



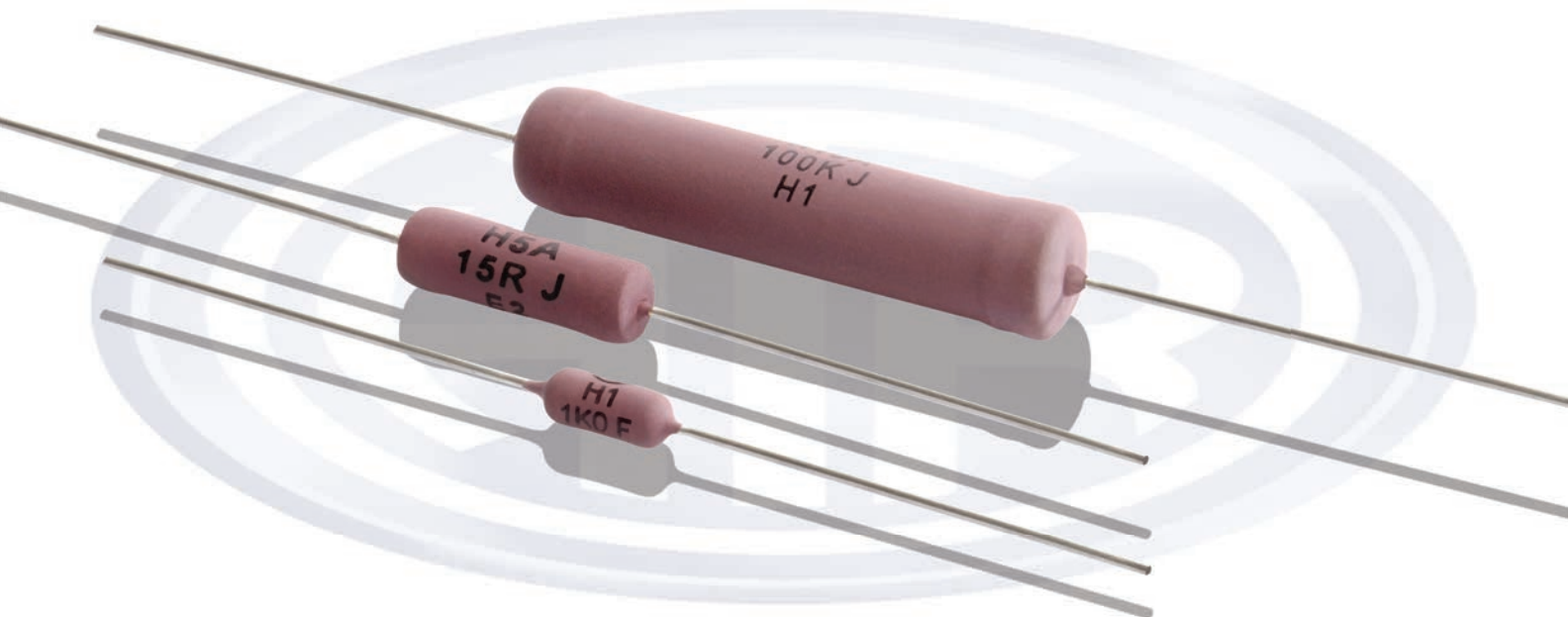
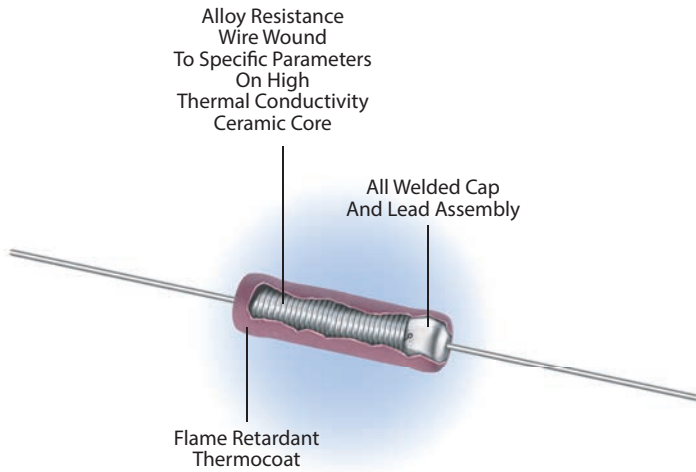
## WIRE WOUND RESISTORS SILICONE COATED TYPE

### HIA SERIES

### PRECISION POWER

### Silicone / Wire Wound Resistors Industrial / Professional Applications

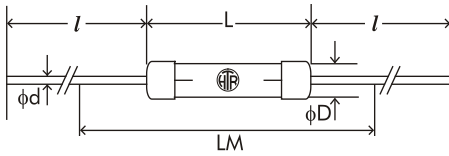
- Flame retardant coating compatible with UL standards
  - 0.5 W to 20 W
- Tolerances as close as 0.25% possible
  - R 01 to 120 K
- TCR as low as +20ppm/°C available depending on application and resistance value
  - Special types available for pulse applications-IEC 61000-4-5





