

# 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



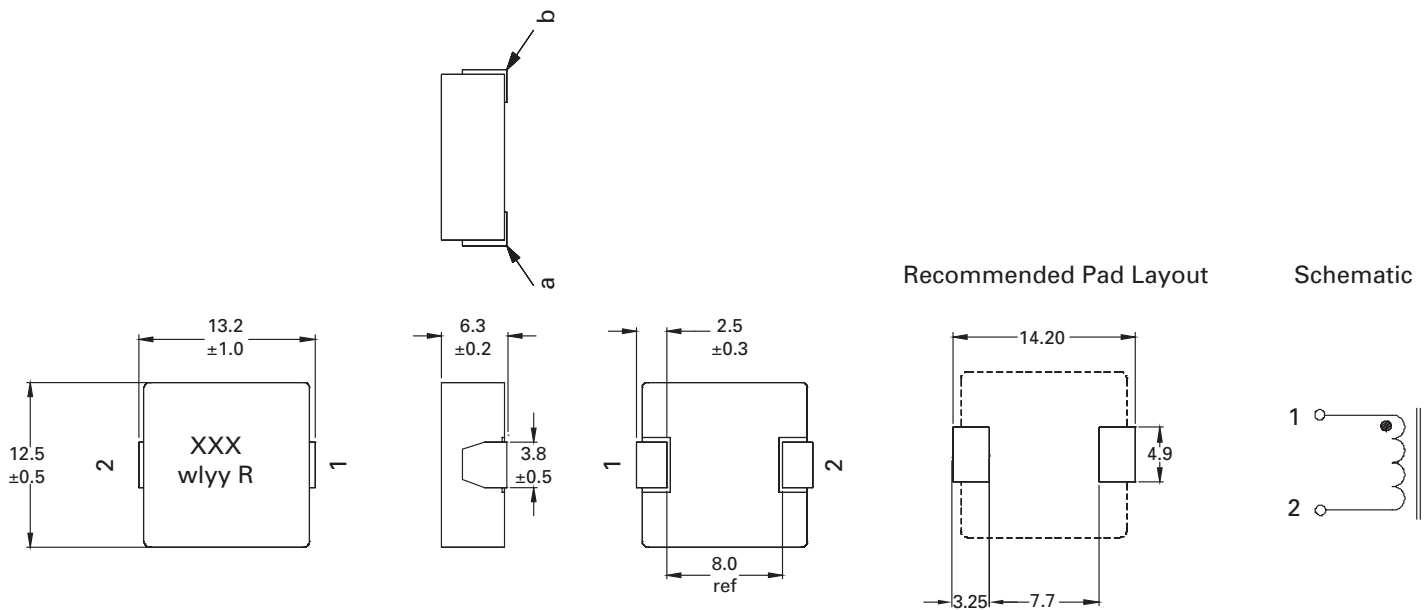
**Product Specifications**

Part Number <sup>6</sup>	OCL <sup>1</sup> ( $\mu\text{H}$ ) $\pm 20\%$	FLL <sup>2</sup> ( $\mu\text{H}$ ) minimum	$I_{\text{rms}}$ <sup>3</sup> (amps)	$I_{\text{sat}}$ <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, 0.0A<sub>dc</sub>, @ +25°C
2. Full Load Inductance (FLL) Test Parameters: 100kHz, 1.0Vrms, @  $I_{\text{sat}}$ , @ +25°C
3.  $I_{\text{rms}}$ : 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.  $I_{\text{sat}}$ : Peak current for approximately 30% rolloff @ +25°C
5. K-factor: Used to determine  $B_p$  for core loss (see graph).  $B_p - p = K * L * \Delta I$ .  $B_p$ : (Gauss), K: (K-factor from table), L: (Inductance in  $\mu\text{H}$ ),  $\Delta I$  (Peak to peak ripple current in Amps).
6. Part Number Definition: HCM1307-xxx-R  
 HCM1307 = Product code and size  
 xxx= inductance value in  $\mu\text{H}$ , R= decimal point ,  
 If no R is present then last character equals number of zeros  
 -R suffix = RoHS compliant

