



# CSM Series Datasheet

SMD power shunt resistor  
Current sensor Open Frame

## APPLICATIONS

- Automotive
- Industrial
- Power & Energy

## FEATURES

- Solid Metal Construction
- High Conductivity Copper Connectors
- 2 Watts Permanent Power (3.0mΩ)
- Constant Current up to 26 amps (3.0mΩ)
- Flame Resistant
- AEC-Q200 Qualified
- Excellent Long-term Stability
- RoHS & REACH Compliant

## ORDERING CODE - Example

CSM	452	F	K	-	13-	R002	AA
Type	Size	Tol.	Pack- Code	TC	Reel diam.	R Value	
	381=3812 452=4524	F = ±1% H = ±3% J = ±5%	Blister tape	Base on spec.	13-inch		AA = Standard

## TECHNICAL DATA

Type / Size		CSM381	CSM452
Nominal Power Rating $P_{70}$	[W]	2	5
Resistance Range (Preferred values)	[Ω]	R002, R003, R004, R005, R01, R015, R02, R025, R05	R001, R002, R0025, R003, R005, R01, R015, R025
Tolerances	±[%]	>R002 = 1, 3, 5, <R002 = 3, 5	
Temperature Coefficient	[ppm/°C]	See table	
Operating Temperature Range	[°C]	-55 ... +170	
Inductance	[nH]	< 10	
Max. working voltage	[V] <sub>RMS</sub>	$\sqrt{P_{70} \times R}$	

## DIMENSIONS [mm]

Type:

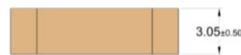
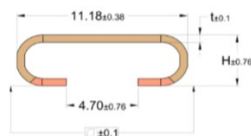


Resistor Dim.:

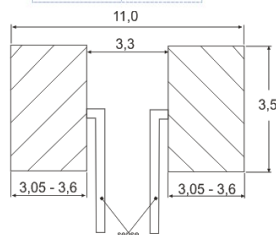
See table next page for t=thickness

PCB Layout (Solder pad):

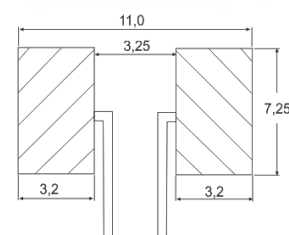
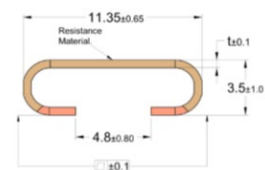
CSM381



Rating (mΩ)	H (mm)
>R003	3.05
R002, R003	3.51



CSM452



# CSM Series Datasheet

## PERFORMANCE DATA

Type		CSM381	CSM452
Short Time Overload <i>(U=5 * √P<sub>nom</sub> * R 5[s])</i>	±[%]	1	
Resistance to Soldering Heat <i>IEC60115-1 clause 4.18 and Mil-STD-202 Method 210 (260°C, 10[s])</i>	±[%]	0,5	
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>	±[%]	2	
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] for 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	
Marking <i>IEC60062</i>		Printed value	

## ELECTRICAL SPECIFICATIONS

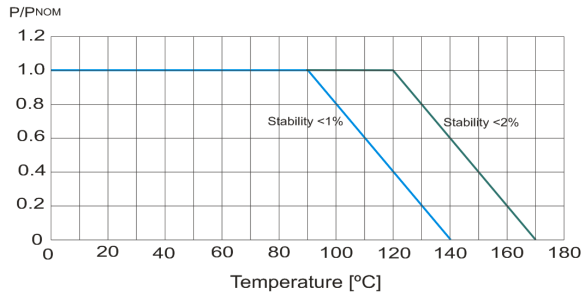
Type	Value [mΩ]	Resistance values	Thickness t	TCR [ppm]	P [W]	Material
CSM381	2	R002	0,50	< 100	2	Copper Manganese Alloy
	3	R003	0,50			
	4	R004	0,38			
	5	R005	0,30			
	10	R01	0,62			Aluchrom Alloy
	15	R015	0,41			
	20	R02	0,31			
	25	R025	0,25			
	50	R050	0,13			

