

# HCM1103

## High current power inductors



### Product features

- 11.5 x 10.3 x 3.0 mm maximum surface mount package
- Iron powder core material
- Magnetically shielded, low EMI
- High current carrying capacity, low core losses
- Inductance range from 0.12  $\mu$ H to 22.0  $\mu$ H
- Current range from 3.0 A to 75 A
- Halogen free, lead free, RoHS compliant

### Applications

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

### Environmental Data

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



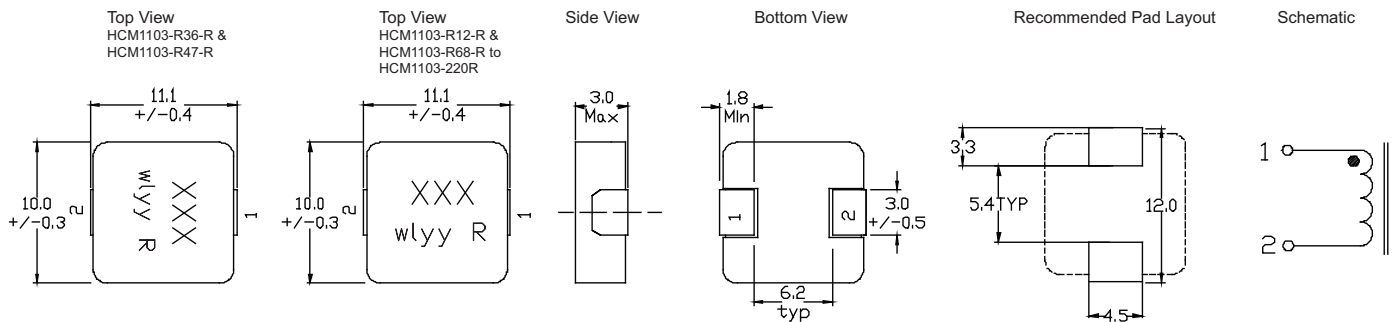
Product Specifications

Part Number <sup>6</sup>	OCL <sup>1</sup> ±20% (µH)	FLL min. <sup>2</sup> (µH)	I <sub>rms</sub> <sup>3</sup> (A)	I <sub>sat</sub> <sup>4</sup> @ +25 °C (A)	DCR (mΩ) @ +20 °C Typical	DCR (mΩ) @ +20 °C Maximum	K-Factor <sup>5</sup>
HCM1103-R12-R	0.12	0.07	30	75	0.55	0.61	1200
HCM1103-R36-R	0.36	0.26	23	28	1.10	1.30	711
HCM1103-R47-R	0.47	0.33	20	26	1.50	2.00	515
HCM1103-R68-R	0.68	0.38	21	23	2.90	3.40	510
HCM1103-1R0-R	1.0	0.56	15	21	5.50	6.00	377
HCM1103-2R2-R	2.2	1.2	13	16	8.40	9.00	264
HCM1103-3R3-R	3.3	1.9	9.0	14	14.5	16.0	230
HCM1103-4R7-R	4.7	2.6	7.0	13	20.5	22.5	205
HCM1103-8R2-R	8.2	4.6	5.0	8.5	35.0	38.5	153
HCM1103-100-R	10.0	5.6	5.0	7.5	40.0	44.0	141
HCM1103-150-R	15.0	8.4	4.0	6.0	59.0	65.0	114
HCM1103-220-R	22.0	12.3	3.0	5.0	90.0	99.0	91

- Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V<sub>rms</sub>, 0.0 Adc @ +25 °C
- Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.25 V<sub>rms</sub>, I<sub>sat</sub> @ +25 °C.
- I<sub>rms</sub>: 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.

- I<sub>sat</sub>: Peak current for approximately 30% rolloff at +25 °C
- K-factor: Used to determine B<sub>p-p</sub> for core loss (see graph). B<sub>p-p</sub> = K \* L \* ΔI. B<sub>p-p</sub>:(Gauss), K: (K-factor from table), L: (Inductance in µH), ΔI (peak-to-peak ripple current in Amps).
- Part Number Definition: HCM1103-xxx-R  
HCM1103 = Product code and size  
xxx= Inductance value in µH, R = decimal point,  
if no R is present then third character = number of zeros.  
-R suffix = RoHS compliant

Dimensions (mm)

