



Ultra Precision Resistor / 超精密电阻器

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<input type="radio"/>	UPRNS Series	3
<input checked="" type="radio"/>	Ultra Precision Resistor Network / 超精密网络电阻	
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Notice: Specification Changed or Version Updated will be posted at irregular intervals.
All Updated and Final Specifications, Please Confirm with TOKEN ELECTRONICS REPRESENTATIVES.



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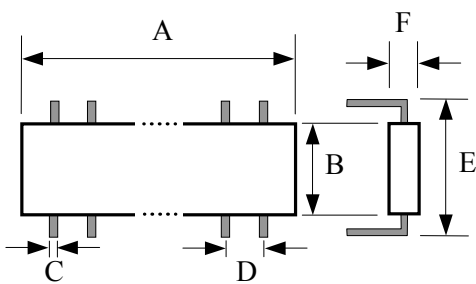
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Precision Resistors

UPRND Metal Film Series - Precision Resistors Network



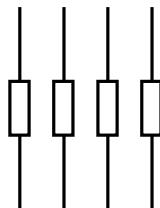
- Precision Network Resistors Low TCR UPRND Series meets ROHS requirements.
- UPRNS: Serial Dip Type; UPRND: Parallel Dip Type
- UPRNS/UPRND Series are relatively consistent with Tolerance of Nominal Resistance and Temperature Coefficient and are good for application's Precision Divider, Bypass, etc...
- UPRNS/UPRND Series are assembled by EE/RE 1/10 series to form a stable, high precision, and low temperature coefficient Precision Network Resistor. Characteristic of UPRNS/UPRND Series meet.

UPRND A(mm) ± 0.5	5.08	11.8	30.3
Number of Resistors #	2	4	11

Dimensions(mm)	A	5.08 ± 0.5 ~ 30.3 ± 0.5
	B	9.0 ± 0.5
	C	0.6 ± 0.05
	D	2.54 ± 0.05
	E	11.5 ± 0.5
	F	3.0 ± 0.5
Rated Wattage of one element unit at 70°C (W)		0.1
Maximum Working Voltage (V)		200
Nominal Resistance Range of component element unit (Ω)		10 ~ 1M
Absolute Tolerance (%)		A2(± 0.02), A5(± 0.05), B(± 0.1), C(± 0.25), D(± 0.5), F(± 1.0)
Relative Tolerance (%)		T(± 0.01), A2(± 0.02), A5(± 0.05), B(± 0.1)
Absolute Temperature Coefficient (ppm/°C)		C7(± 5), C6(± 10), C5(± 15), C3(± 25), C2(± 50)
Relative Temperature Coefficient (ppm/°C)		C10(± 2), C9(± 3), C7(± 5), C6(± 10), C5(± 15)
Working Temperature (°C)		-10 ~ +70

- Remark
- Absolute value means all factors (Tolerance and Temperature Coefficient) of component element units of Network Resistor are independent.
 - Relative value means the maximum difference factor among component element units of Network Resistor.

► Precision Resistor Network Examples for Construction



- There are no standard nominal resistance for UPRNS/UPRND Series.
- Customer can designate or specify the number of component elements of Network Resistor according with this specification of UPRNS/UPRND Series to meet your own needs.
- It can be required to Token's representatives if customer's requirement beyonds the range of Token's specifications.



Precision Resistors

► How to Order

UPRND

❶

4

❷

100R

❸

B

❹

C5

❺

❶ Product type

❷ Number of Resistors

❸ Resistance Value (Ω): 10 ~ 1M

❹ Resistance Tolerance (%)

	Code	Resistance Tolerance (%)
Absolute	A2	± 0.02
	A5	± 0.05
	B	± 0.1
	C	± 0.25
	D	± 0.5
	F	± 1.0
Relative	T	± 0.01
	A2	± 0.02
	A5	± 0.05
	B	± 0.1

❺ Temperature Coefficient (ppm/ $^{\circ}$ C)

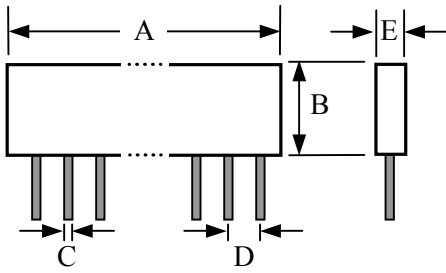
	Code	Temperature Coefficient (ppm/ $^{\circ}$ C)
Absolute	C7	± 5
	C6	± 10
	C5	± 15
	C3	± 25
	C2	± 50
Relative	C10	± 2
	C9	± 3
	C7	± 5
	C6	± 10
	C5	± 15





Precision Resistors

UPRNS Series - Precision Network Resistors



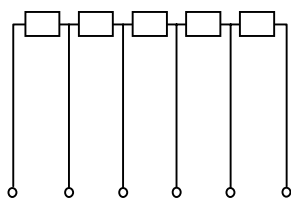
- Precision Network Resistors Low TCR UPRNS Series meets ROHS requirements.
- UPRNS: Serial Dip Type; UPRND: Parallel Dip Type
- UPRNS/UPRND Series are relatively consistent with Tolerance of Nominal Resistance and Temperature Coefficient and are good for application's Precision Divider, Bypass, etc...
- UPRNS/UPRND Series are assembled by EE/RE 1/10 series to form a stable, high precision, and low temperature coefficient Precision Network Resistor. Characteristic of UPRNS/UPRND Series meet.

