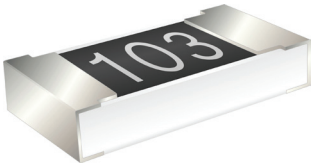
HPCR SERIES
HIGH POWER RESISTORS

VENKEL LTD.



FEATURES:

- Available Sizes 0402 to 1210
- Values from 1Ω to 1MΩ, plus 0Ω Jumper
- TCR as low as ±100PPM
- Good power dissipation capabilities
- 100% matte Tin over Nickel with wrap around termination for excellent solderability

RoHS Compliant | REACH Compliant | HF Halogen FREE | Conflict Minerals FREE 3TG

PART NUMBER STRUCTURE

HPCR	1210	-	W	-	103	J	T	-	☐
Series	Size		Power Rating		Resistance Value	Tolerance	Packaging		Optional Reel Identifier

Size
0402
0603
0805
1206
1210

Power Rating
R = 1/8W (0.125W)
T = 1/4W (0.25W)
U = 1/3W (0.33W)
V = 1/2W (0.50W)
W = 3/4W (0.75)

Resistance Value

3 DIGIT (J TOL.)	2R2=2.2Ω 103=10KΩ
4 DIGIT (F TOL.)	10R2=10.2Ω 1002=10KΩ

Tolerance
F = ± 1%
J = ± 5%

Packaging
T = Tape & Reel

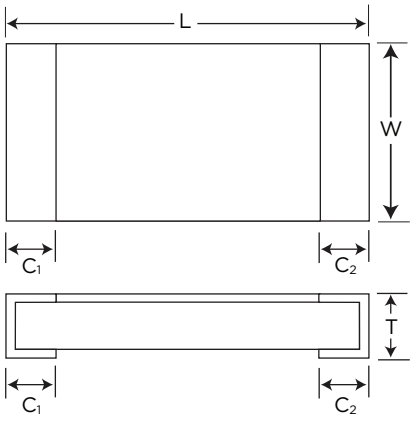
Optional Reel Identifier
Leave blank for standard quantity.

Add "-13" if 13" Reel is required

Example P/N: HPCR1210-W-103JT

Standard Termination is 100% matte Tin over Nickel.

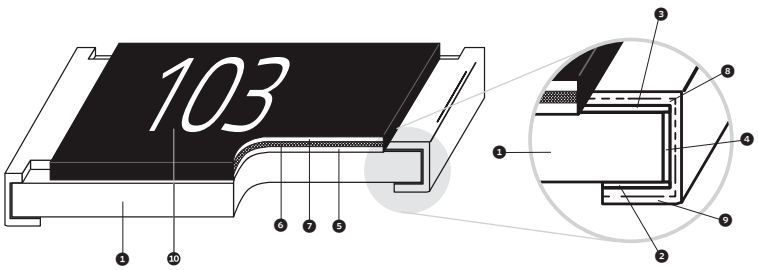
DIMENSIONS



Unit: inches (mm)

SIZE	L	W	T	C_1	C_2
0402	0.040 ± 0.002 (1.0 ± 0.05)	0.020 ± 0.002 (0.5 ± 0.05)	0.014 ± 0.002 (0.35 ± .05)	0.008 ± 0.004 (0.2 ± 0.1)	0.008 ± 0.004 (0.2 ± 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 ± 0.007 (0.30 ± 0.20)	0.012 ± 0.007 (0.30 ± 0.20)
0805	0.079 ± 0.006 (2.0 ± 0.10)	0.050 ± 0.003 (1.25 ± 0.10)	0.019 ± 0.003 (0.50 ± 0.10)	0.014 ± 0.007 (0.35 ± 0.20)	0.015 ± 0.007 (0.40 ± 0.20)
1206	0.122 ± 0.003 (3.10 ± 0.10)	0.061 ± 0.003 (1.55 ± 0.10)	0.021 ± 0.003 (0.55 ± 0.10)	0.020 ± 0.009 (0.50 ± 0.25)	0.020 ± 0.008 (0.50 ± 0.20)
1210	0.122 ± 0.003 (3.10 ± 0.10)	0.10 ± 0.006 (2.60 ± 0.15)	0.021 ± 0.003 (0.55 ± 0.10)	0.020 ± 0.009 (0.50 ± 0.25	0.020 ± 0.008 (0.50 ± 0.20)

