

Ultra-Precision Thermosensitive Resistor

This ultra-precision thermosensitive resistor is a new type of resistor produced by the application of Alpha foil resistor technology. It is made of material only a few μm thick and responds rapidly to temperature changes. The metal foil that is used has a resistivity that varies linearly with temperature change. Strict control of foil composition maintains uniform quality without fluctuation of temperature characteristics of resistance. This thermosensitive resistor is produced by the same fine photo-etching technology used in the metal foil precision resistors. The pattern is ideally designed for temperature detection, providing small size and rapid response.

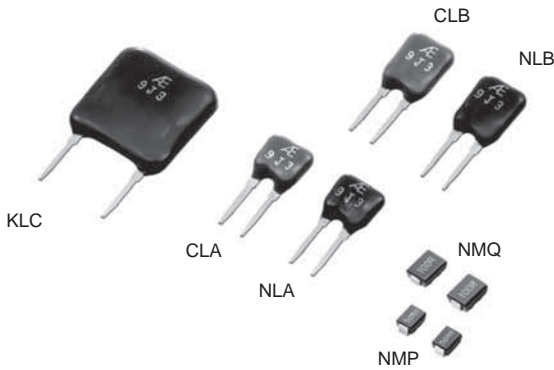
Characteristics

- ① Since the resistance is provided by metal foil, the resistance is highly stable with little change over time
- ② Temperature characteristics of resistance are almost linear
- ③ Response to temperature changes is rapid
- ④ This thermosensitive resistor is small and low-priced
- ⑤ Highly accurate with tolerance of resistance values $\pm 0.5\%$
- ⑥ Temperature characteristics can be freely adjusted (KLC type)

Main Applications

- Cold-junction reference for thermocouple
- Temperature-compensation in load cell
- Temperature-compensation device in semiconductor circuit
- Temperature-sensing device

Composition of Type Number



Example 1:

NLA 100R0 F

① ② ③

- ① Type
- ② Resistance Value*
- ③ Tolerance

Example 2:

KLC 3000-500R0 F

① ② ③ ④

- ① Type
- ② TCR**
- ③ Resistance Value*
- ④ Tolerance

Example 3:

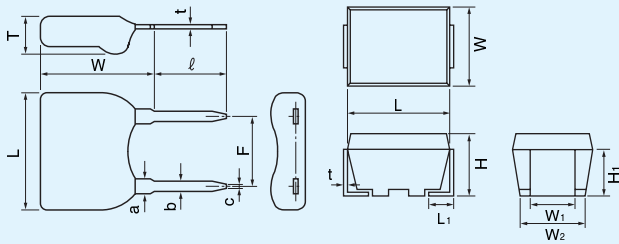
NMP 100R0 F L

① ② ③ ④

- ① Type
- ② Resistance Value*
- ③ Tolerance
- ④ Tape & Reel Package Required

*Resistance value, in ohm, is expressed by a series of five characters, four of which represent significant digits. The fifth R or K is a dual-purpose letter that designates both the value range (R for ohmic; K for kilo-ohm) and the location of decimal point.
 **Specify a desired TCR, following the type, in four-digit coding. The example "3000" means 3,000ppm/°C while "0500" means 500ppm/°C.

Configuration



Type	NLA, CLA	NLB, CLB	KLC
L	5.6±0.5		12.4±0.5
W	6.2±0.5	8.2±0.5	13.3±0.5
T	2.2±0.5		3.3±0.5
F	2.54±0.25		7.62±0.25
ℓ	5.0±1.0		
t	0.3±0.05		
a	1.0±0.05		
b	0.65±0.05		
c	0.4±0.05		

Type	NMP	NMQ
L	3.2±0.2	4.5±0.2
W	2.5±0.2	3.2±0.2
H	2.0±0.2	
L1	0.6±0.2	0.8±0.2
W1	1.4±0.3	
W2	2.3±0.2	3.0±0.2
H1	1.5±0.3	
t	0.15±0.05	

