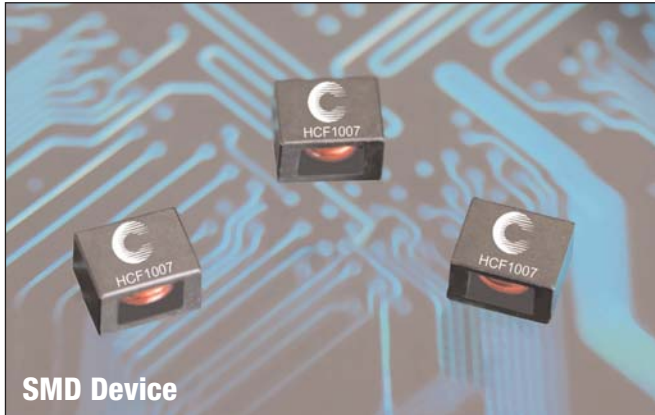


High Current, High Frequency, Power Inductors

HCF1007 Series



Description

- Halogen free
- 125°C maximum total temperature operation
- 10.3 x 8.1 x 6.65mm surface mount package
- Ferrite core material
- Secure 3 terminal mounting
- High current carrying capacity, low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 0.3μH to 10.0μH
- Current range from 5.3 to 48 Amps
- Frequency range up to 1MHz
- RoHS compliant

Applications

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

Environmental Data

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

Packaging

- Supplied in tape and reel packaging, 700 parts per 13" diameter reel

Product Specifications

| Part Number ⁷ | OCL ¹ μH ± 20% | FLL ² Min (μH) | I _{rms} ³ Amps | I _{sat} ¹⁴ Amps @25°C | I _{sat} ²⁵ Amps @125°C | DCR mΩ @20°C | K-factor ⁶ |
|--------------------------|------------------------------|------------------------------|---------------------------------------|--|---|-----------------|-----------------------|
| HCF1007-R30-R | 0.30 | 0.21 | 30 | 48 | 35 | 0.90±10% | 279.9 |
| HCF1007-R42-R | 0.42 | 0.30 | 26 | 45 | 36 | 1.30±7% | 186.6 |
| HCF1007-R56-R | 0.56 | 0.40 | 26 | 36 | 28 | 1.30±7% | 186.6 |
| HCF1007-R68-R | 0.68 | 0.49 | 26 | 29 | 23 | 1.30±7% | 186.6 |
| HCF1007-1R0-R | 1.0 | 0.72 | 16 | 26 | 21 | 2.65±6% | 139.9 |
| HCF1007-1R5-R | 1.5 | 1.08 | 13 | 22 | 17 | 4.15±6% | 112.0 |
| HCF1007-2R2-R | 2.2 | 1.57 | 10.7 | 18 | 14 | 6.35±6% | 93.30 |
| HCF1007-3R3-R | 3.3 | 2.37 | 10 | 14.5 | 11 | 7.50±6% | 79.97 |
| HCF1007-4R7-R | 4.7 | 3.38 | 9.4 | 12 | 8.9 | 8.65±6% | 69.97 |
| HCF1007-5R6-R | 5.6 | 4.03 | 9.4 | 9.4 | 7.5 | 8.65±6% | 69.97 |
| HCF1007-6R8-R | 6.8 | 4.90 | 9.4 | 7.8 | 6.1 | 8.65±6% | 69.97 |
| HCF1007-100-R | 10.0 | 7.20 | 9.4 | 5.3 | 4.2 | 8.65±6% | 69.97 |

