

High Current Power Inductors

HCM1305 Series



SMD Device

Description

- Halogen free
- 125°C maximum total operating temperature
- 13.8x 12.5 x 5.0mm maximum surface mount package
- Powder Iron core material
- Magnetically shielded, low EMI
- High current carrying capacity, low core losses
- Inductance range 0.22µH to 2.2µH
- Current range from 20 to 110 Amps
- Frequency range up to 5MHz
- RoHS compliant

Applications

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

Environmental Data

- Storage temperature range: -55°C to +125°C
- Operating temperature range: -55°C to +125°C (ambient plus self temperature rise)
- Solder reflow temperature: J-STD-020D compliant

Packaging

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

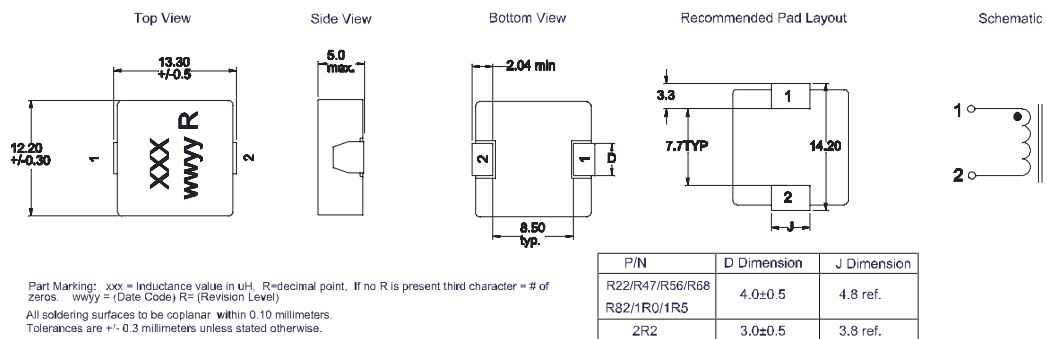
Product Specifications

Part Number ⁶	OCL ¹ ± 20% (µH)	FLL ² Min (µH)	I _{rms} ³ (Amps)	I _{sat} ⁴ @25°C (Amps)	DCR (mΩ) @20°C Nominal	DCR (mΩ) @20°C Maximum	K-factor ⁵
HCM1305-R22-R	0.22	0.14	51	110	0.63	0.72	367
HCM1305-R47-R	0.47	0.30	38	65	0.80	0.92	174
HCM1305-R56-R	0.56	0.36	36	55	1.15	1.33	110
HCM1305-R68-R	0.68	0.44	34	53	1.15	1.33	110
HCM1305-R82-R	0.82	0.52	31	52	1.40	1.61	140
HCM1305-1R0-R	1.00	0.64	29	50	2.10	2.42	117
HCM1305-1R5-R	1.50	0.96	23	48	2.75	3.16	120
HCM1305-2R2-R	2.20	1.41	20	32	4.60	5.29	110

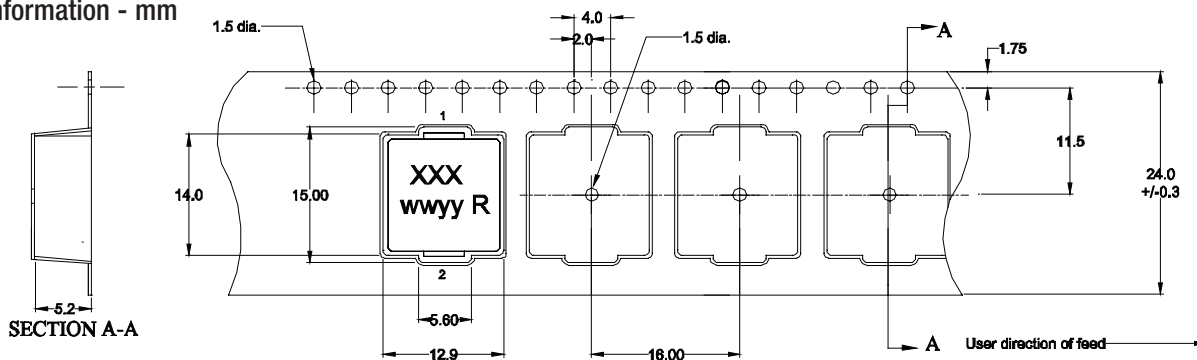
1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.25V_{rms}, 0.0Adc @ 25°C.
2. Full Load Inductance (FLL) Test Parameters: 100kHz, 0.25V_{rms}, I_{sat} @ 25°C.
3. I_{rms}: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB layout, 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_{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).
6. Part Number Definition: HCM1305-xxx-R
 - HCM1305 = Product code and size
 - xxx= Inductance value in µH, R = decimal point
 - "-R" suffix = RoHS compliant

