TY-OHM

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TY-OHM ELECTRONIC WORKS CO.,LTD.

THERMAL FUSE
CEMENT RESISTORS

RESISTOR SPECIFICATION

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APPROVED BY

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THERMAL FUSE CEMENT RESISTORS

1. Applicable Scope:

Since thermal fuses are incorporated, cement resistors respond quickly to overloading as external overheating. These resistors also provide outstanding features againt surges. Therefore they are suitable for the prevention of inrush current for switching regulators.

2. Part Number:

It is composed by Type, Nominal Resistance and Tolerance. e.g.

SQF5	10R	J	145	3A	N
Type	Nominal Resistance	Tolerance	Standard Operating Temperature (145℃)	Max Working Current	RoHS Compliant

2.1 Type:

Thermal Fuse Cement Resistors upon the rated power are called "SQF3", "SQF5", "SQF7", "SQF10S", "SQF10".

2.2 Nominal Resistance:

Ω,KΩ are its unit which be in accordance with JIS-C6409 article 6 (EIA RS-196A) series.

Letter "10R" indicates resistance value 10Ω.

Letter "10K" indicates resistance value 10KΩ.

2.3 Tolerance:

It is measured by Bridge-method at room temperature and expressed by a capital letter.

J=±5%.

2.4 Standard Operating Temperature:

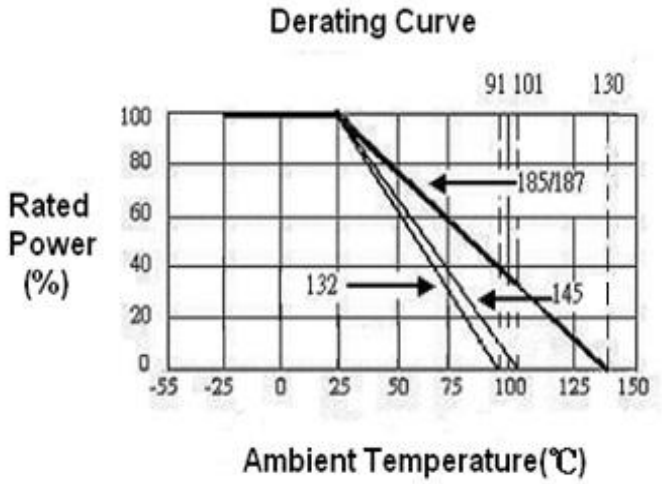
Type	Resistance Range	Tolerance	Fuse Type(℃)		Rated Wattage (continued)	Rated Wattage (momentary)	Max Working Voltage	Max Working Current
			Rated Temperature	CUT-OFF Temperature				
SQF3	0.1~50 KΩ	J: ± 5%	145	140 ± 2	1.6W	3W	250V	3A
SQF3			145	140 ± 2	1.6W	3W	250V	5A
SQF3			132	131＋3/－4	1.6W	3W	250V	10A
SQF3			185	181 ± 2	2.1W	3W	250V	10A
SQF3			187	182＋1/－3	2.1W	3W	250V	10A
SQF5			145	140 ± 2	1.6W	5W	250V	3A
SQF5			145	140 ± 2	1.6W	5W	250V	5A
SQF5			132	131＋3/－4	1.6W	5W	250V	10A
SQF5			185	181 ± 2	2.1W	5W	250V	10A
SQF5			187	182＋1/－3	2.1W	5W	250V	10A
SQF7			145	140 ± 2	2.2W	7W	250V	3A
SQF7			145	140 ± 2	2.2W	7W	250V	5A
SQF7			132	131＋3/－4	2.2W	7W	250V	10A
SQF7			185	181 ± 2	2.4W	7W	250V	10A
SQF7			187	182＋1/－3	2.4W	7W	250V	10A
SQF10S			145	140 ± 2	2.5W	10W	250V	3A
SQF10S			145	140 ± 2	2.5W	10W	250V	5A
SQF10S			132	131＋3/－4	2.5W	10W	250V	10A
SQF10S			185	181 ± 2	3.5W	10W	250V	10A
SQF10S			187	182＋1/－3	3.5W	10W	250V	10A
SQF10			145	140 ± 2	3.2W	10W	250V	3A
SQF10			145	140 ± 2	3.2W	10W	250V	5A
SQF10			132	131＋3/－4	3.2W	10W	250V	10A
SQF10			185	181 ± 2	4.2W	10W	250V	10A
SQF10			187	182＋1/－3	4.2W	10W	250V	10A

2.5 RoHS Compliant:

Letter ”N” indicates RoHS Compliant.

3. Rated Power:

Rated power is the value of Max load power specified at the ambient temperature of 25℃, and shall meet the functions of electrical and mechanical performance. When the ambient temperature surpasses above mention temperature, the value declines as per following DERATING CURVE.



3.1 Rated Voltage:

It is calculated through the following formula:

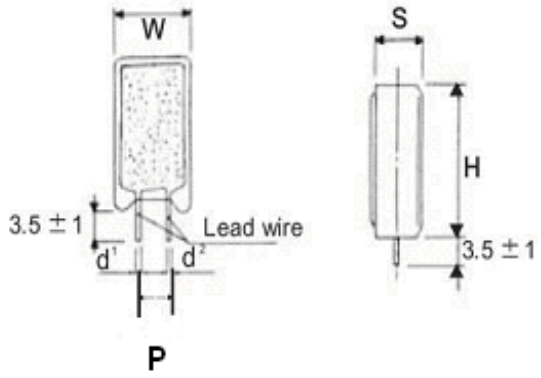
$V = \sqrt{P X R}$

where V: rated voltage
P: rated power
R: total nominal resistance

However, in case the voltage calculated exceeds the maximum load voltage, such the maximum load voltage shall be regarded as its rated voltage, means whichever less.

