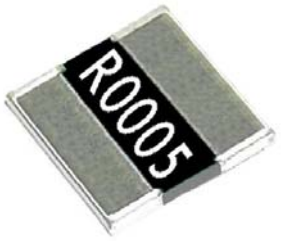
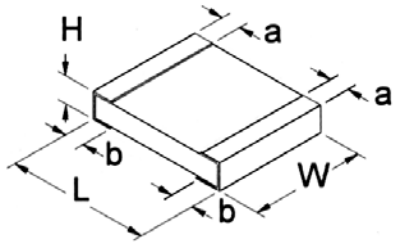
Features:

- High power metal alloy current sense resistor
- Very low inductance (0.5nH to 5nH)
- High temperature performance up to 225°C; for operation up to 275ºC, contact factory
- Excellent frequency response
- Low thermal EMF (<1µV/C)
- Proprietary processing technique produces extremely low resistance values
- RoHS compliant / lead-free



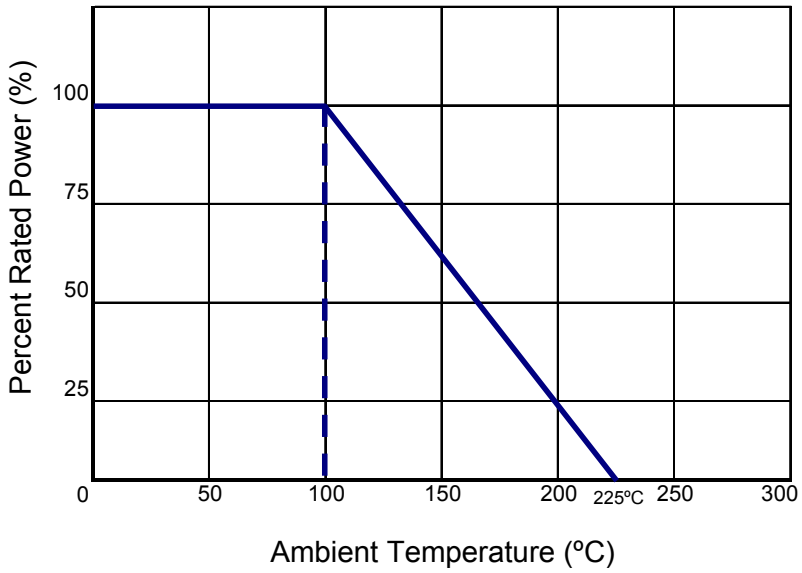
Electrical Specifications						
Type/Code	Maximum Power Rating (Watts)	Maximum Rating Current (A)	Maximum Overload Current (A)	TCR (ppm/ºC)	Ohmic Range (Ω) and Tolerance	
					0.5%	1%, 2%, 5%
CSS1206	1	31.62	63.25	±50 ppm/ºC ±25 ppm/ºC ±15 ppm/ºC	- 0.007 ~ 0.015 0.0151 ~ 0.05	0.001 ~ 0.004 0.0041 ~ 0.015 0.0151 ~ 0.05
CSS2010	1	31.62	63.25	±50 ppm/ºC ±25 ppm/ºC ±15 ppm/ºC	- - 0.007 ~ 0.1	0.001 ~ 0.003 0.0031 ~ 0.0069 0.007 ~ 0.1
CSS2512	2	63.25	141.42	±50 ppm/ºC ±25 ppm/ºC ±15 ppm/ºC	- - 0.007~ 0.075	0.0005 ~ 0.003 0.0031 ~ 0.0069 0.007 ~ 0.075
CSSH2512	3	77.46	134.16	±50 ppm/ºC ±25 ppm/ºC	- 0.007 ~ 0.01	0.0005 ~ 0.0025 0.0026 ~ 0.01
CSS2725	4	126.49	252.95	±50 ppm/ºC	-	0.00025 ~ 0.003
CSS2728	3	27.39	47.43	±25 ppm/ºC ±15 ppm/ºC	0.004 ~ 0.007 0.0071 ~ 0.1	0.004 ~ 0.007 0.0071 ~ 0.1
CSSH2728	4	31.62	63.25	±25 ppm/ºC ±15 ppm/ºC	0.004 ~ 0.007 0.0071 ~ 0.050	0.004 ~ 0.007 0.0071 ~ 0.050

Please refer to the High Power Resistor Application Note (page 5) for more information on designing and implementing high power resistor types.



