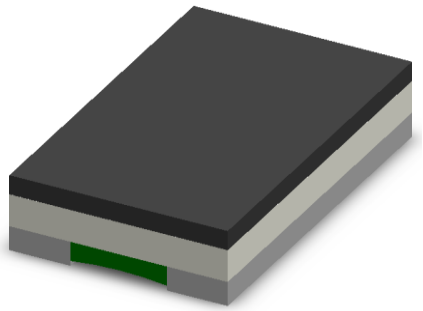
RLM-2012W-6F Series Current Sensor Resistor (Lead / Halogen Free)

Features / Applications :

- Power rating is up to 1W
- Low TCR current sensor
- Low thermal EMF (< 3 μV/°C)
- Resistors are ideal for all types of current sensing
- Metal foil construction; Excellent long-term stability
- Moisture sensitivity level: MSL 1
- RoHS compliant



Electrical Specifications :

Characteristics[1]	Feature	
Power Rating[2]	1 W	
Resistance Value(mΩ)	1	2 to 10
Temperature Coefficient of Resistance(ppm/℃)	± 200	± 150
Operation Temperature Range	-55℃ to +170℃	
Maximum Working Voltage (V)	$(P*R)^{1/2}$	

Note :

1. For detailed information see table on page 3
2. For sensors operated at ambient temperature in excess of 70℃, the maximum load shall be derated in accordance with the following curve.

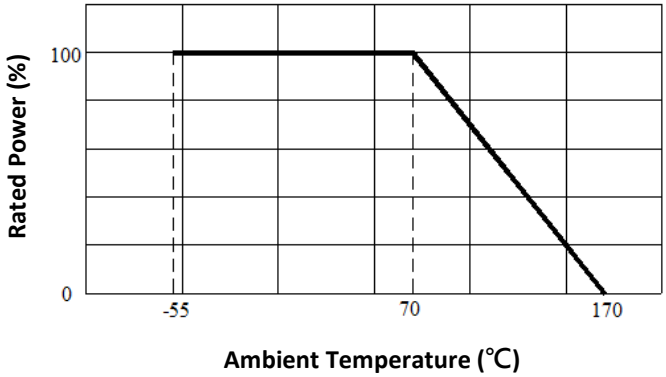
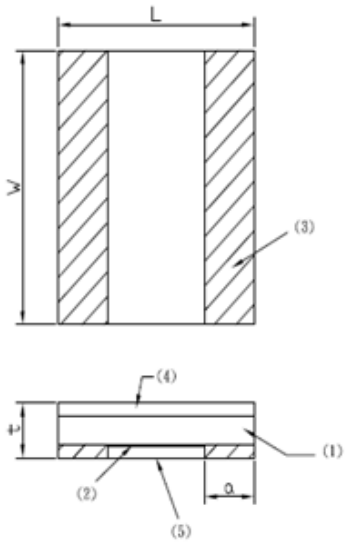


Figure 1. : Power Temperature Derating Curve

Outline Drawing :

Dimensions and schematic :



(1) Substrate
(2) Resistor : Cu alloy
(3) Terminals: Sn (on Cu)
(4) Protection coat :
Heat resistive epoxy resin (Black)
(5) Protection coat :
Heat resistive epoxy resin (White)

Resistance Range(mΩ)	L	W	a	t
1	1.25±0.20	2.00 ± 0.20	0.35 ± 0.20	0.65± 0.20
2 to 10				0.50± 0.20

(Unit : mm)

Type Designation :

R L M – 2 0 1 2 W – 6F – □□□□ – □NH

(1) (2) (3) (4) (5)

Note :

(1) Series No.

(2) Size

(3) Power Rating :6F = 1W

(4) Resistance value : 0R5m = 0.5mΩ ; R002 = 2mΩ ; R010 = 10 mΩ

(5) Tolerance : ±1%(F), ±2%(G), ±5%(J)

Available standard resistance values :

Resistance Values	Tolerance		
	±1.0%	±2.0%	±5.0%
R001	✓	✓	✓
R002	✓	✓	✓
R003	✓	✓	✓
R004	✓	✓	✓
R005	✓	✓	✓
R006	✓	✓	✓
R007	✓	✓	✓
R008	✓	✓	✓
R009	✓	✓	✓
R010	✓	✓	✓

✓ = available

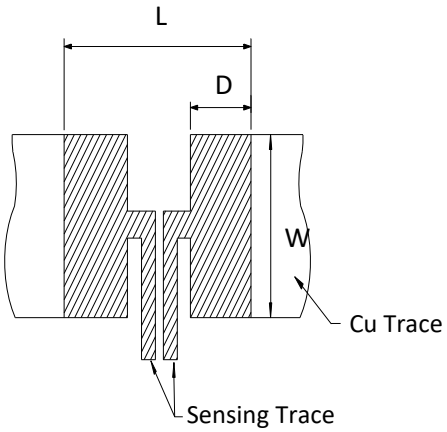
Further values and tolerances on request.

