信昌電子陶瓷股份有限公司
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SPECIFICATION FOR APPROVAL

DATE：

CUSTOMER：

PART NAME： Metal Paste Low Ohm Current Sense Chip Resistor

CUSTOMER'S DWG. NO.：

CUSTOMER'S PART NO.：

PDC PART NO.： **FBF SERIES APPROVED**

DESCRIPTION.：

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PSA PASSIVE SYSTEM ALLIANCE
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ACTION / RESULT	" V "	CUSTOMER'S SIGNATURE	NOTE
FULL APPROVED			
CONDITIONAL APPROVED			
REJECTED			

OUR ACTION	SIGNATURE
PREPARED By	Jenny Tseng
CHECKED By	Tony Chou
APPROVED By	Byron Tsai

CUSTOMER SIGNATURE FOR ACCEPTANCE

PDC

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FBF series. (Metal Paste)
Current Sensing Resistors
Thick-film Chip Resistors

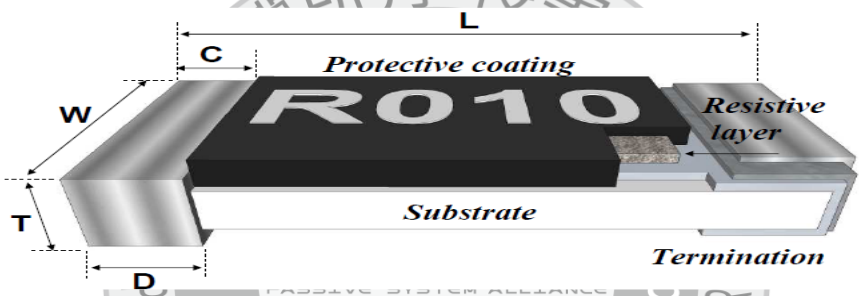
1. Features

- Low resistance and high precision (1%).
- Excellent reliability and suitable cost.
- Suitable for lead free soldering.
- RoHS compliant & Halogen Free.

2. Applications

- Consumer electronics, M/B.
- Battery pack, BTC.
- Notebook, Tablet PC.
- Portable Device, Electronic Equipment.

3. Dimensions and Constructions



Unit：mm

Type 1.	L	W	C	D	T
FBF03	1.60±0.10	0.80±0.10	0.30±0.20	0.30±0.20	0.45±0.10
FBF05	2.00±0.10	1.25±0.10	0.40±0.20	0.40±0.20	0.50±0.10
FBF06	3.10±0.10	1.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
FBF12	3.10±0.10	2.60±0.10	0.50±0.25	0.50±0.25	0.55±0.10
FBF20	5.00±0.20	2.50±0.20	0.60±0.25	0.60±0.25	0.60±0.10
FBF25	6.30±0.20	3.10±0.20	0.60±0.25	0.90±0.25	0.60±0.15

Type 2.	L	W	C	D	T
FBF03	1.60±0.10	0.80±0.10	0.30±0.20	0.50±0.20	0.50±0.10
FBF05	2.00±0.10	1.25±0.10	0.40±0.20	0.65±0.20	0.60±0.10
FBF06	3.10±0.10	1.60±0.10	0.50±0.25	0.90±0.25	0.65±0.10
FBF12	3.10±0.10	2.60±0.10	0.50±0.25	0.90±0.25	0.65±0.10
FBF20	5.00±0.20	2.50±0.20	0.60±0.25	1.25±0.25	0.65±0.10
FBF25	6.30±0.20	3.10±0.20	0.60±0.25	1.90±0.25	0.65±0.15

