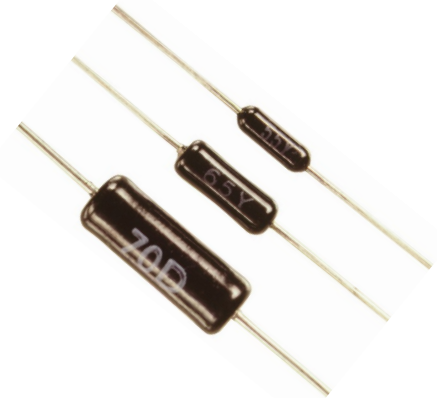


RC Series

Features:

- Available to EN140101 & IECQ-CECC40101 release
- Resistance tolerance down to 0.05%
- Wide resistance range
- Low noise and negligible voltage coefficient
- Screened parts available for critical applications
- Temperature coefficient of resistance down to 5ppm/°C
- Options for Pb-free and Pb-bearing wire finishes



All Pb-free parts comply with EU Directive 2011/65/EU amended by (EU) 2015/863 (RoHS3)

Electrical Data

| Commercial | | RC55 | RC65 | RC70 |
|-----------------------------------|--------|-------------------------|------|-----------|
| Power rating @70°C | W | 0.4 | 0.5 | 1 |
| Resistance range | ohms | 1R0 – 4M0 | | 1R0 – 10M |
| Limiting element voltage | V | 350 | 500 | |
| Isolation voltage | V | 500 | 750 | 700 |
| TCR (20 - 70°C) ¹ | ppm/°C | 5, 10, 15, 25, 50, 100 | | |
| Resistance tolerance ¹ | % | 0.05, 0.1, 0.25, 0.5, 1 | | |
| Standard values ² | | E24 & E96 preferred | | |
| Thermal impedance | °C/W | 110 | 70 | 60 |
| Ambient temperature range | °C | -55 to 155 | | |

Note 1: See table of resistance restrictions.

Note 2: Non-standard values may be requested.

The requirements of the following standards are met or exceeded by the corresponding RC series products above.

| EN140101-806 Requirements | | B | C |
|----------------------------|--------|-------------------|-----------|
| Power rating @70°C | W | 0.25 | 0.5 |
| Qualified resistance range | ohms | 56R – 820K | 56R – 1M0 |
| Limiting element voltage | V | 300 | 500 |
| Isolation voltage | V | 500 | 750 |
| TCR ¹ | ppm/°C | 10, 15, 25, 50 | |
| Resistance tolerance | % | 0.1, 0.25, 0.5, 1 | |

| IECQ-CECC 40101-004 Requirements | | H | J | K | L |
|----------------------------------|--------|-------------------------|-------|-----------|-----|
| Power rating @70°C | W | 0.063 | 0.125 | 0.25 | 0.5 |
| Qualified resistance range | ohms | 1R0 – 1M0 | | 10R – 1M0 | |
| Limiting element voltage | V | 200 | 250 | | 350 |
| Isolation voltage | V | 280 | 350 | | 500 |
| TCR ¹ | ppm/°C | 15, 25, 50, 100 | | | |
| Resistance tolerance | % | 0.05, 0.1, 0.25, 0.5, 1 | | | |

| IECQ-CECC 40101-804 Requirements | | A | B | C |
|----------------------------------|--------|-------------------|------|-----------|
| Power rating @70°C | W | 0.125 | 0.25 | 0.5 |
| Qualified resistance range | ohms | 1R0 – 1M0 | | 10R – 1M0 |
| Limiting element voltage | V | 200 | 250 | 350 |
| Isolation voltage | V | 280 | 350 | 500 |
| TCR ¹ | ppm/°C | 15, 25, 50 | | |
| Resistance tolerance | % | 0.1, 0.25, 0.5, 1 | | |

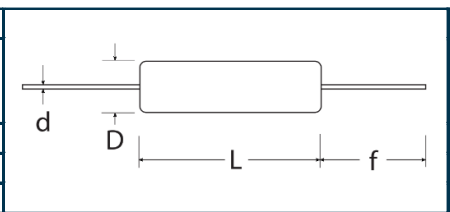
Note 1: In these standards TCRs are not specified for values <5R0, and for values ≥5R0 and <10R the TCR limit is 2 x the stated figure.

General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

Physical Data

| Dimensions in mm and weight in g | | | | | | | |
|----------------------------------|-------|-------|--------------------|-------|----------------------|------------------|---------|
| Type | L max | D max | f min ¹ | d nom | PCB mounting centres | Min. bend radius | Wt. nom |
| RC55 | 7.2 | 2.5 | 30 | 0.6 | 10.2 | 0.6 | 0.24 |
| RC65 | 10 | 3.7 | 30 | 0.6 | 12.7 | 0.6 | 0.4 |
| RC70 | 15.5 | 5.5 | 30 | 0.8 | 18.4 | 1.2 | 1.15 |



Note 1: Dimension relates only to bulk packed products

Construction

A metal film is deposited onto a high quality ceramic rod. Nickel-plated steel caps are force fitted to the rod and termination wires are welded to the caps. The resistor is adjusted to value by a helical cut in the film and the body is protected with a specially formulated epoxy coating.

