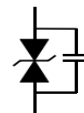
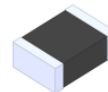


0402 Series

Features

- u Varistor voltage from 8V to 24V
- u Fast response time (<1nS)
- u Low leakage current
- u High transient current capability
- u Low clamping voltage
- u Wide operating temperature range from -40~85 °C
- u Meet IEC 61000-4-2/-5 level standard
- u Compact size for ELA 0402

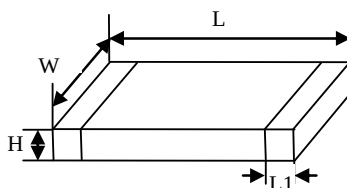


Applications

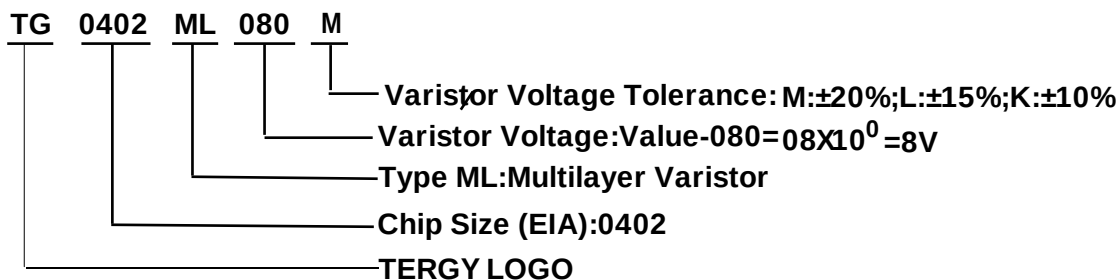
- u For Mother Board and Notebook, Cellular Phone, handheld device, CMS, MSFET, EFT etc

Dimensions Unit: mm

Model	1005(0402)	1608(0603)	2012(0805)	3216(1206)	3225(1210)	4532(1812)	5750(2220)	8050(3220)
Length(L)	1.00±0.15	1.60±0.20	2.00±0.20	3.20±0.20	3.20±0.20	4.50±0.30	5.70±0.30	8.0±0.30
Width(W)	0.50±0.15	0.80±0.20	1.20±0.20	1.60±0.20	2.50±0.20	3.20±0.20	5.00±0.30	5.00±0.30
High(H)	0.70max	0.90max	1.30max	1.60max	2.50max	3.20max	4.50max	4.50max
Termination(L1)	0.25±0.10	0.30±0.20	0.40±0.20	0.50±0.20	0.50±0.20	0.60±0.20	0.60±0.30	0.60±0.30



