

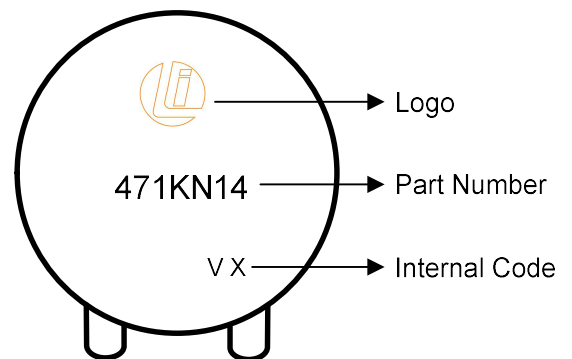
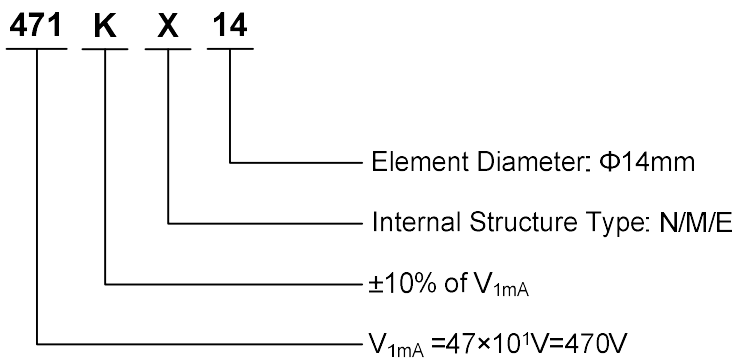
Features

- TMOV is a thermal protection device with integrated fuse and varistor
- Wide operating voltage (V_{1mA}) range from 82V to 1200V
- Fast responding to transient over-voltage
- Large absorbing transient energy capability
- Low clamping ratio and no follow-on current
- Meets MSL level1, per J-STD-020
- Operating temperature: $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$
- Storage Temperature: $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$

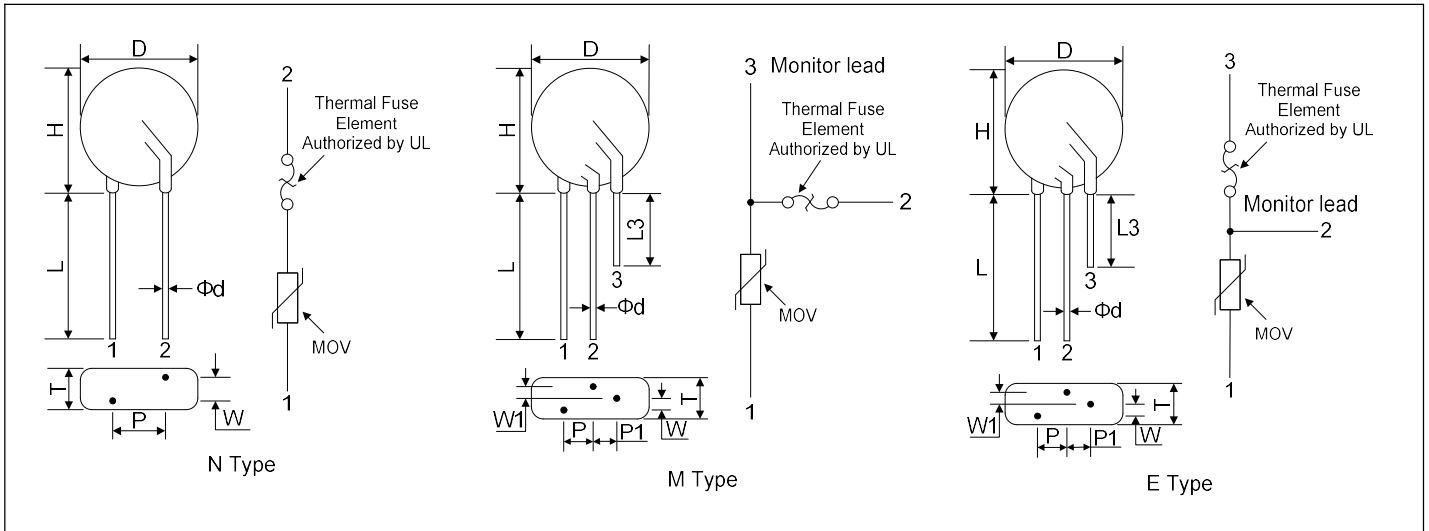
Applications

- Transistor, diode, IC, SCR or SCR 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 and Marking Code



