

# Type MK Precision Power Film Radial-Lead Resistors

## RoHS Compliant -- MK200 Series and MK700 Series Resistors Non-Inductive with Expanded Resistance Range — 1 ohm to 100 Megohms

Type MK Precision Power Film Radial-Lead Resistors provide high density packaging in circuit board applications. These resistors are available in two compact rectangular package configurations with standard lead spacings. Type MK Precision Power Radial-Lead Film Resistors cover the entire resistance range from 1 ohm to 100 Megohms, with a standard tolerance of 1%.

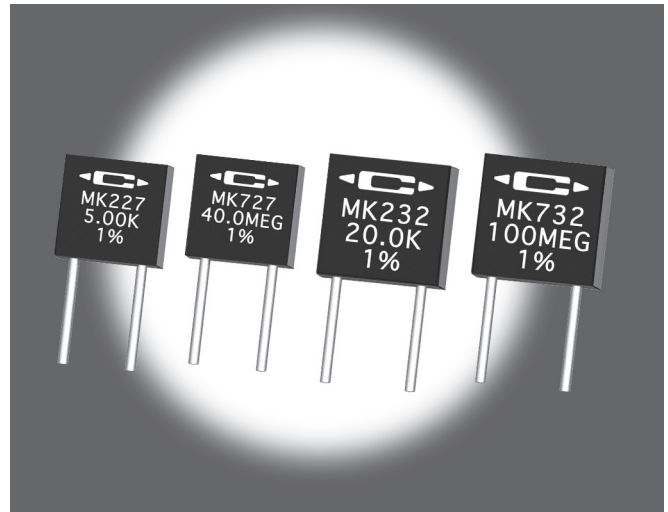
Constructed with Caddock's Micronox® resistance films fired onto a solid ceramic substrate, Type MK Precision Film Resistors combine all of these outstanding advantages:

- **±1% Resistance Tolerance is Standard** - tolerances to ±0.1% are available on special order.
- **Operating Temperature** - from -40°C to +150°C.
- **Power Ratings at +85°C and at +125°C.**
- **Temperature Coefficient is ≤ 50 ppm/°C from 5 ohms to 5 Megohms and ≤ 80 ppm/°C up to 100 Megohms** - referenced to +25°C with the ΔR taken at -15°C and +105°C.
- **Extended Life Stability is typically better than 0.1% per 1,000 Hours.**
- **Caddock's Non-Inductive Performance** - provides faster settling times and minimum distortion in all types of higher frequency circuits.

This combination of performance features in a compact radial-lead resistor package can simplify engineering, inventory, and production:

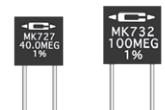
### Selecting one compact radial-lead resistor package can simplify board layouts.

With the exceptionally wide range of resistance values that are available in each model of Type MK Precision Power Film Radial-Lead Resistors, circuits can now be designed for greater packaging densities without the need for leaving extra space where resistor value changes can require larger resistors or non-uniform lead spacings.



Using one compact radial-lead resistor package can speed assembly procedures, simplify procurement, and simplify inventory.

By reducing the wide variety of sizes and types of axial-lead resistors to a single compact radial-lead resistor package with advanced performance ratings, procurement and inventory can be simplified. The radial leads do not require additional bending prior to insertion, and the standard lead spacing can reduce the time required for assembly. For specific price and delivery information, contact our Sales Office.



(Resistors shown full size)

**Standard Part Number Includes:** Standard resistance value (listed below), standard tolerance of 1%.

MK227		MK727		MK232		MK732	
1.00 Ω	2.00 K	4.00 Meg		1.00 Ω	2.00 K	10.0 Meg	
2.00 Ω	4.00 K	5.00 Meg		2.00 Ω	4.00 K	20.0 Meg	
4.00 Ω	5.00 K	10.0 Meg		4.00 Ω	5.00 K	40.0 Meg	
5.00 Ω	10.0 K	20.0 Meg		5.00 Ω	10.0 K	50.0 Meg	
10.0 Ω	20.0 K	40.0 Meg		10.0 Ω	20.0 K	100 Meg	
20.0 Ω	40.0 K			20.0 Ω	40.0 K		
40.0 Ω	50.0 K			40.0 Ω	50.0 K		
50.0 Ω	100 K			50.0 Ω	100 K		
100 Ω	200 K			100 Ω	200 K		
200 Ω	400 K			200 Ω	400 K		
400 Ω	500 K			400 Ω	500 K		
500 Ω	1.00 Meg			500 Ω	1.00 Meg		
1.00 K	2.00 Meg			1.00 K	2.00 Meg		
					4.00 Meg		
					5.00 Meg		

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

**Recommended use:**

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

Presently, most 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 MK 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:**

**MK232 - 500K - 1%**

Model Number \_\_\_\_\_ Resistor Value \_\_\_\_\_ Tolerance \_\_\_\_\_

# Type MK Precision Power Film Radial-Lead Resistors

## Type MK Precision Film Resistors - Low and Standard Resistance Ranges

Model No.	Resistance			Dimensions	Dielectric Strength	+85°C Maximum Ratings			+125°C Maximum Ratings (see Derating Curve)		
	Low Min.	Standard Min.	Standard Max.			Wattage	Max. Working Voltage	1000 hr Load Stability $\Delta R$ less than	Wattage	Max. Working Voltage	1000 hr Load Stability $\Delta R$ less than
MK227	1 $\Omega$	5 $\Omega$	2 Meg	Fig 1	300	0.50	200	$\pm(0.20\% + 0.01 \text{ ohm})$	0.20	200	$\pm(0.40\% + 0.01 \text{ ohm})$
MK232	1 $\Omega$	5 $\Omega$	5 Meg	Fig 2	400	0.75	400	$\pm(0.20\% + 0.01 \text{ ohm})$	0.30	400	$\pm(0.40\% + 0.01 \text{ ohm})$

**Resistance Tolerance:**  $\pm 1\%$  is standard. Tolerances to  $\pm 0.1\%$  available on values of 30 ohms or higher).

