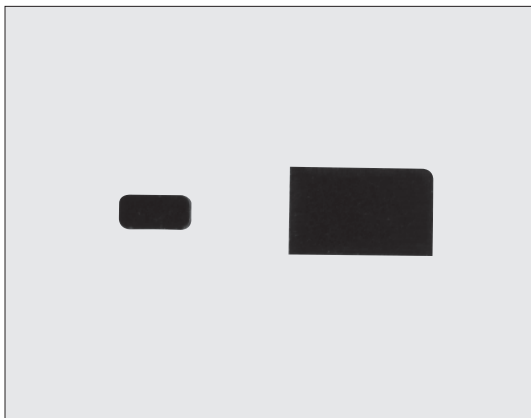


TLR 金属板贴片式低电阻器

Metal Plate Chip Type Low Resistance Resistors

电流检测电阻器
Current Detecting Chip Resistors



外观颜色: 黑色 Coating color: Black

特点 Features

- 小型金属板电流检测电阻器。
- 超低背型, 适于对小型设备的使用。
- 是电阻温度系数 $\pm 100 \times 10^{-6}/K$ 的高信赖性、高性能品。
- 无焊脚产品。(此产品的焊接部分只有电极底面。)
- 对应回流焊接。(不对应波峰焊)
- 符合欧盟RoHS。
- SMD type of small size, metal plate low resistance resistor for current detection.
- Low height suitable for use of Small equipment such as mobile phone.
- High reliability and performance with T.C.R $\pm 100 \times 10^{-6}/K$.
- Filletless products. (The soldering part of this product is only a bottom electrode.)
- Suitable for reflow soldering. (Not suitable for flow soldering.)
- Products meet EU-RoHS requirements.

用途 Applications

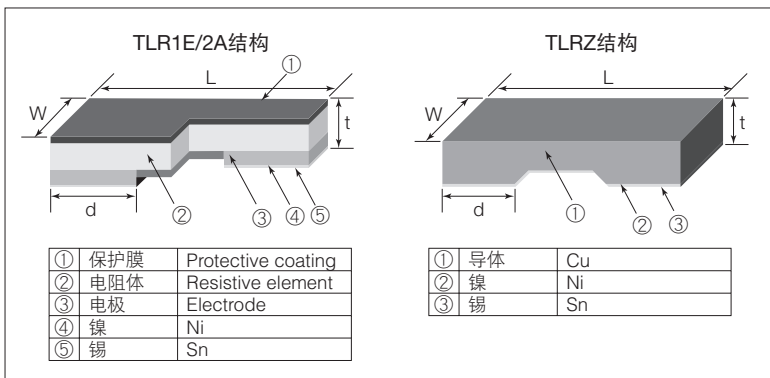
- 手机、便携式信息终端、媒体播放器、电脑等。
- Mobile phones, PDAs, Media players, Computers etc.

参考标准 Reference Standards

IEC 60115-1

JIS C 5201-1

结构图 Construction



外形尺寸 Dimensions

型号 Type	电阻值 Resistance	尺寸 Dimensions (mm)				Weight (g) (1000pcs)
		L	W	d	t	
TLR 1E (0402)	10m Ω	1.0 $\pm$ 0.05	0.5 $\pm$ 0.05	0.3 $\pm$ 0.1	0.25 $\pm$ 0.1	0.9
TLR 2A (0805)	2m Ω	2.0 $\pm$ 0.2	1.25 $\pm$ 0.2	0.60 $\pm$ 0.20	0.30 $\pm$ 0.15	5.6
	3m Ω			0.45 $\pm$ 0.20	0.25 $\pm$ 0.15	4.0
	4m Ω					3.7
	5m Ω					4.8
	6m Ω			0.55 $\pm$ 0.20	0.30 $\pm$ 0.15	4.7
	7m Ω			0.50 $\pm$ 0.20		4.6
	8m Ω			0.50 $\pm$ 0.20		3.8
	9m Ω			0.45 $\pm$ 0.20	0.26 $\pm$ 0.15	3.7
	10m Ω			0.35 $\pm$ 0.20		3.6
TLRZ 1J (0603)	—	1.6 $\pm$ 0.1	0.8 $\pm$ 0.1	0.3 $\pm$ 0.1	0.5 $\pm$ 0.05	4.6
TLRZ 2A (0805)	—	2.0 $\pm$ 0.1	1.25 $\pm$ 0.1			8.9

