



Lead-Free Current Sensing Resistors EBR Series (Halogen-Free) AEC-Q 200-Ver D qualified

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1. Scope

This specification applied to the products of Lead-Free current sensing resistor of metal alloy for Lead-Free EBR series manufactured by TA-I TECHNOLOGY CO.,LTD.

2. Type Designation

EBR59	F	E	R50M
Series No.	Tolerance	Packaging	Resistance
25 : 2512 39 : 3920 59 : 5930	F= $\pm 1\%$ G= $\pm 2\%$ J = $\pm 5\%$	E= Embossed Tape	R001= $1\text{m}\Omega$ R50M= $0.5\text{m}\Omega$

3. Features

Series	Size	Resistance Value (m Ω)	Thickness (mm)	Power (W)	Operation Temperature Range	TCR (ppm/ $^{\circ}\text{C}$)	Tolerance
EBR25	2512	0.2	1.00	6	$-55^{\circ}\text{C}\sim+170^{\circ}\text{C}$	± 175	$\pm 1\%$ $\pm 2\%$ $\pm 5\%$
		0.3	1.00	6		± 175	
		0.5	0.84	6		± 115	
		1	0.42	5		± 100	
EBR39	3920	0.3	1.42	10		± 150	
		0.5	0.82	9		± 70	
		0.7	0.56	7		± 70	
		1	0.41	7		± 50	
		2	0.64	6		± 50	
EBR59	5930	0.2	1.42	15		± 100	
		0.5	0.56	10		± 75	
		1	0.90	9		± 50	



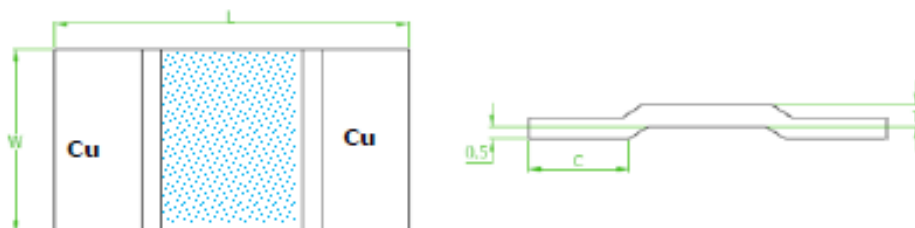
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4. Construction and Dimension



Series	L	W	C	T
EBR59	15.0±0.30	7.6±0.40	4.2±0.4	spc on title 4 Tolerance ±0.1
EBR39	10.0±0.30	5.2±0.40	2.2±0.2	
EBR25	6.3±0.20	3.1±0.30	1.2±0.3	

UNIT: mm

5. Reliability Tests

Test Item	Reference standard	Condition of Test	Test Limits
Temperature Coefficient of Resistance	IEC 60115-1 4.8	-At +25/+125 °C	Refer 5.0
Short Time Overload	IEC60115-1 4.13	5 X rated power for 5s	± 0.5%
High Temperature Exposure (Storage)	AEC-Q200-REV D-Test 3 MIL-STD-202 Method 108	1000 hrs. @ T=125°C. Unpowered. Measurement at 24±2 hours after test conclusion.	± 1%
Temperature Cycling	AEC-Q200-REV D-Test 4 JESD22 Method JA-104	1000 Cycles (-55°Cto+125°C) Measurement at 24±4 hours after test conclusion. 30min maximum dwell time at each temperature extreme. 1 min. maximum transition time.	± 1%
Moisture Resistance	AEC-Q200-REV D-Test 6 MIL-STD-202 Method 106	T=24 hours / Cycle,10Cycles. Notes: Steps 7a& 7b not required. Unpowered.	± 1%
Biased Humidity	AEC-Q200-REV D-Test 7 MIL-STD-202 Method 103	1000 hours 85°C/85%RH. Note: Specified conditions: 10% of operating power. Measurement at 24±2 hours after test conclusion.	± 1%



