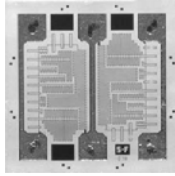


# Thin Film, Center-Tapped Resistor Divider Network



Product may not be to scale

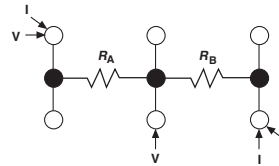
The CTQ series resistor chips offer a wide resistance range with lower shunt capacitance than can be offered with the silicon based resistors but only at a lower power level.

The CTQ offers the designer flexibility in use as either a single value resistor or as two resistor with a center tap feature. The CTQs six bonding pads allows the user increased layout flexibility.

The CTQs are manufactured using Vishay Electro-Films (EFI) sophisticated thin film equipment and manufacturing technology. The CTQs are 100 % electrically tested and visually inspected to MIL-STD-883, method 2032 class H or K.

## FEATURES

- Wire bondable
- Center tap feature
- Chip size: 0.030" x 0.030"
- Case: 0303
- Resistance range total: 10  $\Omega$  to 1 M $\Omega$
- Moisture resistant
- Quartz substrate
- Resistor material: Tantalum nitride, self-passivating
- Low shunt capacitance < 0.1 pF
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

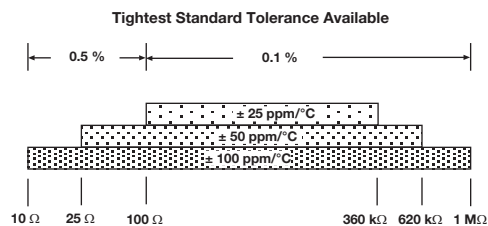


## APPLICATIONS

The CTQ center-tapped resistor chips are used mainly in feedback circuits of amplifiers where ratio matching, low shunt capacitance and tracking between two resistors is critical.

For low values, the resistance of the six bonding pad configuration can vary, depending on the method of measurement used. Vishay EFI measures low-value resistors by the four-wire kelvin technique.

| TEMPERATURE COEFFICIENT OF RESISTANCE, VALUES, AND TOLERANCES |                           |                   |
|---|---------------------------|-------------------|
| PARAMETER   | VALUE                     | UNIT              |
| Total Resistance Range  | 10 to 1M                  | $\Omega$          |
| Standard Tolerances   | $\pm 0.1, \pm 0.5$        | %                 |
| TCR   | $\pm 25, \pm 50, \pm 100$ | ppm/ $^{\circ}$ C |

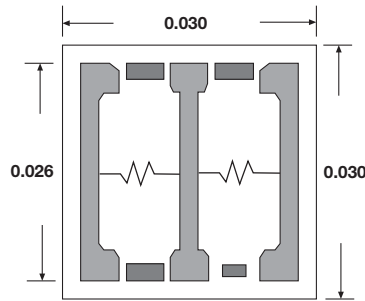
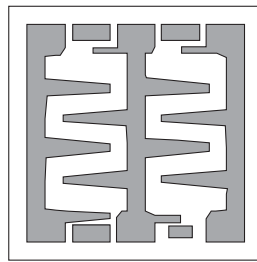
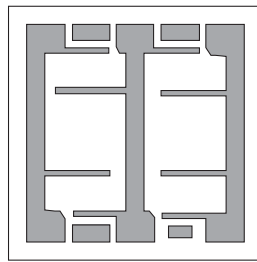
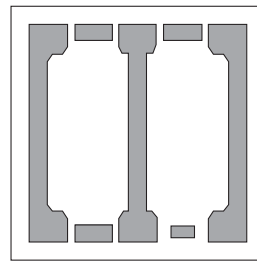