品名构成 Type Designation

实例 Example

TLR	1E	T	TP	10L	G
品 种 Product Code	额定功率 Power Rating	端子表面材质 Terminal Surface Material	二次加工 Taping	公称电阻值 Nominal Resistance	阻值允许偏差 Resistance Tolerance
	1E: 0.2W 2A: 1.0W	T: Sn	TP: 2mm pitch punch paper TD: 4mm pitch punch paper BK: Bulk	F: 4 digits G, J: 3 digits	F: $\pm 1\%$ G: $\pm 2\%$ J: $\pm 5\%$

实例 跳线 Example Jumper

TLRZ	1J	T	TD
品 种 Product Code	额定电流 Current Rating	端子表面材质 Terminal Surface Material	二次加工 Taping
	1J: 20A 2A: 20A	T: Sn	TD: 4mm pitch punch paper BK: Bulk

跳线额定值 Jumper Ratings

型号 Type	电阻值 Resistance	额定电流 Current Rating	连接部温度 Connection Temp.	使用温度范围 Operating Temp. Range	编带和包装数/卷 Taping & Qty/Reel (pcs) TD
TLRZ 1J	0.2m Ω max.	20A	+105 $^{\circ}$ C and less	-55 $^{\circ}$ ~+155 $^{\circ}$ C	5,000
TLRZ 2A					

欲知关于此产品含有的环境负荷物质详情(除EU-RoHS以外), 请与我们联系。

编带细节参照卷末附录C。

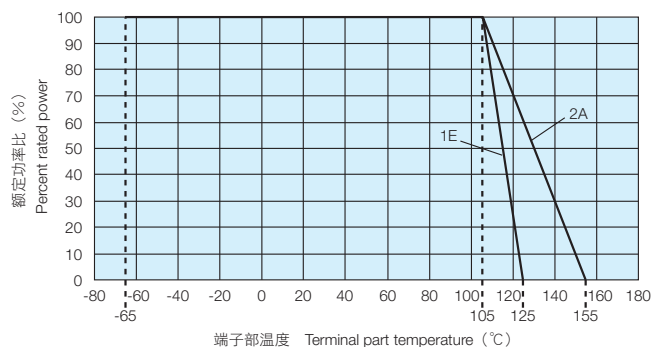
Contact us when you have control request for environmental hazardous material other than the substance specified by EU-RoHS.

For further information on taping, please refer to APPENDIX C on the back pages.

额定值 Ratings

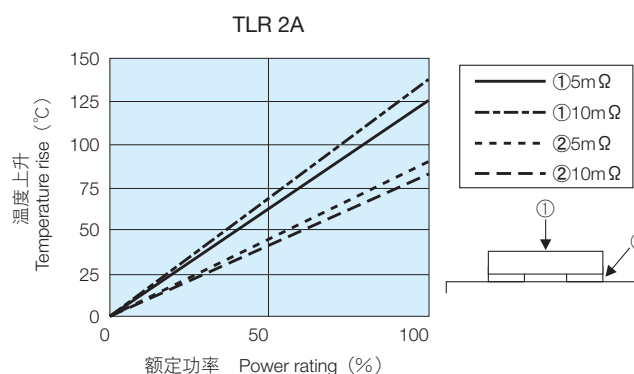
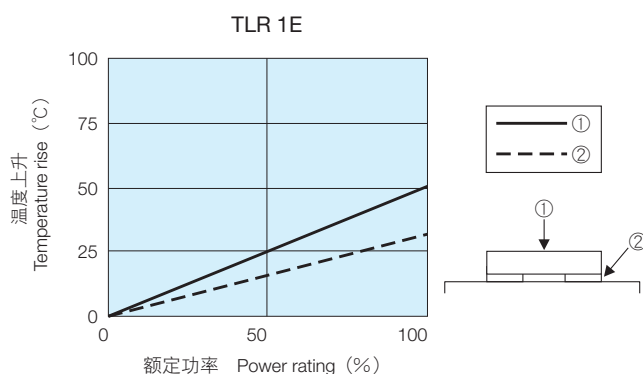
型号 Type	额定功率 Power Rating	电阻温度系数 T.C.R. ($\times 10^{-6}/K$)	电阻值范围 Resistance Range (Ω)	阻值允许偏差 Resistance Tolerance	额定端子部温度 Rated Terminal Part Temp.	使用温度范围 Operating Temp. Range	编带和包装数/卷 Taping & Qty/Reel (pcs)	
							TP	TD
TLR 1E	0.2W	± 100	10m	G: $\pm 2\%$ J: $\pm 5\%$	105 $^{\circ}$ C	-65 $^{\circ}$ C~+125 $^{\circ}$ C	10,000	—
TLR 2A	1.0W	± 100	2m, 3m, 4m 5m, 6m, 7m, 8m, 9m, 10m	F: $\pm 1\%$		-65 $^{\circ}$ C~+155 $^{\circ}$ C	—	5,000

