

# High Current, High Frequency, Power Inductors

## HCP0805 Series



SMD Device

### Description:

- Halogen free
- 125°C maximum total temperature operation
- 7.6 x 7.9 x 5.0mm surface mount package
- Powder iron core material
- Magnetically shielded, low EMI
- High current carrying capacity, Low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 0.40 $\mu$ H to 2.2 $\mu$ H
- Current range from 10.0 to 32 amps
- Frequency range up to 2MHz
- RoHS compliant

### Applications:

- Voltage Regulator Module (VRM)
- Multi-phase regulators
- Desktop and servers
- Base station equipment
- Notebook regulators
- Data networking and storage systems
- Point-of-load modules
- Battery power systems
- DCR sensing

RoHS  
2002/95/EC

### Environmental Data:

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (Range is application specific)
- Solder reflow temperature: J-STD-020D compliant

### Packaging:

- Supplied in tape-and-reel packaging, 700 parts per reel, 13" diameter reel

### Product Specifications

Part Number <sup>6</sup>	OCL <sup>1</sup> $\pm$ 20% ( $\mu$ H)	FLL <sup>2</sup> Min. ( $\mu$ H)	I <sub>rms</sub> <sup>3</sup> (Amps)	I <sub>sat</sub> <sup>4</sup> @ 25°C (Amps)	DCR (m $\Omega$ ) @ 20°C	K-factor <sup>5</sup>
HCP0805-R40-R	0.40	0.26	20	32	3.1 $\pm$ 6.0%	376.0
HCP0805-R68-R	0.68	0.44	17.5	25	4.5 $\pm$ 6.0%	292.0
HCP0805-1R0-R	1.00	0.64	14.5	22	5.8 $\pm$ 6.0%	239.0
HCP0805-1R5-R	1.50	0.96	13.3	18	6.8 $\pm$ 6.0%	202.0
HCP0805-2R2-R	2.20	1.41	10	14	11.2 $\pm$ 6.0%	175.0

1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10V<sub>rms</sub>, 0.0A<sub>dc</sub>

2 Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1V<sub>rms</sub>, I<sub>sat</sub><sup>1</sup>

3 I<sub>rms</sub>: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.

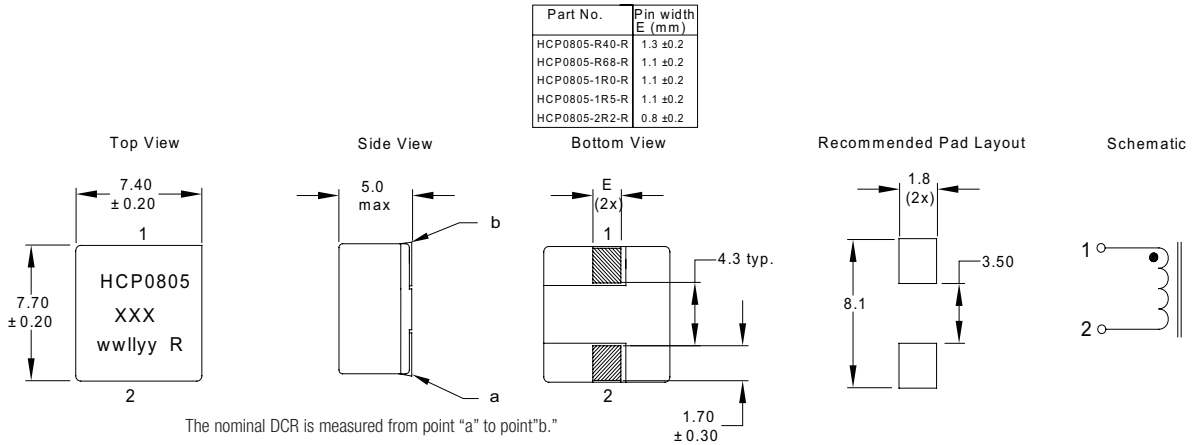
4 I<sub>sat</sub>: Peak current for approximately 20% rolloff at +25°C.

