

14 (M-E-N) XXXK Series

ROHS

Metal Oxide Varistor (TMOV)

Features

- ◆ TMOV integrated thermal protection device
- ◆ Wide operating voltages ranging from 82Vrms to 1200Vrms(AC)
- ◆ High peak surge current rating up to 6KA
- ◆ Rated current: 5A
- ◆ 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
- ◆ Operating Temperature: -40°C~ +85°C
- ◆ Storage Temperature: -40°C~ +85°C
- ◆ Rated Functioning Temperature: 136°C
- ◆ Meets MSL level 1, per J-STD-020

Applications

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

Part Numbering

14 - X - XXX - K
(1) (2) (3) (4)

(1) Size(mm) : 14mm

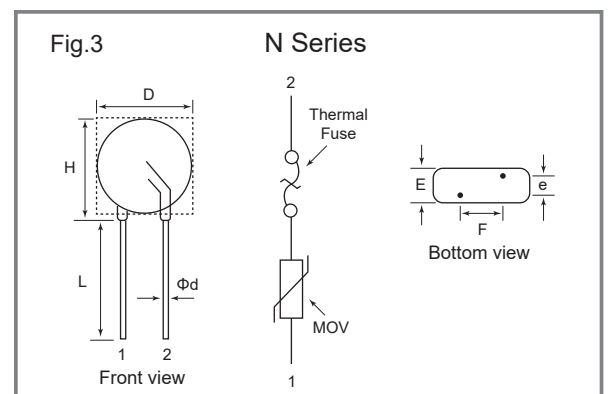
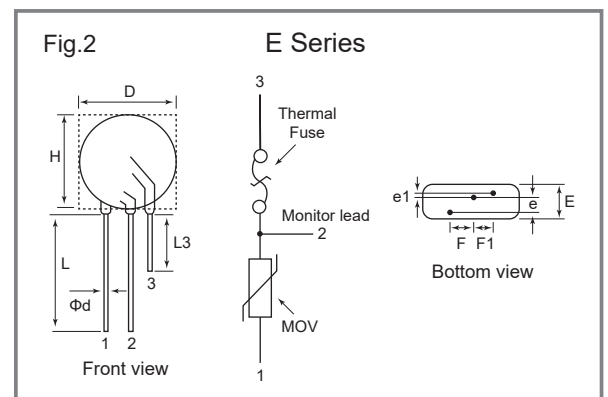
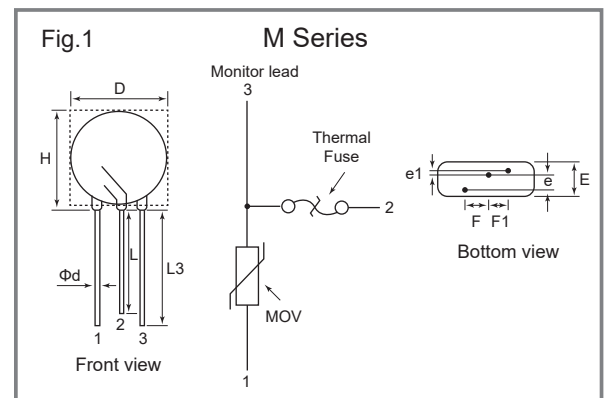
(2) Type : M/E/N: Different Internal Structure

(3) Varistor Voltage : 820($82 \times 10^0 = 82V$) , 821($82 \times 10^1 = 820V$)

(4) Tolerance : K: $\pm 10\%$



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Electrical Characteristics (@ 25°C Unless Otherwise Specified)