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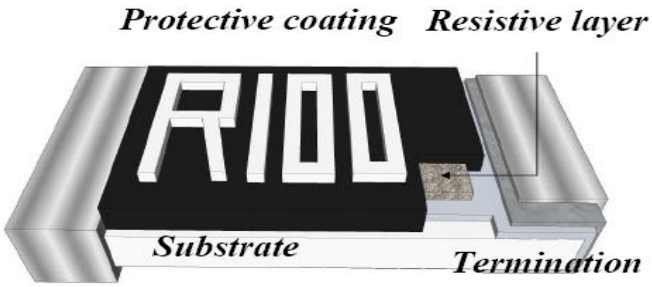
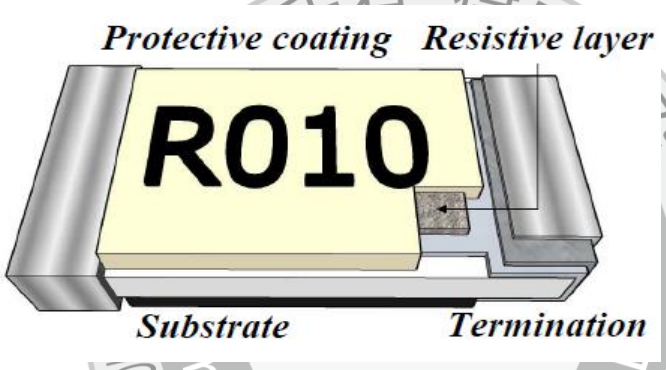
Type 1. Resistance ≧ 40mΩ

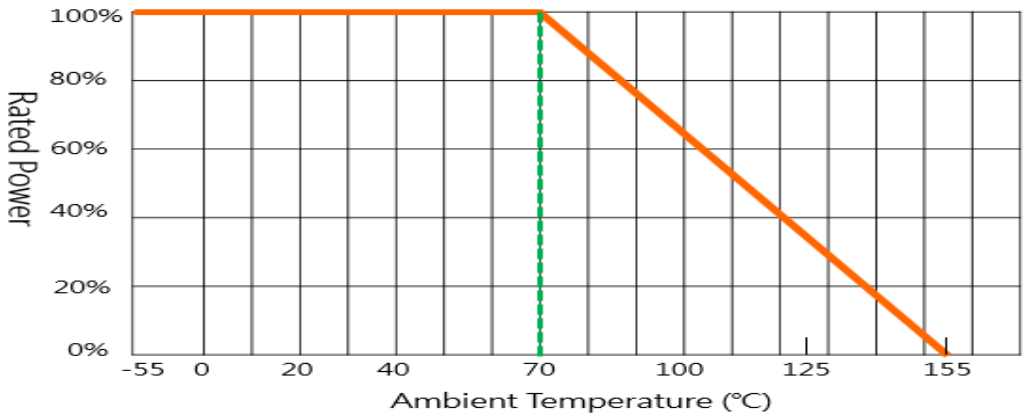


Type 2. Resistance ≦ 39mΩ



4. Power Derating Curve

Operating Temperature Range: -55 to +155℃



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5. Rating

Normal Type		Power Rating at 70℃	Max. RCWV (mV)	Max. Overload Voltage (mV)	Resistance Tolerance (%) **	TCR (ppm/℃) *	Resistance Range (mΩ)		Standard Resistance Values
Type	Size						Min.	Max.	
FBF03	0603	1/8W	337	754	±1 ±2、±5	±200 ±100	40 100	91 910	E-24
FBF05	0805	1/4W	477	1067	±1 ±2、±5	±400 / ±200 ±100	10 47	46 910	E-24
FBF06	1206	1/3W	551	1232	±1 ±2、±5	±400 / ±200 ±100	10 47	46 910	E-24
FBF12	1210	2/3W	779	1742	±1 ±2、±5	±400 / ±200 ±100	10 47	46 910	E-24
FBF20	2010	3/4W	826	1847	±1 ±2、±5	±400 / ±200 ±100	10 47	46 910	E-24
FBF25	2512	1W	954	2133	±1 ±2、±5	±400 / ±200 ±100	10 47	46 910	E-24
Power Type		Power Rating at 70℃	Max. RCWV (mV)	Max. Overload Voltage (mV)	Resistance Tolerance (%) *	TCR (ppm/℃) **	Resistance Range (mΩ)		Standard Resistance Values
Type	Size						Min.	Max.	
FBF03	0603	1/4W	477	1067	±1 ±2、±5	±200 ±100	40 100	91 910	E-24
FBF05	0805	1/2W	675	1508	±1 ±2、±5	±400 / ±200 ±100	10 47	46 910	E-24
FBF06	1206	3/4W	826	1847	±1 ±2、±5	±400 / ±200 ±100	10 47	46 910	E-24
FBF12	1210	3/4W	826	1847	±1 ±2、±5	±400 / ±200 ±100	10 47	46 910	E-24
FBF20	2010	1W	954	2133	±1 ±2、±5	±400 / ±200 ±100	10 47	46 910	E-24
FBF25	2512	2W	1349	3017	±1 ±2、±5	±400 / ±200 ±100	10 47	46 910	E-24

