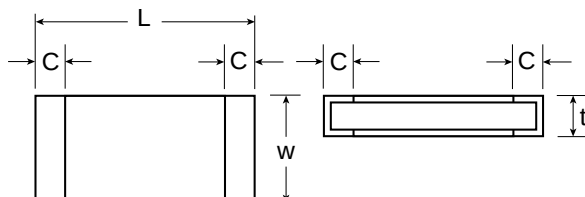


Chip Resistors – CR, LCR and ULCR

Features

- Flat Chip Resistors for surface mount applications
- LCR and ULCR for current sensing applications

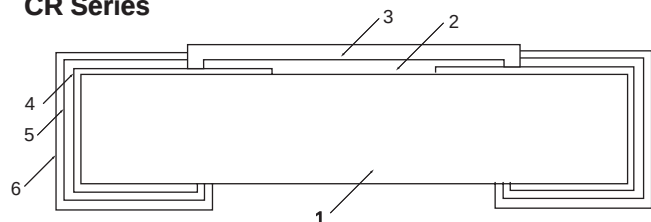
Dimensions



	0201	0402	0603	0805	1206	1210	2010	2512
L (Length) Inches (mm)	0.024 ± .002 (0.6 ± 0.05)	0.040 ± .002 (1.0 ± 0.05)	0.063 ± .004 (1.6 ± 0.1)	0.079 ± .006 (2.0 ± 0.15)	0.126 ± .006 (3.2 ± 0.15)	0.126 ± .006 (3.2 ± 0.15)	0.197 ± .006 (5.0 ± 0.15)	0.248 ± .006 (6.3 ± 0.15)
W (Width) Inches (mm)	0.012 ± .001 (0.3 ± 0.02)	0.020 ± .001 (0.5 ± 0.02)	0.031 ± .004 (0.8 ± 0.1)	0.050 ± .006 (1.25 ± 0.15)	0.063 ± .006 (1.6 ± 0.15)	0.098 ± .006 (2.50 ± 0.15)	0.098 ± .006 (2.50 ± 0.15)	0.126 ± .006 (3.2 ± 0.15)
t (Thickness) Inches (mm)	0.010 ± .002 (0.25 ± 0.05)	0.014 ± .002 (0.35 ± .05)	0.018 ± .004 (0.45 ± 0.1)	0.018 ± .006 (0.45 ± 0.15)	0.022 ± .006 (0.56 ± 0.15)	0.022 ± .006 (0.56 ± 0.15)	0.022 ± .006 (0.56 ± 0.15)	0.022 ± .006 (0.56 ± 0.15)
C (End Band) Inches (mm)	0.006 ± .002 (0.15 ± 0.05)	0.008 ± .004 (0.2 ± 0.1)	0.012 ± .006 (0.30 ± 0.15)	0.014 ± .006 (0.35 ± 0.15)	0.020 ± .008 (0.50 ± 0.20)	0.020 ± .008 (0.50 ± 0.20)	0.024 ± .008 (0.60 ± 0.20)	0.024 ± .008 (0.60 ± 0.20)

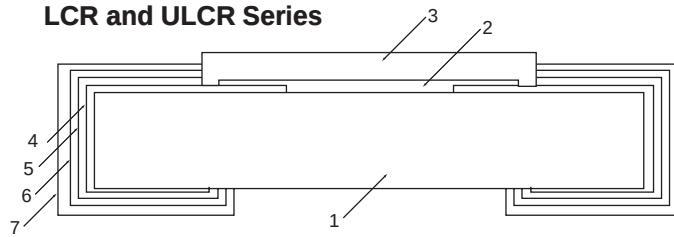
Structure

CR Series



	Description	
1	Substrate	Alumina
2	Resistive element	Ruthenium Oxide (RuO ₂)
3	Protective coating	Boro-Silicate Glass
4	Inner termination	Silver Palladium (Ag-Pd)
5	Inner Plating	Nickel (Ni)
6	Outer Plating	Solder Plating, Sn-Pb (100% Sn for Lead free)

LCR and ULCR Series



	Description	
1	Substrate	Alumina
2	Resistive element	Silver Palladium (Ag-Pd)
3	Protective coating	Boro-Silicate Glass
4	Inner termination	Silver Palladium (Ag-Pd)
5	1st Plating	Copper (Cu)
6	2nd Plating	Nickel (Ni)
7	3rd Plating	Solder Plating, Sn-Pb (100% Sn for Lead free)

