

HPL series

Thick-Film Type

High-Power Low Resistance Chip Resistors

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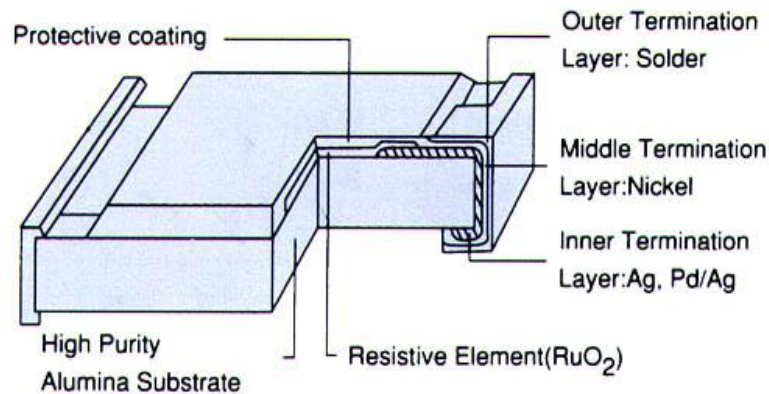
High-Power Low Resistance Chip Resistors

1. SCOPE

1.1 Purpose

Fixed Thick-Film High-Power Chip Resistors, Rated Power up to 2W, used in Consumer Electronics, SMPS, M/B, electronic equipment.

1.2 Configuration



Part Number:

HPL	2512	F	R	-	R100
Type	Size	Tolerance	Packing		Resistance
	0603	F : ± 1%	R: Paper tape – 5 Kpcs		Example :
	0805	J : ± 5%	K : Plastic tape – 4 Kpcs		R100 = 100mΩ
	1206				R050 – 50mΩ
	2010				
	2512				

■ Resistance Marking

E - 24 Series



4 digit marking for ±1%, ±5% 0805, 1206, 2010, 2512
 examples : R100 = 100mΩ
 R050 = 50mΩ



3 digit marking for ±1%, ±5% 0603 (100mΩ ~ 910mΩ)
 examples : R10 = 100mΩ

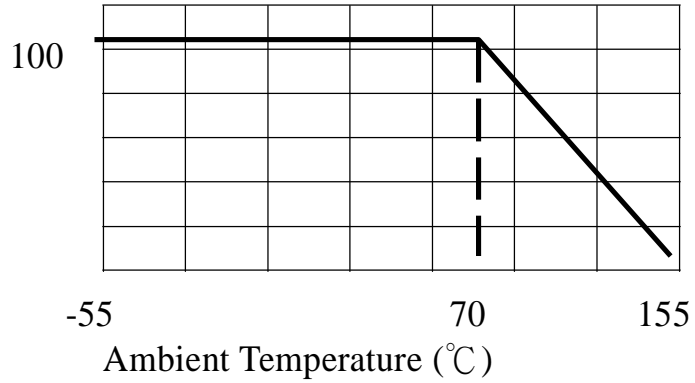


3 digit marking for ±1%, ±5% 0603 (47mΩ ~ 91mΩ)
 examples : 47M = 47mΩ

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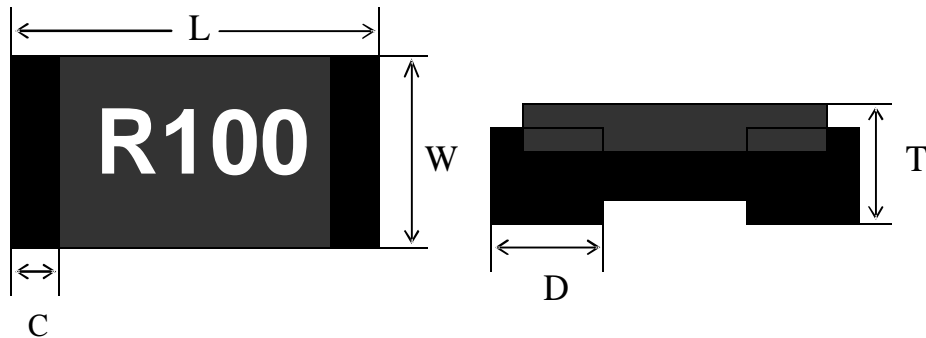
2. PERFORMANNCE CHARCTERISTICS

Power Derating Curve by Ambient Temperature
 Rated Load (%)

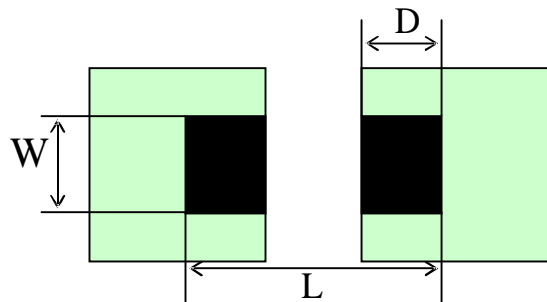


Mechanical Dimensions unit: mm.