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Operational Life	AEC-Q200-REV D-Test 8 MIL-STD-202 Method 108	1000 hours TA=125°C at 45% rated power. Measurement at 24±2 hours after test conclusion.	± 1%
External Visual	AEC-Q200-REV D-Test 9 MIL-STD-883 Method 2009	Electrical test not required. Inspect device construction, marking and workmanship.	
Physical Dimension	AEC-Q200-REV D-Test 10 JESD22 Method JB-100	Verify physical dimensions to the applicable device detail specification. Note: User(s) and Suppliers spec. Electrical test not required.	
Resistance to Solvents	AEC-Q200-REV D-Test 12 MIL-STD-202 Method 215	a: Isopropyl Alcohol : Mineral Spirits = 1 : 3 b: Terpene Defluxer (Bioact EC-7R) c: Deionized water : Propylene Glycol Monomethyl Ether : monoethanolamine = 42 : 1 : 1	Marking and protective layer cannot be detached
Mechanical Shock	AEC-Q200-REV D-Test 13 MIL-STD-202 Method 213	Wave Form: Tolerance for half sine shock pulse. Peak value is 100g's. Normal duration(D) is 6(ms)	± 0.5%
Vibration	AEC-Q200-REV D-Test 14 MIL-STD-202 Method 204	5 g's for 20 min., 12 cycles each of 3 orientations. Note: Test from 10-2000 Hz.	± 0.5%
Resistance to Soldering Heat	AEC-Q200-REV D-Test 15 MIL-STD-202 Method 210	Condition B: Immerse the specimens in and eutectic solder at 260±5°C for 10±1S.	± 0.5%
Thermal Shock	AEC-Q200-REV D-Test 16 MIL-STD-202 Method 107	-55°C/+155°C. Note: Number of cycles required-300, Maximum transfer time-20 seconds, Dwell time-15 minutes. Air-Air.	± 1%
ESD	AEC-Q200-REV D-Test 17	verify the voltage setting at 500V	± 1%
Solderability	AEC-Q200-REV D-Test 18 J-STD-002	Method B, aging 4 hours at 155 °C dry heat Lead-free solder bath at 235±3 °C Dipping time: 3±0.5 seconds	> 95% area covered with tin
Flammability	AEC-Q200-REV D-Test 20 UL-94	V-0 or V-1 are acceptable. Electrical test not required.	V-0 or V-1
Board Flex (Bending)	AEC-Q200-REV D-Test 21	2mm deflection	± 0.5%
Terminal Strength (SMD)	AEC-Q200-REV D-Test 22	Force of 1.8kg for 60 seconds.	± 0.5%



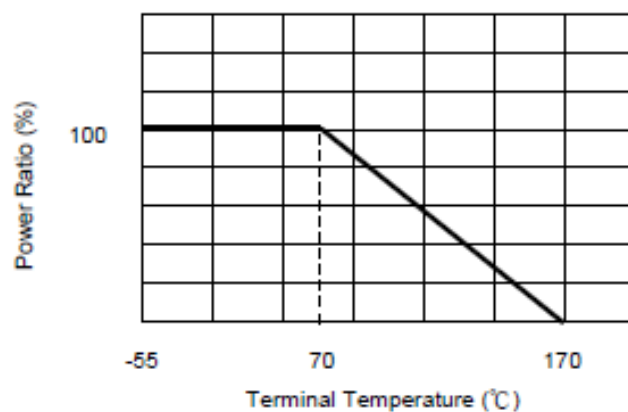
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5.1 Derating Curve



5.2 Rated Current

The rated current is calculated by the following formula:

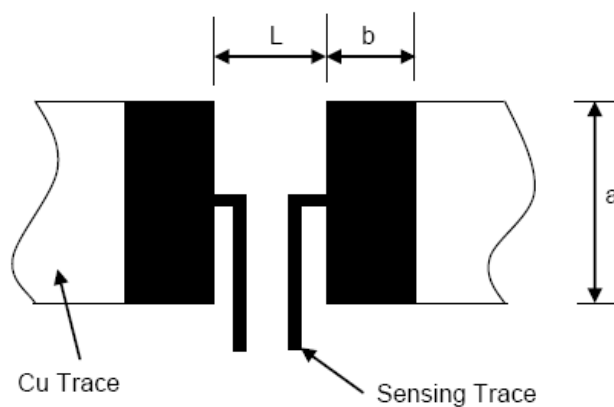
$$I = \sqrt{P \div R}$$

I: Rated Current (A)

P: Rated Power (W)

R: Resistance Value (Ω)

