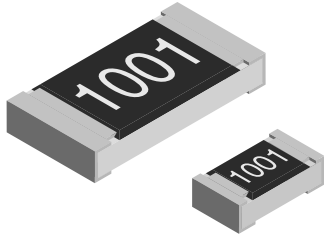


Lead (Pb)-bearing Thick Film, Rectangular Precision Chip Resistor



FEATURES

- Low temperature coefficient (25 ppm/K) and tight tolerances ($\pm 0.25\%$)
- Excellent stability ($(|\Delta R/R| \leq \pm 1\%$ for 1000 h at 70 °C)
- SnPb contacts on Ni barrier layer
- Metal glaze on high quality ceramic
- Protective overglaze

| STANDARD ELECTRICAL SPECIFICATIONS | | | | | | | | |
|------------------------------------|------|--------|--|--|----------------------------------|----------------------------|------------------------------|----------|
| MODEL | SIZE | | POWER RATING $P_{70^\circ\text{C}} \text{ W}$ | LIMITING ELEMENT VOLTAGE MAX. V_{Ξ} | TEMPERATURE COEFFICIENT ppm/K | TOLERANCE % | RESISTANCE RANGE Ω | E-SERIES |
| | INCH | METRIC | | | | | | |
| D10/CRCW0402-P | 0402 | 1005 | 0.063 | 50 | ± 100 | ± 0.5 | 10R - 1M0 | 24 + 96 |
| | | | | | ± 50 | $\pm 0.25; \pm 0.5; \pm 1$ | 100R - 1M0 | |
| | | | | | ± 25 | $\pm 0.5; \pm 1$ | 1K0 - 10K | |
| D11/CRCW0603-P | 0603 | 1608 | 0.1 | 75 | ± 100 | ± 0.5 | 10R - 10M | 24 + 96 |
| | | | | | ± 50 | $\pm 0.5; \pm 1$ | 100R - 10M | |
| | | | | | ± 25 | ± 0.25 | 100R - 1M0 | |
| D12/CRCW0805-P | 0805 | 2012 | 0.125 | 150 | ± 100 | ± 0.5 | 10R - 10M | 24 + 96 |
| | | | | | ± 50 | $\pm 0.5; \pm 1$ | 100R - 10M | |
| | | | | | ± 25 | ± 0.25 | 100R - 1M0 | |
| D25/CRCW1206-P | 1206 | 3216 | 0.25 | 200 | ± 100 | ± 0.5 | 10R - 10M | 24 + 96 |
| | | | | | ± 50 | $\pm 0.5; \pm 1$ | 100R - 10M | |
| | | | | | ± 25 | ± 0.25 | 100R - 1M0 | |
| CRCW1210-P | 1210 | 3225 | 0.33 | 200 | ± 100 | ± 0.5 | 10R - 10M | 24 + 96 |
| | | | | | ± 50 | $\pm 0.5; \pm 1$ | 100R - 1M0 | |
| | | | | | ± 25 | $\pm 0.25; \pm 0.5; \pm 1$ | 150R - 10K | |
| CRCW1218-P | 1218 | 3246 | 1.0 | 200 | ± 100 | ± 0.5 | 10R - 10M | 24 + 96 |
| | | | | | ± 50 | $\pm 0.5; \pm 1$ | 100R - 2M2 | |
| | | | | | ± 25 | $\pm 0.5; \pm 1$ | 100R - 1M0 | |
| CRCW2010-P | 2010 | 5025 | 0.5 | 400 | ± 100 | ± 0.5 | 10R - 10M | 24 + 96 |
| | | | | | ± 50 | $\pm 0.5; \pm 1$ | 100R - 10M | |
| | | | | | ± 25 | $\pm 0.5; \pm 1$ | 100R - 1M0 | |
| CRCW2512-P | 2512 | 6332 | 1.0 | 500 | ± 100 | ± 0.5 | 10R - 10M | 24 + 96 |
| | | | | | ± 50 | $\pm 0.5; \pm 1$ | 100R - 10M | |
| | | | | | ± 25 | $\pm 0.5; \pm 1$ | 100R - 1M0 | |