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}¹

3 I_{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_{sat}¹: Peak current for approximately 20% rolloff at +25°C.

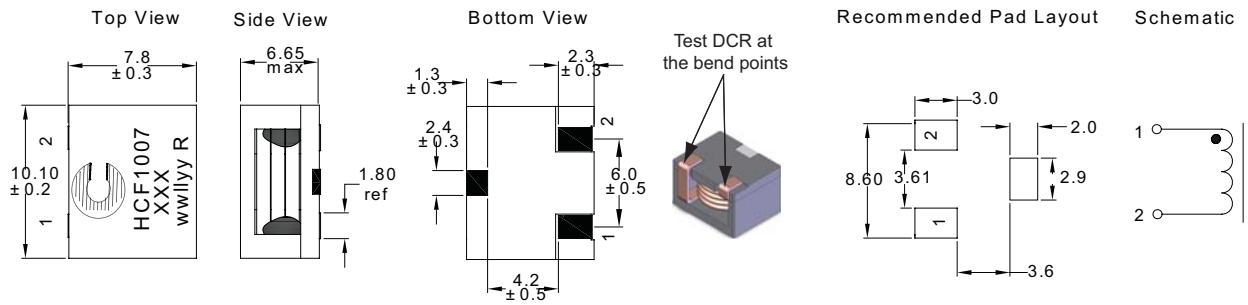
5 I_{sat}²: Peak current for approximately 20% rolloff at +125°C.

6 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).

7 Part Number Definition:HCF1007-xxx-R

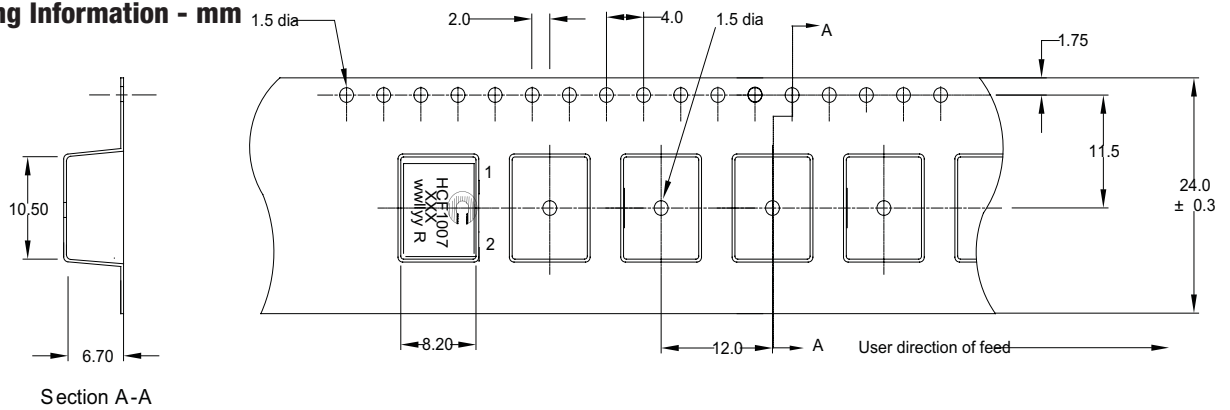
- HCF1007 = Product code and size
- xxx= Inductance value in μH, R = decimal point.
- If no "R" is present then third character =# of zeros
- -R suffix = RoHS compliant

