

## CSB Series Datasheet

Shunt Open Frame Surface Mount Resistor

### APPLICATIONS

- Automotive
- Industrial
- Power & Energy

### FEATURES

- High Conductivity Copper Terminals
- Excellent Long-term Stability
- Flame Resistance
- Solid Metal Construction
- AEC-Q200 Qualified
- RoHS e REACH Compliant

### ORDERING CODE - Example

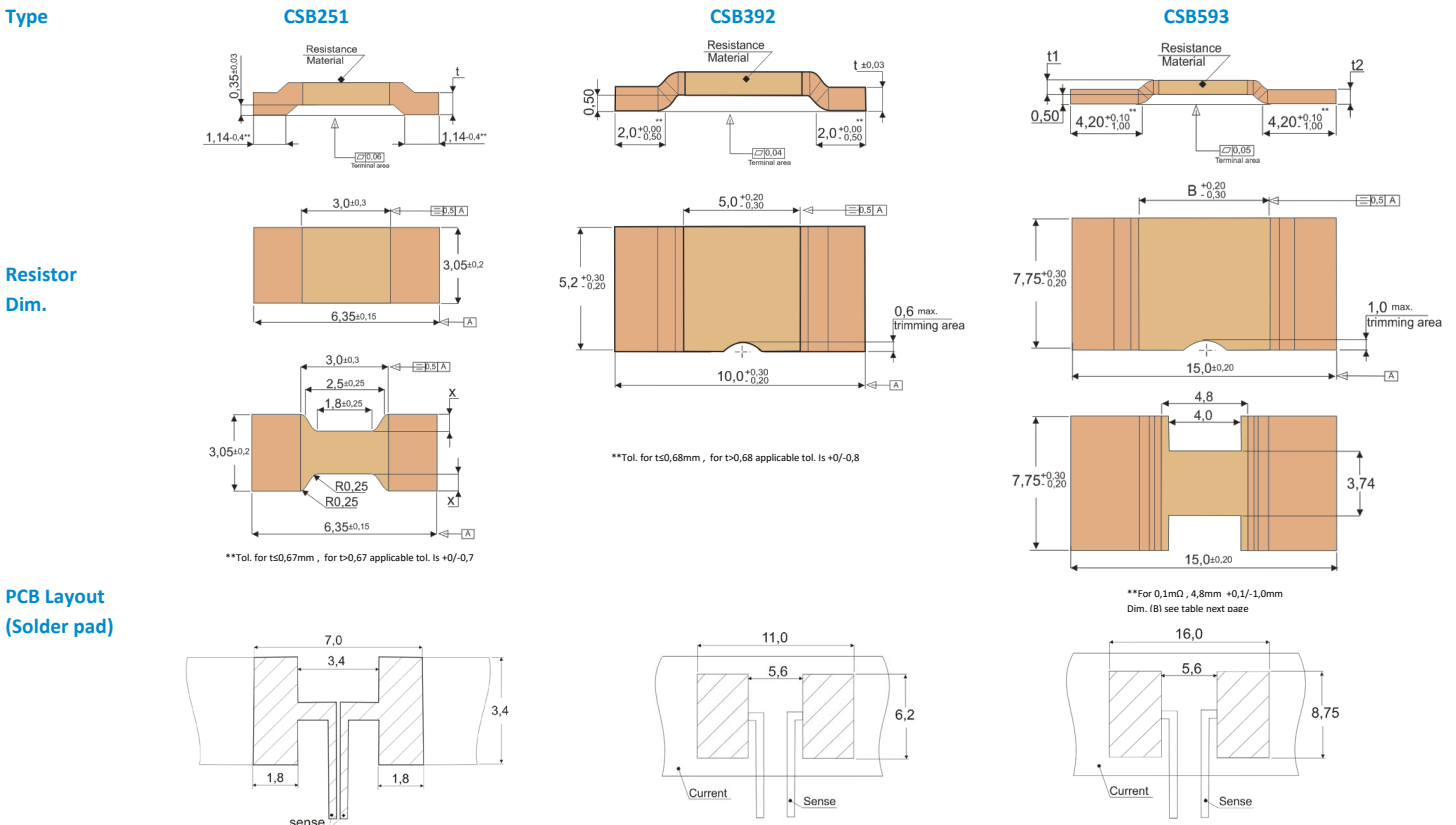
CSB	251	F	K	-	13-	R002	AA
Type	Size	Tol.	Pack-Code	TC	Reel diam.	*R Value	
	251=2512 392=3921 593=5931	F = ±1% H = ±3% J = ±5%	Blister tape	Base on spec.	13- inch		AA = Standard 50 = Special

\*0.2 mΩ to 4 mΩ there are 3~4 digits indicated the resistance value. Letter R/L is decimal point (L2 = 0.0002Ω, 0R001 = 1mΩ)

