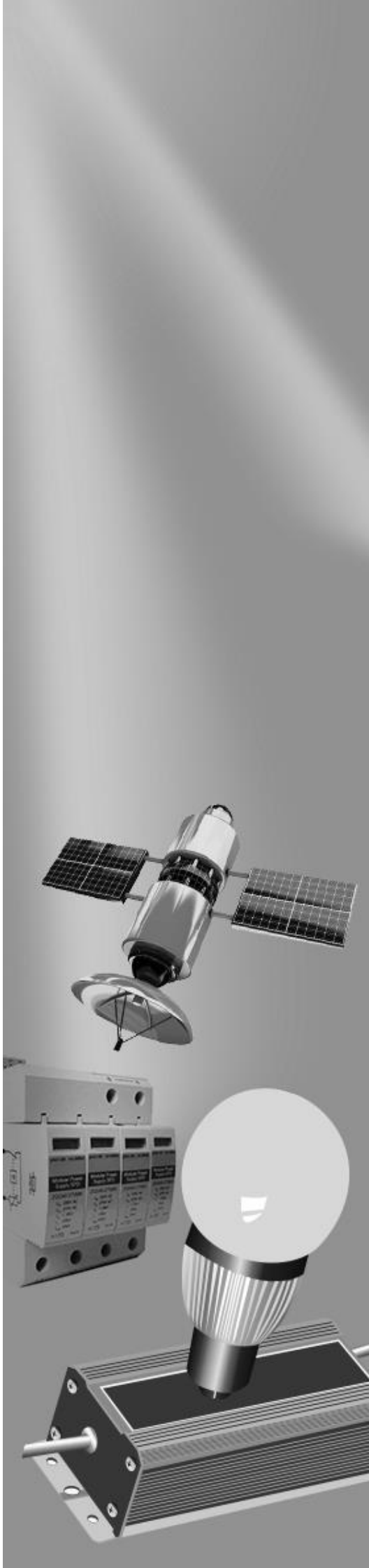
Innovative Service Around the Globe YAGEO

DATA SHEET

METAL OXIDE VARISTORS
POWER SUPPLY

TMOV 25M(E,N) series

RoHS compliant & Halogen free



Product specification– August 03, 2022 V.3

Metal Oxide Varistor Data Sheet

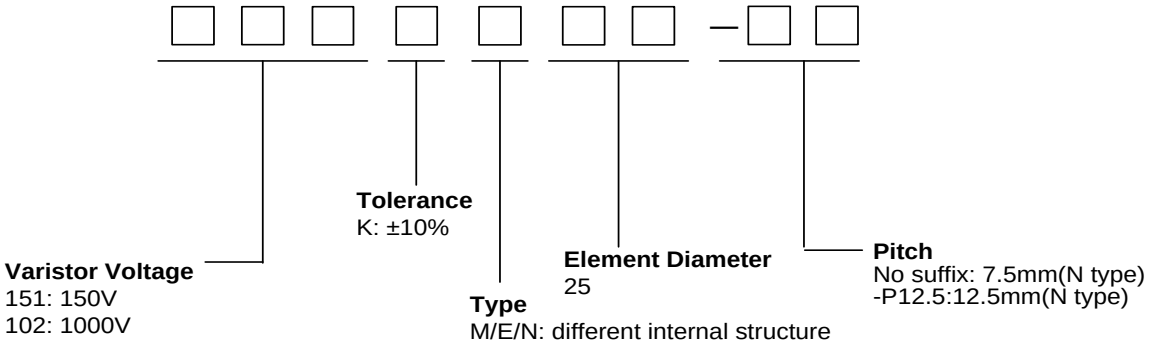
Features

- TMOV integrated thermal protection device
- High peak surge current rating up to 15KA
- Designed to facilitate compliance to UL1449 for TVSS products
- Wide operating voltage (V_{1mA}) range from 150V to 1200V
- Rated current: 20A
- Rated Functioning Temperature:136(℃)
- Fast responding to transient over-voltage and limited current
- Large absorbing transient energy capability
- Low clamping ratio and no follow-on current
- Three-lead version available for indication purposes
- Meets MSL level 1, per J-STD-020
- Operating Temperature：-40℃ ~ +85℃
- Storage Temperature：-40℃ ~ +85℃
- Safety certification: UL: E327997

