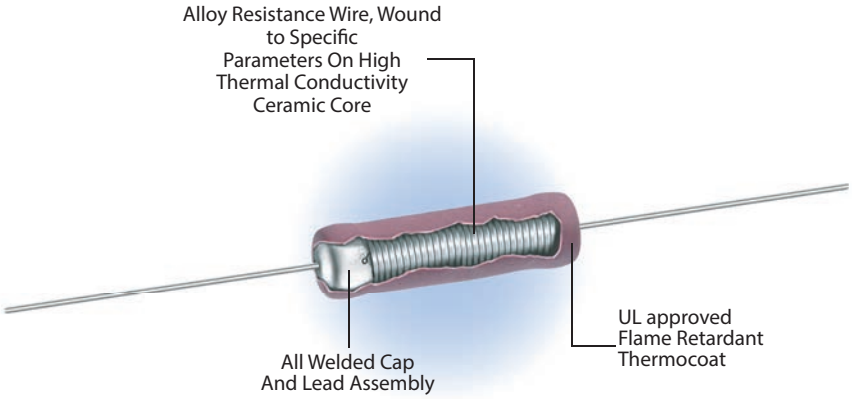


FUSIBLE RESISTORS
SILICONE / CEMENT COATED

FRS
SERIES
FUSIBLE RESISTORS

- Flame Retardant Silicone Coated
- Safety Version Available

- 1W to 5W
- 10R to 100R

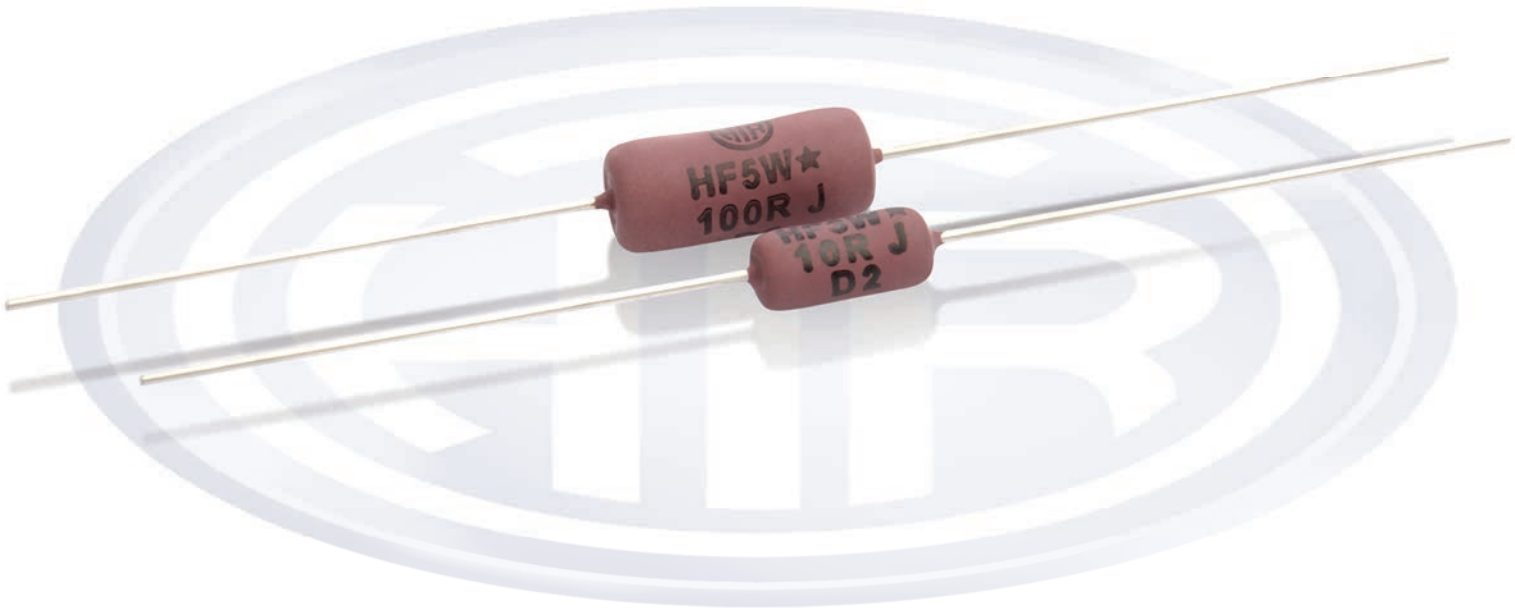
AEC-Q200 Qualified

Pb-free * RoHS COMPLIANT

c UL us

UL RECOGNIZED
As per UL 1412 Fusing Resistors and Temperature-Limited Resistors
UL file # E 342534

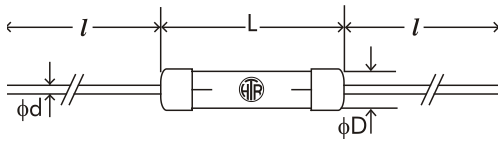
In order to meet the growing demand worldwide for resistors to fuse or blow as a safety measure, HTR can provide fusible resistors which fuse or blow if they are subjected to an abnormal spike of voltage / current or in the event of malfunction of the circuit.