CR – Standard Chip Resistors

Specifications

Series	Power Rating at 70°C	Max. Working Voltage	Zero (ohm) Current Rating	Resistance Range
CR0201-20W	0.050W	$\sqrt{PR}$ or 25V whichever is less	0.5A	Zero, 1 Ω - 10Meg Ω E-12 (1.2Meg Ω - 10Meg Ω)
CR0402-16W	0.063W	$\sqrt{PR}$ or 50V whichever is less	1A	Zero, 1 Ω - 10Meg Ω
CR0603-16W	0.063W	$\sqrt{PR}$ or 50V whichever is less	1A	Zero, 1 Ω - 22Meg Ω
CR0603-10W	0.10W	$\sqrt{PR}$ or 50V whichever is less	1A	Zero, 1 Ω - 22Meg Ω
CR0805-10W	0.10W	$\sqrt{PR}$ or 150V whichever is less	2A	Zero, 1 Ω - 22Meg Ω
CR0805-8W	0.125W	$\sqrt{PR}$ or 150V whichever is less	2A	Zero, 1 Ω - 22Meg Ω
CR1206-8W	0.125W	$\sqrt{PR}$ or 200V whichever is less	2A	Zero, 1 Ω - 22Meg Ω
CR1206-4W	0.25W	$\sqrt{PR}$ or 200V whichever is less	2A	Zero, 1 Ω - 22Meg Ω
CR1210-4W	0.25W	$\sqrt{PR}$ or 200V whichever is less	4A	Zero, 1 Ω - 10Meg Ω
CR1210-2W	0.50W	$\sqrt{PR}$ or 200V whichever is less	4A	Zero, 1 Ω - 10Meg Ω
CR2010-2W	0.50W	$\sqrt{PR}$ or 200V whichever is less	5A	Zero, 1 Ω - 10Meg Ω
CR2010-1W	1.00W	$\sqrt{PR}$ or 200V whichever is less	5A	Zero, 1 Ω - 10Meg Ω
CR2512-1W	1.00W	$\sqrt{PR}$ or 200V whichever is less	5A	Zero, 1 Ω - 10Meg Ω
CR2512-2W	2.00W	$\sqrt{PR}$ or 200V whichever is less	5A	Zero, 1 Ω - 10Meg Ω

Operating Temp. Range is -55°C to +175°C • DC Resistance Value of zero ohm is 50m ohms max.

Chip Resistors

LCR – Low Value Chip Resistors

Specifications

Series	Power Rating At 70°C (W)	Rated Current Range (A)	Resistance Range (mΩ)	Specific Resistance Range (mΩ)	Tolerance Available	Temperature Coefficient of Resistance (ppm) (10 ⁻⁶ /°C)	Dielectric Withstanding Voltage (V)	Operating Temperature Range (°C)
LCR0402	0.125	0.37 – 0.98	130 – 900	130 – 470	J	±300	100	–55 ~ +125
				500 – 900	F, G, J	±200		
LCR0603	0.125	0.37 – 1.11	100 – 900	100 – 430	F, G, J	±300	100	–55 ~ +125
				470 – 900	F, G, J	±200		
LCR0805	0.25	0.53 – 2.23	50 – 900	100 – 430	F, G, J	±300	500	–55 ~ +125
				470 – 900	F, G, J	±200		
LCR1206	0.50	0.74 – 3.16	50 – 900	50 – 470	F, G, J	±300	500	–55 ~ +125
				500 – 900	F, G, J	±200		
LCR1210	0.66	0.85 – 3.63	50 – 900	50 – 470	F, G, J	±300	500	–55 ~ +125
				500 – 900	F, G, J	±200		
LCR2010	0.75	0.91 – 3.87	50 – 900	50 – 470	F, G, J	±300	500	–55 ~ +125
				500 – 900	F, G, J	±200		
LCR2512	1.00	1.05 – 4.47	50 – 900	50 – 470	F, G, J	±300	500	–55 ~ +125
				500 – 900	F, G, J	±200		

Standard resistance values and corresponding codes:

Resistance	P/N Code	Resistance	P/N Code	Resistance	P/N Code	Resistance	P/N Code	Resistance	P/N Code
50m ohm	R050	90m ohm	R090	200m ohm	R200	430m ohm	R430	750m ohm	R750
56m ohm	R056	100m ohm	R100	220m ohm	R220	470m ohm	R470	800m ohm	R800
60m ohm	R060	110m ohm	R110	250m ohm	R250	500m ohm	R500	900m ohm	R900
65m ohm	R065	120m ohm	R120	270m ohm	R270	560m ohm	R560		
68m ohm	R068	130m ohm	R130	300m ohm	R300	600m ohm	R600		
70m ohm	R070	150m ohm	R150	330m ohm	R330	650m ohm	R650		
75m ohm	R075	160m ohm	R160	360m ohm	R360	680m ohm	R680		
80m ohm	R080	180m ohm	R180	400m ohm	R400	700m ohm	R700		

Note: Other nominal resistance values may also be available, please contact VENKEL LTD. for further information.