Dimensions - mm



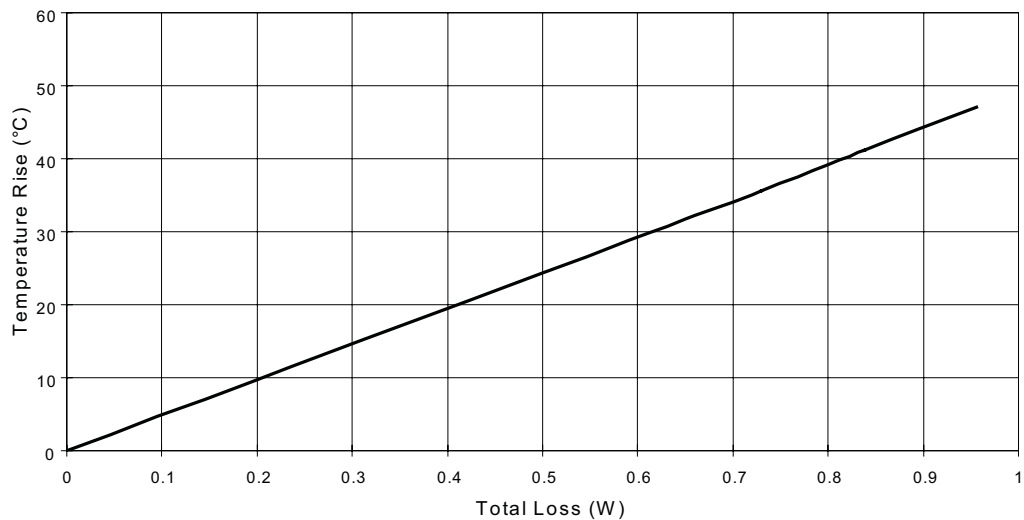
Part Marking: Coiltronics logo HCF1007 xxx = Inductance value in μH . (R = Decimal point). If no "R" is present, then last character is # of zeros wvllly = Date code R = Revision level

Packaging Information - mm



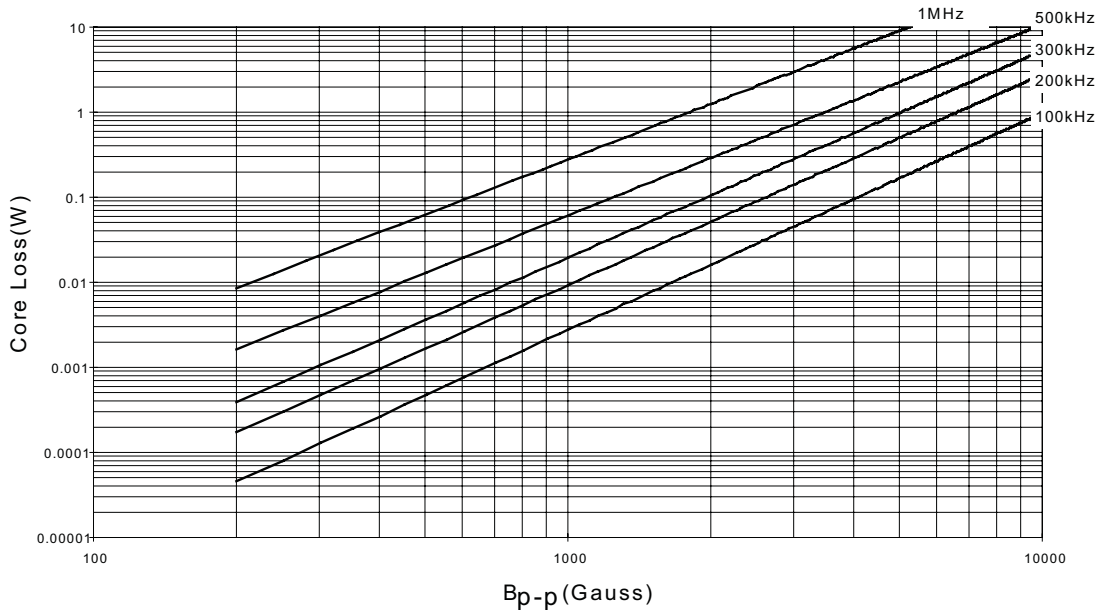
Supplied in tape-and-reel packaging, 700 parts per reel, 13" diameter reel.