Type	Value [mΩ]	Resistance values	Thickness t	TCR [ppm]	P [W]	Material
CSM452	1	R001	0,74	< 100	5	Copper Manganese Alloy
	2	R002	0,60			
	2L5	R0025	0,48			Copper Manganese Nickel Alloy
	3	R003	0,40			
	5	R005	0,24			
	10	R01	0,35			Aluchrom Alloy
	15	R015	0,23			
	25	R025	0,14			

# CSM Series Datasheet

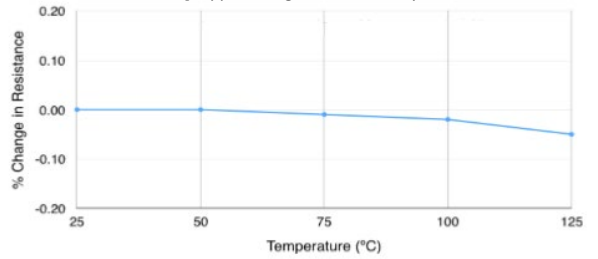
## PERFORMANCE GRAPHS

**Power Derating Curve**



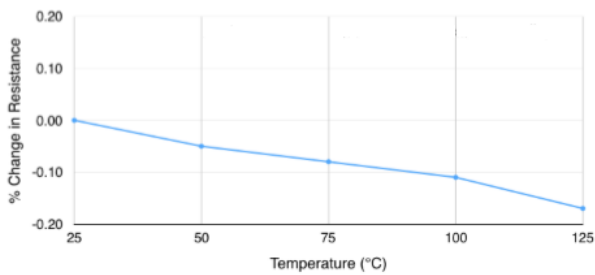
**Resistance Change vs Temperature**

[Copper Manganese CM4 Alloy]



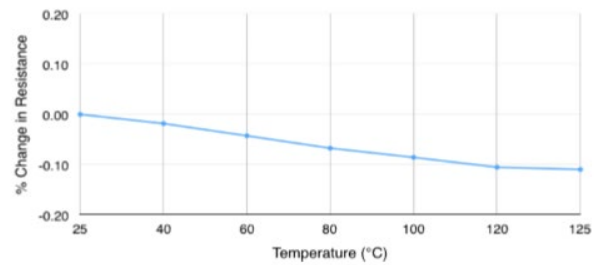
**Resistance Change vs Temperature**

[Copper Manganese Nickel CM3 Alloy]



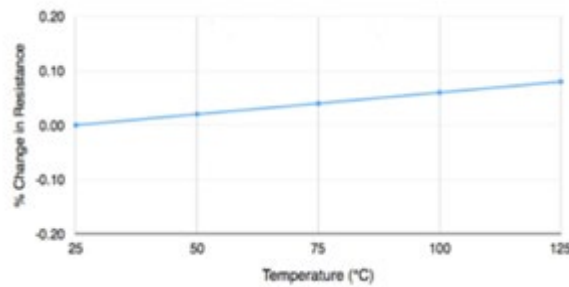
**Resistance Change vs Temperature**

[Typical Resistance Drift AC Alloy]



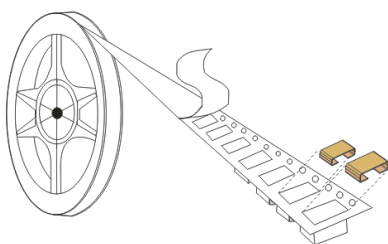
**Resistance Change vs Temperature**

[Copper Manganese Nickel Chrome Alloy]



## PACKAGING

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



Tape and reel information			
Specification : IEC60286-3			
	Tape width [mm]	Reel size [inch]	SPQ
CSM381	24	13	1500
CSM452	24	13	1100