

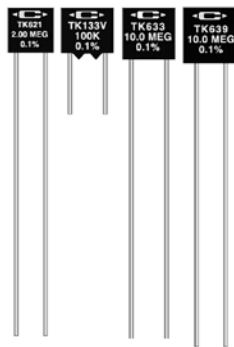
# Type TK Low TC Precision Radial-Lead Film Resistors

## Low TC of 5 ppm/°C, 10 ppm/°C, or 20 ppm/°C and Resistance Range from 1 Kohm to 10 Meg

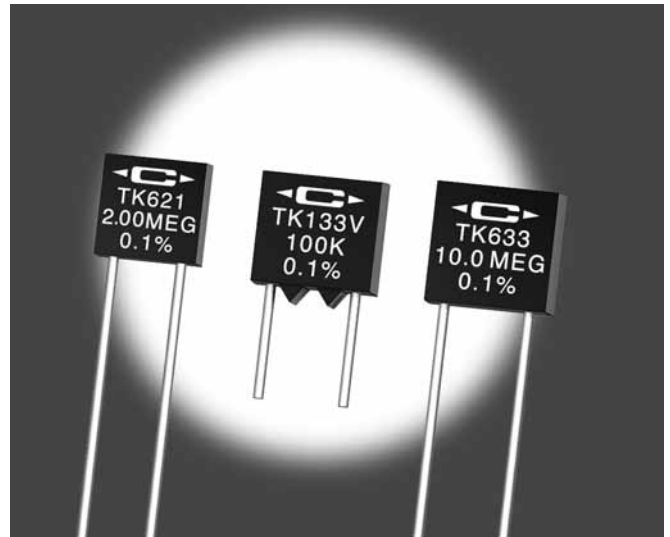
Type TK Low TC Precision Radial-Lead Resistors with the Tetrinox® resistance system solve the reliability problems related to other low TC precision resistor technologies. The robust construction of Caddock's Type TK Resistors provides reliable operation even in harsh temperature cycling and/or power cycling environments.

Type TK Low TC Precision Radial-Lead Film Resistors provide a combination of performance advantages never before available in a resistive component:

- **Low Temperature Coefficient** - better than 5 ppm/°C, 10 ppm/°C, or 20 ppm/°C over the entire temperature range from -55°C to +125°C!
- **Long-Term Absolute Stability** - typically better than ±0.05% per 2,000 hours of operation.
- **Extended Resistance Range** - from 1 K ohm to 10 Megohm.
- **Precision Tolerances** - ±0.1% is standard, and tolerances of ±1% and ±0.05% are available.
- **Wide Operating Temperature Range** - from -55°C to +175°C.
- **Small Size** - with four miniature rectangular cases for maximum packaging density and minimum mounting area.
- **High Power Density** - with power ratings of 0.2 Watt and 0.3 Watt in molded cases, the largest of which is a standard CK06 package.
- **Caddock's Non-Inductive Performance** - provides faster settling times and minimum distortion in all types of high frequency circuits.
- **High Density Packaging** - the radial-lead mounting and small rectangular case of the Type TK resistors permit high packaging densities in low profile circuitry. Because the four models of the Type TK resistors are available in an exceptionally wide range of resistance values, lead spacing and mounting space can be standardized in a larger number of designs.



(Photos show resistors full size)



The Tetrinox® Resistance System was introduced by Caddock in 1975. Tetrinox provides a wide range of resistivities, with the higher resistivities capable of producing resistance values up to 100 times higher than other ultra-low TC resistors in a similar size component. The essentially linear TC is well within 10 ppm/°C over the entire temperature range from -55°C to +125°C. By using TK resistors engineers can design high precision circuits with lower current drain and lower power requirements.

Through our R&D, Caddock has continued to improve the Tetrinox Resistance System, building on over 40 years of experience with our unique complex oxide resistance system technologies.