Temperature Rise vs. Total Loss



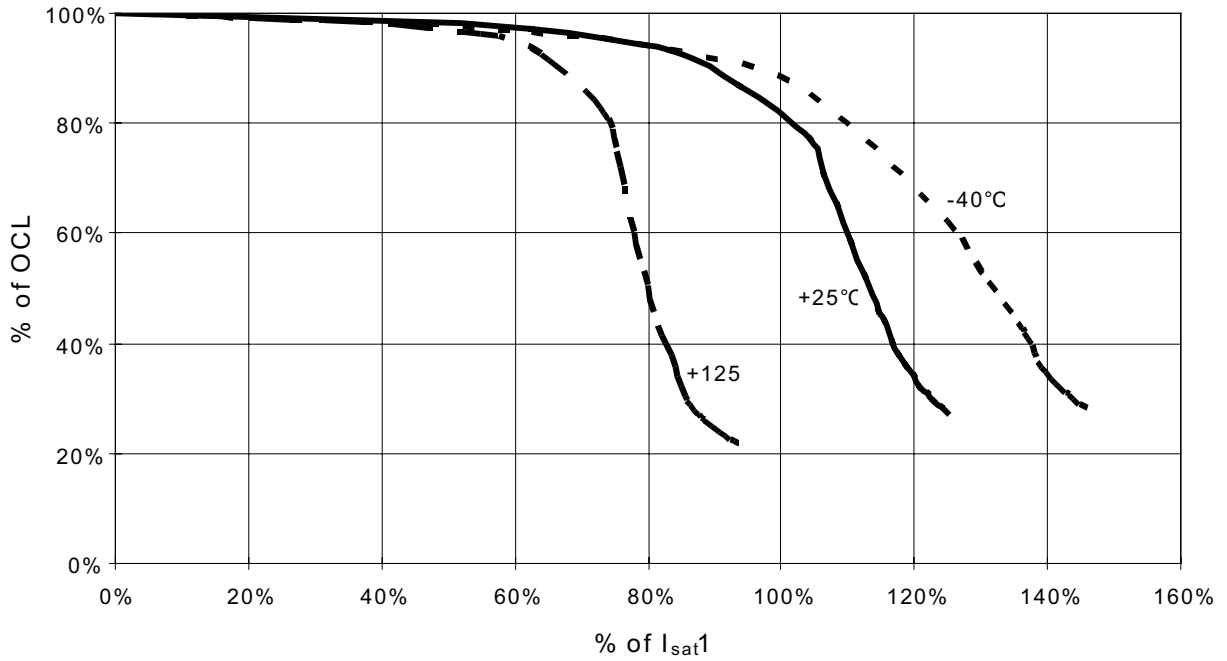
Core Loss

Core Loss vs. B_{p-p}



Inductance Characteristics

% of OCL vs. % of I_{sat1}



Solder Reflow Profile

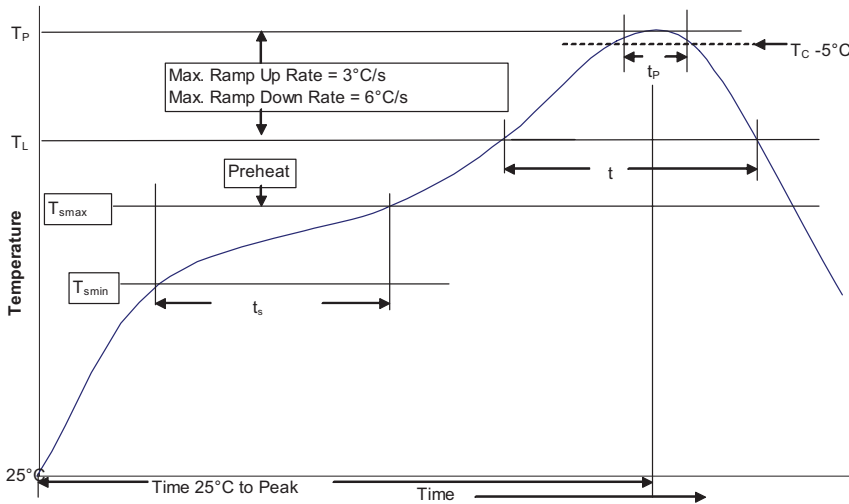


Table 1 - Standard SnPb Solder (T_c)

| 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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