

# Power Resistors Cooled by Auxiliary Heatsink (Not Supplied) Thick Film Technology



## FEATURES

- System without external radiation
- High power / volume ratio
- Non-inductive
- Screw-on outputs
- Possible configuration with 2 or 3 resistors
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

## LINKS TO ADDITIONAL RESOURCES



| STANDARD ELECTRICAL SPECIFICATIONS |        |                              |                                                        |                       |                                                                 |                                            |
|------------------------------------|--------|------------------------------|--------------------------------------------------------|-----------------------|-----------------------------------------------------------------|--------------------------------------------|
| MODEL                              | VALUE  | RESISTANCE RANGE<br>$\Omega$ | MAX. RATED POWER $P_{75\text{ }^{\circ}\text{C}}$<br>W | TOLERANCE<br>$\pm \%$ | TEMPERATURE<br>COEFFICIENT<br>$\pm \text{ppm}/^{\circ}\text{C}$ | E-SERIES<br>OHMIC<br>VALUES <sup>(3)</sup> |
| RCEC 400                           | Single | 0.15 <sup>(2)</sup> to 0.49  | 400                                                    | 10, 5 <sup>(1)</sup>  | 700 (typical)                                                   | E 24                                       |
|                                    | Single | 0.5 to 3                     | 400                                                    | 10, 5 <sup>(1)</sup>  | 300 (typical)                                                   | E 24                                       |
|                                    | Single | 3.3 to 1M                    | 400                                                    | 10, 5 <sup>(1)</sup>  | 100 (typical)                                                   | E 24                                       |
|                                    | Double | 1.5 to 1M                    | 2 x 180                                                | 10, 5 <sup>(1)</sup>  | 150 (typical)                                                   | E 24                                       |

## Notes

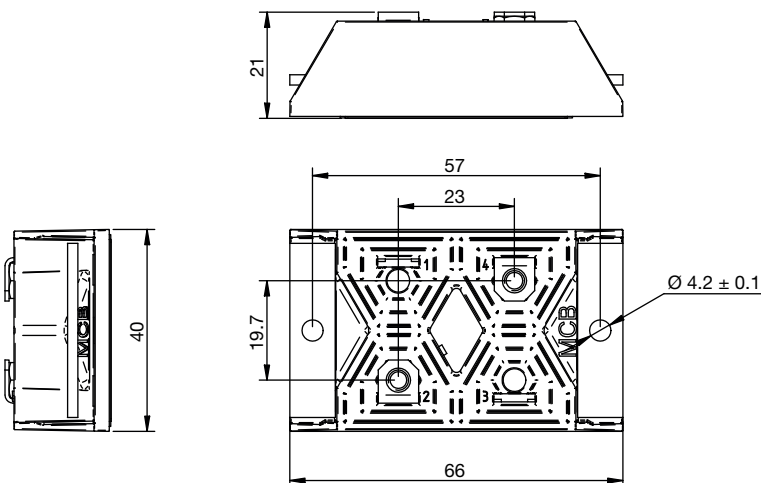
- (1)  $\pm 2 \%$  or  $\pm 1 \%$  on special request for limited resistance value and with reduction of maximum power and pulse rating (contact us for detail)
- (2) Current limitation for 0.15  $\Omega$ : 30 A<sub>RMS</sub> max.
- (3) Other on request

## MECHANICAL SPECIFICATIONS

|                             |                                       |
|-----------------------------|---------------------------------------|
| UL 94 flame classifications | Material in accordance with UL 94 V-0 |
| Resistive element           | Thick film                            |
| Substrate                   | Alumina                               |
| Encapsulation               | Resin filled in housing               |

## TECHNICAL SPECIFICATIONS

| PARAMETER                                            | SINGLE VALUE                                      | DOUBLE VALUE |
|------------------------------------------------------|---------------------------------------------------|--------------|
| Operating temperature range                          | -55 $^{\circ}\text{C}$ to +150 $^{\circ}\text{C}$ |              |
| Maximum operating voltage                            | 4000 V                                            |              |
| Dielectric strength $V_{\text{RMS}}$ (50 Hz / 1 min) | 6000 V                                            |              |
| Creepage distance                                    | > 42 mm                                           |              |
| Clearance distance                                   | > 12 mm                                           | > 10 mm      |
| CTI index                                            | > 600                                             |              |
| Partial discharge                                    | < 20 pC at 5000 V <sub>eff</sub>                  |              |
| Inductance                                           | < 40 nH                                           |              |
| Insulation resistance                                | $10^5 \text{ M}\Omega$ at 500 V <sub>DC</sub>     |              |
| Weight (max.)                                        | 75 g                                              |              |

