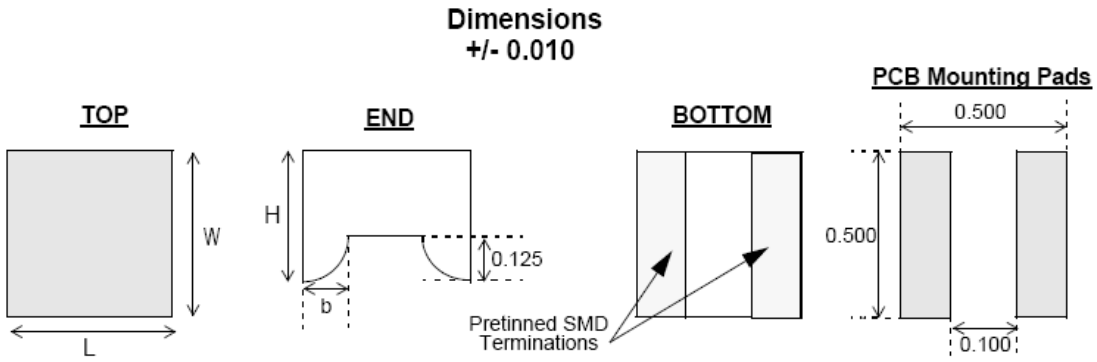
The HPC series represents a breakthrough in functional design, thermal management and end-user benefits. Borrowing from long-proven techniques used in power semiconductors, the HPC series provides up to eight times more useful power than SMD power resistors currently available.

The HPC series, through superior characterization, is intended to remove the mystery of managing board level power by combining established techniques in new ways. The result is superior technology in design options, in a cost effective package.

Features:
- Up to 12W with no external heat sinks
- Compatible with conventional pick and place
- Only 0.5 x 0.5 PCB footprint
- Non-inductive resistive element
- Anodized heat sink top provides 800V voltage withstanding
- Up to 50W for short duration
- Stackpole patent no. US 7,286,358 B2
- Available in 1% and 5% tolerance
- RoHS compliant

Electrical Specifications								
Type / Code	Power Rating (Watts) @ 40ºC w/400 LFM air flow	Power Rating (Watts) @ 40ºC no air flow	Maximum Working Voltage	Maximum Overload Voltage	Dielectric Strength	Inductance	Resistance Temperature Coefficient	Ohmic Range (Ω) and Tolerance
								1%, 5%
HPC12	12W	5W	200V	400V	1,500V	<2nH	±150 ppm/ºC	0.025 - 250K

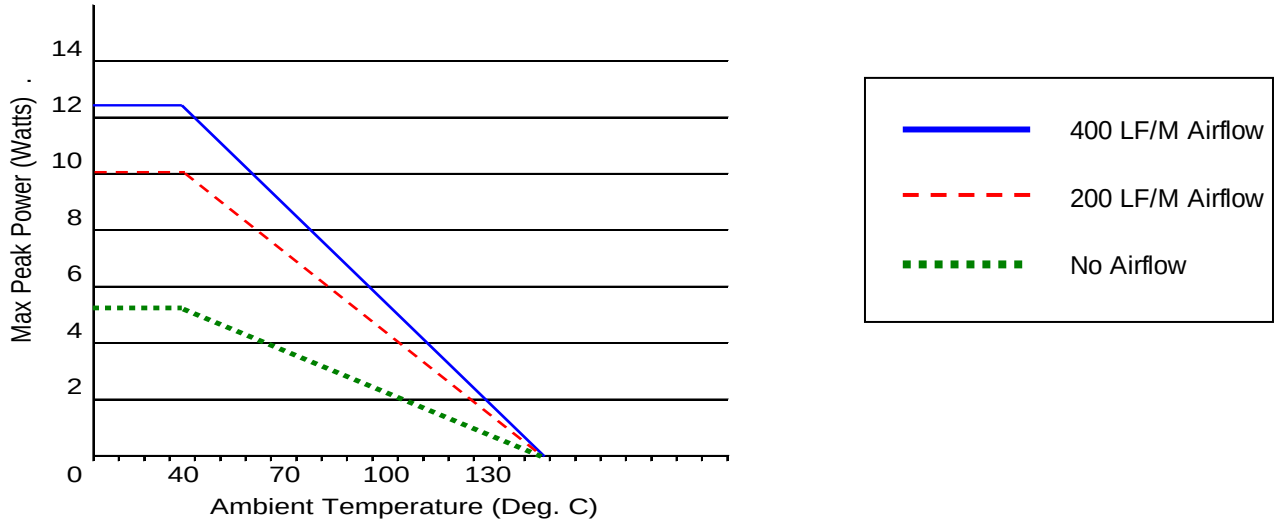
Please refer to the High Power Resistor Application Note (page 4) for more information on designing and implementing high power resistor types.