Dimensions - mm

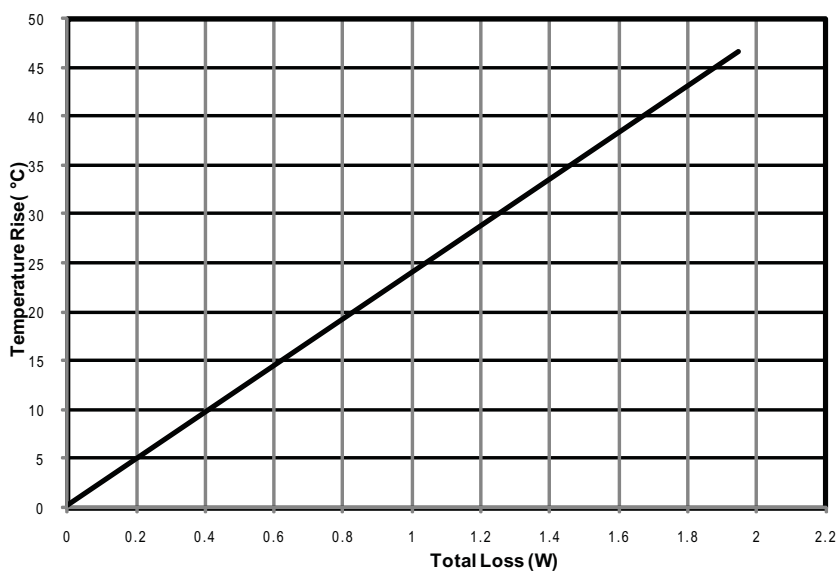


Packaging Information - mm

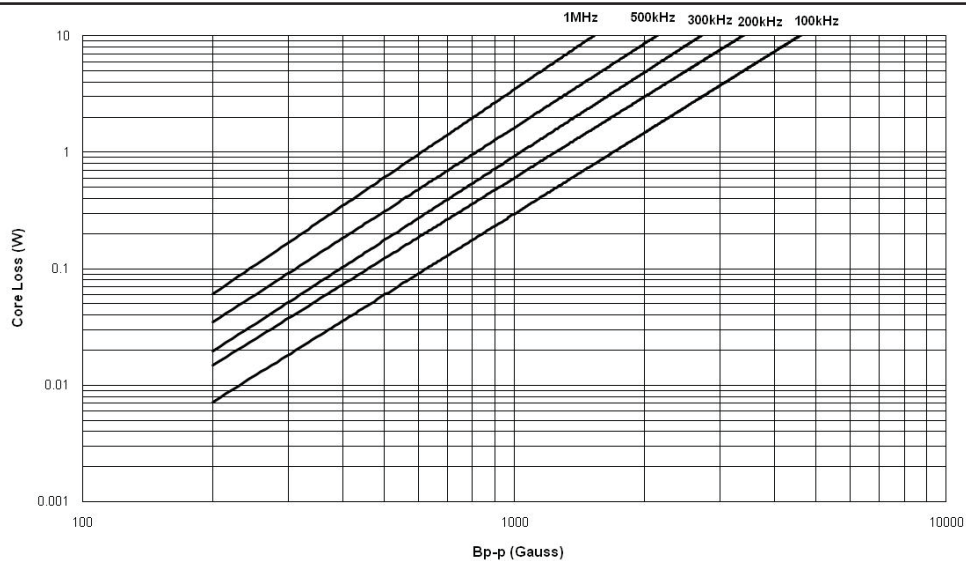


Supplied in tape and reel packaging, 400 parts per 13" diameter reel.