■ 负荷减轻特性曲线 Derating Curve



超过上述端子部温度使用时，请根据负荷减轻特性曲线减小额定功率后使用。
※ 有关使用方法，请参照卷首的“端子部温度负荷减轻特性曲线的说明”。
For resistors operated terminal part temperature of described for each size or above, a power rating shall be derated in accordance with derating curve.
※ Please refer to “Introduction of the derating curves based on the terminal part temperature” on the beginning of our catalog before use.

■ 温度上升 Temperature Rise



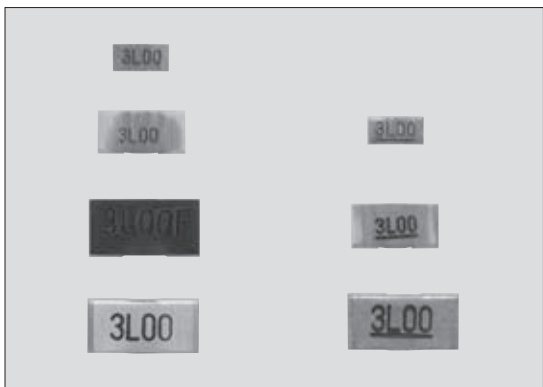
■ 性能 Performance

试验项目 Test Items	标准值 Performance Requirements ΔR%		试验方法 Test Methods
	保证值 Limit	代表值 Typical	
电阻值 Resistance	在规定的允许偏差内 Within specified tolerance	—	25°C
电阻温度系数 T.C.R.	在规定值以内 Within specified T.C.R.	—	+25°C/+100°C
过载（短时间） Overload (Short time)	1	1E: 0.15 2A: 0.05	1E: 额定功率×5倍施加5秒钟 Rated power×5 for 5s 2A: 额定功率×2.5倍施加5秒钟 Rated power×2.5 for 5s
耐焊接热 Resistance to soldering heat	1	0.01	260°C±5°C 10~12秒
温度突变 Rapid change of temperature	1	0.2	1E: -55°C(30min.)/+125°C(30min.) 1000 cycles 2A: -55°C(15min.)/+150°C(15min.) 1000 cycles
耐湿负荷 Moisture resistance	1	0.3	85°C、85%RH、1000h、10% Bias
端子部温度在105°C以下时的耐久性 Endurance at 105°C and less of terminal part temperature	1	0.4	Terminal part temp.: 105°C、1000h、1.5h ON/0.5h OFF cycle
低温放置 Low temperature exposure	1	0.05	-65°C、96h
高温放置 High temperature exposure	1E: 1 2A: 1 (2m~4m、7m~10m) 2 (5m、6m)	1E: 0.3 2A: 0.5 (2m~4m、7m~10m) 0.8 (5m、6m)	1E: 125°C 1000h 2A: 155°C 1000h

有关TLRZ的性能，请您另行询问。 Please ask separately us about Performance of TLRZ.

■ 使用注意事项 Precautions for Use

- 作为分流电阻使用时，应考虑和周围线圈的电磁感应后，配置模型。
- 对于50mΩ或以下的电阻值，焊接后的电阻值可能会根据焊盘图案的大小或焊锡量而变化。对设备进行设计时，请先确认电阻值下降、上升所造成的影响。
- 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 50mΩ or under, 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.