ULCR – Ultra Low Value Chip Resistors

Specifications

Series	Rated Dissipation (W)	Rated Current Range (A)	Resistance Range (mΩ)	Specific Resistance Range (mΩ)	Tolerance Available	Temperature Coefficient of Resistance (ppm) (10 ⁻⁶ /°C)	Operating Temperature Range (°C)
ULCR0402	0.0625	0.6 ~ 1.1	50 ~ 150	50 ~ 150	F, G, J	±400	-55 ~ +125
ULCR0603	0.10	1.0 ~ 2.2	20 ~ 100	20 ~ 50	F, G, J	±600	-55 ~ +125
				56 ~ 100	F, G, J	±400	
ULCR0805	0.125	1.6 ~ 2.5	20 ~ 100	20 ~ 50	F, G, J	±600	-55 ~ +125
				56 ~ 100	F, G, J	±400	
ULCR1206	0.250	2.2 ~ 5.0	10 ~ 50	10 ~ 20	F, G, J	±600	-55 ~ +125
				22 ~ 50	F, G, J	±400	
ULCR2010	0.50	3.2 ~ 7.1	10 ~ 50	10 ~ 20	F, G, J	±600	-55 ~ +125
				22 ~ 50	F, G, J	±400	
ULCR2512	1.0	4.5 ~ 10.0	10 ~ 50	10 ~ 20	F, G, J	±600	-55 ~ +125
				22 ~ 50	F, G, J	±400	

Standard resistance values and corresponding codes:

Resistance	P/N Code	Resistance	P/N Code	Resistance	P/N Code	Resistance	P/N Code
10m ohm	R010	27m ohm	R027	50m ohm	R050	80m ohm	R080
12m ohm	R012	30m ohm	R030	56m ohm	R056	90m ohm	R090
15m ohm	R015	33m ohm	R033	60m ohm	R060	100m ohm	R100
18m ohm	R018	35m ohm	R035	65m ohm	R065	110m ohm	R110
20m ohm	R020	40m ohm	R040	68m ohm	R068	120m ohm	R120
22m ohm	R022	43m ohm	R043	70m ohm	R070	130m ohm	R130
25m ohm	R025	47m ohm	R047	75m ohm	R075	150m ohm	R150

Marking for LCR and ULCR:

The resistance code shall be marked on the resistor as follows (this code is the same for 1% and 5% tolerances):

0402 size no markings

0603 size: 3-digit markings using "R" and 2 digits. When "R" can not be used then 3 digits and underlined. (see below)

0805 – 2512 size: 4-digit markings using "R" and 3 digits. "Rxxx." R010 = 10m ohm, R120 = 120m ohm.

Examples of 3-digit markings:

R01 = 10m ohm 022 = 22m ohm 068 = 68m ohm R08 = 80m ohm R10 = 100m ohm

Characteristics

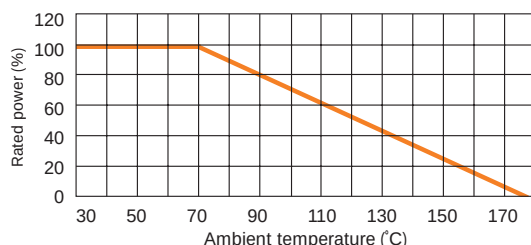
Item	Test Basis: JIS-C-5202	Specification Requirements	Typical
Short-time Overload	2.5 x rated voltage DC for 5 sec.	$\pm 1\% + 0.5\Omega$, no arc evidence	within $\pm 0.4\%$
Load Life	70°C, rated voltage for 1.5 hrs. on/0.5 hr. for 1000 hrs.	<1 meg. $\pm 3\% + 0.1\Omega$, > 1 meg. $\pm 5\%$	—
Dielectric Withstanding Voltage	500V for 1 minute	No insulation breakdown	above 900-950V
Resistance to Soldering Heat	270°C for 10 seconds	$\pm 1\% + 0.05\Omega$, no mechanical damage	—
Temperature Cycling	EIA STD. 575, Para. 3.5 -55 ~ +125° C, 5 cycles.	$\pm 1.0\%$	—
Solderability	230°C, 3 seconds, flux applied	95% minimum coverage	more than 97-98%
Curing Heat Resistance	+150°C for 10 minutes	$\pm 1\% + 0.05\Omega$	within $\pm 0.3\%$
Dry Heat Resistance	-125°C for 1,000 hours	$\pm 3\% + 0.1\Omega$, no mechanical damage	within $\pm 0.5\%$
Pull Terminal Strength	500G load for 30 seconds	$\pm 1\% + 0.05\Omega$, no mechanical damage	within $\pm 0.2\%$
PCB Terminal Strength	1/45mm bend for 10 seconds	$\pm 1\% + 0.05\Omega$, no mechanical damage	within $\pm 0.2\%$
Moisture Resistance, Thermal Shock	-55°C to +125°C, 5 cycles	$\pm 1\% + 0.05\Omega$, no mechanical damage	within $\pm 0.2\%$
Moisture Load Life	40°C, 95% R.H., 1.5 hr. on, 0.5 hr. off, 1,000 hours	<1 meg $\pm 3\% + 0.1\Omega$, > 1 meg. $\pm 5\%$	—
Insulation Resistance	500V, 1 minute	1,000 meg. minimum	more than 10 Meg.
Voltage Coefficient	Rated voltage and 1/10 times rated voltage	+0/-100ppm/v: above 1K $\pm$	within - 90ppm/V
Low Temperature Exposure	-55°C for 1,000 hours	$\pm 3\% + 0.1\Omega$, no mechanical damage	within $\pm 0.5\%$