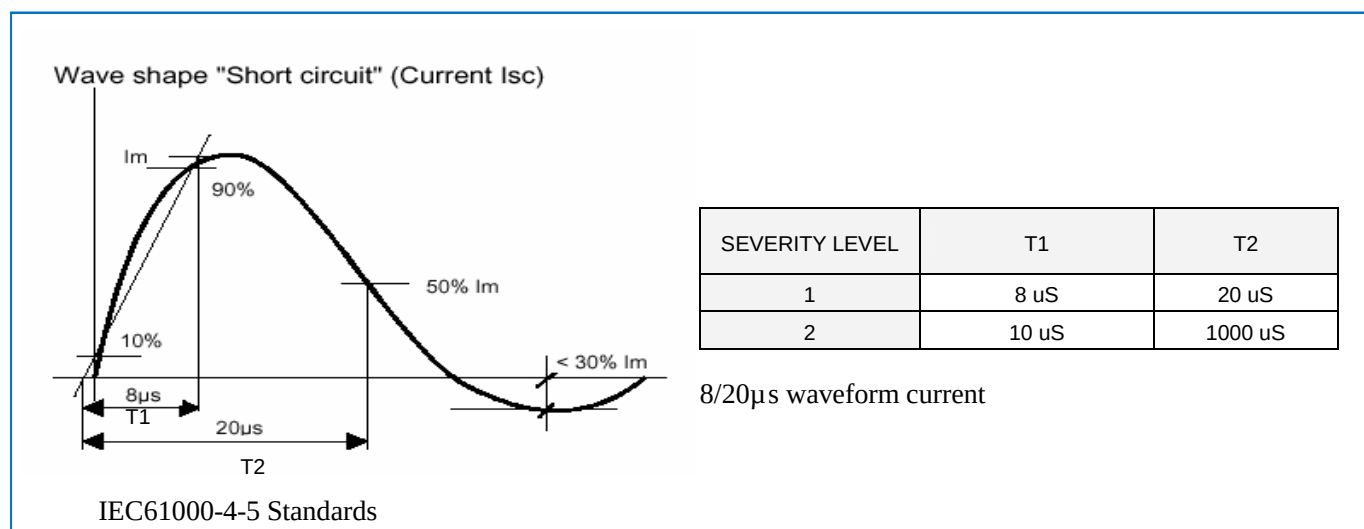
Part Number Code



Electrical Characteristics

Part Number	Working Voltage		Varistor Voltage		Clamping Voltage	Peak Current	Transient Energy	Capacitance
	(I _L < 50 μ A)		V _B		V _C	I _P	E _T	C _P
	AC (V)	DC (V)	@1mA DC		@8/20 μ S	@8/20 μ S	@10/1000 μ S	@1MHz
	V _{RMS} (Max.)	V _{DC} (Max.)	(V)		@1A (V)	(A) (MAX.)	(J) (MAX.)	
TG0402ML080M	4.0	5.5	8.0	7.0~9.9	19	20	0.05	270
TG0402ML120M	7.0	9.0	12	10~14	32	20	0.05	130
TG0402ML180M	11	14	18	15~21	38	20	0.05	90
TG0402ML240K	14	18	24	22~27	45	20	0.05	85

Surge Current Standard Waveform



General Technical Data

Operating Temperature		-40 ~ +85°C
Storage Temperature		-40 ~ +125°C
Response Time		<1 ns
Solderability		245 $\pm$ 5°C, 3 $\pm$ 1sec
Solder leach resistance		260 $\pm$ 5°C, 10 $\pm$ 1sec
Taping Package Storage Condition	Storage Temperature	5 ~ 40°C
	Relative Humidity	To 65%
	Storage Time	12 Months max

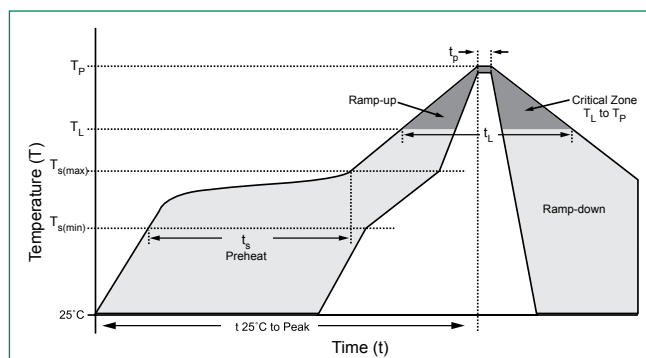
Environmental Reliability Testing

0402 Series

Characteristic	Test method and description			
High Temperature Storage	The specimen shall be subjected to 125°C for 1000 hours in a thermostatic bath without load and then stored at room temperature and humidity for 1 to 2 hours. The change of varistor voltage shall be within 10%.			
Temperature Cycle	The temperature cycle of specified temperature shall be repeated five times and then stored at room temperature and humidity for one two hours. The change of varistor voltage shall be within 10% and mechanical damage shall be examined.	Step	Temperature	Period
		1	-40±3°C	30min±3
		2	Room Temperature	1~2hours
		3	125±2°C	30min±3
High Temperature Load	After being continuously applied the maximum allowable voltage at 85°C for 1000hours, the specimen shall be stored at room temperature and humidity for one or hours, the change of varistor voltage shall be within 10%.	4	Room Temperature	1~2hours
Damp Heat Load/ Humidity Load	The specimen should be subjected to 40°C, 90 to 95%RH environment, and the maximum allowable voltage applied for 1000 hours, then stored at room temperature and humidity for one or two hours. The change of varistor voltage shall be within 10%.			
Low Temperature Storage	The specimen should be subjected to -40°C, without load for 1000 hours and then stored at room temperature for one two hours. The change of varistor voltage shall be within 10%.			

Recommended Soldering Conditions

Reflow Condition		Lead-free assembly
Pre Heat	-Temperature Min ($T_{s(min)}$)	150°C
	-Temperature Max ($T_{s(max)}$)	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
$T_{s(max)}$ to T_L - Ramp-up Rate		5°C/second max
Reflow	-Temperature (T_L) (Liquidus)	217°C
	-Time (min to max) (t_s)	60 – 150 seconds
Peak Temperature (T_p)		260 +0/-5°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.



Note that this product will be easily damaged by rapid heating, rapid cooling or local heating.

Do not give heat shock over 100°C in the process of soldering. We recommend to take preheating and gradual cooling

Soldering gun procedure

Note the follows, in case of using solder gun for replacement.

