

# Type TK Low TC Precision Radial-Lead Film Resistors

## RoHS Compliant -- TK200 Series and TK700 Series Resistors

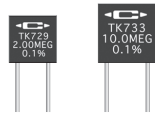
Low TC of 5 ppm/°C or 10 ppm/°C, Resistance Range from 1 Kohm to 1.5 Meg

Low TC of 10 ppm/°C or 20 ppm/°C, Resistance Range from 1.51 Meg to 10 Meg

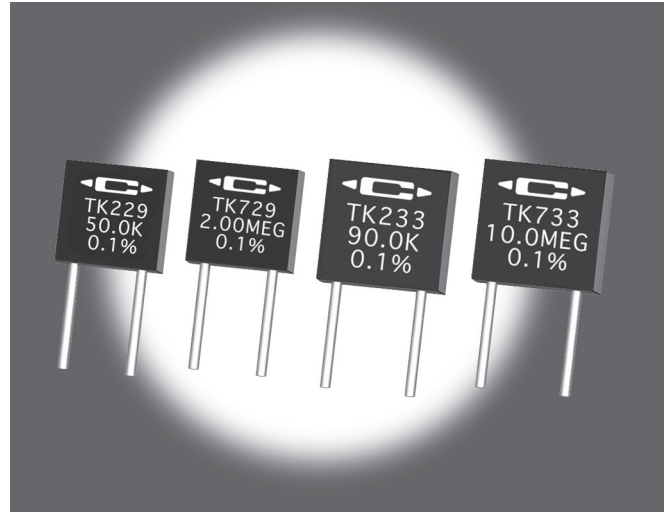
Type TK Low TC Precision Radial-Lead Resistors with the Tetrinox® resistance system solve the reliability problems related to other low TC precision resistor technologies. The robust construction of Caddock's Type TK Resistors provides reliable operation even in harsh temperature cycling and/or power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

Type TK Low TC Precision Radial-Lead Film Resistors provide a combination of performance advantages:

- **Low Temperature Coefficient** - available in 5 ppm/°C, 10 ppm/°C, or 20 ppm/°C over the entire temperature range from -40°C to +125°C, referenced to +25°C.
- **Long-Term Absolute Stability** - typically better than ±0.05% per 2,000 hours of operation.
- **Extended Resistance Range** - from 1 Kohm up to 10 Megohm.
- **Precision Tolerance** - ±0.1% is standard, and tolerances of ±1% and ±0.05% are available.
- **Wide Operating Temperature Range** - from -40°C to +150°C.
- **Small Size** - with two miniature rectangular cases for maximum packaging density and minimum mounting area.
- **High Power Density** - molded cases with power ratings of 0.2 Watt and 0.3 Watt at +85°C, the largest of the molded cases 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.



(Resistors shown full size)



Type TK200 series and TK700 series Low TC Precision Radial Film Resistors utilize Caddock's long proven Tetrinox® resistance system - the first high resistance system to provide a TC that is well within 10 ppm/°C and that is also essentially linear over the entire temperature range from -40°C to +125°C.

**Standard Part Number Includes:** Standard resistance value (listed below), standard tolerance of 0.1%, and standard temperature coefficient of 10 ppm/°C.

TK229	TK729	TK233	TK733
1.00 K	900 K	1.00 K	2.00 Meg
2.00 K	1.00 Meg	2.00 K	4.00 Meg
4.00 K	2.00 Meg	4.00 K	5.00 Meg
5.00 K		5.00 K	9.00 Meg
9.00 K		9.00 K	9.90 Meg
10.0 K		10.0 K	10.0 Meg
20.0 K		20.0 K	
40.0 K		40.0 K	
50.0 K		50.0 K	
90.0 K		90.0 K	
100 K		100 K	
200 K		200 K	
400 K		400 K	
500 K		500 K	
		900 K	
		1.00 Meg	

**Non-Standard Part Number Includes:** Non-standard resistance value and/or non-standard tolerance and/or non-standard TC. Available in a minimum order quantity of 25 pcs.