Temp. Coefficient (PPM/°C) (For CR Series only)

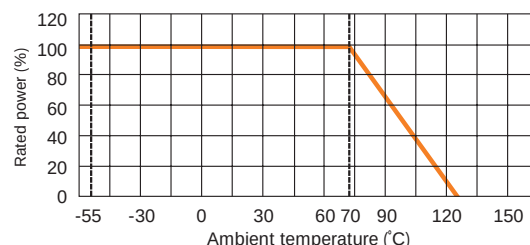
G & J Tol.: ± 200 (1 Ω – 10 Meg. Ω); F & D Tol.: ± 100 (10 Ω – 10 Meg. Ω);
G & J Tol.: ± 350 (under 1 Ω & over 10 Meg Ω); F & D Tol.: ± 350 (under 10 Ω & over 10 Meg. Ω);
0201 and 0402 case sizes, the T.C.R. is ± 250 for J and F Tol. (10 Ω – 10 Meg. Ω)

Derating Curves

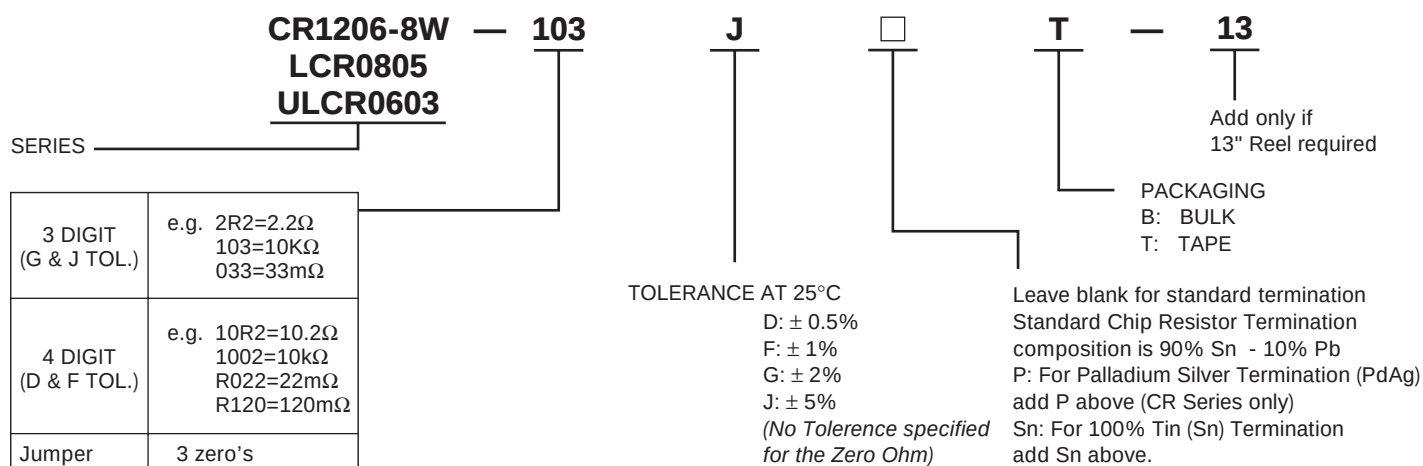
DERATING CURVE (For CR Only)



DERATING CURVE (For LCR and ULCR)



How To Order



0603 — 1% Chip Resistors may not be marked. (For CR Series)

Please consult your salesperson if marking is required. (See the data sheet on Marking Codes)

*E-24 Standard Resistance values that are available in 1%, may be marked with a 3-digit code identifier.

* NOTE: 0201 and 0402 Resistors cannot be marked.

Note: Other nominal resistance values may also be available, please contact your sales representative for further information.

Please Note: Venkel offers Engineering Kits for this product. See page 121 for details.