



High Power Low Resistance Chip Resistors (RLH20 Series)

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1. Scope :

The specification applies for the RLH20 Series of low resistance chip resistors made by TA-I.

2. Features:

- ◆ Low Resistance and High Accuracy Resistor for Current Detection
- ◆ Large Electrode (All series)
- ◆ Good Performance for Heat Dissipation
- ◆ High Purity Alumina Substrate for High Power Dissipation
- ◆ Pb-free to Meet RoHS Requirements

3. Applications:

- ◆ Power Management Applications
- ◆ Switching Power Supply
- ◆ DC-DC Converter, Battery Pack, Charger, Adaptor
- ◆ Portable Instruments (PDA and Cell Phone)
- ◆ Voltage Regulation Module (VRM)
- ◆ Computer

4. Type Designation:

RLH	20	F	E	C	R100
High Power Low Resistance Chip Resistors	Size 20:2010	Tolerance of Resistance at F:±1.0% G:±2.0% J:±5.0%	Packaging E:Embossed Tape	Power Rating (70°C) C=1W D=1.5W	Nominal Resistance R100 : 100mΩ



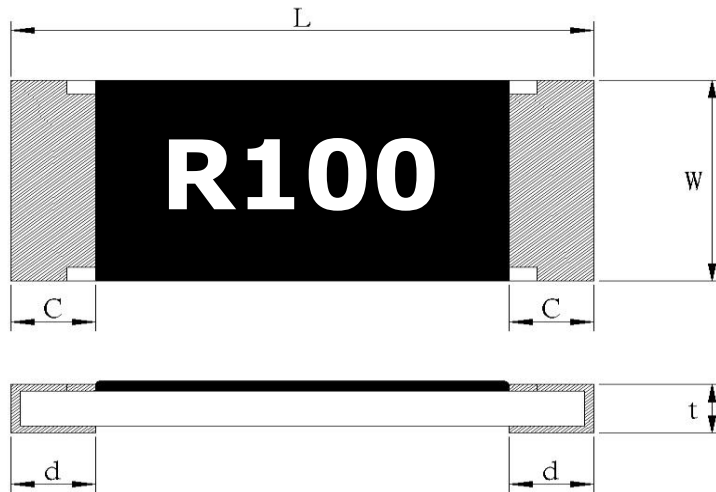
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5. Dimensions:



Unit: mm

Item	L	w	c	d	t
RLH20	5±0.20	2.5±0.25	0.6±0.30	0.5±0.25	0.6±0.10

6. Derating Curve :

For resistors operated at ambient temperature over 70°C, power rating shall be derated in accordance with figure 1.

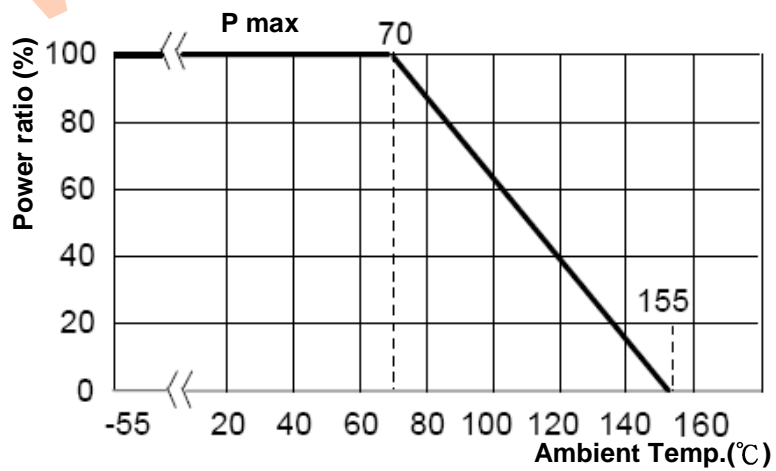


Figure 1



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7. Electrical Characteristics

Type	RLH 20
Power Rating	1W&1.5W
Resistance Value	100m Ω ~910m Ω
Operation Temperature Range	-55 $^{\circ}$ C~ +155 $^{\circ}$ C
Temperature Coefficient of Resistance	100ppm/ $^{\circ}$ C
Tolerance	\pm 1% , \pm 2% , \pm 5%
Insulation Resistance	Over 100M Ω
Maximum Working Voltage(V)	(P*R) ^{1/2}