6. Recommended Solder Pad Dimension



Series	Resistance Range (m Ω)	a	b	L
EBR25	0.2~1	3.4 $\pm$ 0.3	1.8 $\pm$ 0.3	3.4 $\pm$ 0.1
EBR39	0.3~2	6.2 $\pm$ 0.4	2.7 $\pm$ 0.2	5.6 $\pm$ 0.1
EBR59	0.2~1	8.75 $\pm$ 0.4	5.2 $\pm$ 0.4	5.6 $\pm$ 0.1

Note: *The copper foil minimum thickness of PCB needs 3 oz

Unit: mm



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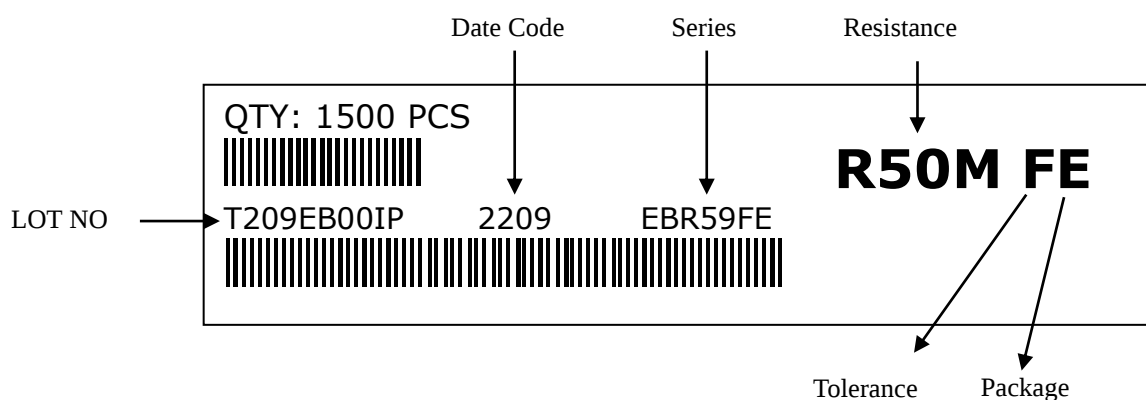
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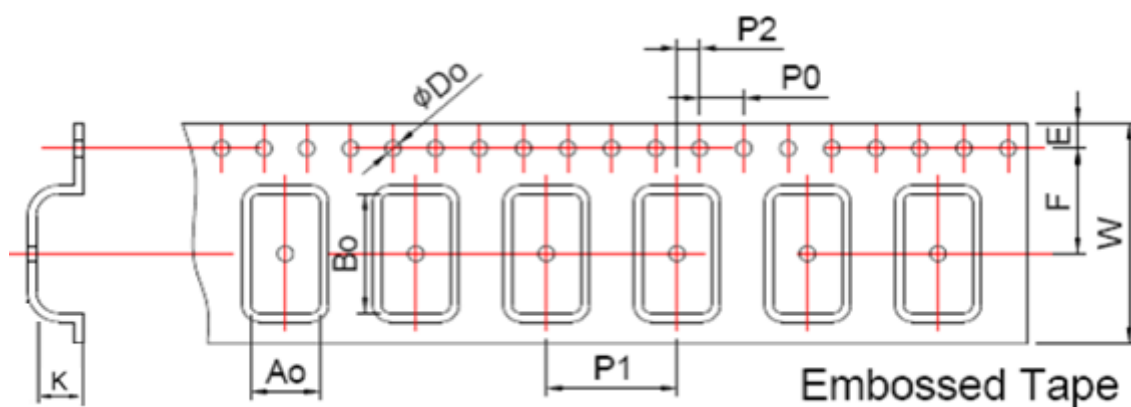
7. Number of Package

	EBR25	EBR39	EBR59
Pieces	4000	3000	1500

8. Label



9. Packaging



Packing	Type	A0	B0	W	F	E	P1	P2	P0	ϕD_0	K
Embossed	EBR25	3.6	6.7	12	5.5	1.75	8.0	2.0	4.0	1.5	1.7
	EBR39	5.7	10.5	16	7.5	1.75	8.0	2.0	4.0	1.5	2.25
	EBR59	8.3	15.6	24	11.5	1.75	12.0	2.0	4.0	1.5	2.4
Tolerance		±0.1	±0.1	±0.3	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1

