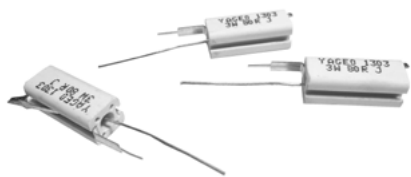


Fiberglass Cement Resistors

Circuit Breaker & Vertical Lead Type

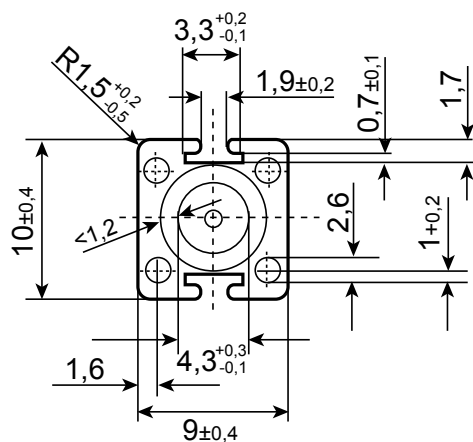
Normal Style [FSM Series]



INTRODUCTION

The FSM Series Fiberglass Cement Resistors are wound on fibre glass core, have a special internal direct contact to virtually eliminate resistance changes caused by varying, often high temperatures. It offers a circuit-breaker function when overload is applied.

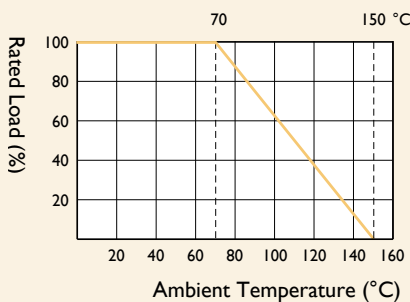
DIMENSIONS



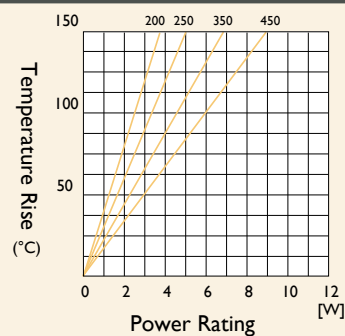
FEATURES

Power Rating	2W, 2.5W, 3.5W, 4.5W
Resistance Tolerance	±5%, ±10%
T.C.R.	-80~+500ppm/°C

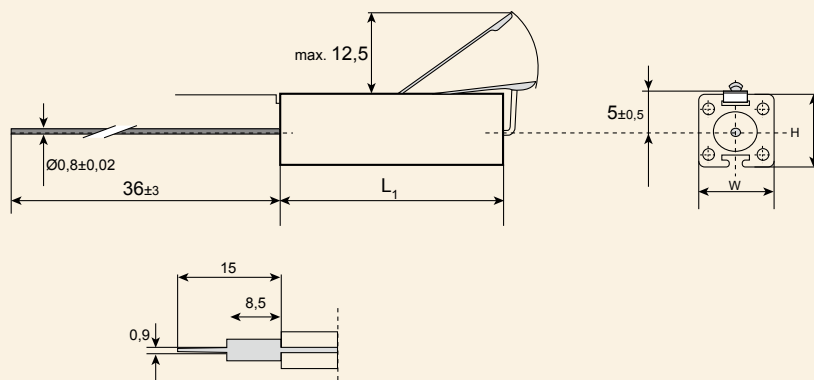
DERATING CURVE



TEMPERATURE RISE



Unit: mm



STYLE

DIMENSION

Normal	L ₁	W	H
FSM200	25±1.0	9±0.4	10±0.4
FSM250	38±1.0	9±0.4	10±0.4
FSM350	50±1.0	9±0.4	10±0.4
FSM450	75±2.0	9±0.4	10±0.4

Note:

ELECTRICAL CHARACTERISTICS

STYLE	FSM200	FSM250	FSM350	FSM450
Power Rating at 70°C	2W	2.5W	3.5W	4.5W
Maximum Working Voltage	$\sqrt{P \times R}$			
Voltage Proof on Insulation	2000V			
Resistance Range	0.15Ω-15KΩ	0.33Ω-33KΩ	0.51Ω-47KΩ	0.91Ω-82KΩ
Operating Temp. Range	-55°C to +150°C			
Temperature Coefficient	-80~+500ppm/°C			