UPRNS A(mm) ± 0.5	14.20	16.90	19.34	21.90	24.10	27.16	35.00	42.30	50.80
Number of Resistors #	5	6	7	8	9	10	13	16	19

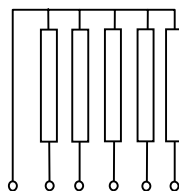
Dimensions (mm)	A	14.20 ± 0.5 ~ 50.80 ± 0.5
	B	12.0 ± 0.5
	C	0.6 ± 0.05
	D	2.54 ± 0.05
	E	4.0 ± 0.5
Rated Wattage of one element unit at 70°C (W)		0.1
Maximum Working Voltage (V)		200
Nominal Resistance Range of component element unit (Ω)		10 ~ 1M
Absolute Tolerance (%)		A2(± 0.02), A5(± 0.05), B(± 0.1), C(± 0.25), D(± 0.5), F(± 1.0)
Relative Tolerance (%)		T(± 0.01), A2(± 0.02), A5(± 0.05), B(± 0.1)
Absolute Temperature Coefficient (ppm/ $^{\circ}$ C)		C7(± 5), C6(± 10), C5(± 15), C3(± 25), C2(± 50)
Relative Temperature Coefficient (ppm/ $^{\circ}$ C)		C10(± 2), C9(± 3), C7(± 5), C6(± 10), C5(± 15)
Working Temperature ($^{\circ}$ C)		-10 ~ +70

- Remark
- Absolute value means all factors (Tolerance and Temperature Coefficient) of component element units of Network Resistor are independent.
 - Relative value means the maximum difference factor among component element units of Network Resistor.

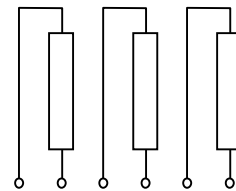
► Precision Network Resistor Examples for Construction



TYPE 1



TYPE 2



TYPE 3

- There are no standard nominal resistance for UPRNS/UPRND Series.
- Customer can designate or specify the number of component elements of Network Resistor according with this specification of UPRNS/UPRND Series to meet your own needs.
- It can be required to Token's representatives if customer's requirement beyonds the range of Token's specifications.



Precision Resistors

► How to Order

UPRNS

❶

8

❷

Type1

❸

10R

❹

B

❺

C5

❻

- ❶ Product type
- ❷ Number of Resistors
- ❸ Construction: Type1, Type2, Type3.
- ❹ Resistance Value (Ω): 10 ~ 1M
- ❺ Resistance Tolerance (%)

	Code	Resistance Tolerance (%)
Absolute	A2	± 0.02
	A5	± 0.05
	B	± 0.1
	C	± 0.25
	D	± 0.5
	F	± 1.0
Relative	T	± 0.01
	A2	± 0.02
	A5	± 0.05
	B	± 0.1

❻ Temperature Coefficient (ppm/ $^{\circ}$ C)

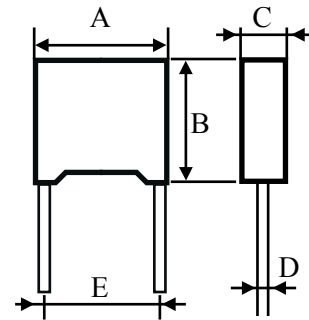
	Code	Temperature Coefficient (ppm/ $^{\circ}$ C)
Absolute	C7	± 5
	C6	± 10
	C5	± 15
	C3	± 25
	C2	± 50
Relative	C10	± 2
	C9	± 3
	C7	± 5
	C6	± 10
	C5	± 15



Precision Resistors

Ultra Precision Network Resistor - Radial Type - UPR Series

- Ultra Precision Network Resistor -Radial Type UPR Series are assembled by Token EE/RE 1/10 series Applications to form a stable, high precision, and low temperature coefficient network resistors.
- UPR Series are relatively consistent with Tolerance of Nominal Resistance and Temperature Coefficient and are good for applications like Precision Instruments, Simulation Equipments, etc...
- The electric characteristics of UPR and UPSC are the same, excepting body size.



▶ Ultra Precision Network Resistor -Radial Type Dimensions and Technical Characteristics

Dimensions (mm)	A	10.5 ± 0.3	
	B	9.1 ± 0.3	
	C	4.0 ± 0.3	
	D	0.6 ± 0.05	
	E	7.62 ± 0.5	
Working Temperature (°C)		-10 ~ +70	
Rated Wattage at 70°C (W)		0.2	
Maximum Working Voltage (V)		250	
Nominal Resistance Range (Ω)		10 ~ 5M	1K ~ 1M
Nominal Resistance Tolerance (%)		A2(±0.02), A5(±0.05), B(±0.1)	T(±0.01), A2(±0.02), A5(±0.05), B(±0.1)
Temperature Coefficient (ppm/°C) [TCR: +25°C ~ +85°C]		C9(±3), C7(±5), C6(±10), C5(±15), C3(±25)	C10(±2), C9(±3), C7(±5), C6(±10), C5(±15), C3(±25)

Remark • Customer can specify Tolerance and Temperature Coefficient range to meet your own needs.

- It can be required to Token's representatives if customer's requirement beyonds the range of Token's specifications.

