Mechanical Reliability	Adhesive strength	IEC 68-2-22 Applied force on SMD chip by fracture from PCB	Strength > 10 N no visible damage

MATERIAL SPECIFICATION

Body	Internal electrode	External electrode	Thickness of Ni/Sn plating layer
ZnO based ceramics	Silver – Palladium	Silver – Nickel – Tin	Nickel > 1 μm , Tin > 2 μm

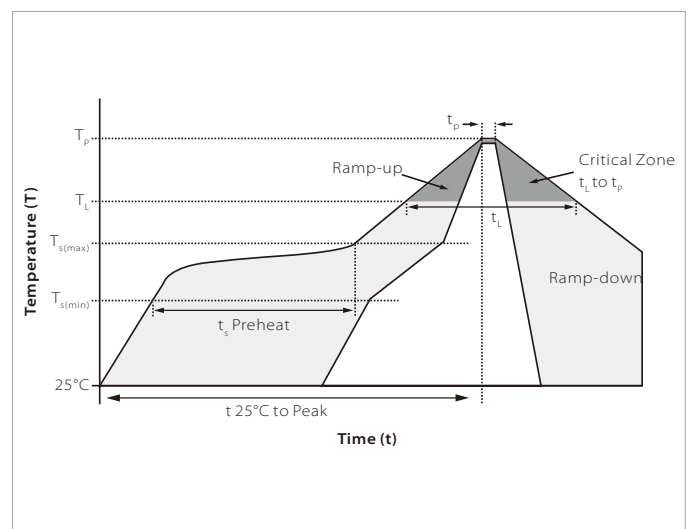
DIMENSION SPECIFICATION



Size	L(mm)	W(mm)	T(mm)	M(mm)
0402	1.0±0.10	0.5±0.10	≤ 0.6	0.20±0.10

SOLDERING RECOMMENDATIONS

Reflow Condition		Lead-free assembly
Pre Heat	Temperature Max ($T_{s(\text{min})}$)	150°C
	Temperature Max ($T_{s(\text{max})}$)	200°C
	Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus Temp (T_L) to peak)		3°C/second max
$T_{s(\text{max})}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	Temperature (T_L) (Liquidus)	217°C
	Time (min to max) (t_r)	60 – 150 seconds
Peak Temperature (T_p)		260°C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_p)		8 minutes max.
Do not exceed		260°C



DRDERING INF ORMATIOON

Part Number	Package&Size	QTY/Reel	Reel Size
SME0402B24MA	0402 (1.0 x 0.5 mm)	10000PCS	7"

Headquarters

No.3387 Shendu Road Pujiang
I&E Park
Minhang Shanghai China
201000

Hotline

400-021-5756

Web

<https://www.semiware.com>

Sales Center

Tel: 86-21-3463-7458
Email: sales18@semiware.com

Customer Service

Tel: 86-21-5484-1001
Email: sales17@semiware.com

Technical Support

Tel: 86-21-3463-7654
Email: fae01@semiware.com

Complaint & Suggestions

Tel: 86-21-3463-7172
Ext: 8868
Email: cs03@semiware.com

By QR Code

Website



Wechat

To find your local partner within Semiware's global network: www.semiware.com

© 2022 Semiware Semiconductor Inc.

The content of this document has been carefully checked and understood. However, neither Semiware nor its subsidiaries assume any liability whatsoever for any errors or inaccuracies of this document and the consequences thereof. Published specifications are subject to change without notice. Product suitability for any area of application must ultimately be determined by the customer. In all cases, products must never be operated outside their published specifications. Semiware does not guarantee the availability of all published products. This disclaimer shall be governed by substantive Chinese law and resulting disputes shall be settled by the courts at the place of business of Semiware. Latest publications and a complete disclaimer can be downloaded from the Semiware website. All trademarks recognized.