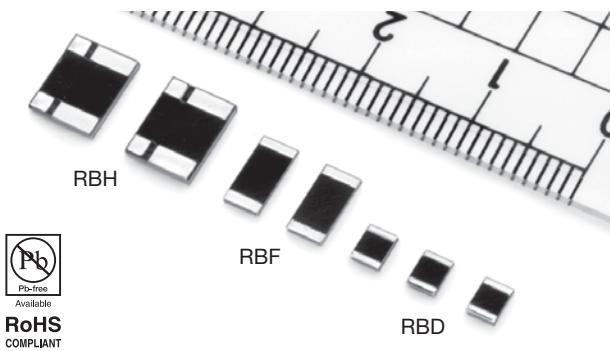


Ultra Precision SMT Current Sense Resistor (Flip-Chip)



COMPOSITION OF TYPE NUMBER

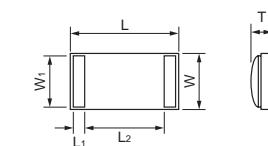
Example:

RBF J R1000 F L

Tape & Reel Package Required
Tolerance
Resistance Value
TCR
Type

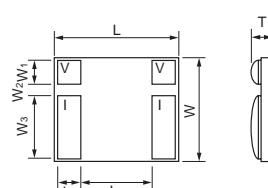
Resistance value in ohm is expressed by a series of four significant digits and an R designates the decimal point.

CONFIGURATION (DIMENSIONS IN mm)



Type	RBD	RBF
L	3.2±0.1	6.3±0.1
W	2.5±0.1	3.2±0.1
L ₁	0.5±0.2	0.7±0.2
L ₂	2.1±0.2	4.7±0.2
W ₁	2.4±0.2	3.0±0.2
T	1.05 max.	

Dimensions in mm

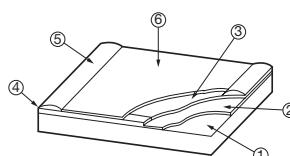


Type	RBF
L	7.5±0.1
W	6.0±0.1
L ₁	1.4±0.2
L ₂	4.4±0.2
W ₁	1.4±0.2
W ₂	0.7±0.2
W ₃	3.6±0.2
T	1.5 max.

Dimensions in mm

I: Current Sensing Terminal
V: Voltage Terminal

CONSTRUCTION



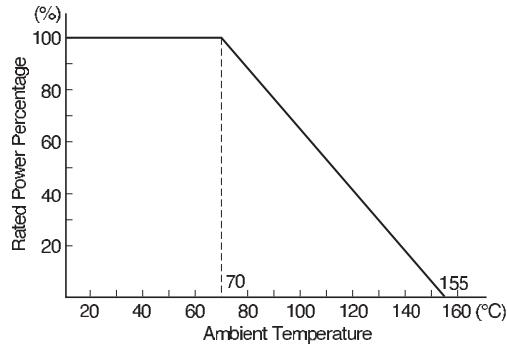
- ① Ceramic Substrate (High-Purity Alumina)
- ② Heat-Resistant Bonding Layer
- ③ Bulk Metal® Foil
- ④ Metal Plating
- ⑤ Solder
- ⑥ Solder-Resist

TCR, RESISTANCE RANGE, TOLERANCE, RATED POWER

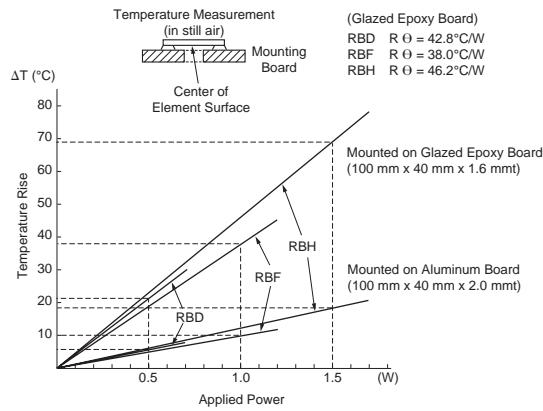
Type	TCR (ppm/°C) -25°C to 125°C*	Resistance Range (Ω)	Resistance Tolerance (%) [*]	Rated Power (W) at 70°C
RBD	0±25 (J)	0.01 to 0.1	±1 (F) ±2 (G) ±5 (J)	0.5
	0±10 (C) 0±25 (J)	0.1 to 1	±0.5 (D) ±1 (F) ±2 (G) ±5 (J)	
RBF	0±25 (J)	0.01 to 0.1	±1 (F) ±2 (G) ±5 (J)	1
	0±10 (C) 0±25 (J)	0.1 to 1	±0.5 (D) ±1 (F) ±2 (G) ±5 (J)	
RBH	0±10 (C) 0±25 (J)	0.01 to 0.1	±0.5 (D) ±1 (F) ±2 (G) ±5 (J)	1.5