Notes

- These resistors do not feature a limited lifetime when operated within the permissible limits. However, resistance value drift increasing over operating time may result in exceeding a limit acceptable to the specific application, thereby establishing a functional lifetime.
- Marking and packaging: see appropriate catalog or web pages
- Power rating depends on the max. temperature at the solder point, the component placement density and the substrate material



Lead (Pb)-bearing Thick Film, Rectangular Precision Chip Resistor

| TECHNICAL SPECIFICATIONS | | | | | | | | | |
|---|-------------------|------------------------|--------------------|--------------------|--------------------|------------|------------|------------|------------|
| PARAMETER | UNIT | D10/ CRCW0402-P | D11/ CRCW0603-P | D12/ CRCW0805-P | D25/ CRCW1206-P | CRCW1210-P | CRCW1218-P | CRCW2010-P | CRCW2512-P |
| Rated Dissipation at 70 °C ⁽³⁾ | W | 0.063 | 0.1 | 0.125 | 0.25 | 0.33 | 1 | 0.5 | 1 |
| Limiting Element Voltage ⁽²⁾ | V _≡ | 50 | 75 | 150 | 200 | 200 | 200 | 400 | 500 |
| Insulation Voltage (1 min) | V _{peak} | > 75 | > 100 | > 200 | > 300 | > 300 | > 300 | > 300 | > 300 |
| Thermal Resistance ⁽¹⁾ | K/W | ≤ 870 | ≤ 550 | ≤ 440 | ≤ 220 | ≤ 140 | ≤ 65 | ≤ 88 | ≤ 65 |
| Insulation Resistance | Ω | > 10 ⁹ | | | | | | | |
| Category Temperature Range | °C | - 55 to + 155 | | | | | | | |
| Failure Rate | h ⁻¹ | 0.3 x 10 ⁻⁹ | | | | | | | |
| Weight/1000 pieces | g | 0.65 | 2 | 5.5 | 10 | 16 | 29.5 | 25.5 | 40.5 |

Notes

- ⁽¹⁾ For sizes 0402 until 1206 the measuring conditions are in acc. to EN 140401-802. For all other sizes the result depends on the solder pad dimensions.
- ⁽²⁾ Rated voltage: $\sqrt{P \times R}$
- ⁽³⁾ The power dissipation on the resistor generates a temperature rise against the local ambient, depending on the heat flow support of the printed-circuit board (thermal resistance). The rated dissipation applies only if the permitted film temperature of 155 °C is not exceeded.