5 K-factor: Used to determine B<sub>p-p</sub> for core loss (see graph). B<sub>p-p</sub> = K \* L \*  $\Delta$ I. B<sub>p-p</sub>: (Gauss), K: (K-factor from table), L: (inductance in  $\mu$ H),  $\Delta$ I (peak-to-peak ripple current in amps).

6 Part Number Definition: HCP0805-xxx-R

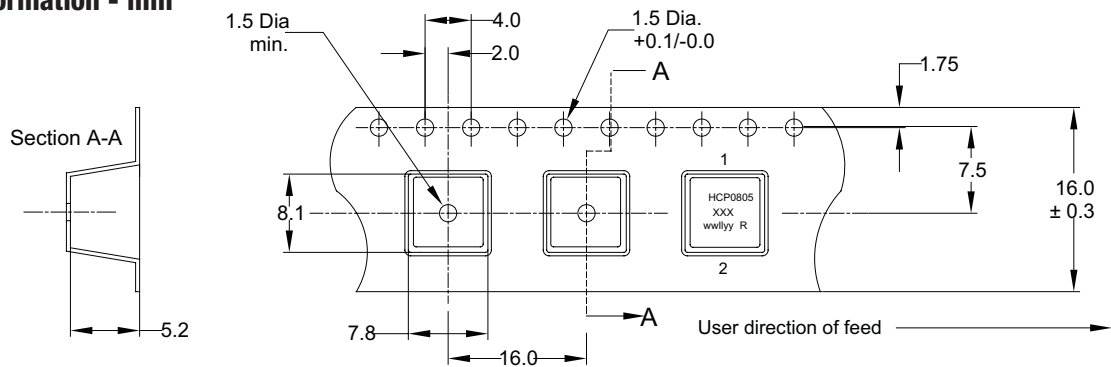
- HCP0805 = Product code and size
- xxx= Inductance value in  $\mu$ H, R = decimal point. If no "R" is present, then third character = # of zeros.
- "R" suffix = RoHS compliant

### Dimensions - mm



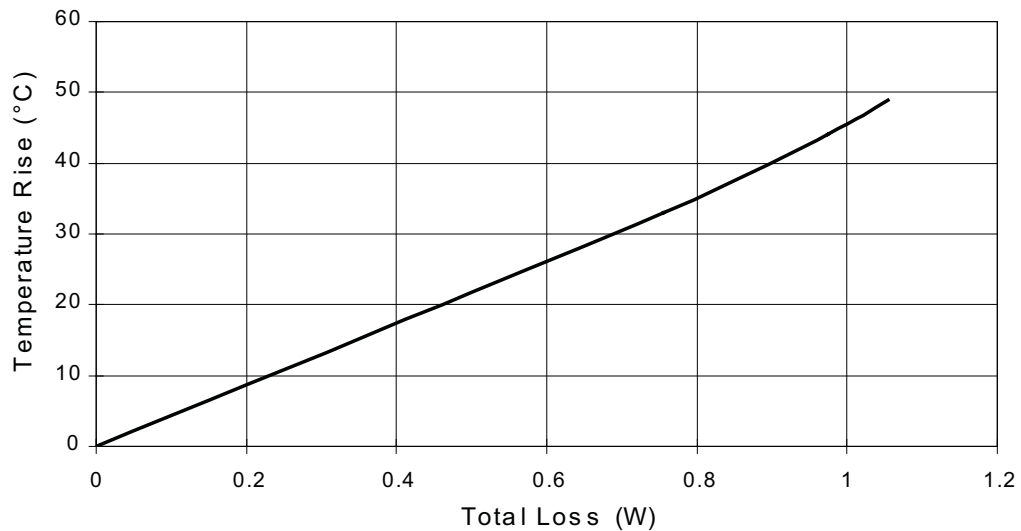
Part Marking: HCP0805      xxx = Inductance value in  $\mu\text{H}$ . (R = Decimal point). If no "R" is present, then last character is # Of zeros      wwllly = Date code      R = Revision level

