

ENVIRONMENTAL CHARACTERISTICS

TRIMMER POTENTIOMETERS

<Cermet trimmer: CT-6 series>

1. Resistance temperature characteristics

Related standard: MIL-STD-202, method 304

Samples are kept at the ambient temperature of 25°C, -15°C, -55 °C, 25°C, 65°C and 120°C respectively for 30 to 45 minutes in a temperature chamber, and the total resistance measurement is made at each temperature. Then, the temperature coefficient referred to a reference temperature of 25°C is computed by the following formula.

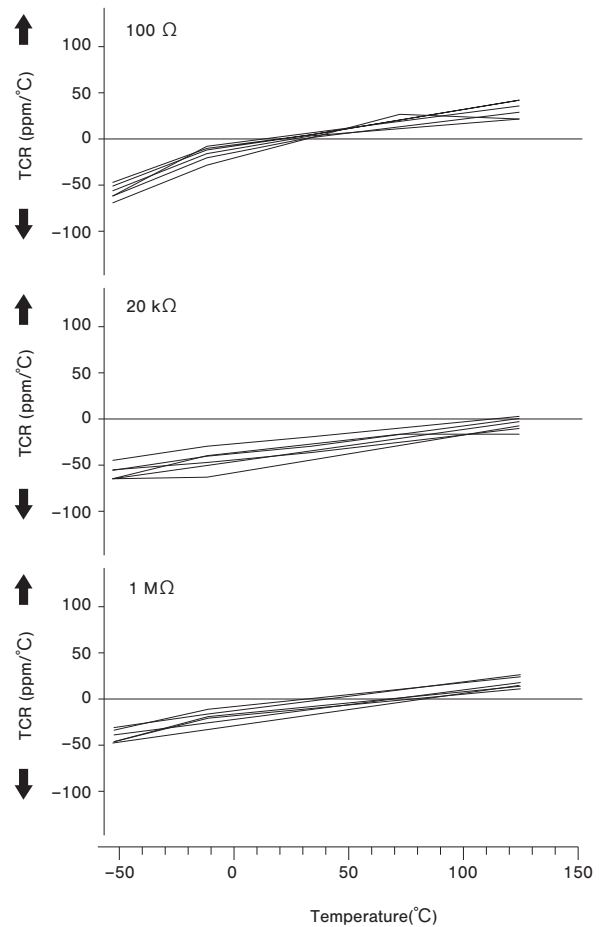
$$TCR \left(10^{-6} / ^\circ C \right) = \frac{R2-R1}{R1 \times (T2-T1)} \times 10^6$$

- R1 : Resistance value at reference temperature of 25°C
- R2 : Resistance value at test temperature
- T1 : The reference temperature
- T2 : The test temperature

The computation of the T.C.R. at the temperatures below zero (-15°C & -55°C) is to be made using the resistance value measured initially at 25°C as a reference, and that for 65°C and 120°C is to be made using the resistance value measured in the middle at 25°C as a reference.

<Specifications>

TCR: $\pm 100 \cdot 10^{-6} / ^\circ C$ maximum (50 Ω ~ 2 M Ω)
 $\pm 250 \cdot 10^{-6} / ^\circ C$ maximum (10 Ω , 20 Ω)



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2. Rotational life

Related standard: MIL-R-22097 4.6.18

The rotor shaft continuously cycled through not less than 90% of the actual effective electrical travel under no load, for a total of 200 cycles. After this, the samples are checked for a change in the total resistance value and evidence for mechanical damage.

<Specifications>

$\Delta R/R$: Change in total resistance

$$\Delta R/R \leq \pm(2\Omega + 3\%)$$

There shall be no mechanical damage.

3. High temperature exposure

Related standard: MIL-R-22097 4.6.17

Samples are exposed to an ambient temperature of 120°C in a temperature chamber for a period of 250 hours. Then, the samples are checked for a change in the total resistance value and setting stability.