▶ How to Order



① Product type

② Rated Power (W): 0.2

③ Resistance Value (Ω): 10 ~ 5M, 1K ~ 1M

④ Resistance Tolerance (%)

Resistance Value	Code	Resistance Tolerance (%)
10 ~ 5M	A2	±0.02
	A5	±0.05
	B	±0.1
1K ~ 1M	T	±0.01
	A2	±0.02
	A5	±0.05
	B	±0.1

⑤ Temperature Coefficient (ppm/°C)

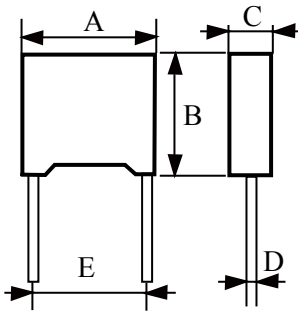
Resistance Value	Code	Temperature Coefficient (ppm/°C)
10 ~ 5M	C9	±3
	C7	±5
	C6	±10
	C5	±15
	C3	±25
1K ~ 1M	C10	±2
	C9	±3
	C7	±5
	C6	±10
	C5	±15
	C3	±25

⑥ Packaging: P(Bulk)



Precision Resistors

Network Resistors Ultra Precision - Radial Type - UPSC Series



Network Resistors Ultra Precision - Radial Type

- UPSC Series are assembled by Token EE/RE 1/10 series to form a stable, high precision, and low temperature coefficient device.
- UPSC Series are relatively consistent with Tolerance of Nominal Resistance and Temperature Coefficient and are good for applications like Precision Instruments, Simulation Equipments, etc...
- UPSC series comes with more compact size by comparing to UPR, but UPR series has wider resistance range.

► Network Resistors Ultra Precision - Radial Type Dimensions and Technical Characteristics

Dimensions (mm)	A	7.65± 0.3	
	B	8.6± 0.3	
	C	2.6± 0.3	
	D	0.6 ± 0.05	
	E	3.81± 0.5	
Working Temperature (°C)		-10 ~ +70	
Rated Wattage at 70°C (W)		0.2	
Maximum Working Voltage (V)		250	
Nominal Resistance Range (Ω)		40 ~ 5M	1K ~ 1M
Nominal Resistance Tolerance (%)		A2(±0.02), A5(±0.05), B(±0.1)	T(±0.01), A2(±0.02), A5(±0.05), B(±0.1)
Temperature Coefficient (ppm/°C) [TCR: +25°C ~ +85°C]		C9(±3), C7(±5), C6(±10), C5(±15), C3(±25)	C10(±2), C9(±3), C7(±5), C6(±10), C5(±15), C3(±25)

Remark • Customer can specify Tolerance and Temperature Coefficient range to meet your own needs.

- It can be required to Token's representatives if customer's requirement beyonds the range of Token's specifications.

► How to Order



① Product type

② Rated Power (W): 0.2

③ Resistance Value (Ω): 40 ~ 5M, 1K ~ 1M

④ Resistance Tolerance (%)

Resistance Value	Code	Resistance Tolerance (%)
40 ~ 5M	A2	±0.02
	A5	±0.05
	B	±0.1
1K ~ 1M	T	±0.01
	A2	±0.02
	A5	±0.05
	B	±0.1

⑤ Temperature Coefficient (ppm/°C)

Resistance Value	Code	Temperature Coefficient (ppm/°C)
40 ~ 5M	C9	±3
	C7	±5
	C6	±10
	C5	±15
	C3	±25
1K ~ 1M	C10	±2
	C9	±3
	C7	±5
	C6	±10
	C3	±25

⑥ Packaging: P(Bulk)

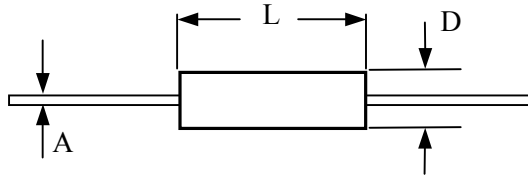


Precision Resistors

EE Series - Precision Resistor Metal Film

○ Precision Resistor Metal Film - Token EE Series meets MIL-PRF-55182 and GJB244A-2001 quality standards.

- Moulding Type
- High reliability
- Excellent stability
- High precision
- Low temperature coefficient PPM.
- Covers all general type resistors

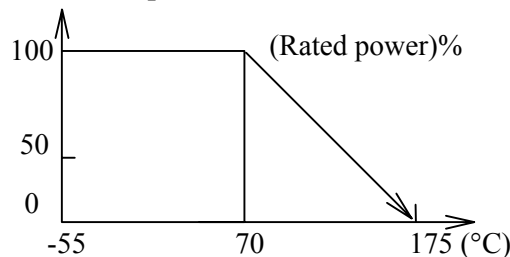


► Precision Resistor Metal Film Technical Characteristics

Type		EE1/20	EE1/10	EE1/8	EE1/4	EE1/2
Rated Wattage (W)	70 °C	0.125	0.25	0.5	0.75	1.0
	125 °C	0.05	0.10	0.125	0.25	0.5
Max. Working Voltage (V)		200	200	250	300	350
Dimensions (mm)	L ± 0.3	4.30	6.80	10.2	14.5	18.4
	D ± 0.4	1.90	2.50	3.80	4.50	6.50
	A ± 0.05	0.40	0.60	0.60	0.60	0.80
Resistance Range (Ω)		20 ~ 200K	10 ~ 3M	10 ~ 5M	10 ~ 10M	10 ~ 15M
Working Temperature Range		-55°C ~ +175°C				
Nominal Resistance Tolerance		B(±0.10%), C(±0.25%), D(±0.50%), F(±1.00%) between 5Ω to 3MΩ can be reached to A5(±0.05%) and A2(±0.02%)				
Temperature Coefficient PPM Normal test range(+25°C ~ +85°C) Special require range(-10°C ~ +50°C)		C6(±10PPM/°C), C5(±15PPM/°C), C3(±25PPM/°C), C2(±50PPM/°C) between 5Ω to 3MΩ can be reached to C7(±5PPM/°C)				

Remark ● Please contact Token's Representatives if your requirement is not in above range.