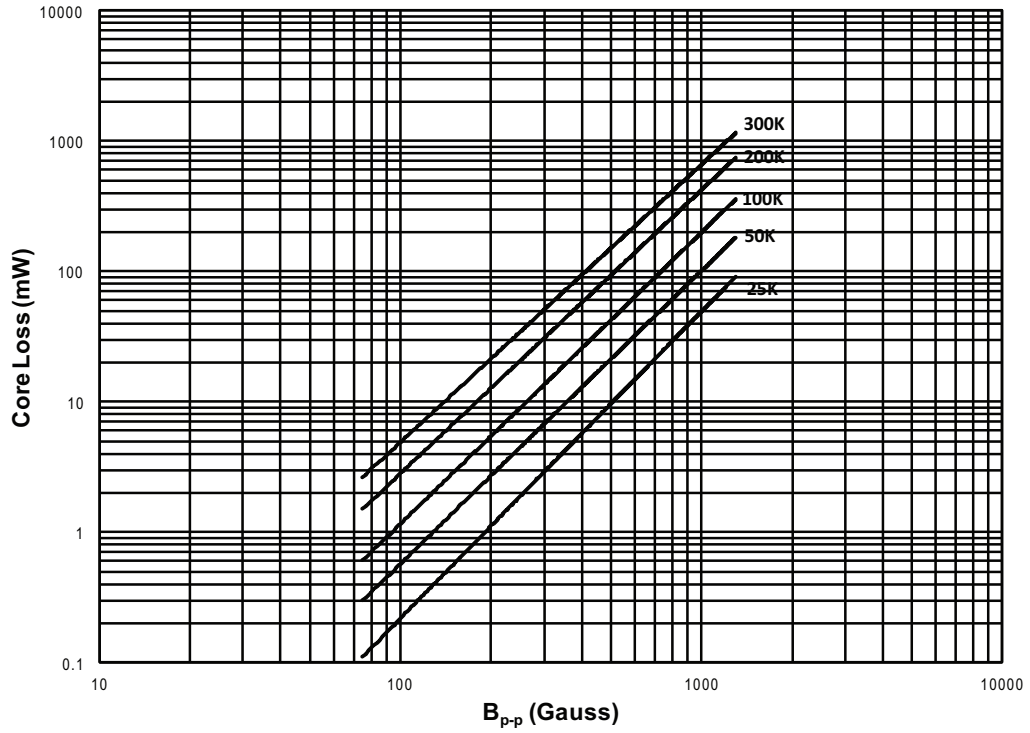


Part Marking: xxx = Inductance value in uH, R = decimal point, if no R is present then third character = # of zeros.  
wlyy = (Date code), R = Revision Level  
All soldering surfaces to be coplanar within 0.10 millimeters.  
Tolerances are ±0.3 millimeters unless stated otherwise.  
HCM1103-R36-R and HCM1103-R47-R Color: Top Grey  
HCM1103-R12-R and HCM1103-R68-R to HCM1103-220-R Color : Top Grey  
Do not route traces or vias underneath the inductor