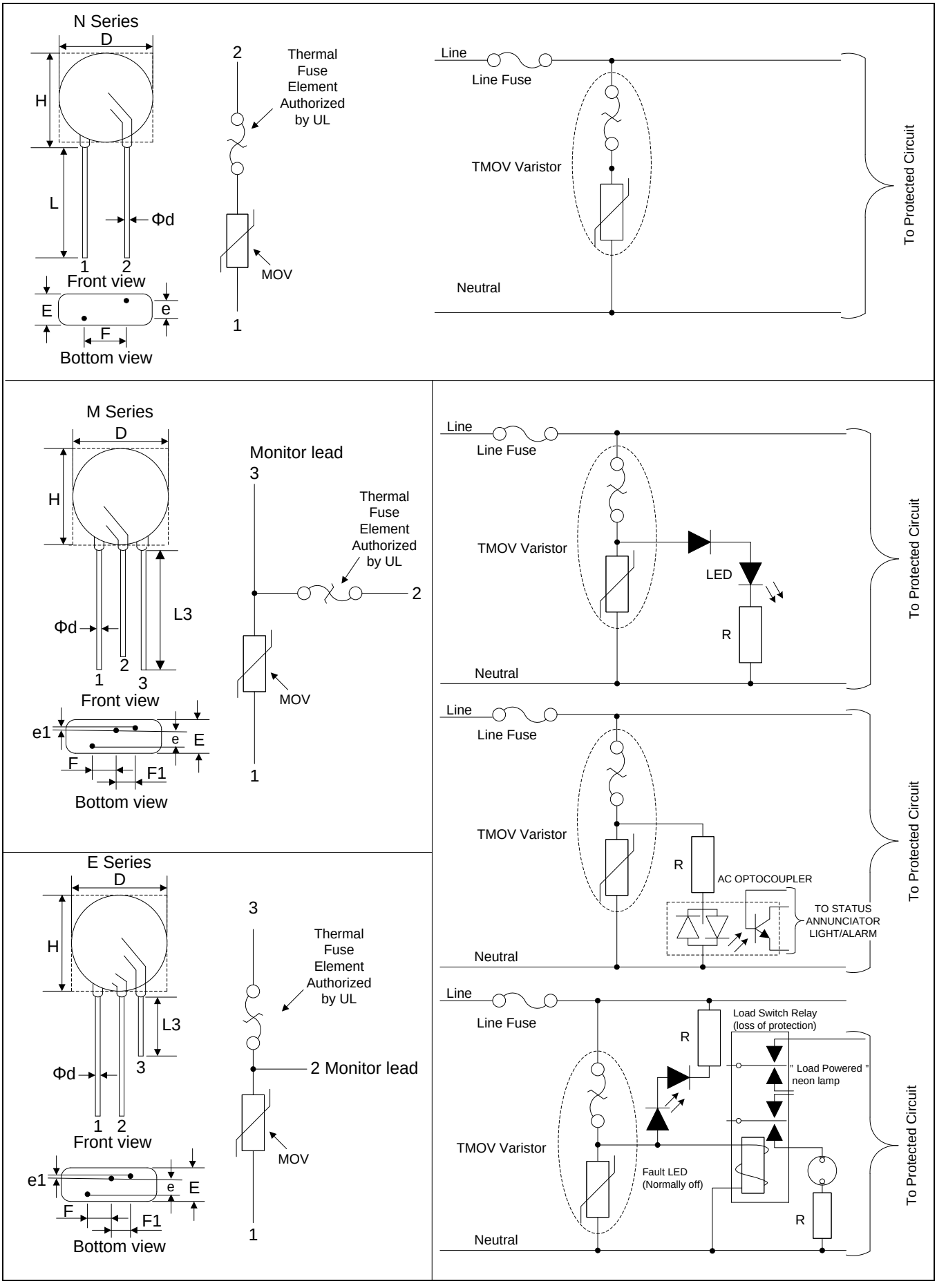
Applications

- AC power line or AC/DC supplies
- Transistor, diode, IC, thyristor or triac semiconductor protection
- Surge protection in consumer electronics
- Surge protection in industrial electronics
- Surge protection in electronic home appliances, gas and petroleum appliances
- Relay and electromagnetic valve surge absorption
- AC panel protection Modules

