

High Current, High Frequency, Power Inductors

HCP0805 Series



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 0.40μH to 2.2μH
- 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



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 ⁶ | OCL ¹ ± 20% (μH) | FLL ² Min. (μH) | I _{rms} ³ (Amps) | I _{sat} ⁴ @ 25°C (Amps) | DCR (mΩ) @ 20°C | K-factor ⁵ |
|--------------------------|-----------------------------|----------------------------|--------------------------------------|---|-----------------|-----------------------|
| HCP0805-R40-R | 0.40 | 0.26 | 20 | 32 | 3.1 ±6.0% | 376.0 |
| HCP0805-R68-R | 0.68 | 0.44 | 17.5 | 25 | 4.5 ±6.0% | 292.0 |
| HCP0805-1R0-R | 1.00 | 0.64 | 14.5 | 22 | 5.8 ±6.0% | 239.0 |
| HCP0805-1R5-R | 1.50 | 0.96 | 13.3 | 18 | 6.8 ±6.0% | 202.0 |
| HCP0805-2R2-R | 2.20 | 1.41 | 10 | 14 | 11.2 ±6.0% | 175.0 |

1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10V_{rms}, 0.0A_{dc}

2 Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1V_{rms}, I_{sat}¹

3 I_{rms}: 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.

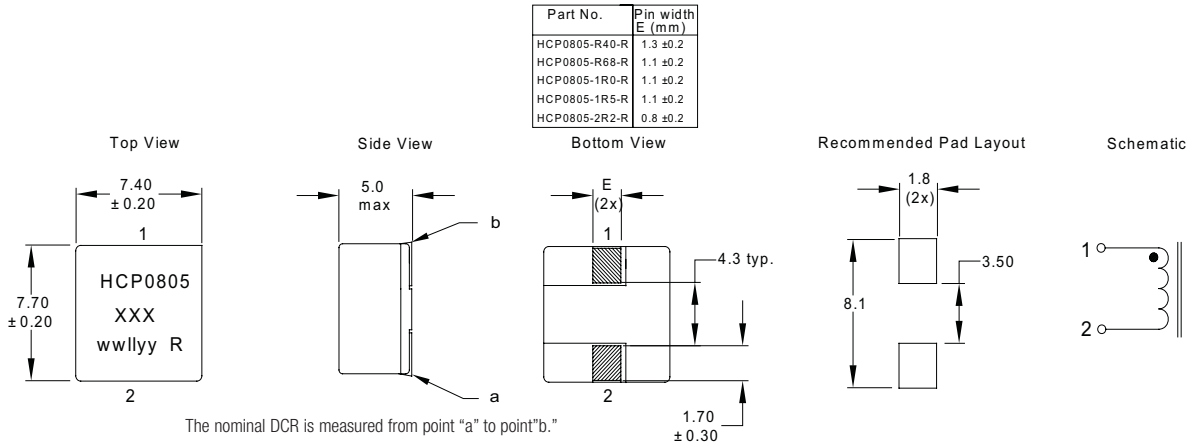
4 I_{sat}: Peak current for approximately 20% rolloff at +25°C.

5 K-factor: Used to determine B_{p-p} for core loss (see graph). B_{p-p} = K * L * ΔI. B_{p-p}: (Gauss), K: (K-factor from table), L: (inductance in μH), ΔI (peak-to-peak ripple current in amps).

6 Part Number Definition: HCP0805-xxx-R

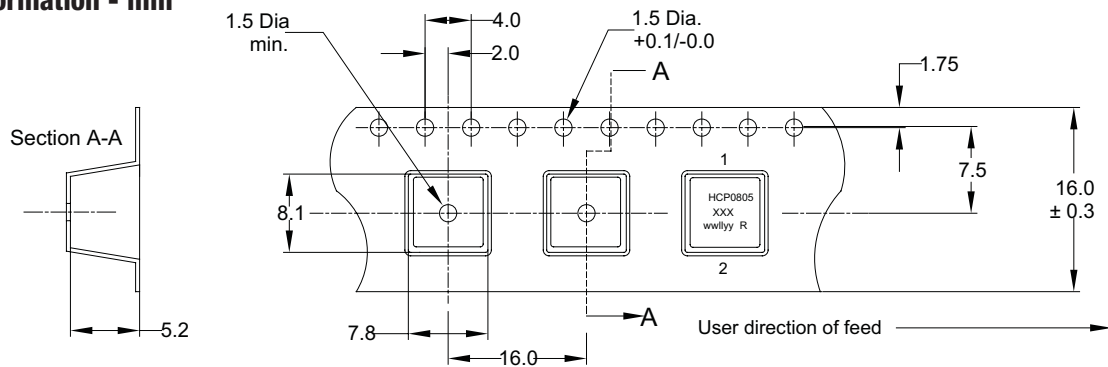
- HCP0805 = Product code and size
- xxx= Inductance value in μH, R = decimal point. If no "R" is present, then third character = # of zeros.
- "R" suffix = RoHS compliant

