

HCM1707

High current power inductors



Product features

- High current carrying capacity
- Magnetically shielded, low EMI
- Frequency range up to 1 MHz
- Inductance range from 1.5 μH to 68 μH
- Current range from 5.2 A to 40 A
- 17.5 mm x 17.2 mm footprint surface mount package in a 7.0 mm height
- Iron powder core material

Applications

- Voltage Regulator Module (VRM)
- Multi-phase regulators
- Point-of-load modules
- Desktop and server VRMs and EVRDs
- Data networking and storage systems
- Base station equipment
- Battery power systems

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 ⁶	OCL ¹ ±20% (μH)	FLL min. ² (μH)	I _{rms} ³ (A)	I _{sat} ⁴ (A)	DCR (mΩ) @ +20 °C (typical)	DCR (mΩ) @ +20 °C (maximum)	K-factor ⁵
HCM1707-1R5-R	1.5	0.96	40	40	1.85	2.15	124
HCM1707-2R2-R	2.2	1.41	37	34	2.15	2.50	103
HCM1707-4R7-R	4.7	3.01	27	24	4.12	4.72	76
HCM1707-6R8-R	6.8	4.35	20	22	6.55	7.55	60
HCM1707-8R2-R	8.2	5.25	16	20	8.10	8.70	55
HCM1707-100-R	10	6.40	14	18	9.30	10	47
HCM1707-150-R	15	9.60	12	13	14.5	15.5	43
HCM1707-220-R	22	14.1	9.5	11	21	23	37
HCM1707-330-R	33	21.1	9.0	10	35	37	28
HCM1707-470-R	47	30.1	6.8	7.5	41	47	25
HCM1707-680-R	68	43.5	5.2	6.5	74	85	20

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V_{rms}, 0.0 Adc, +25 °C.

2. Full Load Inductance (FLL): Test parameters: 100 kHz, 0.25 V_{rms}, I_{sat}, +25 °C.

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.

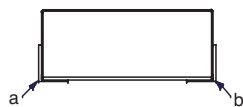
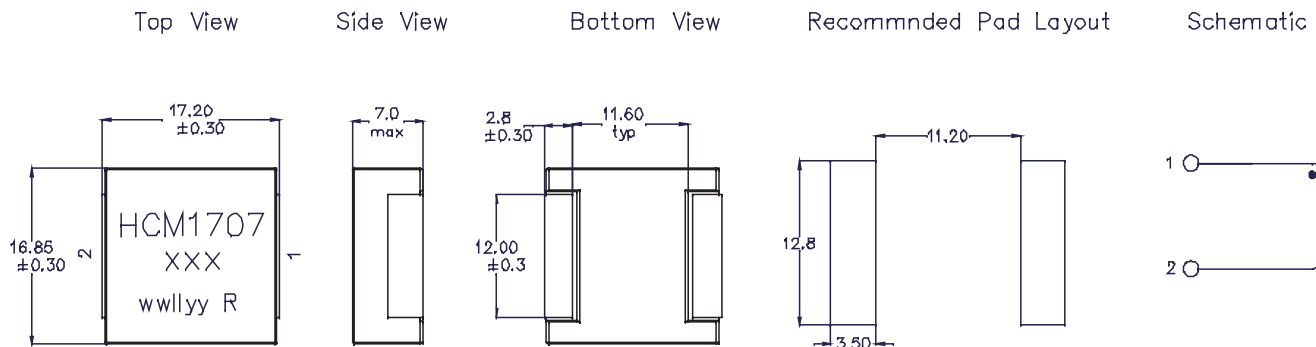
4. I_{sat}: Peak current for approximately 20% rolloff at +25 °C.

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

6. Part Number Definition: HCM1707-yyy-R

- HCM1707 = Product code and size
- yyy= Inductance value in uH, R = decimal point
- if no R is present then third character = number of zeros.
- "-R" suffix = RoHS compliant

