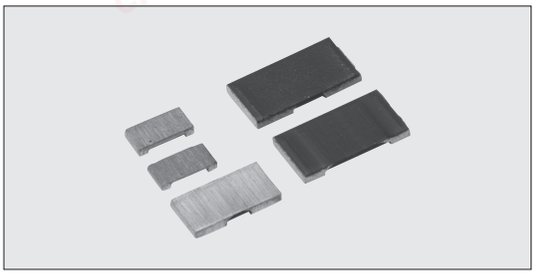
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CURRENT SENSING

EU RoHS

TLR Metal Plate Chip Type Low Resistance Resistors (High Power)



Coating color : Black (2BW(1mΩ,1.5mΩ), 2BP(1mΩ,1.5mΩ), 3AP(0.5m～1.5mΩ), 3APS(2mΩ))

■Features

- Ultra low resistances (0.5mΩ～), suitable for large current sensing.
- Ultra low height with a thickness of 0.6mm, suitable for use of small equipment.
- Excellent high-frequency characteristics.
- Automatic mounting machines are applicable.
- Suitable for reflow soldering. (Not suitable for flow soldering)
- Products meet EU-RoHS requirements.
- AEC-Q200 Tested.

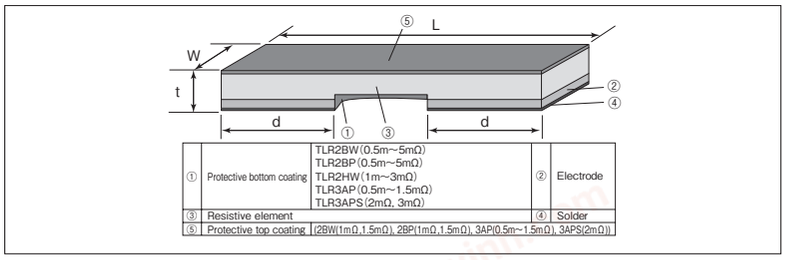
■Applications

- Current sensing for CPU
- Inverter power supplies
- DC-DC converters
- Mobile device etc.

■Reference Standards

IEC 60115-1
JIS C 5201-1

■ Construction



①	Protective bottom coating	TLR2BW(0.5m～5mΩ) TLR2BP(0.5m～5mΩ) TLR2HW(1m～3mΩ) TLR3AP(0.5m～1.5mΩ) TLR3APS(2mΩ, 3mΩ)	② Electrode
③	Resistive element		④ Solder
⑤	Protective top coating	(2BW(1mΩ,1.5mΩ), 2BP(1mΩ,1.5mΩ), 3AP(0.5m～1.5mΩ), 3APS(2mΩ))	

■ Dimensions

Type (Inch Size Code)	Resistance (Ω)	Dimensions (mm) L	W	d	t
2BW (1206)	0.5m	3.2±0.2	1.6±0.2	1.25±0.2	0.7±0.2
	1m, 1.5m			1.1±0.2	0.6±0.2
	2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m, 15m, 16m, 18m, 20m			0.5±0.2	
2BP (1206)	0.5m	3.2±0.2	1.6±0.2	1.25±0.2	0.7±0.2
	1m, 1.5m			1.1±0.2	0.6±0.2
	2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m, 15m, 16m, 18m, 20m			0.5±0.2	
2HW (2010)	0.5m	5.0±0.2	2.5±0.2	1.9±0.2	0.7±0.2
	1m			1.8±0.2	0.65±0.2
	1.5m				0.6±0.2
	2m, 2.5m, 3m, 4m, 5m, 6m			1.5±0.2	
	7m, 8m, 9m, 10m			0.5±0.2	
3AP (2512)	0.5m	6.35±0.25	3.18±0.25	2.725±0.25	0.6±0.25
	0.68m, 0.75m, 0.82m			2.675±0.25	
	1m, 1.5m, 3m, 4m			2.20±0.25	
	2m			2.50±0.25	
	5m, 6m, 7m, 8m			1.20±0.25	
	9m, 10m			0.77±0.25	
3APS (2512)	2m, 3m	6.35±0.25	3.18±0.25	1.20±0.25	0.6±0.25

■Type Designation

Example

TLR	2BW	D	TD	10L0	F	75
Product Code	Power Rating	Termination Surface Material	Taping	Nominal Resistance	Resistance Tolerance	T.C.R. (×10⁻⁶/K)
	2BW : 1.0W 2BP : 1.5W 3.0W 2HW : 2.0W 3AP : 3.0W 5.0W 3APS : 3.0W	D : SnAgCu	TD : 4mm pitch punch paper TE : Plastic embossed BK : Bulk	F : 4 digits	F : ±1%	50 : ±50 75 : ±75

Resistance Value (Ω)	4 digits
0.5m～0.82m	L500～L820
1m～9m	1L00～9L00
10m～20m	10L0～20L0

Contact us when you have control request for environmental hazardous material other than the substance specified by EU-RoHS.
For further information on taping, please refer to APPENDIX C on the back pages.