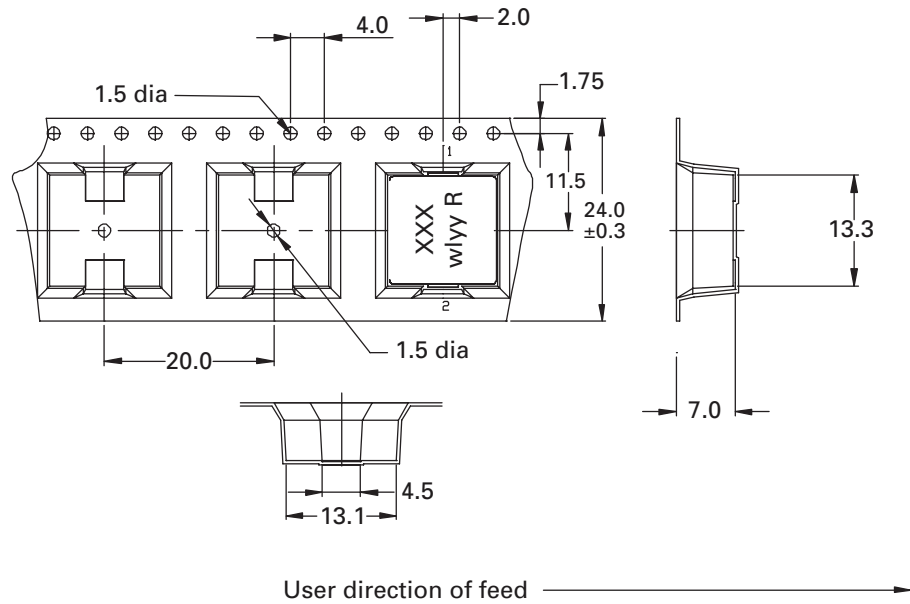
**Dimensions (mm)**



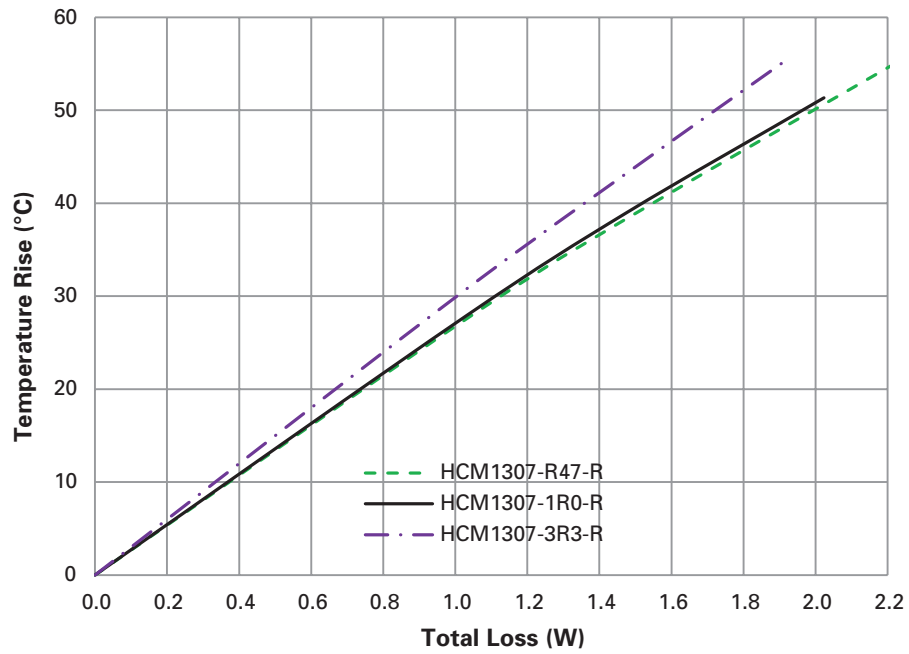
Part marking: XXX=Inductance value in  $\mu\text{H}$ , R= decimal point. If no R is present then last character equals number of zeros.  
 wlyy=date code, R=revision level  
 All soldering surfaces to be coplanar within 0.10 millimeters  
 Tolerances are  $\pm 0.3$  millimeters unless stated otherwise  
 Color: Grey  
 Do not route traces or vias underneath the inductor

**Packaging information (mm)**

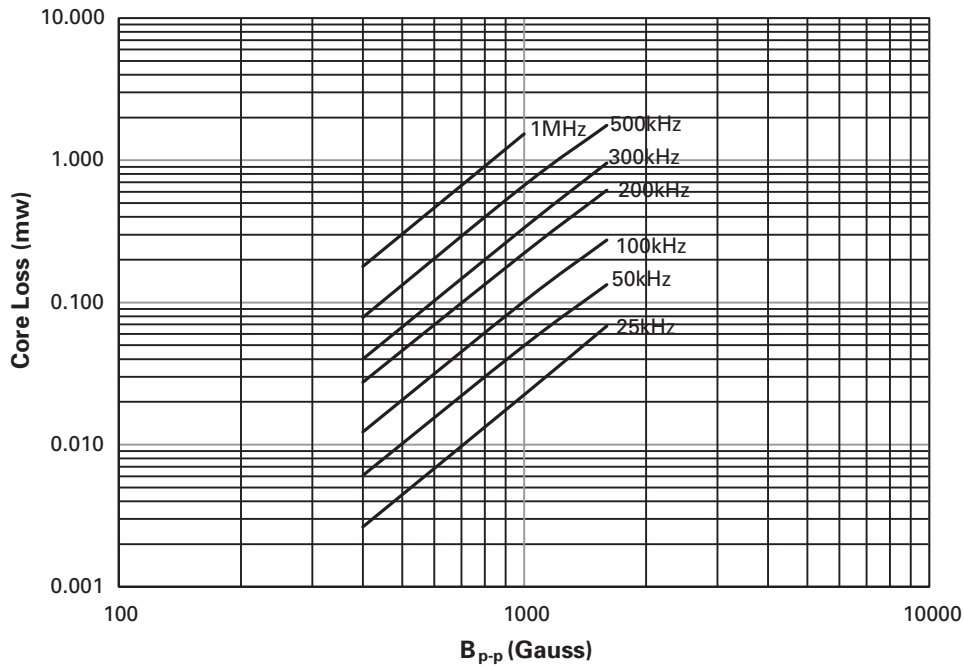
Supplied in tape and reel packaging, 400 parts per 13" diameter reel