- 1) The tip temperature must be less than 280 for the period within 3 seconds by using soldering gun under 30W
- 2) The soldering gun tip shall not touch this product directly.

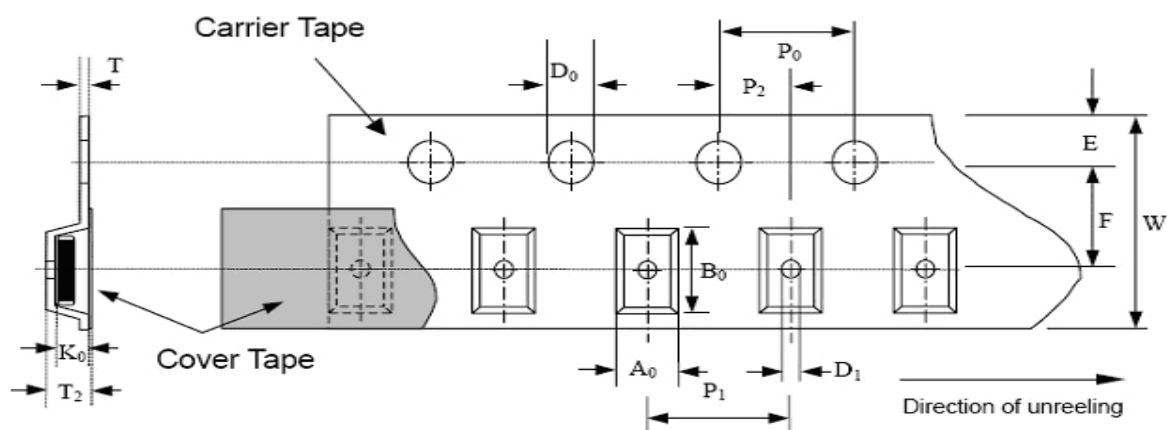
Soldering volume

Note that excess of soldering volume will easily get crack the body of this product.

Packaging Dementions Unit:Millimeters

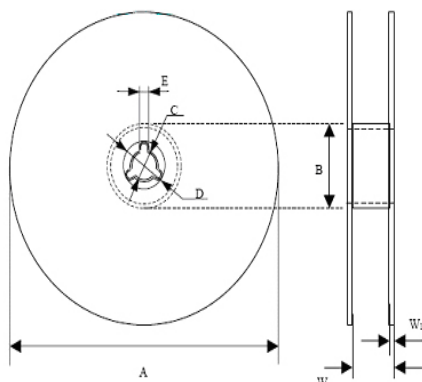
0402 Series

- ◆ Carrier tape transparent cover tape should be heat-sealed to carry the products, and the reel should be used to reel the carrier tape.
- ◆ The adhesion of the heat-sealed cover tape shall be 40 ± 20 - 15 grams.
- ◆ Both the head and the end portion of taping shall be empty for reel package and SMT auto-pickup machine. And a normal paper tape shall be connected in the head of taping for the operator handle.



type	A ₀ ±0.10	B ₀ ±0.10	K ₀ ±0.10	T ±0.05	T ₂ ±0.05	D ₀ +0.10	D ₁ ±0.05	P ₁ ±0.10	P ₂ ±0.05	P ₀ ±0.05	W ±0.20	E ±0.10	F ±0.05
0402	1.08	1.88	1.04	0.22	0.87	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
0603	1.08	1.88	1.04	0.22	1.17	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
0805	1.42	2.30	1.04	0.22	1.26	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1206	1.88	3.50	1.27	0.20	1.49	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1210	2.18	3.46	1.45	0.22	1.77	1.50	1.00	4.00	2.00	4.00	8.00	1.75	3.50
1812	3.66	4.95	1.74	0.25	1.99	1.50	1.50	8.00	2.00	4.00	12.00	1.75	5.50
2220	5.10	5.97	2.80	0.25	3.05	1.50	1.50	8.00	2.00	4.00	12.00	1.75	5.50
3220	5.50	8.50	2.80	0.30	3.50	1.50	1.50	8.00	2.00	4.00	16.00	1.75	7.50

Reel Dimensions Unit:Millimeters



Type	A	B	C	D	E	W	W ₁
0402~ 1210	178±1	60±0.5	13±0.2	21±0.2	2±0.5	9±0.5	1.5±0.15
1812~ 3220	178±1	60±0.5	13.5 ± 0.2	21±0.2	2±0.5	13.6 ± 0.5	1.5±0.15

Packing Quantity

Type	0402	0603	0805	1206	1210	1812	2220	3220
Quantity	10000	4000	4000	3000	3000	1000	1000	1000