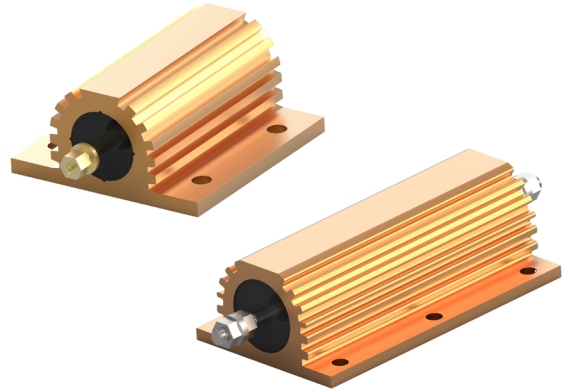


# ALUMINIUM HOUSED POWER RESISTORS

## TYPE HS SERIES

### INTRODUCTION

TE Connectivity (TE) is one of the leading European suppliers of standard and custom designed aluminium housed resistors for general-purpose use, power supplies, power generation and the traction and drives industries. The HS Series product offering, a range of extremely stable, high-quality wire wound resistors are made from quality materials for optimum reliability and stability, capable of dissipating high power in a limited space with relatively low surface temperature. The aluminium housing in these resistors help rapidly dissipate power to a specified heat sink.



This latest revision of the datasheet introduces two new additions to the series: the HSCS stud terminal type HSC75, 100, and 150, and the HSHC type with power ratings from 350W to 500W, giving this series the widest range of power ratings currently on offer. TE is happy to advise on the use of these resistors for pulse applications and high voltage use. On request, TE can modify and test these resistors specifically to conform to relevant international, military or customer specifications. Low ohmic values, alternative mountings, and alternative termination types are also available on request.

### FEATURES

- Established product with proven reliability leading the way with over 50 years of design and manufacturing experience.
- 5 Watts to 500 Watts: Largest range on the market.
- Versatile product bench mark in wide range of industries.
- Custom designs, windings, terminations, mountings available on request.
- Low resistance, low inductance and higher voltage versions available specialising the standard.

### APPLICATIONS

- Braking resistor
- Balancing resistor
- Capacitor charging & discharging
- Crowbar
- Filter
- Electrical machinery general use

## CHARACTERISTICS - ELECTRICAL

### HSA & HSC - 5 Watts to 75 Watts

|                                                | HSA5      | HSA10  | HSA25  | HSA50  | HSC75  |
|------------------------------------------------|-----------|--------|--------|--------|--------|
| Dissipation @ 25°C with heatsink (Watts):      | 10        | 16     | 25     | 50     | 75     |
| Without heatsink (Watts):                      | 5.5       | 8      | 12.5   | 20     | 45     |
| Ohmic value minimum (Ohms):                    | R01       | R01    | R01    | R01    | R05    |
| Ohmic value maximum (Ohms):                    | 10K       | 15K    | 36K    | 100K   | 50K    |
| Operating temperature                          | -55-200°C |        |        |        |        |
| Maximum working voltage (DC or AC rms) Volts:  | 150       | 250    | 500    | 1250   | 1400   |
| Isolation voltage (DC or AC pk) Volts:         | 1400      | 1400   | 2500   | 2500   | 3500   |
| Dielectric strength (AC Peak) Volts:           | 1400      | 1400   | 2500   | 2500   | 5000   |
| Stability (resistance change, 1000 hours) (%): | 1         | 1      | 1      | 1      | 2      |
| Standard heatsink - area (mm <sup>2</sup> ):   | 41500     | 41500  | 53500  | 53500  | 99500  |
| Thickness (mm):                                | 1         | 1      | 1      | 1      | 3      |
| Number of mounting holes:                      | 2 hole    | 2 hole | 2 hole | 2 hole | 4 hole |