8. Reliability Tests:

Test Item	Reference standard	Condition of Test	Test Limits
Temperature Coefficient of Resistance	IEC60115-1-4.8 JIS-C5201-1-4.8	25 $^{\circ}$ C ~ 125 $^{\circ}$ C	Refer to paragraph 6
Short Time Overload	IEC60115-1-4.13 JIS-C5201-1-4.13	5 X rated power, 5s	\pm (1.0%+0.5m Ω)
Load Life	IEC60115-1-4.25.1 JIS-C5201-1-4.25.1	1000 hours at rated power, at 70 $^{\circ}$ C	\pm (5.0%+0.5m Ω)
Load Life with Humidity	IEC60115-1-4.24 JIS-C5201-1-4.24	1000 hours at rated power , 40 \pm 2 $^{\circ}$ C , 90~95% RH	\pm (5.0%+0.5m Ω)
Thermal Shock	IEC60115-1-4.19 JIS-C5201-1-4.19	-55 $^{\circ}$ C (15 min.) / +155 $^{\circ}$ C (15 min.) 5 cycles	\pm (1.0%+0.5m Ω)
Resistance to Solder Heat	IEC60115-1-4.18 JIS-C5201-1-4.18	270 \pm 5 $^{\circ}$ C solder , 10 \pm 1 sec dwell .	\pm (1.0%+0.5m Ω)
Solderability	IEC60115-1-4.17 JIS-C5201-1-4.17	245 \pm 5 $^{\circ}$ C solder, 2 \pm 0.5 sec dwell. Solder : Sn96.5 / Ag3.0 / Cu0.5	At least 95% of surface area of electrode shall be covered with new solder.
Bending Test	IEC60115-1-4.33 JIS-C5201-1-4.33	1mm deflection	\pm (1.0%+0.5m Ω)
Resistance to Dry Heat	IEC60115-1-4.23.2 JIS-C5201-1-4.23.2	155 \pm 5 $^{\circ}$ C for 96 \pm 4hrs	\pm (1.0%+0.5m Ω)



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9. Marking:

From 2010:

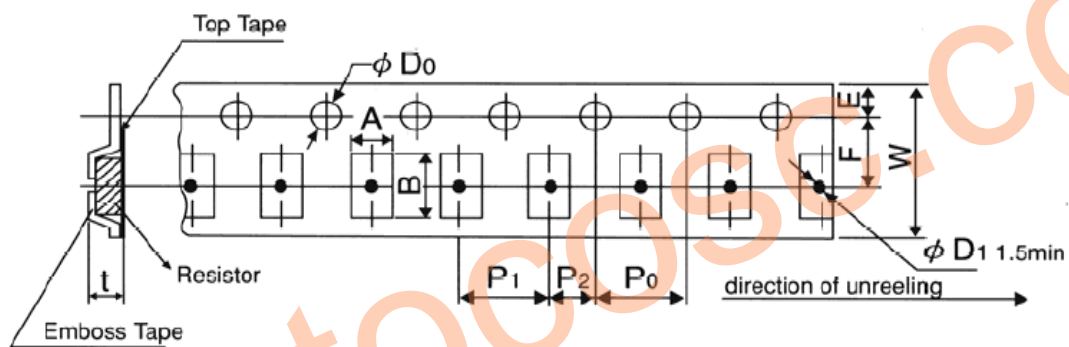
Resistance value is expressed by 4 digits, the first "R" means decimal point and the other digits represent for the normal resistance in Ω .

eg., $100m\Omega = R100$

10. Taping & Reel

10.1 Taping Dimensions

10.1.1 4 mm pitch Emboss



Packing	Type	A	B	W	F	E	P ₁	P ₂	P ₀	D ₀	T
Emboss	RLH20	2.8 ± 0.2	5.3 ± 0.2	12.0 ± 0.2	5.5 ± 0.05	1.75 ± 0.1	4.0 ± 0.1	2.0 ± 0.05	4.0 ± 0.05	$+0.1$ $\Phi 1.5$ -0.1	0.85 ± 0.15