Dimensions (Unit: mm)



Type \ Item	D	H	L	L3	d	P	P1	T	W	W1
14N	≤19.0	≤21.0	≥20.0	-	0.8±0.05	7.5±1.0	-	Refer to the following table	-	-
14M / 14E	≤19.0	≤21.0	≥20.0	≥10.0	0.8±0.05	7.5±1.0	5.0±1.0		1.3±0.8	

Model	T	W
820K~121K	≤8.8	≤2.8
151K~391K	≤9.8	≤3.8
431K~621K	≤11.5	≤5.5
681K~911K	≤13.8	≤7.8
102K~122K	≤16.0	≤10.0

Electrical Characteristics

Model	Varistor Voltage	Maximum Allowable Voltage		Maximum Clamping Voltage		Surge Current	Maximum Energy (10/1000 μ s)	Maximum Leakage Current @83% of V_{1mA}	Rated Power	Typical Capacitance (Reference)
	V_{1mA} (V)	V_{AC} (V)	V_{DC} (V)	I_P (A)	V_C (V)	I (A)	E (J)	I_R (μ A)	P (W)	@1KHz (pF)
820KN(M,E)14	82(74~90)	50	65	50	155	4500	27	35	0.6	2400
101KN(M,E)14	100(90~110)	60	85	50	165	4500	33	35	0.6	2000
121KN(M,E)14	120(108~132)	75	100	50	200	4500	40	35	0.6	1700
151KN(M,E)14	150(135~165)	95	125	50	250	6000	50	35	0.6	1300
181KN(M,E)14	180(162~198)	115	150	50	300	6000	58	35	0.6	1100
201KN(M,E)14	200(185~225)	130	170	50	340	6000	70	35	0.6	1000
221KN(M,E)14	220(198~242)	140	180	50	365	6000	78	35	0.6	900
241KN(M,E)14	240(216~264)	150	200	50	395	6000	85	35	0.6	830
271KN(M,E)14	270(243~297)	175	225	50	455	6000	100	35	0.6	740
301KN(M,E)14	300(270~330)	190	250	50	500	6000	107	35	0.6	670
331KN(M,E)14	330(297~363)	210	275	50	550	6000	115	35	0.6	610
361KN(M,E)14	360(324~396)	230	300	50	595	6000	125	35	0.6	560
391KN(M,E)14	390(351~429)	250	320	50	650	6000	140	35	0.6	510
431KN(M,E)14	430(387~473)	275	350	50	710	6000	155	35	0.6	460
471KN(M,E)14	470(423~517)	300	385	50	775	6000	175	35	0.6	430
511KN(M,E)14	510(459~561)	320	415	50	845	6000	190	35	0.6	390
561KN(M,E)14	560(504~616)	350	460	50	925	6000	200	35	0.6	360
621KN(M,E)14	620(558~682)	385	505	50	1025	6000	210	35	0.6	320
681KN(M,E)14	680(612~748)	420	560	50	1120	6000	220	35	0.6	290
751KN(M,E)14	750(675~825)	460	615	50	1240	6000	225	35	0.6	270
781KN(M,E)14	780(702~858)	485	640	50	1290	6000	240	35	0.6	260
821KN(M,E)14	820(738~902)	510	670	50	1355	6000	245	35	0.6	240
911KN(M,E)14	910(819~1001)	550	745	50	1500	6000	255	35	0.6	220
102KN(M,E)14	1000(900~1100)	625	825	50	1650	6000	280	35	0.6	200
112KN(M,E)14	1100(990~1210)	680	895	50	1815	6000	310	35	0.6	180
122KN(M,E)14	1200(1080~1320)	750	990	50	1980	6000	.338	35	0.6	150

