

HCF1305

High frequency, high current power inductors



Product features

- 12.5 mm x 12.5 mm x 5.0 mm surface mount package
- Ferrite core material
- Inductors designed for higher speed switch mode applications requiring low voltage and high current
- Design utilizes ferrite core with high DC bias resistance and low core loss
- Inductance range from 0.47 μ H to 4.7 μ H
- Current range from 36.0 A to 10.4 A
- Frequency range 100 kHz to 1 MHz

Applications

- Next generation processors
- High current DC-DC converters
- VRM, multi-phase buck regulators
- PC Workstations, Routers, Servers
- Telecom soft switches
- Base stations

Environmental data

- Storage temperature range (component): -40 °C to +125 °C
- Operating temperature range: -40 °C to +125 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant



Product specifications

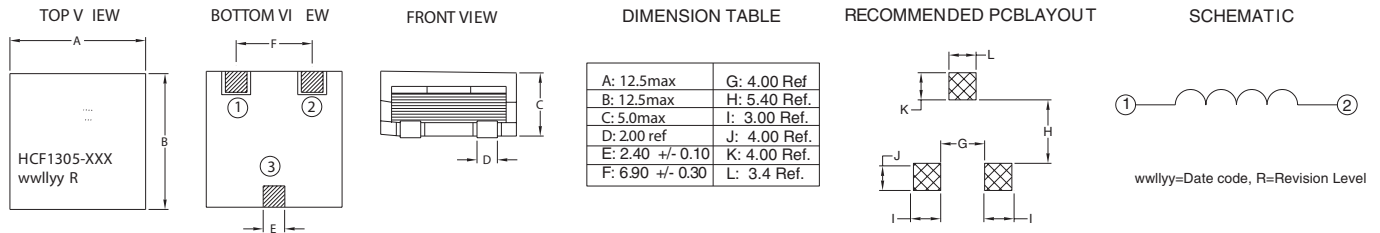
Part Number	Rated Inductance (μH)	OCL (1) μH ± 20%	I _{rms} (2) Amperes	Isat (3) Amperes	Isat2 (4) Amperes	DCR mΩ@20°C (Typical)	DCR mΩ@20°C (Maximum)	K-factor (5)
HCF1305-R47-R	0.47	0.47	32.0	36.0	30.0	0.83	1.00	21
HCF1305-R56-R	0.56	0.56	32.0	30.0	22.5	0.83	1.00	21
HCF1305-1R0-R	1.00	1.00	22.0	24.0	20.0	1.58	1.90	14
HCF1305-1R2-R	1.20	1.20	22.0	20.0	15.0	1.58	1.90	14
HCF1305-1R8-R	1.80	1.80	16.3	18.0	15.0	2.58	3.10	10
HCF1305-2R2-R	2.20	2.20	16.3	15.0	11.2	2.58	3.10	10
HCF1305-3R0-R	3.00	3.00	13.2	14.4	12.0	4.08	4.90	8.3
HCF1305-3R3-R	3.30	3.30	13.2	12.5	9.0	4.08	4.90	8.3
HCF1305-4R0-R	4.00	4.00	10.9	12.0	10.0	6.0	7.2	6.9
HCF1305-4R7-R	4.70	4.70	10.9	10.4	7.5	6.0	7.2	6.9

- 1) OCL: Open Circuit Inductance test parameters: 100 kHz, 0.1 Vrms, 0.0 Adc. OCL@-40 °C can be lower than OCL@+20 °C by 15% max.
- 2) I_{rms}: DC current for an approximate DT 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.
- 3) Isat1: Amperes Peak for approximately 30% rolloff (@+25 °C)
- 4) Isat2: Amperes Peak for approximately 30% rolloff (@+125 °C)

- 5) K-factor: Used to determine B p-p for core loss (see graph). $B p-p = K \cdot L \cdot \Delta I$
B p-p:(mT), K: (K factor from table), L: (Inductance in μH), ΔI (Peak to peak ripple current in Amps).