# Aluminium Housed Power Resistors

Type HS Series

## HSC - 100 Watts to 300 Watts

|                                                | HSC100    | HSC150 | HSC200 | HSC250 | HSC300 |
|------------------------------------------------|-----------|--------|--------|--------|--------|
| Dissipation @ 25°C with heatsink (Watts):      | 100       | 150    | 200    | 250    | 300    |
| Without heatsink:                              | 50        | 55     | 50     | 60     | 75     |
| Ohmic value minimum (Ohms):                    | R05       | R10    | R10    | R10    | R10    |
| Maximum (Ohms):                                | 100K      | 100K   | 50K    | 68K    | 82K    |
| Operating temperature                          | -55-200°C |        |        |        |        |
| Maximum working voltage (DC or AC rms) Volts:  | 1900      | 2500   | 1900   | 2200   | 2500   |
| Isolation voltage (DC or AC pk) Volts:         | 3500      | 3500   | 3600   | 3600   | 3600   |
| Dielectric strength (AC Peak) Volts:           | 5000      | 5000   | 5600   | 5600   | 5600   |
| Stability (resistance change, 1000 hours) (%): | 2         | 2      | 3      | 3      | 3      |
| Standard heatsink - area (mm <sup>2</sup> ):   | 99500     | 99500  | 375000 | 476500 | 578000 |
| Thickness (mm):                                | 3         | 3      | 3      | 3      | 3      |
| Number of mounting holes:                      | 4 hole    | 4 hole | 6 hole | 6 hole | 6 hole |

## HS HC - 350 Watts to 500 Watts

|                                                | HS HC350  | HS HC400 | HS HC450 | HS HC500 |
|------------------------------------------------|-----------|----------|----------|----------|
| Dissipation @ 25°C with heatsink (Watts):      | 350       | 400      | 450      | 500      |
| Without heatsink (Watts):                      | 85        | 100      | 110      | 125      |
| Ohmic value minimum (Ohms):                    | 1R0       | 1R0      | 1R0      | 1R0      |
| Maximum (Ohms):                                | 100K      | 100K     | 100K     | 100K     |
| Operating temperature                          | -55-200°C |          |          |          |
| Maximum working voltage (DC or AC rms) Volts:  | 2500      | 2500     | 2500     | 2500     |
| Isolation voltage (DC or AC pk) Volts:         | 3600      | 3600     | 3600     | 3600     |
| Dielectric strength (AC Peak) Volts:           | 5000      | 5000     | 5000     | 5000     |
| Stability (resistance change, 1000 hours) (%): | 3         | 3        | 3        | 3        |
| Standard heatsink - area (mm <sup>2</sup> ):   | 578000    | 578000   | 578000   | 578000   |
| Thickness (mm):                                | 3         | 3        | 3        | 3        |
| Number of mounting holes:                      | 6 hole    | 6 hole   | 6 hole   | 6 hole   |

|                       |                                                                                                                                                                                                                                                                                                              |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Long term stability   | For improvements in long-term stability, resistors must be derated as follows: for 50% of stated $\Delta R$ maximum dissipation must not exceed 70% of rating: for 25% of stated $\Delta R$ maximum, dissipation must not exceed 50% of rating.                                                              |
| Insulation resistance | Dry: 10,000M $\Omega$ minimum. After moisture test: 1000M $\Omega$ minimum                                                                                                                                                                                                                                   |
| Heat dissipation      | Although the use of proprietary heat sinks with lower thermal resistance is acceptable, up rating is not recommended. The use of proprietary heat sink compound to improve thermal conductivity is recommended for optimum performance of all sizes but essential for higher power ratings (200W and higher) |
| Resistance tolerance  | $\pm 5\%$ Standard. Other options on request.                                                                                                                                                                                                                                                                |
| Specification         | Temperature coefficient of resistance: $\leq 100R$ , $\pm 50ppm/^{\circ}C$ ; $>100R$ , $\pm 25ppm/^{\circ}C$<br>Tolerance, 5% standard: 10%, 3%, 2%, 0.5% & 0.25% available<br>Tolerance for values below R10, 10% standard                                                                                  |
| Shelf life            | 24 Months when stored in original packaging away from chemical pollution                                                                                                                                                                                                                                     |

