# HCPT1309

## High current power inductors

### Product features

- 13.2 mm x 13.2 mm x 9.0 mm through hole package
- Iron powder core material
- Inductance range from 0.20 µH to 3.3 µH
- Current range from 90.0 A to 11.4 A
- Frequency range up to 1 MHz

### Applications

- Next generation processors
- High current DC-DC converters
- VRM, multi-phase buck regulator
- Desktop computers
- Video game power

### Environmental Data

- Storage temperature range (Component): -40 °C to +105 °C
- Operating temperature range: -40 °C to +105 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant

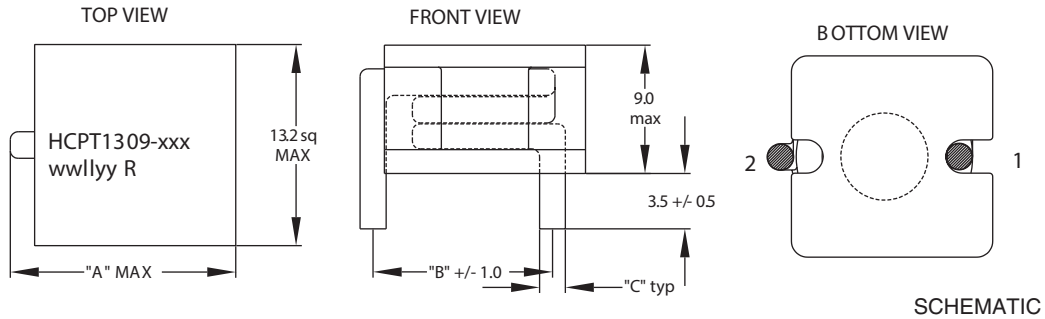
RoHS

## Product Specifications

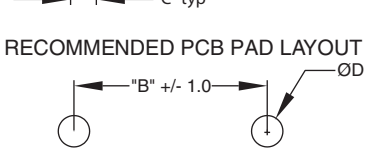
| Part Number | OCL (1) nominal +/- 20% (µH) | Irms (2) (A) | Isat (A) (3) Peak 20%rolloff @ +20 °C | Isat (A) (4) Peak 30%rolloff @+20 °C | DCR (mΩ) nom @+20 °C | K-factor (5) |
|---|---|---|---|---|---|---|
| **HCPT1309-R20-R** | 0.20 | 43.1 | 72.2 | 90.0 | 0.426 | 154.1 |
| **HCPT1309-R47-R** | 0.49 | 34.0 | 43.3 | 55.0 | 0.624 | 92.4 |
| **HCPT1309-1R0-R** | 0.96 | 19.4 | 30.9 | 40.0 | 1.90 | 66.0 |
| **HCPT1309-1R5-R** | 1.59 | 13.7 | 24.1 | 30.6 | 3.82 | 51.4 |
| **HCPT1309-2R2-R** | 2.27 | 12.5 | 19.7 | 25.0 | 4.10 | 42.0 |
| **HCPT1309-3R3-R** | 3.31 | 11.4 | 16.7 | 21.0 | 4.80 | 35.6 |

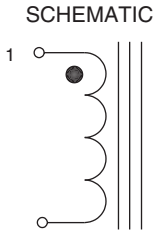
(1) OCL: Open Circuit Inductance test parameters: 100 kHz, 0.1 Vrms, 0.0 Adc.
(2) Irms: DC current for an approximate ΔT of 40 °C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed +105 °C under worst case operating conditions verified in the end application.
(3) Isat Amperes peak for approximately 20% rolloff (@+20 °C)
(4) Isat Amperes peak for approximately 30% rolloff (@+20 °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 uH), Δ(Peak to peak ripple current in Amps).

## Dimensions (mm)



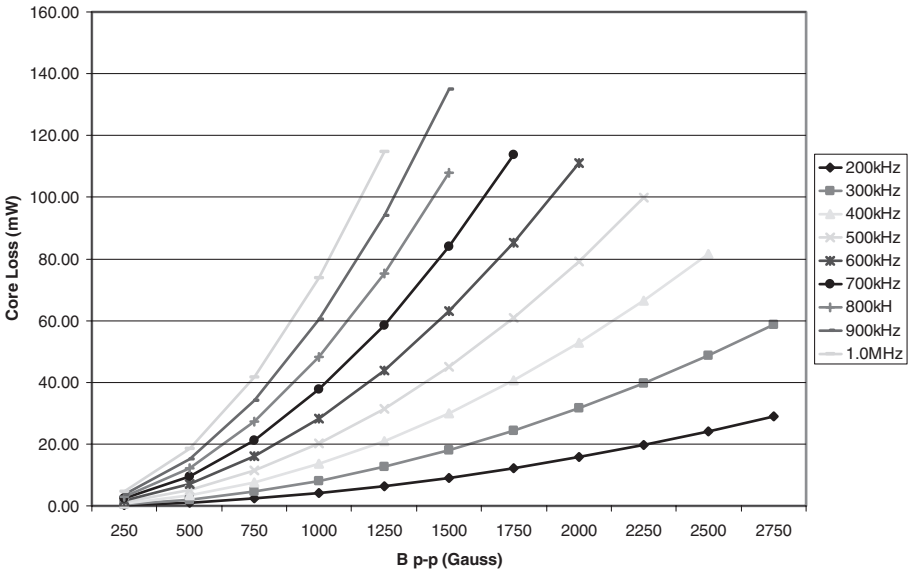

| Dimension Table | | | | |
|---|---|---|---|---|
| Part No | "A" | "B" | "C" | "D" |
| HCPT1309-R20 | 14.0 | 12.2 | 1.63 | 2.13 |
| HCPT1309-R47 | 14.0 | 12.2 | 1.63 | 2.13 |
| HCPT1309-1R0 | 13.7 | 12.0 | 1.29 | 1.6 |
| HCPT1309-1R5 | 13.5 | 11.8 | 1.15 | 1.40 |
| HCPT1309-2R2 | 13.5 | 11.8 | 1.15 | 1.40 |
| HCPT1309-3R3 | 13.5 | 11.8 | 1.15 | 1.40 |