UNIT: mm

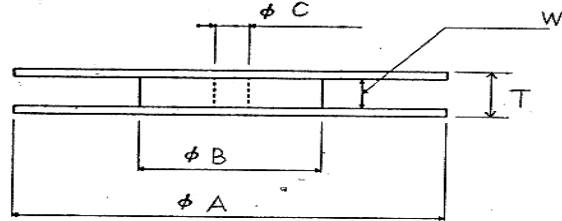
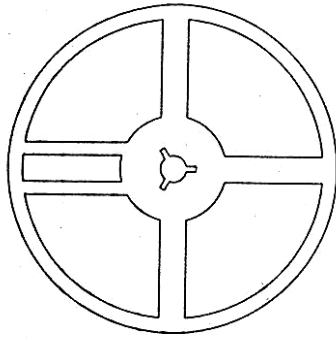
Type Size	Emboss Plastic Tape 4 mm pitch	
RLH	20	4000



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10.2 Reel Specifications

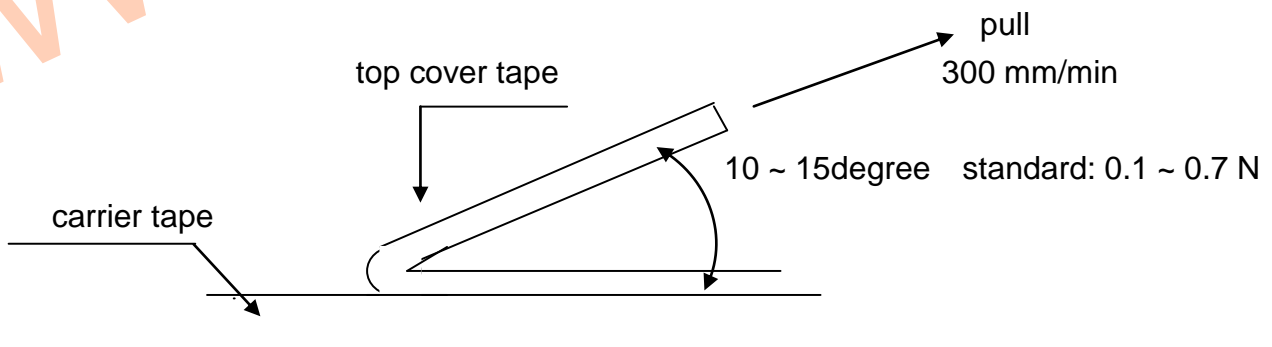


UNIT: mm

Type	ΦA	ΦB	ΦC	W	T
RLH20	178.0±2.0	60.0 ±1.0	13.0 ±1.0	13.0 ±1.0	15.5 ±1.0

10.3 Peel – off force :

Peel – off force of paper and blister tape is in accordance with “JIS ”
that is , 0.1 to 0.7 N at a peel-off speed of 300 mm / minute.