<Specifications>

$\Delta R/R$: Change in total resistance

$$\Delta R/R \leq \pm 3\%$$

S.S.: Setting stability

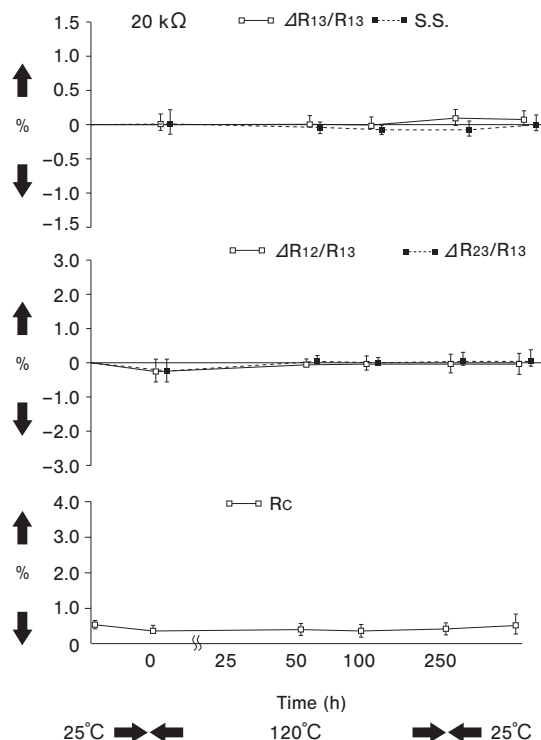
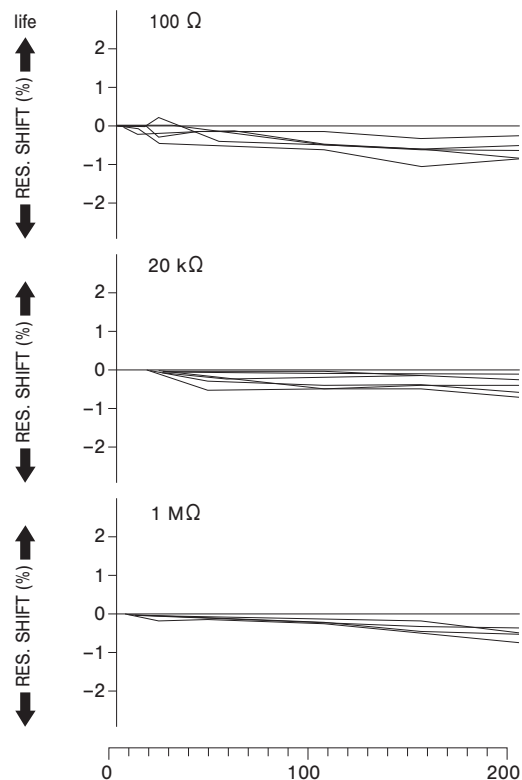
$$S.S. \leq \pm 2\%$$

R₁₃: The resistance between terminal 1 and terminal 3

R₁₂: The resistance between terminal 1 and terminal 2

R₂₃: The resistance between terminal 2 and terminal 3

R_c: Contact resistance



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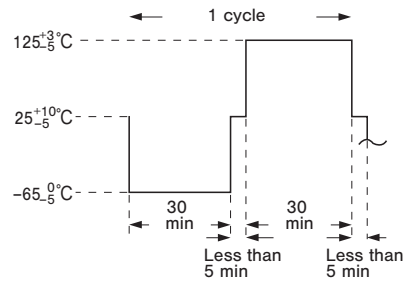
TRIMMER POTENTIOMETERS

<Cermet trimmer: ST-4 series>

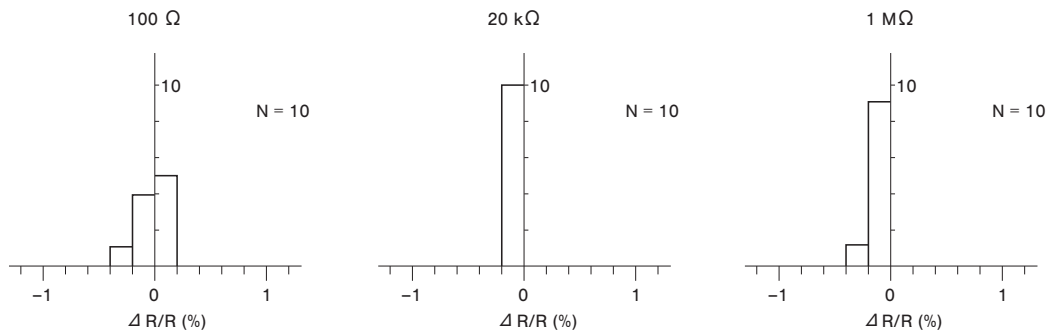
1. Thermal shock

Related standards: MIL-R-22097 4.6.8
MIL-STD-202, method 107, condition B

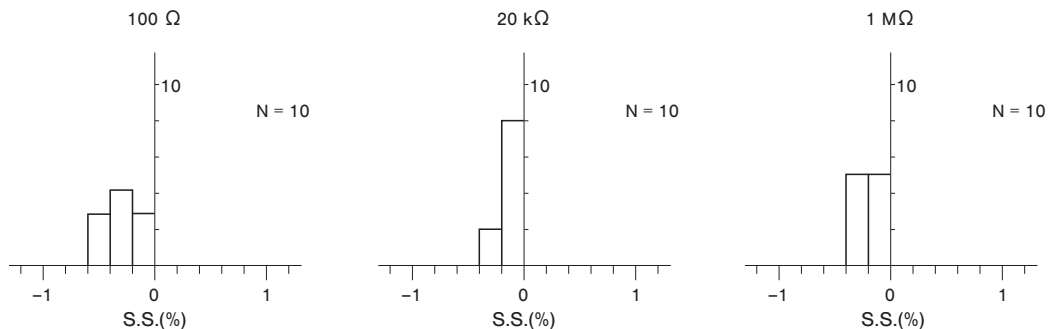
Samples are subjected to the following temperature cycle for 5 times and checked for a change in the total resistance value, setting stability, electrical discontinuity and mechanical damage.