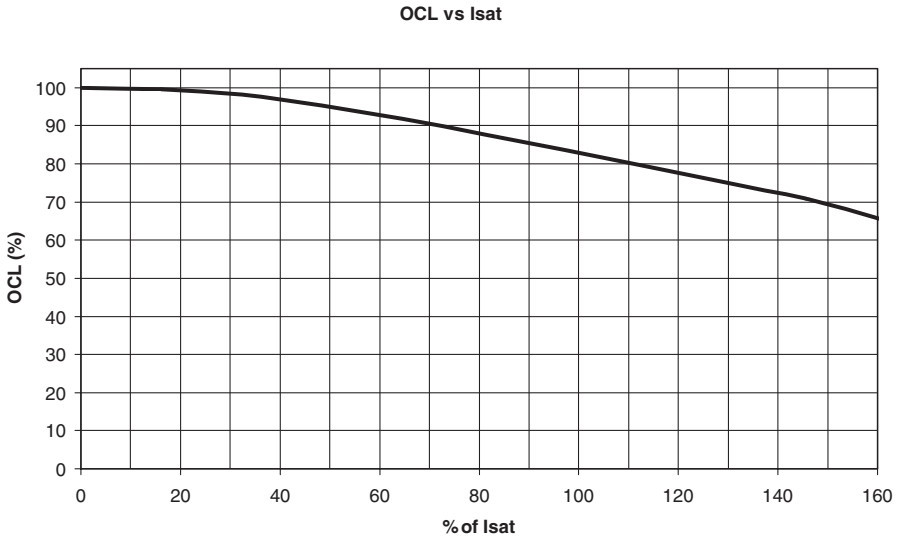




Do not route traces or vias underneath the inductor

**Core loss vs. $B_{p-p}$**

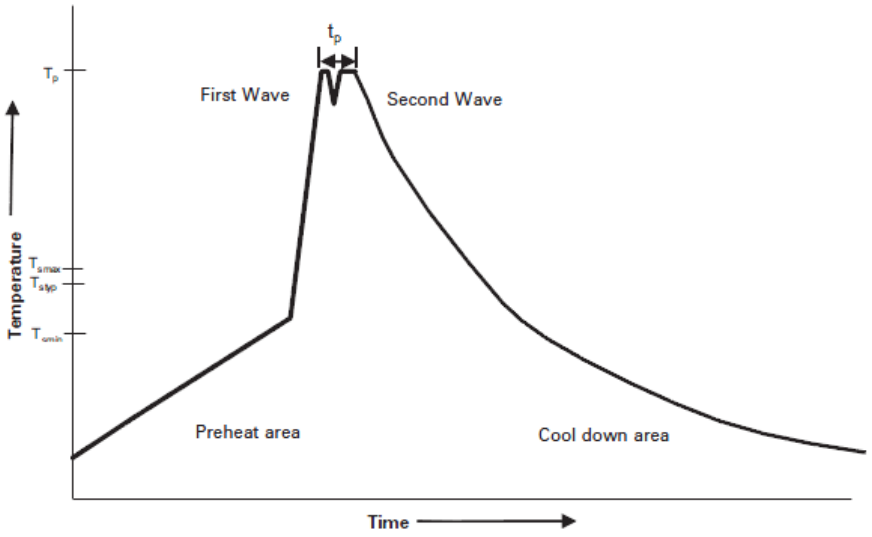



**Inductance characteristics**



## Wave solder profile- Through-hole components

Reflow soldering not recommended




### Reference EN 61760-1:2006

| Profile Feature | | Standard SnPb Solder | Lead (Pb) Free Solder |
|---|---|---|---|
| Preheat | • Temperature min. ($T_{smin}$) | 100°C | 100°C |
| | • Temperature typ. ($T_{styp}$) | 120°C | 120°C |
| | • Temperature max. ($T_{smax}$) | 130°C | 130°C |
| | • Time ($T_{smin}$ to $T_{smax}$) ($t_s$) | 70 seconds | 70 seconds |
| Δ preheat to max Temeperature | | 150°C max. | 150°C max. |
| Peak temperature (Tp)* | | 235°C – 260°C | 250°C – 260°C |
| Time at peak temperature ($t_p$) | | 10 seconds max<br>5 seconds max each wave | 10 seconds max<br>5 seconds max each wave |
| Ramp-down rate | | ~ 2 K/s min<br>~3.5 K/s typ<br>~5 K/s max | ~ 2 K/s min<br>~3.5 K/s typ<br>~5 K/s max |
| Time 25°C to 25°C | | 4 minutes | 4 minutes |

### Manual solder

350°C, 4-5 seconds. (by soldering iron), generally manual, hand soldering is not recommended.

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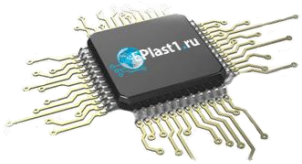


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