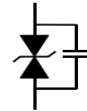
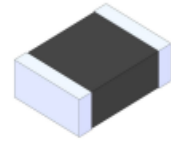


2220 Series

Features

- ☐ Varistor voltage from 24V to 360V
- ☐ Fast response time (<1nS)
- ☐ Low leakage current
- ☐ High transient current capability
- ☐ Low clamping voltage
- ☐ Wide operating temperature range from -40~85
- ☐ Meet IEC 61000-4-2/-5 level standard
- ☐ Compact size for ELA 2220

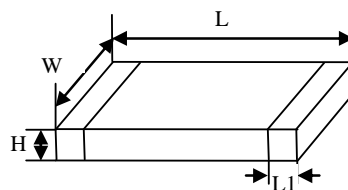


Applications

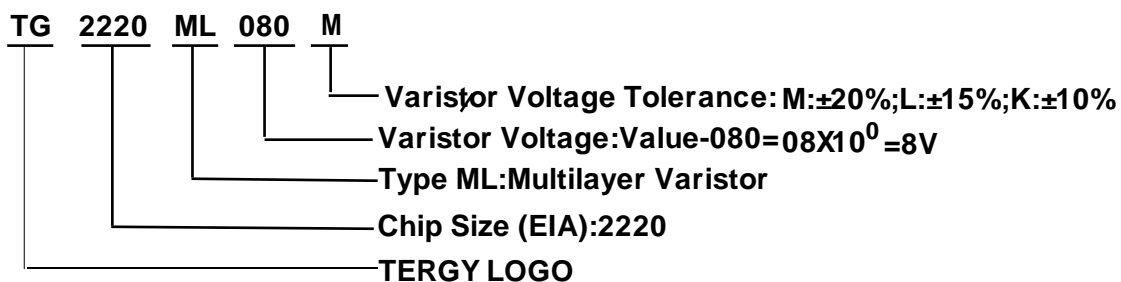
- ☐ For Mother Board and Notebook, Cellular Phone, handheld device, CMS, MSFET, EFT etc

