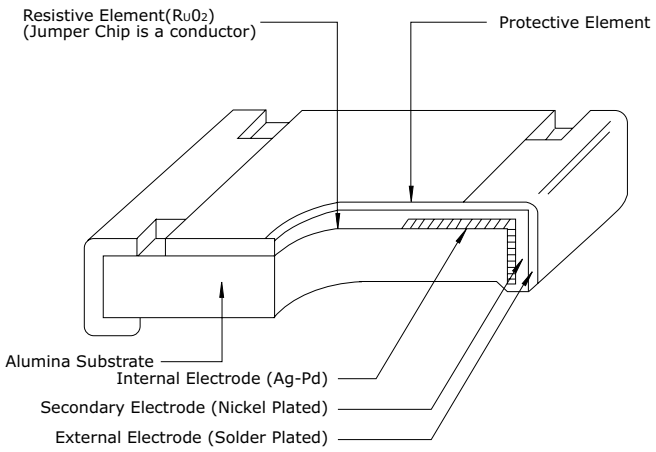
INTRODUCTION

The CR series resistors are manufactured with sophisticated process technology using up-to-date automated production facilities that enable production of small-size, light weight and thin component. They are used in surface mount applications where high density of components with high performance and reliability are needed.

FEATURES

- Extremely thin and light weight.
- Highly reliable multi-layer electrode construction.
- Compatible with wave and reflow soldering process.
- Small size with high power ratings.

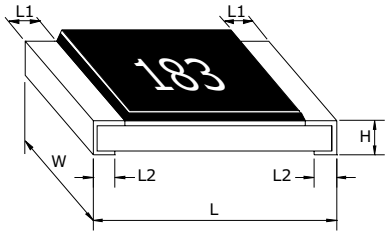
CONSTRUCTION



RATINGS

Type	CR 10 (0402)	CR 16 (0603)	CR 21 (0805)	CR 32 (1206)	CR 40 (1210)	CR 50 (2010)	CR 63 (2512)
Power Rating @ 70°C	1/16W	1/10W	1/8W	1/4W	1/3W	3/4W	1W
Operating Temp. Range Derated to 0 Load at	-55°C to +125°C +125°C						
Maximum Working Voltage	25V	50V	150V	200V	200V	200V	200V
Maximum Overload Voltage	100V	100V	300V	400V	400V	400V	400V
Resistance Range 1%, E-96, E-24 5%, E-24 Zero Ohm Jumper <0.05Ω	 10Ω-1MΩ 10Ω-1MΩ	 1Ω-1MΩ 1Ω-10MΩ	 1Ω-1MΩ 1Ω-10MΩ	 1Ω-1MΩ 1Ω-10MΩ	 1Ω-1MΩ 1Ω-10MΩ	 1Ω-1MΩ 1Ω-10MΩ	 1Ω-1MΩ 1Ω-10MΩ
Temperature Coefficient	1%: ±100ppm/°C, 5%:±200ppm/°C 1Ω - 10Ω: -200ppm/°C to +300ppm/°C; >1MΩ: ±200ppm/°C						
Zero Ohm Jumper Current Rating	1A	1A	2A	2A	2A	2A	2A

DIMENSIONS

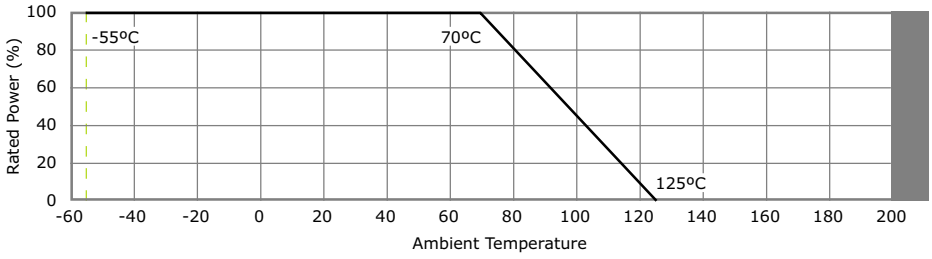


Type	DIMENSIONS Inches (Millimeters)				
	L	W	H	L1	L2
CR 10 (0402)	0.040± 0.004 (1.00± 0.10)	0.020± 0.002 (0.50± 0.05)	0.014± 0.002 (0.35± 0.05)	0.008± 0.004 (0.20± 0.10)	0.010± 0.004 (0.25± 0.10)
CR 16 (0603)	0.063± 0.004 (1.60± 0.10)	0.031± 0.004 (0.80± 0.10)	0.018± 0.004 (0.45± 0.10)	0.012± 0.008 (0.30± 0.20)	0.012± 0.008 (0.30± 0.20)
CR 21 (0805)	0.079± 0.006 (2.00± 0.15)	0.049± 0.004 (1.25± 0.10)	0.020± 0.004 (0.50± 0.10)	0.016± 0.008 (0.40± 0.20)	0.016± 0.008 (0.40± 0.20)
CR 32 (1206)	0.122± 0.004 (3.10± 0.10)	0.063± 0.006 (1.60± 0.15)	0.024± 0.004 (0.60± 0.10)	0.020± 0.010 (0.45± 0.25)	0.020± 0.010 (0.45± 0.25)
CR 40 (1210)	0.122± 0.004 (3.10± 0.10)	0.098± 0.006 (2.50± 0.15)	0.022± 0.006 (0.56± 0.15)	0.020± 0.010 (0.50± 0.25)	0.016± 0.008 (0.40± 0.20)
CR 50 (2010)	0.200± 0.006 (5.00± 0.15)	0.098± 0.006 (2.50± 0.15)	0.022± 0.006 (0.56± 0.15)	0.024± 0.010 (0.60± 0.25)	0.016± 0.008 (0.40± 0.20)
CR 63 (2512)	0.250± 0.006 (6.30± 0.15)	0.126± 0.006 (3.20± 0.15)	0.022± 0.006 (0.56± 0.15)	0.024± 0.010 (0.60± 0.25)	0.016± 0.008 (0.40± 0.20)