► Precision Resistor Metal Film Power - Temperature Curve



► Precision Resistor Metal Film Periodical Inspection Items and Methods

Type	Item	Method	Requirement
Long Period	Life time	GJB244A (MIL-PRF-55182) 4.8.18 Rated Wattage, 125°C, 2000h 10000h	GJB244A (MIL-PRF-55182) 3.24 $\Delta R \leq \pm(0.5\%R + 0.01\Omega)$ $\Delta R \leq \pm(2\%R + 0.01\Omega)$
	Humidity	GJB244A (MIL-PRF-55182) 4.8.18 -10°C ~ +65°C, RH<90% Rated Wattage, Cycle 240h.	GJB244A (MIL-PRF-55182) 3.21 $\Delta R \leq \pm(0.4\%R + 0.01\Omega)$
	High temp exposed	GJB244A 4.8.19 175°C 2000h	GJB244A (MIL-PRF-55182) 3.25 $\Delta R \leq \pm(2.0\%R + 0.01\Omega)$
Short Period	Dielectric voltage	GJB244A (MIL-PRF-55182) 4.8.12/4.8.23/4.8.10	GJB244A (MIL-PRF-55182) 3.18/3.29/3.16 $\Delta R \leq \pm(0.15\%R + 0.01\Omega)$; no physical damage, arc, isolation break through
	Lead strength Impact High frequency vibration	GJB244A (MIL-PRF-55182) 4.8.11/4.8.16/4.8.17	GJB244A (MIL-PRF-55182) 3.17/3.22/3.23; $\Delta R \leq \pm(0.20\%R + 0.01\Omega)$ no physical damage
	Solderability	GJB244A (MIL-PRF-55182) 4.8.14	GJB244A (MIL-PRF-55182) 3.20; $\Delta R \leq \pm(0.10\%R + 0.01\Omega)$ no physical damage





Precision Resistors

► How to Order

- | | | | | | |
|-------|------|-----|---|----|---|
| EE1/8 | 0.5W | 10R | B | C6 | P |
| ① | ② | ③ | ④ | ⑤ | ⑥ |

① Product type: EE1/20, EE1/10, EE1/8, EE1/4, EE1/2.

② Rated Power (W)

Temperature	Rated Power (W)
70 °C	0.125
	0.250
	0.500
	0.750
	1.000
125 °C	0.050
	0.100
	0.125
	0.250
	0.500

③ Resistance Value (Ω): 20 ~ 200K, 10 ~ 3M, 10 ~ 5M, 10 ~ 10M, 10 ~ 15M.

④ Resistance Tolerance (%)

Code	Resistance Tolerance (%)
B	± 0.10
C	± 0.25
D	± 0.50
F	± 1.00

⑤ Temperature Coefficient (ppm/°C)

Code	Temperature Coefficient (ppm/°C)
C6	± 10
C5	± 15
C3	± 25
C2	± 50

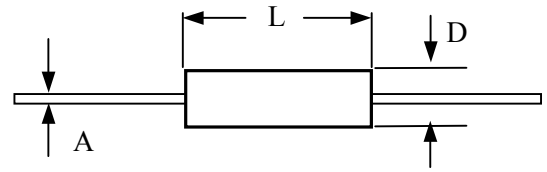
⑥ Packaging: P (Bulk)



Precision Resistors

NE Series - Precision Metal Film Resistors

- Precision Metal Film Resistors Token NE Series meets MIL-PRF-55182 and GJB244A-2001 quality standards
- Moulding Type
- High reliability
- Excellent stability
- Ultra precision
- Low temperature coefficient PPM.
- Caps range of ultra low resistance.

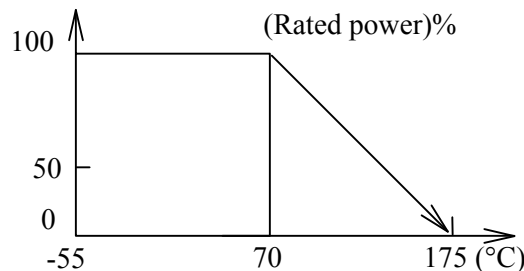


► Precision Metal Film Resistors Technical Characteristics

Type		NE1/10	NE1/8	NE1/4	NE1/2
Rated Wattage (W)	70 °C	0.25	0.5	0.75	1.0
	125 °C	0.10	0.125	0.25	0.5
Resistance Range (Ω)		0.05 ~ 10	0.05 ~ 10	0.025 ~ 10	0.025 ~ 10
Dimensions (mm)	L ± 0.3	6.80	10.2	14.5	18.4
	D ± 0.4	2.50	3.80	4.50	6.50
	A ± 0.05	0.60	0.60	0.60	0.80
Working Temperature Range		-55°C ~ +175°C			
Nominal Resistance Tolerance J(±5.0%) F(±1.0%) D(±0.5%) C(±0.25%) B(±0.10%) A5(±0.05%)		all resistance:J 0.1Ω<R≤0.2Ω:J / F 0.2Ω<R≤0.4Ω:J / F / D 0.4Ω<R≤1.0Ω:J / F / D / C 1Ω<R≤5Ω :J / F / D / C / B 5Ω<R : J / F / D / C / B / A5			
Temperature Coefficient PPM Normal test range (+25°C ~ +85°C)		1Ω≤R≤3Ω: C2(±50PPM/°C), C3(±25PPM/°C) R>3Ω: C2(±50PPM/°C), C3(±25PPM/°C),C5(±15PPM/°C), C6(±10PPM/°C), C7(±5PPM/°C) R<1Ω:No Temperature Coefficient reference			

Remark • Please contact Token's Representatives if your requirement is not in above range.