*Symbols parenthesized are for type number composition.

POWER DERATING CURVE

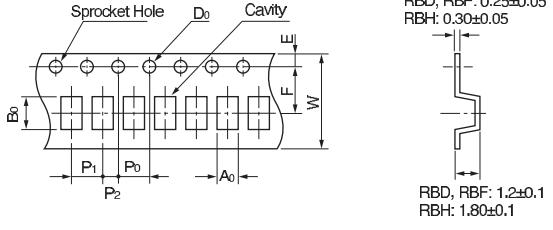
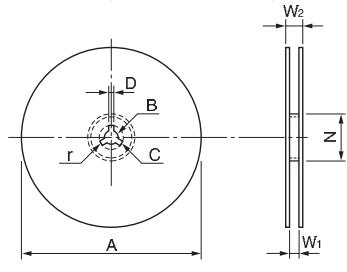


TEMPERATURE OF RESISTOR SURFACE



Please use board made of metal for continuous use with 2W at 70°C.
Please keep the temperature of board less than 90°C when using the glazed epoxy board.

PERFORMANCE		Test Condition	ALPHA Specification	ALPHA Typical Test Data
Maximum Rated Operating Temperature		70°C		-65°C to +155°C
Working Temperature Range				
Thermal Shock Overload		-65°C/30 min. ↔ +155°C/30 min., 5 cycles Rated Power x 2.5, 5 sec.		±0.1% ±0.1% ±0.03% ±0.03%
Low Temperature Storage and Operation		-65°C, No Load, 24 hrs. → Rated Voltage, 45 min.		±0.1% ±0.05%
Substrate Bending Test		Substrate Bent 3 mm, 60 sec.		±0.1% ±0.05%
Dielectric Withstanding Voltage		Atmo. Pres.: AC 200V, 1 min.		±0.05% over 10,000 MΩ
Insulation Resistance		DC 100V, 1 min.		±0.01% over 10,000 MΩ
Resistance to Soldering Heat		260°C, 10 sec.		±0.1% ±0.05%
Moisture Resistance		+65°C to -10°C, 90% RH to 98% RH, Rated Voltage, 10 cycles (240 hrs.)		±0.1% ±0.03% ±0.03%
Shock Vibration, High Frequency		100G, 6 ms, Sawtooth Wave, X, Y, Z, each 10 shocks 20G, 10 Hz to 2,000 Hz to 10 Hz, 20 min., X, Y, Z, each 2.5 hrs.		±0.05% ±0.05% ±0.01% ±0.01%
Life		70°C, Rated Power, 1.5 hr. → ON, 0.5 hr. → OFF, 2,000 hrs		±0.1% ±0.05%
Storage Life		15°C to 35°C, 15% RH to 75% RH, No Load, 10,000 hrs.		±0.05% ±0.01%
High Temperature Exposure		155°C, No Load, 2,000 hrs.		±0.1% ±0.05%

