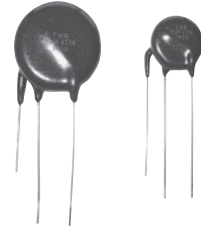


GF Series are combined TNR Varistor with Thermal Fuse

●Coating resin : UL94V-0



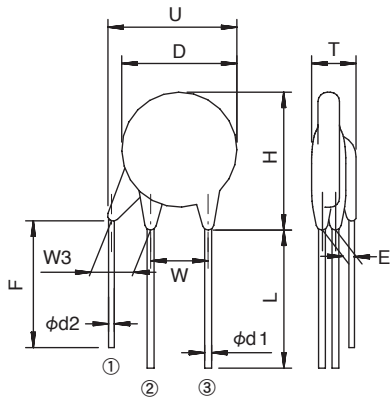
Operating Temperature Range: -40 to +85°C

Storage Temperature Range: -50 to +125°C

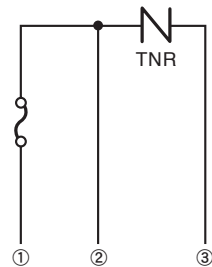
◆STANDARD RATINGS

Part Number	Previous Part Number (Just for your reference)	Maximum Ratings					Max. Clamping Voltage	Capacitance Typical @1kHz	Varistor Voltage V1mA	T Max.	E ±1.0
		Max. Allowable Voltage		Max. Peak Current	Max. Energy	Rated Wattage					
15GF Type		AC(Vrms)	DC(V)	8/20μs(A)	2ms(J)	(W)	V50A (V)	(pF)	(V)	(mm)	(mm)
TND15GF271KB00EAA0	TNR15GF271K-E	175	225	2500A/2 times	50	0.6	440	680	270 (243~297)	9	1.5
TND15GF471KB00EAA0	TNR15GF471K-E	300	385		80	0.6	765	450	470 (423~517)	10	2.2
TND15GF821KB00EAA0	TNR15GF821K-E	510	670		110	0.6	1340	280	820 (738~902)	12	3.5
23GF Type		AC (Vrms)	DC (V)	8/20μs(A)	2ms(J)	(W)	V100A (V)	(pF)	(V)	(mm)	(mm)
TND23GF271KB00EAA0	TNR23GF271K-E	175	225	4000A/2 times	90	0.8	440	1850	270 (243~297)	9	1.5
TND23GF471KB00EAA0	TNR23GF471K-E	300	385		150	1.0	765	1200	470 (423~517)	10	2.3
TND23GF821KB00EAA0	TNR23GF821K-E	510	670		190	1.5	1340	800	820 (738~902)	12	3.6

◆DIMENSIONS [mm]



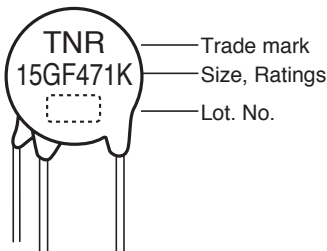
	15GF	23GF
D	18 Max.	25 Max.
T	Refer to Standard Ratings	
H	22 Max.	32 Max.
W	7.5±1	10±1
W3	2.5 Min.	2.5 Min.
L	25 Min.	25 Min.
U	23 Max.	28 Max.
F	17 Min.	17 Min.
E	Refer to Standard Ratings	
φd1	0.8±0.05	0.8±0.05
φd2	0.53±0.05	0.58±0.05



Type	Thermal fuse ratings
15GF	145°C-250V-1A
23GF	145°C-250V-3A

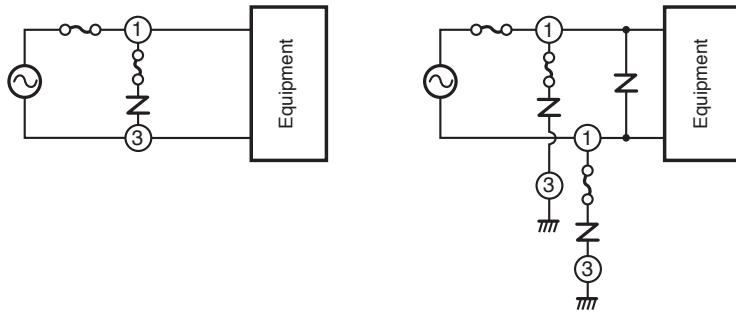
◆MARKING

EX)