### Low TC “Matched-Pair” Voltage Dividers can be Assembled Without Pre-Selection of Resistors.

An important application for Type TK resistors is in “matched-pair” voltage dividers where the low 5 ppm/°C temperature coefficient provides ratio tracking of less than 10 ppm/°C without resistor pre-selection or special testing. With factory selection, Type TK resistor pairs can be matched to within 1 ppm/°C.

### Recommended Limitation of Use:

The Type TK resistors that are shown on this data sheet have pure matte tin (Sn) lead finish which is a preferred lead finish in commercial and industrial applications. These resistors are recommended by Caddock for use only in commercial and industrial applications. Any use of this product in a military program, against this recommended limitation of use, will be completely supported by the customer program design activity and component engineering activity based on their complete evaluation and testing, there will be no support provided by Caddock for this military use.

### Background regarding the “Recommended Limitation of Use” for these Type TK resistors:

Presently, military applications either prohibit the use of a matte tin lead finish or are trending toward this prohibition. Therefore, Caddock no longer recommends and no longer supports, in any way, the Type TK Resistors that are shown on this data sheet for use in military applications.

**For Military Applications, Caddock recommends the “Pure Tin Free” design of Models TK134 and TK634, that have Gold Plated lead finish.**

**Please see the “TK134 and TK634” data sheet.**

# Type TK Low TC Precision Radial-Lead Film Resistors

|              | Model No. | Temperature Coefficient ppm/°C | Wattage @ +125°C                   | Max. Working Voltage | Dielect. Strength | Resistance |         | Dimensions         | Encapsulation   | Leadwire      | Comments      |
|--------------|-----------|--------------------------------|------------------------------------|----------------------|-------------------|------------|---------|--------------------|-----------------|---------------|---------------|
|              |           |                                |                                    |                      |                   | Min.       | Max.    |                    |                 |               |               |
| TK100 Series | TK121     | 5, 10, or 20                   | 0.2                                | 200                  | 300               | 1 K        | 500 K   | Ref. Case "A" Dwg. | Transfer Molded | Tinned Copper | ————          |
|              | TK133     | 5, 10, or 20                   | 0.3                                | 300                  | 400               | 1 K        | 1.5 Meg | Ref. Case "B" Dwg. | Transfer Molded | Tinned Copper | ————          |
|              | TK133V    | 5, 10, or 20                   | 0.3                                | 300                  | 400               | 1 K        | 1.5 Meg | Ref. Case "D" Dwg. | Transfer Molded | Tinned Copper | With Standoff |
|              | TK139     | 5, 10, or 20                   | 0.3                                | 300                  | 400               | 1 K        | 1.5 Meg | Ref. Case "C" Dwg. | Transfer Molded | Tinned Copper | ————          |
| TK600 Series | TK621     | 5, 10 or 20                    | Limited by Maximum Working Voltage | 200                  | 300               | 501 K      | 2 Meg   | Ref. Case "A" Dwg. | Transfer Molded | Tinned Copper | ————          |
|              | TK633     | 5, 10 or 20                    |                                    | 300                  | 400               | 1.51 Meg   | 10 Meg  | Ref. Case "B" Dwg. | Transfer Molded | Tinned Copper | ————          |
|              | TK633V    | 5, 10 or 20                    |                                    | 300                  | 400               | 1.51 Meg   | 10 Meg  | Ref. Case "D" Dwg. | Transfer Molded | Tinned Copper | With Standoff |
|              | TK639     | 5, 10 or 20                    |                                    | 300                  | 400               | 1.51 Meg   | 10 Meg  | Ref. Case "C" Dwg. | Transfer Molded | Tinned Copper | ————          |

**Resistance Tolerance:** ±0.1% Standard (tolerances of ±1% and ±0.05% are available)

**Temperature Coefficient:** Referenced to 25°C, ΔR taken at -55°C to +125°C.

TC identification is made with a color stripe on the top edge of the part.

- 5 ppm/°C White Stripe
- 10 ppm/°C No Stripe
- 20 ppm/°C Green Stripe

**Overload\*:**

TK100 Series - 6.25 times rated power for 5 seconds at voltage not to exceed 1.5 times maximum rated working voltage, ΔR less than 0.05%.