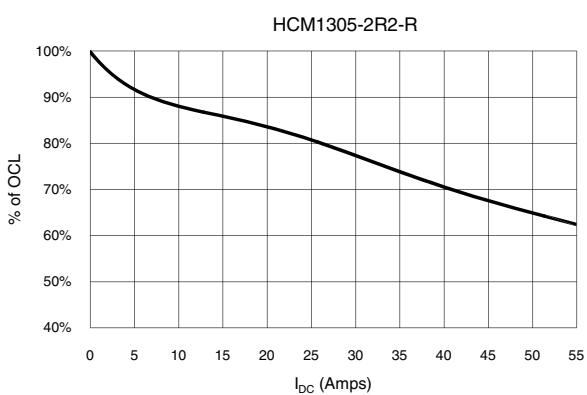
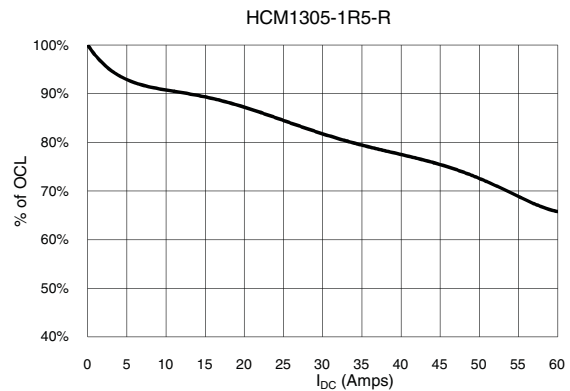
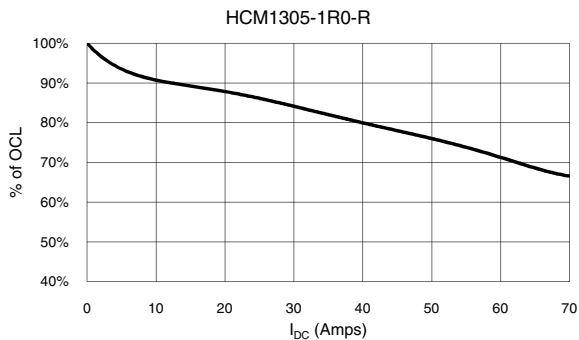
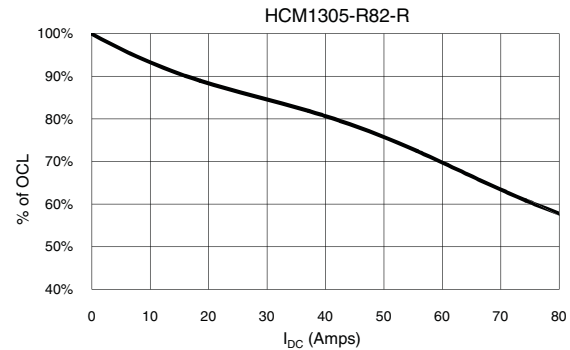
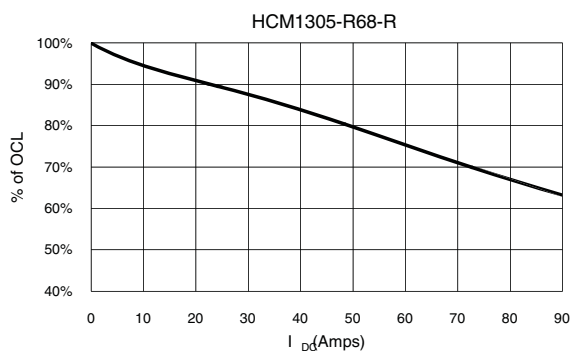
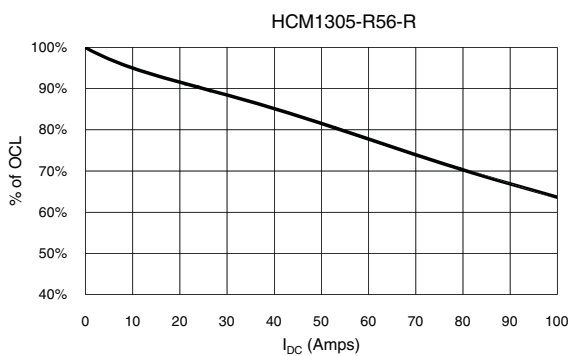
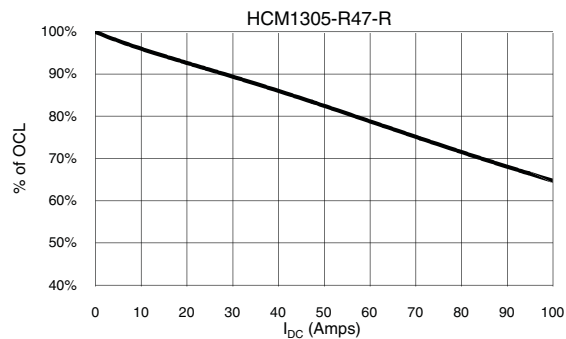
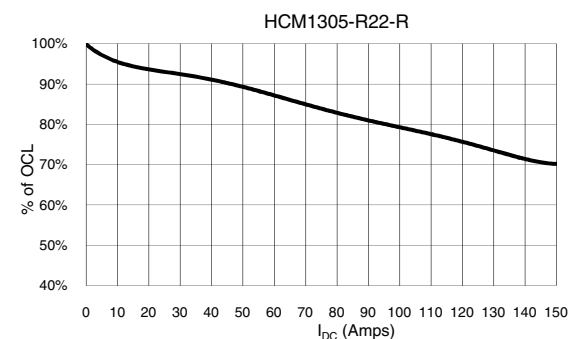
Temperature Rise vs. Total Loss



