

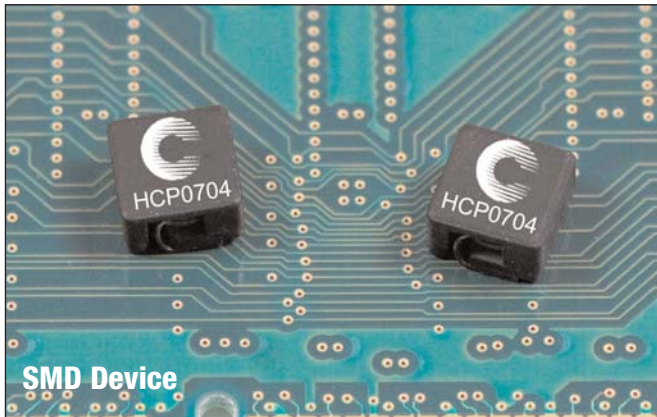


**THE DATASHEET OF
HCP0704-R40-R**



High Current, High Frequency, Power Inductors

HCP0704 Series



Description:

- Halogen free
- 155°C maximum total temperature operation
- 6.8 x 6.8 x 4.2mm surface mount package
- Powder iron core material
- Magnetically shielded, low EMI
- High temperature core material eliminates thermal aging issues
- High current carrying capacity, low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 0.40μH to 4.7μH
- Current range from 5.0 to 27 amps
- Frequency range up to 2MHz
- RoHS compliant

Applications:

- Voltage Regulator Module (VRM)
- Multi-phase regulators
- Desktop and servers
- Base station equipment
- Notebook regulators
- Data networking and storage systems
- Point-of-load modules
- Battery power systems
- DCR sensing



Environmental Data:

- Storage temperature range: -40°C to +155°C
- Operating temperature range: -40°C to +155°C (Range is application specific)
- Solder reflow temperature: J-STD-020D compliant

Packaging:

- Supplied in tape-and-reel packaging, 1000 parts per reel, 13" diameter reel

Product Specifications

Part Number ⁶	OCL ¹ ± 25% (μH)	FLL ² Min. (μH)	I _{rms} ³ (Amps)	I _{sat} ⁴ @ 25°C (Amps)	DCR (mΩ) @ 20°C	K-factor ⁵
HCP0704-R40-R	0.40	0.28	17	27	3.2 ±10%	383.1
HCP0704-R60-R	0.60	0.42	14	21	4.5 ±10%	313.5
HCP0704-1R0-R	1.00	0.7	12	17	6.2 ±10%	265.3
HCP0704-1R8-R	1.80	1.26	8.5	13	11.0 ±10%	202.8
HCP0704-2R3-R	2.30	1.56	7.5	11.5	16.5 ±10%	164.2
HCP0704-3R3-R	3.30	2.31	6.0	9.5	25.0 ±10%	149.9
HCP0704-4R7-R	4.70	3.29	5.0	8.0	29.5 ±10%	127.7

1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10V_{rms}, 0.0A_{dc}

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 pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 155°C under worst case operating conditions verified in the end application.

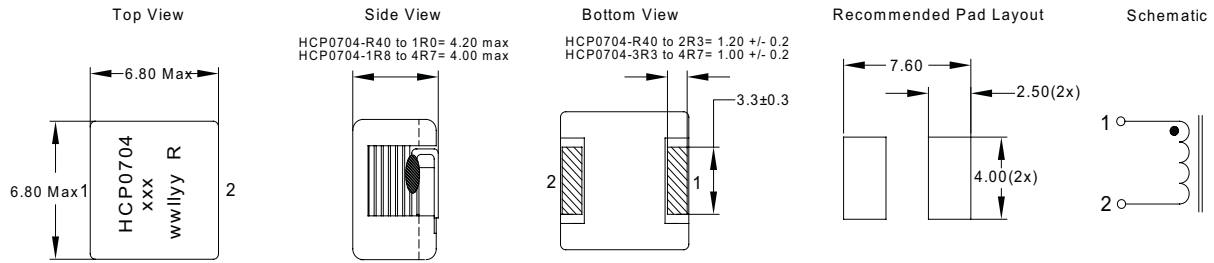
4 I_{sat}: Peak current for approximately 20% rolloff at +25°C.

