Surface-Mount Varistor (High Energy)

1. Features

- Advanced encapsulation technology, UL94 V-0 rated encapsulation material
- Compact structure, small size and space saving
- Superior high temperature and high humidity performance
- Strong ability to suppress high surge and high current
- SMD reel packaging applicable for lead-free reflow/wave soldering during automatic mounting

2. Applications

- LED circuit protection
- Telecommunication equipments
- Industrial equipments
- Automotive

Part numbering on request.

4. General Technical Data

Parameter	3225	4032
Varistor Voltage Range	201K～821K	201K～821K
Peak Current Rating(8/20 μs)	1750A×1times	3500A×1times
Maximum Energy(10/1000 μs)	17～73 J	35～110 J
Operation Temperature	-40 ～ +105℃	-40 ～ +105℃

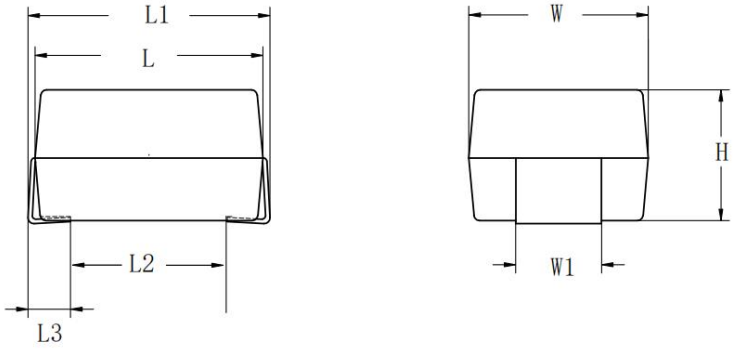
5. Marking

Example			
	1	STE	Songtian Logo
	2	4032	Product Dimension 10.75*8.2mm
	3	K	Varistor Voltage Tolerance ±10%
	4	821	Varistor Voltage 470VDC

6. Safety Certificate

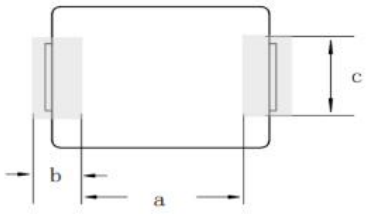
Approval		Organization	Safety Standards	Certificate No.
China	CQC	CQC	GB/T10193-1997 GB/T10194-1997	3225: CQC25001467314
			GB/T10193-1997 GB/T10194-1997 GB4943.1-2022 IEC61051-2:1991+And1:2009	4032: CQC25001467310
USA / Canada	c UL us	UL/cUL	UL1449	E528563
Germany	TÜV SÜD	TUV	EN IEC61051-1:2018 IEC61051-2018 IEC61051-2:2021 IEC61051-2-2:1991	B1171680003

7. Structure and Dimension



Dimension	L±0.2 (mm)	W±0.2 (mm)	H±0.2 (mm)	W1±0.3 (mm)	L1±0.2 (mm)	L2±0.2 (mm)	L3±0.2 (mm)
3225	8.0	6.3	4.6	3.0	8.5	5.5	1.5
4032	10.75	8.2	4.6	3.0	11.25	8.0	1.6

8. Soldering Pad Configuration



Dimension	Product Dimension	a±0.2(mm)	b±0.2 mm)	c±0.2 (mm)
3225	8.0*6.3	4.5	3.5	4.5
4032	10.75*8.2	6.5	3.5	4.5