### Packaging Information - mm



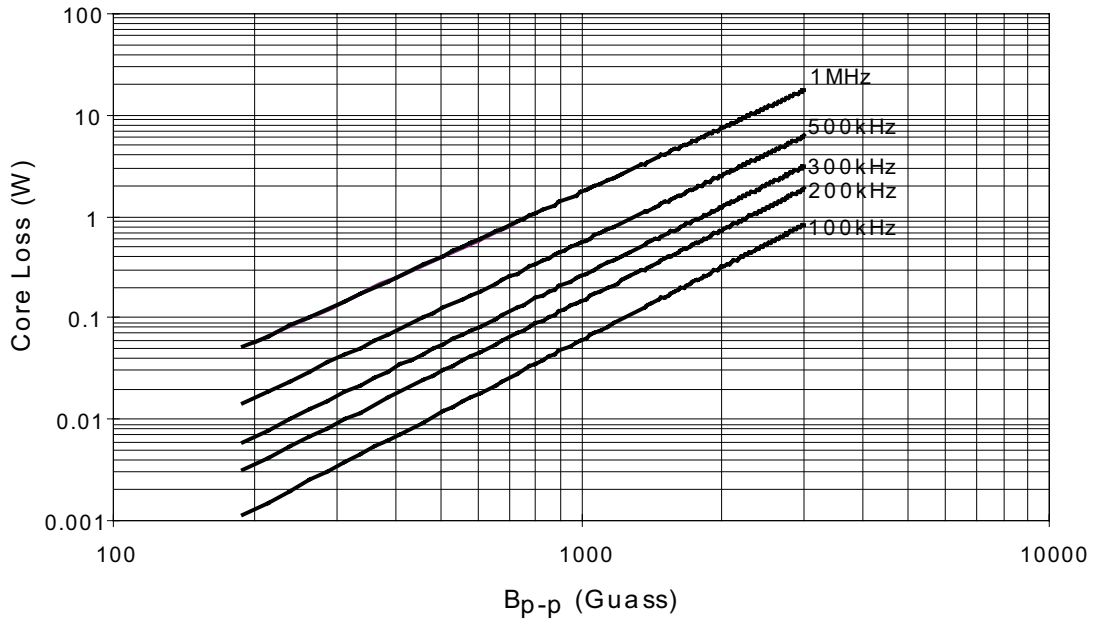
Supplied in tape-and-reel packaging, 700 parts per reel, 13" diameter reel.

