

# HCM1307

## High current power inductors



### Description

- High current carrying capacity
- Low core losses
- Magnetically shielded, low EMI
- Frequency range up to 1MHz
- Inductance range from 0.47 $\mu$ H to 3.3 $\mu$ H
- Current range from 15 to 63 amps
- 14.2 x 13.0mm footprint surface mount package in a 6.5mm height
- Iron powder core material
- Halogen free, lead free, RoHS compliant

### Applications

- Multi-phase regulators
- Voltage Regulator Modules (VRMs)
- Distributed power systems DC-DC converters
- Desktop and server VRMs and EVRDs
- Point-of-Load (POL) modules
- Field Programmable Gate Array (FPGA) DC-DC converters
- Battery power systems
- High current power supplies
- Data networking and storage systems

### Environmental Data

- Storage temperature range (Component): -55°C to +125°C
- Operating temperature range: -55°C to +125°C (ambient + self-temperature rise)
- Solder reflow temperature: J-STD-020D compliant



## Product Specifications

Part Number <sup>6</sup>	OCL <sup>1</sup> ( $\mu$ H) $\pm 20\%$	FLL <sup>2</sup> ( $\mu$ H) minimum	I <sub>rms</sub> <sup>3</sup> (amps)	I <sub>sat</sub> <sup>4</sup> (amps)	DCR (m $\Omega$ ) typical @ +20°C	DCR (m $\Omega$ ) maximum @ +20°C	K-factor <sup>5</sup>
HCM1307-R47-R	0.47	0.26	38	63	1.0	1.2	192
HCM1307-1R0-R	1.0	0.56	29	49	1.7	2.0	111
HCM1307-3R3-R	3.3	1.85	15	40	4.3	4.5	88

1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 1.0Vrms, 0.0Adc, @ +25°C

2. Full Load Inductance (FLL) Test Parameters: 100kHz, 1.0Vrms, @ I<sub>sat</sub> @ +25°C

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 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 125°C under worst case operating conditions verified in the end application.

4. I<sub>sat</sub>: Peak current for approximately 30% rolloff @ +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 \* Al. B<sub>p-p</sub>: (Gauss), K: (K-factor from table), L: (Inductance in  $\mu$ H), Al (Peak to peak ripple current in Amps).