Part Number	Lead Configurations	Maximum Allowable Voltage		Varistor Voltage	Maximum Peak Current (8/20μS)		Maximum Clamping Voltage		Maximum Energy		Rated Power	Typical Capacitance (Reference)
		V _{AC} (V)	V _{DC} (V)	V _{1mA} (V)	1 time	2 times	V _C (V)	I _P (A)	(10/1000μs)	2ms	(W)	@1KHz (pF)
					(A)				(J)			
14M820K	Fig.1	50	65	82(74-90)	4500	2500	135	50	27	22	0.6	2400
14E820K	Fig.2											
14N820K	Fig.3											
14M101K	Fig.1	60	85	100(90-110)	4500	2500	165	50	33	28	0.6	2000
14E101K	Fig.2											
14N101K	Fig.3											
14M121K	Fig.1	75	100	120(108-132)	4500	2500	200	50	40	32	0.6	1700
14E121K	Fig.2											
14N121K	Fig.3											
14M151K	Fig.1	95	125	150(135-165)	6000	4500	250	50	50	35	0.6	1300
14E151K	Fig.2											
14N151K	Fig.3											
14M181K	Fig.1	115	150	180(162-198)	6000	4500	300	50	58	40	0.6	1100
14E181K	Fig.2											
14N181K	Fig.3											
14M201K	Fig.1	130	170	200(185-225)	6000	4500	340	50	70	50	0.6	1000
14E201K	Fig.2											
14N201K	Fig.3											
14M221K	Fig.1	140	180	220(198-242)	6000	4500	365	50	78	55	0.6	900
14E221K	Fig.2											
14N221K	Fig.3											
14M241K	Fig.1	150	200	240(216-264)	6000	4500	395	50	85	60	0.6	830
14E241K	Fig.2											
14N241K	Fig.3											
14M271K	Fig.1	175	225	270(243-297)	6000	4500	455	50	100	70	0.6	740
14E271K	Fig.2											
14N271K	Fig.3											
14M301K	Fig.1	190	250	300(270-330)	6000	4500	500	50	107	75	0.6	670
14E301K	Fig.2											
14N301K	Fig.3											
14M331K	Fig.1	210	275	330(297-363)	6000	4500	550	50	115	80	0.6	610
14E331K	Fig.2											
14N331K	Fig.3											
14M361K	Fig.1	230	300	360(324-396)	6000	4500	595	50	125	90	0.6	560
14E361K	Fig.2											
14N361K	Fig.3											

Electrical Characteristics (@ 25°C Unless Otherwise Specified)

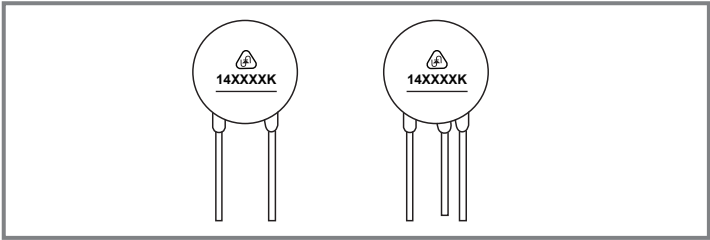
Part Number	Lead Configurations	Maximum Allowable Voltage		Varistor Voltage	Maximum Peak Current (8/20μS)		Maximum Clamping Voltage		Maximum Energy		Rated Power	Typical Capacitance (Reference)
		V _{AC} (V)	V _{DC} (V)	V _{1mA} (V)	1 time	2 times	V _C (V)	I _P (A)	(10/1000μs)	2ms	(W)	@1KHz (pF)
					(A)				(J)			
14M391K	Fig.1	250	320	390(351-429)	6000	4500	650	50	140	100	0.6	510
14E391K	Fig.2											
14N391K	Fig.3											
14M431K	Fig.1	275	350	430(387-473)	6000	4500	710	50	155	110	0.6	460
14E431K	Fig.2											
14N431K	Fig.3											
14M471K	Fig.1	300	385	470(423-517)	6000	4500	775	50	175	125	0.6	430
14E471K	Fig.2											
14N471K	Fig.3											
14M511K	Fig.1	320	415	510(459-561)	6000	4500	845	50	190	136	0.6	390
14E511K	Fig.2											
14N511K	Fig.3											
14M561K	Fig.1	350	460	560(504-616)	6000	4500	920	50	200	140	0.6	360
14E561K	Fig.2											
14N561K	Fig.3											
14M621K	Fig.1	385	505	620(558-682)	6000	4500	1025	50	210	150	0.6	320
14E621K	Fig.2											
14N621K	Fig.3											
14M681K	Fig.1	420	560	680(612-748)	6000	4500	1120	50	220	155	0.6	290
14E681K	Fig.2											
14N681K	Fig.3											
14M751K	Fig.1	460	615	750(675-825)	6000	4500	1240	50	225	160	0.6	270
14E751K	Fig.2											
14N751K	Fig.3											
14M781K	Fig.1	485	640	780(702-858)	6000	4500	1290	50	240	165	0.6	260
14E781K	Fig.2											
14N781K	Fig.3											
14M821K	Fig.1	510	670	820(738-902)	6000	4500	1355	50	245	170	0.6	240
14E821K	Fig.2											
14N821K	Fig.3											
14M911K	Fig.1	550	745	910(819-1001)	6000	4500	1500	50	255	180	0.6	220
14E911K	Fig.2											
14N911K	Fig.3											
14M102K	Fig.1	625	825	1000(900-1100)	6000	4500	1650	50	280	190	0.6	200
14E102K	Fig.2											
14N102K	Fig.3											