Reliability Performance :

Test Item	Condition of Test	Requirements
Short Time Overload	2.5 x Rated power for 5 seconds Refer to JIS C 5201-1 4.13	ΔR：±1.0%
Thermal Cycling	-55 to 125℃ 100 cycles, 15 min at each extreme condition Refer to JIS C 5201-1 4.19	ΔR：±1.0%
Low Temperature Storage	Kept at -55℃, 1000 hours Refer to JIS C 5201-1 4.23.4	ΔR：±1.0%
Resistance to Soldering Heat	Dipped into solder at 260±5℃ for 10±1 seconds Refer to JIS C 5201-1 4.18	ΔR：±1.0%
Load Life	Rated voltage for 1.5hours followed by a pause 0.5hour at 70±3℃ Cycle repeated 1000 hours Refer to JIS C 5201-1 4.25	ΔR：±2.0%
Damp Heat with Load	40±2℃ with relative humidity 90% to 95%. D.C. rated voltage for 1.5 hours ON and 30 minutes OFF. Cycle repeated 1,000 hours Refer to JIS C 5201-1 4.24	ΔR：±2.0%
High Temperature Exposure	Kept at 170℃ for 1000 hours Refer to JIS C 5201-1 4.23.2	ΔR：±1.0%
Solderability	Temperature of Solder : 245±5℃ Immersion Duration : 3±0.5 second Refer to JIS C 5201-1 4.17	Uniform coating of solder cover minimum of 95% surface being immersed
Mechanical Shock	100 G's for 6milliseconds. 5 pulses Refer to JIS C 5201-1 4.21	ΔR：±1.0%
Substrate Bending	Glass-Epoxy board thickness : 1.6mm Bending width : 2mm Between the fulcrums : 90mm Refer to JIS C 5201-1 4.33	ΔR：±1.0%

Note : Measurement at 24±4 hours after test conclusion for all reliability tests-parts.

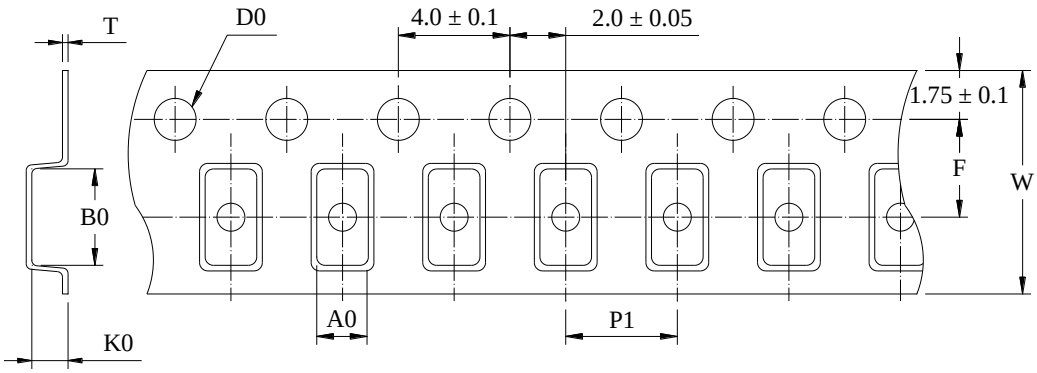
Recommend Solder Pad Dimensions :



Dimensions (mm)	W	L	D
1 to 10 mΩ	2.3	1.95	0.75

Packaging :