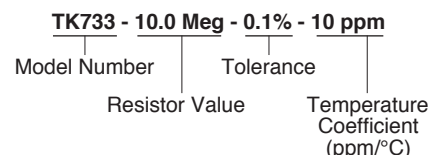
### Recommended use:

The Type TK resistors that are shown on this data sheet are recommended by Caddock for use in commercial and industrial applications. These resistors have pure matte tin (Sn) lead finish for use in commercial and industrial applications.

Presently, military applications either prohibit the use of a matte tin lead finish or are trending toward this prohibition. Therefore, Caddock does not recommend and does not support the Type TK Resistors that are shown on this data sheet for use in military applications.

Any use of this product in a military program, against this recommended limitation of use, must be completely supported by the customer program design activity and component engineering activity based on the complete evaluation and testing by these activities, there will be no support provided by Caddock for the military use. In this case, a military customer drawing must clearly specify the lead material, lead finish and the military customer's responsibility for use.

### Ordering Information:



# Type TK Low TC Precision Radial-Lead Film Resistors

## Type TK Low TC Precision Radial-Lead Film Resistors - Standard Resistance Range

Model No.	Temperature Coefficient ppm/°C	Resistance		Dimensions	Dielectric Strength	+85°C Maximum Ratings			+125°C Maximum Ratings (see Derating Curve)		
		Min.	Max.			Wattage	Max. Working Voltage	2000 hr Load Life ΔR less than	Wattage	Max. Working Voltage	2000 hr Load Life ΔR less than
TK229	5 or 10	1.00 K	500 K	Fig 1	300	0.20	200	0.07%	0.08	80	0.15%
TK233	5 or 10	1.00 K	1.50 Meg	Fig 2	400	0.30	300	0.07%	0.12	120	0.15%

Temperature Coefficient identified with color stripe on the top edge of the part:  
 5 ppm/°C White Stripe  
 10 ppm/°C No Stripe

**Resistance Tolerance:** ±0.1% is standard. Tolerances of ±1% and ±0.05% are available on special order.

**Temperature Coefficient:** 10 ppm/°C is standard. TC referenced to +25°C, ΔR taken at -40°C and +125°C. TC of 5 ppm/°C is available on special order.

**Operating Temperature:** -40°C to +150°C.

**Overload\*:** 6.25 times rated power for 5 seconds at voltage not to exceed 1.5 times maximum working voltage, ΔR less than 0.05%.

**Thermal Shock:** MIL-STD-202, Method 107, Cond. B, except low temperature is -40°C. ΔR less than 0.05%.

**Low Temperature Operation\*:** -40°C, ΔR less than 0.02%.

**Dielectric Withstanding Voltage\*:** ΔR less than 0.02%.

**Moisture Resistance\*:** MIL-STD-202, Method 106, ΔR less than 0.05%.

**Load Stability\*:** %ΔR is shown in the table for 2,000 hours at rated voltage not to exceed rated power.

**Shelf Stability (Typical):** 25 ppm/year.

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

**Vibration\*:** ΔR less than 0.03%.

**Shock\*:** ΔR less than 0.05%.

**Solderable Leads:** Matte Tin Plated Copper.

\*Test methods per procedures of MIL-PRF-55182/9 with the test temperatures shown in these specifications used during testing.

## Type TK Low TC Precision Radial-Lead Film Resistors - Extended Resistance Range

Model No.	Temperature Coefficient ppm/°C	Resistance		Dimensions	Dielectric Strength	+85°C Maximum Ratings			+125°C Maximum Ratings (see Derating Curve)		
		Min.	Max.			Wattage	Max. Working Voltage	2000 hr Load Life ΔR less than	Wattage	Max. Working Voltage	2000 hr Load Life ΔR less than
TK729	10 or 20	501 K	2.00 Meg	Fig 1	300	Limited by Max. Working Voltage	200	0.10%	Limited by Max. Working Voltage	80	0.20%
TK733	10 or 20	1.51 Meg	10.0 Meg	Fig 2	400	Limited by Max. Working Voltage	300	0.10%	Limited by Max. Working Voltage	120	0.20%

Temperature Coefficient identified with color stripe on the top edge of the part:  
 10 ppm/°C No Stripe  
 20 ppm/°C Green Stripe

**Resistance Tolerance:** ±0.1% is standard. Tolerances of ±1% and ±0.05% are available on special order.

**Temperature Coefficient:** 10 ppm/°C is standard. TC referenced to +25°C, ΔR taken at -40°C and +125°C. TC of 20 ppm/°C is available on special order.