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

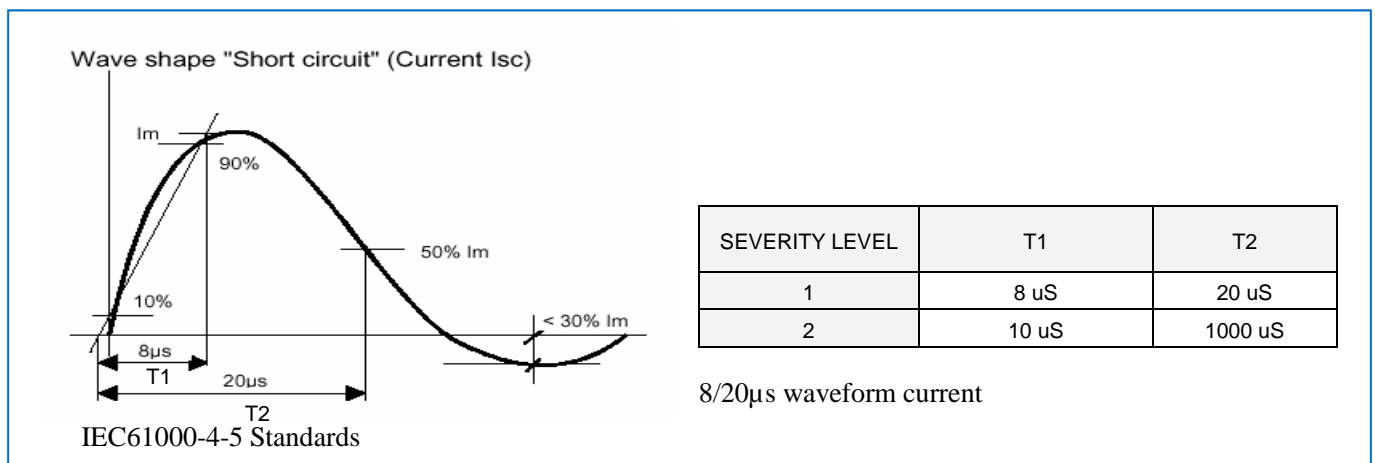


2220 Series

Electrical Characteristics

Part Number	Working Voltage ($I_L < 50 \mu A$)		Varistor Voltage		Clamping Voltage	Peak Current	Transient Energy	Capacitance
			V_B		V_C	I_P	E_T	C_P
	AC (V)	DC (V)	@1mA DC (V)		@8/20 μS	@8/20 μS	@10/1000 μS	@1MHz
	$V_{RMS(Max.)}$	$V_{DC(Max.)}$			@10A (V)	(A) (MAX.)	(J) (MAX.)	
TG2220ML240K	14	18	24	22~27	38	1200	7.6	4000
TG2220ML330K	20	26	33	29~36	54	1200	7.6	2700
TG2220ML390K	24	30	39	35~42	65	1200	7.6	2700
TG2220ML470K	28	36	47	42~52	77	1200	7.6	2500
TG2220ML560K	35	45	56	50~62	90	1200	7.6	1500
TG2220ML680K	40	56	68	60~75	110	1200	7.6	1500
TG2220ML820K	50	65	82	73~91	135	1200	7.6	1500
TG2220ML101K	60	85	100	90~110	165	1200	7.6	1500
TG2220ML121K	75	100	120	108~132	200	1200	7.6	1500
TG2220ML151K	95	125	150	135~165	250	1200	7.6	1500
TG2220ML181K	115	150	180	162~198	300	1200	7.6	1500
TG2220ML201K	130	170	205	184~226	340	1200	7.6	1500
TG2220ML221K	140	180	220	198~242	360	1200	7.6	1500
TG2220ML241K	150	200	240	216~264	395	1200	7.6	1500
TG2220ML271K	175	225	270	243~297	445	1200	7.6	1500
TG2220ML361K	230	300	360	324~396	595	1200	7.6	1500

Surge Current Standard Waveform



General Technical Data

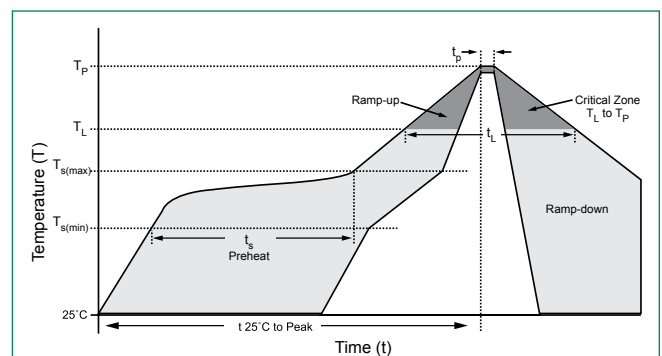
Operating Temperature	-40 ~ +85°C	
Storage Temperature	-40 ~ +125°C	
Response Time	<1 ns	
Solderability	245±5°C, 3±1sec	
Solder leach resistance	260±5°C, 10±1sec	
Taping Package Storage Condition	Storage Temperature	5 ~ 40°C
	Relative Humidity	To 65%
	Storage Time	12 Months max

Environmental Reliability Testing

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
4	Room Temperature	1~2hours		
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%.			
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.

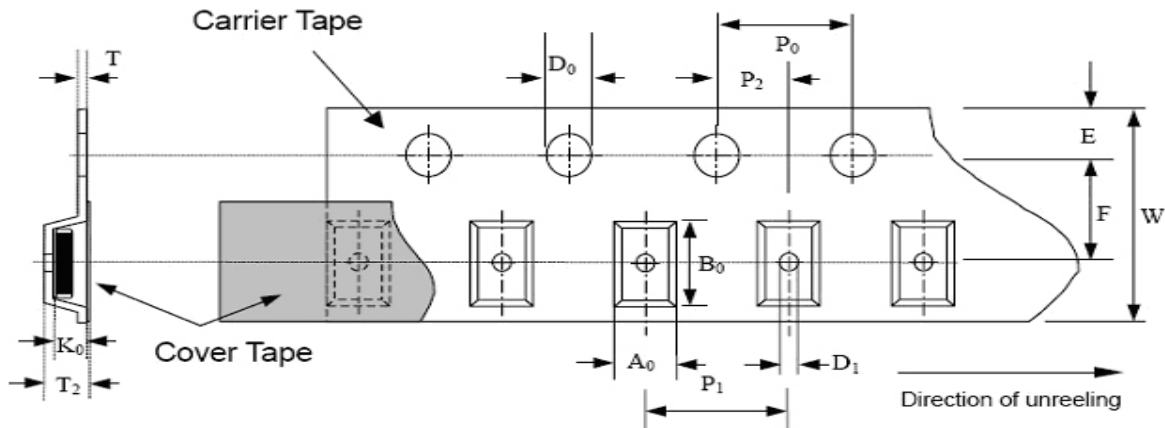
Soldering volume

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

Packaging Dementions Unit:Millimeters

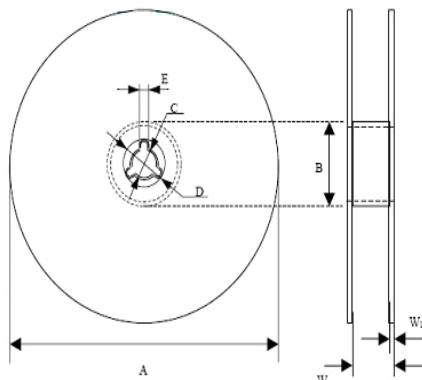
2220 Series

- ◆ 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	B ₀	K ₀	T	T ₂	D ₀	D ₁	P ₁	P ₂	P ₀	W	E	F
	±0.10	±0.10	±0.10	±0.05	±0.05	+0.10	±0.05	±0.10	±0.05	±0.05	±0.20	±0.10	±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