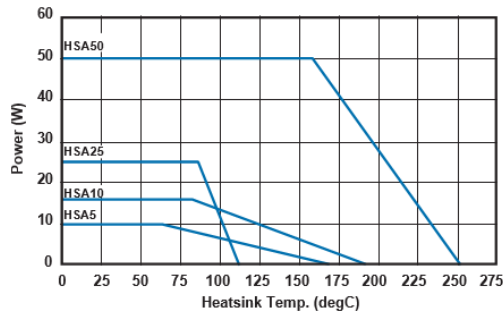
# Aluminium Housed Power Resistors

Type HS Series

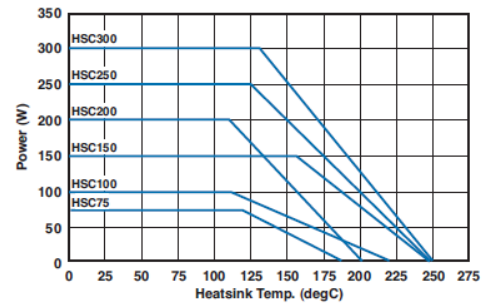
## DERATING CURVE

N.B. The graphs plot power against allowable heatsink temperature range and not the temperature the heatsink will rise to under this power condition, nor the ambient temperature.

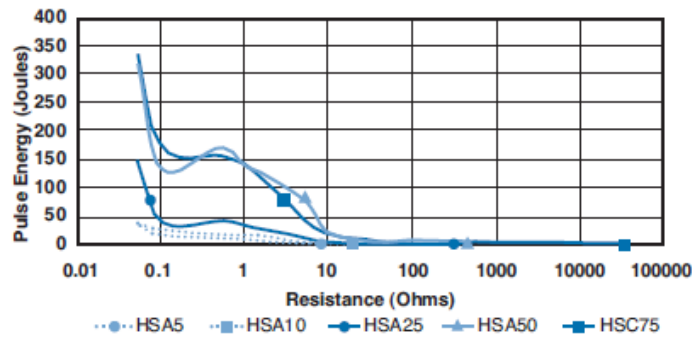
### HSA5 - 50



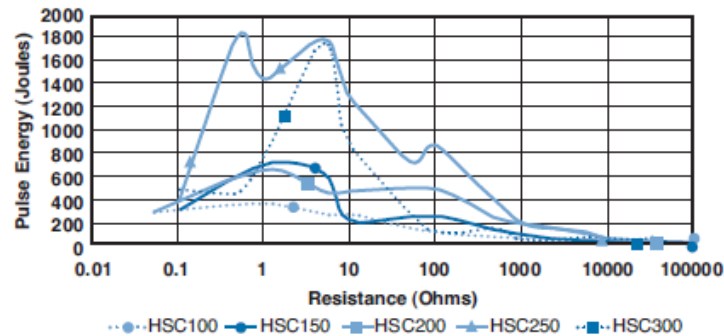
### HSC75 - 300



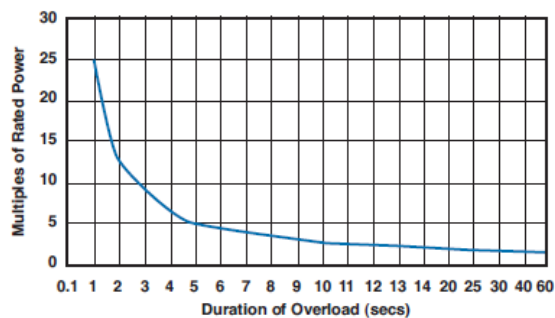
### Pulse Energy HSA5 to HSC75 (pulse length 200ms)