6. Part Number Definition: HCM1307-xxx-R

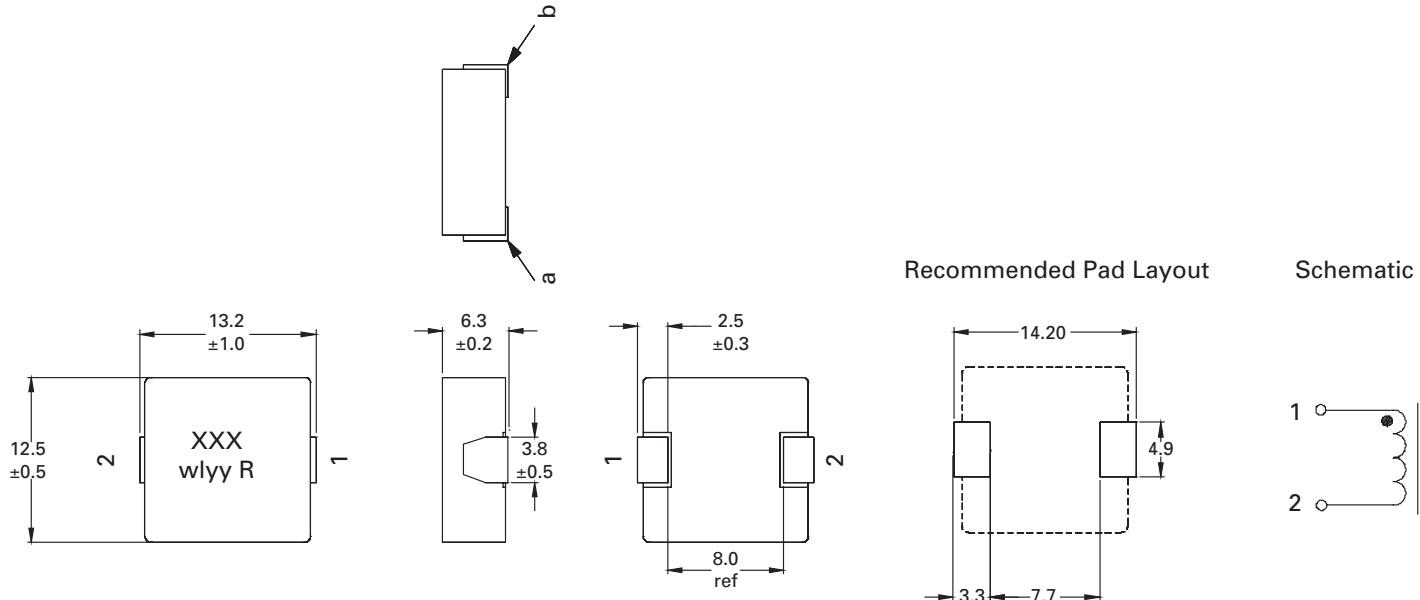
HCM1307 = Product code and size

xxx= inductance value in  $\mu$ H, R= decimal point ,

If no R is present then last character equals number of zeros

-R suffix = RoHS compliant

## Dimensions (mm)



Part marking: XXX=Inductance value in  $\mu$ H, R= decimal point. If no R is present then last character equals number of zeros.  
wlyy=date code, R=revision level

All soldering surfaces to be coplanar within 0.10 millimeters

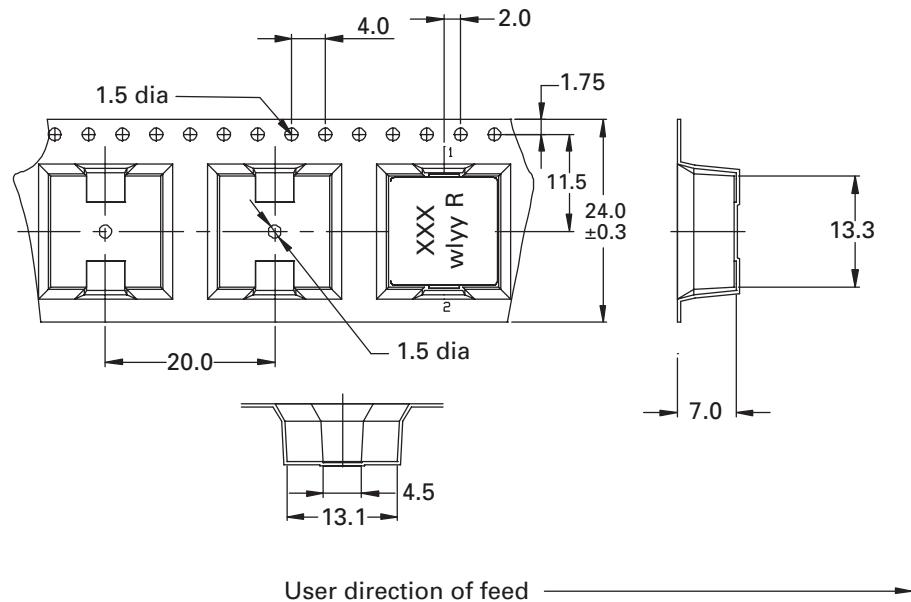
Tolerances are  $\pm 0.3$  millimeters unless stated otherwise

Color: Grey

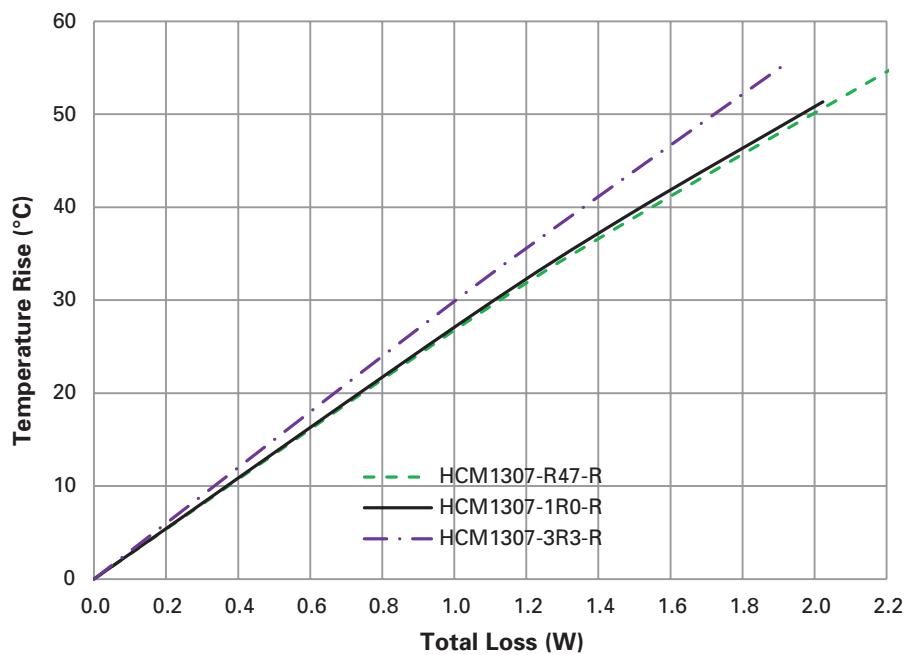
Do not route traces or vias underneath the inductor