Type	DIMENSIONS				
	L	W	C	D	T
HPL0603	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
HPL0805	2.00±0.15	1.20±0.15	0.40±0.20	0.40±0.20	0.50±0.10
HPL1206	3.10±0.15	1.60±0.15	0.50±0.25	0.50±0.25	0.55±0.10
HPL2010	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
HPL2512	6.30±0.20	3.10±0.20	0.60±0.25	1.80±0.25	0.60±0.15



Recommended Solder Pad Dimensions



Type	W	D	L
HPL2512	3.7mm	2.45mm	7.6mm

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3. SPECIFICATION
Electrical Characteristic

Type	Size	Power Rating at 70°C	Max. RC WV	Max. Overload Voltage	Resistance Tolerance (%)	Temperature Coefficient (TCR; ppm/°C)	Resistance Range (Ω)		Standard Resistance Values
							Min.	Max.	
HPL0603	0603	1/4W	477mV	954mV	±1% ±5%	±200 ±100	47mΩ 100mΩ	91mΩ 910mΩ	E-24
HPL0805	0805	1/3W	551mV	1102mV		±150 ±100	47mΩ 100mΩ	91mΩ 910mΩ	
HPL1206	1206	1/2W	675mV	1349mV		±100 ±100	47mΩ 100mΩ	91mΩ 910mΩ	
HPL2010	2010	1W	954mV	1908mV			47mΩ 100mΩ	91mΩ 910mΩ	
HPL2512	2512	2W	1349mV	2698mV					

Note :

(*)2W loading with total solder-pad and trace size of 300 mm²

(**) E = (P×R)^{1/2}

E : Working Voltage(V) , P : Rated Power(W) , R : Resistance Value(Ω)

Reliability Performance

Test Item	Specification	Test Method
DC Resistance	F : ±1% ; J : ±5%	IEC 60115-1 / JIS C 5201-1 , Clause 4.5 Measure the resistance Value.
Short Time Overload	J: ΔR ≤ ±(2% + 0.5mΩ) F: ΔR ≤ ±(1% + 0.5mΩ)	5 × Rated power for 5 seconds
Solderability	Over 95% of termination must be	IEC 60115-1 / JIS C 5201-1 , Clause 4.17 After immersing flux, dip in the 235±2°C molten solder bath for 2±0.5 sec.
Resistance to solder Heat	J: ΔR ≤ ±(1% + 0.5mΩ) F: ΔR ≤ ±(0.5% + 0.5mΩ) No	IEC 60115-1 / JIS C 5201-1 , Clause 4.18 With 260±5°C for 10±1sec.
Load Life Humidity	J: ΔR ≤ ±(3% + 0.5mΩ) F: ΔR ≤ ±(1% + 0.5mΩ)	40±2°C with relative humidity 90% ~ 95% D.C. rated voltage for 1.5 hours ON 30 minutes OFF.