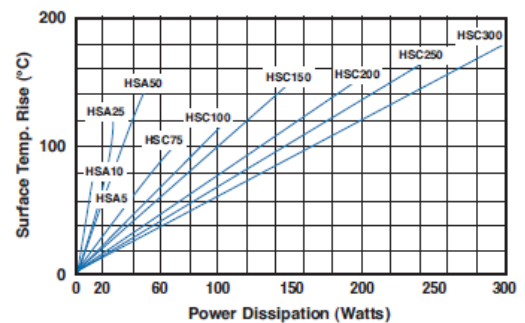
### Pulse Energy HSC100 to HSC300 (pulse length 200ms)



### Power Overload



### Surface Temperature Rise



This graph indicates the amount that the rated power (at 20°C) of the standard HS series resistor may be increased for overloads of 100ms to 60s

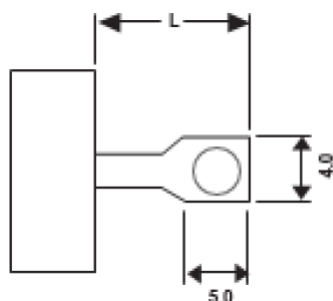
For resistor mounted on standard heatsink, related to power dissipation

# Aluminium Housed Power Resistors

Type HS Series

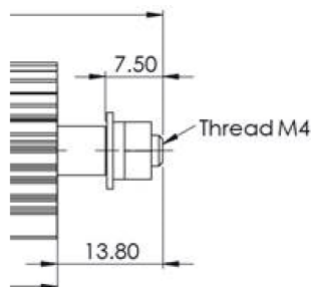
## PRODUCT SPECIFICATIONS (Unit:mm)

### HSA5 - HSC150 Standard

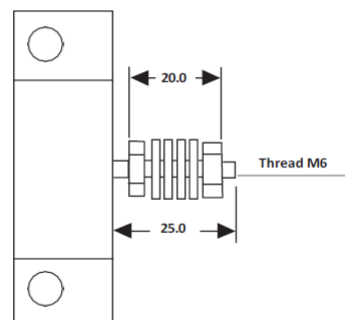


| Standard Type   | L  |
|-----------------|----|
| HSA5, 10        | 7  |
| HSA25, 50       | 10 |
| HSC75, 100, 150 | 8  |

### HSC75S - HSC150S

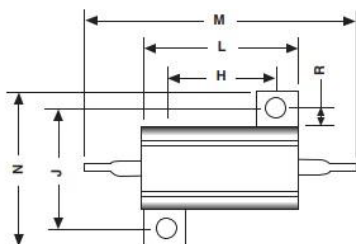


### HSC200 - HSC300 & HSHC350 - HSHC500



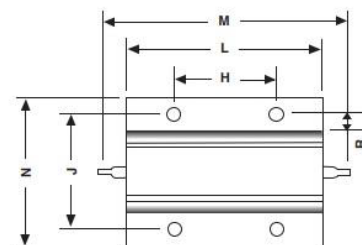
## DIMENSIONS (Unit:mm)

### HSA5 - HSA50



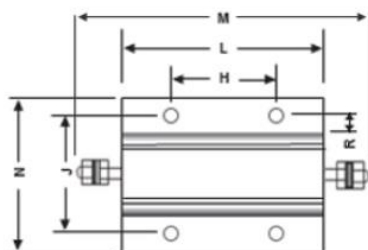
**HSA5 - HSA10** : Mounting Hole 2 x 2.4mm  
**HSA25 - HSA50** : Mounting Hole 2 x 3.3mm

### HSC75 - HSC150



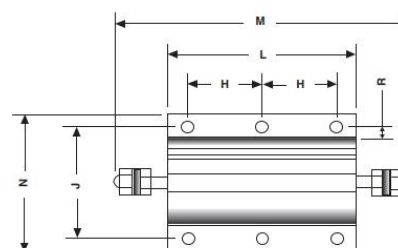
**HSC75 - HSC150** : Mounting Hole 4 x 4.4mm