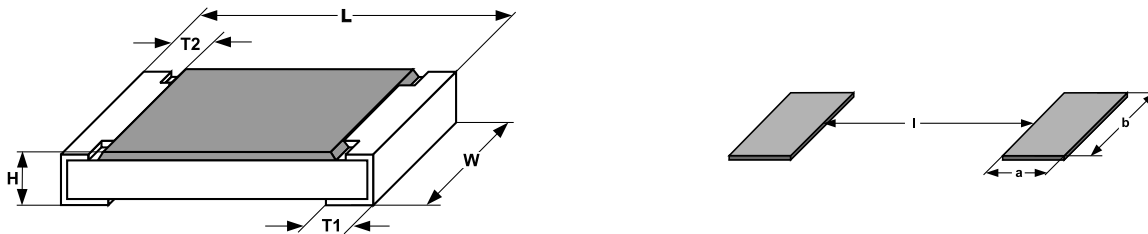
| PART NUMBER AND PRODUCT DESCRIPTION | | | | | | | | | | | | | | | | | |
|--|------------------------------|--|--|--|---|---|---|---|---|---|---------------------------------|---|---|---|---|---|--|
| PART NUMBER: CRCW080525R0DKTAP ⁽⁴⁾ | | | | | | | | | | | | | | | | | |
| C | R | C | W | 0 | 8 | 0 | 5 | 2 | 5 | R | 0 | D | K | T | A | P | |
| MODEL/SIZE | | VALUE | | TOLERANCE | | TCR | | PACKAGING ⁽⁵⁾ | | | SPECIAL | | | | | | |
| CRCW0402 CRCW0603 CRCW0805 CRCW1206 CRCW1210 CRCW1218 CRCW2010 CRCW2512 | | R = Decimal K = Thousand M = Million | | C = ± 0.25 % D = ± 0.5 % F = ± 1 % | | E = ± 25 ppm/K H = ± 50 ppm/K K = ± 100 ppm/K | | TA, TB, TC, TD, TE, TF, TG, TH, TI, TK, TL | | | up to 2 digits P = Precision | | | | | | |
| PRODUCT DESCRIPTION: CRCW0805 25R0 D 100 RT1 | | | | | | | | | | | | | | | | | |
| CRCW0805 | 25R0 | | D | 100 | RT1 | | | | | | | | | | | | |
| MODEL | RESISTANCE VALUE | | TOLERANCE | TCR | PACKAGING ⁽⁵⁾ | | | | | | | | | | | | |
| CRCW0402 CRCW0603 CRCW0805 CRCW1206 CRCW1210 CRCW1218 CRCW2010 CRCW2512 | 49R9 = 49.9 Ω 5R1 = 5.1 Ω | | C = ± 0.25 % D = ± 0.5 % F = ± 1 % | ± 25 ppm/K ± 50 ppm/K ± 100 ppm/K | RT1, RT5, RT6, RT7 RT4, R02, R67, R82, RG1, RT9, R20 | | | | | | | | | | | | |

Notes

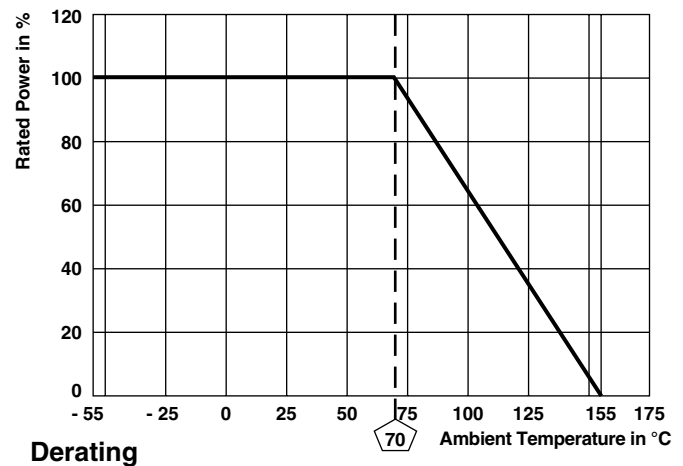
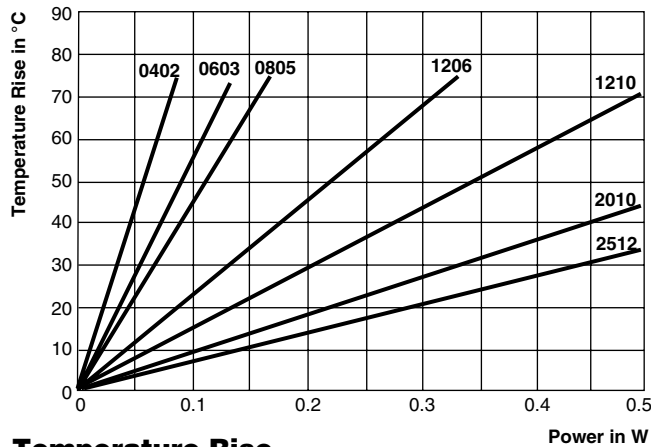
- ⁽⁴⁾ Preferred way for ordering products is by use of the PART NUMBER
- ⁽⁵⁾ Please refer to table PACKAGING, see next page