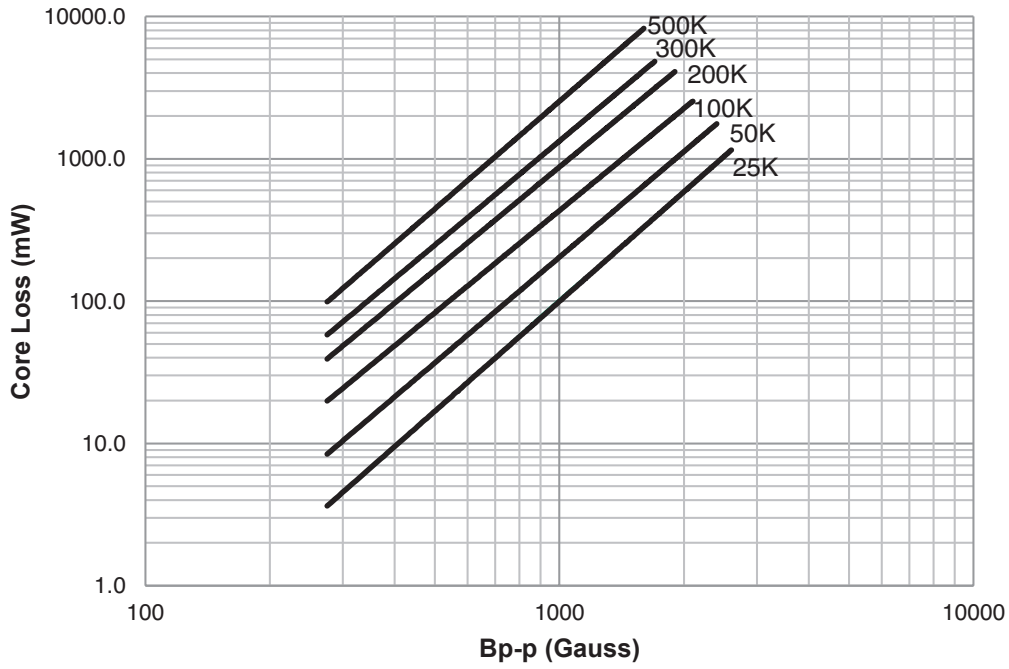
Dimensions - mm



DCR measured between point "a" and point "b"

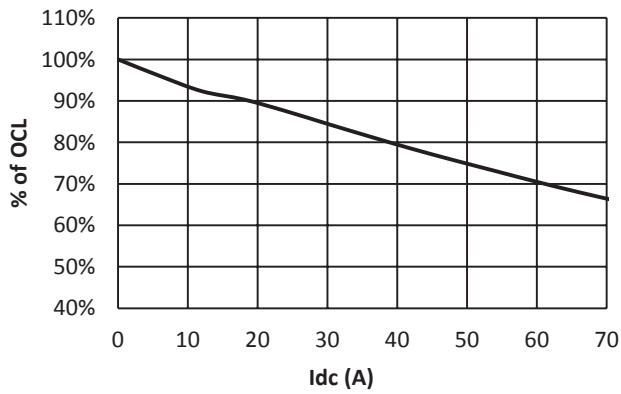
All soldering surfaces coplanar within 0.10 millimeters.
Part marking: HCM1707; XXX = initial inductance in μH, R = decimal point; if no R is present, last digit equals number of zeros.
wwllly = date code, R = revision level
Color: Grey.
Do not route traces or vias underneath the inductor