TLR 金属板贴片式低电阻器
Metal Plate Chip Type Low Resistance Resistors

外观颜色: 黑色 (3A、3AW (0.5m~1.5mΩ))
Coating color: Black (3A, 3AW (0.5mΩ~1.5mΩ))

■ 特点 Features

- 是超低电阻 (0.5mΩ~) 器, 适用于对大电流的检测。
- 厚度0.6mm超低背型, 适于对小型设备的使用。
- 高频率特性优异。
- 无焊脚产品。(此产品的焊接部分只有电极底面。)
- 可以自动安装。
- 对应回流焊接。
- 符合欧盟RoHS。
- AEC-Q200相关数据已取得。
- 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.
- Filletless products. (The soldering part of this product is only a bottom electrode.)
- Automatic mounting machines are applicable.
- Suitable for reflow soldering. (Not suitable for flow soldering)
- Products meet EU-RoHS requirements.
- AEC-Q200 qualified.

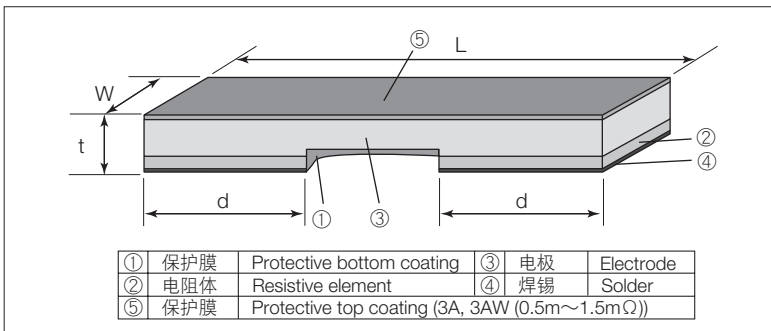
■ 用途 Applications

- CPU的电流检测。
- 换流器电源。
- DC-DC换流器。
- Current detection for CPU
- Inverter power supplies
- DC-DC converters

■ 参考标准 Reference Standards

IEC 60115-1
JIS C 5201-1

■ 结构图 Construction



■ 外形尺寸 Dimensions

型号 Type	电阻值 (Ω) Resistance	尺寸 Dimensions (mm)			
		L	W	d	t
TLR2BN, 2B (1206)	2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m, 15m, 16m, 18m, 20m	3.2±0.2	1.6±0.2	0.5±0.2	0.6±0.2
TLR2H (2010)	1m	5.0±0.2	2.5±0.2	1.8±0.2	0.65±0.2
	2m, 3m, 4m, 5m, 6m			1.5±0.2	0.6±0.2
	7m, 8m, 9m, 10m			0.5±0.2	
TLR3A (2512)	1m	6.35±0.25	3.18±0.25	2.20±0.25	0.62±0.25
	2m			1.20±0.25	
	3m			1.85±0.25	
	4m			1.20±0.25	
TLR3AW (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, 2m, 3m, 4m			2.20±0.25	
	5m, 6m, 7m, 8m			1.20±0.25	
	9m, 10m			0.77±0.25	

■ 品名构成 Type Designation

实例 Example	TLR	2B	D	TD	2L00	F	75
品种 Product Code	TLR	2B	D	TD	2L00	F	75
额定功率 Power Rating		2BN: 0.5W 2B: 0.5W 2H: 1.0W 3A: 1.0W 3AW: 2.0W					
端子表面材质 Terminal Material			D: SnAgCu				
二次加工 Taping				TD: 4mm pitch punch paper TE: Plastic embossed BK: Bulk			
公称电阻值 ^{※1} Nominal Resistance					F: 4 digits		
阻值允许偏差 Resistance Tolerance					F: ±1%		
电阻温度系数 T.C.R. (×10 ⁻⁶ /K)							Nil: ±150, ±200 75: ±75

电阻值范围 (Ω) Resistance Value	4位显示 4 digits
0.5m~0.82m	L500~L820
1m~9m	1L00~9L00
10m~20m	10L0~20L0

※1 欲知关于此产品含有的环境负荷物质详情 (除EU-RoHS以外), 请与我们联系。
编带细节请参考卷末附录C。

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.

