

High Current, Power Inductors

HCP0605 Series



Description

- Halogen free
- 125°C maximum total temperature operation
- 5.3 x 6.1 x 4.95mm surface mount package
- Powder Iron core material
- High current carrying capacity, high permeability
- Frequency range up to 1MHz
- RoHS compliant

Applications

- Voltage Regulator Module (VRM)
- Multi-phase regulators
- Desktop and server VRMs and EVRDs
- Point of load modules
- Notebook regulators
- Data networking and storage systems
- Graphics cards
- Battery power systems

Environmental Data

- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (with derated current)
- Solder reflow temperature: J-STD-020D compliant

Packaging

- Supplied in tape and reel packaging, 1,000 parts per reel, 13" diameter reel

Product Specifications

Part Number ⁶	OCL ¹ μH ± 15%	FLL ² μH Minimum	I _{rms} ³ Amps	I _{sat} ⁴ Amps@25°C	DCR mΩ@20°C Maximum	K-factor ⁵
HCP0605-R10-R	0.095	0.06	53	20	0.40	120.5

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

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

3 I_{rms}: DC current for an approximate ΔT rise of 40°C without core loss. Derating is necessary for AC currents. PCB 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.

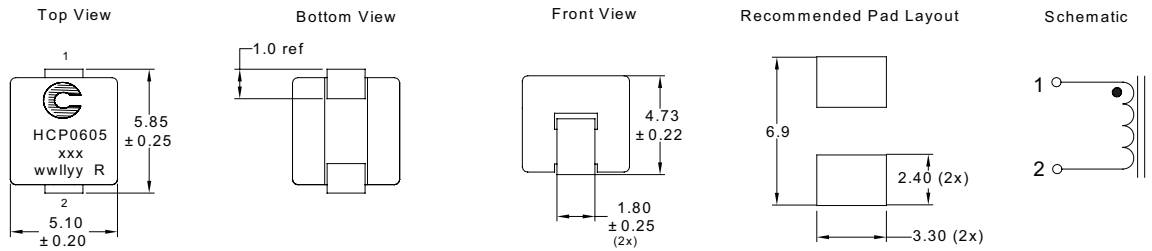
4 I_{sat}: Peak current for approximately 30% rolloff at 25°C.

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: HCP0605-xxx-R

- HCP0605 = Product code and size
- xxx= Inductance value in μH, R = decimal point.
- "-R" suffix = RoHS compliant

Dimensions - mm



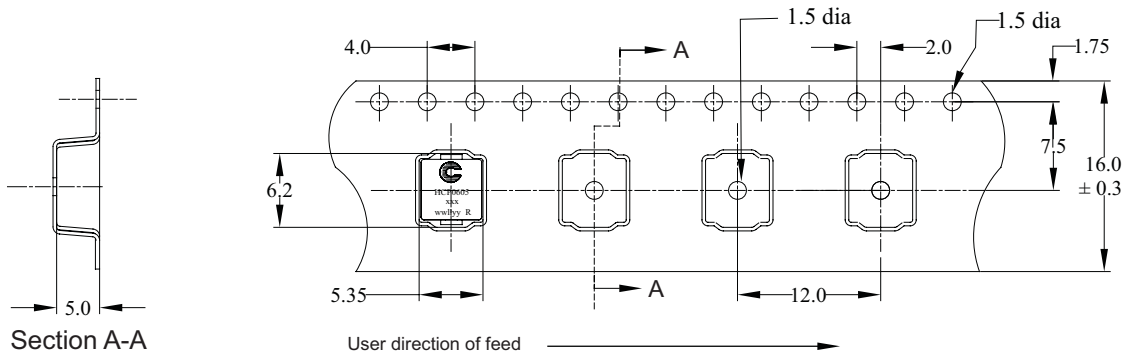
Part Marking: HCP0605

xxx = Inductance value in μH . (R = Decimal point)

