LCR SERIES
CURRENT SENSE LOW VALUE RESISTORS

VENKEL LTD.

FEATURES:

- TCR as low as ±100ppm
- Low resistance for current sense resistors
- Resistance Range: 10mΩ to 900mΩ

RoHS Compliant | REACH Compliant | HF Halogen FREE | Conflict Minerals FREE

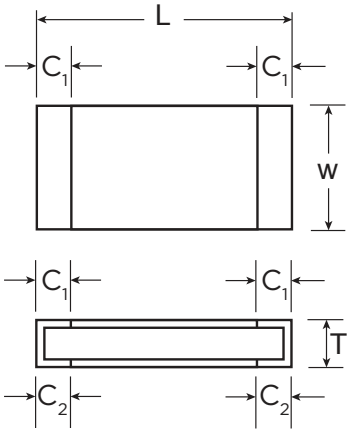
PART NUMBER STRUCTURE

LCR	0805 ☐		-	R022	J	T	☐
Series	**Size**	**Power Rating**		**Resistance**	**Tolerance**	**Packaging**	**Optional Reel Identifier**
	0402	Leave blank		R022=22mΩ	F = ± 1%	T = Tape & Reel	Leave blank if standard reel size.
	0603	for standard		R033=33mΩ	G = ± 2%		Add "-13" if 13" Reel is required
	0805	power rating.		R120=120mΩ	J = ±5%		
	1206	Insert "-1W"					
	1210	for 2512 1W.					
	2010						
	2512						

Example P/N: LCR0805-R022JT

Standard Termination is 100% matte Tin over Nickel.

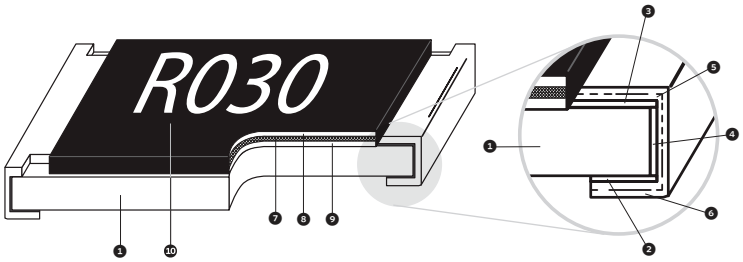
DIMENSIONS



Unit: inches (mm)

SIZE	L	W	T	C_1	C_2
0402	0.040 ± 0.002 (1.0 ± 0.05)	0.020 ± 0.001 (0.5 ± 0.02)	0.014 ± 0.002 (0.35 ± .05)	0.010 ± 0.004 (0.25 ± 0.1)	0.008 ± 0.004 (0.20 ± 0.1)
0603	0.063 ± 0.004 (1.6 ± 0.1)	0.031 ± 0.004 (0.8 ± 0.1)	0.018 ± 0.004 (0.45 ± 0.1)	0.012 ± 0.008 (0.30 ± 0.20)	0.012 ± 0.008 (0.30 ± 0.20)
0805	0.079 ± 0.006 (2.0 ± 0.15)	0.050 ± 0.006 (1.25 ± 0.15)	0.018 ± 0.006 (0.45 ± 0.15)	0.012 ± 0.008 (0.30 ± 0.20)	0.016 ± 0.01 (0.40 ± 0.25)
1206	0.126 ± 0.006 (3.2 ± 0.15)	0.063 ± 0.006 (1.6 ± 0.15)	0.022 ± 0.006 (0.56 ± 0.15)	0.020 ± 0.012 (0.50 ± 0.30)	0.016 ± 0.01 (0.40 ± 0.25)
1210	0.126 ± 0.006 (3.2 ± 0.15)	0.098 ± 0.006 (2.50 ± 0.15)	0.022 ± 0.006 (0.56 ± 0.15)	0.020 ± 0.012 (0.50 ± 0.30	0.020 ± 0.012 (0.50 ± 0.30)
2010	0.197 ± 0.006 (5.0 ± 0.15)	0.098 ± 0.006 (2.50 ± 0.15)	0.022 ± 0.006 (0.56 ± 0.15)	0.020 ± 0.014 (0.60 ± 0.35)	0.020 ± 0.012 (0.50 ± 0.30)
2512 (10-100mΩ)	0.248 ± 0.006 (6.3 ± 0.15)	0.126 ± 0.006 (3.2 ± 0.15)	0.029 ± 0.004 (0.74 ± 0.10)	0.024 ± 0.014 (0.60 ± 0.35)	0.0217 ± 0.01 (0.55 ± 0.25)
2512 (110-900mΩ)	0.248 ± 0.006 (6.3 ± 0.15)	0.126 ± 0.006 (3.2 ± 0.15)	0.029 ± 0.004 (0.74 ± 0.10)	0.024 ± 0.014 (0.60 ± 0.35)	0.106 ± 0.004 (2.10 ± 0.10)