Electrical Ratings

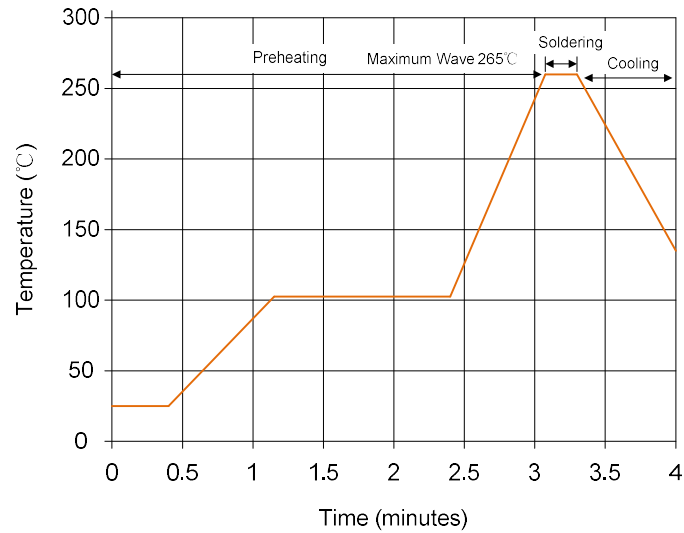
Items	Test Condition/Description	Requirement
Varistor Voltage	The voltage between two terminals with the specified measuring current 1mA.DC applied is called Vb.	To meet the Specified value
Maximum Allowable Voltage	The recommended maximum sine wave voltage (RMS) or the Maximum DC voltage can be applied continuously.	
Maximum Clamping Voltage	The maximum voltage between two terminals with the specification standard impulse current. Applied waveform: 8/20μs	
Surge Current	The maximum current within the varistor voltage change of ±10% with the standard impulse current (8/20μs) applied one time.	
Energy	The maximum energy within the varistor voltage change of ±10% when one impulse of 10/1000μs is applied.	
Leakage Current	The current through the varistor when 0.83V _{1mA} is applied to both end.	
Rated Power	The maximum average power that can be applied within the specified ambient temperature.	
Varistor Voltage Temp. Coefficient	$\left \frac{V_{1mA@85^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{60} \times 100\% (\%/^{\circ}C) \right $	≤0.05%/°C
	$\left \frac{V_{1mA@-40^{\circ}C} - V_{1mA@25^{\circ}C}}{V_{1mA@25^{\circ}C}} \times \frac{1}{65} \times 100\% (\%/^{\circ}C) \right $	

Mechanical Characteristics and Reliability

Items	Test conditions / Methods		Specifications	
Tensile Strength of Terminals	Gradually applying the force specified and keeping the unit fixed for 10±1 sec.		No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 5\%$	
	Terminal diameter (mm)	Force (kg)		
	0.5<d≤0.8	1.0		
	0.8<d≤1.25	2.0		
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.		No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 5\%$	
	Terminal diameter (mm)	Force (kg)		
	0.5<d≤0.8	0.5		
	0.8<d≤1.25	1.0		
Vibration	Frequency range: 10~55 Hz Amplitude: 0.75mm or 98m/s ² Direction: 3 mutually perpendicular directions, 2hrs each.		No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 5\%$	
	Solder Temp: 245±5°C Dipping Time: 2±0.5 sec			
Solder ability	Solder Temp: 245±5°C 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°C Dipping Time: ≤10sec		No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 10\%$	
High Temperature Storage	Ambient Temp: 85±2°C Duration: 1000hrs		$ \Delta V_{1mA}/V_{1mA} \leq 5\%$	
Low Temperature Storage	Ambient Temp: -40±2°C Duration: 1000hrs		$ \Delta V_{1mA}/V_{1mA} \leq 5\%$	
Humidity	Ambient Temp: 40±2°C, 90~95% R.H. Duration: 1000hrs		$ \Delta V_{1mA}/V_{1mA} \leq 5\%$	
Temperature Cycle	The conditions shown below shall be repeated 5 cycles			No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 5\%$
	Step	Temperature (°C)	Period (minutes)	
	1	-40±3	30±3	
	2	Room temperature	15±3	
	3	85±3	30±3	
High Temperature Load	Ambient Temp: 85±2°C Duration: 1000hrs Load: Max. Allowable Voltage In AC eara.		$ \Delta V_{1mA}/V_{1mA} \leq 10\%$	
	Ambient Temp: 40±2°C, 90~95% R.H. Duration: 1000hrs Load: Max. Allowable Voltage			
Damp Heat Load	Ambient Temp: 40±2°C, 90~95% R.H. Duration: 1000hrs Load: Max. Allowable Voltage		No visible damage $ \Delta V_{1mA}/V_{1mA} \leq 10\%$	
Voltage Proof	Metal balls method, 2500Vac 1 min.		No visible damage	

Soldering Recommendation

Wave Lead Free Soldering Recommendation



Peak Temperature: 265°C

Dipping Time: 10 seconds (max.)

Soldering: 1 time

Recommendation Reworking Conditions with Soldering Iron

Temperature of Soldering Iron-tip: 360°C (max.)

Soldering Time: 3 seconds (max.)

Distance from Varistor: 2mm (min.)

Quantity

Packaging	Model	Quantity	
Bulk	820K~122K	200pcs/bag	2 bags/box