5 K-factor: Used to determine B_{p-p} for core loss (see graph). B_{p-p} = K * L * ΔI : (Gauss), K: (K-factor from table), L: (inductance in μH), ΔI (peak-to-peak ripple current in amps).

6 Part Number Definition: HCP0704-xxx-R

- HCP0704 = 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

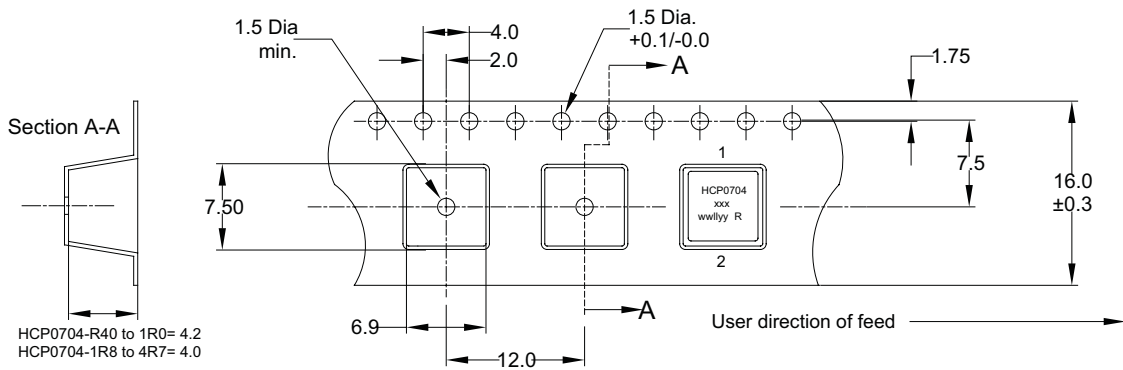
Dimensions - mm



The nominal DCR test point is in the middle of the terminal

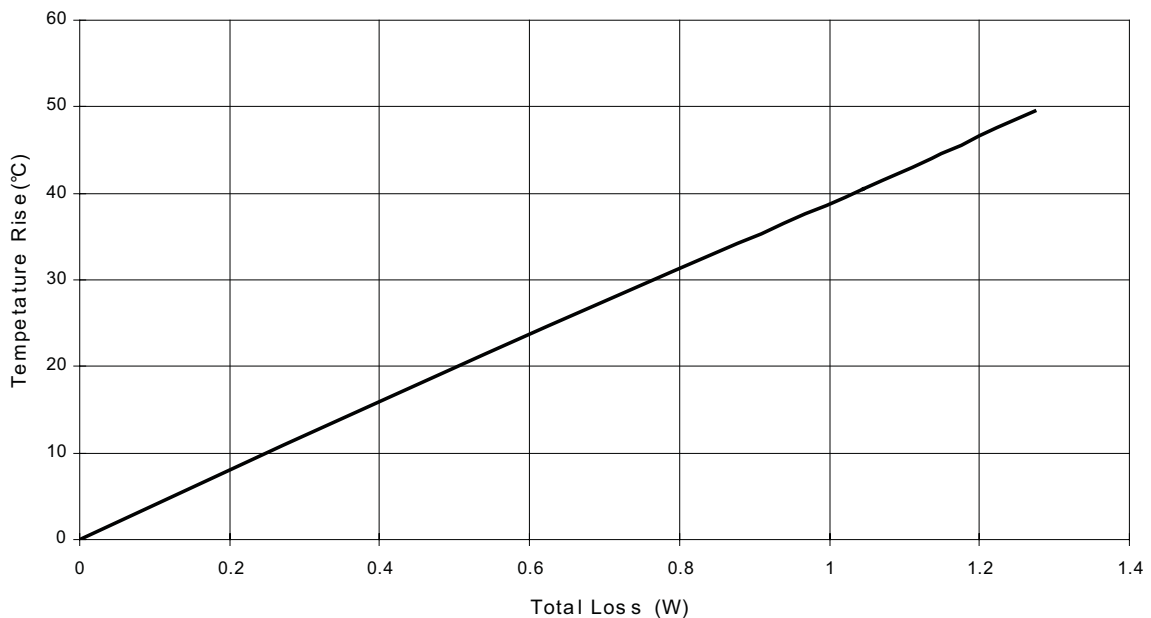
Part Marking: HCP0704 xxx = Inductance value in μH . (R = Decimal point). If no "R" is present, then last character is # of zeros wwllly = Date code R = Revision level