STRUCTURE



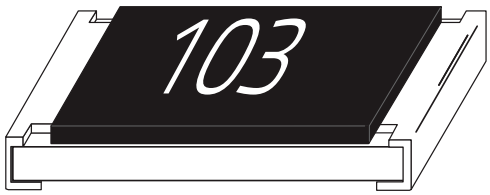
1	Alumina Substrate	6	Primary Coating
2	Backside Electrode	7	Protective Coating
3	Top Electrode	8	Barrier Layer (Ni)
4	Edge Electrode	9	Termination 100% matte Tin
5	Resistive layer	10	Marking

ELECTRICAL SPECIFICATION & RANGE

	SIZE	0402	0603	0805	1206	1210
	Power Rating at 70°C (W)	0.125W (1/8W)	0.25W (1/4W)	0.33W (1/3W)	0.50W (1/2W)	0.75W (3/4W)
	Max. Working Voltage	— √ PR or 50V whichever is less	— √ PR or 75V whichever is less	— √ PR or 150V whichever is less	— √ PR or 200V whichever is less	— √ PR or 200V whichever is less
	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
Zero Ohm (Jumper)	Current Rating	1.5A	2A	2.5A	3.5A	4.5A
Zero Ohm (Jumper)	Resistance	20 mΩ (max)	20 mΩ (max)	20 mΩ (max)	20 mΩ (max)	20 mΩ (max)
Tolerance	TCR	Resistance Range	Resistance Range	Resistance Range	Resistance Range	Resistance Range
±1 (F)	±100ppm	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ
	±200ppm	1Ω - 9.76Ω	1Ω - 9.76Ω	1Ω - 9.76Ω	1Ω - 9.76Ω	1Ω - 9.76Ω
±5% (J)	±100ppm	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ
	±200ppm	1Ω - 9.76Ω	1Ω - 9.76Ω	1Ω - 9.76Ω	1Ω - 9.76Ω	1Ω - 9.76Ω

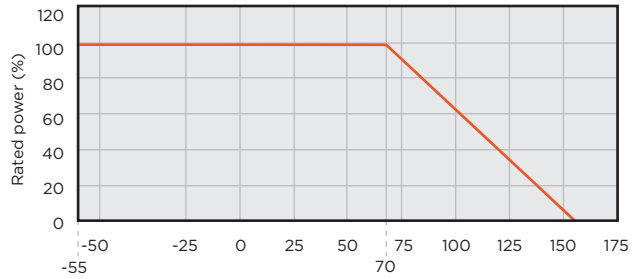
NOTE: Overload Voltage=2.5*√(P*R).

MARKING CODE

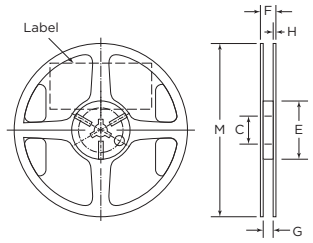


- 1% E-24 values for 0603 size and larger are typically marked with the standard 3 digit marking code.
- 1% E-96 values for 0805 size and larger, will be marked with standard 4 digit marking code.
- 5% E-24 values for 0603 size and larger, will be marked with standard 3 digit marking code.
- 0603 - 1% E-96 values will be marked with a standard 3 digit alpha numeric code (Please see alpha numeric marking codes for resistors).
- 0402 size cannot be marked

DERATING CURVE



REEL SPECIFICATIONS

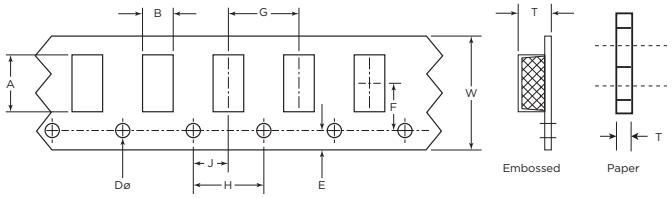


Unit: mm (inch)

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.