**DIMENSIONS** in millimeters

**PERFORMANCES**

| TESTS                   |              | CONDITIONS                                 | REQUIREMENTS                          | TYPICAL VALUES |
|-------------------------|--------------|--------------------------------------------|---------------------------------------|----------------|
| Momentary overload      | Single value | 800 W / 10 s                               | 2 %                                   | 0.2 %          |
|                         | Double value | 2 x 360 W / 10 s                           |                                       |                |
| Humidity (steady state) |              | 56 days, 40 °C, 95 % HR                    | 2 % or 0.05 $\Omega$ <sup>(1)</sup>   | 0.2 %          |
| VRT                     |              | -55 °C to +125 °C 5 cycles                 | 2 % or 0.05 $\Omega$ <sup>(1)</sup>   | 0.2 %          |
| Mechanical shock        |              | IEC 60115-4 clause 2-3-6                   | 0.5 % or 0.05 $\Omega$ <sup>(1)</sup> | 0.25 %         |
| Vibration               |              | IEC 60115-4 clause 2-3-2                   | 0.5 % or 0.05 $\Omega$ <sup>(1)</sup> | 0.25 %         |
| Terminals strength      |              | 130 Ncm / 100 N                            | 1 % or 0.05 $\Omega$ <sup>(1)</sup>   | 0.1 %          |
| Endurance               |              | 2000 cycles P <sub>n</sub> 30 min / 30 min | 5 %                                   | 0.2 %          |

**Note**
<sup>(1)</sup> The higher of either value

**ENERGY ABSORPTION**
**Single Value**

Repetitive operation: 2 J/t = 50  $\mu$ s

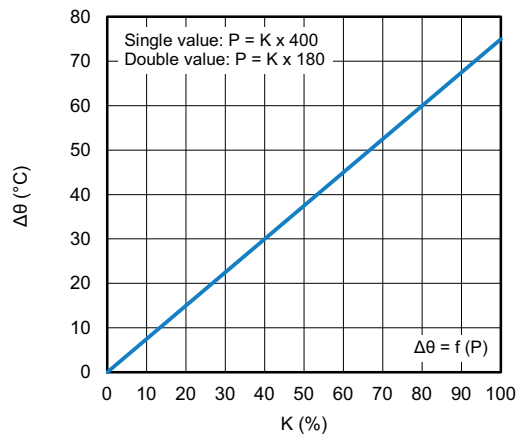
Other t values: consult us

**Double Value**

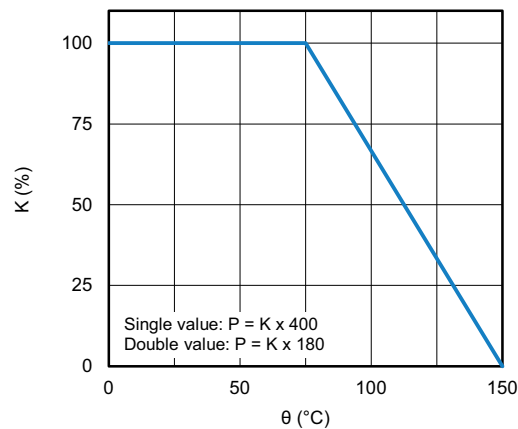
Repetitive operation: 2 J/t = 50  $\mu$ s

Other t values: consult us

## DISSIPATION

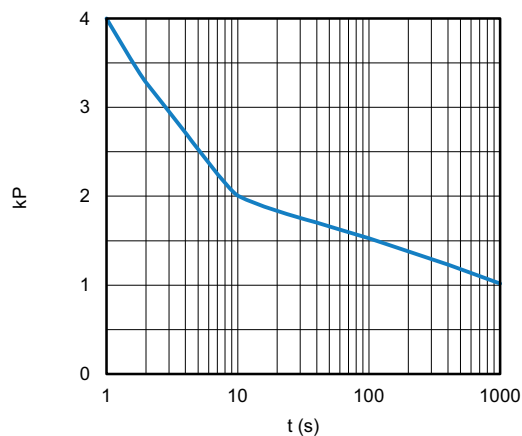


Temperature Rise as a Function of the Power Applied  
Overall Thermal Resistance 0.1875 °C/W  
(Double Value: 0.2083 °C/W)