### HSC75S - HSC150S



**HSC75 - HSC150** : Mounting Hole 4 x 4.4mm

### HSC300 - HSC300, HSHC350 - HSHC500



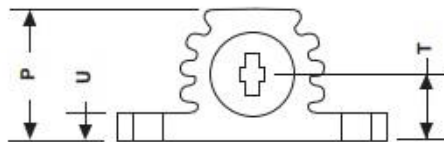
**HSC200 - HSC250** : Mounting Hole 2 x 2.4mm  
**HSC300, HSHC350 - HSHC500** : Mounting Hole 2 x 3.3mm

# Aluminium Housed Power Resistors

Type HS Series

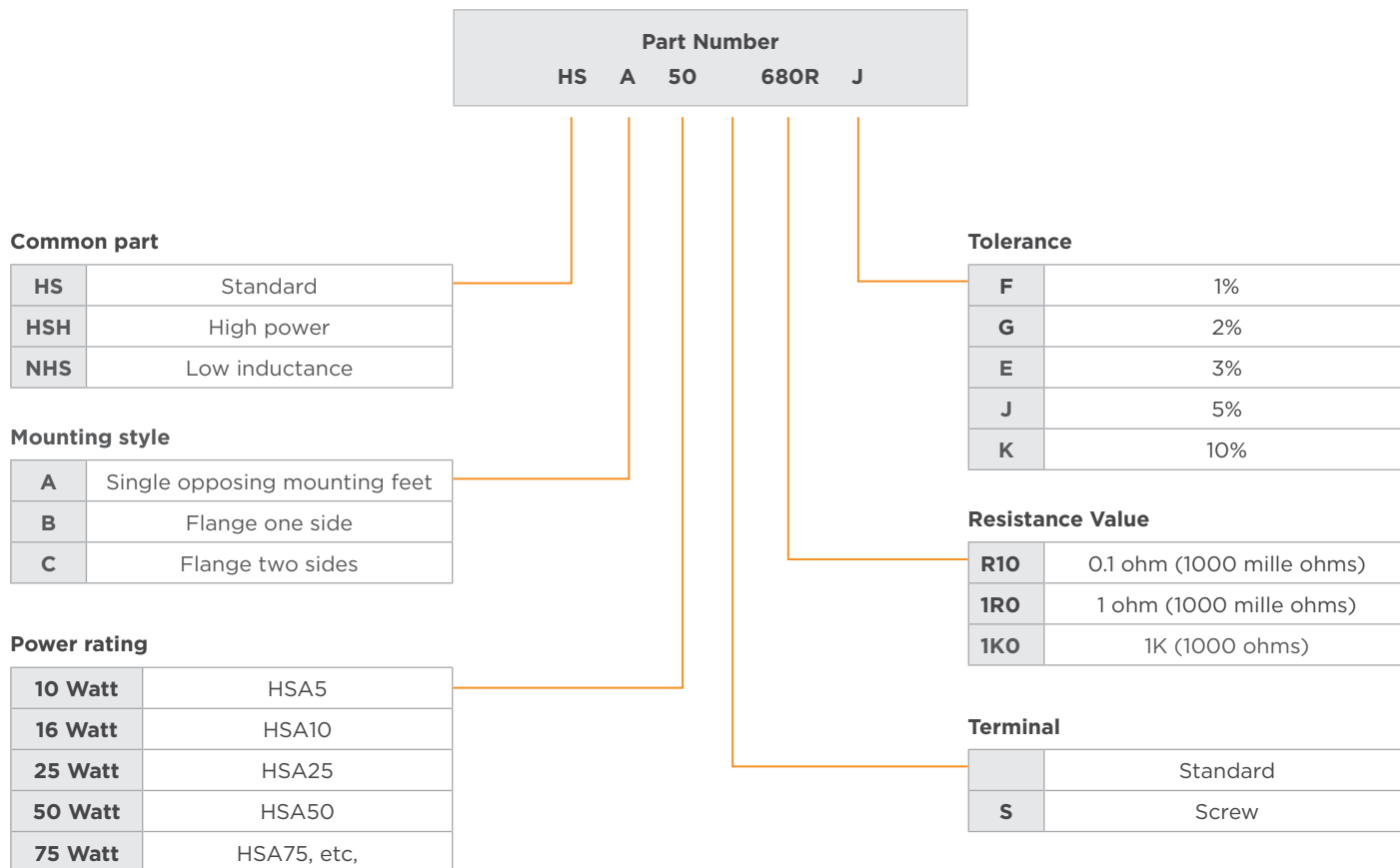
## DIMENSIONS (continued)