Dimensions in mm

TCR, Resistance Range, Tolerance, Rated Power

Type	TCR (ppm/°C)	Resistance Range (Ω)	Resistance Tolerance (%)* at 0°C	Rated Power (W) at 70°C
NMP	+6,040±2% (0 to 25°C)	5 to 250	±0.5 (D)	0.1
NMQ	+6,220±2% (0 to 50°C)			
NLA	+6,040±1% (0 to 25°C)	5 to 500	±1.0 (F)	0.125
NLB	+6,220±1% (0 to 50°C)			
NLA	+6,040±1% (0 to 25°C)	5 to 1k	±2.0 (G)	0.25
NLB	+6,590±1% (0 to 100°C)			
CLA	+4,250±1% (0 to 100°C)	5 to 100	±5.0 (J)	0.125
CLB		5 to 200		0.25
KLC	See fig.1 on page 37			0.25

*Symbols parenthesized are for type number composition.

Tape and Reel Package (Based on EIA-481-1)

See details on page 7.

TCR Spread from Nominal and Distribution

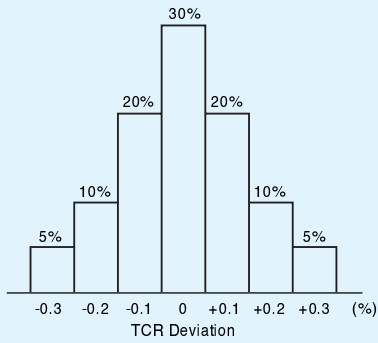
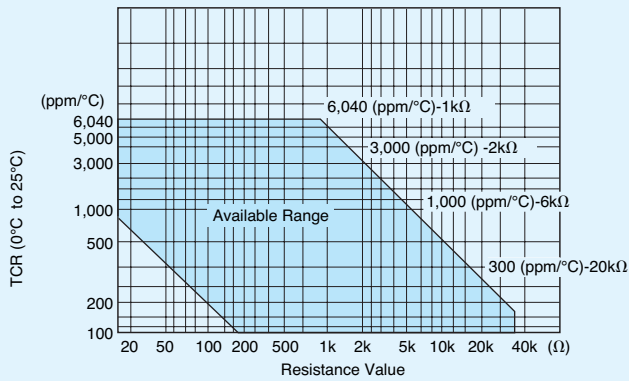
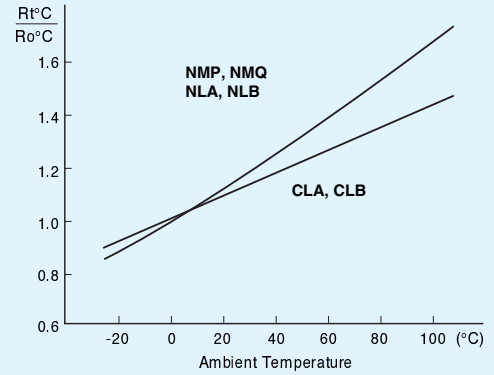


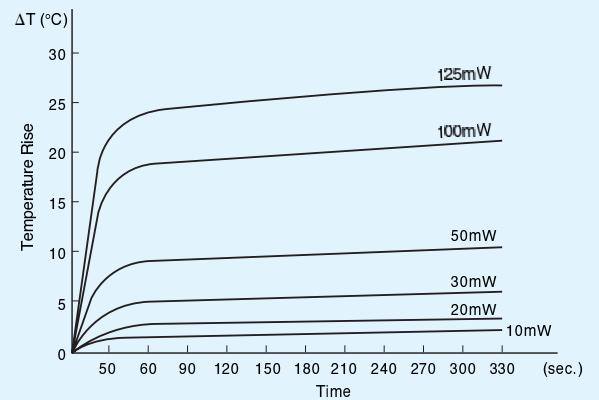
Fig. 1 TCR and Resistance Available in KLC Type



Temperature Characteristics of Resistance



Temperature of Resistor Surface



Response Time to Temperature Change

