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DIRECT

Electronics Tech.

(CCR) Carbon Composition Resistors

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▶ Product Introduction**High pulse withstanding carbon composition resistors handle big peaks and pulses.****Features :**

- Low inductance
- Solid rod carbon composition
- Power rating 1/4W and 2W
- Resistance range 1.8Ω ~ 22KΩ
- Resistance tolerance J(±5%), K(±10%) and M(±20%)
- High pulse withstanding and high energy capability
- Products with Pb-free Terminations and RoHS compliant

Applications :

- Strobe Lighting
- High Power Lighting
- Medical defibrillators
- Welding, Automotive
- Inrush Current Limiting
- High Voltage Power Supplies
- Protection (e.g. Discharge Circuits, Surge Protection)

The high pulse withstanding capability of the CCR series of carbon composition resistors from Direct Electronics offers designers a compact solution for applications involving high voltages and high-energy pulses.

Though, many resistor manufacturers claim to offer carbon composition replacements. However, these wire wound or thick film alternatives do not fully match the pulse performance and low inductance of carbon composition.

Direct's CCR series now offers the industry a carbon composition resistor made up of a solid rod of conductive composite material, the chemical composition of which is altered to produce different resistance values.

The main advantage of carbon composition is their pulse handling capability. This is due to the fact that the entire rod conducts and so the thermal mass is far higher, which results in a higher energy capability. Due to the need for higher peak voltages, the CCR range is perfect for vehicle ignition system applications, medical monitoring equipment and as output resistors in defibrillators.

The standard carbon composition CCR resistor offers a power rating of 1/4W, 1/2W, 1W and 2W at 25 °C and is made up of a solid rod of conductive composition material, which can be altered to produce different resistance values. With a typical resistance range of 1.8Ω ~ 22KΩ, resistance tolerance is J(±5%), K(±10%) and M(±20%). Resistors with 5%, 10% and 20% tolerance have four bands indicating value and tolerance in accordance with IEC62.

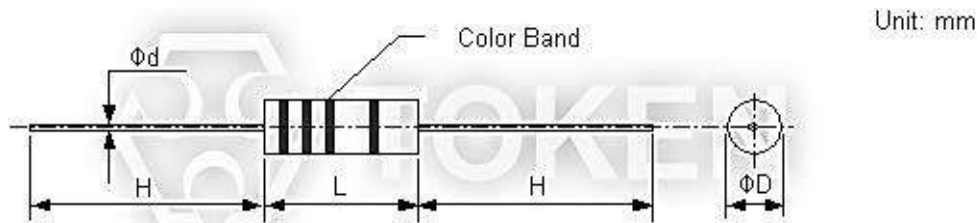
Our custom solutions are designed to address your need for technical and economic success in a timely manner. Contact us with your specific needs. For more information, please link to Direct official website "[General Purpose Resistors](#)".



► **Dimensions**

Dimensions (Unit: mm) (CCR)

Type	Power Rating	L		Φ D	H	Φ d
CCR	1/4W	6.3	+1.0	2.3±0.3	27±2	0.60±0.02
			-1.0			
CCR	1/2W	9.5	+0.5	3.5±0.3	27±2	0.70±0.02
			-1.5			
CCR	1W	15	+1.5	6.0±0.3	28±2	0.80±0.02
			-0.5			
CCR	2W	18	+0.5	8.0±0.3	27±2	1.00±0.02
			-1.5			



Carbon Composition (CCR) Dimensions (Unit: mm)

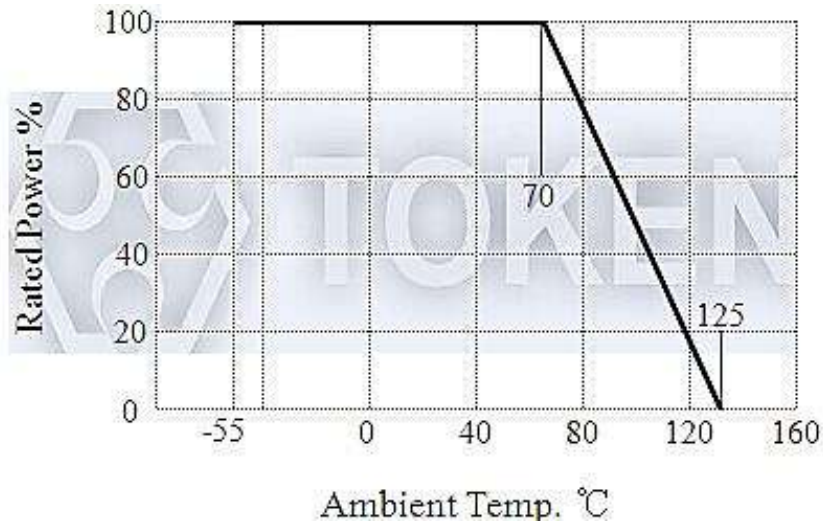
► **Ratings Specifications**

Ratings Specifications (CCR)