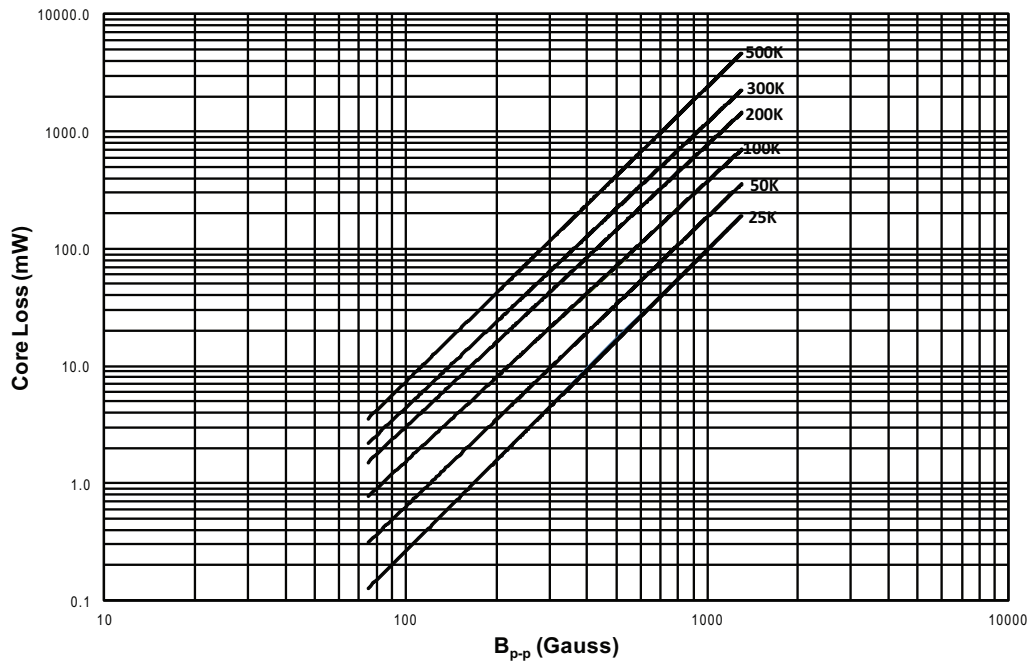


Core loss vs.  $B_{p-p}$

HCM1103-; R36-R and R47-R

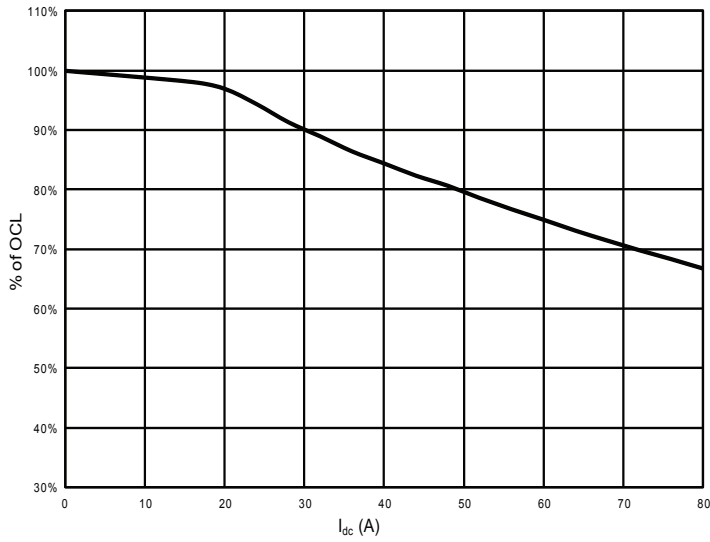


HCM1103-; R12-R, R68-R through 220-R

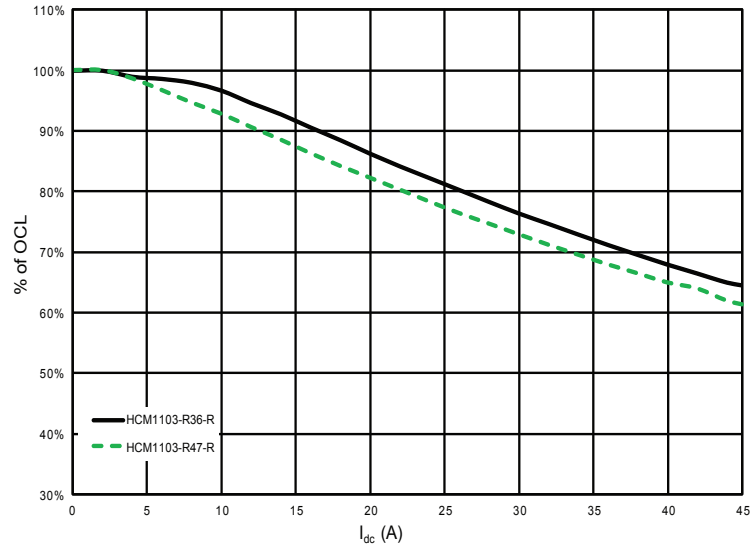


Inductance characteristics

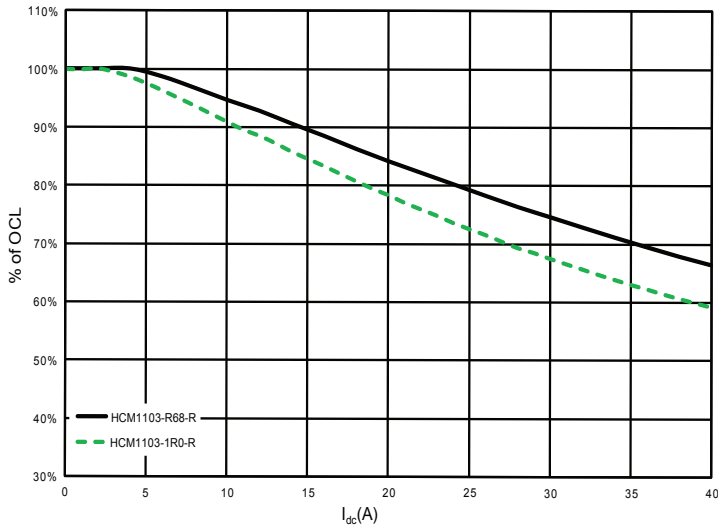