► Precision Metal Film Resistors Power - Temperature Curve





Precision Resistors

► Precision Metal Film Resistor Periodical Inspection Items and Methods

Type	Item	Method	Requirement
Long Period	Life time	GJB244A (MIL-PRF-55182) 4.8.18 Rated Wattage, 125°C, 2000h 10000h	GJB244A (MIL-PRF-55182) 3.24 $\Delta R \leq \pm(0.5\%R + 0.01\Omega)$ $\Delta R \leq \pm(2\%R + 0.01\Omega)$
	Humidity	GJB244A (MIL-PRF-55182) 4.8.18 -10°C ~ +65°C, RH<90% Rated Wattage, Cycle 240h.	GJB244A (MIL-PRF-55182) 3.21 $\Delta R \leq \pm(0.4\%R + 0.01\Omega)$
	High temp exposed	GJB244A 4.8.19 175°C 2000h	GJB244A (MIL-PRF-55182) 3.25 $\Delta R \leq \pm(2.0\%R + 0.01\Omega)$
Short Period	Dielectric voltage	GJB244A (MIL-PRF-55182) 4.8.12/4.8.23/4.8.10	GJB244A (MIL-PRF-55182) 3.18/3.29/3.16 $\Delta R \leq \pm(0.15\%R + 0.01\Omega)$ no physical damage, arc, isolation break through
	Lead strength Impact High frequency vibration	GJB244A (MIL-PRF-55182) 4.8.11/4.8.16/4.8.17	GJB244A (MIL-PRF-55182) 3.17/3.22/3.23 $\Delta R \leq \pm(0.20\%R + 0.01\Omega)$ no physical damage
	Solderability	GJB244A (MIL-PRF-55182) 4.8.14	GJB244A (MIL-PRF-55182) 3.20 $\Delta R \leq \pm(0.10\%R + 0.01\Omega)$ no physical damage

► How to Order

NE1/8	0.5W	10R	B	C6	P
①	②	③	④	⑤	⑥

① Product type: NE1/10, EE1/8,
NE1/4, NE1/2.

② Rated Power (W)

Temperature	Rated Power (W)
70 °C	0.25
	0.50
	0.75
	1.00
125°C	0.10
	0.125
	0.25
	0.50

③ Resistance Value (Ω): 0.05 ~ 10, 0.05 ~ 10,
0.025 ~ 10, 0.025 ~ 10.

⑥ Packaging: P (Bulk)

④ Resistance Tolerance (%)

Code	Resistance Tolerance (%)
J	± 5.00
F	± 1.00
D	± 0.50
C	± 0.25
B	± 0.10
A5	± 0.05

⑤ Temperature Coefficient (ppm/°C)

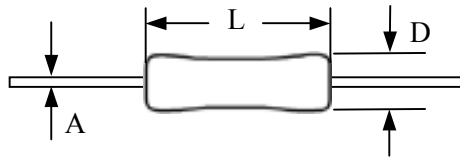
Code	Temperature Coefficient (ppm/°C)
C7	± 5
C6	± 10
C5	± 15
C3	± 25
C2	± 50



Precision Resistors

RE Metal Film Series - High Precision Resistors

- Token High Precision Resistor RE Series meets MIL-PRF- 55182and GJB244A-2001 quality standards
- Coating Type
- Ultra precision
- Extreme stability
- Excellent reliability
- Low temperature coefficient PPM.
- Covers all general type resistors

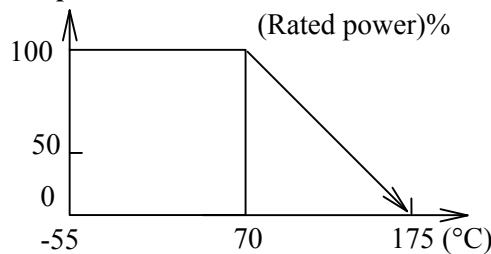


► High Precision Resistors Technical Characteristics

Type		RE50	RE55	RE60	RE65	RE70	RE75
Rated Wattage (W)	70 °C	0.125	0.25	0.5	0.75	1.0	1.5
	125 °C	0.05	0.10	0.125	0.25	0.5	1.0
Max. Working Voltage (V)		200	200	250	300	350	500
Dimensions (mm)	L ± 0.3	4.0	6.7	9.6	11.8	13.9	17.7
	D ± 0.4	1.40	2.05	3.15	3.75	4.65	7.20
	A ± 0.05	0.40	0.60	0.60	0.60	0.80	0.80
Resistance Range (Ω)		20 ~ 200K	10 ~ 3M	10 ~ 5M	10 ~ 10M	10 ~ 15M	10 ~ 15M
Working Temperature Range		-55°C ~ +175°C					
Nominal Resistance Tolerance		B(±0.10%), C(±0.25%), D(±0.50%), F(±1.00%) between 5Ω to 3MΩ can be reached to A5(±0.05%) and A2(±0.02%)					
Temperature Coefficient PPM Normal test range(+25°C ~ +85°C) Special require range(-10°C ~ +50°C)		C6(±10PPM/°C), C5(±15PPM/°C), C3(±25PPM/°C), C2(±50PPM/°C) between 5Ω to 3MΩ can be reached to C7(±5PPM/°C)					

Remark ● Please contact Token's Representatives if your requirement is not in above range.