Marking

Type reference, TCR code, resistance value and tolerance code are legend marked. The resistance values conform to IEC 62.

Terminations

- Material** Copper wire with Sn or SnPb finish.
- Strength** The terminations meet the requirements of IEC 68.2.21.
- Solderability** The terminations meet the requirements of IEC 115-1, clause 4.17.3.2.

Solvent Resistance

The body protection and marking are resistant to all normal industrial cleaning solvents suitable for printed circuit boards.

Performance Data

| | | EN140101-806 Requirements | IECQ-CECC 40101-004 Requirements | IECQ-CECC 40101-804 Requirements | Actual Performance | |
|---|-------|---------------------------|----------------------------------|----------------------------------|-------------------------|---------|
| | | | | | Maximum ^{1,2} | Typical |
| Load at full rated power: P _r for 1000 hours at 70°C | ±ΔR% | Not specified | | | 0.3 | 0.1 |
| Load at EN140101 & IECQ-CECC40101 ratings: 1000 hours at 70°C | ±ΔR% | 0.25 ³ | 0.5 ³ | 0.5 ³ | 0.3 | 0.05 |
| Dry heat: No load, 1000 hours at 155°C | ±ΔR% | 0.25 ³ | 0.5 ³ | 0.5 ³ | 1 | 0.15 |
| Shelf life test: 12 months at room temperature | ±ΔR% | Not specified | | | 0.1 | 0.03 |
| Derating from rated power at 70°C | | Zero @125°C | Zero @155°C | 50% @125°C | 50% @125°C, zero @155°C | |
| Short term overload: Lesser of 6.25xP _r or 2.5xLEV for 5s | ±ΔR% | 0.5 ² | 0.1 ² | 0.1 ³ | 0.1 | 0.02 |
| Climatic | ±ΔR% | 0.25 ³ | 0.5 ³ | 0.5 ³ | 0.3 | 0.1 |
| Climatic category | | 55/125/56 | 55/155/56 | 55/125/56 | 55/155/56 | |
| Long term damp heat | ±ΔR% | 0.25 ³ | 0.5 ³ | 0.5 ³ | 0.5 | 0.1 |
| Temperature rapid change | ±ΔR% | 0.05 ² | 0.1 ² | 0.1 ² | 0.2 | 0.05 |
| Resistance to solder heat | ±ΔR% | 0.05 ² | 0.1 ² | 0.1 ² | 0.06 | 0.03 |
| Vibration | ±ΔR% | 0.05 ² | 0.1 ² | 0.1 ² | 0.06 | 0.02 |
| Bump | ±ΔR% | Not specified | | | 0.06 | 0.02 |
| Noise in a decade of frequency | μV/V | <0.5 | Not specified | | 1 | 0.1 |
| Voltage coefficient of resistance | ppm/V | Not specified | | | | <1 |

Note 1: All values within the qualified resistance range meet EN140101 and IECQ-CECC40101 requirements.

Note 2: Apply an ohmic addition of R01.

Note 3: Apply an ohmic addition of R05.

Table of Resistance Restrictions

| TCR ppm/°C | Tolerance % | | | | | | | | |
|------------------|-------------|------------|-----------------------------------|-------------|------------|-----------------------------------|-------------|------------|-----------------------------------|
| | RC55 | | | RC65 | | | RC70 | | |
| | 0.05 | 0.1 - 0.25 | 0.5 ³ - 1 ³ | 0.05 | 0.1 - 0.25 | 0.5 ³ - 1 ³ | 0.05 | 0.1 - 0.25 | 0.5 ³ - 1 ³ |
| 5 ¹ | 10R to 500K | | 1R0 to 500K | 10R to 500K | | 1R0 to 500K | 10R to 750K | | |
| 10 | 10R to 1M0 | 10R to 1M0 | 1R0 to 1M0 | 10R to 1M0 | 10R to 1M0 | 1R0 to 1M0 | 10R to 1M0 | 10R to 1M0 | 1R0 to 1M0 |
| 15 | | | | | 5R0 to 1M0 | | | 10R to 2M0 | 1R0 to 2M0 |
| 25 | | 10R to 2M0 | 1R0 to 2M0 | | 5R0 to 2M0 | 1R0 to 2M0 | | 10R to 5M0 | 1R0 to 5M0 |
| 50 ² | | | | | 1R0 to 4M0 | 1R0 to 4M0 | | 5R0 to 10M | 1R0 to 10M |
| 100 ² | | | | | 1R0 to 2M0 | | | 1R0 to 10M | |

Note 1: Based on sampling. 100% screened product is available.