| PACKAGING | | | | | | | | |
|------------------|------------|---------------|-------|--------------|---------------|---------|-------|---------|
| MODEL | REEL | | | | PART NUMBER | | BULK | |
| | TAPE WIDTH | DIAMETER | PITCH | PIECES/ REEL | PAPER | BLISTER | PAPER | BLISTER |
| | | | | | PRODUCT DESC. | | PAPER | BLISTER |
| D10/ CRCW0402 | 8 mm | 180 mm/7" | 2 mm | 10 000 | TD | | RT7 | |
| | | 330 mm/13" | 2 mm | 50 000 | TE | | RF4 | |
| D11/ CRCW0603 | 8 mm | 180 mm/7" | 4 mm | 5000 | TA | TI | RT1 | RG1 |
| | | 285 mm/11.25" | 4 mm | 10 000 | TB | | RT5 | |
| | | 330 mm/13" | 4 mm | 20 000 | TC | TL | RT6 | R20 |
| D12/ CRCW0805 | 8 mm | 180 mm/7" | 4 mm | 5000 | TA | TI | RT1 | RG1 |
| | | 285 mm/11.25" | 4 mm | 10 000 | TB | | RT5 | |
| | | 330 mm/13" | 4 mm | 20 000 | TC | TL | RT6 | R20 |
| D25/ CRCW1206 | 8 mm | 180 mm/7" | 4 mm | 5000 | TA | TI | RT1 | RG1 |
| | | 285 mm/11.25" | 4 mm | 10 000 | TB | | RT5 | |
| | | 330 mm/13" | 4 mm | 20 000 | TC | TL | RT6 | R20 |
| CRCW1210 | 8 mm | 180 mm/7" | 4 mm | 5000 | TA | | RT1 | |
| | | 285 mm/11.25" | 4 mm | 10 000 | TB | | RT5 | |
| | | 330 mm/13" | 4 mm | 20 000 | TC | | RT6 | |
| CRCW1218 | 12 mm | 180 mm/7" | 4 mm | 4000 | | TK | | RT9 |
| CRCW2010 | 12 mm | 180 mm/7" | 4 mm | 4000 | | TF | | R02 |
| CRCW2512 | 12 mm | 180 mm/7" | 8 mm | 2000 | | TG | | R67 |
| | | | 4 mm | 4000 | | TH | | R82 |

DIMENSIONS



| SIZE | | DIMENSIONS [in millimeters] | | | | | SOLDER PAD DIMENSIONS [in millimeters] | | | | | |
|------|--------|--|-------------|-------------|---|-----------|--|-----|-----|----------------|-----|-----|
| | | | | | | | REFLOW SOLDERING | | | WAVE SOLDERING | | |
| INCH | METRIC | L | W | H | T1 | T2 | a | b | l | a | b | l |
| 0402 | 1005 | 1.0 ± 0.05 | 0.5 ± 0.05 | 0.35 ± 0.05 | 0.25 ± 0.05 | 0.2 ± 0.1 | 0.4 | 0.6 | 0.5 | | | |
| 0603 | 1608 | 1.55 ^{+0.10} / _{-0.05} | 0.85 ± 0.1 | 0.45 ± 0.05 | 0.3 ± 0.2 | 0.3 ± 0.2 | 0.5 | 0.9 | 1.0 | 0.9 | 0.9 | 1.0 |
| 0805 | 2012 | 2.0 ^{+0.20} / _{-0.10} | 1.25 ± 0.15 | 0.45 ± 0.05 | 0.3 ^{+0.20} / _{-0.10} | 0.3 ± 0.2 | 0.7 | 1.3 | 1.2 | 0.9 | 1.3 | 1.3 |
| 1206 | 3216 | 3.2 ^{+0.10} / _{-0.20} | 1.6 ± 0.15 | 0.55 ± 0.05 | 0.45 ± 0.2 | 0.4 ± 0.2 | 0.9 | 1.7 | 2.0 | 1.1 | 1.7 | 2.3 |
| 1210 | 3225 | 3.2 ± 0.2 | 2.5 ± 0.2 | 0.55 ± 0.05 | 0.45 ± 0.2 | 0.4 ± 0.2 | 0.9 | 2.5 | 2.0 | 1.1 | 2.5 | 2.2 |
| 1218 | 3246 | 3.2 ^{+0.10} / _{-0.20} | 4.6 ± 0.15 | 0.55 ± 0.05 | 0.45 ± 0.2 | 0.4 ± 0.2 | 1.05 | 4.9 | 1.9 | 1.25 | 4.8 | 1.9 |
| 2010 | 5025 | 5.0 ± 0.15 | 2.5 ± 0.15 | 0.6 ± 0.1 | 0.6 ± 0.2 | 0.6 ± 0.2 | 1.0 | 2.5 | 3.9 | 1.2 | 2.5 | 3.9 |
| 2512 | 6332 | 6.3 ± 0.2 | 3.15 ± 0.15 | 0.6 ± 0.1 | 0.6 ± 0.2 | 0.6 ± 0.2 | 1.0 | 3.2 | 5.2 | 1.2 | 3.2 | 5.2 |