wwllly = Date code

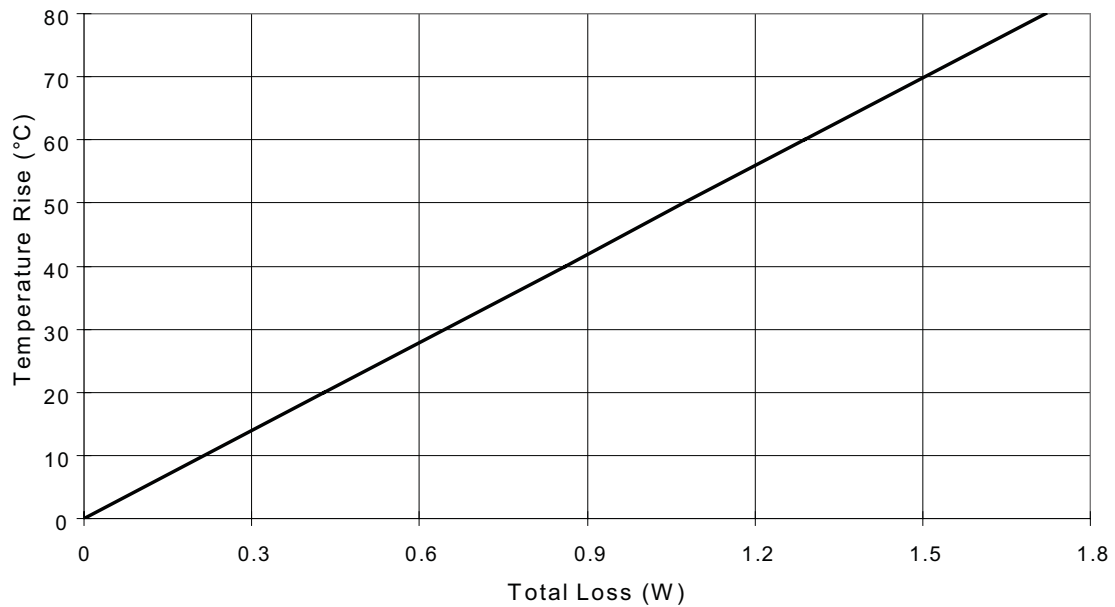
R = Revision level

Packaging Information - mm



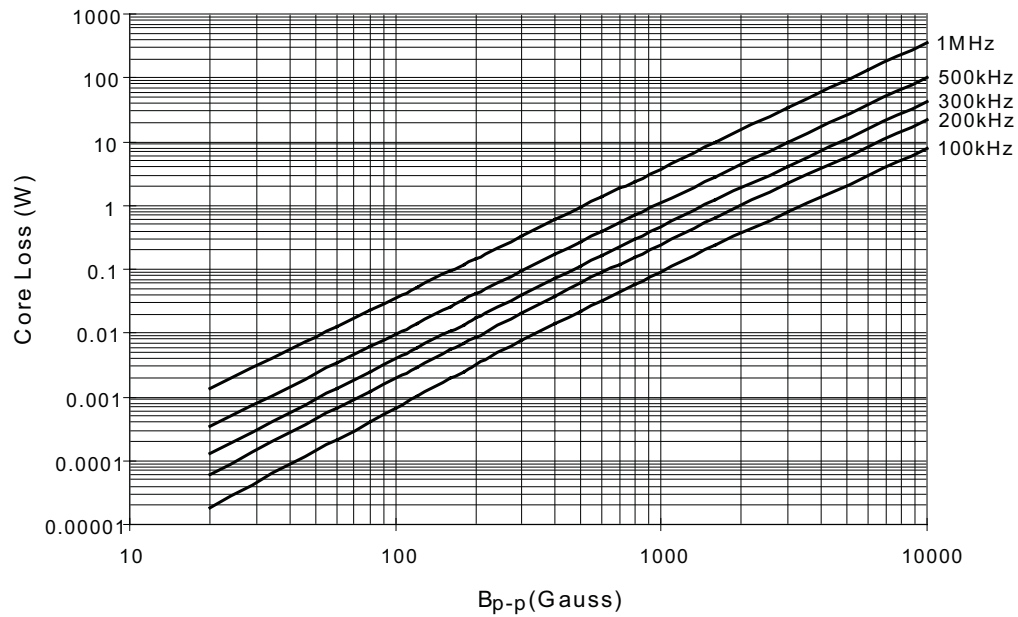
Supplied in tape-and-reel packaging, 1000 parts per reel, 13" diameter reel.