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Notes:

1. RCWV is Rated Voltage, V=$\sqrt{P*R}$ or Max. Working Voltage whichever is lower.
2. V：Working Voltage(V), P：Rated Power (W), R：Resistance Value(Ω)
3. Before use low ohm resistors, please consider the resistance variance from soldering pad/trace/amount, and keep the surface temperature do not exceed 105℃ when working.
4. *: ±400 / ±200 means 10mΩ~18mΩ: TCR ±400ppm, 20mΩ~46mΩ: TCR ±200ppm
5. **: ±0.5% available items please refer below.

Type	Available Resistance (mΩ)
FBF06	50,100

6. Part Number

Type	Size	Tolerance	Packing	Power Code	R Value (GM)	Control Code
FBF	**03** :0603 **05** :0805 **06** :1206 **12** :1210 **20** :2010 **25** :2512	**D** :±0.5% **F** :±1% **G** :±2% **J** :±5%	**Paper Tape：** **0603.0805.1206** **1210** **T** : 5Kpcs **V** : 10Kpcs **W** : 20Kpcs **Plastic Tape：** **2010.2512** **P** : 4Kpcs **X** : 8Kpcs **Y** : 16Kpcs	**-**: **Normal** Rating **P**: **Power** Rating	**XXXX** 4 digits	**K** **R010~R018** **Control code**

Example：

FBF06FT-R100

➔1206 size, tolerance 1%, paper tape, 100mΩ

FBF25FP-R015K

➔2512 size, tolerance 1%, plastic tape, 15mΩ.

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7. Marking/Soldering

Resistance value identify：

0805/1206/1210/2010/2512

Top Marking. (4 Digits marking to identify the resistance value.)

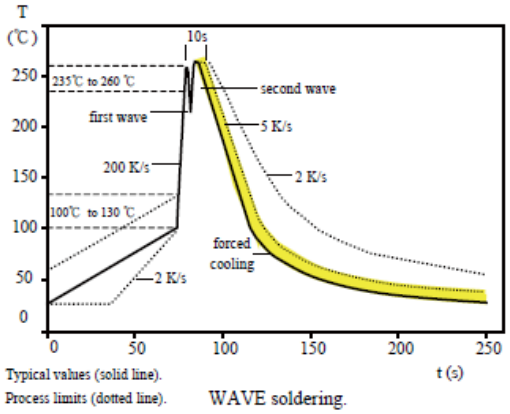
R068=68mΩ，R120=120mΩ

0603

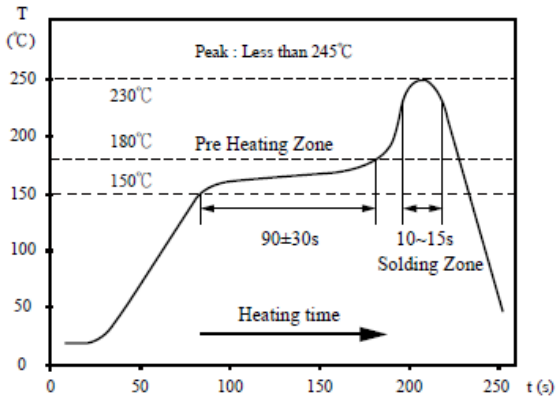
Top Marking. (3 Digits marking to identify the resistance value.)

