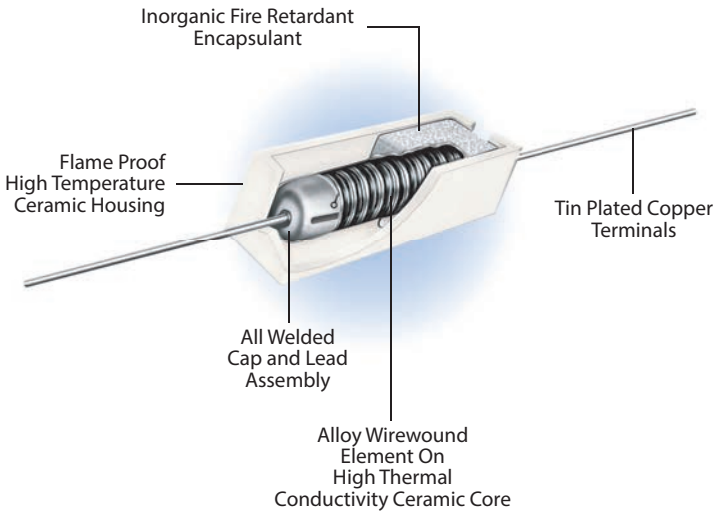


FUSIBLE RESISTORS
CERAMIC TYPES

FRC

SERIES

FUSIBLE RESISTORS

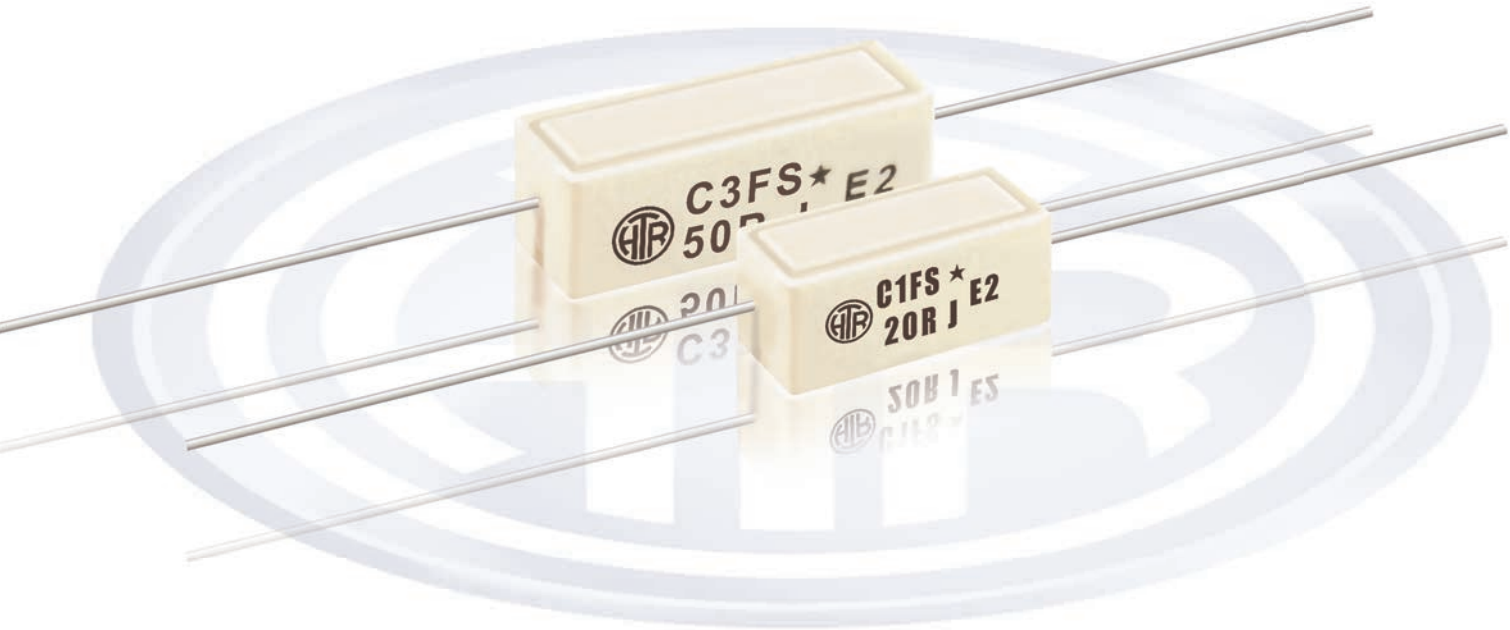
Ceramic Encased Bath Tub Type With Flame Retardant Moulding