Mechanical Specifications								
Type/Code	Maximum Power Rating (Watts)	Resistance Range (Ω)	L	W	H	a	b	Unit
CSS1206	1	0.001 - 0.05	0.126 ± 0.01 3.2 ± 0.254	0.063 ± 0.01 1.6 ± 0.254	0.0254 ± 0.01 0.645 ± 0.254	0.02 ± 0.01 0.508 ± 0.254	0.02 ± 0.01 0.508 ± 0.254	inches mm
CSS2010	1	0.001 - 0.003	0.2 ± 0.01 5.08 ± 0.254	0.1 ± 0.01 2.54 ± 0.254	0.031 ± 0.01 0.787 ± 0.254	0.051 ± 0.01 1.295 ± 0.254	0.051 ± 0.01 1.295 ± 0.254	inches mm
		0.0031 - 0.1	0.2 ± 0.01 5.08 ± 0.254	0.1 ± 0.01 2.54 ± 0.254	0.254 ± 0.01 0.645 ± 0.254	0.031 ± 0.01 0.787 ± 0.254	0.031 ± 0.01 0.787 ± 0.254	inches mm
CSS2512	2	0.0005 - 0.004	0.246 ± 0.01 6.248 ± 0.254	0.13 ± 0.01 3.302 ± 0.254	0.031 ± 0.01 0.787 ± 0.254	0.074 ± 0.01 1.88 ± 0.254	0.074 ± 0.01 1.88 ± 0.254	inches mm
		0.0041 - 0.075	0.246 ± 0.01 6.248 ± 0.254	0.13 ± 0.01 3.302 ± 0.254	0.0254 ± 0.01 0.645 ± 0.254	0.044 ± 0.01 1.118 ± 0.254	0.044 ± 0.01 1.118 ± 0.254	inches mm
CSSH2512	3	0.0005	0.246 ± 0.01 6.248 ± 0.254	0.13 ± 0.01 3.302 ± 0.254	0.031 ± 0.01 0.787 ± 0.254	0.074 ± 0.01 1.88 ± 0.254	0.074 ± 0.01 1.88 ± 0.254	inches mm
		0.0006 - 0.0029 & 0.0041 - 0.01	0.246 ± 0.01 6.248 ± 0.254	0.13 ± 0.01 3.302 ± 0.254	0.031 ± 0.01 0.787 ± 0.254	0.044 ± 0.01 1.118 ± 0.254	0.044 ± 0.01 1.118 ± 0.254	inches mm
		0.003 - 0.004	0.246 ± 0.01 6.248 ± 0.254	0.13 ± 0.01 3.302 ± 0.254	0.031 ± 0.01 0.787 ± 0.254	0.066 ± 0.01 1.676 ± 0.254	0.066 ± 0.01 1.676 ± 0.254	inches mm
CSS2725	4	0.00025, 0.0005	0.268 ± 0.01 6.807 ± 0.254	0.254 ± 0.01 6.452 ± 0.254	0.039 ± 0.01 0.991 ± 0.254	0.085 ± 0.01 2.159 ± 0.254	0.085 ± 0.01 2.159 ± 0.254	inches mm
		0.001	0.268 ± 0.01 6.807 ± 0.254	0.254 ± 0.01 6.452 ± 0.254	0.043 ± 0.01 1.092 ± 0.254	0.085 ± 0.01 2.159 ± 0.254	0.085 ± 0.01 2.159 ± 0.254	inches mm
		0.0015	0.268 ± 0.01 6.807 ± 0.254	0.254 ± 0.01 6.452 ± 0.254	0.039 ± 0.10 0.991 ± 0.254	0.085 ± 0.01 2.159 ± 0.254	0.085 ± 0.01 2.159 ± 0.254	inches mm
		0.002	0.268 ± 0.01 6.807 ± 0.254	0.254 ± 0.01 6.452 ± 0.254	0.035 ± 0.01 0.889 ± 0.254	0.071 ± 0.01 1.803 ± 0.254	0.071 ± 0.01 1.803 ± 0.254	inches mm
		0.0025	0.268 ± 0.01 6.807 ± 0.254	0.254 ± 0.01 6.452 ± 0.254	0.035 ± 0.01 0.889 ± 0.254	0.065 ± 0.01 1.651 ± 0.254	0.065 ± 0.01 1.651 ± 0.254	inches mm
		0.003	0.268 ± 0.01 6.807 ± 0.254	0.254 ± 0.01 6.452 ± 0.254	0.035 ± 0.01 0.889 ± 0.254	0.051 ± 0.01 1.295 ± 0.254	0.051 ± 0.01 1.295 ± 0.254	inches mm
CSS2728	3	0.004 - 0.1	0.264 ± 0.01 6.706 ± 0.254	0.283 ± 0.01 7.188 ± 0.254	0.039 ± 0.01 0.991 ± 0.254	0.045 ± 0.01 1.143 ± 0.254	0.045 ± 0.01 1.143 ± 0.254	inches mm
CSSH2728	4	0.004 - 0.1	0.264 ± 0.01 6.706 ± 0.254	0.283 ± 0.01 7.188 ± 0.254	0.039 ± 0.01 0.991 ± 0.254	0.045 ± 0.01 1.143 ± 0.254	0.045 ± 0.01 1.143 ± 0.254	inches mm

