

Power Resistor, for Mounting onto a Heatsink Thick Film Technology



Manufactured in cermet thick film technology, these power resistors exhibit remarkable characteristics and the series includes 4 types ranging from 5 W to 50 W.

Designed to be mounted onto a heatsink, the resistors can bear high short time overloads and 3 types of terminations are available.

The resistors are non inductive and are particularly suitable for high frequency operation and cut-out circuits.

FEATURES

- 5 W to 50 W
- High power rating
- High overload capabilities up to 2500 V_{RMS}
- Wide resistance range from 0.24 MΩ to 1 MΩ
- High thermal capacity up to 0.8 °C/W
- Easy mounting
- Reduced size and weight
- High insulation: 10⁶ MΩ
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT

DIMENSIONS in millimeters



| MODEL | RCH5 | RCH10 | RCH25 | RCH50 |
|--------------------|------|-------|-------|-------|
| L | 16.6 | 19 | 28 | 47.8 |
| W | 9 | 11 | 14 | 15.5 |
| H | 16.4 | 20.6 | 27.5 | 29.5 |
| P Leads Pitch | 10.2 | 12.7 | 18.3 | 30.5 |
| F Connection Pitch | 11.3 | 14.3 | 18.3 | 39.7 |
| T | 12.5 | 15.9 | 19.8 | 21.4 |
| S | 5.3 | 5 | 7.7 | 8 |
| Ø D | 2.4 | 2.4 | 3.2 | 3.2 |
| Weight (g) | 4 | 5 | 7 | 12 |

Note

- Tolerances unless stated: ± 0.3 mm

**STANDARD ELECTRICAL SPECIFICATIONS**

| MODEL | RESISTANCE RANGE Ω | RATED POWER $P_{25\text{ }^\circ\text{C}}$ W | TOLERANCE $\pm \%$ | TEMPERATURE COEFFICIENT $\pm \text{ppm}/^\circ\text{C}$ |
|-------|------------------------------|--|-----------------------|--|
| RCH | 0.24 to 1 M E24 range | 5 to 50 | 1, 2, 5, 10 | 150, 250 |

MECHANICAL SPECIFICATIONS

| | |
|-----------------------|---------------------|
| Mechanical Protection | Insulated case |
| Resistive Element | Cermet |
| Substrate | Alumina |
| Connections | Tinned copper alloy |

ENVIRONMENTAL SPECIFICATIONS

| | |
|-------------------|--|
| Temperature Range | - 55 °C to + 125 °C |
| Climatic Category | 55/125/56 |
| Flammability | IEC 60695-11-5 2 applications 30 s separated by 60 s |

TECHNICAL SPECIFICATIONS

| | |
|---|--------------------------------------|
| Dissipation and Associated | Onto a heatsink |
| Power Rating: Chassis Mounted Unmounted | 5 W to 50 W 2 W to 5.5 W |
| Temperature Coefficient | $\pm 150 \text{ ppm}/^\circ\text{C}$ |
| Insulation Resistance | $10^6 \text{ M}\Omega$ |
| Total Inductance | $\leq 0.1 \mu\text{H}$ |

PERFORMANCE

| TESTS | CONDITIONS | REQUIREMENTS |
|--------------------------|---|---------------------------------|
| Momentary Overload | NF EN140000 CEI 115_1 2 Pr/5 s $U_S < 1.5 U_L$ | $< \pm (0.25 \% + 0.05 \Omega)$ |
| Rapid Temperature Change | NF EN140000 125 °C CEI 68215 Test Na 5 cycles - 55 °C to + 125 °C | $< \pm (0.25 \% + 0.05 \Omega)$ |
| Load Life | NF EN140000 CEI 115_1 1000 h Pr at + 25 °C | $< \pm (0.5 \% + 0.05 \Omega)$ |
| Humidity (Steady State) | 56 days RH 95 % MIL-STD-202 Method 103 B and C | $< \pm (0.5 \% + 0.05 \Omega)$ |

RESISTANCE VALUE IN RELATION TO TOLERANCE AND TCR

| | | |
|----------------------|--------------------------------------|--------------------------------------|
| Resistance Values | $< 1 \Omega$ | $> 1 \Omega$ |
| Standard Tolerances | $\pm 5 \%$ $\pm 10 \%$ | |
| Standard TCR | $\pm 250 \text{ ppm}/^\circ\text{C}$ | $\pm 150 \text{ ppm}/^\circ\text{C}$ |
| Tolerance on Request | $\pm 1 \%$ to $\pm 2 \%$ | |

SPECIAL FEATURES

| MODEL | RCH 5 | RCH 10 | RCH 25 | RCH 50 |
|---|---------------|---------------|-----------------|-----------------|
| Power Rating-Chassis Mounted | 5 W | 10 W | 25 W | 50 W |
| Power Rating-Unmounted | 2 W | 2.5 W | 4 W | 5.5 W |
| Thermal Resistance $R_{th(j-c)}$ | 4.8 °C/W | 3.2 °C/W | 1.4 °C/W | 0.8 °C/W |
| Limiting Element Voltage (V_{RMS}) | 160 V | 250 V | 550 V | 1285 V |
| Max. Overload Voltage (V_{RMS}) | 320 V | 500 V | 1100 V | 2500 V |
| Dielectric Strength (V_{RMS}) 50 Hz, 1 min MIL-STD-202 Method 301 10 mA max. | 2000 V | 2000 V | 3500 V | 3500 V |
| Critical Resistance | 5120 Ω | 6250 Ω | 12 100 Ω | 33 024 Ω |