Packaging Information - mm

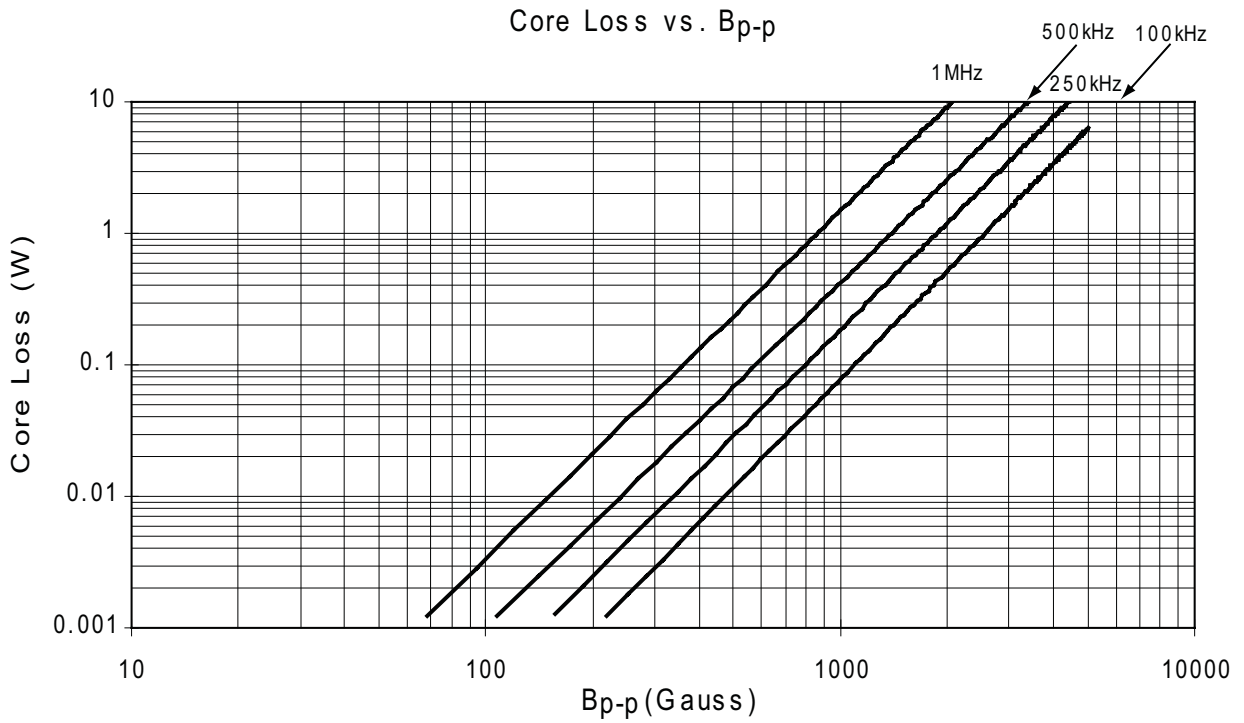


Supplied in tape-and-reel packaging, 1000 parts per reel, 13" diameter reel.