Type	Power Rating	Resistance Range	Tolerance E12,E24	Max Working voltage	Max overload Voltage	Rated Ambient Temp.	Operating Temp. Range
CCR	1/4W	2.2Ω ~ 12MΩ	J(±5%) K±10% M±20%	250V	400V	+70°C	-55°C ~ +125°C
CCR	1/2W	2.2Ω ~ 22MΩ		350V	700V	+70°C	-55°C ~ +125°C
CCR	1W	2.2Ω ~ 22KΩ		500V	1000V	+70°C	-55°C ~ +125°C
CCR	2W	1.8Ω ~ 10KΩ		500V	1000V	+70°C	-55°C ~ +125°C

● **Rated Voltage = $\sqrt{\text{Power Rating} \times \text{Resistance Value}}$ or Max. Working voltage, whichever is lower.**



▶ Derating Curve**| Derating Curve (CCR)**

(CCR) Derating Curve



Performance

Performance (CCR)

Description		Performance Requirements		Test Method
Resistance Temperature Coefficient	Resistance Range	Maximum Resistance Value Change %		Test Temperature +20°C /-40°C /+20°C /+100°C /+20°C
		-40~+20°C	+20~+100°C	
	<1KΩ	±6.5%	±5.0%	
	1.1KΩ ~10KΩ	±10%	±6.0%	
	11KΩ ~100KΩ	±13%	±7.5%	
	>11MΩ	±25%	±20%	
Short-time Overload		Δ R≤±2.5%		Rate Voltage*2.5 or maximum overload voltage (the lower)5sec.
With Standing Voltage		No flashover or breakdown		2times maximum working voltage 1 minute
Terminal Strength	Pulled	ΔR≤±2% No visible damage		Load 10N 10s
	Winded			Load 10N 4*90°
	Twisted			3*360° in opposite direction
Resistance to vibration		No visible damage		10~50Hz 3 direction 2 hours each
Solder-heat Resistance		ΔR≤±5% Marks legible, no visible damage		350°C 4mm from the body,3 seconds
Solderability		At least 95% if the dipping surface must be covered by new solder, no flaws gathered.		235°C 2mm from the body,2 seconds
Temperature Cycle		ΔR≤±2% No visible damage		-40°C (30min.)/85°C (30min.)5 cycles
Humidity		ΔR≤±10% No visible damage		40°C 95% RH 240 hours
Load Life		ΔR≤±10% No visible damage, marks legible		Rated voltage or maximum working voltage, 1.5 hours on, 0.5 hours off, 40°C 1000 hours

Order Codes

Order Codes (CCR)

CCR	1/2W	120R		K		P	
Part Number	Rated Power (W)	Resistance Value (Ω)		Resistance Tolerance (%)		Package	
CCR		2R2	2.2Ω	J	±5%	P	Bulk
		120R	120Ω	K	±10%		
		1M2	1.2MΩ	M	±20%		
		22M	22MΩ				



► General Information

General Purpose Resistors with Customized Service

Direct Electronics is expanding business to include a broad range of General Purpose Resistor products designed for high volume applications. This expanded range of commercial resistor presents a more comprehensive product offering for Customer Experience Management (CEM) and other high volume customers that require quality products at competitive pricing.

Backed by the same customer service, technical support and quality assurance that Direct has always provided, these new commercial products enable you the opportunity to source a wider range of resistors from a trusted supplier.

General Use

When an ambient temperature exceeds a rated ambient temperature, resistor shall be applied on the derating curve by derating the load power. General purpose resistor under overloads is not combustion resistant and is likely to emit, flame, gas, smoke, red heat, etc. Flame retardant resistor generally emits smoke and red heat in a certain power and over but do not emit fire or flame.

When resistors are shielded or coated with resin etc., stress from the storage heat and the resins are applied. So, performance and reliability should be checked well before use.

When a voltage higher than rated is applied in a short time (single pulse, repeated pulses, surge, etc.), it does not necessarily ensure safety that an effective wattage is not higher than a rated wattage. Then consult with us with your specified pulse wave shape. Resistors shall be used in a condition causing no dew condensation.

Keep temperature from rising by choosing resistor with a higher rated capacity; do not use a component having the exact load value required. For considerations of safety in extended period applications, the rating should be more than four times higher than the actual wattage involved, but never use resistors at less than 25% of its rated power.

In applications where resistors are subject to intermittent current surges and spikes, be sure in advance that the components selected are capable of withstanding brief durations of increased load.

Do not exceed the recommended rated load. Resistor must use within the rated voltage range to prevent the shortening of service life and/or failure of the wound resistance elements.

Minimum load: Resistor must be utilized at 1/10 or more of the rated voltage to prevent poor conductance due to oxidation build-up. For basic particulars for cautions, refer to EIAJ Technical Report RCR-2121 "Guidance for care note on fixed-resistors".