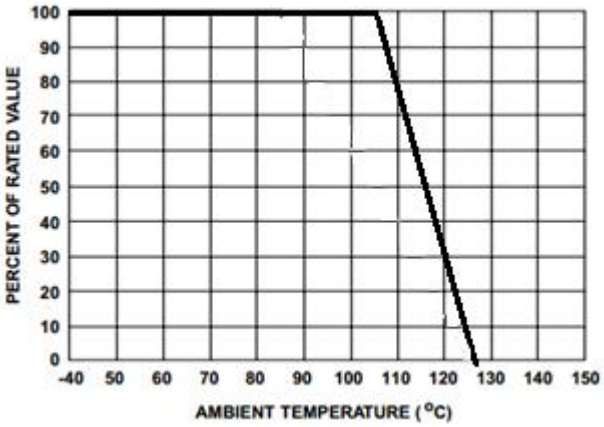
9. Electrical Characteristics

Model	Varistor Voltage (@1mA DC)	Maximum RMS Operating Voltage		Maximum Clamping Voltage (8/20μs)		Maximum Surge Current (8/20μs)	Maximum Energy (10/1000μs)	Rated Power
	V1mA (V)	VAC (V)	VDC (V)	Vp (V)	Ip (A)	I max (A)	W max (J)	P (W)
SMDMOV3225K201K	200(180-220)	130	170	340	10	1750×1times 1200×2times	17	0.25
SMDMOV3225K221K	220(198-242)	140	180	360	10	1750×1times 1200×2times	20	0.25
SMDMOV3225K241K	240(216-264)	150	200	395	10	1750×1times 1200×2times	21	0.25
SMDMOV3225K271K	270(243-297)	175	225	455	10	1750×1times 1200×2times	24	0.25
SMDMOV3225K301K	300(270-330)	190	250	500	10	1750×1times 1200×2times	26	0.25
SMDMOV3225K331K	330(297-363)	210	275	550	10	1750×1times 1200×2times	28	0.25
SMDMOV3225K361K	360(324-396)	230	300	595	10	1750×1times 1200×2times	32	0.25
SMDMOV3225K391K	390(351-429)	250	320	650	10	1750×1times 1200×2times	35	0.25
SMDMOV3225K431K	430(387-473)	275	350	710	10	1750×1times 1200×2times	40	0.25
SMDMOV3225K471K	470(423-517)	300	385	775	10	1750×1times 1200×2times	42	0.25
SMDMOV3225K511K	510(459-561)	320	415	845	10	1750×1times 1200×2times	45	0.25
SMDMOV3225K561K	560(504-616)	350	460	925	10	1750×1times 1200×2times	50	0.25
SMDMOV3225K621K	620(558-682)	385	505	1025	10	1750×1times 1200×2times	55	0.25
SMDMOV3225K681K	680(612-748)	420	560	1120	10	1750×1times 1200×2times	60	0.25
SMDMOV3225K751K	750(675～825)	460	615	1240	10	1750×1times 1200×2times	65	0.25
SMDMOV3225K781K	780(702～858)	485	640	1290	10	1750×1times 1200×2times	69	0.25
SMDMOV3225K821K	820(738～902)	510	670	1355	10	1750×1times 1200×2times	73	0.25