### TECHNICAL DATA

Type / Size		CSB251	CSB392	CSB593
Nominal Power Rating $P_{70}$	[W]	Up to 4.3	Up to 12	Up to 15
Resistance Range (Preferred values)	[Ω]	R0, R0003, R0005, R001, R0013, R002, R003, R004, R005, R0068, R01	R0002, R0003, R0005, R0007, R001, R0015, R002, R0025, R003, R004, R005	R0001, R0002, R0003, R0004, R0005, R0006, R001, R002
Tolerances	±[%]	F = 1%, H = 3%, J = 5%		
Temperature Coefficient	[ppm/°C]	See table		
Operating Temperature Range	[°C]	-55 ... +170		
Inductance	[nH]	< 2	< 3	< 3
Max. working voltage	[V] <sub>RMS</sub>	$\sqrt{P_{70} \times R}$		

### DIMENSIONS [mm]



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## PERFORMANCE DATA

Type		CSB251	CSB392	CSB593
Derating Linear	[°C]	70...170 (0W)		
Short Time Overload <i>(U=5 * √P<sub>70</sub> * R<sub>1</sub> 5[s])</i>	±[%]	1,0		
Resistance to Soldering Heat <i>IEC60115-1 clause 4.18 (260<sup>±5</sup>[°C], 3,5<sup>±1</sup>[s])</i>	±[%]	N.A.		
Low Temperature Storage <i>-65[°C] 24[H]</i>	±[%]	0,2		
High Temperature Exposure <i>Mil-STD-202 Method 108 +170[°C] 1000[H]</i>	±[%]	1		
Rapid change of temperature <i>IEC60115-1 clause 4.19 and IEC60068-2-14 (30 [min] -55 [°C] and 30 [min] +150 [°C])</i>	±[%]	0,5		
Biased Humidity <i>MIL-STD-202 Method 103 (85[°C], 85[%RH] 1.000[h])</i>	±[%]	0,5		
Vibrations <i>Mil-STD-202 Method 204 (10 to 2000 [Hz], 5 [G] for 20 [min], 12 cycles, each of 3 orientation)</i>	±[%]	0,2		
Mechanical Shock <i>Mil-STD-202 Method 213 (100 [G],6[ms], Half sine)</i>	±[%]	0,2		
Solderability <i>IEC60068-2-20 and J-STD-002</i>		Solder bath method (> 95% coverage)		
Stability deviation <i>* Tt = Terminal Temperature</i>	±[%]	< 0.5 after 2000 Hours * T <sub>t</sub> = 110°C		
		< 1.0 after 2000 Hours * T <sub>t</sub> = 140°C		

## ELECTRICAL SPECIFICATIONS

Type	Value [mΩ]	Resistance values	Thickness t [mm]	TCR [ppm]	P <sub>70</sub> [W]	P <sub>100</sub> [W]	Material	Resistive alloy TCR [ppm]	
CSB251 [AA = Standard]	0.0	R0	0,42	---	---	---	Tin Plated Copper	---	
	0.3	L3	0,95	< 100	4,3	3,0	Copper Manganese MC2Alloy	<±10	
	0.5	L5	0,85	< 75	4,3	3,0			
	1.0	R001	0,42	< 50	4,3	3,0	Copper Manganese 43 Alloy	<±10	
	1.3	1L3	0,33		4,3	3,0			
	2.0	R002	0,67		4,3	3,0	Aluchrom Alloy		<-25
	3.0	R003	0,45		2,9	2,0			
	4.0	R004	0,33		2,9	2,0			
	5.0	R005	0,33	2,1	1,5				
	6.8	6L8	0,33	2,1	1,5				
10	R01	0,33	1,4	1,0					

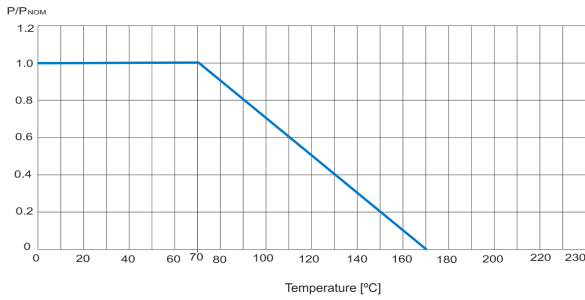
Type	Value [mΩ]	Resistance values	Thickness t [mm]	TCR [ppm]	P <sub>70</sub> [W]	P <sub>100</sub> [W]	Material	Resistive alloy TCR [ppm]	
CSB392 [AA = Standard]	0.2	L2	1,42	< 150	12	5	Copper Manganese MC2Alloy	<±10	
	0.3	L3	1,42	< 100	10	5			
	0.5	L5	0,84	< 70	9	5	Copper Manganese 43 Alloy		
	0.7	L7	0,60	< 60	8	5			
	1.0	R001	0,42	< 50	7	4	Aluchrom Alloy		<-25
	1.5	1L5	0,91		7	4,5			
	2.0	R002	0,68		6	4			
	2.5	2L5	0,54		5	3,5			
	3.0	R003	0,45		5	3			
	4.0	R004	0,34	4	2,5				
5.0	R005	0,27	3	2					