► High Precision Resistors Power - Temperature Curve



► High Precision Resistors Periodical Inspection Items and Methods

Type	Item	Method	Requirement
Long Period	Life time	GJB244A (MIL-PRF-55182) 4.8.18 Rated Wattage,125°C,2000h 10000h	GJB244A (MIL-PRF-55182) 3.24 $\Delta R \leq \pm(0.5\%R+0.01\Omega)$ $\Delta R \leq \pm(2\%R+0.01\Omega)$
	Humidity	GJB244A (MIL-PRF-55182) 4.8.18 -10°C ~ +65°C, RH<90% Rated Wattage, Cycle 240h.	GJB244A (MIL-PRF-55182)3.21 $\Delta R \leq \pm(0.4\%R+0.01\Omega)$
	High temp exposed	GJB244A 4.8.19 175°C 2000h	GJB244A (MIL-PRF-55182)3.25 $\Delta R \leq \pm(2.0\%R+0.01\Omega)$
Short Period	Dielectric voltage	GJB244A (MIL-PRF-55182) 4.8.12/4.8.23/4.8.10	GJB244A (MIL-PRF-55182) 3.18/3.29/3.16 $\Delta R \leq \pm(0.15\%R+0.01\Omega)$ no physical damage, arc, isolation break through
	Lead strength Impact High frequency vibration	GJB244A (MIL-PRF-55182) 4.8.11/4.8.16/4.8.17	GJB244A (MIL-PRF-55182) 3.17/3.22/3.23 $\Delta R \leq \pm(0.20\%R+0.01\Omega)$ no physical damage
	Solderability	GJB244A (MIL-PRF-55182) 4.8.14	GJB244A (MIL-PRF-55182)3.20 $\Delta R \leq \pm(0.10\%R+0.01\Omega)$ no physical damage





Precision Resistors

► How to Order



① Product type: RE50, RE55,
RE60, RE65,
RE70, RE75.

② Rated Power (W)

Temperature	Rated Power (W)
70 °C	0.125
	0.25
	0.5
	0.75
	1.0
	1.5
125 °C	0.05
	0.10
	0.125
	0.25
	0.5
	1.0

③ Resistance Value (Ω): 20 ~ 200K, 10 ~ 3M,
10 ~ 5M, 10 ~ 10M,
10 ~ 15M, 10 ~ 15M.

④ Resistance Tolerance (%)

Code	Resistance Tolerance (%)
B	± 0.10
C	± 0.25
D	± 0.50
F	± 1.00

⑤ Temperature Coefficient (ppm/°C)

Code	Temperature Coefficient (ppm/°C)
C6	± 10
C5	± 15
C3	± 25
C2	± 50

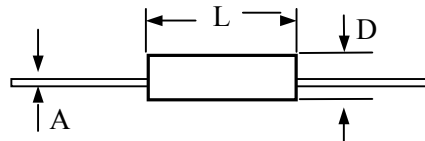
⑥ Packaging: P (Bulk)



Precision Resistors

RN Series - High Precision Metal Film Resistors

- High precision
- extreme reliability
- excellent stability
- Moulding Type
- Low temperature coefficient PPM.
- Token RN Series meets MIL-PRF-55182 and GJB244A-2001 quality standards



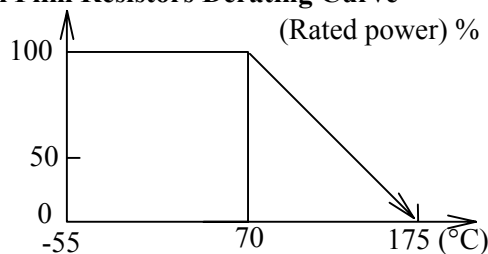
High Precision Metal Film Resistor Technical Characteristics

TYPE		RN50	RN55	RN60	RN65	RN70
Rated Wattage (W)	70°C	0.067	0.125	0.250	0.500	0.750
	125°C	0.050	0.100	0.125	0.250	0.500
Max. Working Voltage (V)		200	200	250	300	350
Dimensions (mm)	L ± 0.3	3.9	6.8	10.0	14.8	18.3
	D ± 0.4	1.8	2.5	3.7	5.2	6.5
	A ± 0.05	0.45	0.60	0.60	0.60	0.81
MIL-Approved Resistance Range (Ω)		10.0 ~ 100K	49.9 ~ 100K	49.9 ~ 499K	49.9 ~ 1.0M	24.9 ~ 1.0M
AWG Wire No.		26	22	22	22	20
Working Temperature Range		-55°C ~ +175°C				
Nominal Resistance Tolerance		B(±0.10%), C(±0.25%), D(±0.50%), F(±1.00%)				
Temperature Coefficient		E(±25PPM/°C), C(±50PPM/°C), D(±100PPM/°C)				

Remark • Temperature Coefficient PPM can be low to ±5PPM/°C, if applications only need operation in narrow precise temperature range within -55°C ~ +175°C. Please contact Token Representatives.

- Please contact Token's Representatives if your requirement is not in above range.