Note: Special value is available on request

ENVIRONMENTAL CHARACTERISTICS

PERFORMANCE TEST	TEST METHOD		APPRAISE
Short Time Overload	IEC 60115-1 4.13	10 times rated power for 5 Sec.	±2.0%+0.05Ω
Voltage Proof on Insulation	IEC 60115-1 4.7	in V-block for 60 Sec., test voltage by type	By type
Temperature Coefficient	IEC 60115-1 4.8	-55°C to +150°C	By type
Insulation Resistance	IEC 60115-1 4.6	in V-block for 60 Sec.	>10,000M
Solderability	IEC 60115-1 4.17	235±5°C for 3±0.5 Sec.	95% Min. coverage
Solvent Resistance of Marking	IEC 60115-1 4.30	IPA for 5±0.5 Min. with ultrasonic	"No deterioration of coatings and markings"
Robustness of Terminations	IEC 60115-1 4.16	Direct load for 10 Sec. in the direction of the terminal leads	≥50N
Periodic-pulse Overload	IEC 60115-1 4.39	4 times RCWV 10,000 cycles (1 Sec. on, 25 Sec. off)	±2.0%+0.05Ω
Damp Heat Steady State	IEC 60115-1 4.24	40±2°C, 90-95% RH for 56 days, loaded with 0.1 times RCWV	±2.0%+0.05Ω
Endurance at 70°C	IEC 60115-1 4.25	70±2°C at RCWV for 1,000 Hr. (1.5 Hr. on, 0.5 Hr. off)	±3.0%+0.05Ω
Temperature Cycling	IEC 60115-1 4.19	-55°C ⇄ Room Temp. ⇄ +155°C ⇄ Room Temp. (5 cycles)	±2.0%+0.05Ω
Resistance to Soldering Heat	IEC 60115-1 4.18	260±3°C for 10±1 Sec., immersed to a point 3±0.5mm from the body	±0.2%+0.05Ω

Note: RCWV(Rated Continuous Working Voltage) = $\sqrt{\text{Power Rating} \times \text{Resistance Value}}$ or Max. working voltage listed above, whichever less.

Revision: 201304



EXPLANATIONS OF ORDERING CODE

MFR	-12	F	T	F	52-	100R
Code 1 - 3 Series Name See Index	Code 4 - 6 Power Rating -05 = $\varnothing$ d0.5mm -06 = $\varnothing$ d0.6mm -07 = $\varnothing$ d0.7mm -08 = $\varnothing$ d0.8mm -10 = $\varnothing$ d1.0mm -14 = $\varnothing$ d1.4mm -12 = 1/6W -25 = 1/4W 25S = 1/4WS -50 = 1/2W 50S = 1/2WS 100 = 1W 1WS = 1WS 200 = 2W 2WS = 2WS 204 = 0.4W 207 = 0.6W 300 = 3W 3WS = 3WS 3WM = 3WM 400 = 4W 500 = 5W 5WS = 5WS 5SS = 5WSS 700 = 7W 7WS = 7WS 10A = 10W 20A = 20W 30A = 30W 40A = 40W 50A = 50W 10S = 10WS 15A = 15W 25A = 25W 10B = 100W 25B = 250W	Code 7 Tolerance P = $\pm 0.02\%$ A = $\pm 0.05\%$ B = $\pm 0.1\%$ C = $\pm 0.25\%$ D = $\pm 0.5\%$ F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$ K = $\pm 10\%$ - = Base on Spec.	Code 8 Packing Style T = Tape/Box R = Tape/Reel B = Bulk	Code 9 Temperature Coefficient of Resistance - = Base on Spec. A = $\pm 5 \text{ ppm}/^{\circ}\text{C}$ B = $\pm 10 \text{ ppm}/^{\circ}\text{C}$ C = $\pm 15 \text{ ppm}/^{\circ}\text{C}$ S = $\pm 20 \text{ ppm}/^{\circ}\text{C}$ D = $\pm 25 \text{ ppm}/^{\circ}\text{C}$ E = $\pm 50 \text{ ppm}/^{\circ}\text{C}$ F = $\pm 100 \text{ ppm}/^{\circ}\text{C}$ G = $\pm 200 \text{ ppm}/^{\circ}\text{C}$ H = $\pm 250 \text{ ppm}/^{\circ}\text{C}$ I = $\pm 300 \text{ ppm}/^{\circ}\text{C}$ J = $\pm 350 \text{ ppm}/^{\circ}\text{C}$	Code 10 - 12 Forming Type 26- = 26mm 52- = 52.4mm 73- = 73mm 81- = 81mm 91- = 91mm F = F Type FK = FK Type FKK = FKK Type FFK = F-form Kink M = M-Type Forming MB = M-form W/flat MT = MT Type Forming MR = MR Type AV = AVIsert PN = PANAsert	Code 13 - 17 Resistance Value 0R1 = 0.1 100R = 100 10K = 10,000 10M = 10,000,000

EXCEPTION:

• Cement series:

<Code 8>: Special packing style code

B: Bulk with wirewound or metal oxide sub-assembly for resistance value

W: Bulk with ceramic based wirewound sub-assembly for resistance value

M: Bulk with metal oxide sub-assembly for resistance value

F: Bulk with Fiberglass based wirewound sub-assembly for resistance value

<Code 10-12>: Without forming code

Example: **SQP500JB-10R**

• JPW series:

<Code 13-17>: without resistance value code

Example: **JPW-06-T-52-**