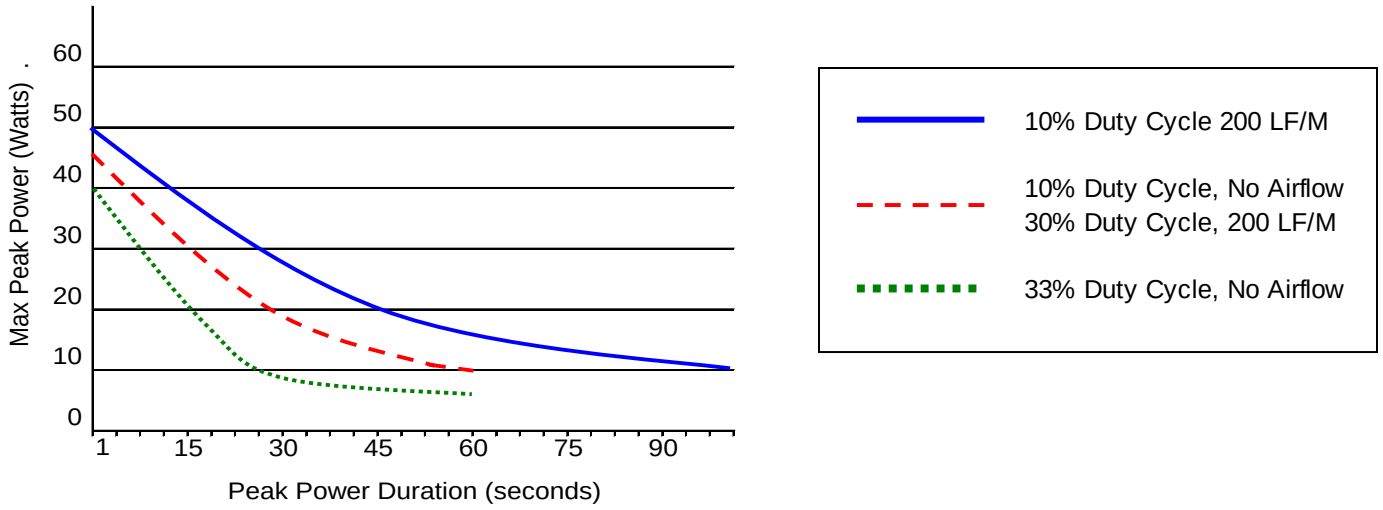
Mechanical Specifications					
Type / Code	L Body Length	W Body Width	H Body Height	b Bottom Termination	Unit
HPC12	0.48 12.19	0.50 12.70	0.40 10.16	0.11 2.79	inches mm