### Temperature Rise vs. Total Loss



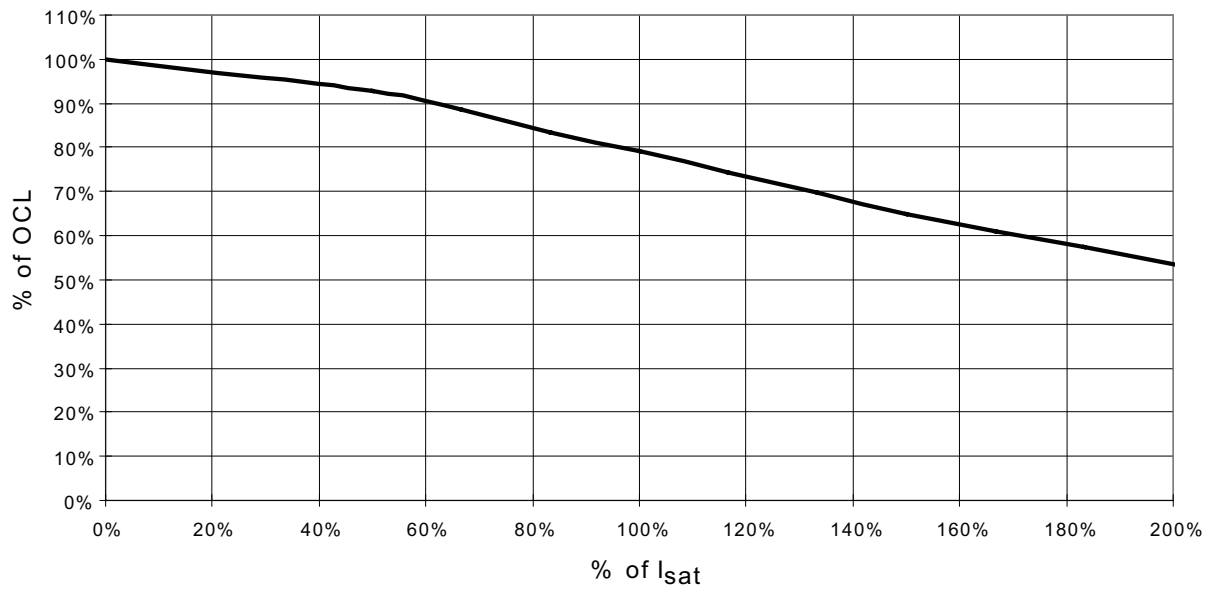
## Core Loss

Core Loss vs.  $B_{p-p}$



## Inductance Characteristics

% of OCL vs. % of  $I_{sat}$



## Solder Reflow Profile

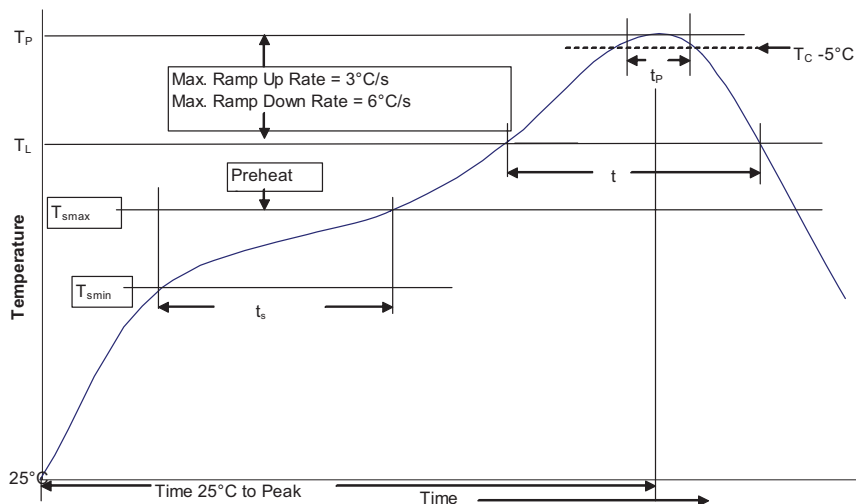


Table 1 - Standard SnPb Solder ( $T_c$ )

Package Thickness	Volume $\text{mm}^3$ <350	Volume $\text{mm}^3$ $\geq 350$
<2.5mm	235°C	220°C
$\geq 2.5\text{mm}$	220°C	220°C

Table 2 - Lead (Pb) Free Solder ( $T_c$ )

Package Thickness	Volume $\text{mm}^3$ <350	Volume $\text{mm}^3$ 350 - 2000	Volume $\text{mm}^3$ >2000
<1.6mm	260°C	260°C	260°C
1.6 - 2.5mm	260°C	250°C	245°C
>2.5mm	250°C	245°C	245°C

## Reference JDEC J-STD-020D

Profile Feature	Standard SnPb Solder	Lead (Pb) Free Solder
Preheat and Soak		
• Temperature min. ( $T_{smin}$ )	100°C	150°C
• Temperature max. ( $T_{smax}$ )	150°C	200°C
• Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	60-120 Seconds	60-120 Seconds
Average ramp up rate $T_{smax}$ to $T_p$	3°C/ Second Max.	3°C/ Second Max.
Liquidous temperature ( $T_L$ )	183°C	217°C
Time at liquidous ( $t_L$ )	60-150 Seconds	60-150 Seconds
Peak package body temperature ( $T_p$ )*	Table 1	Table 2
Time ( $t_p$ )** within 5 °C of the specified classification temperature ( $T_c$ )	20 Seconds**	30 Seconds**
Average ramp-down rate ( $T_p$ to $T_{smax}$ )	6°C/ Second Max.	6°C/ Second Max.
Time 25°C to Peak Temperature	6 Minutes Max.	8 Minutes Max.

\* Tolerance for peak profile temperature ( $T_p$ ) is defined as a supplier minimum and a user maximum.

\*\* Tolerance for time at peak profile temperature ( $t_p$ ) is defined as a supplier minimum and a user maximum.

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