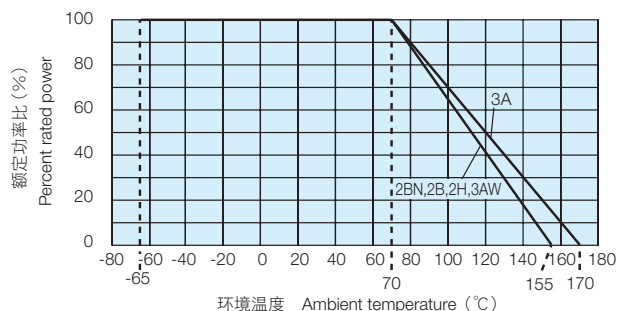
■ 额定值 Ratings

型号 Type	额定功率 Power Rating	电阻温度系数 ^{※3} T.C.R. (×10 ⁻⁶ /K)	电阻值范围 Resistance Range (Ω)	阻值允许偏差 Resistance Tolerance	额定环境温度 Rated Ambient Temp.	额定端子部温度 Rated Terminal Part Temp.	使用温度范围 Operating Temp. Range	编带和包装数/卷 Taping & Q'ty / Reel (pcs)	
								TD	TE
TLR 2B	0.5W	± 75	2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m, 15m, 16m, 18m, 20m	F: ±1%	70℃	105℃	-65℃~+155℃	5,000	—
TLR 2BN		± 150	2m, 3m, 4m, 5m, 6m, 7m, 8m, 10m, 11m, 12m, 13m, 15m, 16m, 18m, 20m					5,000	—
TLR 2H	1.0W	± 75	1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m				-65℃~+170℃	—	4,000
		± 150	1m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m					—	
TLR 3A	1.0W	± 150	1m, 2m				-65℃~+170℃	—	2,000
		± 200	3m, 4m					—	
TLR 3AW	2.0W	± 75	0.5m, 0.68m, 0.75m, 0.82m, 1m, 1.5m, 2m ^{※3} , 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m				-65℃~+155℃	—	2,000
		± 150	0.5m, 0.68m, 0.75m, 0.82m, 1m, 1.5m, 2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m					—	

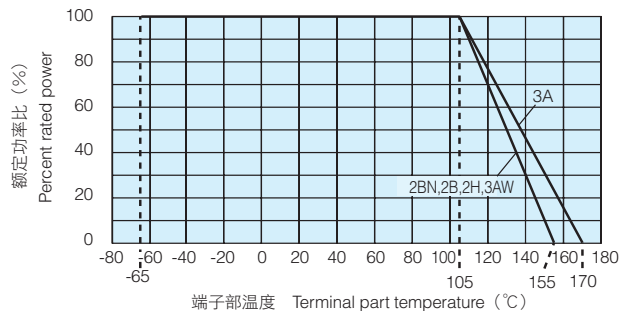
※2 关于电阻温度系数为±50×10⁻⁶/K的产品, 请您另行询问。 Please ask separately us about T.C.R. (±50×10⁻⁶/K).

※3 关于未达2mΩ的产品, 请您另行询问。 Please ask separately us about dimensions of 2mΩ.

■ 负荷减轻特性曲线 Derating Curve

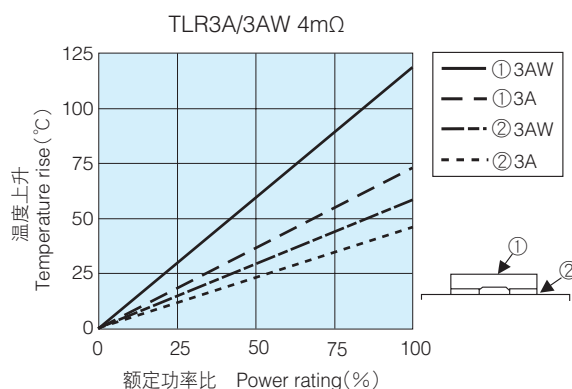
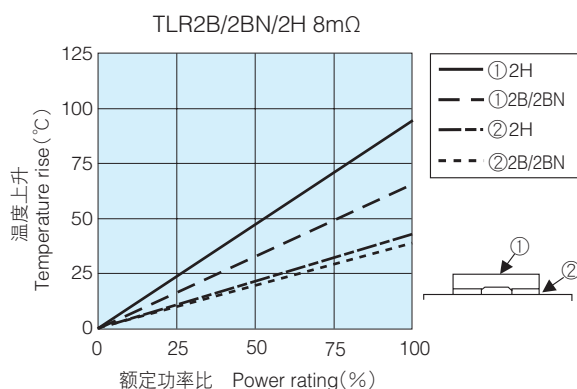


在环境温度70℃以上使用时，应按照上图负荷减轻特性曲线，减小额定功率。
For resistors operated at an ambient temperature of 70°C or above, a power rating shall be derated in accordance with the above derating curve.