In order to meet the growing demand worldwide for resistors to fuse or blow as a safety measure, HTR can provide fusible resistor which fuse or blow if they are subjected to an abnormal spike of voltage / current.

- 1W to 3W
- 10R to 750R

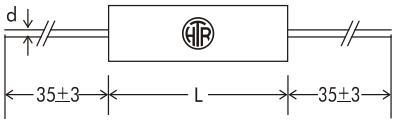
AEC-Q200 Qualified

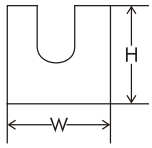
Pb-free * RoHS COMPLIANT



e : info@htr-india.com

PHYSICAL CONFIGURATION



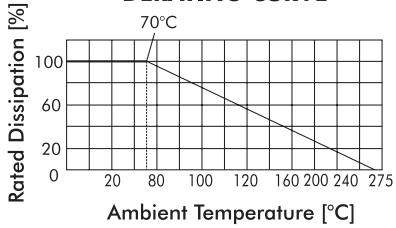


	POWER RATING at 70°C	DIMENSIONS (mm)				RESISTANCE RANGE		TYPICAL WEIGHT PER PC (gms)
		▲ L ±1.5	W ±1	H ±1	d ±0.05	min	max	
C-1AF	1W	13.0	5.5	5.5	0.8	10R	750R	1.4
C-1F	1W	15.0	7.5	6.5	0.8	10R	680R	1.9
C-2F	2W	17.5	7.5	7.0	0.8	10R	680R	3.2
C-3F	3W	22.0	8.0	8.0	0.8	10R	560R	4.4

- Resistance values below the minimum range can be supplied on request.

▲A bead of potting compound may be observed at the point where the termination emerges out of the ceramic case.

DERATING CURVE



ELECTRICAL CHARACTERISTICS / DATA

PARAMETER/PERFORMANCE TEST & TEST METHOD	PERFORMANCE REQUIREMENTS
Power Rating (Rated Ambient Temperature)	Full Power dissipation at 70°C and linearly derated to zero at +275°C - Refer Derating curve above
Operating Temperature Range (Ambient)	-55°C to +275°C with suitable derating as per derating curve
Voltage Rating / Limiting Voltage / Max. Working Voltage	$V=\sqrt{PxR}$
Resistance Tolerances Available JIS - C - 5202 para 5.1	±10% (K); ±5% (J); ±3% (H); ±2%(G); ±1% (F)

ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS / DATA

PARAMETER/ PERFORMANCE TEST	TEST METHOD- DETAILS	PERFORMANCE REQUIREMENTS
Short Time Overload	JIS - C - 5202 para 5.5 Upto 3W - condition A (RV x 2.5 for 5 secs)	ΔR ± [2% + R05]
Dielectric Withstanding Voltage / Voltage Proof	JIS - C - 5202 para 5.7 Condition F (Limiting voltage x 2 or 500V)	ΔR ± [1% + R05] No flashover, arcing or insulation breakdown
Temperature Co-efficient of Resistance	JIS - C - 5202 para 5.2	± 30 ppm / °C or ± 90 ppm / °C [>10R] Depending on wire selected ± 80 ppm / °C [<10R]
Insulation Resistance	JIS - C - 5202 para 5.6 (Condition F)	>1000MΩ (Min)
Endurance - under load with humidity	JIS - C - 5202 para 7.9 1000 hours at 40°C ± 2°C, 95% R.H with limiting voltage (1.5 hours on / 0.5 hours off)	Δ± [5% + R05]
Load Life	JIS - C - 5202 para 7.10 1000 hours at 70°C limiting voltage (1.5 hours on / 0.5 off)	ΔR ± [5% + R05]
Temperature Cycling	JIS - C - 5202 para 7.4 [Room temperature →-55°C→ Room temperature →155°C→ Room temperature for 5 cycles.]	ΔR ± [5% + R05]
Damp Heat (Steady State)	JIS - C - 5202 para 7.5	ΔR ± [5% + R05]
Solvent Resistance	JIS - C - 5202 para 6.9 Solvent A - IPA for 60secs ± 10 secs.	No effect on case filling or marking