### Packaging information (mm)

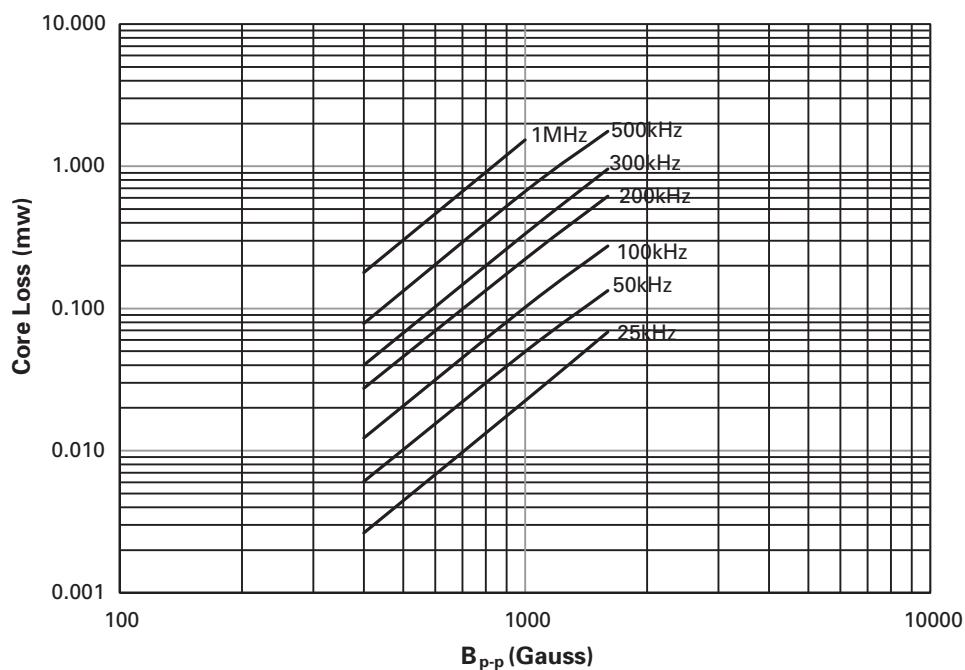
Supplied in tape and reel packaging, 400 parts per 13" diameter reel