R12=120mΩ，68M=68mΩ

Soldering Reference：



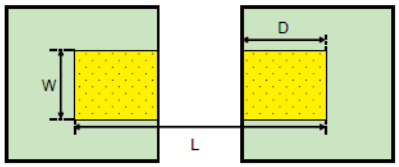
WAVE soldering.



IR Reflow soldering.

Recommend Solder Pad Dimensions：

Type	W	D	L
FBF03	0.90	1.00	3.00
FBF05	1.30	1.15	3.50
FBF06	1.80	1.30	4.70
FBF12	3.00	1.30	4.70
FBF20	3.00	1.50	6.80
FBF25	3.70	1.60	7.60



Unit:mm

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8. Reliability Performance

Test Item	Specification	Test Method
DC Resistance	D：±0.5%　　F：±1% G：±2%　　J：±5%	**IEC 60115-1 / JIS C 5201-1 , Clause 4.5** Measure the resistance Value.
Resistance to Solder Heat	ΔR≦±(1%＋0.5mΩ) D.F：ΔR≦±(0.5%＋0.5mΩ) No mechanical damage	**IEC 60115-1, Clause 4.18** Solder dipping @ 260℃±5℃ for 10sec.±1sec.
Solder Ability	Over 95% of termination must be covered with Solder.	**IEC 60115-1, Clause 4.17** After immersing flux, dip in the 245±2℃ molten solder bath for 3±0.5 sec.
Short Time Overload	ΔR≦±(2%＋0.5mΩ) D.F：ΔR≦±(1%＋0.5mΩ)	**IEC 60115-1, Clause 4.13** 5 × Rated power for 5 seconds
Temperature Coefficient of Resistance (TCR)	Within the spec.	**IEC 60115-1, Clause 4.8** T_1　　T_2 Test temperature：25℃~ 155℃ TCR(ppm/℃) = $(R_2-R_1)/R_1 \times 1 / (T_2-T_1) \times 10^6$
Load Life	ΔR≦±(3%＋0.5mΩ)	**IEC 60115-1, Clause 4.25** Rated voltage for 1.5 hours for followed by a pause 0.5 hour at 70±2℃. Cycle repeated 1000 hours.
Bending Strength	ΔR≦ ±(1%＋0.5mΩ) D.F：ΔR≦ ±(0.5%＋0.5mΩ) No mechanical damage.	**IEC 60115-1 / JIS C 5201-1 ,Clause 4.33** Resistance variance after bended on the 90mm PCB. Bending width：3mm for 0603 0805 2mm for 1206 2010 2512
Insulation Resistance	Between termination and coating must over 1000MΩ	**IEC 60115-1, Clause 4.6** Test voltage：100±15V

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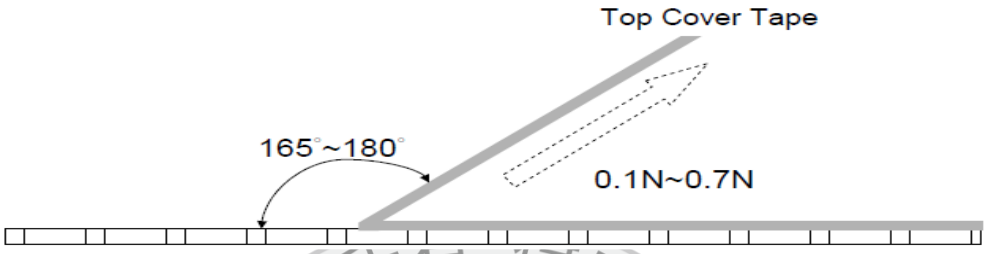
9. PACKAGING