Dimensions - mm



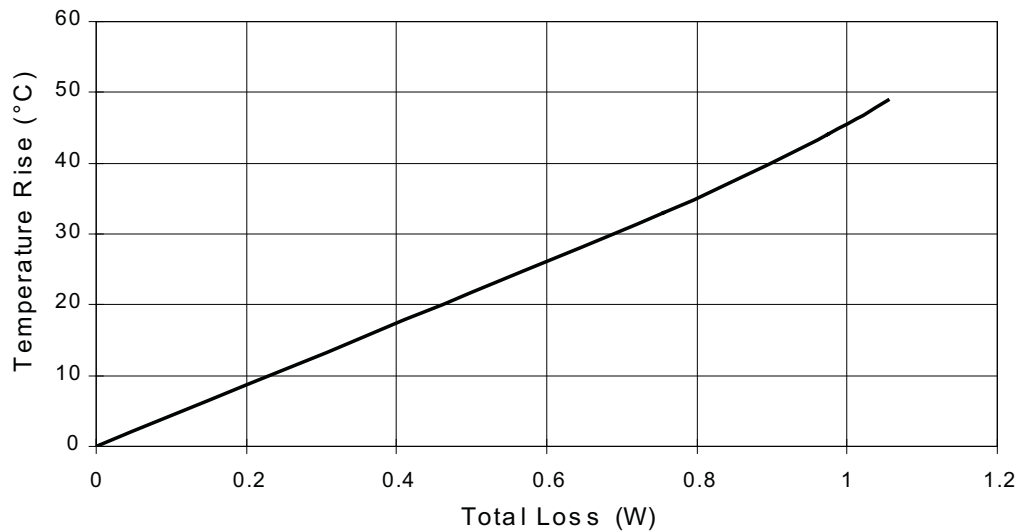
Part Marking: HCP0805 xxx = Inductance value in μH . (R = Decimal point). If no "R" is present, then last character is # Of zeros wwllly = Date code R = Revision level

Packaging Information - mm



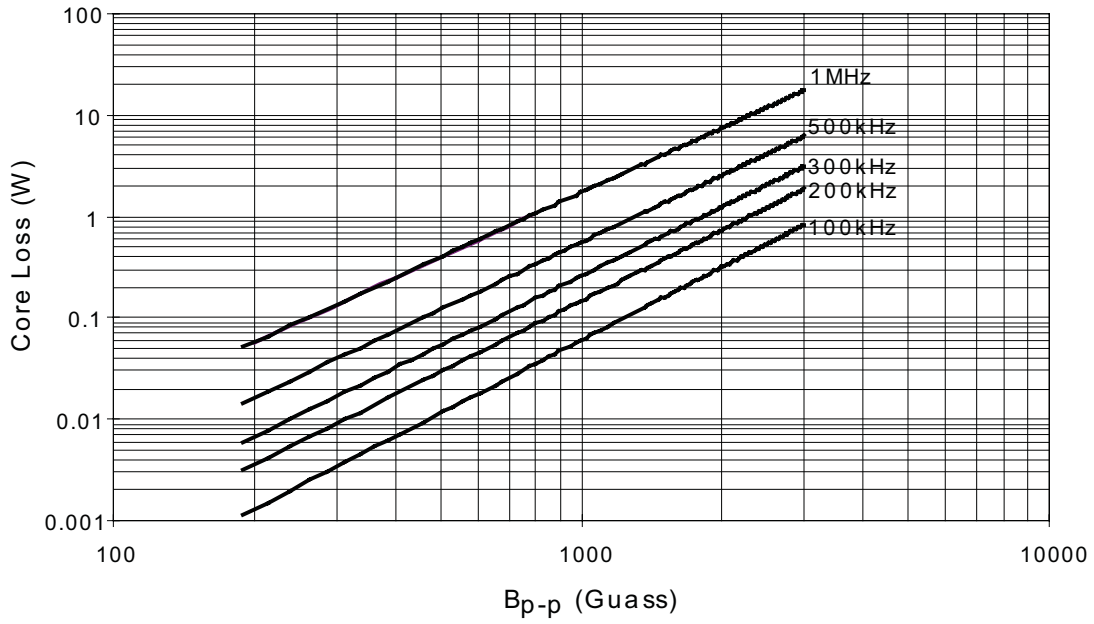
Supplied in tape-and-reel packaging, 700 parts per reel, 13" diameter reel.