**Temperature rise vs. total loss**

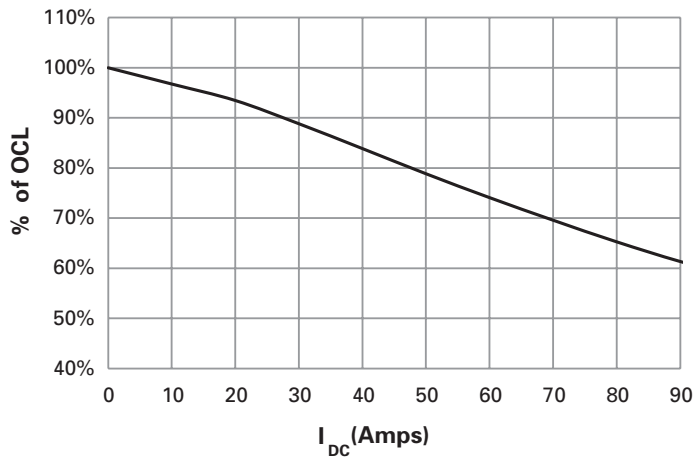


Core loss vs.  $B_{p-p}$

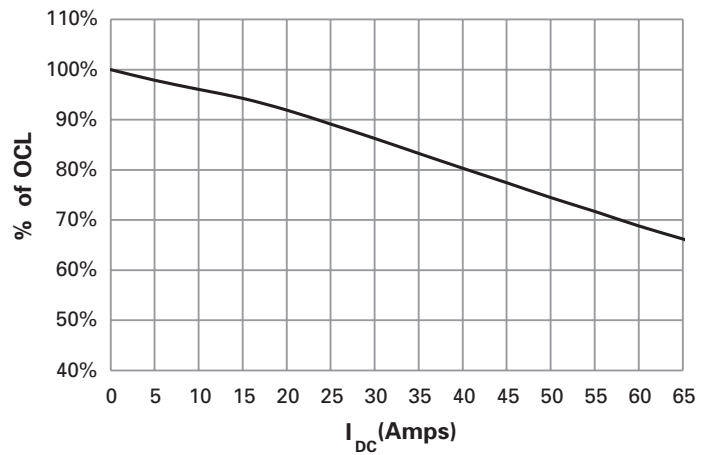


Inductance characteristics

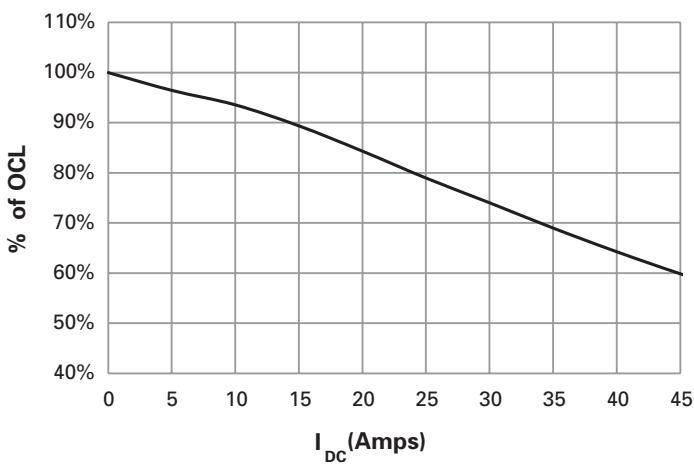
HCM1307-R47-R



HCM1307-1R0-R



HCM1307-3R3-R



**Solder reflow profile**



**Table 1 - Standard SnPb Solder (T<sub>c</sub>)**

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<sub>c</sub>)**

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 JEDEC J-STD-020D**

Profile Feature	Standard SnPb Solder	Lead (Pb) Free Solder
Preheat and Soak		
• Temperature min. (T <sub>smin</sub> )	100°C	150°C
• Temperature max. (T <sub>smax</sub> )	150°C	200°C
• Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )	60-120 Seconds	60-120 Seconds
Average ramp up rate T <sub>smax</sub> to T <sub>p</sub>	3°C/ Second Max.	3°C/ Second Max.
Liquidous temperature (T <sub>L</sub> )	183°C	217°C
Time at liquidous (t <sub>L</sub> )	60-150 Seconds	60-150 Seconds
Peak package body temperature (T <sub>p</sub> )*	Table 1	Table 2
Time (t <sub>p</sub> )** within 5 °C of the specified classification temperature (T <sub>c</sub> )	20 Seconds**	30 Seconds**
Average ramp-down rate (T <sub>p</sub> to T <sub>smax</sub> )	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<sub>p</sub>) is defined as a supplier minimum and a user maximum.  
\*\* Tolerance for time at peak profile temperature (t<sub>p</sub>) is defined as a supplier minimum and a user maximum.

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