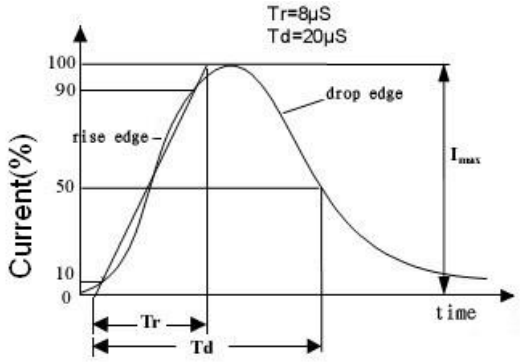
Model	Varistor Voltage (@1mA DC)	Maximum RMS Operating Voltage		Maximum Clamping Voltage (8/20μs)		Maximum Surge Current (8/20μs)	Maximum Energy (10/1000μs)	Rated Power
	V1mA (V)	VAC (V)	VDC (V)	Vp (V)	Ip (A)	I max (A)	W max (J)	P (W)
SMDMOV4032K201K	200(180-220)	130	170	340	25	3500×1times 2500×2times	35	0.4
SMDMOV4032K221K	220(198-242)	140	180	360	25	3500×1times 2500×2times	39	0.4
SMDMOV4032K241K	240(216-264)	150	200	395	25	3500×1times 2500×2times	42	0.4
SMDMOV4032K271K	270(243-297)	175	225	455	25	3500×1times 2500×2times	50	0.4
SMDMOV4032K301K	300(270-330)	195	250	500	25	3500×1times 2500×2times	55	0.4
SMDMOV4032K331K	330(297-363)	210	275	550	25	3500×1times 2500×2times	58	0.4
SMDMOV4032K361K	360(324-396)	230	300	595	25	3500×1times 2500×2times	65	0.4
SMDMOV4032K391K	390(351-429)	250	320	650	25	3500×1times 2500×2times	70	0.4
SMDMOV4032K431K	430(387-473)	275	350	710	25	3500×1times 2500×2times	80	0.4
SMDMOV4032K471K	470(423-517)	300	385	775	25	3500×1times 2500×2times	85	0.4
SMDMOV4032K511K	510(459-561)	320	415	845	25	3500×1times 2500×2times	90	0.4
SMDMOV4032K561K	560(504-616)	350	460	925	25	3500×1times 2500×2times	92	0.4
SMDMOV4032K621K	620(558-682)	385	505	1020	25	3500×1times 2500×2times	95	0.4
SMDMOV4032K681K	680(612-748)	420	560	1120	25	3500×1times 2500×2times	98	0.4
SMDMOV4032K751K	750(675～825)	460	615	1240	25	3500×1times 2500×2times	100	0.4
SMDMOV4032K781K	780(702～858)	485	640	1290	25	3500×1times 2500×2times	105	0.4
SMDMOV4032K821K	820(738～902)	510	670	1355	25	3500×1times 2500×2times	110	0.4