Core Loss



Inductance Characteristics



Solder Reflow Profile

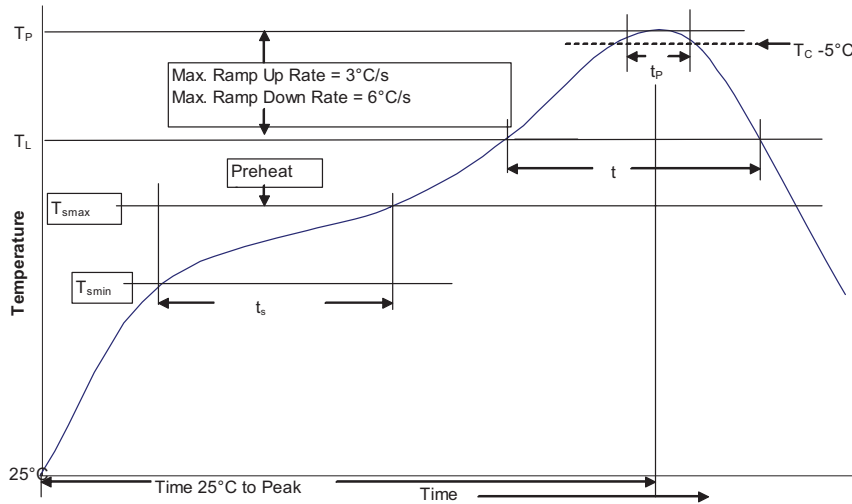


Table 1 - Standard SnPb Solder (T_C)

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