**Operating Temperature:** -40°C to +150°C.

**Overload\*:** 1.5 times maximum rated working voltage for 5 seconds, ΔR less than 0.20%

**Thermal Shock:** MIL-STD-202, Method 107, Cond. B, except low temperature is -40°C. ΔR less than 0.10%.

**Low Temperature Operation\*:** -40°C, ΔR less than 0.05%.

**Dielectric Withstanding Voltage\*:** ΔR less than 0.05%.

**Moisture Resistance\*:** MIL-STD-202, Method 106, ΔR less than 0.10%.

**Load Stability\*:** %ΔR is shown in the table for 2,000 hours at rated voltage.

**Shelf Stability (Typical):** 50 ppm/year.

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

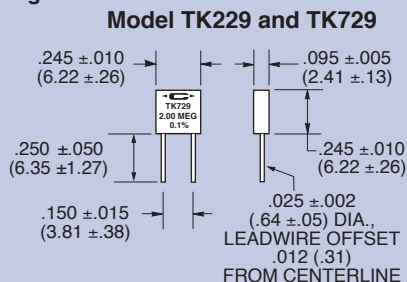
**Vibration\*:** ΔR less than 0.05%.

**Shock\*:** ΔR less than 0.05%.

**Solderable Leads:** Matte Tin Plated Copper.

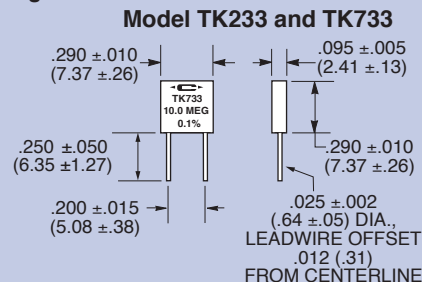
\*Test methods per procedures of MIL-PRF-55182/9 with the test temperatures shown in these specifications used during testing.

Fig 1

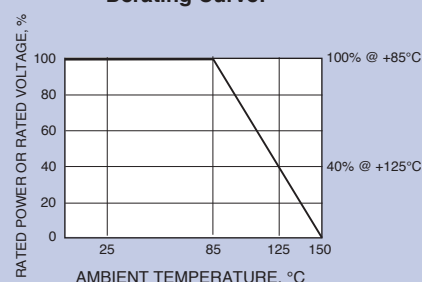


DIMENSIONS IN INCHES AND (MILLIMETERS)

Fig 2



Derating Curve:



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[TK133-100K-.05%-20PPM](#) [TK133-1.45M-.05%-20PPM](#) [TK633V-4.99M-0.05%-5PPM](#) [TK223-10.0K-0.1%-10ppm](#)  
[TK1331.00M-1%](#) [TK733-2.00M-0.1%-10ppm](#) [TK233-200K-0.1%-10ppm](#) [TK233-20.0K-0.1%-10ppm](#) [TK233-1.00K-](#)  
[0.1%-10ppm](#) [TK233-500K-0.1%-10ppm](#) [TK233-10.0K-0.1%-10ppm](#) [TK233-2.00K-0.1%-10ppm](#) [TK233-50.0K-0.1%-](#)  
[10ppm](#) [TK733-5.00M-0.1%-10ppm](#) [TK733-10.0M-0.1%-10ppm](#) [TK233-100K-0.1%-10ppm](#) [TK233-5.00K-0.1%-10ppm](#)  
[TK233-1.00M-0.1%-10ppm](#)