

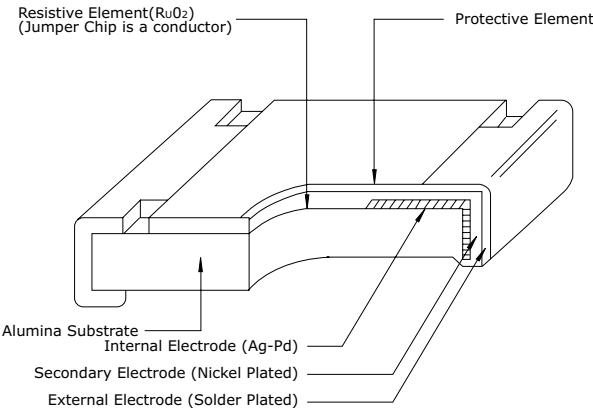
INTRODUCTION

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

- Highly reliable multi-layer electrode construction.
- Compatible with wave and reflow soldering process.
- Small size with high power ratings.
- Lead free terminals also available.

CONSTRUCTION

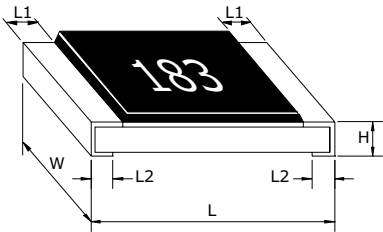


RATINGS

Type	CR 10	CR 16	CR 21	CR 32
	0402(1005)	0603(1608)	0805(2012)	1206(3216)
Rated Power at 70°C	1/16W	1/10W	1/8W	1/4W
Operating Temp Range	-55°C to +155°C			
Derating to 0 load at	+155°C			
Maximum Working Voltage	50V	50V	150V	200V
Maximum Overload Voltage	100V	100V	300V	400V
Resistance Range				
D(± 0.5%) E-96	-	-	10Ω≤ R<10Ω	10Ω≤ R<10Ω
F(± 1%) E-96,E-24	1Ω≤ R<10Ω	10Ω≤ R<1MΩ	10Ω≤ R<10Ω	10Ω≤ R<10Ω
G(± 2%) E-24	1Ω≤ R<10Ω	10Ω≤ R<1MΩ	-	1Ω≤ R<10Ω
J(± 5%) E-24	1Ω≤ R<10Ω	10Ω≤ R<3.3MΩ	-	1Ω≤ R<10Ω
Jumper Rated Current	1A	1A	2A	2A
Jumper Resistance Value	<0.05Ω	<0.05Ω	<0.05Ω	<0.05Ω
RTC (ppm/°C)	+500 -200	± 200	± 100 ± 200	± 100 ± 200

Type	CR 40	CR 46	CR 50	CR 63
	1210(3225)	1218(3246)	2010(5025)	2512(6432)
Rated Power at 70°C	1/3W	1W	3/4W	1W
Operating Temp Range	-55°C to +155°C			
Derating to 0 load at	+155°C			
Maximum Working Voltage	200V	200V	200V	200V
Maximum Overload Voltage	400V	400V	400V	400V
Resistance Range				
D(± 0.5%) E-96	10Ω≤ R<10MΩ	1Ω≤ R<10Ω	10Ω≤ R<10MΩ	10Ω≤ R<10MΩ
F(± 1%) E-96,E-24	10Ω≤ R<10MΩ	1Ω≤ R<10Ω	10Ω≤ R<10MΩ	10Ω≤ R<10MΩ
G(± 2%) E-24	-	1Ω≤ R<10MΩ	-	1Ω≤ R<10MΩ
J(± 5%) E-24	-	1Ω≤ R<10MΩ	-	1Ω≤ R<10MΩ
Jumper Rated Current	2A	2A	2A	3A
Jumper Resistance Value	<0.05Ω	<0.05Ω	<0.05Ω	<0.05Ω
RTC (ppm/°C)	± 100 ± 200	± 100 ± 200	± 100 ± 200	± 100 ± 200