Electrical Characteristics (@ 25°C Unless Otherwise Specified)

Part Number	Lead Configurations	Maximum Allowable Voltage		Varistor Voltage	Maximum Peak Current (8/20μS)		Maximum Clamping Voltage		Maximum Energy		Rated Power	Typical Capacitance (Reference)
		V _{AC} (V)	V _{DC} (V)	V _{1mA} (V)	1 time	2 times	V _C (V)	I _P (A)	(10/1000μs)	2ms	(W)	@1KHz (pF)
					(A)				(J)			
14M112K	Fig.1	680	895	1100(990-1210)	6000	4500	1815	50	310	205	0.6	180
14E112K	Fig.2											
14N112K	Fig.3											
14M122K	Fig.1	750	990	1200(1080-1320)	6000	4500	1980	50	338	215	0.6	150
14E122K	Fig.2											
14N122K	Fig.3											

Part Marking



Marking	
Trademark	UN logo
Part No.	14XXXXXK

Packaging Information

Unit:Pcs

Dimension	Part No.	Bag	Carton
14 (M-E-N) XXXK Series	820K to 122K	200	400

Package Dimensions Unit: mm

Symbol		14M Series	14E Series	14N Series
D (Max.)		19.0	19.0	19.0
H (Max.)		21.0	21.0	21.0
F (±1.0)		7.5	7.5	7.5
F1 (±1.0)		5.0	5.0	-
e (Max.)	820K-121K	2.8	2.8	2.8
	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	820K-121K	1.3±0.8	1.3±0.8	-
	151K-391K			
	431K-621K			
	681K-911K			
	102K-122K			
E (Max.)	820K-121K	8.8	8.8	8.8
	151K-391K	9.8	9.8	9.8
	431K-621K	11.5	11.5	11.5
	681K-911K	13.8	13.8	13.8
	102K-122K	16.0	16.0	16.0
L (Min.)		20.0	20.0	20.0
L3 (Min.)		10.0	10.0	-
Φd		0.8		

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. <table><tr><td>Terminal diameter (mm)</td><td>Force (kg)</td></tr><tr><td>0.5 < d ≤ 0.8</td><td>1.0</td></tr><tr><td>0.8 < d ≤ 1.25</td><td>2.0</td></tr><tr><td>1.25 < d</td><td>4.0</td></tr></table>	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 $\Delta V_{1mA}/V_{1mA} \leq 5\%$
Terminal diameter (mm)	Force (kg)									
0.5 < d ≤ 0.8	1.0									
0.8 < d ≤ 1.25	2.0									
1.25 < d	4.0									
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. <table><tr><td><u>Terminal diameter (mm)</u></td><td><u>Force (kg)</u></td></tr><tr><td>0.5 < d ≤ 0.8</td><td>0.5</td></tr><tr><td>0.8 < d ≤ 1.25</td><td>1.0</td></tr><tr><td>1.25 < d</td><td>2.0</td></tr></table>	<u>Terminal diameter (mm)</u>	<u>Force (kg)</u>	0.5 < d ≤ 0.8	0.5	0.8 < d ≤ 1.25	1.0	1.25 < d	2.0	No visible damage $\Delta V_{1mA}/V_{1mA} \leq 5\%$
<u>Terminal diameter (mm)</u>	<u>Force (kg)</u>									
0.5 < d ≤ 0.8	0.5									
0.8 < d ≤ 1.25	1.0									
1.25 < d	2.0									
Vibration	Frequency range: 10~55 Hz Amplitude: 0.75mm or 98m/s² Direction: 3 mutually perpendicular directions, 2hrs each.	No visible damage $\Delta V_{1mA}/V_{1mA} \leq 5\%$								
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: ≤ 10 sec	No visible damage $\Delta V_{1mA}/V_{1mA} \leq 10\%$								

Reliability

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

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