■Ratings

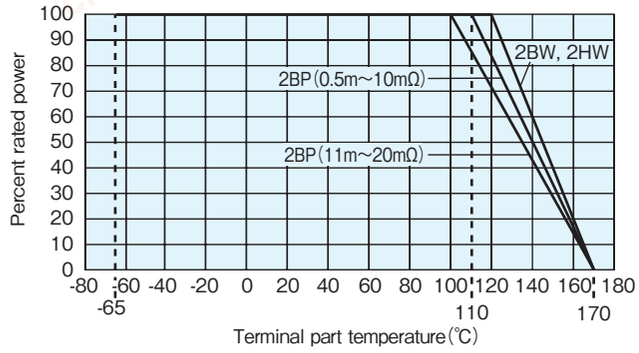
Type	Power Rating	T.C.R. (×10⁻⁶/K)	Resistance Range (Ω)	Resistance Tolerance	Rated Terminal Part Temp.	Operating Temp. Range	Taping & Q'ty/Reel (pcs) TD	TE
TLR2BW	1.0W	±50	2m,3m,4m,5m,6m,7m,8m,9m,10m, 11m,12m,13m,15m,16m,18m,20m	F : ±1%	+120℃ and less	−65℃～ +170℃	5000	–
		±75	0.5m,1m,1.5m,2m,3m,4m,5m,6m,7m,8m,9m, 10m,11m,12m,13m,15m,16m,18m,20m					
TLR2BP	1.5W	±50	5m,6m,7m,8m,9m,10m		+110℃ and less			
			11m,12m,13m,15m,16m,18m,20m		+100℃ and less			
		±75	5m,6m,7m,8m,9m,10m		+110℃ and less			
			11m,12m,13m,15m,16m,18m,20m		+100℃ and less			
	3.0W	±50	2m,3m,4m		+110℃ and less			
		±75	0.5m,1m,1.5m,2m,3m,4m					
TLR2HW	2.0W	±50	0.5m,1m,1.5m,2m,2.5m,3m,4m,5m,6m,7m 8m,9m,10m		+120℃ and less		–	4000
		±75						
TLR3AP	3.0W	±50	5m,6m,7m,8m,9m,10m		5m～8m : +110℃ and less 9m～10m : +90℃ and less		–	2000
		±75						
	5.0W	±50	2m,3m,4m		0.5m～1m,2m～4m : +110℃ and less 1.5m : +90℃ and less			
		±75	0.5m,0.68m,0.75m,0.82m,1m,1.5m,2m,3m,4m					
TLR3APS	3.0W	±50,±75	2m,3m		+110℃ and less			

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.
Contact our sales representatives before you use our products for applications including automotives, medical equipment and aerospace equipment.
Malfunction or failure of the products in such applications may cause loss of human life or serious damage.

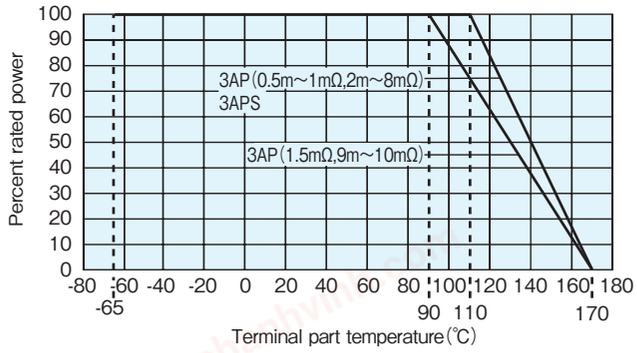
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■Derating Curve