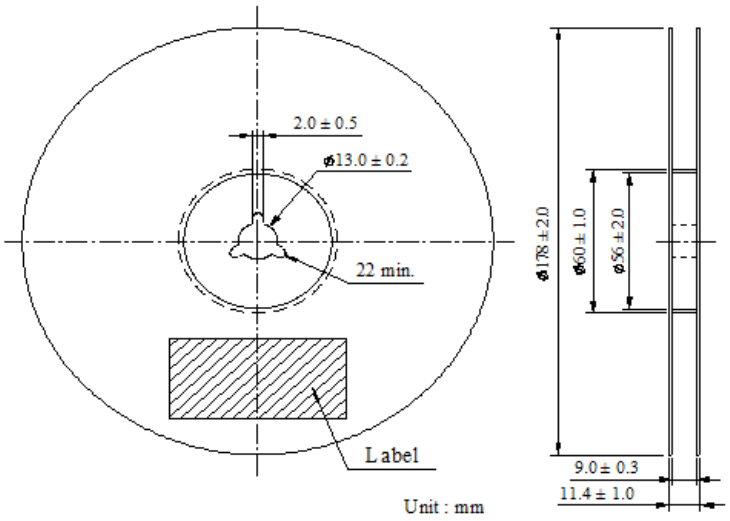
Tape packaging dimensions：



A0	1.65 ± 0.10	F	3.50 ± 0.05
B0	2.35 ± 0.10	P1	4.00 ± 0.10
T	0.20 ± 0.10	W	8.00 ± 0.30
K0	1.05 ± 0.10	D0	ϕ1.55 ± 0.05

Unit : mm

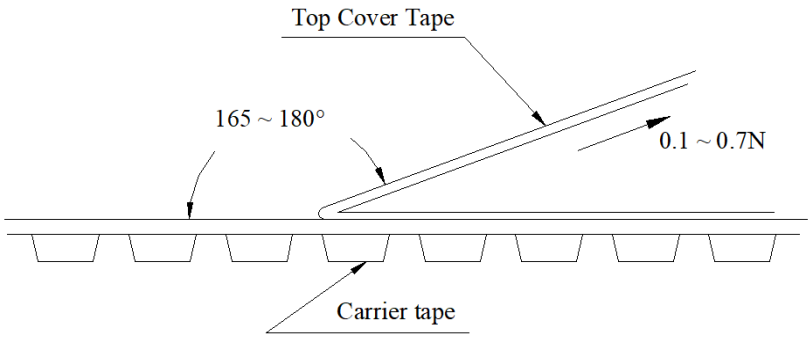
Reel dimensions：



Peel Strength of Top Cover Tape：

The peel speed shall be about 300mm/min.

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



Number of Taping：

4,000 pieces / reel

Label Marking :

The following items shall be marked on the reel.

(1) Type designation

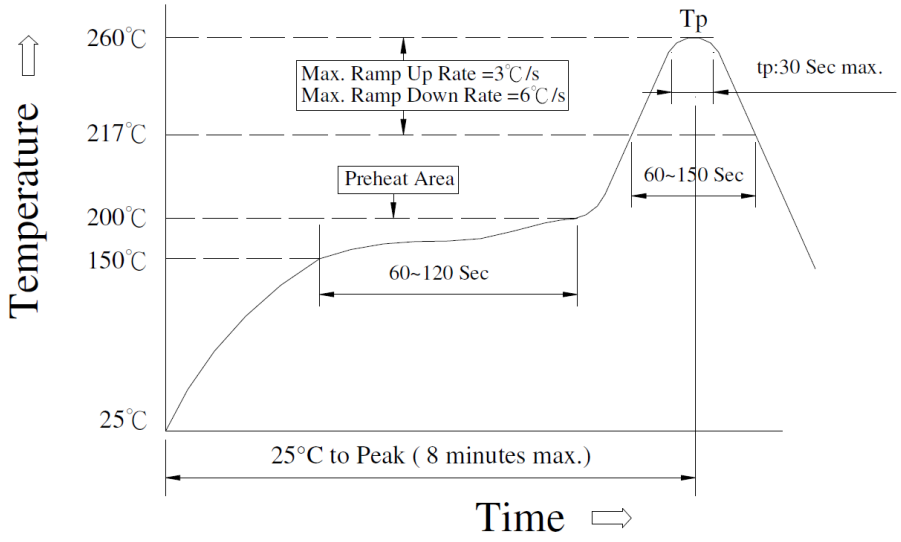
(2) Quantity

(3) Manufacturing date code

(4) Manufacturer's name

(5) The country of origin

Recommend Soldering Conditions:



Meet JEDEC-020D

(1) Reflow Soldering Method :

Reflow Soldering	**Tp:255 to 260℃ Max.30 seconds (Tp)**
	217℃ 60 to 150 seconds
Pre-Heat	**150 to 200℃ 60 to 120 seconds**
Time 25℃ to peak temperature	**8 minutes max**

(2) Soldering Iron Method : 350± 5℃ max.3 seconds

Care Note :

Care note for storage

(1) Current sensor shall be stored in a environment where temperature and humidity must be controlled (temperature 5 to 40℃, humidity 30 to 80% RH) . However, the humidity should be maintained as low as possible.

(2) Current sensor shall not be stored under direct sunlight.

(3) Current sensor shall be stored in condition without moisture, dust, any material defect solderability, or hazardous gas (i.e. Chlorination hydrogen, sulfurous acid gas, and sulfuration hydrogen)

(4) The sensor can be stored for at least one year under the condition mentioned above.

Care note for operating and handling

(1) It is necessary to protect the edge and protection coat of resistors from mechanical stress.

(2) Handle with care when printing circuit board (PCB) is divided or fixed on support body, because bending of printing circuit board (PCB) mounting will make mechanical stress for resistors.

(3) Resistors shall be used with in rated range shown in specification. Especially, if voltage more than specified value will be loaded to resistor, there is a case it will make damage for machine because of temperature rise depending on generating of heat, and increase resistance value or breaks.

(4) In case that resistor is loaded a rated voltage, it is necessary to confirms temperature of a resistor and to reduce a load power according to load reduction curve, because a temperature rise of a resistor depends on influence of heat from mounting density and neighboring element.

(5) Observe Limiting element voltage and maximum overload voltage specified in each specification

(6) If there is possibility that a large voltage (pulse voltage, shock voltage) charge to resistor, it is necessary that operating condition shall be set up before use.