STRUCTURE

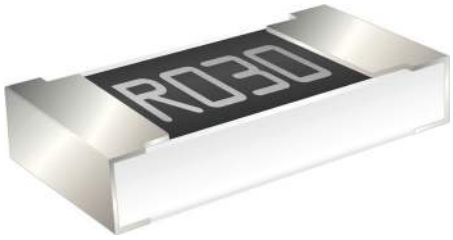


1	Alumina Substrate	6	Tin Plating
2	Backside Electrode	7	Primary Coating
3	Topside Electrode	8	Secondary Layer
4	Edge Electrode	9	Resistive layer
5	Nickel Plating	10	Marking

ELECTRICAL SPECIFICATION & RANGE

	SIZE	0402	0603	0805	1206	1210	2010	2512	2512
	Power Rating at 70°C (W)	0.125W (1/8W)	0.125W (1/8W)	0.25W (1/4W)	0.50W (1/2W)	0.75W (3/4W)	1W	1W	2W
	Max. Working Voltage	√PR or 50V whichever is less	√PR or 50V whichever is less	√PR or 150V whichever is less	√PR or 200V whichever is less	√PR or 200V whichever is less	√PR or 200V whichever is less	√PR or 200V whichever is less	√PR or 200V whichever is less
	Dielectric Withstanding Voltage	100V	100V	500V	500V	500V	500V	500V	500V
	Rated Current Range (A)	0.360A - 1.58A	0.360A - 2.50A	0.50A - 3.53A	0.71A - 7.07A	0.91A - 8.66A	0.87A - 8.66A	1.05A - 10A	1.49A - 14.14A
	Operating Temp. Range	-55°C to +155°C	-55°C to +155°C	-55°C to +155°C	-55°C to +155°C	-55°C to +155°C	-55°C to +155°C	-55°C to +155°C	-55°C to +155°C
Tolerance	TCR	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range
±1% (F)	±100ppm	511 - 900mΩ	511 - 900mΩ	511 - 900mΩ	511 - 900mΩ	500 - 900mΩ	511 - 900mΩ	511 - 900mΩ	511 - 900mΩ
	±200ppm	102 - 500mΩ	102 - 500mΩ	102 - 500mΩ	51 - 500mΩ	50 - 470mΩ	51 - 500mΩ	51 - 500mΩ	51 - 500mΩ
	±300ppm	51 - 100mΩ	51 - 100mΩ	51 - 100mΩ	21 - 50mΩ	21 - 50mΩ	21 - 50mΩ	21 - 50mΩ	21 - 50mΩ
	±450ppm	-	20 - 50mΩ	20 - 50mΩ	10 - 20mΩ	10 - 20mΩ	10 - 20mΩ	10 - 20mΩ	10 - 20mΩ
±2% (G)	±100ppm	511 - 900mΩ	511 - 900mΩ	511 - 900mΩ	511 - 900mΩ	500 - 900mΩ	511 - 900mΩ	511 - 900mΩ	511 - 900mΩ
	±200ppm	102 - 500mΩ	102 - 500mΩ	102 - 500mΩ	51 - 500mΩ	50 - 470mΩ	51 - 500mΩ	51 - 500mΩ	51 - 500mΩ
	±300ppm	51 - 100mΩ	51 - 100mΩ	51 - 100mΩ	21 - 50mΩ	21 - 50mΩ	21 - 50mΩ	21 - 50mΩ	21 - 50mΩ
	±450ppm	-	20 - 50mΩ	20 - 50mΩ	10 - 20mΩ	10 - 20mΩ	10 - 20mΩ	10 - 20mΩ	10 - 20mΩ
±5% (J)	±100ppm	511 - 900mΩ	511 - 900mΩ	511 - 900mΩ	511 - 900mΩ	500 - 900mΩ	511 - 900mΩ	511 - 900mΩ	511 - 900mΩ
	±200ppm	102 - 500mΩ	102 - 500mΩ	102 - 500mΩ	51 - 500mΩ	50 - 470mΩ	51 - 500mΩ	51 - 500mΩ	51 - 500mΩ
	±300ppm	51 - 100mΩ	51 - 100mΩ	51 - 100mΩ	21 - 50mΩ	21 - 50mΩ	21 - 50mΩ	21 - 50mΩ	21 - 50mΩ
	±450ppm	-	20 - 50mΩ	20 - 50mΩ	10 - 20mΩ	10 - 20mΩ	10 - 20mΩ	10 - 20mΩ	10 - 20mΩ