MECHANICAL SPECIFICATIONS

PARAMETER/ PERFORMANCE TEST	TEST METHOD-DETAILS	PERFORMANCE REQUIREMENTS
Pull Test / Robustness of Terminations	Direct load for 15 secs 2 to 4.5kgs depending on size	No effect
Solderability	JIS - C - 5202 para 6.5	ΔR ± [1% +R05] Continuous and satisfactory (95% Min coverage)

TYPICAL APPLICATIONS

A fusible resistor is a tailormade dual purpose component -

a) In normal conditions it functions as a resistor.
b) In high overload / fault conditions it acts as a fuse / safety device.

In some countries all types of ceramic encased / bath tub type resistors are wrongly called as fusible resistors. It must be clearly understood that fusible resistors are special purpose, specially designed resistors and are produced mainly in two configurations.

a) Ceramic encased bath - tub type and
b) Flame retardant silicone coated type. (Refer FRS series)

ORDERING INFORMATION

In order to design a fusible ceramic encased resistor suitable for your needs, we need the following data:-

1. Power rating in terms of watts.
2. Resistance in ohms.
3. Tolerance.
4. Maximum continuous working voltage across the resistor, at which the resistor must continue to function.
5. Fusing voltage - The voltage at which the resistor must fuse or blow.
6. Fusing Time - The duration within which the resistor must blow or fuse on being subjected to the fusing voltage.
7. Frequency of power source, voltage waveform.
8. Brief details of your application.

In certain cases, the designer must be made aware that the compromise inherent in the trade off between resistive and fusing function make certain exact combinations not possible. Having said this, that does not mean that it is not possible to make a functional fusible resistor capable of meeting the requirement of that particular application.

Generally speaking as per international standards, a fusible resistor fuses on being given fusing voltage from instantaneously to 45 seconds without any flame.

At HTR if no special data is provided, we assume that if a fusible resistor is ordered, it should fuse on being given voltage calculated at 16 times power from instantaneously to 45 seconds.

AT HTR, A SPECIAL "SAFETY VERSION" IS AVAILABLE IN FRC SERIES FOR RESISTANCE VALUES ≥10R WHERE THE RESISTOR WILL FUSE INSTANTANEOUSLY WHEN MAINS VOLTAGE 220/240V IS APPLIED WITH NO FLAME OR EXPLOSION. PLEASE SUFFIX TYPE WITH ALPHABET 'S'.

For resistance values <10R the fusing timing and suitability must be tested for each individual application.

Precautions to be taken: Before conducting this test, the voltage must be correctly set / adjusted by first using a dummy piece which should then be discarded.

Note :

1. The ceramic cases used may be steatite ceramic, corderite ceramic or high alumina ceramic.
   Thus, the ceramic cases may be off-white or variations of brown / grey, colours which are inherent to these ceramic material.
2. The customer is strongly advised to ascertain the suitability of the resistor for his particular application before ordering in bulk.

ORDERING INFORMATION

Series	Type	Packing	Resistance Value	Tolerance
FRC	C2F/C2F*	Bulk-C2F/C2F*	47R	J

a) For RoHS version - C2F *.