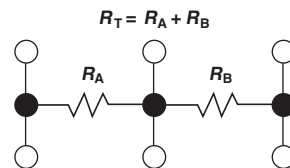
## STANDARD ELECTRICAL SPECIFICATIONS

| PARAMETER   | VALUE                        | UNIT              |
|---|------------------------------|-------------------|
| TCR Tracking Between Halves ( $R_A/R_B$ ) <sup>(1)</sup>  | $\pm 2$                      | ppm/ $^{\circ}$ C |
| Center Tap Ratio, $R_A/R_B$ : Tolerance   | $1 \pm 1$ standard           | %                 |
| Noise, MIL-STD-202, Method 308, 100 $\Omega$ to 250 k $\Omega$ , < 100 $\Omega$ or > 251 k $\Omega$ | - 35 typ.<br>- 20 typ.       | dB                |
| Moisture Resistance, MIL-STD-202, Method 106  | $\pm 0.5$ max. $\Delta R/R$  | %                 |
| Stability, 1000 h, + 125 $^{\circ}$ C, 30 mW  | $\pm 0.25$ max. $\Delta R/R$ | %                 |
| Operating Temperature Range   | - 55 to + 125                | $^{\circ}$ C      |
| Thermal Shock, MIL-STD-202, Method 107, Test Condition F  | $\pm 0.1$ max. $\Delta R/R$  | %                 |
| High Temperature Exposure, + 150 $^{\circ}$ C, 100 h  | $\pm 0.2$ max. $\Delta R/R$  | %                 |
| Dielectric Voltage Breakdown  | 400                          | V                 |
| Insulation Resistance   | $10^{12}$ min.               | $\Omega$          |
| Operating Voltage   | 200 max.                     | V                 |
| DC Power Rating at + 70 $^{\circ}$ C (derated to zero at + 175 $^{\circ}$ C)                        | 0.06 max.                    | W                 |
| 5 x Rated Power Short-Time Overload, + 25 $^{\circ}$ C, 5 s   | $\pm 0.25$ max. $\Delta R/R$ | %                 |

### Note

<sup>(1)</sup> 5 ppm/ $^{\circ}$ C for  $R < 100$ . 20 ppm/ $^{\circ}$ C for  $R < 20$

**DIMENSIONS** in inches

**STANDARD CONFIGURATION**  
 Six locations. All pads 0.005 x 0.005 inches

**TYPICAL RANGE**  
 10 Ω to 26.9 Ω

**TYPICAL RANGE**  
 27 Ω to 99 Ω

**TYPICAL RANGE**  
 100 Ω to 1 MΩ

**SCHEMATIC**


| MECHANICAL SPECIFICATIONS |  |
|---------------------------|--|
| PARAMETER                 | VALUE  |
| Chip Size                 | 0.030" x 0.030" ± 0.002" (0.762 mm x 0.762 mm ± 0.05 mm) |
| Chip Thickness            | 0.010" ± 0.003" (0.254 mm ± 0.05 mm)                     |
| Chip Substrate Material   | Quartz   |
| Resistor Material         | Tantalum nitride, self-passivating                       |
| Bonding Pad Size          | 0.005" x 0.005" (0.127 mm x 0.127 mm) min.               |
| Number of Pads            | 6  |
| Pad Material              | 10 kÅ minimum gold (Al optional)                         |
| Backing                   | None, lapped quartz                                      |

**Options:** Alphanumeric part marking, up to six characters.

| GLOBAL PART NUMBER INFORMATION  |  |   |   |  |                                   |  |                  |            |                            |   |   |   |   |   |   |   |
|---|--|---|---|--|-----------------------------------|--|------------------|------------|----------------------------|---|---|---|---|---|---|---|
| Global Part Number: CTQ50000KCKKGNHWS   |  |   |   |  |                                   |  |                  |            |                            |   |   |   |   |   |   |   |
| Global Part Number Description: CTQ 5K 10 % RT 0.25 % ± 100 ppm/°C ± 10 ppm/°C Au None H WS |  |   |   |  |                                   |  |                  |            |                            |   |   |   |   |   |   |   |
| C   | T  | Q   | 5   | 0  | 0                                 | 0  | 0                | K          | C                          | K                                       | K | G | N | H | W | S |
| MODEL   | RESISTANCE (R TOTAL)                                 | RESISTANCE MULTIPLIER CODE                                    | TOL. CODE (%)   | RATIO TOL. (%)   | TCR (ppm/°C)                      | TCR TRACK (ppm/°C)                       | TERMINATION      | BACK METAL | VISUAL CLASS               | PACKAGING CODE                          |   |   |   |   |   |   |
| CTQ   | First 4 digits are significant figures of resistance | B = 0.01<br>A = 0.1<br>0 = 1<br>1 = 10<br>2 = 100<br>3 = 1000 | B = 0.1<br>C = 0.25<br>D = 0.5<br>F = 1.0<br>G = 2.0<br>J = 5.0<br>K = 10.0 | B = 0.1<br>C = 0.25<br>D = 0.5<br>F = 1.0<br>G = 2.0<br>N = No | E = ± 25<br>C = ± 50<br>K = ± 100 | G = ± 2<br>J = ± 5<br>K = ± 10<br>N = No | G = Au<br>A = Al | N = None   | H = Class H<br>K = Class K | WS = Waffle pack<br>100 min.,<br>1 mult |   |   |   |   |   |   |



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