STANDARD RESISTANCE VALUES AND CORRESPONDING CODES



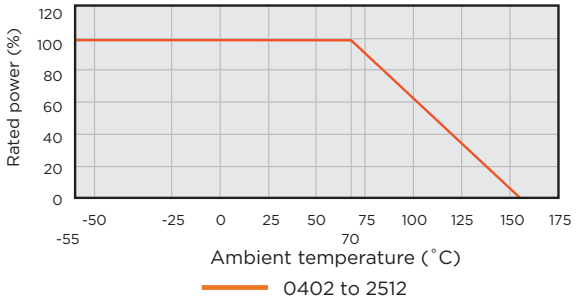
Note: 0603 size will be marked a with a 3 digit marking for E-24 values.
Marking exception is when the R value suffix is zero [example code: R500FT ➔ marking: R50]
For E-96, 3 digit marking will be underlined. For Non E-24 and E-96 values, please check with Venkel for marking status.

Examples:
R10 = 100mΩ or 0.100Ω
R01 = 10mΩ or 0.010Ω
102 = 102mΩ or 0.102Ω
022 = 22mΩ or 0.022Ω

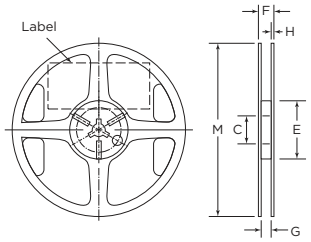
0402 size cannot be marked.

Resistance	P/N (Marking) Code	Resistance	P/N (Marking) Code	Resistance	P/N (Marking) Code	Resistance	P/N (Marking) Code	Resistance	P/N (Marking) Code	Resistance	P/N (Marking) Code	Resistance	P/N (Marking) Code
10m ohm	R010	27m ohm	R027	50m ohm	R050	80m ohm	R080	160m ohm	R160	330m ohm	R330	600m ohm	R600
12m ohm	R012	30m ohm	R030	56m ohm	R056	90m ohm	R090	180m ohm	R180	360m ohm	R360	650m ohm	R650
15m ohm	R015	33m ohm	R033	60m ohm	R060	100m ohm	R100	200m ohm	R200	400m ohm	R400	680m ohm	R680
18m ohm	R018	35m ohm	R035	65m ohm	R065	110m ohm	R110	220m ohm	R220	430m ohm	R430	700m ohm	R700
20m ohm	R020	40m ohm	R040	68m ohm	R068	120m ohm	R120	250m ohm	R250	470m ohm	R470	750m ohm	R750
22m ohm	R022	43m ohm	R043	70m ohm	R070	130m ohm	R130	270m ohm	R270	500m ohm	R500	800m ohm	R800
25m ohm	R025	47m ohm	R047	75m ohm	R075	150m ohm	R150	300m ohm	R300	560m ohm	R560	900m ohm	R900

DERATING CURVE



REEL SPECIFICATIONS

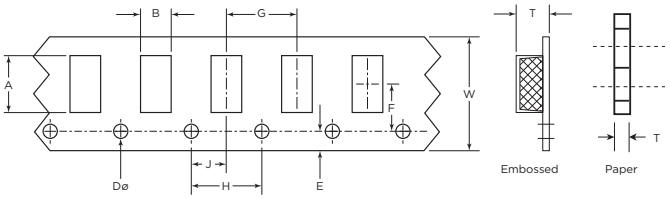


Unit: mm (inch)

C	E	F	G	H	M
13.0 ± 0.2 (0.51 ± 0.008)	60.0 ± 1.0 (2.36 ± 0.03)	11.4 ± 1.0 (0.45 ± 0.04)	9.0 ± .3 (0.35 ± 0.012)	1.5 ± .3 (0.06 ± 0.012)	180 ± 2.0 (7.09 ± 0.08)

Minimum of 30 empty pockets at the beginning of reel, 65 minimum empty pockets at the end.

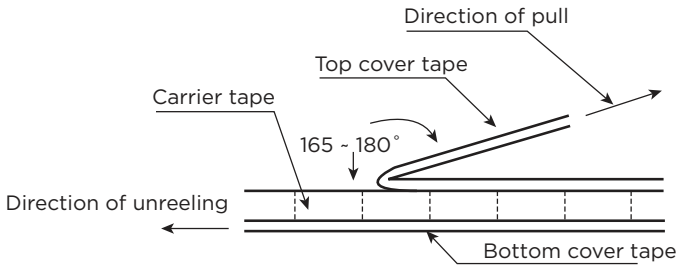
TAPE SPECIFICATIONS



Units: mm (inches).