Part number code



Lead configurations and application examples



Dimensions

Symbol		BK'S M / E / N Varistor Unit: mm		
		25M	25E	25N
D (max.)		29.0	29.0	29.0
H (max.)		32.0	32.0	32.0
F (±1.0)		7.5	7.5	12.5 / 7.5
F1 (±1.0)		5.0	5.0	-
e Max.	151K~391K	3.8	3.8	3.8
	431K~621K	5.5	5.5	5.5
	681K~911K	7.8	7.8	7.8
	102K~122K	10.0	10.0	10.0
e1	151K~391K	2.3±1.0	2.3±1.0	--
	431K~621K			
	681K~911K			
	102K~122K			
E Max.	151K~391K	11.8	11.8	11.8
	431K~621K	13.5	13.5	13.5
	681K~911K	15.8	15.8	15.8
	102K~122K	18.0	18.0	18.0
L (min.)		20.0	20.0	20.0
L3 (min.)		10.0	10.0	-
Φd (±0.05)		1.0		

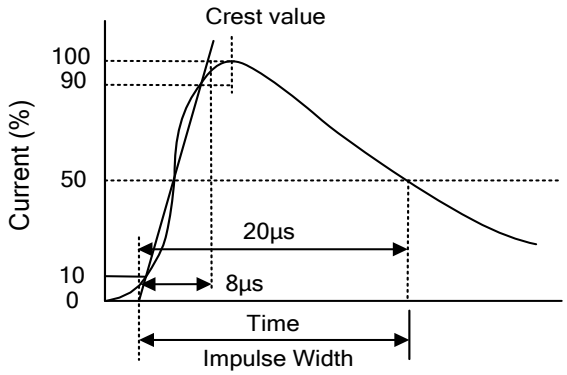
Note: 20N Series default pitch is 7.5mm

Electrical characteristics

Part Number	Maximum Allowable Voltage		Varistor Voltage	Maximum Clamping Voltage		Maximum Peak Current (8/20μs)		Maximum Energy (Joule)		Rated Power	Typical Capacitance (Reference)
	V_{AC}(V)	V_{DC}(V)	V_{1mA}(V)	I_P(A)	V_C(V)	1 time (A)	2 times (A)	10/1000μs	2ms	(W)	@1KHz (pf)
151KM(E,N)25	95	125	150(135~165)	150	250	15000	12000	160	105	1.20	4300
181KM(E,N)25	115	150	180(162~198)	150	300	15000	12000	175	120	1.20	3500
201KM(E,N)25	130	170	200(185~225)	150	340	15000	12000	210	150	1.20	3200
221KM(E,N)25	140	180	220(198~242)	150	365	15000	12000	230	165	1.20	2900
241KM(E,N)25	150	200	240(216~264)	150	395	15000	12000	255	180	1.20	2650
271KM(E,N)25	175	225	270(243~297)	150	455	15000	12000	285	205	1.20	2400
301KM(E,N)25	190	250	300(270~330)	150	500	15000	12000	310	220	1.20	2100
331KM(E,N)25	210	275	330(297~363)	150	550	15000	12000	325	231	1.20	1900
361KM(E,N)25	230	300	360(324~396)	150	595	15000	12000	340	240	1.20	1750
391KM(E,N)25	250	320	390(351~429)	150	650	15000	12000	360	250	1.20	1600
431KM(E,N)25	275	350	430(387~473)	150	710	15000	12000	440	310	1.20	1500
471KM(E,N)25	300	385	470(423~517)	150	775	15000	12000	490	345	1.20	1400
511KM(E,N)25	320	415	510(459~561)	150	845	15000	12000	530	370	1.20	1250
561KM(E,N)25	350	460	560(504~616)	150	920	15000	12000	560	390	1.20	1150
621KM(E,N)25	385	505	620(558~682)	150	1025	15000	12000	590	410	1.20	1050
681KM(E,N)25	420	560	680(612~748)	150	1120	15000	12000	620	430	1.20	950
751KM(E,N)25	460	615	750(675~825)	150	1240	15000	12000	630	440	1.20	850
781KM(E,N)25	485	640	780(702~858)	150	1290	15000	12000	675	470	1.20	800
821KM(E,N)25	510	670	820(738~902)	150	1355	15000	12000	690	480	1.20	750
911KM(E,N)25	550	745	910(819~1001)	150	1500	15000	12000	715	500	1.20	700
102KM(E,N)25	625	825	1000(900~1100)	150	1650	15000	12000	750	505	1.20	650
112KM(E,N)25	680	895	1100(990~1210)	150	1815	15000	12000	780	550	1.20	600
122KM(E,N)25	750	990	1200(1080~1320)	150	1980	15000	12000	840	590	1.20	550