超过上述端子部温度使用时，请根据负荷减轻特性曲线减小额定功率后使用。
※ 有关使用方法，请参照卷首的“端子部温度负荷减轻特性曲线的说明”。
For resistors operated terminal part temperature of described for each size or above, a power rating shall be derated in accordance with derating curve.
※ Please refer to “Introduction of the derating curves based on the terminal part temperature” on the beginning of our catalog before use.

■ 温度上升 Temperature Rise



表面温度上升，由于是用本公司测定条件测定的，根据使用状况、使用基板不同，数值也有不同，因此在使用时应另行询问。

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.

■ 性能 Performance

试验项目 Test Items	标准值 Performance Requirements $\Delta R\%$		试验方法 Test Methods
	保证值 Limit	代表值 Typical	
电阻值 Resistance	在规定的允许偏差内 Within specified tolerance	—	25°C
电阻温度系数 T.C.R.	在规定的值以内 Within specified T.C.R.	—	+25°C/+100°C
耐焊接热 Resistance to soldering heat	0.5	0.3	260°C $\pm$ 5°C, 10s t_0^2 s
温度突变 Rapid change of temperature	0.5	0.4	-55°C (15min.) / +150°C (15min.) 1000 cycles
耐湿性 (温湿度循环) Moisture resistance	0.5	0.1	MIL-STD-202, 106, 0% power, 7a and 7b not required
耐湿负荷 Moisture resistance	0.5	0.1	85°C $\pm$ 2°C, 85%RH, 1000h, 10% Bias
在70°C时的耐久性 Endurance at 70°C	1	0.3	70°C $\pm$ 2°C, 1000h, 1.5h ON/0.5h OFF cycle
高温放置 High temperature exposure	1	0.6	+155°C (2BN, 2B, 2H, 3AW), +170°C (3A), 1000h

■ 使用注意事项 Precautions for Use

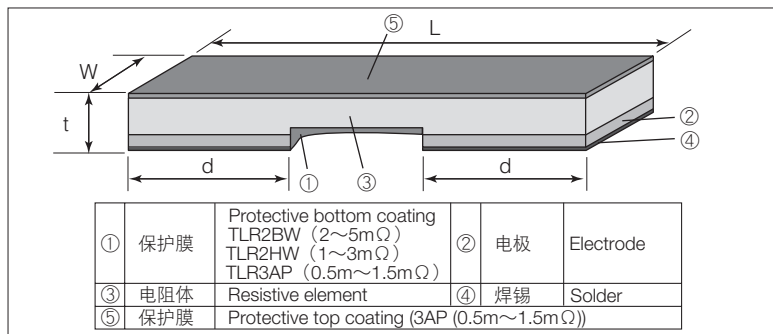
- 作为分流电阻使用时，应考虑和周围线圈的电磁感应后配置模型。
- 在50 mΩ以下的电阻值，根据焊盘图案大小和接续焊接的量，焊接后的电阻值会变动。应在事前确认电阻值降低・提高的影响后，进行设备设计。
- In case of using the low ohm resistors as shunt resistors, please lay out a pattern considering the electromagnetic induction with surrounding inductors.
- In the resistance values of 50mΩ or under, 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.

TLR2BW · TLR2HW · TLR3AP

金属板贴片式低电阻器

Metal Plate Chip Type Low Resistance Resistors

■ 结构图 Construction



■ 外形尺寸 Dimensions

型 号 Type	电阻值 (Ω) Resistance	尺寸 Dimensions (mm)			
		L	W	d	t
TLR2BW (1206)	2m, 3m, 4m, 5m, 6m, 7m, 8m, 9m, 10m, 11m, 12m, 13m, 15m, 16m, 18m, 20m	3.2±0.2	1.6±0.2	0.5±0.2	0.6±0.2
TLR2HW (2010)	1m	5.0±0.2	2.5±0.2	1.8±0.2	0.65±0.2
	2m, 3m, 4m, 5m, 6m			1.5±0.2	0.6±0.2
	7m, 8m, 9m, 10m			0.5±0.2	
TLR3AP (2512)	0.5m	6.35±0.25	3.18±0.25	2.725±0.25	0.62±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	