High Precision Metal Film Resistors Derating Curve



High Precision Metal Film Resistors Periodical Inspection Items and Methods

Type	Item	Method	Requirement
Long Period	Life time	GJB244A (MIL-PRF-55182) 4.8.18 Rated Wattage, 125°C, 2000h 10000h	GJB244A (MIL-PRF-55182) 3.24 $\Delta R \leq \pm(0.5\%R + 0.01\Omega)$ $\Delta R \leq \pm(2\%R + 0.01\Omega)$
	Humidity	GJB244A (MIL-PRF-55182) 4.8.18 -10°C ~ +65°C, RH < 90% Rated Wattage, Cycle 240h.	GJB244A (MIL-PRF-55182) 3.21 $\Delta R \leq \pm(0.4\%R + 0.01\Omega)$
	High temp exposed	GJB244A 4.8.19 175°C 2000h	GJB244A (MIL-PRF-55182) 3.25 $\Delta R \leq \pm(2.0\%R + 0.01\Omega)$
Short Period	Dielectric voltage	GJB244A (MIL-PRF-55182) 4.8.12/4.8.23/4.8.10	GJB244A (MIL-PRF-55182) 3.18/3.29/3.16 $\Delta R \leq \pm(0.15\%R + 0.01\Omega)$ no physical damage, arc, isolation break through
	Lead strength	GJB244A (MIL-PRF-55182) 4.8.11/4.8.16/4.8.17	GJB244A (MIL-PRF-55182) 3.17/3.22/3.23 $\Delta R \leq \pm(0.20\%R + 0.01\Omega)$
	Impact		no physical damage
	High frequency vibration		no physical damage
	Solderability	GJB244A (MIL-PRF-55182) 4.8.14	GJB244A (MIL-PRF-55182) 3.20 $\Delta R \leq \pm(0.10\%R + 0.01\Omega)$ no physical damage





Precision Resistors

► How to Order

RN65	0.500W	100KR	D	C2	P
①	②	③	④	⑤	⑥

① Product type: RN50, RN55, RN60, RN65, RN70.

② Rated Power (W)

Temperature	Rated Power (W)
70 °C	0.067
	0.125
	0.250
	0.500
	0.750
125 °C	0.050
	0.100
	0.125
	0.250
	0.500

③ Resistance Value (Ω): 10.0 ~ 100K, 49.9 ~ 100K, 49.9 ~ 499K, 49.9 ~ 1.0M, 24.9 ~ 1.0M.

④ Resistance Tolerance (%)

Code	Resistance Tolerance (%)
B	± 0.10
C	± 0.25
D	± 0.50
F	± 1.00

⑤ Temperature Coefficient (ppm/°C)

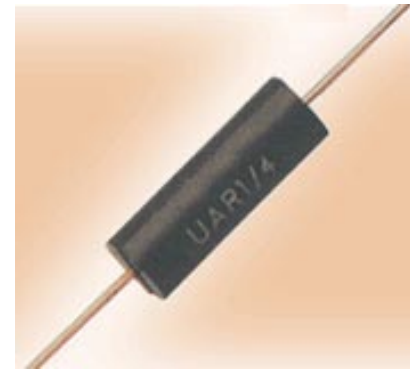
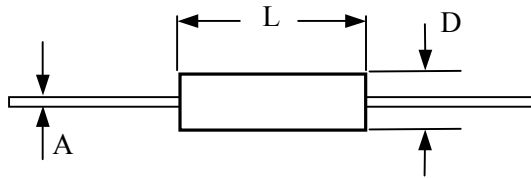
Code	Temperature Coefficient (ppm/°C)
C3	± 25
C2	± 50
C1	± 100

⑥ Packaging: P (Bulk)



Precision Resistors

UAR Series - High Precision Resistor Mold Type



► High Precision Resistor Mold Type Technical Characteristics

Type		UAR1/4	UAR1/8	UAR1/10
Power Rating at 85°C (W)		0.33	0.25	0.125
Max. Working Voltage (V)		300	300	300
Resistance Range (Ω)		500.0~1.0M	100.0~1.0M	100.0~1.0M
Dimensions (mm)	L±0.3	14.8	10.0	6.8
	D±0.3	5.2	3.7	2.5
	A±0.05	0.6	0.6	0.6

► High Precision Resistor Mold Type Specification

Tolerance:	±0.02, ±0.05, ±0.10, ±0.25, ±0.5, ±1.0%
Temp. Coefficient:	±3, ±5, ±10, ±15ppm/°C
Standard temperature characteristic:	+25 to 85 °C
on request:	-10 to +85 °C
Noise:	less than 0.05 μV/V
Voltage coefficient:	less than 0.02 ppm/V
Non linearity (3. Harm):	more than (-100)dB
Inductivity:	≤1MHz
Thermal voltage to copper:	1 ~ 3 μV/°C
Isolations Resistance:	10 ¹⁰ Ω

► High Precision Resistor Mold Type Tests According MIL STD 202

Temperature cycling:	0.02%
Low temp. operation:	0.013%
Short time overload:	0.01%
Dielectric strength:	0.01%
Load life:	0.04%
Resistance to soldering heat:	0.012%
Moisture test:	0.050%
Shock-and Vibrations test:	0.015%



Precision Resistors

► How to Order

UAR1/8

①

0.25W

②

100R

③

B

④

C9

⑤

P

⑥

① Product type: UAR1/4, UAR1/8,
UAR1/10.

② Rated Power (W): 0.33, 0.25, 0.125

③ Resistance Value (Ω): 500.0 ~ 1.0M,
100.0 ~ 1.0M,
100.0 ~ 1.0M.