Core loss vs. Bp-p

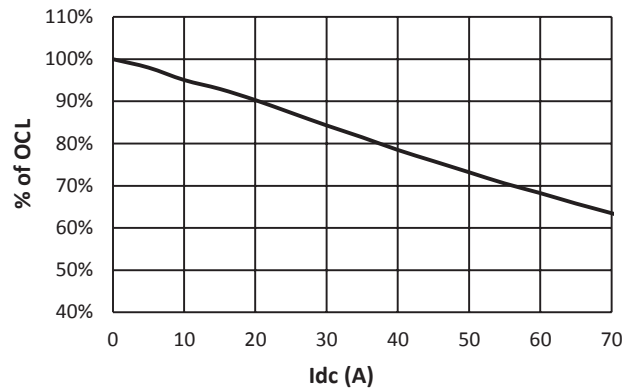


Inductance characteristics

HCM1707-1R5-R

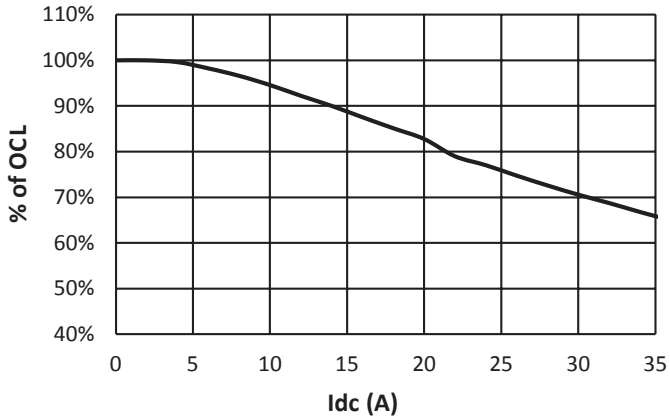


HCM1707-2R2-R

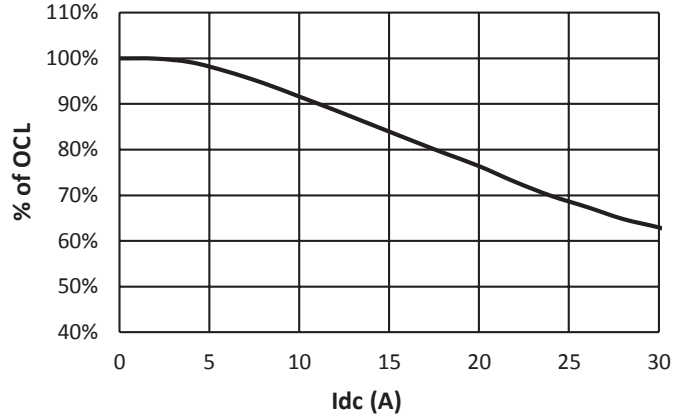


Inductance characteristics

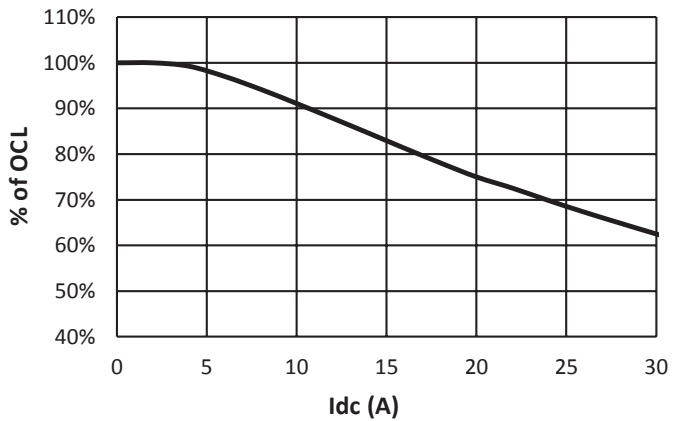
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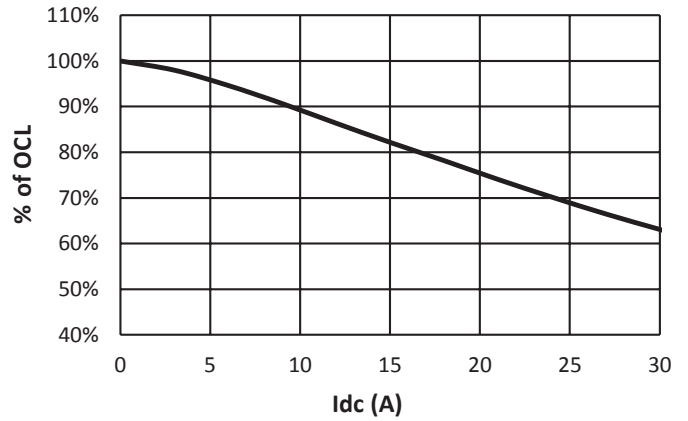
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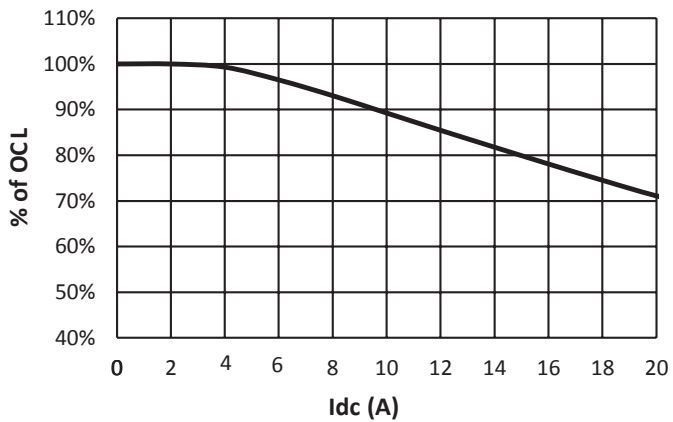
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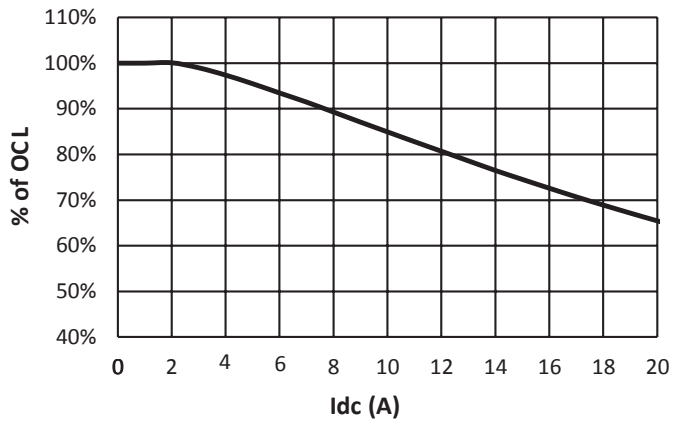
HCM1707-100-R