10. Rated Value & Characteristic

■ Declining curve

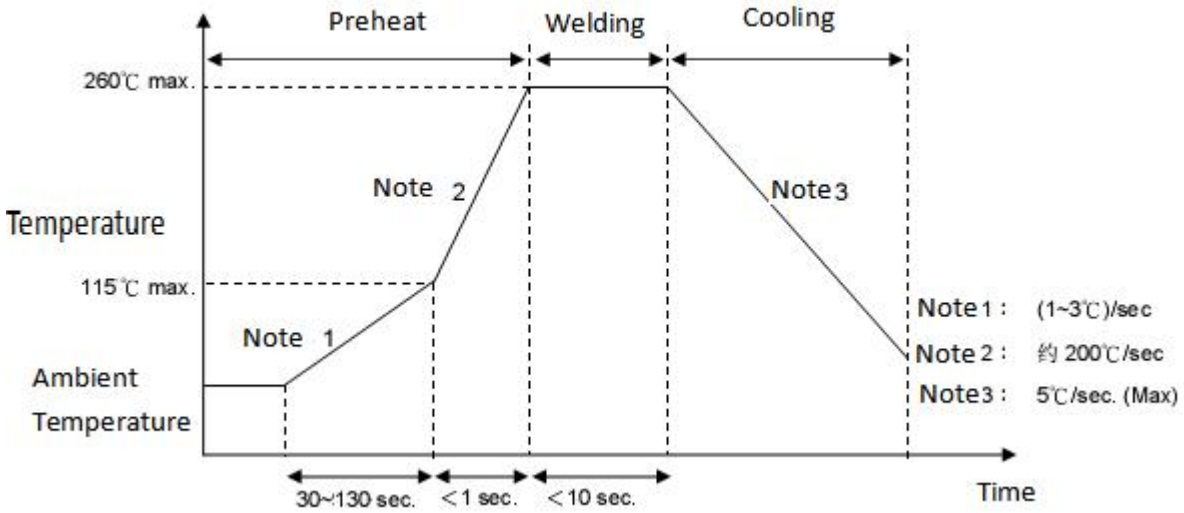


■ 8/20 μ s Standard Waveforms Figure

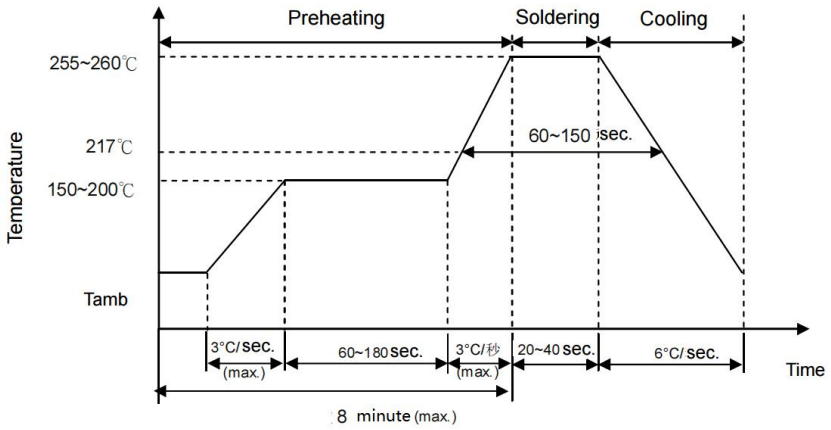


11. Soldering Recommendation

■ Wave Soldering Curve



■ Reflow Soldering Curve



■ Soldering Conditions

Item	Condition
Soldering Iron Tip Temperature	350℃(max.)
Soldering Time	3sec(max.)
Distance from Thermistor	Φ3mm(max)

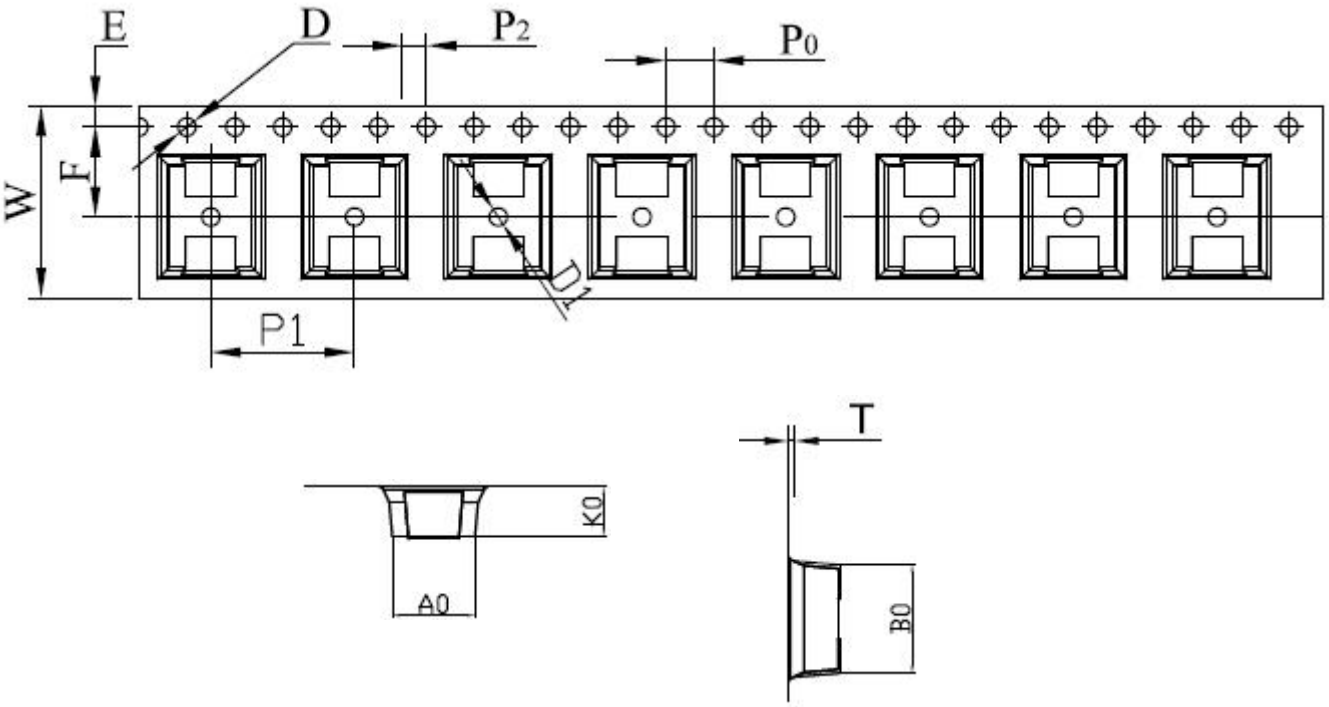
12. Basic Characteristics and Reliability Experiments