FUSIBLE RESISTORS SILICONE / CEMENT COATED

FRS

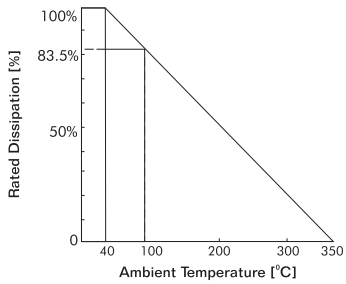
PHYSICAL CONFIGURATION



HTR TYPE	POWER RATING at 40°C (Ambient)	DIMENSIONS (mm)				RESISTANCE RANGE		TYPICAL WEIGHT PER PC (gms)
		* L (max)	D (max)	*l* ±1.5	d ±0.05	min	max	
A-1F*/ A1FS*	1W	6.75	4.50	38	0.8	10R	100R	0.60
H-1F*/ H1FS*	1W	9.5	4.5	38	0.8	10R	100R	0.7
A-2F* / A-2FS*+	2W	9.2	3.6	38	0.8	10R	100R	0.55
H-2F* / H-2FS*	2W	11.5	4.5	38	0.8	10R	100R	0.75
D-2F* / D-2FS*	2W (70°C)	14.5	6.0	38	0.8	10R	100R	1.2
H-3AF* / H-3AFS*+	3W	11.5	5.5	38	0.8	10R	100R	1.1
H-3F* / H-3FS*	3W	15.5	6.0	38	0.8	10R	100R	1.4
H-4F* / H-4FS*+	4W	16.0	6.0	38	0.8	10R	100R	1.4
5ACF* / 5ACFS*+	5W	16.8	7.5	38	0.8	10R	100R	1.8
A-5F* / A-5FS*	5W	15.7	5.9	38	0.8	10R	100R	1.35

* Coating overflow on each lead not to exceed half of 'D'.
• Resistance values below the minimum range can be supplied on request.
\+ Certified to UL 1412

DERATING CURVE



ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS / DATA

PARAMETER/PERFORMANCE TEST & TEST METHOD	PERFORMANCE REQUIREMENTS
Power Rating (Rated Ambient Temperature) to zero at +350°C - Refer Derating Curve above	Full Power dissipation at 40°C and linearly derated
Resistance Tolerances Available	±10% (K); ±5% (J); ±3% (H); ±2%(G); ±1% (F)
Temperature Range	-55°C to +350°C with suitable derating as per derating curve.
Voltage Rating / Limiting Voltage / Max. Working Voltage	$V=\sqrt{PxR}$
Dielectric Withstanding Voltage / Voltage Proof (based on limiting voltage x 2 for 60 secs)	ΔR ± (1% + R05) - No flashover, mechanical damage, arcing or insulation breakdown
Short Time Overload (5 x Rated Power for 5 secs)	ΔR ± (2% + R05)
Temperature Co-efficient of Resistance	±60 ppm /°C for <10R - Average ± 90 ppm /°C or ± 30 ppm /°C for >10R depending on wire selected
Insulation Resistance	>1000MΩ (Min)
Temperature Cycling (Room temperature -55°C Room Temperature 200°C Room Temperature for 5 cycles)	ΔR ± [2% + R05]
Damp Heat (Steady State) (40°C at 93% R.H for 1000 hours - no load applicable)	ΔR ± [≤5% + R05] - Average
Endurance - Load Life (70°C with limiting voltage - 1.5 hours on / 0.5 hours off for 1000 hours)	ΔR ± [≤5% + R05] - Average
Solvent Resistance (IPA for 60 secs ±10 secs)	No effect on coating / marking

MECHANICAL SPECIFICATIONS

PARAMETER/PERFORMANCE TEST & TEST METHOD	PERFORMANCE REQUIREMENTS
Terminal Tensile Strength	50 Newtons
Resistance To Soldering Heat (260°C - 270°C for 10 secs)	ΔR ± [0.5% + R05] - Typical
Solderability (As per IEC pub. 60068 - 2 - 20 Ta)	Must meet the requirements laid down
Marking	As per IEC Pub. 60062

Note : Contrary to popular belief, fusible resistors are not standard resistor types and each type of fusible resistor must be tailor designed to suit a particular application.

TYPICAL APPLICATIONS

As mentioned previously, 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.

ORDERING INFORMATION

AT HTR, A SPECIAL "SAFETY VERSION" IS AVAILABLE IN FRS SERIES FOR RESISTANCE VALUES ≥10R
WHERE THE RESISTOR WILL FUSE INSTANTANEOUSLY WHEN MAINS VOLTAGE 220 / 240V IS APPLIED WITH NO FLAME OR EXPLOSION. THE SAFETY VERSION OF THIS TYPE IS DENOTED BY ALPHABET 'S' AFTER THE NAME OF THE SERIES e.g. for the type H-1F, the safety version will be termed as H-1FS.
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.

ORDERING INFORMATION

Series	Type	Packing	Resistance Value	Tolerance
FRS	H2F*/ H2FS*	Bulk H2F*/ H2FS* Tape & Ammo H2F*T / H2FS*T Tape & Reel H2F*TR / H2FS*TR	15R	K

FOR EXAMPLE
1. For Tape & Ammo packing - H2F*T / H2FS*T
2. For Tape & Reel - H2F*TR / H2FS*TR

NOTE: THE CUSTOMER IS STRONGLY ADVISED TO ASCERTAIN THE SUITABILITY OF THE RESISTOR FOR HIS PARTICULAR APPLICATION BEFORE ORDERING IN BULK.