

Version:
March 1, 2017

DIRECT

Electronics Tech.

(EE)

Low TCR Metal Film Resistors

Web: www.direct-token.com

Email: rfq@direct-token.com

Direct Electronics Industry Co., Ltd.

China: 12F, Zhong Xing Industry Bld., Chuang Ye Road,
Nan Shan District, Shen Zhen City,
Guang Dong, China 518054
Tel: +86 755 26055363; Fax: +86 755 26055365

Taiwan: No.137, Sec. 1, Zhongxing Rd., Wugu District,
New Taipei City, Taiwan, R.O.C. 24872
Tel: +886 2981 0109 Fax: +886 2988 7487

▶ Product Introduction**Low TCR high precision resistors offer more precision design options.****Features :**

- Power Rating :0.125W ~ 1W.
- Precision tolerance tight to T($\pm 0.01\%$).
- Precision metal film, excellent stability and reliability.
- Superior electrical TCR performances narrowed to C10 ($\pm 2 \text{ ppm}/^\circ\text{C}$).
- Lead (Pb)-free and RoHS compliant, Covers all general type resistors.

Applications :

- Medical electronics.
- Measuring and calibration equipment.
- High gain feedback applications.
- Precision Instruments, Avionics.
- Telecom.

Known for providing design engineers with a comprehensive range of military-qualified resistive precision devices, Direct Electronics Advanced Metal Film has further expanded its military product capabilities.

These cost-effective high precision moulding resistors meets ROHS requirements, MIL-PRF-55182, and GJB244A-2001 quality standards.

EE Series manufactured by depositing a homogeneous film of metal alloy onto a high-grade ceramic body, the metal film resistors are moulded into cylinder shape to provide mechanical, electrical and climatic protection.

EE Series equate Vishay, IRC, EBG, and Panasonic Precision Devices with more competitive price and fast delivery. Contact us with your specific needs. Besides, you can link to Direct official website "[Precision Resistors](#)" to get more information.

Production Standard:

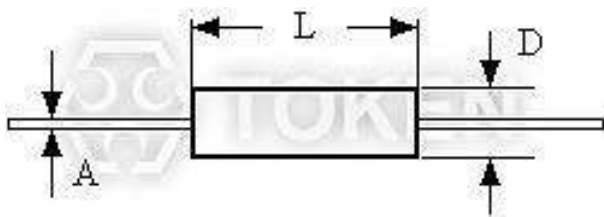
This is made referencing to Chinese National Quality Standard GJB244A-2001 standards and USA Military/Established Reliability MIL-PRF-55182 in environmental and dimensional requirements.



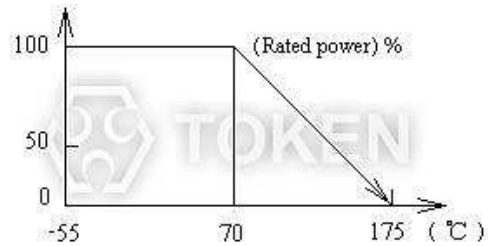
► **Dimensions & Technical Characteristics**

Dimensions & Technical Characteristics (EE)

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
Max. Working Voltage (V)		200	200	250	300	350
Dimensions (Unit: mm)	L ± 0.3	4.3	6.8	10.2	15.1	18.4
	D ± 0.4	1.9	2.5	3.8	5.2	6.5
	A ± 0.05	0.40	0.60	0.60	0.60	0.80
Resistance Range (Ω)		10Ω ~ 2.5MΩ	10Ω ~ 10MΩ	10Ω ~ 10MΩ	10Ω ~ 10MΩ	10Ω ~ 10MΩ
Working Temperature Range		-55°C ~ +175°C				
Nominal Resistance Tolerance		A2(±0.02%), A5(±0.05%), B(±0.10%), C(±0.25%), D(±0.50%), F(±1.00%) between 10Ω to 350KΩ can be reached to T(±0.01%)				
Temperature Coefficient PPM Normal test range (+25°C ~ +85°C) Special require range (-10°C ~ +50°C)		C7(±5PPM/°C), C6(±10PPM/°C), C5(±15PPM/°C), C3(±25PPM/°C), C2(±50PPM/°C) between 10Ω to 350KΩ can be reached to C8(±4PPM/°C), C9(±3PPM/°C), or C10(±2PPM/°C)				



Precision (EE) Dimensions



(EE) Power Derating Curve

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



Mechanical and Electrical Test Conditions

Mechanical and Electrical Test Conditions (EE)

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

Order Codes

Order Codes (EE)

EE1/8	0.5W			10R		B		C6		P	
Part Number	Rated Power (W)			Resistance Value (Ω)		Resistance Tolerance (%)		Temperature coefficient (PPM/°C)		Package	
EE1/20	EE1/20	70°C	0.125	10R	10	T	±0.01	C2	±50	P	Bulk
EE1/10	EE1/10		0.25	100R	100	A2	±0.02	C3	±25		
EE1/8	EE1/8		0.5	1K1	1.1K	A5	±0.05	C5	±15		
EE1/4	EE1/4		0.75	110K	110K	B	±0.1	C6	±10		
EE1/2	EE1/2		1	1M1	1.1M	C	±0.25	C7	±5		
EE1/2				10M	10M	D	±0.5	C8	±4		
						F	±1.0	C9	±3		
								C10	±2		



► General Information

High Precision Devices Made in Direct

Direct is equipped to design and produce custom components to meet many design and reliability demands.

Direct's line of high-reliability and precision products reflects a long-term commitment to our industrial and military customers. In addition to standard industry-grade resistor products, we also have many resistive products designed to meet various military source-controlled drawings.

We continually strive to meet the changing application requirements of the markets by developing new products and manufacturing technologies on an on-going basis.

Enhanced Precision and Stability for Low-Cost Uses

Every component Direct provides to the commercial, industrial, and military markets for cost-efficiency uses is backed by the comprehensive testing and failure analysis capabilities of our own technical staff, whom are industrial experts in understanding and meeting the requirements of the environment.

Low TCR - Fast Approach to a Steady State

Direct Electronics provides a precision Temperature Coefficient of Resistance TCR as low as 2 ppm/°C, If you must guarantee a smaller resistance change in your application. TCR is the best known parameter used to specify a resistor's stability, and is used to depict the resistive element's sensitivity to temperature change due to ambient temperature variations.

A resistor's TCR tells how much its value changes as its temperature changes. It is usually expressed in ppm/°C (parts per million per degree Centigrade) units.

Long-Term Proven Service

Our technical expertise, our knowledge of the industry, our broad product offering, and our ability to work long-term are all part of Direct's ongoing commitment to meeting the changing requirements of our most reliability-conscious customer, today and in the future.