Item	Test conditions / Methods	Specifications
Vibration	Frequency range: 10Hz-55 Hz-10 Hz Amplitude: 0.75mm Direction: 3 mutually perpendicular directions, 2 hrs each	No visible damage $\lvert \Delta V/V_{1mA} \rvert \leq 5\%$
Solderability	245±3℃, 3±0.3s. Solder composition:	At least 95% of terminal electrode is covered by new solder
Resistance To Soldering Heat	260±3℃, 10±1sec	No visible damage $\lvert \Delta V/V_{1mA} \rvert \leq 5\%$
High Temperature Storage	105±5℃, 1000±24 hrs.	No visible damage $\lvert \Delta V/V_{1mA} \rvert \leq 5\%$
Damp Heat, Humidity Steady State	a. 40±2 , 90 ~ 95 % RH ℃ , 1000 hrs b. 40±2℃, 90 ~ 95 % RH, at 10%Vdc, 1000 hrs.	No visible damage $\lvert \Delta V/V_{1mA} \rvert \leq 10\%$
Temperature Cycle	The conditions shown below shall be repeated 5 cycles. Step / Temperature (℃) / Period (Minutes) 1 / -40±3 / 30±3 2 / +25±3 / 5±3 3 / +105±2 / 30±3 4 / +25±3 / 5±3	No visible damage $\lvert \Delta V/V_{1mA} \rvert \leq 5\%$
High Temp. Load	105±2℃.1000±24hr sat VAC (Max. Continuous Voltage) .	No visible damage $\lvert \Delta V/V_{1mA} \rvert \leq 10\%$
Varistor Voltage Temperature Coefficient	$\frac{V1mA\ at\ 105℃ - V1mA\ at25℃}{V1mA\ at\ 25℃} \times \frac{1}{100} \times 100\ (\%/℃)$	-0.05≤Tc≤0.05(%/℃)

13. Packaging Specifications

■ Tape

3225: Width of Tape: 16mm
4032: Width of Tape: 24mm



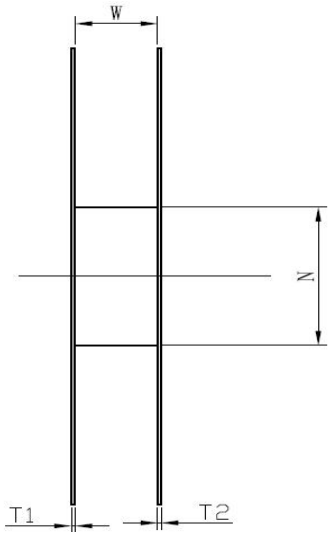
Unit: mm

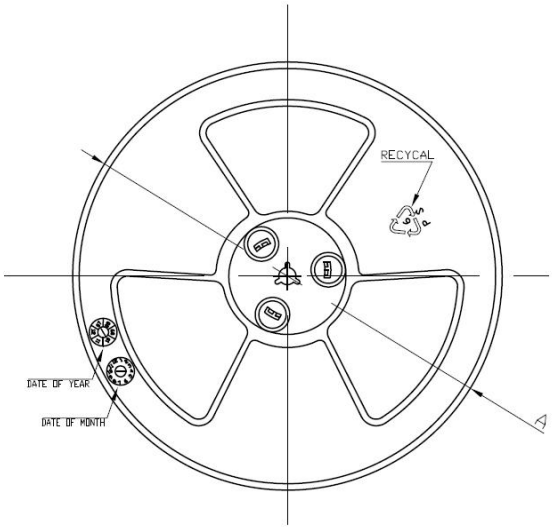
Code	A0	B0	K0	P0	P1	P2	Length/Reel
3225	6.60±0.1	9.05±0.1	5.2±0.1	4.00±0.1	12.0±0.1	2.00±0.1	18240
4032	8.50±0.1	11.80±0.1	5.2±0.1	4.00±0.1	12.0±0.1	2.00±0.1	18240
Code	W	T	E	F	D0	D1	Quantity/Reel
3225	16.0±0.3	0.40±0.1	1.75±0.1	7.50±0.1	1.50+0.1/-0	1.50±0.1	1500pcs
4032	24.0±0.3	0.40±0.1	1.75±0.1	11.50±0.1	1.50+0.1/-0	1.50±0.1	1500pcs

