

GENERAL DESCRIPTION

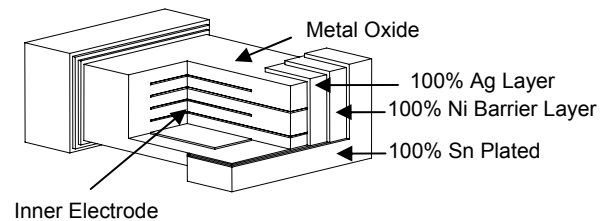
These Multi Layer Varistors are small, leadless, surface mount packages made of multiple layers of Zinc Oxide, with electrodes between them. They are used to help protect integrated circuits and other sensitive equipment. Their small size is ideal for high density printed circuit boards. The "E" series is a family of low capacitance parts, specifically designed for ESD protection of high data rate applications.

BENEFITS

- Minimal signal distortion
- Help to protect sensitive equipment against typical ESD events
- 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

- Low capacitance
- Bidirectional clamping
- Compatible with standard surface mount methods
- Low and stable leakage current
- Low clamping voltage
- Quick response time (<1ns)
- High transient current capability
- Capable of withstanding over 1000 pulses of IEC 61000-4-2, level 4
- Lead Free



APPLICATIONS

ESD protection of:

- High speed computer I/O ports and interfaces (USB, IEEE 1394, etc...)
- Portable devices
- Telecom equipment

SYMBOL



MATERIALS INFORMATION

ROHS Compliant

Directive 2002/95/EC
Compliant

ELV Compliant

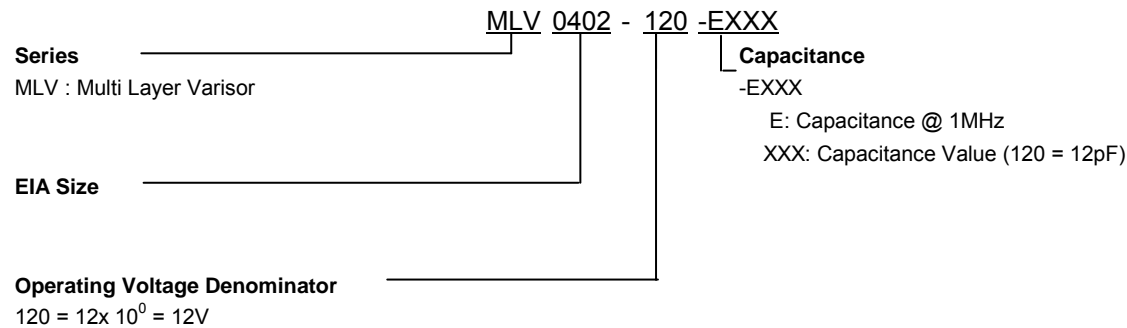
Directive 2000/53/EC
Compliant

Ratings @ (25± 5°C)

	Maximum Working Voltage	Typical Clamping Voltage ¹	Leakage Current	Typical Capacitance
Symbol	V _{DC}	V _c	I _L	C _p
Units	V (Max)	V	µA (Max)	pF
Test Conditions	< 10µA	IEC Pulse	@12V	@ 1MHz
MLV0402-120-E120	12	100	<1	12

Note 1: Measure during IEC61000-4-2,8kV contact discharge,30 ns after initiation of the ESD pulse.

PART NUMBERING



GENERAL CHARACTERISTICS

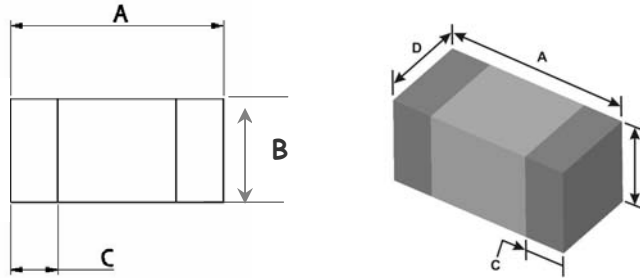
Operating Temperature: -40 to +85°C

Storage Temperature: -40 to +85°C

ENVIRONMENTAL CHARACTERISTICS

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

DIMENSIONS



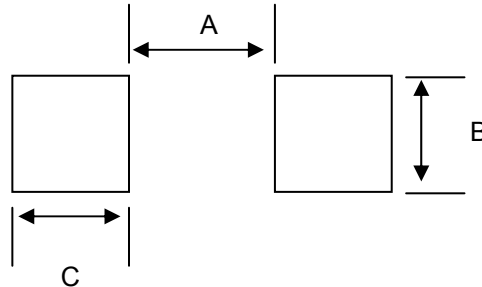
Drawing Not To Scale

	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

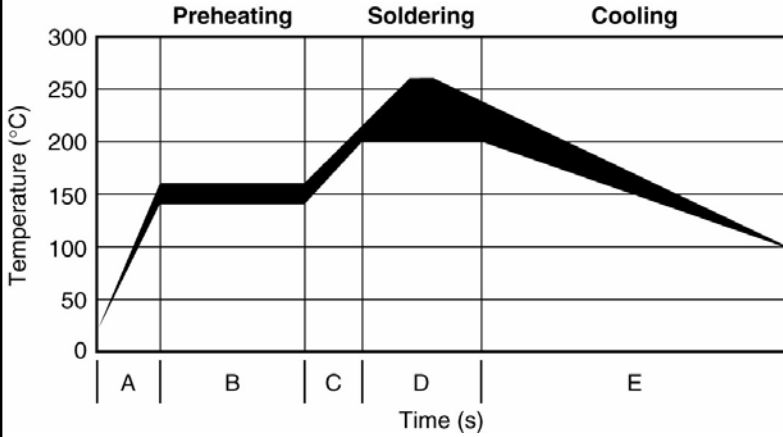
Print solder with a thickness of 150 to 200µm



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

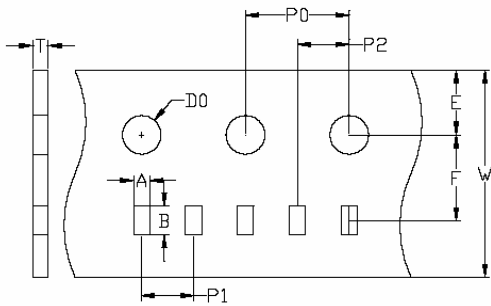
* Rounded off approximation

SOLDER REFLOW RECOMMENDATIONS



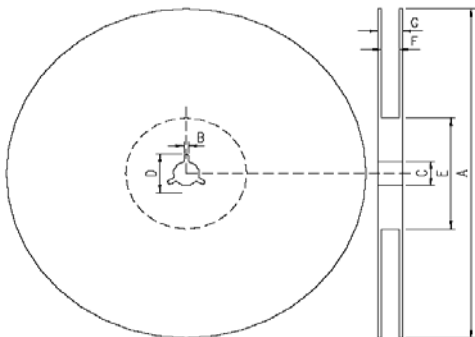
A	Temperature ramp up 1	From ambient to Preheating temperature	30s to 60s
B	Preheating	140°C - 160°C	60s to 120s
C	Temperature ramp up 2	From preheating to Main heating temperature	20s to 40s
D	Main Heating	at 200°C	60s ~ 70s
		at 220°C	50s ~ 60s
		at 240°C	30s ~ 40s
		at 260°C	5s ~ 10s
E	Cooling	From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



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

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

For in-line washing, the temperature of the water sprayed should be at 110°C, rinse 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.