[Change in total resistance value] Specification: $\Delta R/R \leq \pm 2\%$



[Setting stability] Specification: S.S. $\leq \pm 1\%$



$\Delta R/R (%)$ = Change in total resistance value

S.S. (%) = Setting stability

ENVIRONMENTAL CHARACTERISTICS

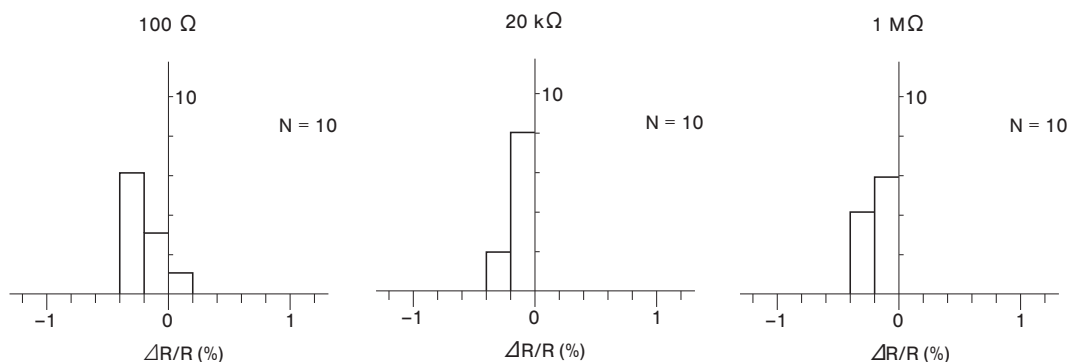
TRIMMER POTENTIOMETERS

<Cermet trimmer: ST-4 series>

2. Soldering heat resistance

The trimmer is immersed in a pot of molten solder at a temperature of 260_{-5}^0 °C for period of 10 seconds, and checked for a change in the total resistance value and evidence of mechanical damage.

[Change in total resistance value] Specification: $\Delta R/R \leq \pm 1\%$



There shall be no mechanical damage.

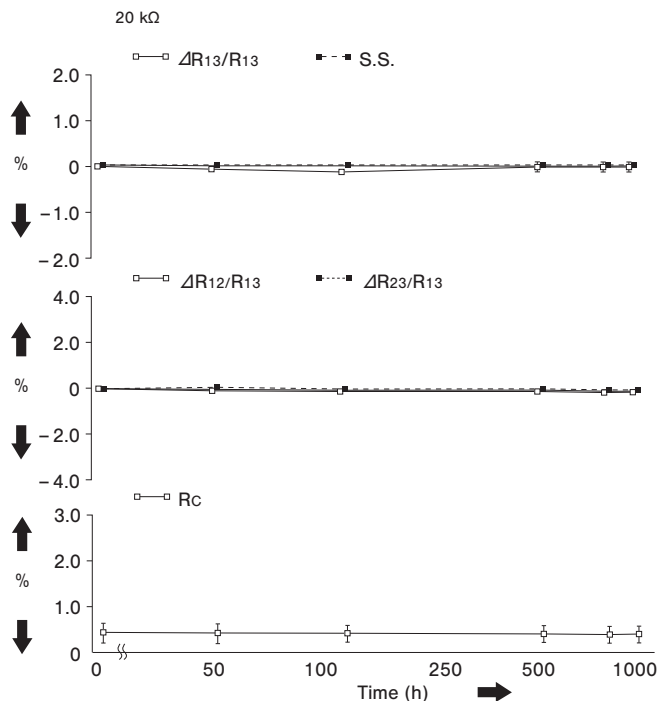
3. Load life

Related standard: MIL-R-22097 4.6.15
MIL-STD-202, method 108, condition D

DC rated working voltage is applied intermittently to the end terminals (1 and 3) of the trimmers, 1.5 hours ON and 0.5 hour OFF, for a total of 1000 hours at a test temperature of 70°C in the temperature chamber. Then, the samples are checked for a change in the total resistance value and setting stability. While the samples are in the temperature chamber, a change in the resistance value is checked at 50, 100, 250, 500, 750 and 1000 hours respectively.

<Specifications>

$\Delta R/R$: Change in total resistance
 $\Delta R/R \leq \pm 3\%$
 S.S. : Setting stability
 $S.S. \leq \pm 1\%$



R₁₃ : The resistance between terminal 1 and terminal 3
 R₁₂ : The resistance between terminal 1 and terminal 2
 R₂₃ : The resistance between terminal 2 and terminal 3
 R_c : Contact resistance