Type	Value [mΩ]	Resistance values	Thickness t1	t2	TCR [ppm]	P <sub>70</sub> [W]	P <sub>100</sub> [W]	B [mm]	Material	Resistive alloy TCR [ppm]
CSB593 [AA = Standard]	0.1	L1	1,42	1,42	< 100	15	10	3,7	Copper Manganese MC2Alloy	<±10
	0.2	L2	1,40	1,40		15	10	5,0		
	0.3	L3	0,93	0,93		10	7	5,0	Copper Manganese 43 Alloy	
	0.4	L4	0,72	0,72	9	6,5	5,0			
	0.5	L5	0,56	0,56	< 75	8	6	5,0	Copper Manganese 43 Alloy	
	0.6	L6	0,47	0,47	8	6	5,0			
	1.0	R001	0,91	0,91	< 50	9	6	5,0	Aluchrom Alloy	
2.0	R002	0,46	0,70		7	4	5,0			
CSB593 [S0 = Special]	0.5	L5	1,62	1,42	< 75	10	7	4,4	Aluchrom Alloy	<-25

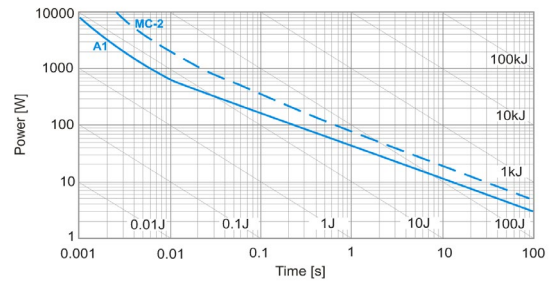
# CSB Series Datasheet

## PERFORMANCE GRAPHS

**Power Derating Curve**

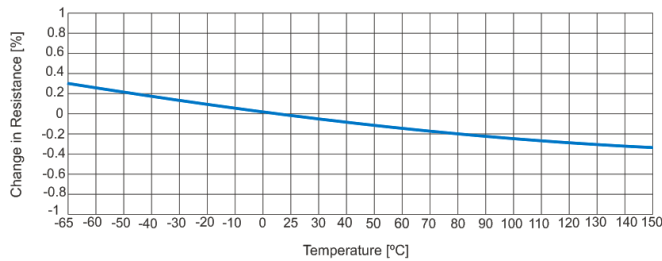


**Pulse Power Curve**



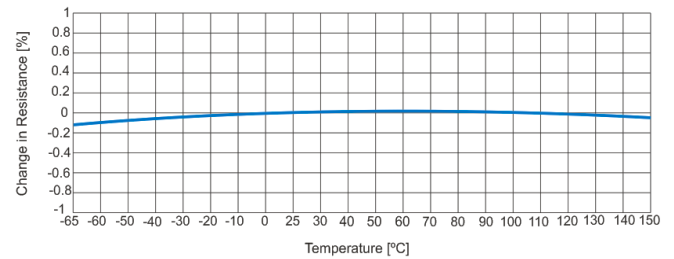
**Resistance Change vs Temperature**

Typical Resistance Drift (A1 Alloy)



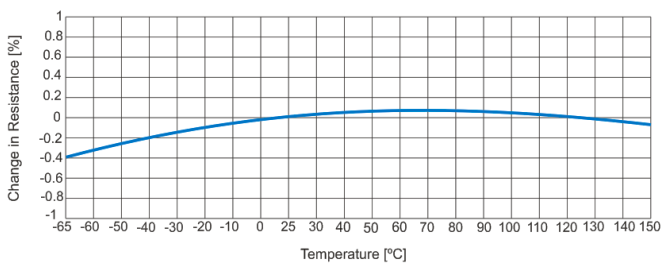
**Resistance Change vs Temperature**

Typical Resistance Drift (Copper Manganese MC-2)



**Resistance Change vs Temperature**

Typical Resistance Drift (Copper Manganese 43 Alloy)



## MARKING

The resistors marking will follow below concept:

4 digits where "R" designates the decimal location in ohms, e.g. 1mΩ the product marking is R001.

4 digits where "m" designates the decimal location in milli-ohms, e.g. 0.2mΩ the product marking is 0m2, 0.5mΩ the product marking is 0m50.

0.2mΩ , 0.3mΩ , 0.5mΩ



The "m" is used as a decimal point ; the other 3 digits are significant and the unit is milliohm 0.2mΩ to 0.5mΩ

1 ~ 4mΩ

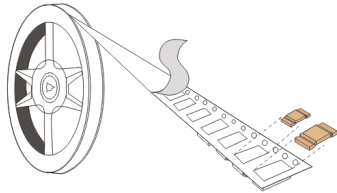


The "R" is used as a decimal point ; the other 3 digits are significant 1mΩ to 4mΩ

# CSB Series Datasheet

## PACKAGING

The standard packaging CSB dimensions below (blister tape [mm]).



Tape and reel information			
Specification : IEC60286-3			
	Tape width [mm]	Reel size	Parts per reel
CSB251	12	330 = 13"	5000
CSB392	16		3000
CSB593	24		2000