UNIT: mm

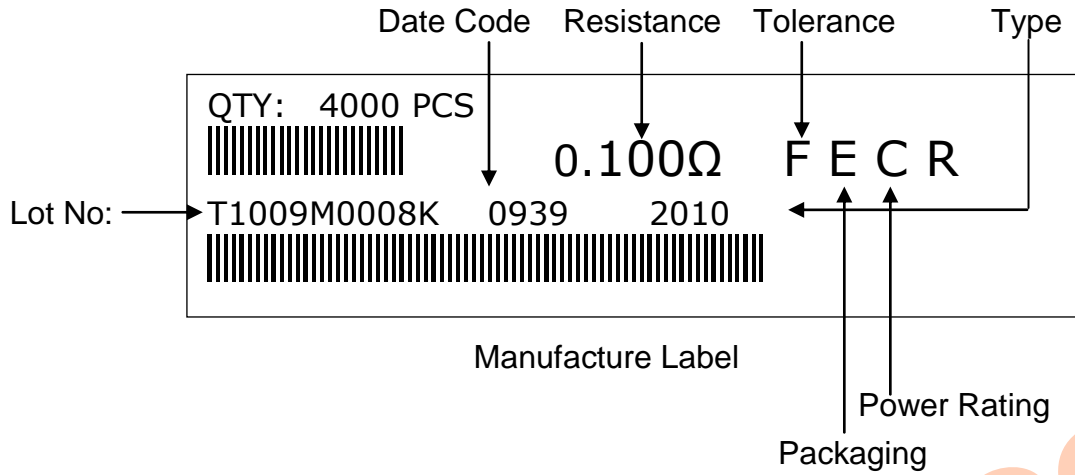


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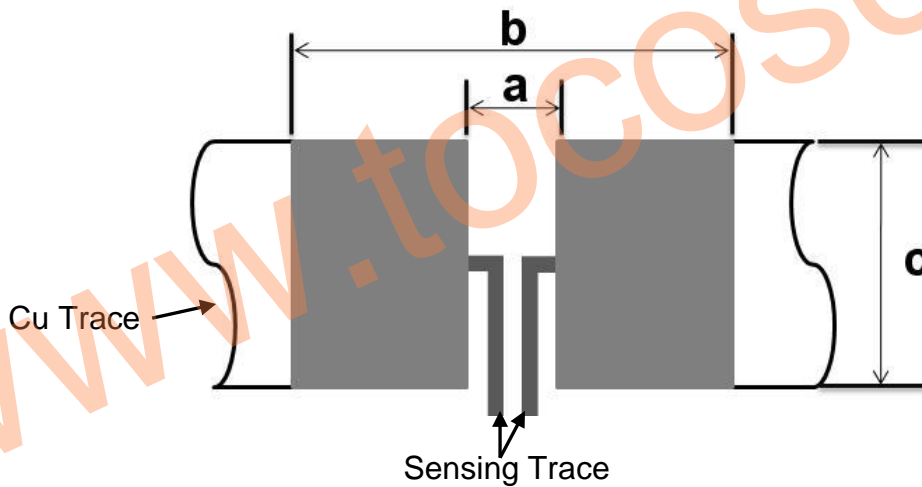
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11. Label

11.1 Normal Products :



12. Recommended land patterns



Land pattern		Dimension (mm)		
Type	Size	a	b	c
RLH	20 (2010)	1±0.20	6.1±0.20	3.5±0.20



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13. ECN

Engineering Change Notice: The customer will be informed with ECN if there is significant modification on the characteristics and materials described in Approval Sheet.

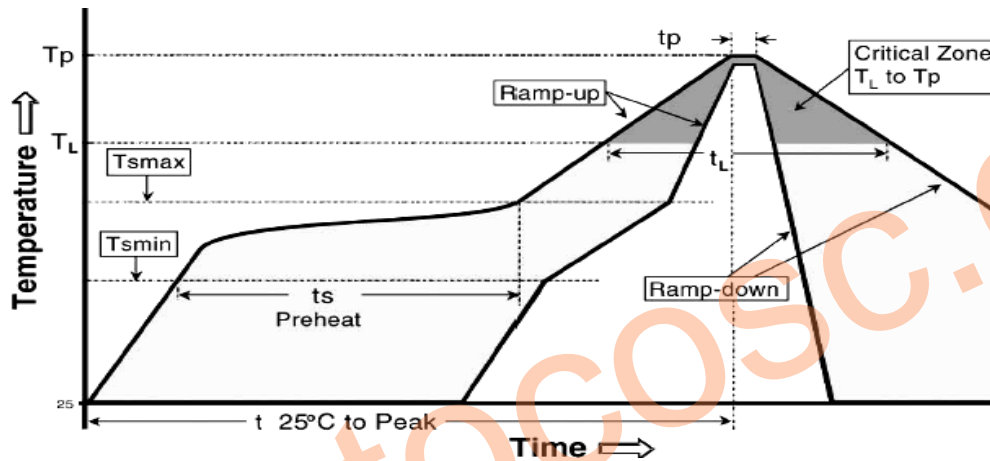
14. Storage Conditions:

Temperature: 5°C~35°C, Humidity: 40%~75%

15. Shelf Life:

2 years from manufacturing date.

16. Recommend IR – Reflow profile : (solder : Sn96.5 / Ag3 / Cu0.5)



Profile Feature	Lead (Pb)-Free Assembly
Average ramp-up rate (T _{smax} to T _p)	3°C / second max.
Preheat - Temperature Min (T _{smin}) - Temperature Max (T _{smax}) - Time (T _{smin} to T _{smax}) (ts)	150°C 200°C 60 -150 seconds
Time maintained above : - Temperature (T _l) - Time (T _l)	217°C 60-120 seconds
Peak Temperature (T _p)	260°C
Time within $\begin{matrix} +0 \\ -5 \end{matrix}$ °C of actual Peak Temperature (tp) ²	10 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8minutes max.



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17. Manufacturing Country & City :

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