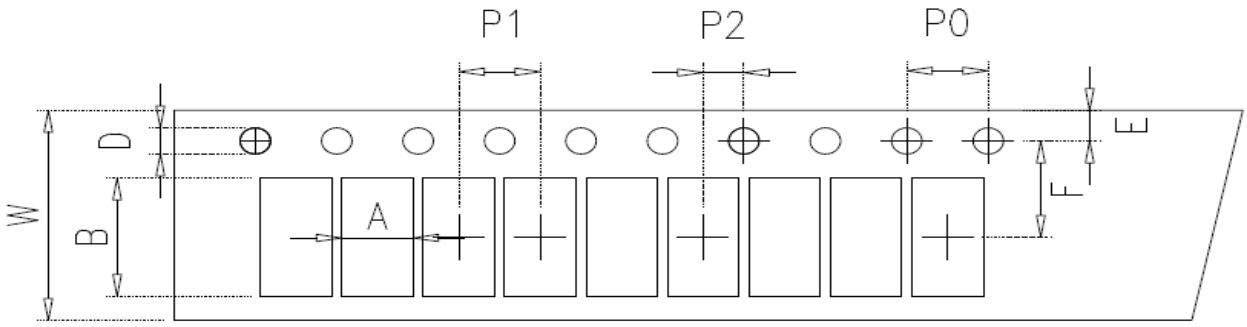
9.1 Peel Strength of Top Cover Tape

The peel speed shall be about 300 mm/min

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



9.2 Tape Packaging Dimensions



unit:mm

Size	A	B	W	F	E	P1	P2	P0	D
0603	1.10±0.20	1.90±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
0805	1.65±0.20	2.40±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
1206	2.00±0.20	3.60±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
1210	3.00±0.20	3.60±0.20	8.00±0.30	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
2010	2.80±0.20	5.50±0.20	12.00±0.30	5.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0
2512	3.50±0.20	6.70±0.20	12.00±0.30	5.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50+0.10/-0

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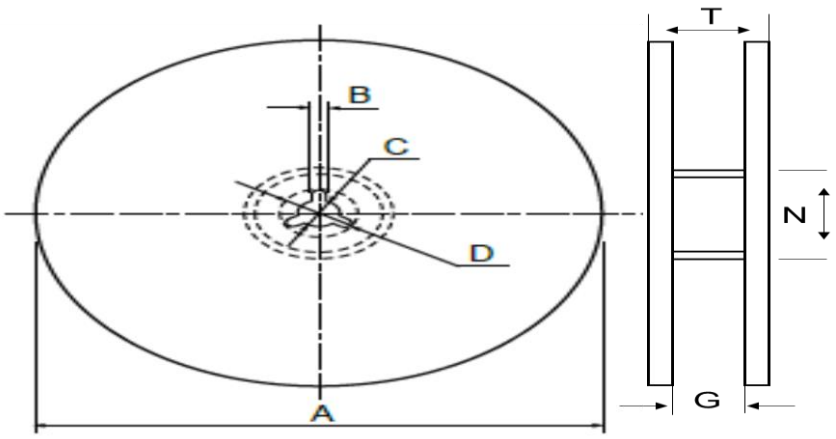
9.3 Reel Dimensions



unit:mm

Size	Packaging Q'ty	A	N	C	D	B	G	T
0603 0805 1206 1210	5kpcs/Reel	178.0±2.0	60.0±0.5	13.0±0.5	20(Min.)	2.0±0.5	10.0±1.5	14.9max.
	10kpcs/Reel	254.0±2.0	100.0±1.0	13.5±0.5	20(Min.)	2.0±0.5	10.0±1.5	14.9max.
	20kpcs/Reel	330.0±2.0	100.0±1.0	13.5±0.5	20(Min.)	2.0±0.5	10.0±1.5	14.9max.
2010 2512	4kpcs/Reel	178.0±2.0	60.0±0.5	13.0±0.5	20(Min.)	2.0±0.5	13.8±1.5	16.7max.
	8kpcs/Reel	254.0±2.0	100.0±0.5	13.5±0.5	20(Min.)	2.0±0.5	13.8±1.5	20.0max.
	16kpcs/Reel	330.0±2.0	100.0±1.0	13.5±0.5	20(Min.)	2.0±0.5	13.8±1.5	20.0max.

10. Storage &. Handling

… Products are recommended to be used up within one year as ensured shelf life.
Check solder ability in case shelf life extension is needed.

… To store products with following condition:
Temperature:5 to 40℃ ; Humidity: 20 to 70% relative humidity.

※ All product specification and data are subject to change without notice.

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