Power Derating Curve:



Performance Characteristics			
Test Item	Condition of Test	Test Method	Test Limits
Temperature Coefficient of Resistance (TCR)	TCR (ppm/ºC) = $\frac{(R2-R1)}{R1\ (T2-T1)} \times 10^6$ R1: resistance of room temperature (T1) R2: resistance of 150ºC (T2)	JIS C 5201-1 4.8	Per specification (refer to Electrical Specification table)
Short Time Overload	The number of rated power are as follows: 1. CSS1206-1W: 4 times rated power 2. CSS2010-1W: 4 times rated power 3. CSS2512-2W: 5 times rated power 4. CSSH2512-3W: 3 times rated power 5. CSS2725-4W: 4 times rated power 6. CSS2728-3W: 3 times rated power 7. CSSH2728-4W: 4 times rated power Rating power duration: 5 seconds	JIS C 5201-1 4.13	$(\Delta R/R1) \leq \pm 0.5\%$
Insulation Resistance	100±15V DC for 1 minute	JIS C 5201-1 4.6	$\geq 10^9 \Omega$
Dielectric Withstanding Voltage	Applied 500V AC for 1 minute and limit surge current 50mA (max)	JIS C 5201-1 4.7	Without break down

Operating Temperature Range: -55°C to +225°C. Contact factory for operation at higher temperatures.

How to Order

1	2	3	4	5	6	7	8	9	10	11	12	13
C	S	S	2	7	2	5	F	T	3	L	0	0

Product Series	
CSS	Metal Alloy
CSSH	High Power

Size	Power
1206	1W
2010	1W
2512	2W
(H)2512	3W
2725	4W
2728	3W
(H)2728	4W

Tolerance	
Code	Tol
D	0.5%
F	1%
G	2%
J	5%

Packaging			
Code	Description	Size	Quantity
T	7" Reel - Plastic Tape	1206	4,000
		2010, 2512 (H)2512	2,000
		2725, 2728 (H)2728	1,000

Resistance Value
Four characters with "L" used as multiplier of 10^{-3} for any value under 0.1 ohm.
0.00025 ohm = L250 0.0009 ohm = L900 0.003 ohm = 3L00

Legacy Part Number (before January 3, 2011):

SEI Type	Code	Nominal Resistance	Tolerance	Packaging
CSS	2725	0.003	1%	R

Type	Description
CSS	Metal Alloy
CSSH	High Power

Code	Wattage	Size
1206	1W	1206
2010	1W	2010
2512	2W	2512
(H) 2512	3W	2512
2725	4W	2725
2728	3W	2728
(H) 2728	4W	2728