Temperature Rise vs. Total Loss



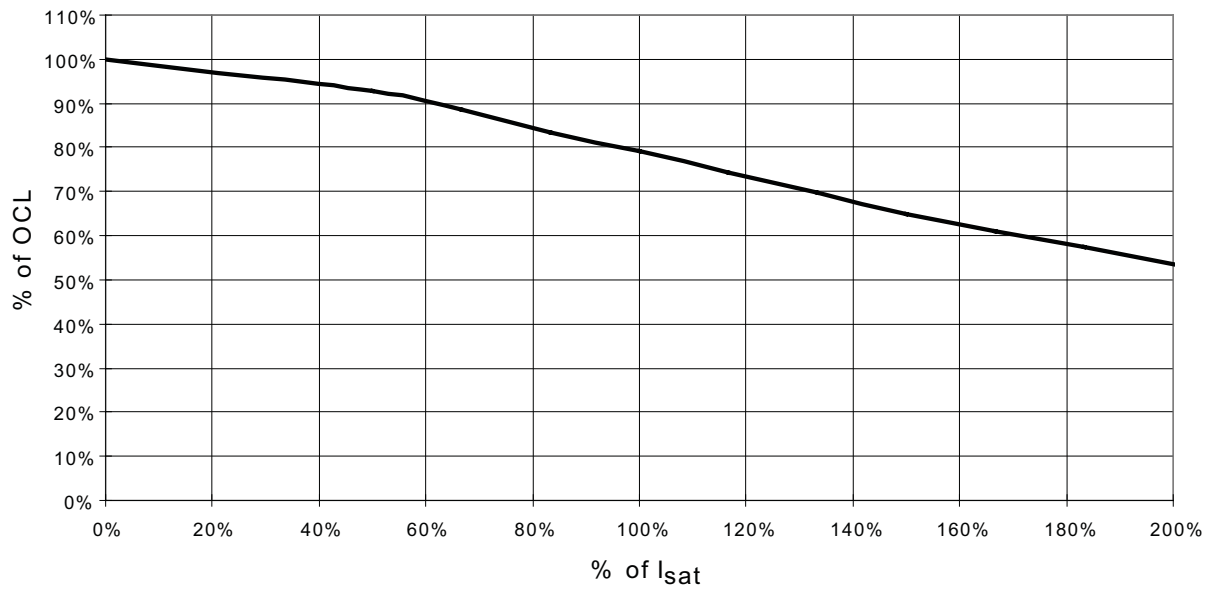
Core Loss

Core Loss vs. B_{p-p}



Inductance Characteristics

% of OCL vs. % of I_{sat}



Solder Reflow Profile

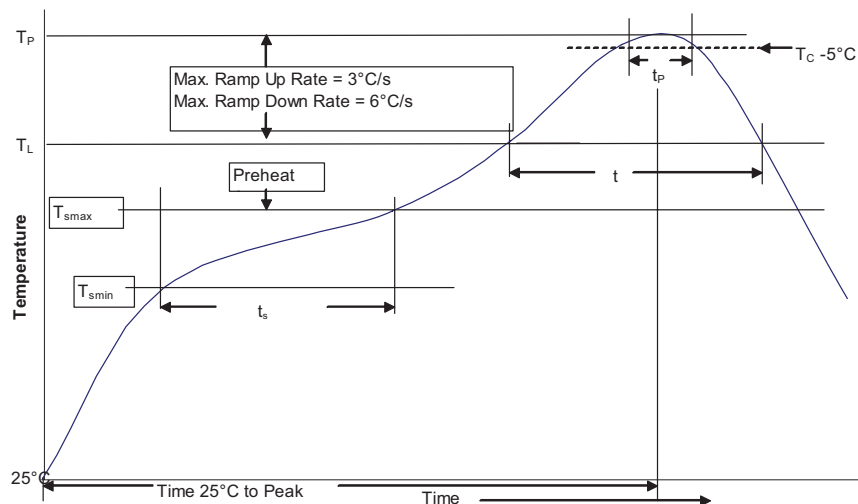


Table 1 - Standard SnPb Solder (T_c)

| Package Thickness | Volume mm^3 <350 | Volume mm^3 ≥ 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 mm^3 <350 | Volume mm^3 350 - 2000 | Volume 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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