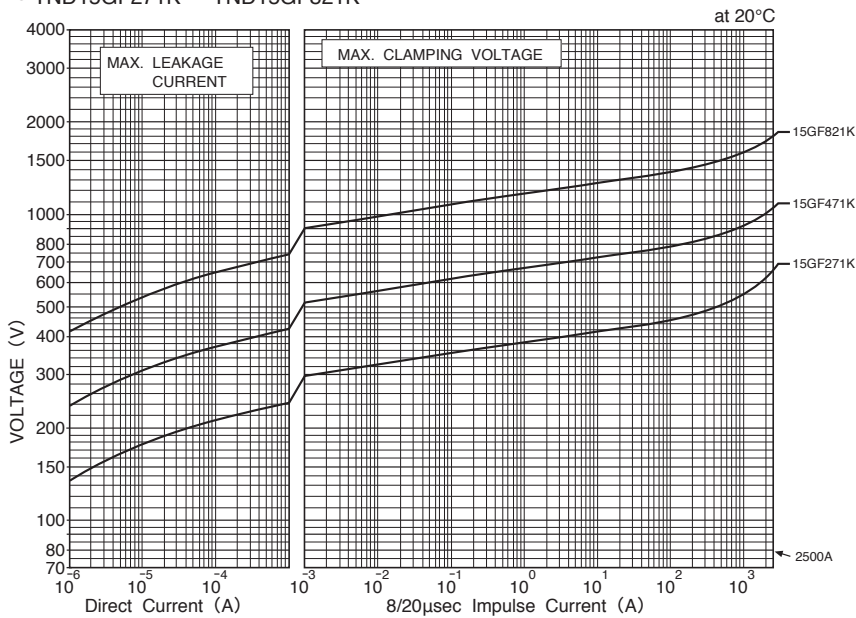
GF Series

◆ APPLICATION CIRCUIT EXAMPLE



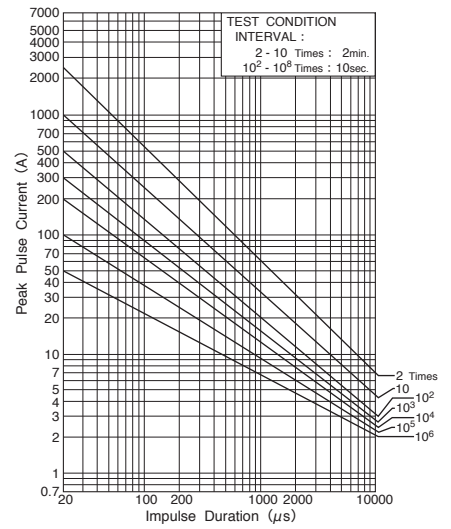
◆ V-I CURVE

● TND15GF271K ~ TND15GF821K

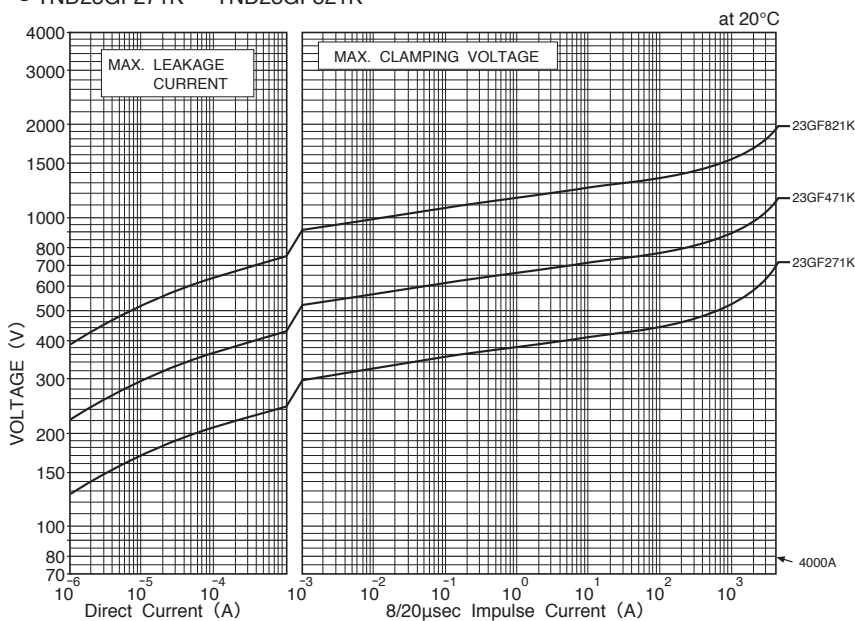


◆ PULSE LIFE TIME RAITINGS

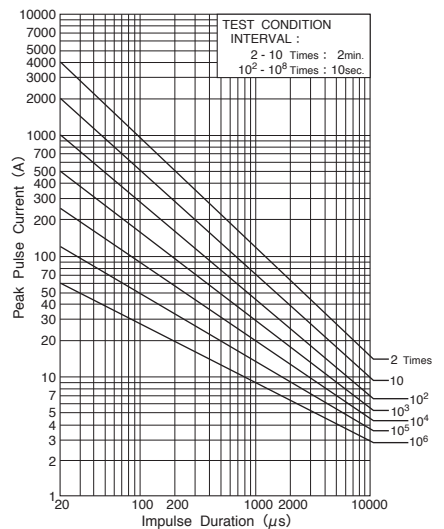
● TND15GF271K ~ TND15GF821K



● TND23GF271K ~ TND23GF821K



● TND23GF271K ~ TND23GF821K



GF Series

◆GENERAL SPECIFICATIONS

Item	Test Conditions	Specifications
Standard Test Condition	20±15°C, 85%RH Max.	
Varistor Voltage	The V1 mA voltage between the two leads at 1 mA DC is quickly measured.	Satisfy the specification.
Maximum Allowable Voltage	The maximum DC voltage to be continuously applied, and the maximum sinusoidal AC voltage effective value.	
Maximum Peak Surge Current	The maximum current value if the change rate is ±10% of the varistor voltage against an initial value when the standard impulse current at 8/20 μs is applied in one direction twice within a five-minute interval.	
Energy Rating	The maximum energy if the change rate is ±10% of the varistor voltage against an initial value when a 2 ms square wave is applied once.	
Rated Wattage	The maximum electric power if the change rate of the varistor voltage is ±10% when commercial frequency AC power is applied in 85±2°C for 1000±12 hours.	
Maximum Clamping Voltage	The maximum voltage between the terminals, measured standard impulse current (8/20 μs).	
Temperature Coefficient	The varistor voltage is measured at 25±2°C and 85±2°C, and the change rate of the varistor voltage per 1°C is calculated.	Within ±0.05 % / °C
Insulation	Short circuit the two leads of the varistor, and put the varistor body into metal balls (approximately 1 mm diameter) leaving approximately 2 mm between the leads and the balls. Then, apply AC2000 Vrms between the leads and the metal balls for 60±5 seconds.	No abnormalities caused by insulation breakdown, etc.
Capacitance	The capacitance measured by 1kHz, 1 Vrms sinusoidal wave.	For reference only

Note: In DC load or unipolar surge tests, apply varistor voltage in the test voltage forward direction to measure and evaluate. Varistor voltage change is measured after stored at Standard Test Conditions for 1 to 2 hours.