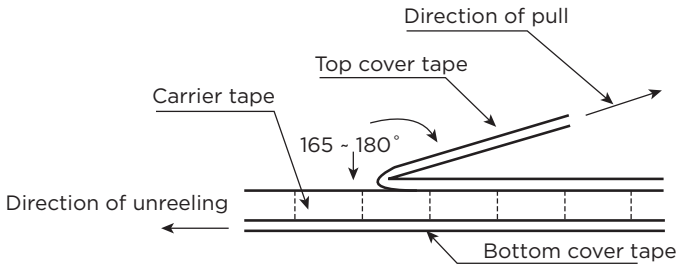
TAPE SPECIFICATIONS



Units: mm (inches).

TAPE	SIZE (in)	A	B	W	E	F	T	G	H	J	Dø
Paper	0402	1.15 ±0.10	0.65 ±0.10	8.0 ±0.20	1.75 ±0.10	3.50 ±0.05	0.45 ±0.10	2.00 ±0.05	4.00 ±0.10	2.00 ±0.05	1.50 ±0.10
	0603	1.90 ±0.10	1.10 ±0.10	8.0 ±0.20	1.75 ±0.10	3.50 ±0.05	0.70 ±0.10	4.00 ±0.10	4.00 ±0.10	2.00 ±0.05	1.50 ±0.10
	0805	2.40 ±0.10	1.65 ±0.10	8.0 ±0.20	1.75 ±0.10	3.50 ±0.05	0.85 ±0.10	4.00 ±0.10	4.00 ±0.10	2.00 ±0.05	1.50 ±0.10
	1206	3.50 ±0.10	1.90 ±0.10	8.0 ±0.20	1.75 ±0.10	3.50 ±0.05	0.85 ±0.10	4.00 ±0.10	4.00 ±0.10	2.00 ±0.05	1.50 ±0.10
	1210	3.50 ±0.10	2.80 ±0.10	8.0 ±0.20	1.75 ±0.10	3.50 ±0.05	0.85 ±0.10	4.00 ±0.10	4.00 ±0.05	2.00 ±0.05	1.50 ±0.10

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
	±1% and below	±5%	Jumper	
Temperature Coefficient of Resistance (T.C.R.)	As Spec.			**JIS-C-5201-1 4.8** **IEC-60115-1 4.8** At 25°C/-55°C and 25°C/+125°C, 25°C is the reference temperature
Short Time Overload	±(1.0%+0.05Ω)	±(2.0%+0.05Ω)	<50mΩ	**JIS-C-5201-1 4.13** **IEC-60115-1 4.13** RCWV*2.5 or Max. Overload Voltage whichever is lower for 5 seconds, 2 seconds for high power series
Insulation Resistance	≥10G			**JIS-C-5201-1 4.6** **IEC-60115-1 4.6** Max. Overload Voltage for 1 minute
Endurance	±(1.0%+0.10Ω)	±(2.0%+0.10Ω)	<100mΩ	**JIS-C-5201-1 4.25** **IEC-60115-1 4.25.1** 70±2˚C, RCWV for 1000 hrs with 1.5 hrs “ON” and 0.5 hr “OFF”
Damp Heat with Load	±(1.0%+0.10Ω)	±(2.0%+0.10Ω)	<100mΩ	**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”
Dry Heat	±(1.0%+0.05Ω)	±(1.5%+0.10Ω)	<50mΩ	**JIS-C-5201-1 4.23** **IEC-60115-1 4.23.2** at +125/+155˚C for 1000 hrs
Bending Strength	±(1.0%+0.05Ω)	±(1.0%+0.05Ω)	<50mΩ	**JIS-C-5201-1 4.33** **IEC-60115-1 4.33** Bending once for 5 seconds 2010, 2512 sizes: 2mm Other sizes: 3mm
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)	±(1.0%+0.05Ω)	<50mΩ	**JIS-C-5201-1 4.18** **IEC-60115-1 4.18** 260±5˚C for 10 seconds
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)	±(1.0%+0.05Ω)	<50mΩ	**JIS-C-5201-1 4.19** **IEC-60115-1 4.19** -55˚C to +125/+155˚C, 5 cycles

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