WIRE WOUND  
RESISTORS  
SILICONE/  
COATED TYPE  
**HIA**

## PHYSICAL CONFIGURATION



HTR TYPE	POWER RATING at 40°C (Ambient)	DIMENSIONS (mm)					RESISTANCE RANGE		TYPICAL WEIGHT PER PC (gms)
		▲ L (max)	* D (max)	$l \pm 1.5$	$d \pm 0.05$	▼ LM $\pm 1$	min	max	
H-0.5 D-0.5	0.5W	6.75	4.5	38	0.8	30	R01	2K0	0.6
H-1	1W	9.50	4.5	38	0.8	30	R01	5K0	0.7
H-2	2W	11.50	4.5	38	0.8	35	R01	6K2	0.75
D-2	2W (70°C)	14.50	6.0	38	0.8	35	R01	14K	1.2
H-3A	3W	11.50	5.5	38	0.8	35	R01	10K	1.1
H-3	3W	15.50	6.0	38	0.8	35	R01	15K	1.4
H-4	4W	15.50	6.0	38	0.8	35	R01	15K	1.4
H-5A	5W	19.25	6.5	38	0.8	40	R01	24K	2.0
D-5	5W (70°C)	22.50	7.5	38	0.8	45	R01	33K	2.9
H-5	5W	24.50	8.7	38	0.8	45	R01	47K	4.0
H-7A	7W	31.75	9.5	38	0.8	55	R01	68K	5.2
H-7	7W	38.50	8.7	38	0.8	60	R01	70K	5.2
H-10A	10W	43.50	10.0	38	0.8	65	R05	100K	7.2
H-10	10W	53.50	9.0	38	0.8	75	R10	100K	5.5
H-15	15W	43.50	10.0	38	1.0	65	R05	100K	8.2
H-20	20W	67.00	10.0	38	1.0	90	R10	120K	11.2

- \* For non-inductive types and for resistance values <math><1R0</math>, +0.8mm allowed.
- ▲ Coating overflow on each lead not to exceed half of 'D'.
- ▼ For resistance values less than R10 and tolerance less than  $\pm 2\%$ , please measure resistance over centered length LM.
- Special Resistance values available on request.

## NON INDUCTIVE RESISTORS

Low inductance Aryton - Perry winding type resistors are available in this series. For non-inductive types reduce maximum resistance values shown to 50% and the continuous working voltage to 70% (please refer to note (2) of ordering information for placing orders).

## PRE-FORMED LEADS

The resistor terminations can be bent and cut as per requirements for quick PCB mounting. Please send detailed drawings of specific type of preforming required. Depending on application the resistors leads may be tin plated Copper Weld<sup>®</sup> instead of tin plated copper.

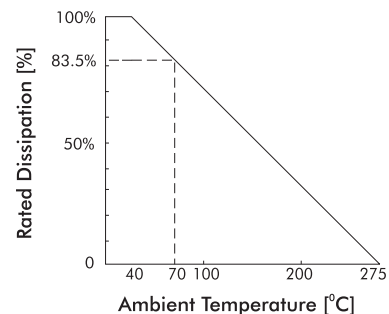
## TAPING

Types H-0.5, D-0.5, H-1, H-2, D-2, H-3, H-3A, H-4, H-5A, H-5, D-5, H-7A, H-7, H-10A, H-10 and H-15 can be supplied in taped form.

Please refer to tape/ ammo pack specifications. Tape / Reel on request.

Type H-5, D-5, H-7A, H-7, H-10A, H-10 and H-15 in taped will be supplied with tin plated copper clad steel (copper weld<sup>®</sup>) terminations.

## DERATING CURVE





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## ELECTRICAL CHARACTERISTICS/ DATA

PARAMETER/PERFORMANCE TEST & TEST METHOD	PERFORMANCE REQUIREMENTS
<b>Power Rating</b> (Rated Ambient Temperature)	Full power dissipation at upto 40°C and linearly derated down to zero dissipation at 275°C. [see Derating Curve above]
<b>Resistance Tolerances Available</b> (Test method no. 303 of MIL 202F)	±10% [K]; ±5% [J]; ±3% [H]; ±2% [G]; ±1% [F]; ±0.5% [D], ±0.25% [C]
<b>Voltage Rating / Limiting Voltage / Max. Working Voltage</b>	$V = \sqrt{P \times R}$
<b>Voltage Proof / Dielectric Withstanding Voltage</b> (based on limiting voltage x 2 or 500V whichever is applicable) (Test Method no. 301 of MIL 202F)	Max. $\Delta R \pm (1\% + R05)$ - No flashover, mechanical damage, arcing or insulation breakdown
<b>Insulation Resistance</b> (Test Method no. 302 of MIL 202F)	>1000 M (Dry) > 100M (Wet)
<b>Short Time Overload</b> (Test Method - 5 secs at 5 times rated power for 3 watts and smaller; 5 secs at 10 times rated power for 4 watts and larger)	Max. $\Delta R \pm (2\% + R05)$
<b>Resistor Temperature Rise as a Function of Applied Power</b>	As temperature rise varies between different power ratings and ratings and also between different resistance values, if this parameter is required in detail, please provide power rating (W) and resistance (R) required and factory will provide a suitable graph.