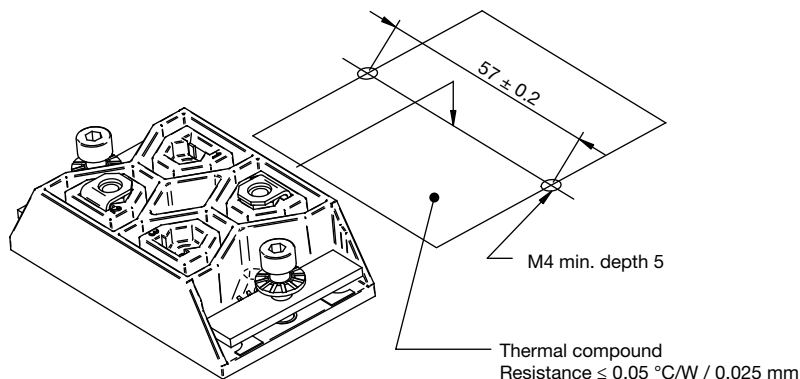
Permanent Applicable Power as a Function  
of Heatsink Temperature

## OVERLOAD



Intermittent Overload (Exceptional Operation)

## ASSEMBLY



Maximum tightening torque:  
150 Ncm, mechanical mounting  
130 Ncm, electrical mounting

## COOLING

The temperature of the heatsink may be maintained at the specified values with:

- Forced air ventilation
- Internal circulation of a cooling liquid
- Heatsink contact surface: Ra 6.3 µm
- Evenness defect: 0.05 mm max.
- Surface temperature gradient (isotherm): 20 °C max.
- Thermal compound not supplied (resistance < 0.025 °C/W / 0.05 mm)

The user must select the thermal resistance of the heatsink according to the power applied.

| ORDERING INFORMATION |                            |    |                                        |                                                  |                                        |                            |                                        |        |           |
|----------------------|----------------------------|----|----------------------------------------|--------------------------------------------------|----------------------------------------|----------------------------|----------------------------------------|--------|-----------|
| RCEC                 | 400                        | GD | MP                                     | 100K                                             | 5 %                                    | 100K                       | 5 %                                    | XXX    | BO20      |
| MODEL                | STYLE                      |    | OPTION                                 | RESISTANCE<br>VALUE                              | TOLERANCE                              | RESISTANCE<br>VALUE        | TOLERANCE                              | CUSTOM | PACKAGING |
|                      | Single<br>Double<br>Triple |    | Common<br>point for<br>double<br>value | Value for<br>single<br>First value<br>for double | ± 5 %<br>± 10 %<br>Other on<br>request | Second value<br>for double | ± 5 %<br>± 10 %<br>Other on<br>request |        |           |

| GLOBAL PART NUMBER INFORMATION |   |                                           |   |                                                                                                                                                                                                                                                                       |   |                     |   |           |   |                                      |   |   |   |   |  |  |  |
|--------------------------------|---|-------------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------------|---|-----------|---|--------------------------------------|---|---|---|---|--|--|--|
| R                              | C | E                                         | C | 4                                                                                                                                                                                                                                                                     | 0 | 0                   | G | S         | 2 | R                                    | 7 | 0 | J | B |  |  |  |
| 1                              |   |                                           |   |                                                                                                                                                                                                                                                                       |   | 2                   |   | 3         |   |                                      |   | 4 | 5 | 6 |  |  |  |
| 1                              |   | 2                                         |   | 3                                                                                                                                                                                                                                                                     |   | 4                   |   | 5         |   | 6                                    |   |   |   |   |  |  |  |
| GLOBAL<br>MODEL                |   | LEAD                                      |   | OHMIC VALUE                                                                                                                                                                                                                                                           |   | TOLERANCE           |   | PACKAGING |   | INDUSTRIALIZATION<br>NUMBER          |   |   |   |   |  |  |  |
| RCEC 400                       |   | Simple = GS<br>Double = GD<br>Triple = GT |   | The first three digits<br>are significant<br>figures and the last<br>specifies the<br>number of zeros to<br>follow, R designates<br>decimal point.<br>4702 = 47 kΩ<br>48R7 = 48.7 Ω<br>In case of double or<br>triple value =><br>value = sum of the<br>2 or 3 values |   | J = 5 %<br>K = 10 % |   | B = box   |   | 3 specific digits<br>(if applicable) |   |   |   |   |  |  |  |

| EXAMPLES |                                           |                    |
|----------|-------------------------------------------|--------------------|
| MODEL    | DESCRIPTION                               | PART NUMBER        |
| RCEC 400 | RCEC 400 GS 2U7 5 % BO20                  | RCEC400GS2R70JB    |
| RCEC 400 | RCEC 400 GD MP 12K 10 % 12K 10 % 998 BO20 | RCEC400GD2402KB998 |



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