■ Reel

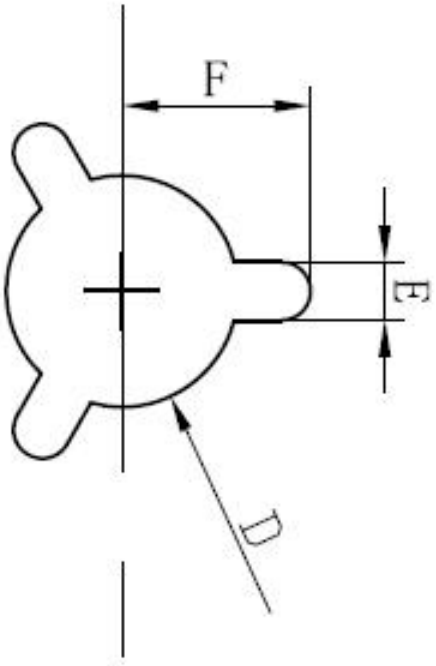
15 Inch:

Unit: mm



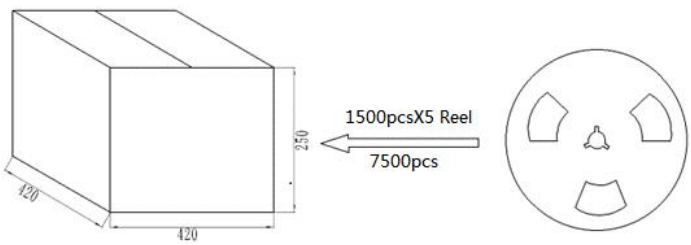


SPEC	16	24
E±0.5	2.3	2.3
F±0.5	10.75	10.75
W±0.2	16.4	24.4
T1±0.3	2.2	2.2
T2±0.3	2.2	2.2
A+0/-2	φ380	φ380
N±3.0	φ100	φ100
D±0.3	13.3	13.3

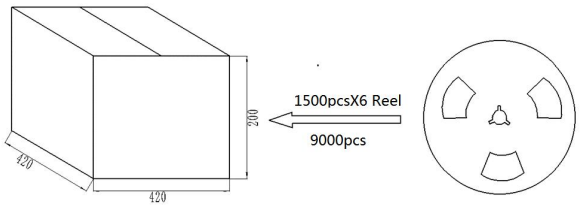


■ Packing Carton

3225



4032



14. Storage Environment

- The insulation coating of the varistors cannot form a perfect seal; therefore, avoid using or storing the varistors in corrosive environments, especially where chloride gas, sulfide gas, acids, alkalis, salts, or similar substances are present, and minimize exposure to moisture. Verify that cleaning, soldering, or forming processes do not affect the product quality before these processes are performed.
- This is an MSL3 product. Hence,to prevent moisture absorption,the varistors is packaged in a moisture-proof sealed bag.
- The varistors should be stored and used within the following conditions for up to 6 months after delivery:

Temperature: Below 30°C

Humidity: 60%RH max

- After opening the moisture-proof packaging, solder the varistors within 168 hours. Post-opening, store the varistors in a moisture-proof bag with desiccant, along with the information card, and maintain the aforementioned conditions.
- If the storage period exceeds 6 months or the sealed bag is opened, perform baking (60°C, 168 hours) before soldering.