### Temperature rise vs. total loss

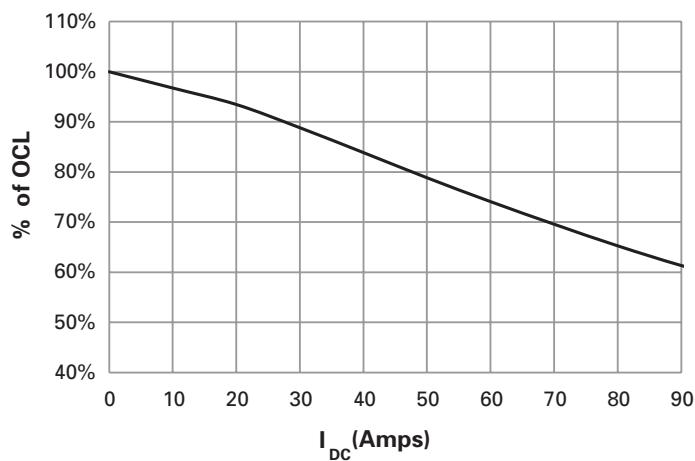


### Core loss vs. $B_{p-p}$

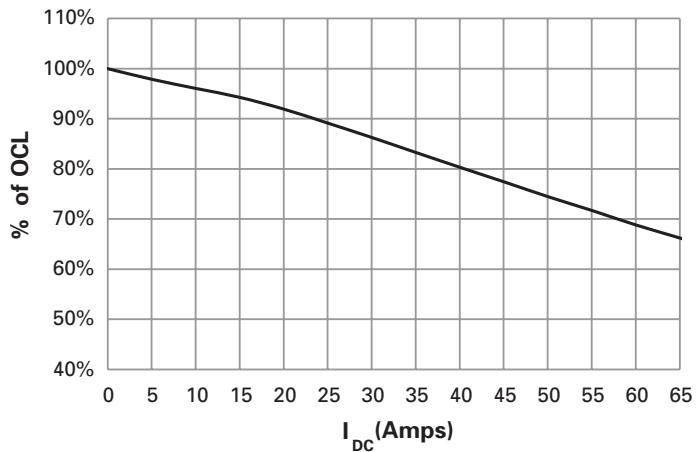


### Inductance characteristics

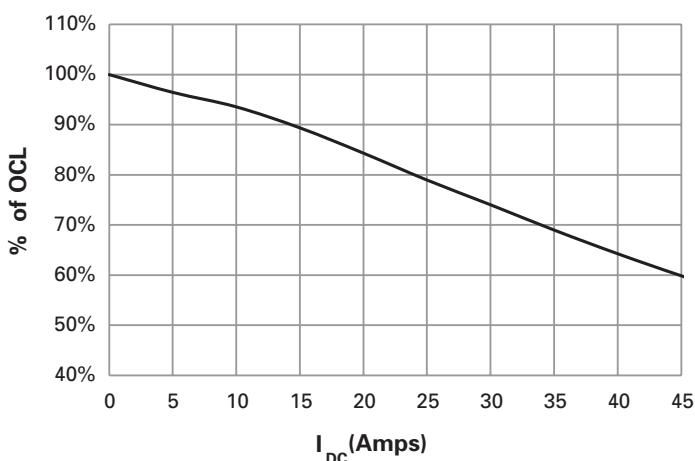
HCM1307-R47-R



HCM1307-1R0-R



HCM1307-3R3-R



### Solder reflow profile

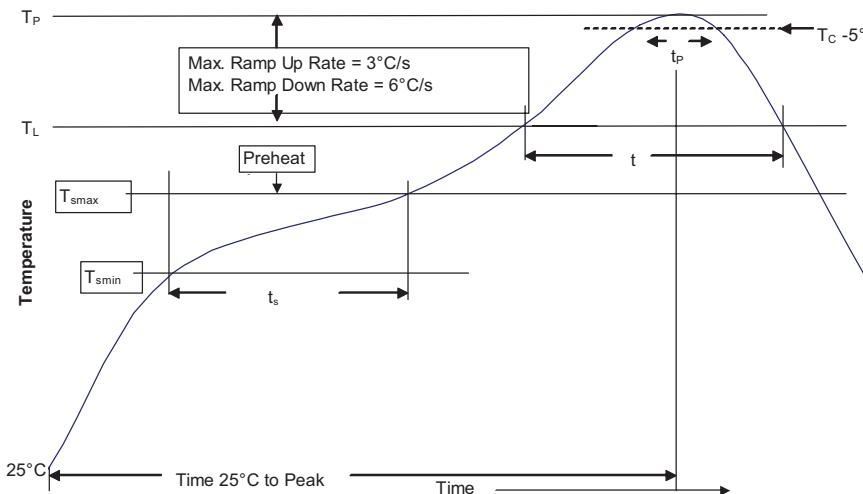


Table 1 - Standard SnPb Solder ( $T_c$ )

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> ≥350
<2.5mm)	235°C	220°C
≥2.5mm	220°C	220°C

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

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> 350 - 2000	Volume mm <sup>3</sup> >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	<ul style="list-style-type: none"> <li>Temperature min. (<math>T_{smin}</math>)</li> <li>Temperature max. (<math>T_{smax}</math>)</li> <li>Time (<math>T_{smin}</math> to <math>T_{smax}</math>) (<math>t_s</math>)</li> </ul>	100°C 150°C 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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