DIMENSIONS



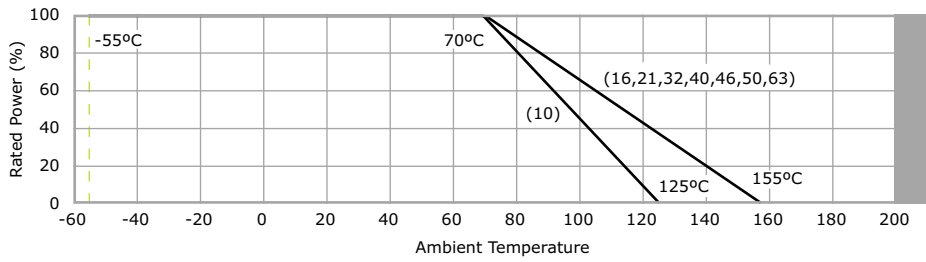
Type	DIMENSIONS Inches (Millimeters)				
	L	W	H	L1	L2
CR 10 (0402/1005)	0.040±0.004 (1.00±0.10)	0.020±0.002 (0.50±0.05)	0.014±0.002 (0.35±0.05)	0.008±0.004 (0.20±0.10)	0.010±0.004 (0.25±0.10) [∞]
CR 16 (0603/1608)	0.063±0.004 (1.60±0.10)	0.031±0.004 (0.80±0.10)	0.018±0.004 (0.45±0.10)	0.012±0.008 (0.30±0.20)	0.012±0.008 (0.30±0.20)
CR 21 (0805/2012)	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 (1206/3216)	0.122±0.004 (3.10±0.10)	0.063±0.006 (1.60±0.15)	0.022±0.002 (0.55±0.05)	0.020±0.010 (0.50±0.25)	0.020±0.010 (0.50±0.25)
CR 40 (1210/3225)	0.122±0.004 (3.10±0.10)	0.098±0.006 (2.50±0.15)	0.022±0.002 (0.55±0.05)	0.020±0.010 (0.50±0.25)	0.016±0.008 (0.40±0.20)
CR 46 [∞] (1218/3246)	0.122±0.004 (3.10±0.10)	0.181±0.006 (4.60±0.15)	0.022±0.002 (0.55±0.05)	0.020±0.010 (0.50±0.25)	0.016±0.008 (0.40±0.20)
CR 50 (2010/5025)	0.200±0.006 (5.00±0.15)	0.098±0.006 (2.50±0.15)	0.022±0.002 (0.55±0.05)	0.024±0.010 (0.60±0.25)	0.016±0.008 (0.40±0.20)
CR 63 (2512/6432)	0.250±0.006 (6.30±0.15)	0.126±0.006 (3.20±0.15)	0.022±0.002 (0.55±0.05)	0.024±0.010 (0.60±0.25)	0.016±0.008 (0.40±0.20)