PERFORMANCE CHARACTERISTICS

Performance Test	Test Method	Specification	
DC Resistance	MIL-STD-202F, Method 303	± 1% Tolerance	± 5% Tolerance
Resistance Temperature Coefficient	MIL-STD-202F, Method 304	± 100ppm/°C	± 200ppm/°C
Short Time Overload	MIL-R-55342E, Sect. 4.7.5	± (0.5% + 0.05Ω)	± (1.0% + 0.05Ω)
Dielectric Withstanding Voltage	MIL-STD-202F, Method 301	± (1.0% + 0.05Ω)	± (1.0% + 0.05Ω)
Insulation Resistance	MIL-STD-202F, Method 302	$>10^3$MΩ	$>10^3$MΩ
Current Noise	MIL-STD-202F, Method 308	<5.6μ v/v	<5.6μ v/v
Solderability	MIL-STD-202F, Method 208	>95% coverage	>95% coverage
Resistance to Soldering Heat	MIL-R-55342E, Sect. 4.7.7	± (0.5% + 0.05Ω)	± (0.5% + 0.05Ω)
Robustness of electrode (Bending Strength)	JIS C 5202, Sect. 6.2	± (1.0% + 0.05Ω)	± (1.0% + 0.05Ω)
Resistance to Solvents	MIL-STD-202F, Method 215	No Mechanical Damage	No Mechanical Damage
Moisture Resistance	MIL-STD-202F, Method 106	± (0.5% + 0.05Ω)	± (2.0% + 0.05Ω)
Temperature Cycling	MIL-STD-883F, Method 1010.7	± (0.5% + 0.05Ω)	± (1.0% + 0.05Ω)
Low Temperature Operation	MIL-R-55342E, Sect. 4.7.4	± (0.5% + 0.05Ω)	± (1.0% + 0.05Ω)
High Temperature Exposure	MIL-R-55342E, Sect. 4.7.6	± (1.0% + 0.05Ω)	± (2.0% + 0.10Ω)
Thermal Shock	MIL-STD-202F, Method 107	± (0.5% + 0.05Ω)	± (1.0% + 0.05Ω)
Loadlife	MIL-STD-202F, Method 108	± (1.0% + 0.05Ω)	± (3.0% + 0.10Ω)

DERATING CURVE

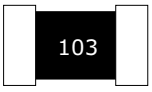


ORDERING CODE

CR XX - XXXX X X

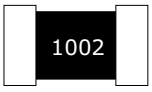
CHIP	TYPE	RESISTANCE	TOLERANCE	PACKAGING
RESISTOR	10	VALUE CODE	F - 1%	Q - 4000 pcs
	16		G - 2%	F - 5000 pcs
	21		J - 5%	T - 10000 pcs
	32		K - 10%	C - Bulk Cassette
	40		M - 20%	W - 20000 pcs
	50		Z - zero Ohm	
	63			

MARKING DIAGRAMS



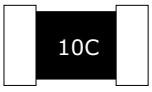
5% marking
Value = 10KΩ

CR 16 (0603)
CR 21 (0805)
CR 32 (1206)
CR 40 (1210)
CR 50 (2010)
CR 63 (2512)



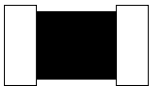
1% marking
Value = 10KΩ

CR 21 (0805)
CR 32 (1206)
CR 40 (1210)
CR 50 (2010)
CR 63 (2512)



1% marking
Value = 12.4KΩ

CR 16 (0603)
EIA-96 marking



no marking

CR 10 (0402)

Marking Explanation

- 2%, 5%, 10% tolerance : 3 digits (First two digits are significant figures, third digit is number of zeros).
  Letter R is decimal point
- 1% tolerance : 4 digits (First three digits are significant figures, fourth digit is number of zeros).
  Letter R is decimal point
- 0603 1% : EIA-96 marking (see page 46)
- 0402 : No marking
- Chip jumper resistor : Marking shall be 0

Packing Explanation (Refer to Page 39 - 42)

- Paper carrier tape per 7” reel
  CR 10 : 10000 pcs
  CR 16/21/32/40 : 5000 pcs
- Embossed plastic carrier tape per 7” reel
  CR 50 : 4000 pcs
  CR 63 : 4000 pcs
- Bulk casette (see page 42)(EIA JET-7201)
- Standard packaging is 8mm tape reel per EIA-481 (JIS C 0806)
- 10” and 13” reel (Refer to Page 39 - 42)