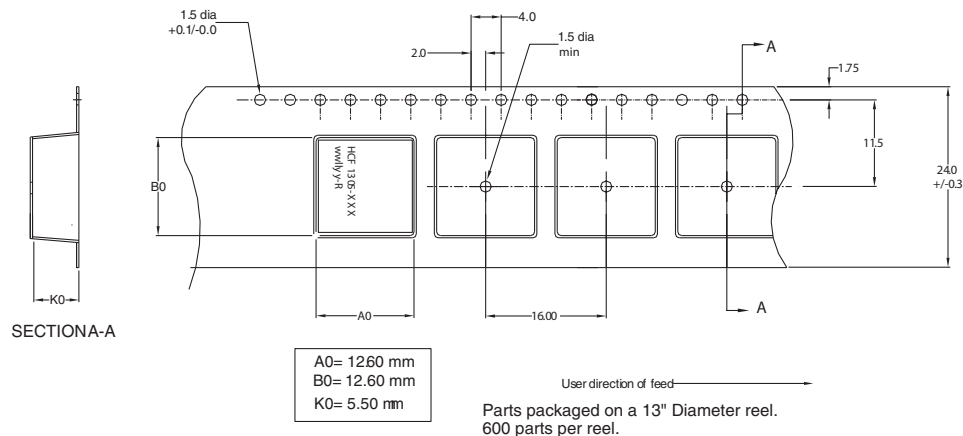
Part number definition:
HCF1305-XXX-R
HCF1305 = Product code and size
XXX = Inductance value in μH.
R = Decimal point. If no R is present, third character = #of zeros -R suffix indicates RoHS compliant