**Overload/Overvoltage:** 5 times rated power with applied voltage not to exceed 1.5 times maximum working voltage for 5 seconds,  $\Delta R \pm(0.15 \text{ percent} + 0.01 \text{ ohm})$  max.

**Operating Temperature:**  $-40^\circ\text{C}$  to  $+150^\circ\text{C}$ .

**Temperature Coefficient:**

Resistance Range	Temp. Coef.
Standard : 5 $\Omega$ and above	50 ppm/ $^\circ\text{C}$
Low : 1 $\Omega$ to 4.99 $\Omega$	200 ppm/ $^\circ\text{C}$

Temperature Coefficient referenced to  $+25^\circ\text{C}$ ,  $\Delta R$  taken at  $-15^\circ\text{C}$  and  $+105^\circ\text{C}$ .

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

**Load Stability:**  $\% \Delta R$  is shown in the table for 1,000 hours at rated voltage not to exceed rated power.

**Thermal Shock:** MIL-STD-202, Method 107, Cond. B, except low temperature is  $-40^\circ\text{C}$ ,  $\Delta R \pm(0.20 \text{ percent} + 0.01 \text{ ohm})$  max.

**Moisture Resistance:** MIL-STD-202, Method 106,  $\Delta R \pm(0.50 \text{ percent} + 0.01 \text{ ohm})$  max.

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

**Measurement Note:** Resistance measurement on low resistance values shall be made at a point within 0.2 inch (5.08 mm) of the body.

## Type MK Precision Film Resistors - Extended Resistance Range

Model No.	TC ppm/ $^\circ\text{C}$	Resistance		Dimensions	Dielectric Strength	+85°C Maximum Ratings			+125°C Maximum Ratings (see Derating Curve)		
		Min.	Max.			Wattage	Max. Working Voltage	1000 hr Load Stability $\Delta R$ less than	Wattage	Max. Working Voltage	1000 hr Load Stability $\Delta R$ less than
MK727	80	2.01 Meg	40.0 Meg	Fig 1	300	Limited by Max. Working Voltage	200	0.20%	Limited by Max. Working Voltage	200	0.50%
MK732	80	5.01 Meg	100 Meg	Fig 2	400	Limited by Max. Working Voltage	400	0.20%	Limited by Max. Working Voltage	400	0.50%

**Resistance Tolerance:**  $\pm 1\%$  (consult factory for tighter tolerances).

**Overload/Overvoltage:** 1.5 times maximum working voltage for 5 seconds,  $\Delta R 0.50\%$  max.

**Operating Temperature:**  $-40^\circ\text{C}$  to  $+150^\circ\text{C}$ .

**Temperature Coefficient:** See Table for TC value. TC referenced to  $+25^\circ\text{C}$ ,  $\Delta R$  taken at  $-15^\circ\text{C}$  and  $+105^\circ\text{C}$ .

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

**Load Stability:**  $\% \Delta R$  is shown in the table for 1,000 hours at rated voltage.

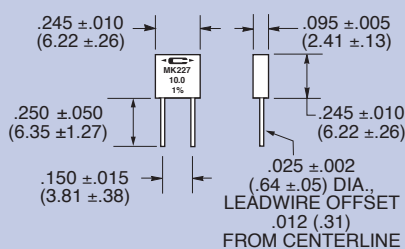
**Thermal Shock:** MIL-STD-202, Method 107, Cond. B, except low temperature is  $-40^\circ\text{C}$ ,  $\Delta R 0.50\%$  max.

**Moisture Resistance:** MIL-STD-202, Method 106,  $\Delta R 0.50\%$  max.

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

Fig 1

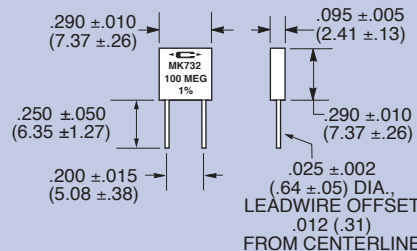
Model MK227 and MK727



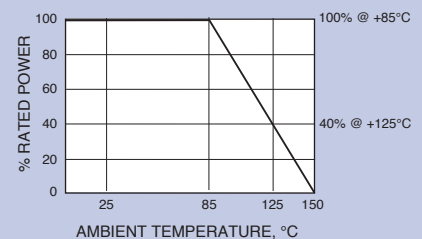
DIMENSIONS IN INCHES AND (MILLIMETERS)

Fig 2

Model MK232 and MK732



Derating Curve:



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