

High Current, Power Inductors

HCM0503 Series



Description

- Halogen Free, lead free, RoHS compliant
- 125°C maximum total temperature operation
- 5.5 x 5.3 x 3.0mm maximum surface mount package
- Powder iron core material
- Magnetically shielded, low EMI
- High current carrying capacity, low core losses
- Inductance range from 0.20μH to 1.0μH
- Current range from 8.5 to 22.2 Amps
- Frequency range up to 1MHz

Applications

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

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, 2000 parts per 13" diameter reel

Product Specifications

Part Number ⁶	OCL ¹ (μH) ±20%	FLL min, ² (μH)	I _{rms} ³ (Amps)	I _{sat} ⁴ @ 25°C (Amps)	DCR (mΩ) @ 20°C (Typical)	DCR (mΩ) @ 20°C (Maximum)	K-factor ⁵
HCM0503-R20-R	0.20	0.128	22.2	21.0	2.10	2.31	1764
HCM0503-R35-R	0.35	0.224	16.6	14.9	3.90	4.29	1259
HCM0503-R75-R	0.75	0.480	11.3	9.7	8.50	9.35	801
HCM0503-1R0-R	1.00	0.640	10.1	8.5	10.40	11.44	588

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: HCM0503-xxx-R

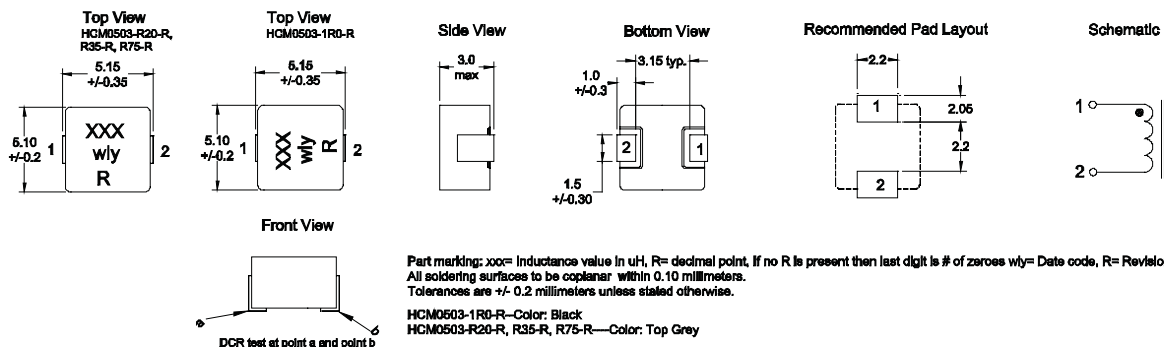
• HCM0503 = Product code and size

• xxx= Inductance value in μH, R = decimal point,

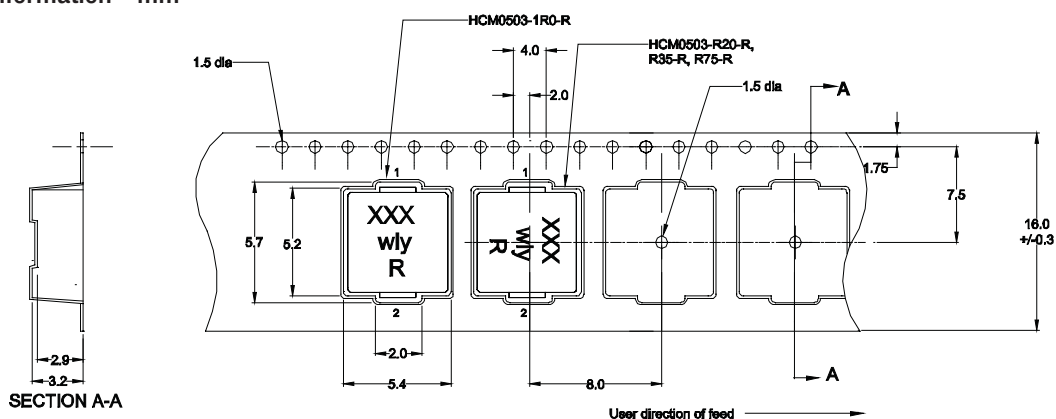
If no R is present then 3rd digit equals number of zeros.