④ Resistance Tolerance (%)

Code	Resistance Tolerance (%)
A2	± 0.02
A5	± 0.05
B	± 0.10
C	± 0.25
D	± 0.50
F	± 1.00

⑤ Temperature Coefficient (ppm/ $^{\circ}$ C)

Code	Temperature Coefficient (ppm/ $^{\circ}$ C)
C9	± 3
C7	± 5
C6	± 10
C5	± 15

⑥ Packaging: P (Bulk)

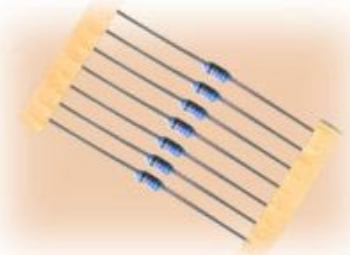


Precision Resistors

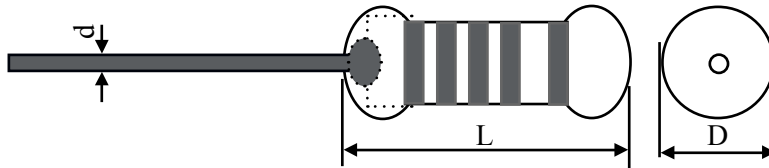
RJ Series - Precision Resistors

Precision Resistor

- MF - Metal Film use nickel-chromium or a similar alloy deposited on a ceramic rod by a vacuum process of evaporation or sputtering.
- The final resistance value is (most commonly) defined by cutting an insulating path through the film along the length of the rod while keeping it in rotation.
- The technology is capable of supporting accuracy characteristics over a broad resistance range.
- Types include axial through-hole and metal film fusible for special purpose.



► Precision Resistors Quick Reference Data



Type	RJ72	RJ73	RJ74	RJ16	RJ17	RJ18	
MIL-R-10509F type	RN50	RN55	RN60	RN65	RN70	RN75	
Resistance range (Ω)	0.1 ~ 22M						
Resistance tolerance (%)	A5 (± 0.05), B (± 0.10), C (± 0.25), D (± 0.5), F (± 1), J (± 5.0)						
Temperature coefficient (ppm/ $^{\circ}$ C)	C7 (± 5), C6 (± 10), C5 (± 15), C3 (± 25), C2 (± 50), C1 (± 100)						
Climatic category (LCT/UCT/days)	55 / 125 / 56						
Rated dissipation (W) P70	0.16	0.25	0.50	1.0	2.0	3.0	
Operating voltage (V) U_{max}	200	250	300	350	450	500	
Short time over load voltage (V) U_{max}	400	500	600	700	900	1000	
Operating Temperature range	-55 $^{\circ}$ C to 125 $^{\circ}$ C						
Insulation voltage	>500V						
Insulation resistance	>1G Ω						
Dimensions (mm)	L (Max.)	3.8	6	10	12	16	26
	D (Max.)	2.0	2.5	3.5	4.5	5.5	8.6
	d ± 0.1	0.45	0.5	0.6	0.7	0.8	0.8

Type	RJ73S	RJ74S	RJ16M	RJ16S	RJ17M	RJ17S	RJ18M	RJ18S	
MIL-R-10509F type	RN50	RN55	RN60	RN60	RN65	RN65	RN70	RN70	
Resistance range (Ω)	0.1 ~ 22M								
Resistance tolerance (%)	A5 (± 0.05), B (± 0.10), C (± 0.25), D (± 0.50), F (± 1.0), J (± 5.0)								
Temperature coefficient (ppm/ $^{\circ}$ C)	C7 (± 5), C6 (± 10), C5 (± 15), C3 (± 25), C2 (± 50), C1 (± 100)								
Climatic category (LCT/UCT/days)	55 / 125 / 56								
Rated dissipation (W) P70	0.25	0.50	1.00	1.00	2.00	2.00	3.00	3.00	
Operating voltage (V) U_{max}	250	300	350	350	400	400	450	450	
Short time over load voltage (V) U_{max}	500	600	700	700	800	800	900	900	
Operating Temperature range	-55 $^{\circ}$ C to 125 $^{\circ}$ C								
Insulation voltage	>500V								
Insulation resistance	>1G Ω								
Dimensions (mm)	L (Max.)	3.8	6.0	6.3	10	10	12	12	16
	D (Max.)	2.00	2.54	2.54	3.50	3.50	4.50	4.50	5.50
	d ± 0.1	0.5	0.6	0.6	0.6	0.7	0.8	0.8	0.8

Notice : Resistance out of range, tolerance and temperature coefficient match are under request.



Precision Resistors

► How to Order

RJ16

①

1.0W

②

10R

③

B

④

C6

⑤

P

⑥

① Product type: RJ72, RJ73, RJ74, RJ16, RJ17, RJ18
RJ73S, RJ74S, RJ16M, RJ16S, RJ17M, RJ17S, RJ18M, RJ18S

② Rated Power (W): 0.16, 0.25, 0.50, 1.0, 2.0, 3.0
0.25, 0.50, 1.00, 1.00, 2.00, 2.00, 3.00, 3.00

③ Resistance Value (Ω): 0.1 ~ 22M

④ Resistance Tolerance (%)

Code	Resistance Tolerance (%)
A5	± 0.05
B	± 0.10
C	± 0.25
D	± 0.50
F	± 1.00
J	± 5.00

⑤ Temperature Coefficient (ppm/ $^{\circ}$ C)

Code	Temperature Coefficient (ppm/ $^{\circ}$ C)
C7	± 5
C6	± 10
C5	± 15
C3	± 25
C2	± 50
C1	± 100

⑥ Packaging

Code	Packaging
P	Bulk
TB	Taping Box