Dimensions- mm

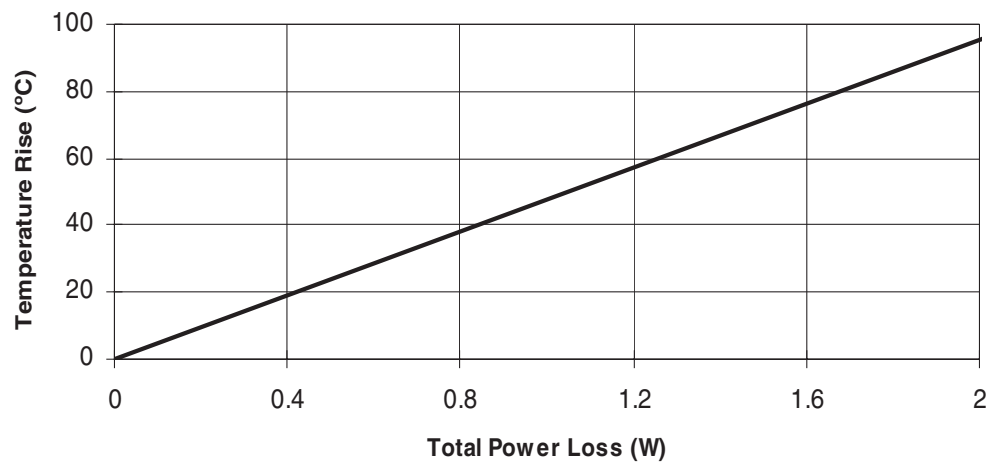


Do not route traces or vias underneath the inductor

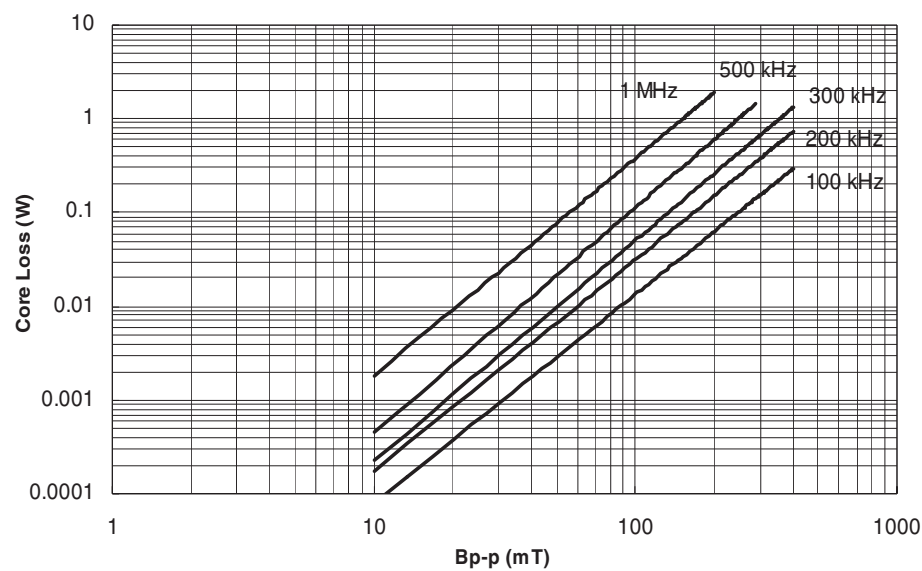
Packaging information - mm



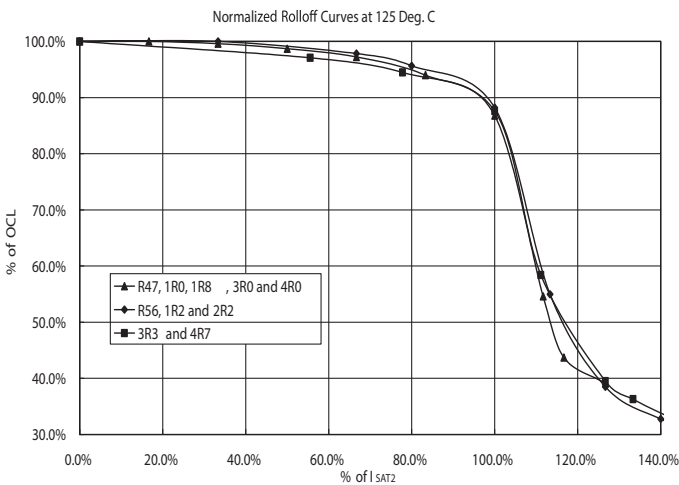
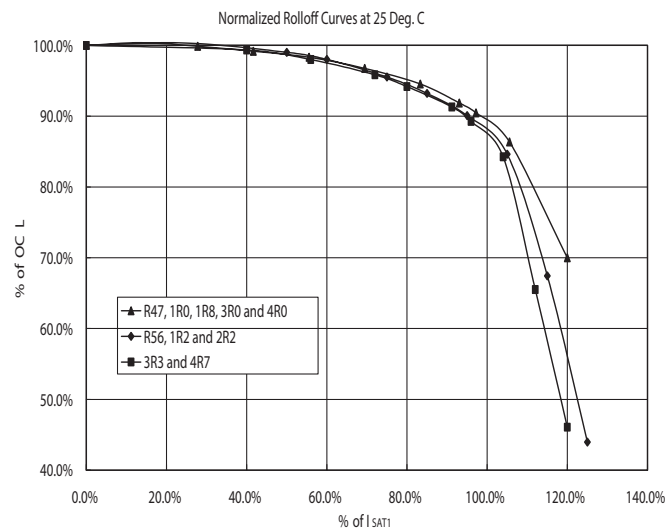
Temperature rise vs total loss



Core loss vs Bp-p



Inductance characteristics



Solder Reflow Profile

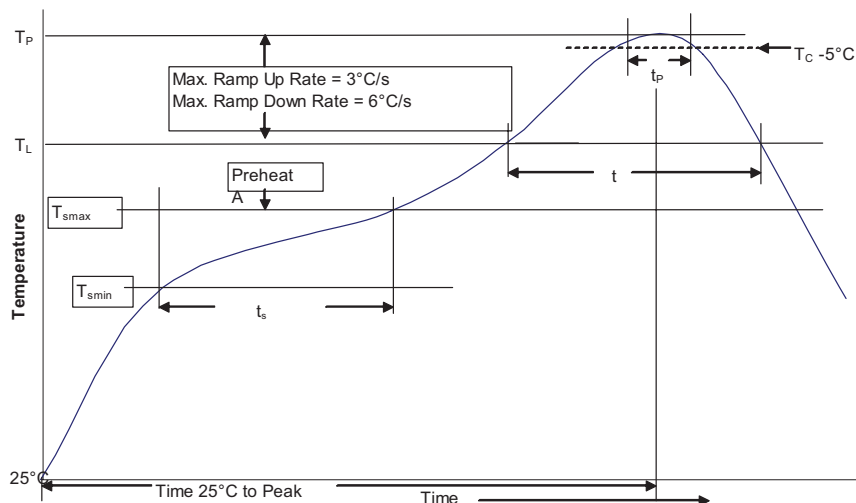


Table 1 - Standard SnPb Solder (T_p)

Package Thickness	Volume mm^3 <350	Volume mm^3 ≥ 350
<2.5mm	235°C	220°C
$\geq 2.5mm$	220°C	220°C

Table 2 - Lead (Pb) Free Solder (T_p)

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-020

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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