Unit: mm



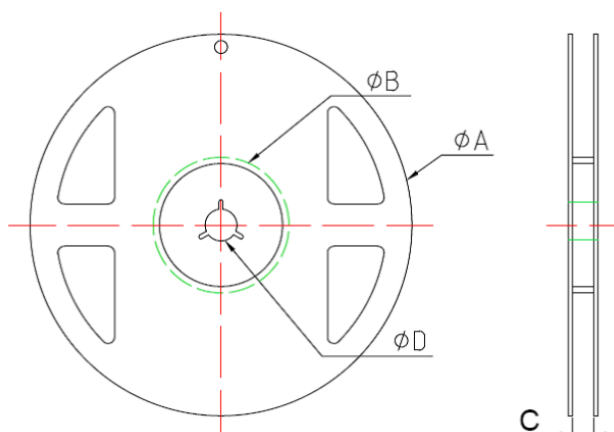
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10. Reel Specification



Series	ϕA	ϕB	C	ϕD
EBR25	330 ± 2.0	100 ± 1.0	12.0 ± 1.0	13.0 ± 0.2
EBR39			16.0 ± 1.0	
EBR59			24.0 ± 1.0	

Unit: mm

11. Storage Conditions

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

12. Shelf Life

2 years from manufacturing date.



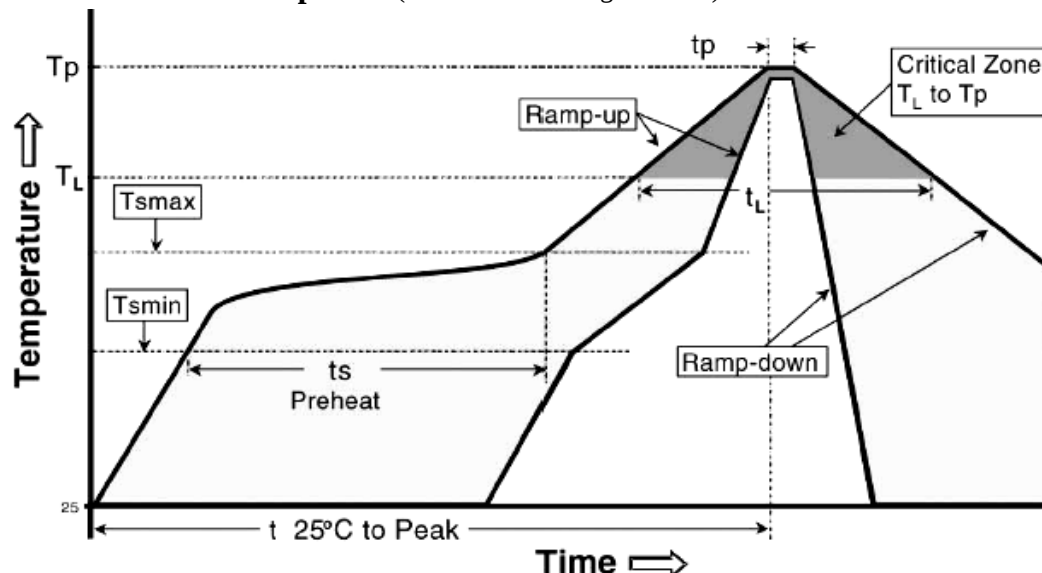
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13. Recommend IR – Reflow profile (solder: Sn96.5 / Ag3 / Cu0.5)



Allowed Re-flow times: 3 times

**Remark: To avoid discoloration phenomena of chip on terminal electrodes,
please use N2 Re-flow furnace.**

Iron Solder: 350±10°C, 3+1/-0 sec, 1 time

Profile Feature	Lead (Pb)-Free Assembly
Average ramp-up rate (Tsmax to Tp)	3°C / second max.
Preheat - Temperature Min (T _{min}) - Temperature Max (T _{max}) - Time (T _{min} to T _{max}) (ts)	150°C 200°C 60 -120 seconds
Time maintained above: - Temperature (T _L) - Time (T _L)	217°C 60-150 seconds
Peak Temperature (Tp)	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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14. 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.

15. Manufacturing Country & City

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