End Elevation (all models)



| Type     | H $\pm 0.3$ | J $\pm 0.3$ | L<br>maximum | M<br>maximum | N<br>maximum | P<br>maximum | R<br>minimum | T $\pm 0.5$ | U<br>maximum |
|----------|-------------|-------------|--------------|--------------|--------------|--------------|--------------|-------------|--------------|
| HSA5     | 11.3        | 12.4        | 17.0         | 30.0         | 17.0         | 9.0          | 1.9          | 4.3         | 2.5          |
| HSA10    | 14.3        | 15.9        | 21.0         | 36.5         | 21.0         | 11.0         | 1.9          | 5.2         | 3.2          |
| HSA25    | 18.3        | 19.8        | 29.0         | 51.0         | 28.0         | 15.0         | 2.8          | 7.2         | 3.2          |
| HSA50    | 39.7        | 21.4        | 51.0         | 72.5         | 30.0         | 17.0         | 2.8          | 8.2         | 3.2          |
| HSC75    | 29.0        | 37.0        | 49.0         | 71.0         | 48.0         | 24.0         | 5.0          | 11.5        | 3.5          |
| HSC100   | 35.0        | 37.0        | 66.0         | 87.5         | 48.0         | 24.0         | 5.0          | 11.5        | 3.5          |
| HSC150   | 58.0        | 37.0        | 98.0         | 122.0        | 48.0         | 24.0         | 5.0          | 11.5        | 3.5          |
| HSC200   | 35.0        | 57.2        | 90.0         | 143.0        | 73.0         | 42.0         | 5.6          | 20.25       | 5.3          |
| HSC250   | 44.5        | 57.2        | 109.0        | 163.0        | 73.0         | 42.0         | 5.6          | 20.25       | 5.3          |
| HSC300   | 52.0        | 59.0        | 128.0        | 180.0        | 73.0         | 42.0         | 5.6          | 20.25       | 5.3          |
| HSC75S   | 29.0        | 37.0        | 49.0         | 78.0         | 48.0         | 24.0         | 5.0          | 11.5        | 3.5          |
| HSC100S  | 35.0        | 37.0        | 66.0         | 94.0         | 48.0         | 24.0         | 5.0          | 11.5        | 3.5          |
| HSC150S  | 58.0        | 37.0        | 98.0         | 127.0        | 48.0         | 24.0         | 5.0          | 11.5        | 3.5          |
| HS HC350 | 61.50       | 59.0        | 147          | 196.0        | 73           | 42.0         | 5.6          | 20.25       | 5.3          |
| HS HC400 | 71.0        | 59.0        | 166          | 215.0        | 73           | 42.0         | 5.6          | 20.25       | 5.3          |
| HS HC450 | 80.5        | 59.0        | 185          | 234.0        | 73           | 42.0         | 5.6          | 20.25       | 5.3          |
| HS HC500 | 90.0        | 59.0        | 204          | 253.0        | 73           | 42.0         | 5.6          | 20.25       | 5.3          |

## ORDERING INFORMATION



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1773035 Rev. E 04/24 ED