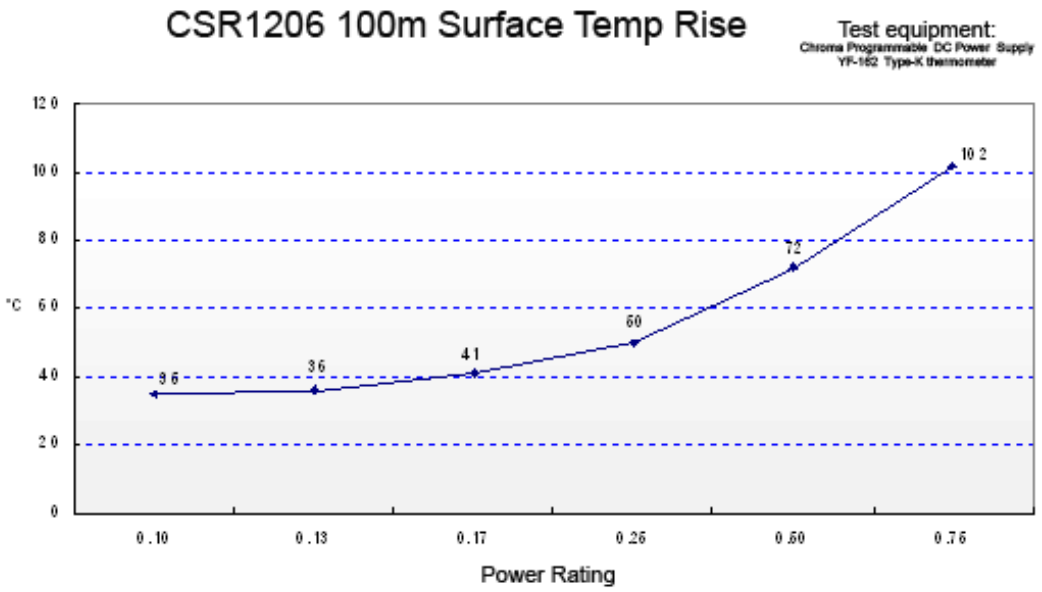
Tolerance
0.5%
1%
2%
5%

SEI Types	Quantity		Description
	Standard	Code	
CSS1206	4,000	R	7" reel plastic tape
CSS2010	2,000		
CSS2512			
CSSH2512			
CSS2725	1,000		
CSS2728			
CSSH2728			

High Power Chip Resistors and Thermal Management

Stackpole has developed several surface mount resistor series in addition to our current sense resistors, which have had higher power ratings than standard resistor chips. This has caused some uncertainty and even confusion by users as to how to reliably use these resistors at the higher power ratings in their designs.

The data sheets for the RHC, RMCP, RNCP, CSR, CSRN, CSRF, CSS, and CSSH state that the rated power assumes an ambient temperature of no more than 100 degrees C for the CSS / CSSH series and 70 degrees C for all other high power resistor series. In addition, IPC and UL best practices dictate that the combined temperature on any resistor due to power dissipated and ambient air shall be no more than 105C. At first glance this wouldn't seem too difficult, however the graph below shows typical heat rise for the CSR ½ 100 milliohm at full rated power. The heat rise for the RMCP and RNCP would be similar. The RHC with its unique materials, design, and processes would have less heat rise and therefore would be easier to implement for any given customer.



The 102 degrees C heat rise shown here would indicate there will be additional thermal reduction techniques needed to keep this part under 105C total hot spot temperature if this part is to be used at 0.75 watts of power. However, this same part at the usual power rating for this size would have a heat rise of around 72 degrees C. This additional heat rise may be dealt with using wider conductor traces, larger solder pads and land patterns under the solder mask, heavier copper in the conductors, vias through PCB, air movement, and heat sinks, among many other techniques. Because of the variety of methods customers can use to lower the effective heat rise of the circuit, resistor manufacturers simply specify power ratings with the limitations on ambient air temperature and total hot spot temperatures and leave the details of how to best accomplish this to the design engineers. Design guidelines for products in various market segments can vary widely so it would be unnecessarily constraining for a resistor manufacturer to recommend the use of any of these methods over another.

Note: The final resistance value can be affected by the board layout and assembly process, especially the size of the mounting pads and the amount of solder used. This is especially notable for resistance values ≤ 50 mΩ. This should be taken into account when designing.