## PULSE CAPABILITY

- Resistors for use under pulse conditions as per IEC - 61000 - 4 - 5 available. For further information please refer to "Pulse / Surge Capability of resistors".
- In-case a tailor made pulse resistor is required, please refer to "Questionnaire of data required" and provide data accordingly.
- Once power rating and resistance value are established by the design engineer, HTR can provide vital data in the form of charts/graphs for two important characteristics of the pulse version of these resistors - 1.Pulse on a regular basis ; Max allowable peak pulse power (W) as a function of pulse duration (T). 2.Pulse capability ; Energy (J) as a function of R ( $\Omega$ ).

It is essential that this data must be validated in actual trials and HTR will be pleased to provide the necessary samples for validation and homologation.

## ENVIRONMENTAL SPECIFICATIONS

PARAMETER/PERFORMANCE TEST & TEST METHOD	PERFORMANCE REQUIREMENTS
<b>Temperature Co-efficient of Resistance</b> (Test Method 304 of MIL 202F)	± 120ppm / °C (< R10); ± 80ppm / °C (<1R0); ± 60ppm / °C (<100R); ± 90ppm / °C or ± 30ppm / °C (>100R) depending on wire selected.
<b>Temperature Cycling</b> Test Method as per JIS-C-5202 Para 7.4 [Room Temperature ---> -55°C ---> Room Temperature ---> +155°C ---> Room Temperature for 5 cycles]	$\Delta R \pm [2\% + R05]$ - Typical
<b>Damp Heat</b> (Steady State) (Test Method No. 103B of MIL 202F and test condition 'D')	Max. $\Delta R \pm (3\% + R05)$ - No mechanical damage
<b>Thermal Shock</b> (Test Method No. 107D of MIL 202F & Test Condition 'B')	Max $\Delta R \pm (3\% + R05)$ - No physical Deterioration
<b>Load Life</b> (Test Method no. 108A of MIL 202F) (1000 hours intermittent @ 40°C)	Max. $\Delta R \pm (3.5\% + R05)$



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## MECHANICAL SPECIFICATIONS

PARAMETER/PERFORMANCE TEST & TEST METHOD	PERFORMANCE REQUIREMENTS
<b>Mechanical Shock</b> (Test Method No. 213B of MIL 202F)	Test condition & requirement to be mutually decided.
<b>Pull Test / Robustness of Termination</b> [Force supplied from 2 to 4.5Kgs depending on size]	No mechanical damage
<b>Vibration</b> (Test Method No. 201A of MIL 202F)	Max $\Delta R \pm(3\% + R05)$ - No physical damage
<b>Solderability</b> [Test method no.208F of MIL 202F]	$\Delta R < \pm [1\% + R05]$ - Continuous and satisfactory
<b>Resistance to Soldering Heat</b> (Test Method 210A of MIL 202 F & Test condition C)	Max $\Delta R \pm(2\% + R05)$
<b>Resistance to Solvents</b>	Marking must remain Legible.

## TYPICAL APPLICATIONS

The usage of HIA series resistors will expand circuit design limits significantly because they have precision resistor characteristics with low TC and are able to carry load at high ambient temperatures.

HIA series can effectively be used in all industrial, electrical, electronic and telecommunication equipment where large power dissipation is required (e.g. when used as a voltage divider or bleeder resistor in DC power supplies or for series dropping). They are generally satisfactory for use at frequencies upto 50KHz.

HIA series when wound by the Aryton-Perry method can be used effectively for high frequency applications where fast rise time and minimum shift AC characteristics are necessary.

Note : Type H5, H7, H7A, H10, H10A can be supplied with lead diameter of 1.0mm. Please specify to avoid confusion.

## ORDERING INFORMATION

Series	Type	Packing	Resistance Value	Tolerance
HIA	H2 / H2*	Bulk H2 / H2* Tape & Ammo H2*T / H2T Tape & Reel H2*TR / H2TR	100R	J

1. For RoHS version - H-2\*
2. For Non Inductive type - N H2
3. For Pulse type - H2 I
4. For Tape and Ammo packing - H2 T
5. For Tape and Reel - H2 TR