■ 品名构成 Type Designation

实例 Example

TLR	2BW	D	TD	10L0	F	75
品种 Product Code	额定功率 Power Rating	端子表面材质 Termination Surface Material	二次加工 Taping	公称电阻值*1 Nominal Resistance	阻值允许偏差 Resistance Tolerance	电阻温度系数 T.C.R. (×10 ⁻⁶ /K)
	2BW: 1.0W 2HW: 2.0W 3AP: 3.0W	D: SnAgCu	TD: 4mm pitch punch paper TE: Plastic embossed BK: Bulk	F: 4 digits	F: ±1%	75: ±75

※1	电阻值范围 (Ω) Resistance Value	4位显示 4 digits
	0.5m~0.82m	L500~L820
	1m~9m	1L00~9L00
	10m~20m	10L0~20L0

欲知关于此产品含有的环境有害物质详情（除EU-RoHS以外），请与我们联系。
编带细节参照卷末附录C。

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.

外观颜色：黑色（3AP (0.5m~1.5mΩ)）
Coating color: Black (3AP (0.5m~1.5mΩ))

■ 特点 Features

- 是超低电阻（0.5mΩ~）器，适用于对大电流的检测。
- 厚度0.6mm超低背型，适于对小型设备的使用。
- 高频率特性优异。
- 无焊脚产品。（此产品的焊接部分只有电极底面。）
- 可以自动安装。
- 对应回流焊接。（不对应波峰焊。）
- 符合欧盟RoHS。
- AEC-Q200相关数据已取得。
- 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.
- Filletless products. (The soldering part of this product is only a bottom electrode.)
- Automatic mounting machines are applicable.
- Suitable for reflow soldering. (Not suitable for flow soldering)
- Products meet EU-RoHS requirements.
- AEC-Q200 qualified.

■ 用途 Applications

- CPU的电流检测。
- 换流器电源。
- DC-DC换流器。
- 移动设备。
- Current sensing for CPU
- Inverter power supplies
- DC-DC converters
- Mobile device etc.

■ 参考标准 Reference Standards

IEC 60115-1
JIS C 5201-1

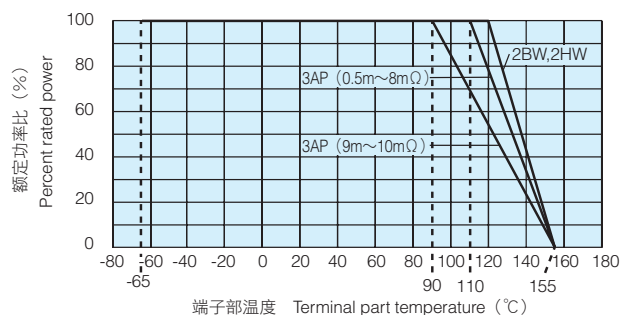
■ 额定值 Ratings

型 号 Type	额定功率 Power Rating	电阻温度系数*2 T.C.R. (×10 ⁻⁶ /K)	电阻值范围 Resistance Range (Ω)	阻值允许偏差 Resistance Tolerance	额定端子部温度 Rated Terminal Part Temp.	使用温度范围 Operating Temp. Range	编带和包装数/卷 Taping & Q'ty/Reel (pcs)	
							TD	TE
TLR2BW	1.0W	±75	2m,3m,4m,5m,6m,7m,8m,9m,10m,11m,12m,13m,15m,16m,18m,20m	F: ±1%	120℃	-65℃~+155℃	5,000	—
TLR2HW	2.0W	±75	1m,2m,3m,4m,5m,6m,7m,8m,9m,10m,				—	4,000
TLR3AP	3.0W	±75	0.5m,0.68m,0.75m,0.82m,1m,1.5m,2m,3m,4m,5m,6m,7m,8m,9m,10m				—	2,000

※2 关于电阻温度系数为±50×10⁻⁶/K的产品，请您另行询问。

※2 Please ask separately us about T.C.R (±50×10⁻⁶/K).

