

GENERAL DESCRIPTION

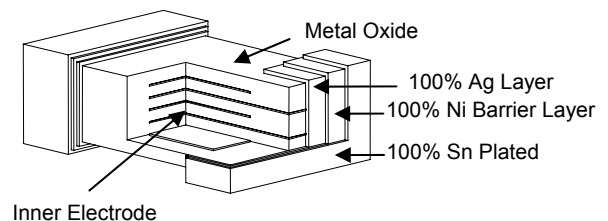
These Multi Layer Varistors are small, leadless, surface mount packages made of multiple layers of Zinc Oxide, with electrodes between them. They are used to help protect integrated circuits and other sensitive equipment. Their small size is ideal for high density printed circuit boards.

BENEFITS

- Help to protect sensitive equipment against typical ESD, EMC and EOS (Electrical Over Stress) events and transients
- Cost efficient assembly and protection
- Resistance to standard wave solder fluxes, provides excellent solderability
- Space savings
- Longer battery life due to low leakage current

FEATURES

- Bidirectional clamping
- Compatible with standard surface mount methods
- Low and stable leakage current
- Low clamping voltage
- Quick response time (<1ns)
- High transient current capability
- RoHS Compliant



APPLICATIONS

ESD, EMC and EOS protection of:

- Computer I/O ports and interfaces (USB, IEEE 1394, etc...)
- Portable devices
- Automotive electronic circuits
- Telecom equipment
- Medical instruments

SYMBOL



MATERIALS INFORMATION

ROHS Compliant

Directive 2002/95/EC
Compliant

ELV Compliant

Directive 2000/53/EC
Compliant

Multi Layer Varistor Overvoltage Protection Device

Raychem Circuit Protection Products

PRODUCT: MLV0402

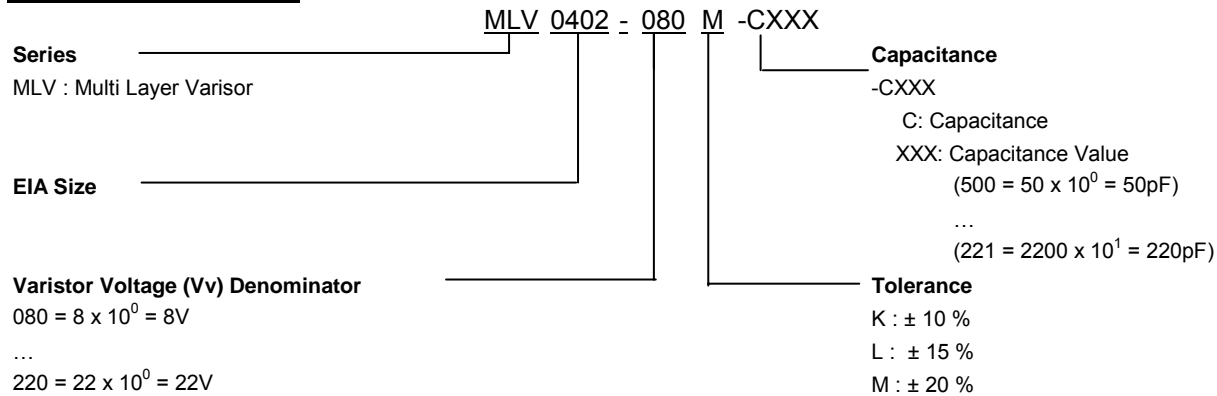
DOCUMENT: SCD 26385
PCN : RF0107, RF0545
REV LETTER: D
REV DATE: AUGUST 10, 2007
PAGE NO.: 2 OF 5

Ratings @ (25± 5°C)

	Varistor Voltage	Maximum Working Voltage		Clamping Voltage	Typical Resistance	Peak Current	Transient Energy	Typical Capacitance ¹	
Symbol	V _V	V _{RMS}	V _{DC}	V _C	IR	I _{max}	W _{max}	C _p	
Units	V	V	V (Max)	V	X10 ⁶ Ohm (Min)	A (Min)	J (Max)	pF	
Test Conditions	@ 1mA DC	<10μA	< 10μA	@ 1A 8/20μs	@ 5 V _{DC}	8/20μs	10/1000μs	@ 1KHz	@ 1MHz
MLV0402-080M-C221	8 ± 20%	4	5.5	20	10	20	0.05	230	220
MLV0402-250K-C400	25 ± 10%	14	18	50	10	20	0.05	45	40