TLR2BW, TLR2BP, TLR2HW



TLR3AP, TLR3APS

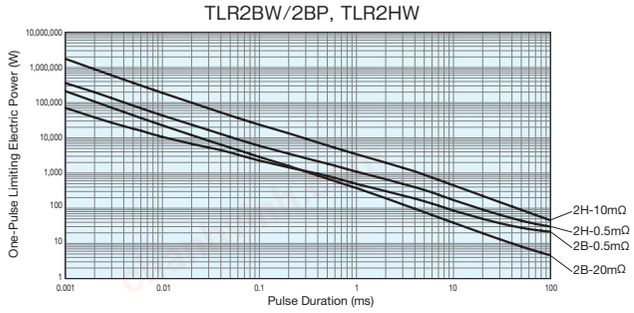


When the terminal part temperature of the resistor exceeds the rated terminal part temperature shown above, the power shall be derated according to the derating curve.
※Please refer to "Introduction of the derating curves based on the terminal part temperature" on the beginning of our catalog before use.

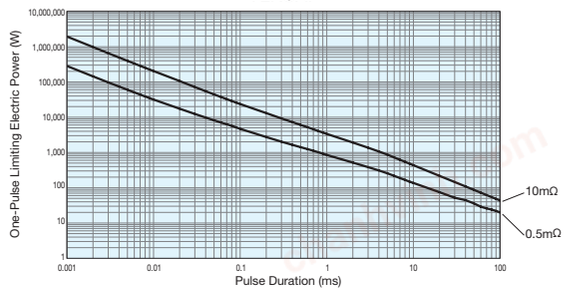
■One-Pulse Limiting Electric Power

Please ask us about the resistance characteristic of continuous applied pulse.
The pulse endurance values are not assured values,so be sure to check the products on actual equipment when you use them.

TLR2BW/2BP, TLR2HW



TLR3AP



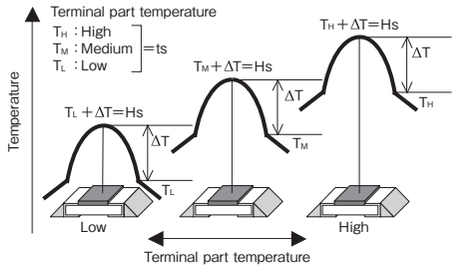
■Thermal Resistance

Type	Size	Resistance (Ω)	Rth (℃/W)
TLR	2BW 2BP	0.5m	7.2
		20m	116
	2HW	0.5m	9
		10m	61.1
	3AP	0.5m	6
		10m	62

Rth=(Hs-ts)/Power

Regarding the temperature rise, the value of the temperature varies per conditions and board for use since the temperature is measured under our measuring conditions. Please refer to us before use.

The temperature of the resistor will increase the same ⊿T from the standard terminal part temperature regardlless of the ambient temperature when the same power is applied. This is because there is hardly any heat dissipation from the resistor surface to the ambient air.



■Performance

Test Items	Performance Requirements ΔR%		Test Methods
	Limit	Typical	
Resistance	Within specified tolerance	—	25℃
T.C.R.	Within specified T.C.R.	—	+25℃/+125℃
Resistance to soldering heat	0.5	0.3	260℃±5℃, 10s$^{+2}_{0}$s
Rapid change of temperature	0.5	0.3	−55℃ (15min.) /+150℃ (15min.) 1000 cycles
Moisture resistance	0.5	0.1	MIL-STD-202-106 0% power, 7a and 7b not required
Biased humidity	0.5	0.1	85℃±2℃, 85%RH, 1000h, 10% Bias
Endurance of Rated Terminal Part Temperature	1	0.3	120℃±2℃(2BW, 2HW), 110℃±2℃(3AP 0.5m~1mΩ, 2m~8mΩ) 90℃±2℃(3AP 1.5mΩ, 9m~10mΩ)、110℃±2℃(3APS 2mΩ, 3mΩ)、110℃±2℃(2BP 0.5m~10mΩ)、100℃±2℃(2BP 11m~20mΩ) 1000h, 1.5h ON/0.5h OFF cycle
High temperature exposure	1	0.6	+155℃, 1000h
	2	0.8	+170℃, 1000h

■Precautions for Use

- In case of using the low ohm resistors as shunt resistors, please lay out a pattern considering the electromagnetic induction with surrounding inductors.
- In the resistance values of TLR the resistance value after soldering may change depending on the size of pad pattern or solder amount. Make sure the effect of decline/increase of resistance value before designing.

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.
Contact our sales representatives before you use our products for applications including automotives, medical equipment and aerospace equipment.
Malfunction or failure of the products in such applications may cause loss of human life or serious damage.