■ 负荷减轻特性曲线 Derating Curve



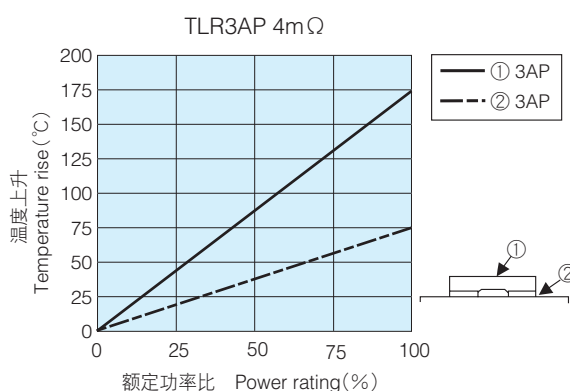
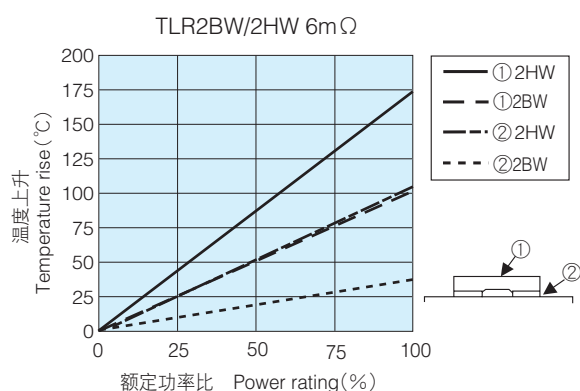
超过端子部温度使用时，请根据上图负荷减轻特性曲线减小额定功率后使用。

※ 有关使用方法，请参照卷首的“端子部温度负荷减轻特性曲线的说明”。

For resistors operated terminal part temperature of described for each size or above, a power rating shall be derated in accordance with derating curve.

※ Please refer to "Introduction of the derating curves based on the terminal part temperature" on the beginning of our catalog before use.

■ 温度上升 Temperature Rise



表面温度上升，由于是用本公司测定条件测定的，根据使用状况、使用基板不同，数值也有不同，因此在使用时应另行询问。

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.

■ 性能 Performance

试验项目 Test Items	标准值 Performance Requirements $\Delta R\%$		试验方法 Test Methods
	保证值 Limit	代表值 Typical	
电阻值 Resistance	在规定的阻值允许偏差内 Within specified tolerance	—	+25°C
电阻温度系数 T.C.R.	在规定值以内 Within specified T.C.R.	—	+25°C/+100°C
耐焊接热 Resistance to soldering heat	0.5	0.3	260°C $\pm$ 5°C, 10s $\pm$ 2s
温度突变 Rapid change of temperature	0.5	0.3	-55°C (15min.) / +150°C (15min.) 1000 cycles
耐湿性 (温湿度循环) Moisture resistance	0.5	0.1	MIL-STD-202-106 0% power, 7a and 7b not required
耐湿负荷 Biased humidity	0.5	0.1	85°C $\pm$ 2°C, 85%RH, 1000h, 10% Bias
额定端子部温度的耐久性 Endurance of Rated Terminal Part Temperature	1	0.3	120°C $\pm$ 2°C (2BW, 2HW), 110°C $\pm$ 2°C (3AP 0.5~8mΩ) 90°C $\pm$ 2°C (TLR3AP 9~10mΩ) 1000h, 1.5h ON/0.5h OFF cycle
高温放置 High temperature exposure	1	0.6	+155°C, 1000h

■ 使用注意事项 Precautions for Use

● 作为分流电阻使用时，应考虑和周围线圈的电磁感应后，配置模型。

对于50mΩ或以下的电阻值，焊接后的电阻值可能会根据焊盘图案的大小或焊锡量而变化。对设备进行设计时，请先确认电阻值下降、上升所造成的影响。

● 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 50mΩ or under, 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.

本样本手册中记载的产品规格如有变更，恕不一一奉告。订购以及使用之前，请仔细确认规格表的内容。

用于车载设备、医疗设备、航空设备以及其他涉及人身安全、或可能引起重大损失的设备上时，请务必事先与我公司联系。这些产品在这类用途中出现故障或失灵可能导致人身事故或严重损坏。

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 automobiles, medical equipment and aerospace equipment.

Malfunction or failure of the products in such applications may cause loss of human life or serious damage.

Mar. 2015