Performance Characteristics		
Test	Test Conditions (JIS C 5202)	Test Results
Short Time Overload	2.5x rated voltage for 5 seconds	±(2% + 0.1Ω)
Dielectric Withstanding Voltage	100VAC, 1 minute	±(1% + 0.05Ω)
Resistance to Soldering Heat	260ºC ±5ºC for 10 sec; ±0.5 sec (Solder Bath)	±(1% + 0.05Ω)
Solderability	235ºC ±5ºC for 2 sec.; ±0.5 sec (Colophonium flux)	95% coverage, minimum
Temperature Cycle	-65ºC: 30 min.; 25ºC: 2 to 3 min. 150ºC: 30 min.; 25ºC: 2 to 3 min. (5 cycles)	± (1% + 0.05Ω) Jumper (<0.05Ω)
Endurance (Damp load)	40ºC ± 2ºC, 90% to RH, rated load 90 min. ON, 30 min. OFF for 1,000 hrs. -0 hrs. / +48 hrs.	±(3% + 0.1Ω) Jumper (<0.05Ω)
Endurance (Rated load)	70ºC ± 2ºC, 90% to RH, rated load 90 min. ON, 30 min OFF for 1,000 hrs. -0 hrs. / +48 hrs.	±(3% + 0.1Ω) Jumper (<0.05Ω)
Voltage Coefficient	1/10 rated voltage for 3 sec. max. then rated voltage for 3 sec. max.	± 100 (ppm/V)
Robustness of Termination	Bend of 3mm for 5 ± 1 sec.	±(1% + 0.05Ω)

HPC12 Power Derating Curve



HPC12 Power vs. Duration



How to Order

1	2	3	4	5	6	7	8	9	10	11
H	**P**	**C**	**1**	**2**	**J**	**T**	**1**	**K**	**0**	**0**

Product Series	
HPC	High Power SMD

Size	Power
12	12W

Tolerance	
Code	Tol
F	1%
J	5%

Packaging			
Code	Description	Size	Quantity
T	Tape	12	200
B	Bulk		100

Resistance Value
Four characters with the multiplier used as the decimal holder. "L" used as multiplier of 10^{-3} for any value under 0.1 ohm.
0.025 ohm = 25L0 0.125 ohm = R125 0.1 ohm = R100 100 Kohm = 100K

Legacy Part Number (before January 3, 2011):

SEI Type	Code	Nominal Resistance	Tolerance	Packaging
HPC	**12**	**1K**	**5%**	**R**

Type	Description
HPC	High Power SMD

Code
12

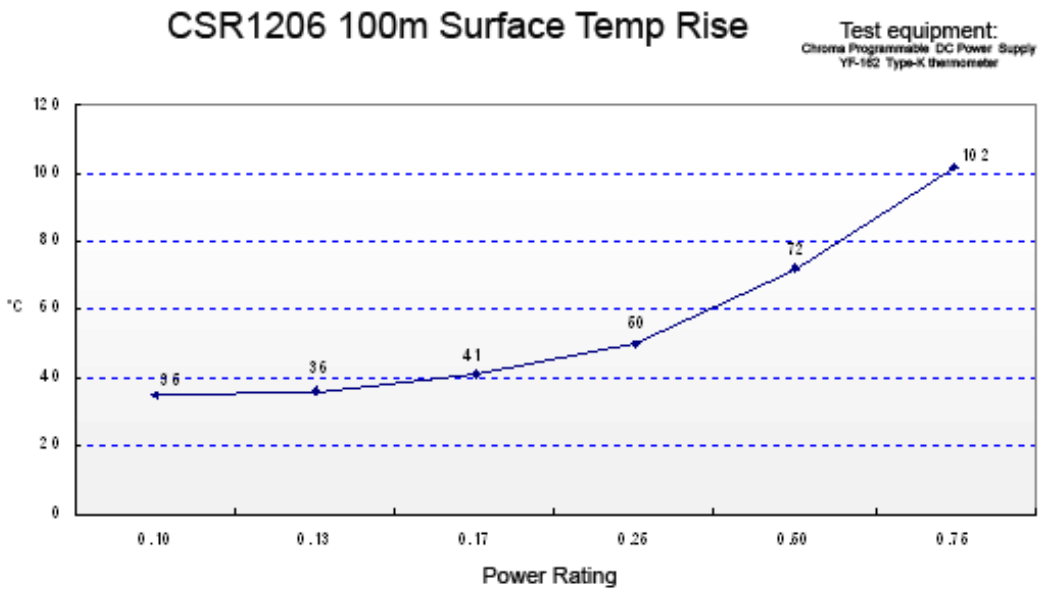
Tolerance
1%
5%

Types	Qty	Description	Code
HPC12	200	Tape	R
	100	Bulk	B

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.