Notes: Leakage Current (@83% of V1mA)： IR≤35μA (151K~122K).

Electrical Ratings

Items	Test Condition/Description	Requirement
Varistor Voltage	The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.	To meet the Specified value
Maximum Allowable Voltage	The recommended maximum sine wave voltage (RMS) or the Maximum DC voltage can be applied continuously.	
Maximum Clamping Voltage	The maximum voltage between two terminals with the specification standard impulse current. Applied waveform: 8/20μs 	
Rated Wattage	The maximum average power that can be applied within the specified ambient temperature.	
Energy	The maximum energy within the varistor voltage change of ±10% when one impulse of 10/1000μs or 2ms is applied.	
Withstanding Surge Current	The maximum current within the varistor voltage change of ±10% with the standard impulse current (8/20μs) applied one time.	
Varistor Voltage Temp. Coefficient	$\left\lvert \frac{V_{1mA@85℃}-V_{1mA@25℃}}{V_{1mA@25℃}} \times \frac{1}{60} \times 100\%(\%/℃) \right\rvert$	≤0.05%/℃
	$\left\lvert \frac{V_{1mA@-40℃}-V_{1mA@25℃}}{V_{1mA@25℃}} \times \frac{1}{65} \times 100\%(\%/℃) \right\rvert$	