Note 1: Cp – Device capacitance measured with zero volt bias and 1 Vrms signal

PART NUMBERING



GENERAL CHARACTERISTICS

Operating Temperature: -40 to +85°C

Storage Temperature: -40 to +85°C

ENVIRONMENTAL CHARACTERISTICS

Characteristics	Specifications	Test Conditions
Bias Humidity	$\Delta V_V / V_V \leq \pm 10\%$	90%RH, 40°C, maximum working Voltage V _{DC} , 1000 hours
Thermal Shock	$\Delta V_V / V_V \leq \pm 10\%$	-40°C to 85°C, 30 min. cycle, 5 cycles
Full Load Voltage	$\Delta V_V / V_V \leq \pm 10\%$	Maximum working Voltage V _{DC} , 85°C, 1000 hours
Solderability	95% Coverage	230°C, 3s
Solder Heat Resistance	90% Coverage	260°C, 10s

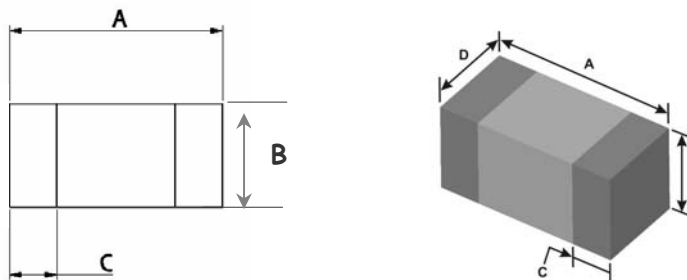
Multi Layer Varistor Overvoltage Protection Device

Raychem Circuit Protection Products

PRODUCT: MLV0402

DOCUMENT: SCD 26385
PCN : RF0107, RF0545
REV LETTER: D
REV DATE: AUGUST 10, 2007
PAGE NO.: 3 OF 5

DIMENSIONS



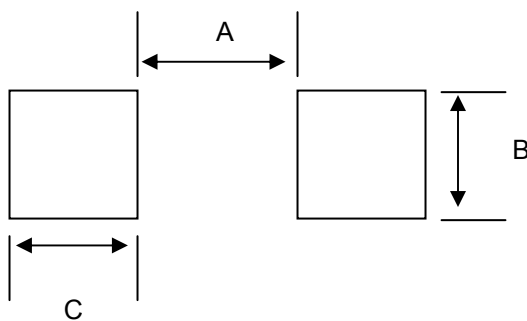
Drawing Not To Scale

	length A		Height B		Terminal Width C		Width D	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
mm:	0.85	1.15	0.4	0.6	0.1	0.4	0.4	0.6
in*:	(0.033)	(0.045)	(0.016)	(0.024)	(0.004)	(0.016)	(0.016)	(0.024)

* Rounded off approximation

RECOMMENDED PAD LAYOUT

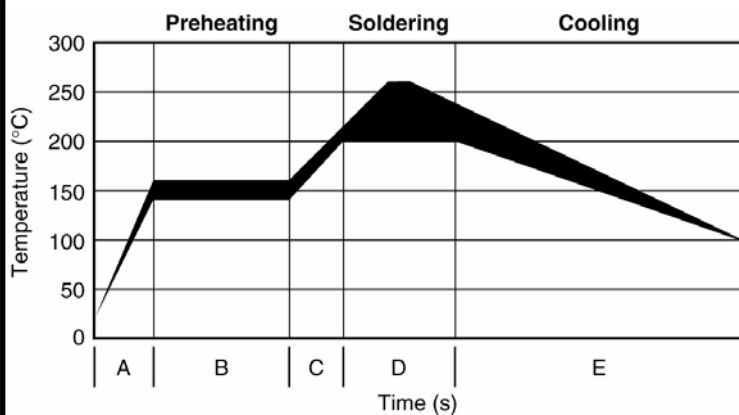
Print solder with a thickness of 150 to 200µm



	A	B	C
mm:	0.35	0.75	0.85
in*:	(0.014)	(0.030)	(0.033)