TAPE AND REEL PACKAGE (BASED ON EIA-481-1) (DIMENSIONS IN mm)										
Tape Dimensions					Reel Dimensions					
 <p>Diagram showing tape dimensions: Sprocket Hole, D₀, Cavity, W, L, P₁, P₀, P₂, A₀, and D₀. Specific values are listed: RBD, RBF: 0.25±0.05, RBH: 0.30±0.05; RBD, RBF: 1.2±0.1, RBH: 1.80±0.1.</p>					<p>Reel Dimensions</p> <p>Reel Capacity RBH: 1,000 pieces/reel RBD, RBF: 4,000 pieces/reel</p>  <p>Diagram showing reel dimensions: A, B, C, D, W₁, W₂, and r. Specific values are listed: RBD: Dia.178 ±2, Dia.60 min., Dia.13 ±0.5, Dia.21 ±0.8, 2.0 ±0.5, 8.4 +2.0-0, 14.4 max., 1.0 ±0.5; RBF: Dia.178 ±2, Dia.60 min., Dia.13 ±0.5, Dia.21 ±0.8, 2.0 ±0.5, 12.4 +2.0-0, 18.4 max., 1.0 ±0.5; RBH: Dia.178 ±2, Dia.60 min., Dia.13 ±0.5, Dia.21 ±0.8, 2.0 ±0.5, 17.0 ±0.3, 19.4 ±0.1, 1.0 ±0.5.</p>					
Type	A ₀	B ₀	W	F	E	P ₁	P ₂	P ₀	D ₀	
RBD	2.85 ±0.1	3.7 ±0.1	8.0 ±0.2	3.5 ±0.05	1.75 ±0.1	4.0 ±0.05	2.0 ±0.1	4.0 ±0.1	Dia.1.5 +0.1-0	
RBF	3.4 ±0.1	6.7 ±0.1	12.0 ±0.2	5.5 ±0.05	1.75 ±0.1	4.0 ±0.1	2.0 ±0.05	4.0 ±0.1	Dia.1.5 +0.1-0	
RBH	6.3 ±0.1	7.8 ±0.1	16.0 ±0.2	7.5 ±0.1	1.75 ±0.1	8.0 ±0.1	2.0 ±0.1	4.0 ±0.1	Dia.1.5 +0.1-0	
Type	A	N	B	C	D	W ₁	W ₂	r		
RBD	Dia.178 ±2	Dia.60 min.	Dia.13 ±0.5	Dia.21 ±0.8	2.0 ±0.5	8.4 +2.0-0	14.4 max.	1.0 ±0.5		
RBF	Dia.178 ±2	Dia.60 min.	Dia.13 ±0.5	Dia.21 ±0.8	2.0 ±0.5	12.4 +2.0-0	18.4 max.	1.0 ±0.5		
RBH	Dia.178 ±2	Dia.60 min.	Dia.13 ±0.5	Dia.21 ±0.8	2.0 ±0.5	17.0 ±0.3	19.4 ±0.1	1.0 ±0.5		

PRECAUTION IN USING SMD CURRENT SENSE RESISTORS

1. Storage

Storage condition or environment may adversely affect solderability of the exterior terminals. Do not store in high temperature and humidity. The recommended storage environment is lower than 40°C, has less than 70% RH humidity and is free from harmful gases such as sulphur and chlorine.

2. Caution in Soldering

① Solder Reflow in Furnace

Recommended

- Peak Temperature: 250+0/-5°C
- Holding time: 10 sec. max.
- To cool gradually at room temperature.

② Dipping in Solder (Wave or Still)

Recommended

- Temp. of Solder: 260°C max.
- Length of Dipping: 10 sec.

③ Other

Soldering iron is never recommended. Corrosion-free flux such as rosin is recommended.

3. Cleaning

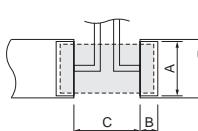
Use volatile cleaner such as methylalcohol or propylalcohol.

4. Circuit Board Design

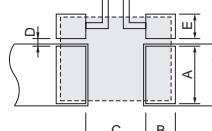
① Solder Land Dimensions

The dimensions of solder land must be determined in conformity with the size of resistors and with the soldering method. They are also subject to the mounting machine and the material of the substrate. See example at right.

RBD, RBF



RBH



Type	Dimensions in mm				
	A	B	C	D	E
RBD	2.6 to 2.8	0.8	2.0		
RBF	3.4 to 3.6	1.2	4.5		
RBH	3.8 to 4.0	2.0	4.0	0.5	1.7

② Circuit Design

It is recommended that the circuit be drawn so that current may approach, cross and go away from the mounted resistor in one direction as illustrated below. Thicker copper foil should be used if possible.