• "-R" suffix = RoHS compliant

Dimensions - mm

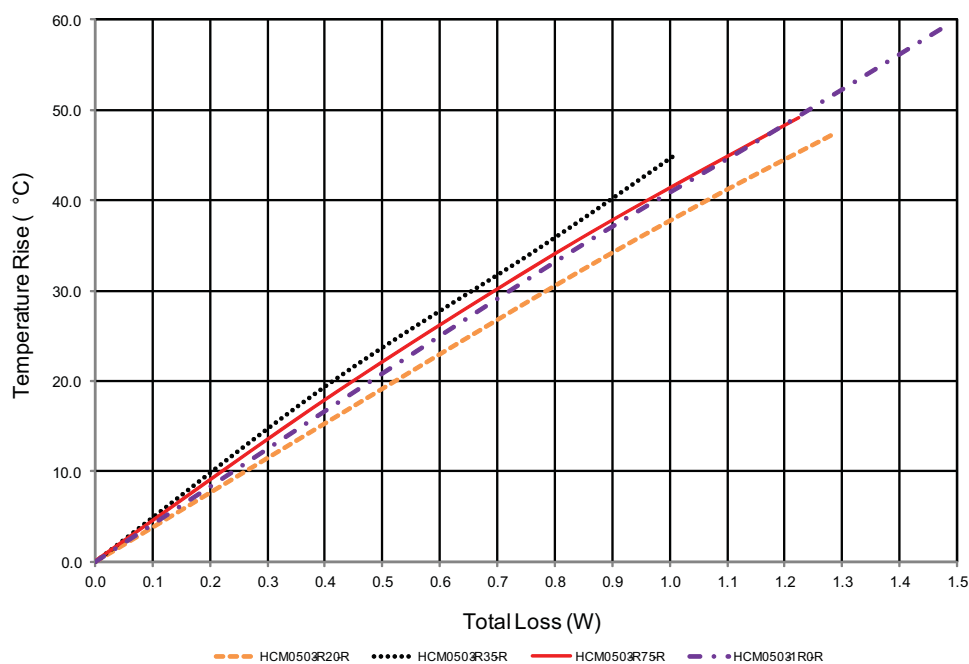


Packaging Information - mm

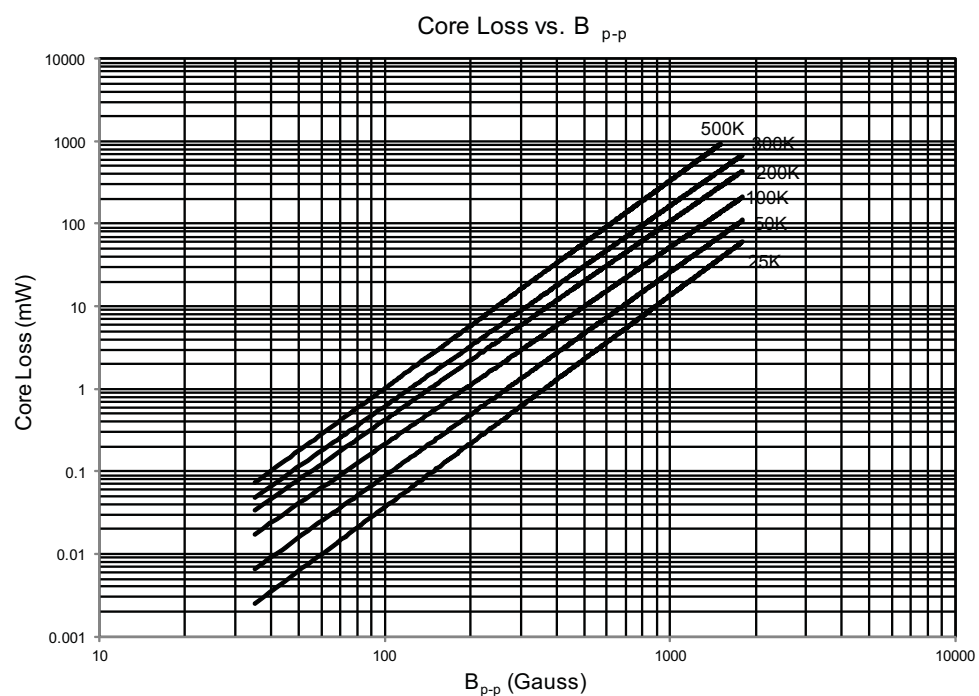


Supplied in tape-and-reel packaging, 2000 parts per 13" diameter reel.