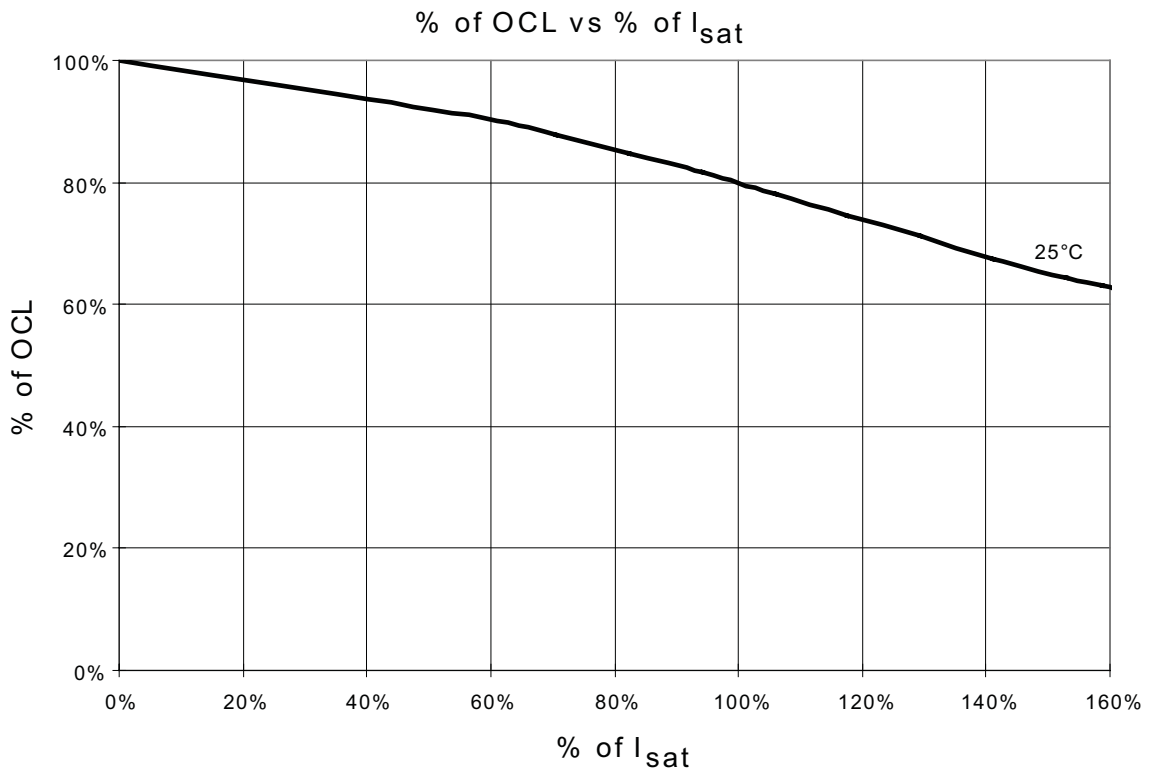
Temperature Rise vs. Total Loss



Core Loss



Inductance Characteristics



Solder Reflow Profile

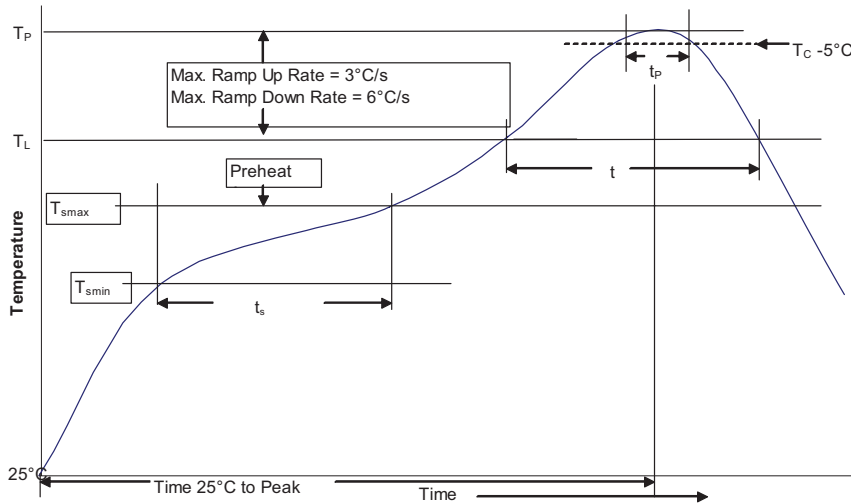


Table 1 - Standard SnPb Solder (T_c)

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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