



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

Document No	TEBR-XX0S002A
Issued date	2017/12/21
page	1/7

## 1. Scope :

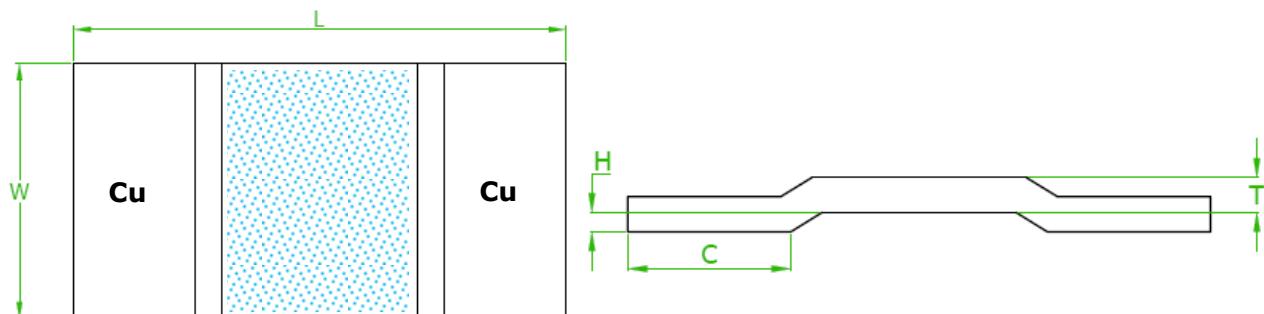
This specification applied to the products of Lead-Free current sensing resistor of metal alloy for Lead-Free EBR series manufactured by TA-I TECHNOLOGY CO.,LTD.

## 2. Type Designation :

EBR59	F	E	R001
<b>Series No.</b>	<b>Tolerance</b>	<b>Package</b>	<b>Resistance</b>
39→3920 59→5930	F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$	E= Embossed	R001=1 mΩ R50M=0.5 mΩ

Note: Load capacity (Power) refer 4.0 on page 2

## 3. Dimension :



Series	L	W	C	H	T
EBR59	15.00 $\pm$ 0.20	7.6 $\pm$ 0.40	4.2 $\pm$ 0.3	0.5 $\pm$ 0.1	Refer 4.0 on page 2
EBR39	10.00 $\pm$ 0.30	5.2 $\pm$ 0.30	2.2 $\pm$ 0.2	0.5 $\pm$ 0.1	Refer 4.0 on page 2

UNIT : mm



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Document No	TEBR-XX0S002A
Issued date	2017/12/21
page	2/7

**4. Features:**

Series	Size	Resistance Value (mΩ)	T Thickness (mm)	P <sub>70</sub> Power (W)	Operation Temperature Range	TCR (ppm/°C)	Tolerance
EBR39	3920	0.2	1.50±0.1	5	-55°C ~+170°C	±50	±1% ±2% ±5%
		0.3	1.35±0.1	5			
		0.5	0.81±0.1	5			
		1	1.22±0.1	4			
		2	0.62±0.1	4			
		3	0.41±0.1	4			
EBR59	5930	0.2	1.5±0.1	6			
		0.5	0.6±0.1	6			
		1	0.94±0.1	6			
		2	0.46±0.1	5			
		3	0.31±0.1	5			



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Document No	TEBR-XX0S002A
Issued date	2017/12/21
page	3/7

## 5. Reliability Tests:

Test Items	Reference	Condition of Test	Test Limits
Temperature Coefficient of Resistance	IEC60115-1 4.8	+25 ~ 125°C	Refer 4.0
High Temperature Exposure(Storage)	MIL-STD-202 Method 108	T=125°C,1000hrs,Measurement at 24hrs after test conclusion.	< ±1%
Low temperature operation	IEC60115-1 4.23.4	-55 °C for 45 min	< ±1%
Temperature Cycling	JESD22 Method JA-104	1000Cycle (-55°C to 125 °C),Measurement at 24hrs after test conclusion.	< ±1%
Short time overload	IEC60115-1 4.13	5 X rated power for 5s	< ±0.5%
Biased Humidity	MIL-STD-202 Method 103	10% Rated voltage at 85 °C,RH:85% ,1000Hrs, Measurement at 24hrs after test conclusion.	< ±0.5%
Operation life	MIL-STD-202 Method 108	1000 h at +70 °C, 1.5 h “ON”, 0.5 h “OFF”	< ±1%
Resistance to Soldering Heat	IEC60115-1 4.18	T=260+/-5°C solder,10+/-1 sec dwell	< ±0.5%
Mechanical Shock	MIL-STD-202 Method 213	100g's , Normal duration is 6ms , half sine shock pulse	< ±0.5%
Resistance to vibration	MIL-STD-202 Method 204	5g's for 20min.12cycles, 10-2000Hz	<±0.5%
Board Flex	AEC-Q200-005	Min 2mm deflection ,60sec.	< ±0.5%
Flammability	UL-94	V-0 or V-1are acceptable, Electrical test not required	

### 5.1 Rated Current & Voltage

The rated Current and Voltage are calculated by the following formula:

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

I: Rated Current (A)

P: Rated Power W)

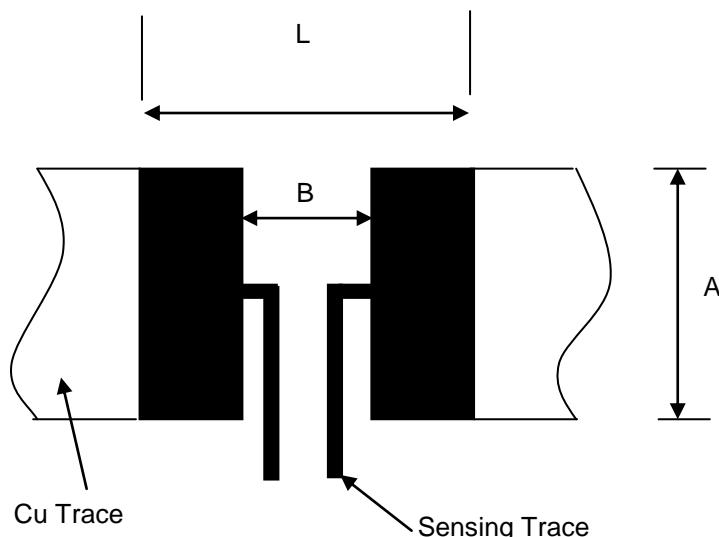
R: Resistance Value( $\Omega$ )



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Document No	TEBR-XX0S002A
Issued date	2017/12/21
page	4/7