Tape	Size (inches)	A	B	W	E	F	T	G	H	J	Dø
Paper	0402	1.15 ± 0.1	0.65 ± 0.1	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	0.45 ± 0.1	2.0 ± 0.05	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0
	0603	1.9 ± 0.1	1.1 ± 0.1	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	0.70 ± 0.1	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0
	0805	2.4 ± 0.1	1.65 ± 0.1	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	0.85 ± 0.1	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0
	1206	3.5 ± 0.1	1.9 ± 0.1	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	0.85 ± 0.1	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0
	1210	3.5 ± 0.1	2.8 ± 0.1	8.0 ± 0.2	1.75 ± 0.1	3.5 ± 0.05	0.85 ± 0.1	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0
Embossed	2010	5.4 ± 0.2	2.9 ± 0.2	12.0 ± 0.1	1.75 ± 0.1	5.5 ± 0.5	1.00 ± 0.2	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0
	2512	6.9 ± 0.2	3.6 ± 0.2	12.0 ± 0.1	1.75 ± 0.1	5.5 ± 0.5	1.00 ± 0.2	8.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	1.5 + 0.1-0

PEEL BACK FORCE AND DIRECTION DIAGRAM



Peel back force and direction of peel back angle should follow EIA481-1-A. Peel back force should be between 0.1N – 1.3N and peel back angle of 165˚ – 180˚.

ENVIRONMENTAL CHARACTERISTICS

TEST	REQUIREMENT	TEST METHOD
Temperature Coefficient of Resistance (T.C.R.)	As Spec.	**JIS-C-5201-1 4.8** **IEC60115-1 4.8** At 25˚C/-55˚C and 25˚C/+125˚C, 25˚C is the reference temperature
Short Time Overload	±(0.5%+0.05Ω)	**JIS C 5201-1 4.13** **IEC 60115-1 4.13** RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds CS06 1W: 5*rated power for 5 seconds
	±(1.0%+0.05Ω) For High power rating	
Insulation Resistance	≥10G	**JIS-C-5201-1 4.6** **IEC-60115-1 4.6** Max. Overload Voltage for 1 minute
Endurance	±(1.0%+0.05Ω)	**JIS-C-5201-1 4.25.1** **IEC60115-1 4.25** 70±2˚C, rated power for 1000 hrs with 1.5 hrs “ON” and 0.5 hr “OFF”
Damp Heat with Load	±(0.5%+0.05Ω)	**JIS-C-5201-1 4.24** **IEC-60115-1 4.24** 40±2˚C, 90-95% R.H., RCWV for 1000 hrs with 1.5 hrs “ON” and 0.5 hr “OFF”
	1W : ±(1.0%+0.05Ω)	
Dry Heat	±(0.5%+0.05Ω)	**JIS-C-5201-1 4.23.2** **IEC60115-1 4.23.2** at +155˚C for 1000 hrs
	1W : ±(1.0%+0.05Ω)	
Bending Strength	±(1.0%+0.05Ω)	**JIS-C-5201-1 4.33** **IEC-60115-1 4.33** Bending once for 5 seconds with 3mm 2010, 2512 sizes: 2mm
Solderability	95% min. coverage	**JIS-C-5201-1 4.17** **IEC-60115-1 4.17** 245±5˚C for 3 seconds
Resistance to Soldering Heat	±(0.5%+0.05Ω)	**JIS-C-5201-1 4.18** **IEC-60115-1 4.18** 260±5˚C for 10 seconds
	1W : ±(1.0%+0.05Ω)	
Voltage Proof	No breakdown or flashover	**JIS-C-5201-1 4.7** **IEC-60115-1 4.7** 1.42 times Max. Operating Voltage for 1 minute
Leaching	Individual leaching area ≤5% Total leaching area ≤10%	**JIS-C-5201-1 4.18** **IEC-60068-2-58 8.2.1** 260±5˚C for 30 seconds
Rapid Change of Temperature	±(0.5%+0.05Ω)	**JIS-C-5201-1 4.19** **IEC-60115-1 4.19** -55˚C to +155˚C, 5 cycles
	1W : ±(1.0%+0.05Ω)	

RCWV (Rated Continuous Working Voltage)=√(P*R) or Max. Operating Voltage whichever is lower.
Storage Temperature: 15-28°C; **Humidity:** < 80%RH