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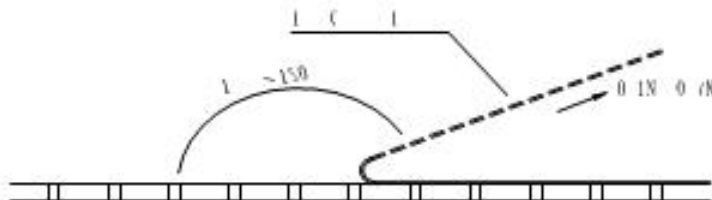
Temperature Coefficient of Resistance (TCR)	Size:0603 $50\text{m}\Omega \sim 91\text{m}\Omega : \pm 200\text{ppm}/^\circ\text{C}$ Size:0805 $50\text{m}\Omega \sim 91\text{m}\Omega : \pm 150\text{ppm}/^\circ\text{C}$ Size:1206、2010、2512 $50\text{m}\Omega \sim 91\text{m}\Omega : \pm 100\text{ppm}/^\circ\text{C}$ Size:0603、0805、1206、2010、2512 $100\text{m}\Omega \sim 910\text{m}\Omega : \pm 100\text{ppm}/^\circ\text{C}$	IEC 60115-1 / JIS C 5201-1 , Clause 4.8 Test temperature : T_1 T_2 $25^\circ\text{C} \sim -55^\circ\text{C}$ $25^\circ\text{C} \sim +155^\circ\text{C}$ $\text{TCR}(\text{ppm}/^\circ\text{C}) =$ $(R_2 - R_1) / R_1 \times 1 / (T_2 - T_1) \times 10^6$
Load Life	J : $\Delta R \leq \pm(3\% + 0.5\text{m}\Omega)$ F : $\Delta R \leq \pm(1\% + 0.5\text{m}\Omega)$	IEC 60115-1 / JIS C 5201-1 , Clause 4.25 Rated voltage for 1.5hours for followed by a pause 0.5 hour at $70 \pm 3^\circ\text{C}$. Cycle repeated 1000 hours
Temperature Cycle	J : $\Delta R \leq \pm(1\% + 1\text{m}\Omega)$ F : $\Delta R \leq \pm(0.5\% + 1\text{m}\Omega)$ No mechanical damage	IEC 60115-1 / JIS C 5201-1 , Clause 4.19 Repeat 5 cycles as follows -55°C (30min.) + 25°C (2~3min.) $+155^\circ\text{C}$ (30min.) + 25°C (2~3min.)
Insulation Resistance	Between termination and coating must be over $1000\text{M}\Omega$	IEC 60115-1 / JIS C 5201-1 , Clause 4.6 Test voltage : $100 \pm 15\text{V}$
Bending strength	J : $\Delta R \leq \pm(1\% + 1\text{m}\Omega)$ F : $\Delta R \leq \pm(0.5\% + 1\text{m}\Omega)$ No mechanical damage	IEC 60115-1 / JIS C 5201-1 , Clause 4.33 Resistance change after bended on the 90mm PCB. Bending width : 3mm for 0603 0805 2mm for 1206 2010 2512

4. PACKAGING

Peel Strength of Top Cover Tape

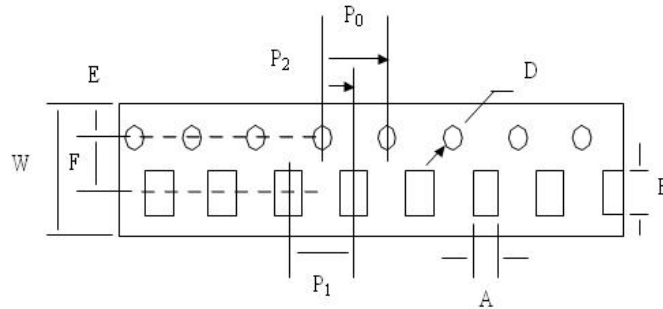
The peel speed shall be about 300 mm/min

The peel force of top cover tape shall between 0.1 to 0.7N



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4.2 Tape Packaging Dimensions

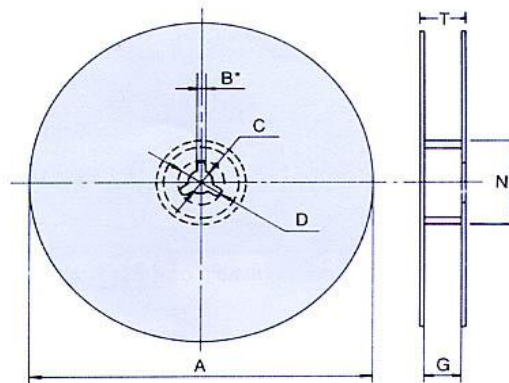


Accumulated dimensional tolerance $40\pm 0.2\text{mm}$

Size	A	B	W	F	E	P1	P2	P0	D
0603	1.10 ± 0.20	1.90 ± 0.20	8.00 ± 0.30	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50+0.10/-0$
0805	1.65 ± 0.20	2.40 ± 0.20	8.00 ± 0.30	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50+0.10/-0$
1206	2.00 ± 0.20	3.57 ± 0.20	8.00 ± 0.30	3.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50+0.10/-0$
2010	2.80 ± 0.20	5.50 ± 0.20	12.00 ± 0.30	5.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50+0.10/-0$
2512	3.50 ± 0.20	6.70 ± 0.20	12.00 ± 0.30	5.50 ± 0.05	1.75 ± 0.10	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	$1.50+0.10/-0$

unit : mm

4.3 Reel Dimensions



Size	Packaging Q'ty	A	N	C	D	B	G	T
0603 0805 1206	5kpcs/Reel	178.0 ± 2.0	60.0 ± 0.5	13.0 ± 0.5	20(Min.)	2.0 ± 0.5	10.0 ± 1.5	14.9max.
2010 2512	4kpcs/Reel	178.0 ± 2.0	60.0 ± 0.5	13.0 ± 0.5	20(Min.)	2.0 ± 0.5	13.8 ± 1.5	16.7max.

unit : mm