## 6. Recommended Solder Pad Dimension

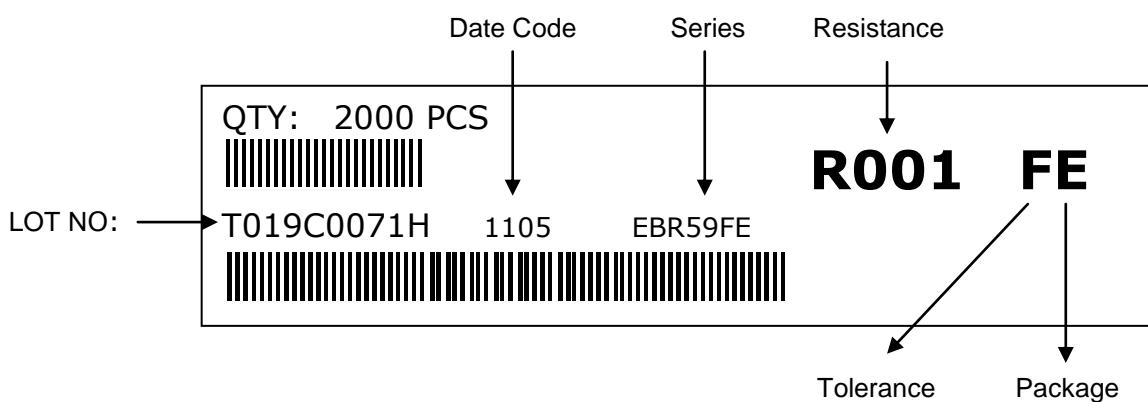


Unit: mm

Series	Resistance (mΩ)	A	L	B
EBR39	0.2 ~ 3	6.2	11	5.6
EBR59	0.2 ~ 3	8.75	16	5.6

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

## 7. Label:

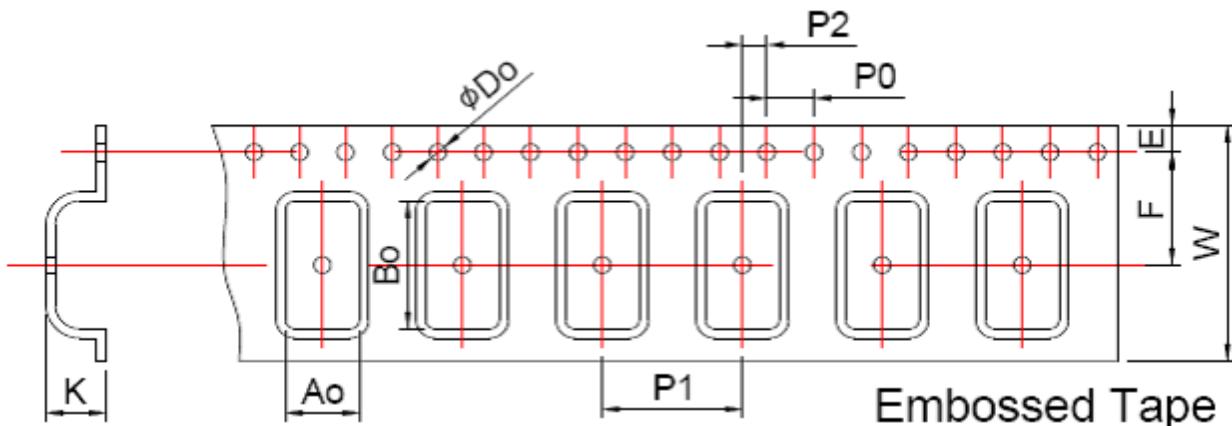




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AEC-Q 200-Ver D qualified**

Document No	TEBR-XX0S002A
Issued date	2017/12/21
page	5/7

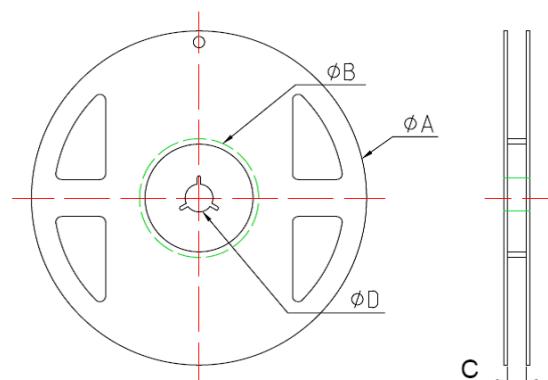
## 8. Package



Tape packaging dimension											Unit: mm
Packing	Type	$A_0$	$B_0$	$W$	$F$	$E$	$P_1$	$P_2$	$P_0$	$D_0$	$K$
Embossed Tape	3920	6.0	11.0	24.0	11.2	1.55	12.0	6.0	12.0	1.5	2.0
	5930	8.3	15.6	24.0	10.8	1.55	12.0	6.0	12.0	1.5	2.4
Tolerance		$\pm 0.2$	$\pm 0.20$	$\pm 0.20$	$\pm 0.10$						

## 9. Reel Specification

Number of Package		
Series	EBR39	EBR59
Pieces/Package	2500	2000



Series	$\phi A$	$\phi B$	$\phi C$	D
5930	$330 \pm 2.0$	$100 \pm 1.0$	$25.2 \pm 0.5$	$13.0 \pm 0.2$

## 10. Storage Conditions:

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

## 11. Shelf Life:

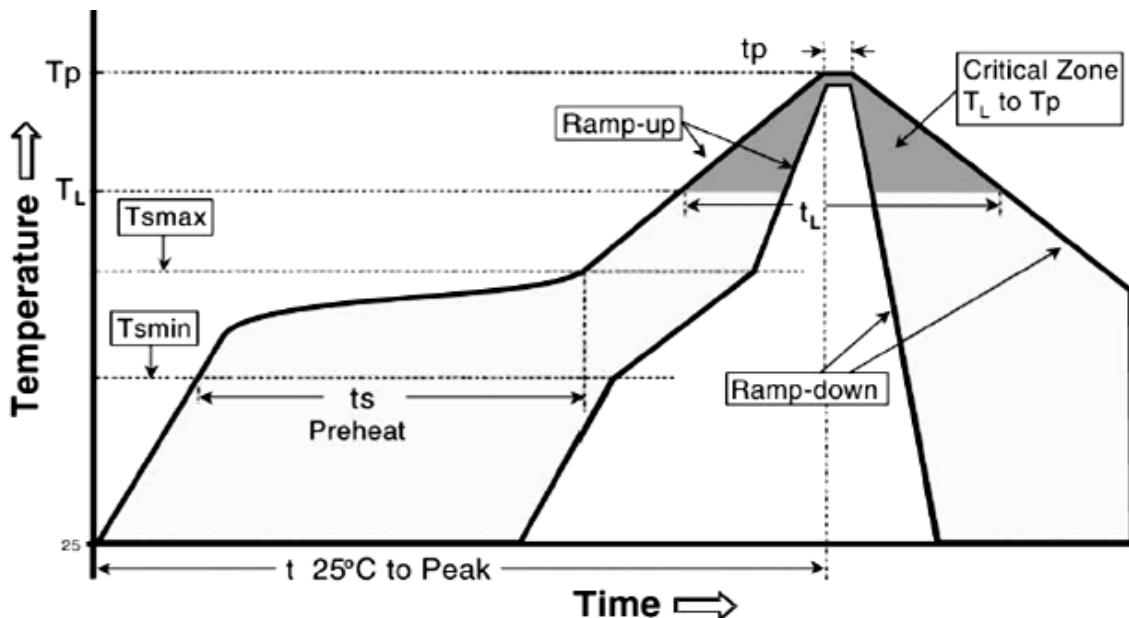
2 years from manufacturing date.



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Document No	TEBR-XX0S002A
Issued date	2017/12/21
page	6/7

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



**Alloyed 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 (Ts <sub>min</sub> to Tp)	3°C / second max.
Preheat - Temperature Min (Ts <sub>min</sub> ) - Temperature Max (Ts <sub>max</sub> ) - Time (Ts <sub>min</sub> to Ts <sub>max</sub> ) (ts)	150°C 200°C 60 -150 seconds
Time maintained above : - Temperature (T <sub>L</sub> ) - Time (T <sub>L</sub> )	217°C 60-120 seconds
Peak Temperature (Tp)	260°C
Time within ${}^{+0}_{-5}$ °C of actual Peak Temperature (tp) <sup>2</sup>	10 seconds
Ramp-down Rate	6°C/second max.
Time 25°C to Peak Temperature	8 minutes max.



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Document No	TEBR-XX0S002A
Issued date	2017/12/21
page	7/7

### 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.