◆MECHANICAL CHARACTERISTICS

Item	Test Conditions	Specifications														
Terminal Pull Strength	Fix the unit, and gradually apply and maintain the rated tensile force to the lead wire for 10±5 seconds.(Conform to JIS C 5035)	No abnormality such as disconnection.														
	<table border="1"> <thead> <tr> <th>Type</th> <th>Lead Diameter</th> <th>Force</th> </tr> </thead> <tbody> <tr> <td>15GF, 23GF</td> <td>0.8mm</td> <td>10N</td> </tr> <tr> <td>Thermal fuse (15GF)</td> <td>0.53mm</td> <td>5N</td> </tr> <tr> <td>Thermal fuse (23GF)</td> <td>0.58mm</td> <td>10N</td> </tr> </tbody> </table>		Type	Lead Diameter	Force	15GF, 23GF	0.8mm	10N	Thermal fuse (15GF)	0.53mm	5N	Thermal fuse (23GF)	0.58mm	10N		
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Thermal fuse (15GF)	0.53mm	5N														
Thermal fuse (23GF)	0.58mm	10N														
Terminal Bending Strength	The unit shall be secured with its terminal kept vertical and the weight specified below be applied in the axial direction. The terminal shall gradually be bent by 90° in one direction then 90° in the opposite direction, and again back to the original position. (Conform to JIS C 5035)	The leads shall not disconnect, slacken, or peel off after bending twice.														
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Thermal fuse (23GF)	0.58mm	5N														
Vibration	Mount varistor body on vibrator, and conduct the following vibration test. Peak-to-Peak amplitude : 1.5mm, Acceleration : 5G Vibration frequency range : 10 to 500Hz Sweeping time: Approximately 20 minutes for 10Hz → 500Hz → 10Hz Direction and duration of vibration : Three directions of X, Y, and Z. 2 hours each. 6 hours total.	No remarkable appearance abnormality.														
	Solderability		Each lead shall be dipped into a methanol solution (about 25%) of rosin for 5 to 10 sec. Then each lead shall be dipped into a solder.	At least, 95% of the leads shall be covered with solder uniformly.												
			<table border="1"> <thead> <tr> <th>Solder</th> <th>Pb free (Sn-3.0Ag-0.5Cu)</th> <th>Eutectic (Sn/Pb)</th> </tr> </thead> <tbody> <tr> <td>Solder Temp.</td> <td>245±5°C</td> <td>235±5°C</td> </tr> <tr> <td>Dipping Time</td> <td colspan="2">2±0.5sec.</td> </tr> <tr> <td>Dipping Depth</td> <td colspan="2">1.5 to 2.0mm (from the body)</td> </tr> </tbody> </table>		Solder	Pb free (Sn-3.0Ag-0.5Cu)	Eutectic (Sn/Pb)	Solder Temp.	245±5°C	235±5°C	Dipping Time	2±0.5sec.		Dipping Depth	1.5 to 2.0mm (from the body)	
			Solder		Pb free (Sn-3.0Ag-0.5Cu)	Eutectic (Sn/Pb)										
Solder Temp.		245±5°C	235±5°C													
Dipping Time	2±0.5sec.															
Dipping Depth	1.5 to 2.0mm (from the body)															
Resistance to Soldering Heat	Each lead shall be dipped into a solder bath having a temperature of 350±10°C to a point 2.0 to 2.5 mm from the body of the unit, be held there for 3 sec and then be stored at room temperature for 1 to 2 hours. The ΔV1mA and mechanical damage shall be examined. (Conform to JIS C 5102)	ΔV1mA / V1mA ≤ ±5% No remarkable damage														

◆ENVIRONMENTAL CHARACTERISTICS

Item	Test Conditions	Specifications
High Temperature Storage (Dry heat)	The specimen shall be subjected 125±2°C for 1000±12 hours without load.	ΔV1mA/V1mA ≤ ±5%
Damp heat (Humidity)	The specimen shall be subjected 40±2°C for 1000±12 hours without load.	ΔV1mA/V1mA ≤ ±5%
Temperature Cycle	The temperature cycle shown below shall be repeated 50 cycles. -40±3°C, 30 minutes ↔ +150±2°C, 30 minutes	ΔV1mA/V1mA ≤ ±5% No remarkable damage No thermal fuse disconnection.
Damp heat Operating	The specimen shall be subjected to 40±2°C, 90 to 95%RH with the maximum allowable voltage for 1000±12 hours.	ΔV1mA/V1mA ≤ ±10%
High Temperature Operating	The specimen shall be subjected to 85±2°C with the maximum allowable voltage for 1000±12 hours.	ΔV1mA/V1mA ≤ ±10% No thermal fuse disconnection.