Note 2: For maximum availability, where the ohmic value permits, 25ppm/°C is preferred to 50 or 100ppm/°C.

Note 3: For maximum availability, where the ohmic value permits, 0.25% is preferred to 0.5 or 1%.

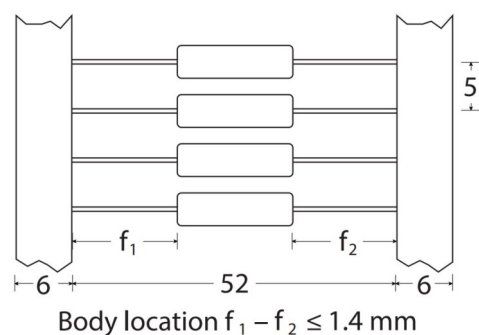
Application Notes

Matched Sets

TT Electronics has many years' experience in the supply of matched sets of precision resistors. Resistors can be supplied matched for tolerance and TCR down to ±0.02% and ±2ppm/°C.

Packaging

RC55 and RC65 standard packing is in tape, as shown below, whilst RC70 is bulk packed. Taped resistors on reel or loose packed components can also be supplied by special request.



Ordering Procedure

This product has two valid part numbers:

European (Welwyn) Part Number: RC55V-31K6BI (RC55 with TCR $\pm 5\text{ppm}/^\circ\text{C}$ at 31.6 kilohms $\pm 0.1\%$, Pb-free)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|--|
| R | C | 5 | 5 | V | - | 3 | 1 | K | 6 | B | I | |
| 1 | | 2 | | 3 | | | 4 | | 5 | | | |

| 1 | 2 | 3 | 4 | 5 | | |
|------|---------------|----------------------|------------------|-------------------------------|---------------------------------------|----------------|
| Type | TCR (ppm/°C) | Value | Tolerance | Finish, Screening & Packing | | |
| RC55 | V = ± 5 | E24 = 3/4 characters | W = $\pm 0.05\%$ | I | Pb-free (RoHS) | |
| RC65 | T = ± 10 | E96 = 3/4 characters | B = $\pm 0.1\%$ | SC | Pb-free with screened TCR (5ppm only) | |
| RC70 | Y = ± 15 | R = ohms | C = $\pm 0.25\%$ | PB | Sn(95)Pb(5) finish | |
| | D = ± 25 | K = kilohms | D = $\pm 0.5\%$ | HL | Sn(60)Pb(40) high lead finish | |
| | C = ± 50 | M = megohms | F = $\pm 1\%$ | All above in Standard Packing | | |
| | Z = ± 100 | | | | | |
| | | | | RC55 | Ammo | Up to 5000/box |
| | | | | RC65 | | Up to 2500/box |
| | | | | RC70 | Bulk | 250/box |

Note: For product released to EN140101 or CECC40101, follow the MPN with text indicating the relevant release and style. For CECC40101-004 the style includes a TCR code which is the same as that used in the MPN. Note that this additional text does not form part of our MPN.

Examples: **RC55Y-31K6BI** EN140101-806 B
RC55Y-31K6BI CECC40101-004 JY

For CECC 40101-804 the TCR codes T and E are used in the style for 15 and 25ppm/°C, coded in the MPN as Y and D respectively. Also an additional suffix -804 is added after, or in the case of Pb-free, instead of, the Finish, Screening & Packing code.

Examples: **RC65Y-31K6B-804** CECC 40101-804 BT
RC55D-31K6BPB-804 CECC 40101-804 AE

USA (IRC) Part Number: RC55LFV3162BA (RC55 with TCR $\pm 5\text{ppm}/^\circ\text{C}$ at 31.6 kilohms $\pm 0.1\%$, Pb-free)

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R | C | 5 | 5 | L | F | V | 3 | 1 | 6 | 2 | B | A |
| 1 | | 2 | | 3 | 4 | | | 5 | 6 | | | |

| 1 | 2 | 3 | 4 | 5 | 6 | | |
|------|--------------|---------------|-----------------------|------------------|---------|------|----------------------|
| Type | Termination | TCR (ppm/°C) | Value | Tolerance | Packing | | |
| RC55 | Omit for | V = ± 5 | 3 digits + multiplier | A = $\pm 0.05\%$ | A | RC55 | Ammo, up to 5000/box |
| RC65 | Sn(95)Pb(5) | T = ± 10 | R = ohms for values | B = $\pm 0.1\%$ | | RC65 | Ammo, up to 2500/box |
| RC70 | LF = Pb-free | Y = ± 15 | <100 ohms | C = $\pm 0.25\%$ | B | RC70 | Bulk, 250/box |
| | | D = ± 25 | | D = $\pm 0.5\%$ | | | |
| | | C = ± 50 | | F = $\pm 1\%$ | | | |
| | | Z = ± 100 | | | | | |