HCM1707-150-R

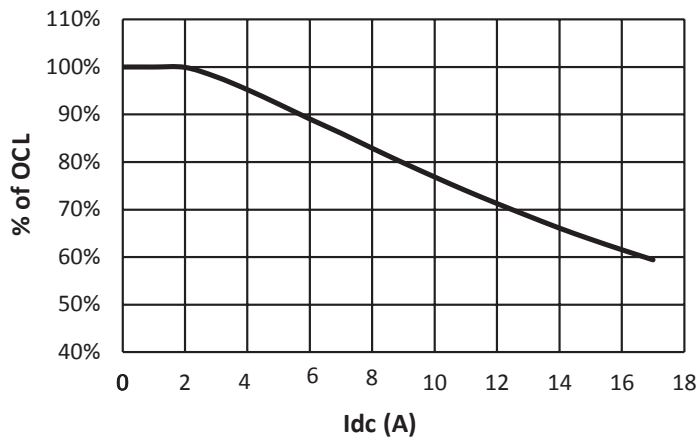


HCM1707-220-R

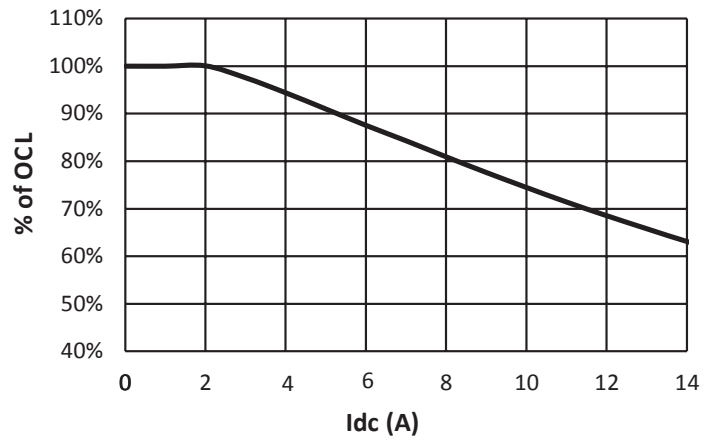


Inductance characteristics

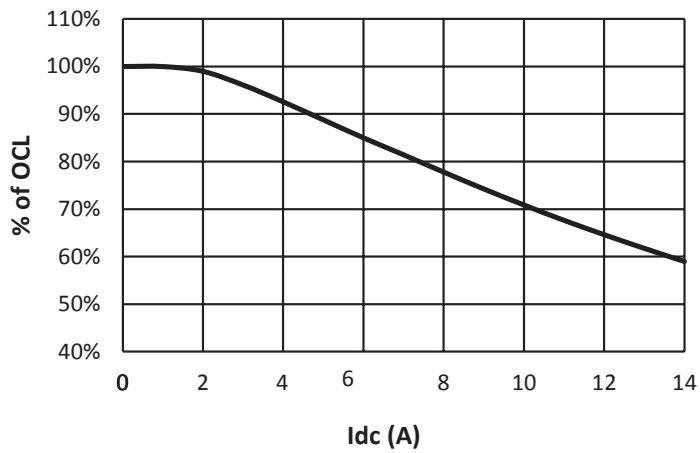
HCM1707-330-R



HCM1707-470-R



HCM1707-680-R



Solder Reflow Profile

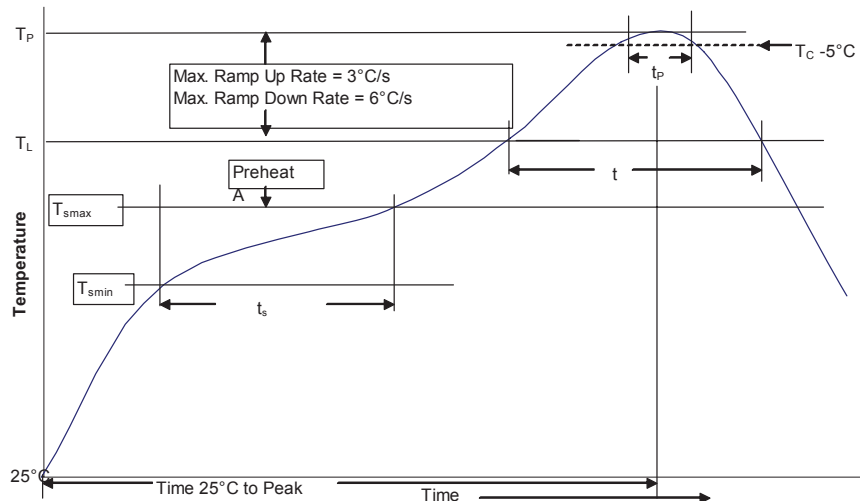


Table 1 - Standard SnPb Solder (T_C)

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-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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