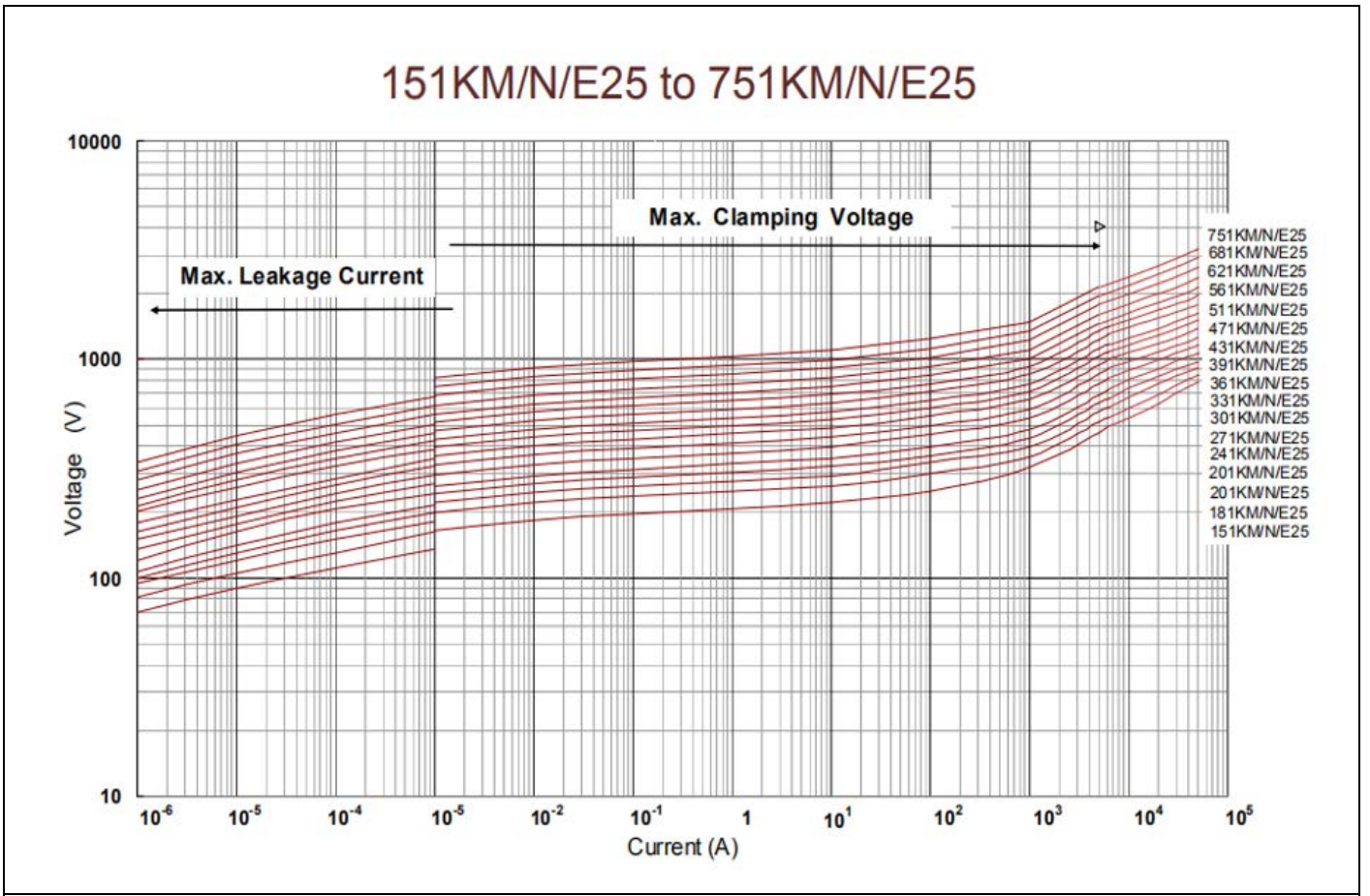
Mechanical Characteristics

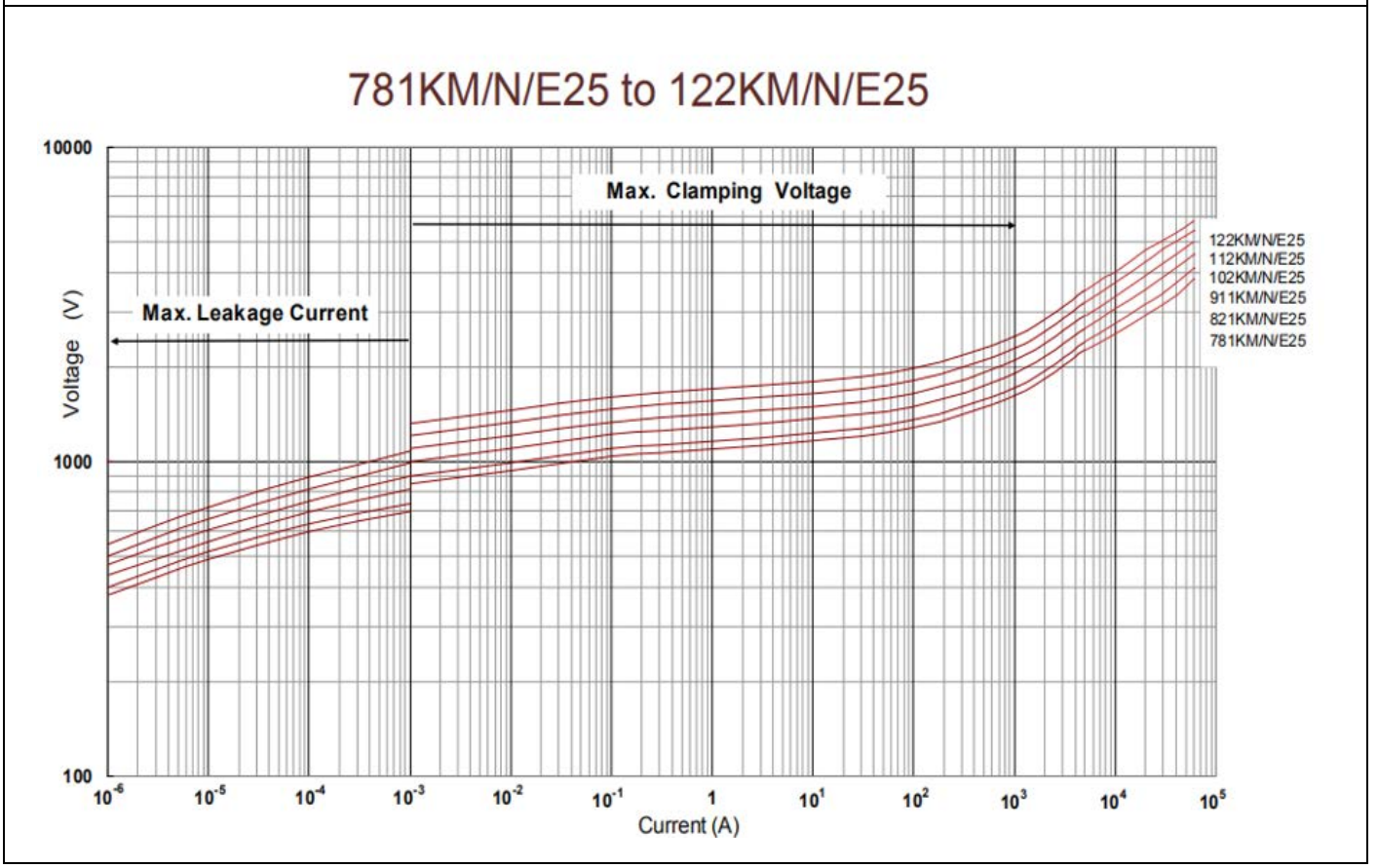
Items	Test conditions / Methods	Specifications
Tensile Strength of Terminals	Gradually applying the force specified and keeping the unit fixed for 10±1 sec. Terminal diameter (mm) / Force (kg) 0.5＜d≤0.8 / 1.0 0.8＜d≤1.25 / 2.0 1.25＜d / 4.0	No visible damage $\lvert\Delta V_{1mA}/V_{1mA}\rvert \leq 5\%$
Bending Strength of Terminals	Hold specimen and apply the force specified below to each lead. Bend the specimen to 90°, then return to the original position. Repeat the procedure in the opposite direction. Terminal diameter (mm) / Force (kg) 0.5＜d≤0.8 / 0.5 0.8＜d≤1.25 / 1.0 1.25＜d / 2.0	No visible damage $\lvert\Delta V_{1mA}/V_{1mA}\rvert \leq 5\%$
Vibration	Frequency range: 10~55 Hz Amplitude: 0.75mm or 98m/s^2 Direction: 3 mutually perpendicular directions, 2hrs each.	No visible damage $\lvert\Delta V_{1mA}/V_{1mA}\rvert \leq 5\%$
Solder ability	Solder Temp: 245±5℃ Dipping Time: 2±0.5 sec	At least 95% of terminal electrode is covered by new solder
Resistance to Soldering Heat	Solder Temp: 260±5℃ Dipping Time: ≤10 sec	No visible damage $\lvert\Delta V_{1mA}/V_{1mA}\rvert \leq 10\%$