Temperature Rise vs. Total Loss



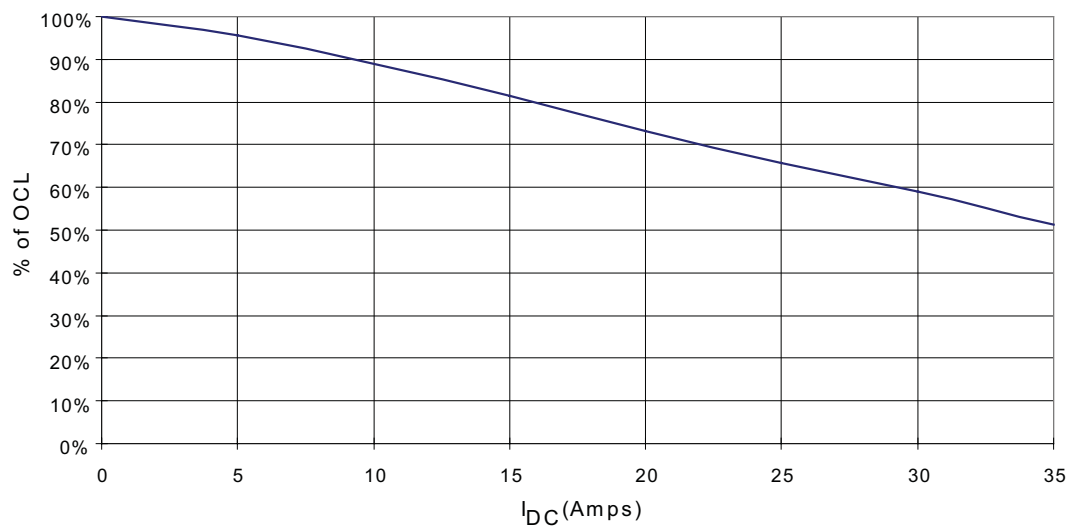
Core Loss

Core Loss vs B_{p-p}



Inductance Characteristics

% of OCL vs I_{DC}



Solder Reflow Profile

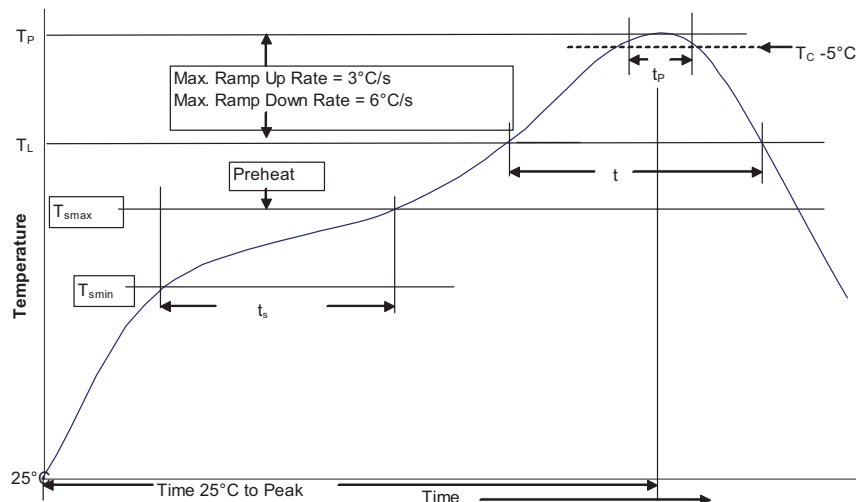


Table 1 - Standard SnPb Solder (T_C)

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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