**Lead (Pb)-bearing Thick Film, Rectangular
Precision Chip Resistor**

TEST PROCEDURES AND REQUIREMENTS

| EN 60115-1 | | |
|--|---|---|
| TEST (clause) | CONDITIONS OF TEST | REQUIREMENTS |
| | | PERMISSIBLE CHANGE ($\Delta R/R$) |
| | Stability for product types: | STABILITY CLASS 1 OR BETTER |
| | D../CRCW....-P | 10R to 10M |
| Resistance (4.5) | - | $\pm 1\%$; $\pm 0.5\%$; $\pm 0.25\%$ |
| Temperature coefficient (4.8.4.2) | 20/- 55/20 °C and 20/125/20 °C | ± 100 ppm/K; ± 50 ppm/K; ± 100 ppm/K |
| Overload (4.13) | $U = 2.5 \times (P_{70} \times R)^{1/2}$ $\leq 2 \times U_{max.}$; Duration: according the style | $\pm (0.25\% R + 0.05 \Omega)$ |
| Solderability (4.17.5) | Aging 4 h at 155 °C, dryheat solder bath method; 235 °C; 2 s visual examination | Good tinning ($\geq 95\%$ covered) no visible damage |
| Resistance to soldering heat (4.18.2) | Solder bath method; (260 \pm 5) °C; (10 \pm 1) s | $\pm (0.25\% R + 0.05 \Omega)$ |
| Rapid change of temperature (4.19) | 30 min at LCT = - 55 °C; 30 min at UCT = 125 °C; 5 cycles | $\pm (0.25\% R + 0.05 \Omega)$ |
| Damp heat, steady state (4.24) | (40 \pm 2) °C; 56 days; (93 \pm 3) % RH | $\pm (1\% R + 0.05 \Omega)$ |
| Climatic sequence (4.23) | 16 h at UCT = 125 °C; 1 cycle at 55 °C; 2 h at LCT = - 55 °C; 1 h/1 kPa at 15 °C to 35 °C; 5 cycles at 55 °C $U = (P_{70} \times R)^{1/2}$ $U = U_{max.}$; whichever is less severe | $\pm (1\% R + 0.05 \Omega)$ |
| Endurance at 70 °C (4.25.1) | $U = (P_{70} \times R)^{1/2}$ $U = U_{max.}$; whichever is less severe 1.5 h ON; 0.5 h OFF; 70 °C; 1000 h | $\pm (1\% R + 0.05 \Omega)$ |
| Extended endurance (4.25.1.8) | Duration extended to 8000 h | $\pm (2\% R + 0.1 \Omega)$ |
| Endurance at upper category temperature (4.25.3) | UCT = 125 °C; 1000 h | $\pm (1\% R + 0.05 \Omega)$ |

APPLICABLE SPECIFICATIONS

| | |
|-----------------|--|
| • EN 60115-1 | Generic Specifications |
| • EN 140400 | Sectional Specification |
| • EN 140401-802 | Detail Specifications |
| • IEC 60068-2-x | Variety of environmental test procedures |
| • IEC 60286-3 | Packaging of SMD components |



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