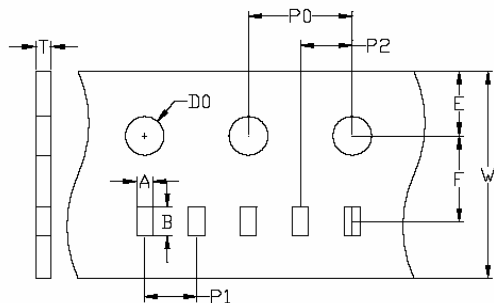
* Rounded off approximation

SOLDER REFLOW RECOMMENDATIONS



A	Temperature ramp up 1	From ambient to Preheating temperature	30s to 60s
B	Preheating	140°C - 160°C	60s to 120s
C	Temperature ramp up 2	From Preheating to Main heating temperature	20s to 40s
D	Main heating	at 200°C at 220°C at 240°C at 260°C	60s ~ 70s 50s ~ 60s 30s ~ 40s 5s ~ 10s
E	Cooling	From main heating temperature to 100°C	max 4°C/s

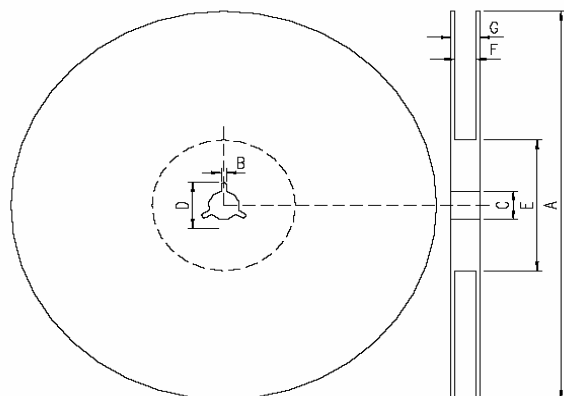
PACKAGING



	A		B		W		E		F		P0		P1		P2		D0		T	
mm	0.59	0.65	1.09	1.15	7.7	8.3	1.7	1.8	3.45	3.55	3.9	4.1	1.95	2.05	1.95	2.05	1.4	1.6	0.55	0.65
inch*	(0.023)	(0.025)	(0.042)	(0.045)	(0.303)	(0.326)	(0.066)	(0.070)	(0.135)	(0.139)	(0.153)	(0.161)	(0.076)	(0.080)	(0.076)	(0.080)	(0.055)	(0.062)	(0.021)	(0.025)

*Rounded off approximation

Leader & Trailer: The leader is 180mm in length & consists of empty cavities with sealed cover tape.
The trailer is 350mm in length & consists of empty cavities with sealed cover tape.



A	178.0±2.0
B	2.0±0.5
C	13.0±0.5
D	21.0±0.8
E	62.0±1.5
F	9.0±0.5
G	13.0±1.0



308 Constitution Drive
Menlo Park, CA 94025-1164
Phone: 800-227-4856
www.circuitprotection.com

Multi Layer Varistor Overvoltage Protection Device

Raychem Circuit Protection Products

PRODUCT: MLV0402

DOCUMENT: SCD 26385
PCN : RF0107, RF0545
REV LETTER: D
REV DATE: AUGUST 10, 2007
PAGE NO.: 5 OF 5

RECOMMENDED STORAGE CONDITIONS

Storage time: 12 months max
Storage temperature: 5 to 40°C
Storage Relative humidity: 65% max

POST REFLOW, CLEANING CONDITIONS

A 5% saponifier combined with water during wash.

For an Ultrasonic process water temperature should be at 50°C and board should be submerged for a minimum of one minute in the solution, then rinse and dry.

For in-line washing, the temperature of the water sprayed should be at 110°C, rise and drying is done in-line.

Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of each product for their applications. Tyco Electronics Corporation assumes no responsibility for the use of its product or for any infringement of patents or other rights of third parties resulting from the use of its product. No license is granted by implication or otherwise under any patent or proprietary right of Tyco Electronics except the right to use such product for the purpose for which it is sold. Tyco Electronics reserves the right to change or update, without notice, any information contained in this publication; to change, without notice, the design, construction, processing, or specification of any product; and to discontinue or limit production or distribution of any product. This publication supersedes and replaces all information previously supplied. Without express written consent by an officer of Tyco Electronics, Tyco Electronics does not authorize the use of any its products as components in nuclear facility applications, aerospace, or in critical life support devices or systems. Tyco Electronics' only obligations are those in the Tyco Electronics Standard Terms and Conditions of Sale and in no case will Tyco Electronics be liable for any incidental, indirect, or consequential damages arising from the sale, resale, use, or misuse of its products.