

UPR SERIES

ULTRA-HIGH STABLE RESISTORS

MOLD TYPE

Feature

- Advanced thin film technology
- Excellent overall stability: Class 0.025%
- Ultra-precision: up to $\pm 0.01\%$
- Very low TCR: up to $\pm 1\text{ppm}/^\circ\text{C}$
- Very low noise and voltage coefficient
- Compliant to RoHS directive 2011/65/EU
- Compliant to REACH (EC No. 1907/2006)) (last updated: 27/06/2018)

Description

Production is strictly controlled and follows an extensive set of instructions established in production procedure for reproducibility. A homogeneous film of metal alloy is deposited on the surface of **CeramTec**'s ceramic cores (96% Al_2O_3) and conditioned to achieve the desired stability and the temperature coefficients.

A professional laser is pressed on the metalized rods to not only achieve the target value but also perfect electronics performance by smoothly cutting a helical groove in the resistance layer on the ceramic rods without damaging the ceramics. The resistance layers are covered by a protective coating and hard Bakelite designed for electrical, mechanical and climatic protection.

The resistors are tested in accordance with MIL-R-10509F which refers to MIL-STD-202 or IEC60115.

The established reliability in accordance with CECC 40401-803 Version E is available upon request.

1. PRODUCT: ULTRA-STABLE METAL FILM RESISTORS MOLD TYPE

2. PART NUMBER: Part number of the resistor is identified by the series name, size code, power rating, tolerance, temperature coefficient, packing type and resistance value.

Example:

UPR1	25	L	10	T	1002
Series Name	Power Rating	Tolerance	Temperature Coefficient	Packing Type	Resistance Value

(1) Series name: UPR0. SERIES NORMAL SIZE;

UPR1 SERIES NARROW SIZE

(2) Power Rating below 70°C: 25=0.25W、50=0.5W、1.0=1.0W

(3) Tolerance: L=±0.01%; P=±0.025%; W=±0.05%; B=±0.1%;

(4) T.C.R.: 10=±1ppm/°C; 9=±2ppm/°C; 8=±3ppm/°C; 7=±5ppm/°C; 6=±10ppm/°C;

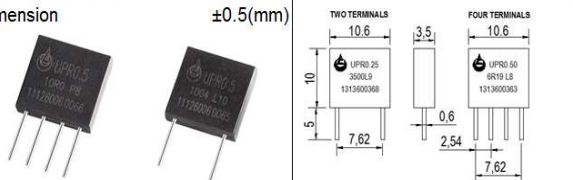
(5) Packaging Type: T=TUBE/BOX

(6) Resistance Value: 1R00、20R0、1000、1001、1002、3303、1004

3. Marking:

Digital marking including type, power, value, Tolerance, TCR, batch number

4. ELECTRICAL CHARACTERISTICS

Type	UPR0.25	UPR0.50	UPR125	UPR150	型号
Standard applied	Q\SLC003-1995				技术标准
Rated dissipation, P_{70}	0.25W	0.50W	0.25W	0.50W	70℃下额定功率
Operating voltage U_{max}	400V	500V	400V	500V	额定工作电压
Resistance range	10Ω to 1MΩ				标准阻值范围
Tol.	L(±0.01%); P(±0.025%); W(±0.05%); B(±0.10%);				精度
TCR (ppm/℃)	C10(±1); C9(±2); C8(±3); C7(±5); C6(±10); C5(±15);				(ppm/℃) 温度系数
Endurance: rated power load	20Ω to 220kΩ	20Ω to 220kΩ	20Ω to 220kΩ	20Ω to 220kΩ	70℃耐久性实验
Max. resistance change at P_{70}	≤0.01%	≤0.01%	≤0.01%	≤0.01%	最大允许阻值变化量
△R/R _{max.} after 1000h	≤0.01%	≤0.01%	≤0.01%	≤0.01%	1000小时后 △R/R _{max.}
Noise	per IEC 60195 ≤0.05μV/V				电压噪声
Operating Temperature range	-55℃~125℃				工作环境温度
Dimension					±0.5(mm) 尺寸

Unless otherwise specified, all values are tested at the following condition:

Temperature: 21℃ to 25℃; Relative humidity: 45% to 60%

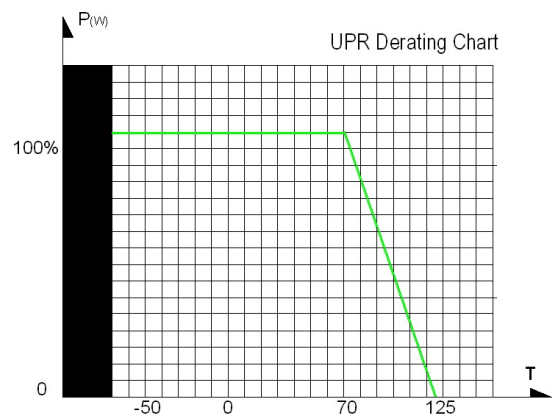
Standard resistance is 10Ω~ 1MΩ, resistance out of range is available upon request.

5. DERATING CURVE

The power dissipation on the resistor generates a temperature rise against the local ambient, depending on the heat flow support of the printed-circuit board (thermal resistance). The rated dissipation applies only if the permitted film temperature is not exceeded.

These resistors do not feature a limited lifetime when operated within the permissible limits. However,

resistance value drift increasing over operating time may result in exceeding a limit acceptable to the specific application, thereby establishing a functional lifetime.



6. ENVIRONMENTAL CHARACTERISTICS

(1) Insulation Resistance

IEC 60115-1, 4.6: in V-block for 60 seconds, the test resistance should be high than 10,000 M Ohm.

(2) Dielectric Withstanding Voltage

IEC 60115-1 4.7: Place resistors in V-block for 60 Seconds, no breakdown or flashover.

(3) Temperature Coefficient Test

IEC 60115-1, 4.8: Test of resistors at room temperature and 60°C or 100°C on request above room temperature. Then measure the resistance. The Temperature Coefficient is calculated by the following equation and its value should be within the range requested.

$$\text{Resistor Temperature Coefficient} = \frac{R - R_0}{R_0} \times \frac{1}{t - t_0} \times 10^6$$

R = Resistance value under the testing temperature

R₀ = Resistance value at the room temperature

t = the 2nd testing temperature

t₀ = Room temperature

(4) Short Time Over Load Test

IEC60115-1 4.13: At 10 times rated voltage or 2 times the maximum working voltage whichever is lower for 5 seconds, the resistor should be free from defects. The change of the resistance value should be within ±(0.01%+0.05 Ω) as compared with the value before the test.

(5) Solderability

IEC 60115-1, 4.17: 235±5°C for 3±0.5 Seconds, there are at least 95% solder coverage on the termination.

(6) Resistance to soldering heat:

IEC 60115-1, 4.18: $260 \pm 3^{\circ}\text{C}$ for 10 ± 1 Seconds, immersed to a point $3 \pm 0.5\text{mm}$ from the body. The change of the resistance value should be within $\pm(0.02\% + 0.05 \Omega)$ as compared with the value before the test.

(7) Climatic sequence

IEC 60115-1, 4.19: -55°C to Room Temp. to $+155^{\circ}\text{C}$ to Room Temp. (5 cycles). The change of the resistance value shall be within $\pm(0.02\% + 0.05 \Omega)$ as compared with the value before the test.

(8) Damp Heat Steady State

IEC 60115-1, 4.24: $40 \pm 2^{\circ}\text{C}$, 90-95% RH for 56 days, loaded with 0.1 times RCWV or the maximum working voltage whichever is lower. The change of the resistance value should be within $\pm(0.02\% + 0.05 \Omega)$ as compared with the value before the test.

(9) Load Life Test

IEC 60115-1, 4.25: $70 \pm 2^{\circ}\text{C}$ at RCWV or the maximum working voltage whichever is lower for $1,000 + 48/-0$ Hr. (1.5Hr. on, 0.5Hr. off). The resistors shall be arranged not much effected mutually by the temperature of others and the excessive ventilation shall not be performed. The change of the resistance value should be within $\pm(0.02\% + 0.05 \Omega)$ as compared with the value before the test.

(10) Accidental Overload Test

IEC 60115-1, 4.26: 4 times RCWV for 1 Minute. No evidence of flaming or arcing

(11) Resistance to Solvent

IEC 60115-1, 4.30: IPA for 5 ± 0.5 Min. with ultrasonic. No deterioration occurred.

Disclaimer

All products, product specifications and data are subject to change without notice to improve reliability, function or design or otherwise.

Thunder Precision Resistors makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product to the maximum extent permitted by applicable law.