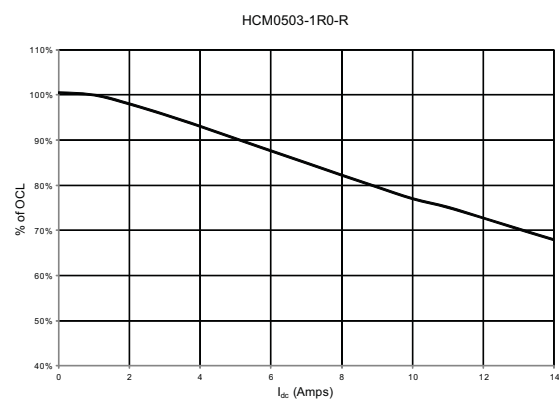
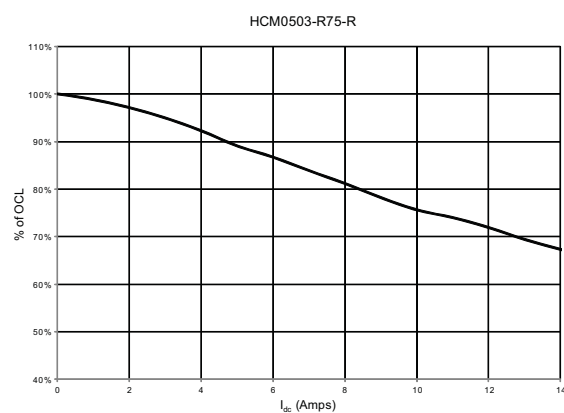
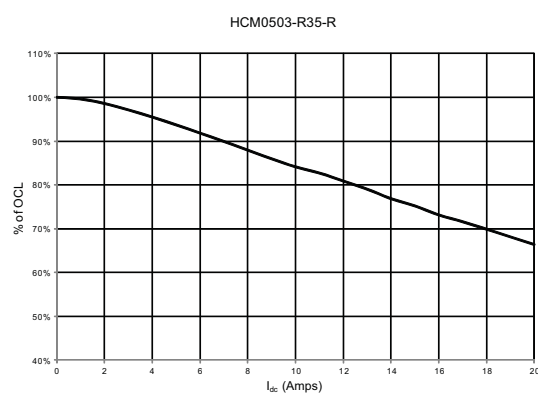
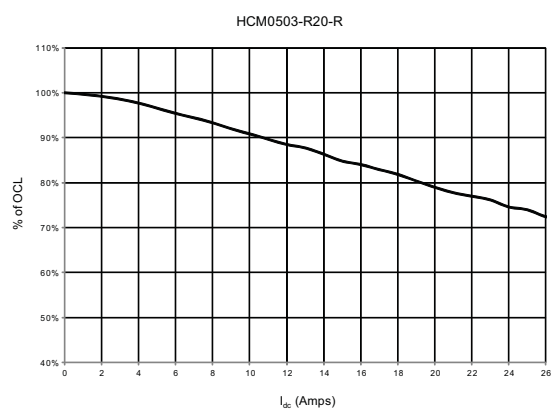
Temperature Rise vs. Total Loss



Core Loss



Inductance Characteristics



Solder Reflow Profile

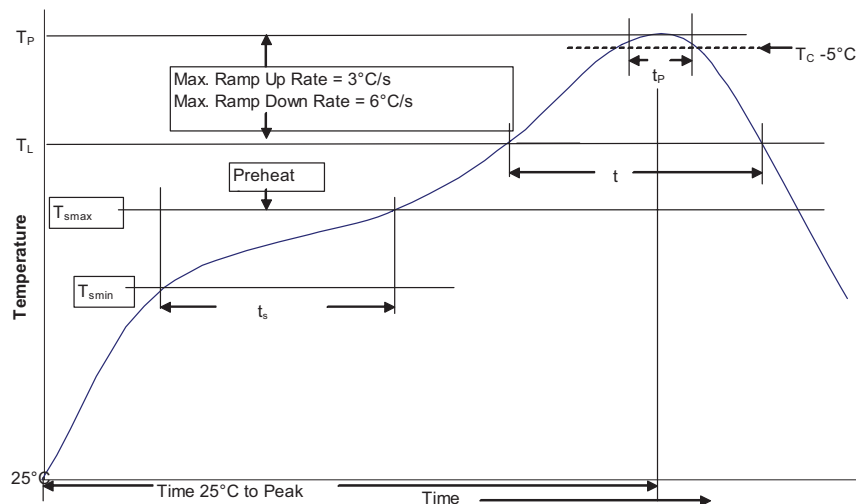


Table 1 - Standard SnPb Solder (T_c)

Package Thickness	Volume mm^3 <350	Volume mm^3 >350
<2.5mm	235°C	220°C
≥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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