Reliability

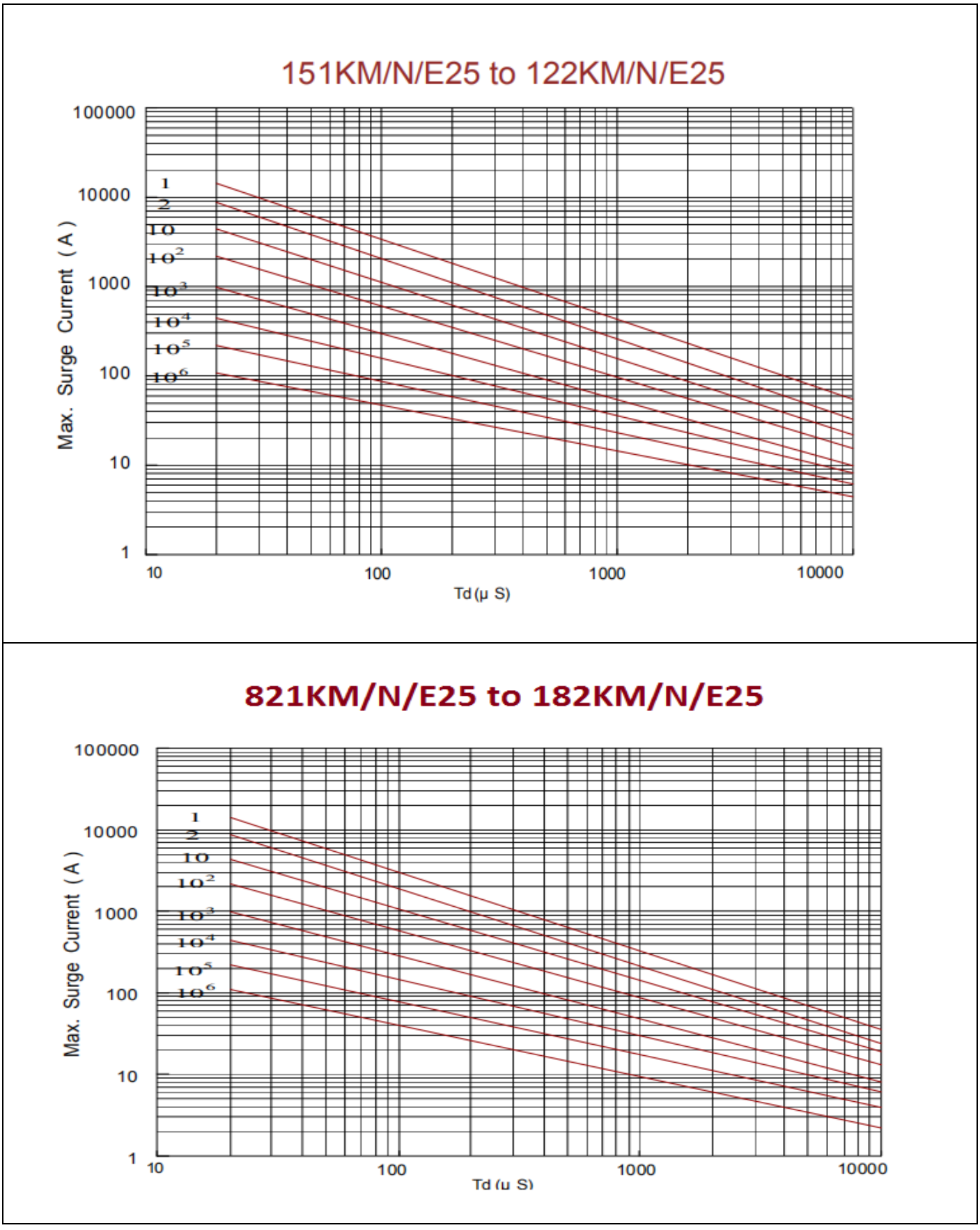
Items	Test conditions / Methods	Specifications
High Temperature Storage	Ambient Temp: 85±2℃ Duration: 1000hrs	$\lvert\Delta V_{1mA}/V_{1mA}\rvert \leq 5\%$
Low Temperature Storage	Ambient Temp: -40±2℃ Duration: 1000hrs	$\lvert\Delta V_{1mA}/V_{1mA}\rvert \leq 5\%$
Humidity	Ambient Temp: 40±2℃, 90~95% R.H. Duration: 1000hrs	$\lvert\Delta V_{1mA}/V_{1mA}\rvert \leq 5\%$
Temperature Cycle	The conditions shown below shall be repeated 5 cycles Step / Temperature (℃) / Period (minutes) 1 / -40±3 / 30±3 2 / Room temperature / 15±3 3 / 85±3 / 30±3 4 / Room temperature / 15±3	No visible damage $\lvert\Delta V_{1mA}/V_{1mA}\rvert \leq 5\%$
High Temperature Load	Ambient Temp: 85±2℃ Duration: 1000hrs Load: Max. Allowable Voltage In AC eara.	$\lvert\Delta V_{1mA}/V_{1mA}\rvert \leq 10\%$
Damp Heat Load	Ambient Temp: 40±2℃, 90~95% R.H. Duration: 1000hrs Load: Max. Allowable Voltage	No visible damage $\lvert\Delta V_{1mA}/V_{1mA}\rvert \leq 10\%$
Voltage Proof	Metal balls method, 2500Vac 1 min.	No visible damage