∞ Consult Factory

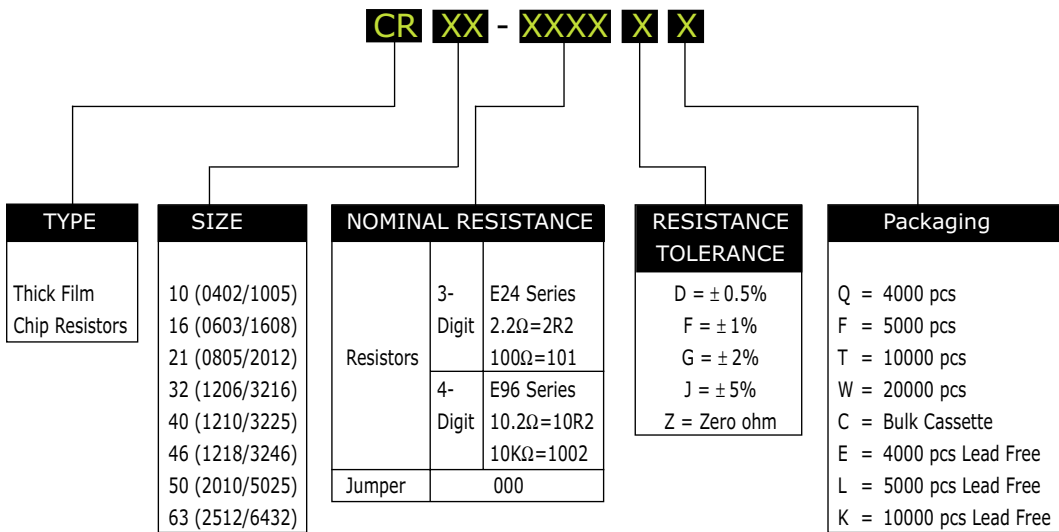
PERFORMANCE CHARACTERISTICS

Performance Test	Test Method	Specification	
DC Resistance	JIS C 5202 5.1	0.5% (For 1206 only) & 1% tol	2% & 5% tol
Voltage Coefficient	JIS C 5202 5.3 Method II	≤ 100 ppm/V	≤ 100 ppm/V
Shortage Time Overload	JIS C 5202 5.5	± (0.5%+0.05 ohm)	± (1%+0.05 ohm)
Insulation Resistance	JIS C 5202 5.6	>10G ohm	>10G ohm
Dielectric Withstanding Voltage	JIS C 5202 5.7	± (1%+0.05 ohm)	± (1%+0.05 ohm)
Intermittent Overload	JIS C 5202 5.8	± (5%+0.10 ohm)	± (5%+0.10 ohm)
Noise	JIS C 5202 5.9	1-9 ohm : <-10dB (0.32μv/v) 10-99 ohm : <-5dB (0.52μv/v) 100-999 ohm : <0dB (1.0μv/v) 1K-9.9K ohm : <10dB (3.2μv/v) 10K-99.9K ohm : <18dB (5.6μv/v) 100K-999.9K ohm : <20dB (10μv/v) >1M ohm : <30dB (32μv/v)	1-9 ohm : <-10dB (0.32μv/v) 10-99 ohm : <-5dB (0.52μv/v) 100-999 ohm : <0dB (1.0μv/v) 1K-9.9K ohm : <10dB (3.2μv/v) 10K-99.9K ohm : <18dB (5.6μv/v) 100K-999.9K ohm : <20dB (10μv/v) >1M ohm : <30dB (32μv/v)
Terminal Strength	JIS C 5202 6.1		
A) Bend Test (applicable for chip size ≤ 1210)	JIS C 5202 6.1.4(1) Method 2	± (0.5%+0.05 ohm)	± (0.5%+0.05 ohm)
B) Pull Test (applicable for chip size ≥ 0805)	JIS C 5202 6.1	± (1%+0.05 ohm)	± (1%+0.05 ohm)
C) Push Test (applicable for chip size >0402)	JIS C 5202 6.1.4(3)	± (1%+0.05 ohm)	± (1%+0.05 ohm)
Resistance to Soldering Heat	JIS C 5202 6.10	± (0.5%+0.05 ohm)	± (0.5%+0.05 ohm)
Solderability	JIS C 5202 6.11	≥ 95% coverage	≥ 95% coverage
Resistance to Solvent	JIS C 5202 6.9	± (1%+0.05 ohm)	± (1%+0.05 ohm)
Low Temperature	JIS C 5202 7.1	± (0.5%+0.05 ohm)	± (1%+0.05 ohm)
Low Temperature with Load	JIS C 5202 7.1	± (0.5%+0.05 ohm)	± (1%+0.05 ohm)
High Temperature	JIS C 5202 7.2	± (1%+0.05 ohm)	± (2%+0.05 ohm)
Terminal Shock (Temperature Cycling)	JIS C 5202 7.4	± (0.5%+0.05 ohm)	± (1%+0.05 ohm)
Resistance to Damp Heat (Humidity)	JIS C 5202 7.5	± (1%+0.10 ohm)	± (1%+0.10 ohm)
Loadlife	JIS C 5202 7.10	± (1%+0.05 ohm)	± (2%+0.05 ohm)
Salt Spray	JIS C 5202 7.7	± (3%+0.10 ohm)	± (3%+0.10 ohm)

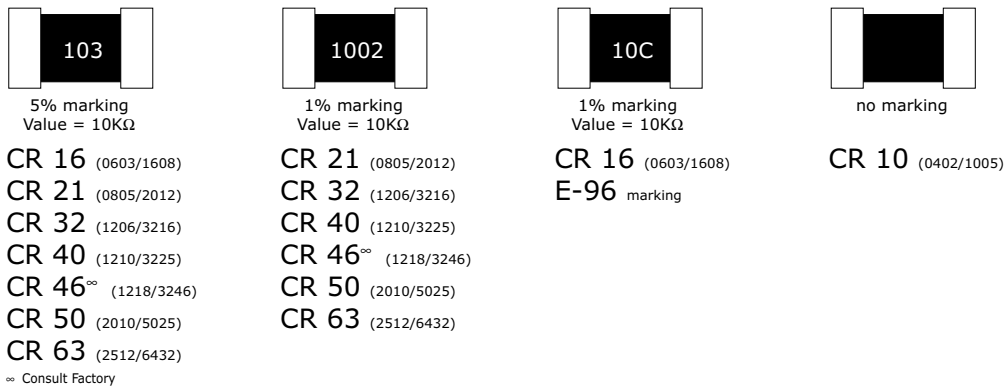
DERATING CURVE



ORDERING CODE



MARKING DIAGRAMS



Marking Explanation

- 2%, 5% 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% : E-96 marking (see page 38)
- 0402 : No marking
- Chip jumper resistor : Marking shall be 0

Packing Explanation (Refer to Page 31 - 34)

- 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 46 : 4000 pcs
CR 50 : 4000 pcs
CR 63 : 4000 pcs
- Bulk cassette (see page 34)(EIA JET-7201)
- Standard packaging is 8mm tape reel per EIA-481 (JIS C 0806)
- 10" and 13" reel (Refer to Page 31 - 34)