4. DIMENSION & STRUCTURE:

4.1 DIMENSION:



TYPE	Dimension (mm)					
	W±1	S±1	H±1.5	P+2/-1	d^1±0.1	d^2±0.1
SQF3	12	8	25	5	0.8	3A:0.6 5A:1.0 10A:1.0
SQF5	13	9	25	5	0.8	
SQF7	13	9	39	5	0.8	
SQF10S	16	12	35	7.5	0.8	
SQF10	20Max.	9	25Max.	12.5	0.8	0.8

4.2 STRUCTURE:

4.2.1 Terminal:

Terminal is to be firmly connected with resistors element, both electrically and mechanically, and allow easy soldering.

4.2.2 Stuffing:

Stuffing is made by flameproof cement (resistant to 800℃) which is solid enough to be free from looseness, crack and easy breakage.

4.2.3 Marking:

Marking is made on the surface with Type, Nominal Resistance, Tolerance and Maker's trademark (TY-OHM).

5. Operating Temperature Range:

-25℃～91℃(Thermal fuse:132℃)

-25℃～101℃(Thermal fuse:145℃)

-25℃～130℃(Thermal fuse:185℃/187℃)

6. Mechanical Performance:

6.1 Terminal tensile:

To fix the resistor body, a static load of 4.5kgs, is to be gradually applied into the terminal for 10 seconds without causing any looseness and fall.

6.2 Twist withstand:

To bend the lead wire at the point of about of about 6mm from resistor body to 90°, then catch the wire at 1.2 ±0.4mm apart from the bent point end and turn it (clockwise) by 360 degrees perpendicular to the resistor axis at speed of 5 seconds per turn, and do the same counterclockwise again which constitute a whole turn. Repeat the turn for 2 times without causing any break and looseness.

7. Electrical Performance:

7.1 Resistance Temperature Coefficient:

It shall be within ±300ppm/℃ and if the ohmic value is under 1Ω the T.C. shall be within ±600ppm/℃.

T.C. (ppm/℃) = 〔(R2－R1) ÷R1〕 ×〔1 ÷(T2－T1)〕 $\times 10^6$

where R1: resistance value at room temperature

R2: resistance value at test temp.

T1: room temp. (usu. 25℃)

T2: test temp. (e.g. 75℃)

7.2 Temperature Cycle:

Following temp. cycles are to be made 5 times and then put at room temp. for one hour, the resistance value change rate between pre-and-post test shall be within ±1%.

Steps	Temperature(℃)	Time (minutes)
1st step	-25 ± 3	30
2nd step	Room temp.	3
3rd step	Operating temp.(max) ± 3	30
4th step	Room temp.	3

7.3 Short Time Over Load:

When the resistors are applied 10 times as much as rated power for 5 seconds continuously, it shows no evidence of arc, flame...etc. Removing the voltage and place the resistors to the normal condition for 30 minutes, the resistance value change rate between pre-and-post test shall be within ±2%.

7.4 Insulation Character :

Resistors are located in a V-shaped metal trough. Using the DC 500V megger instrument 2 poles to clutch either side of lead wires and metal trough, measuring the Insulation Resistance which shall be over 1000MΩ.

7.5 Voltage Withstanding:

Resistors are located in a V-shaped metal trough. Applying AC 1000V for one minute and should find no physical damage to the resistors, such as arc, char...etc.

7.6 Load Life:

The resistors arrayed are sent into the 70℃ oven, applying rated voltage at the cycle of 1.5 hours ON, 0.5 hour OFF for 1000^{+48}_{-0} hours in total. Then, after removing the voltage, take the resistors out of the oven and left under normal temp. for one hour cooling. The resistance value change rate between pre-and-post test shall be within ±5%.

7.7 Moisture-proof Load Life:

The resistors arrayed are placed into a constant temp./humidity oven at the temp. of 40±2℃ and the humidity of 90～95%, rated power is applied for 1.5 hours and cut off for 0.5 hour. The similar cycle will be repeated for 500^{+24}_{-0} hours in total (including cut-off time). Then remove the voltage, taking the resistors out of the oven and leaving them at room temp. for one hour. The resistance value change rate between pre-and-post test shall be within ±5%. There also shall be no evidence of remarkable change on appearance, and the marking shall not be illegible.

7.8 Solder-ability:

The leads with flux are dipped in a melted solder of 235 ±5℃ for 2 seconds, more than 95% of the circumference of the lead wires shall be covered with solder.

7.9 Resistance to Soldering Heat:

Two leads are together dipped in a melted solder of 265 ±5℃(the ambient temp. is 110℃) for 10 ±1 seconds then remove the resistors and leaving them at room temp. for one hour. The resistance value change rate between pre-and-post test shall be within ±1%.

7.10 Nonflammability:

The resistors are applied the power of 16 times the rated wattage for 5 min. and shall not get flame.