Maximum Leakage Current and Maximum Clamping Voltage Curve

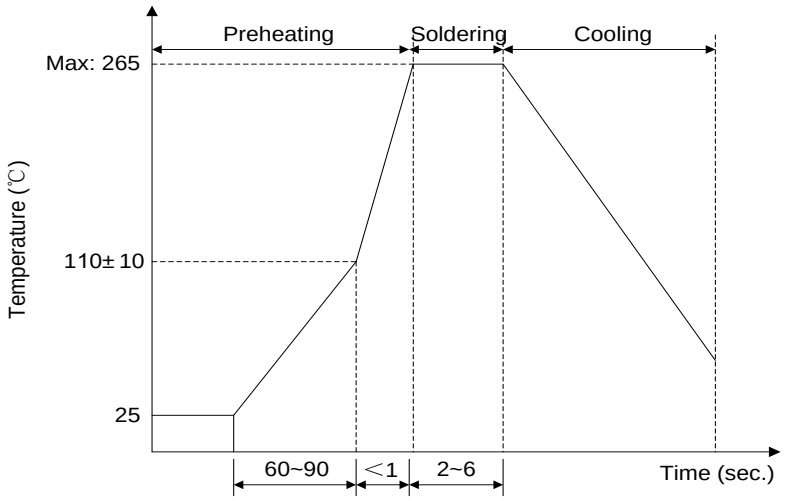




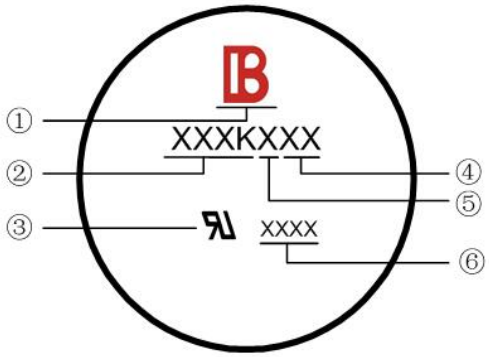
Maximum Surge Current Derating Curve



Soldering Recommendation

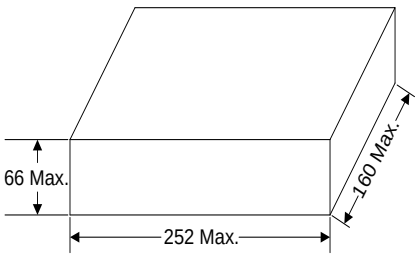


Marking code



① Brightking Logo
② Varistor Voltage And Tolerance
③ UL Accreditation Logo
④ Disk Size
⑤ Different internal structure (M / E / N)
⑥ Internal Code

Quantity

Packaging Dimensions (Unit: mm)	Quantity
Bulk 	50pcs/bag 2bags/box

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