TK600 Series - 1.5 times rated working voltage for 5 seconds, ΔR less than 0.2%.

**Operating Temperature:** -55°C to +175°C.

**Thermal Shock:**

TK100 Series - Mil-Std-202, Method 107, Cond. B, ΔR less than 0.05%.

TK600 Series - Mil-Std-202, Method 107, Cond. B, ΔR less than 0.1%.

**Low Temperature Operation\*:**

TK100 Series - ΔR less than 0.02%.

TK600 Series - ΔR less than 0.05%.

**Dielectric Withstanding Voltage\*:**

TK100 Series - ΔR less than 0.02%.

TK600 Series - ΔR less than 0.05%.

**Moisture Resistance\*:**

Mil-Std-202, Method 106,

1K to 500K ΔR less than 0.05%,

500.1K to 10.0 Meg ΔR less than 0.1%.

**Load Life\*:** 2,000 hours at +125°C.

TK100 Series -

1K to 500K ΔR less than 0.07%,

500.1K to 1.5 Meg ΔR less than 0.1%.

TK600 Series -

1.51 Meg to 10 Meg ΔR less than 0.2%.

**Shelf Life (Typical):**

TK100 Series - 25 ppm/year.

TK600 Series - 50 ppm/year.

**Insulation Resistance:** 10,000 Megohms.

**Vibration\*:**

TK100 Series - ΔR less than 0.03%.

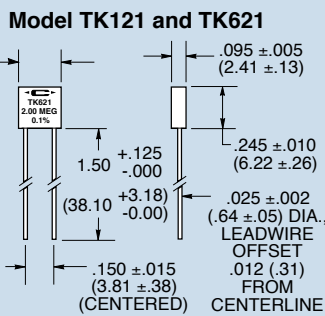
TK600 Series - ΔR less than 0.05%.

**Shock\*:** ΔR less than 0.05%.

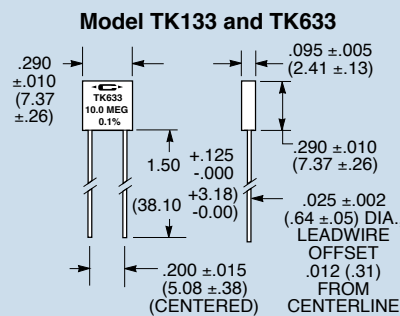
\*Test methods per procedures of Mil-PRF-55182/9.

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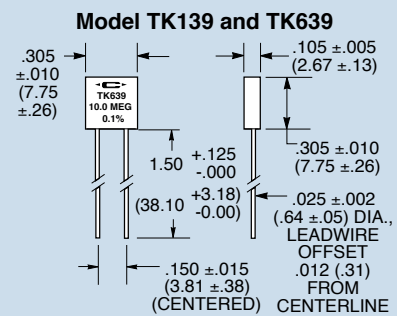
**Case "A"**



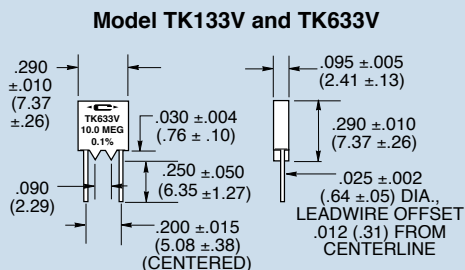
**Case "B"**



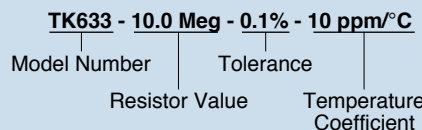
**Case "C"**



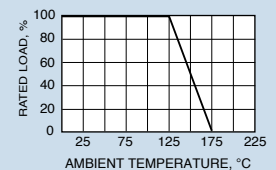
**Case "D"**



**Ordering Information:**



**Derating Curve:**



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