RECOMMENDATIONS FOR MOUNTING ONTO A HEATSINK

- Surfaces in contact must be carefully cleaned.
- The heatsink must have an acceptable flatness: From 0.05 mm to 0.1 mm/100 mm.
- Roughness of the heatsink must be around 6.3 μm. In order to improve thermal conductivity, surfaces in contact (alumina, heatsink) are coated with a silicone grease (type SI 340 from Rhône-Poulenc or Dow 340 from Dow Corning).
- The fastening of the resistor to the heatsink is under pressure control of two screws (not supplied).

| Tightening Torque on heatsink | RCH 5 | RCH 10 | RCH 25 | RCH 50 |
|-------------------------------|--------|--------|--------|--------|
| | 0.5 Nm | 0.6 Nm | 0.7 Nm | 1 Nm |

- In order to improve the dissipation, either forced-air cooling or liquid cooling may be used.
- A low thermal radiation of the case allows several resistors to be mounted onto the same heatsink.
- Do not forget to respect an insulation value between two resistors (dielectric strength in dry air 1 kV/mm).
- In any case the hot spot temperature, measured locally on the case must not exceed 125 °C.
- Tests should be performed by the user.

CHOICE OF THE HEATSINK

The user must choose according to the working conditions of the component (power, room temperature). Maximum working temperature must not exceed 125 °C. The dissipated power is simply calculated by the following ratio:

$$P = \frac{\Delta T}{[R_{TH(j-c)} + R_{TH(c-a)}]} \quad (1)$$

- P: Expressed in W
- ΔT: Difference between maximum working temperature and room temperature or fluid cooling temperature.
- R_{th(j-c)}: Thermal resistance value measured between resistive layer and outer side of the resistor. It is the thermal resistance of the component: 0.039 °C/W.
- R_{th(c-h)}: Thermal resistance value measured between outer side of the resistor and upper side of the heatsink. This is the thermal resistance of the interface (grease, thermal pad), and the quality of the fastening device.
- R_{th(h-a)}: Thermal resistance of the heatsink.

Example:

R_{TH(c-a)} for RCH 25 power rating 20 W at ambient temperature + 50 °C

Thermal resistance R_{TH(j-c)}: 2.5 °C/W

Considering equation (1) we have:

$$\Delta T \leq 125 \text{ °C} - 50 \text{ °C} \leq 75 \text{ °C}$$

$$R_{TH(j-c)} = 1.4 \text{ °C/W (Special Features)}$$

$$R_{TH(j-c)} + R_{TH(c-a)} = \frac{\Delta T}{P} = \frac{75}{20} = 3.75 \text{ °C/W}$$

$$R_{TH(c-a)} \leq 3.75 \text{ °C/W} - 1.4 \text{ °C/W} \leq 2.35 \text{ °C/W}$$



OVERLOADS

The applied voltage must always be lower than the maximum overload voltage as shown in the special features table.

The values indicated on the graph below are applicable to resistors in air or mounted onto a heatsink.

ENERGY CURVE



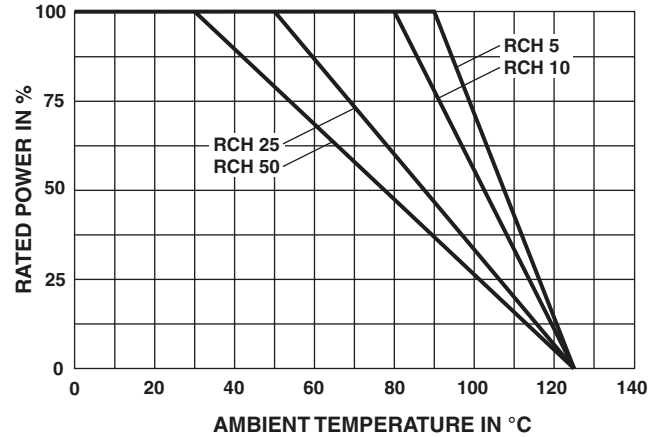
POWER CURVE



POWER RATING

For resistors mounted onto heatsink and thermal resistance of 1 °C/W.

To improve the thermal conductivity, surfaces in contact should be coated with a silicone grease.



MARKING

Model, style, resistance value (in Ω), tolerance (in %), manufacturing date, Vishay Sfernice trademark.



| ORDERING INFORMATION | | | | | |
|----------------------|-----------|------------------|---|---|---------------|
| RCH | 25 | 3.3 kΩ | ± 5 % | R | xxx |
| MODEL | STYLE | RESISTANCE VALUE | TOLERANCE | CONNECTIONS | CUSTOM DESIGN |
| | | | Optional ± 1 % ± 2 % ± 5 % ± 10 % | Optional S: Flat with hole R: Round lead V: M2 screw | Optional |





Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and/or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)
Email: org@lifeelectronics.ru