HCM1103-R12-R



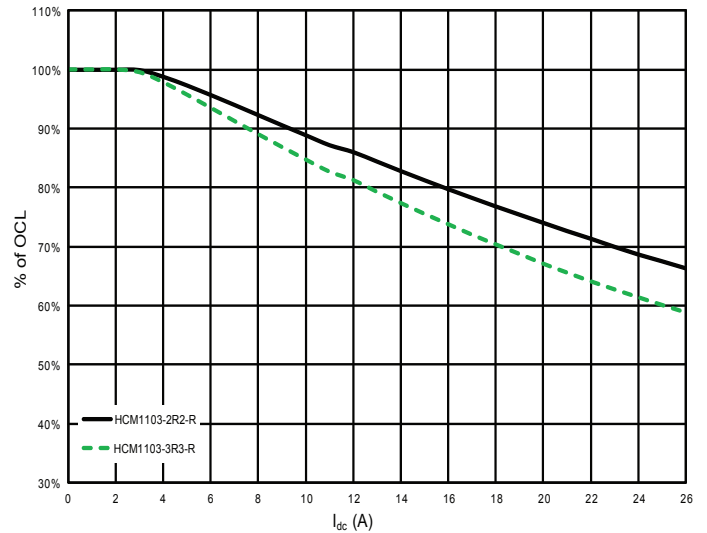
HCM1103-; R36-R, R47-R



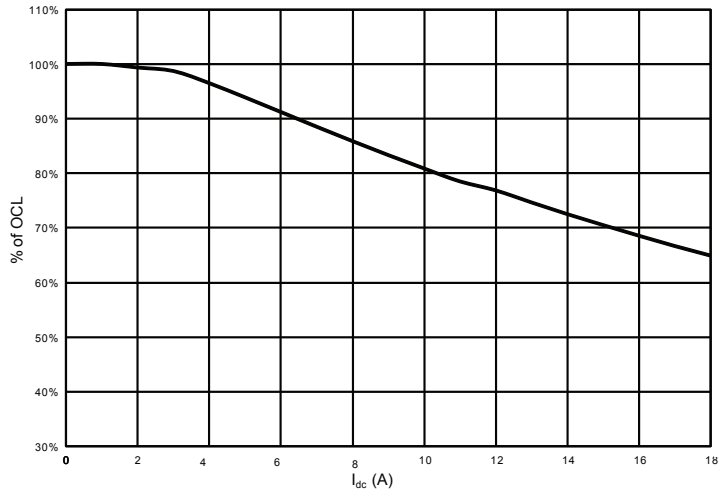
HCM1103-; R68-R, 1R0-R



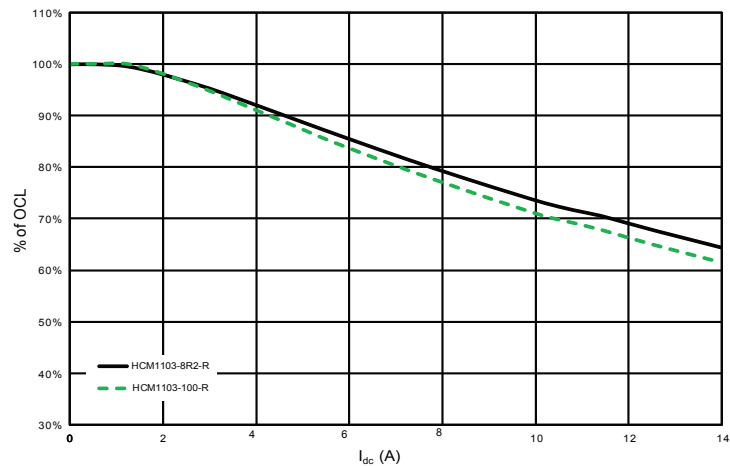
HCM1103-; 2R2-R, 3R3-R



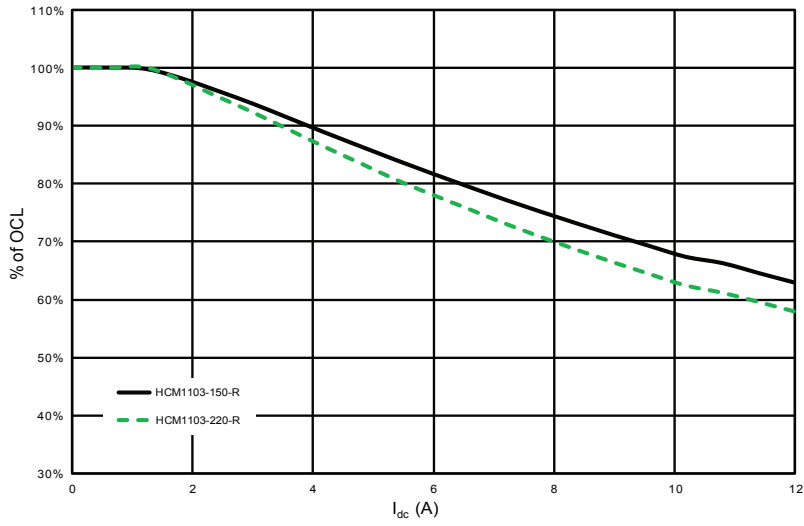
HCM1103-4R7-R



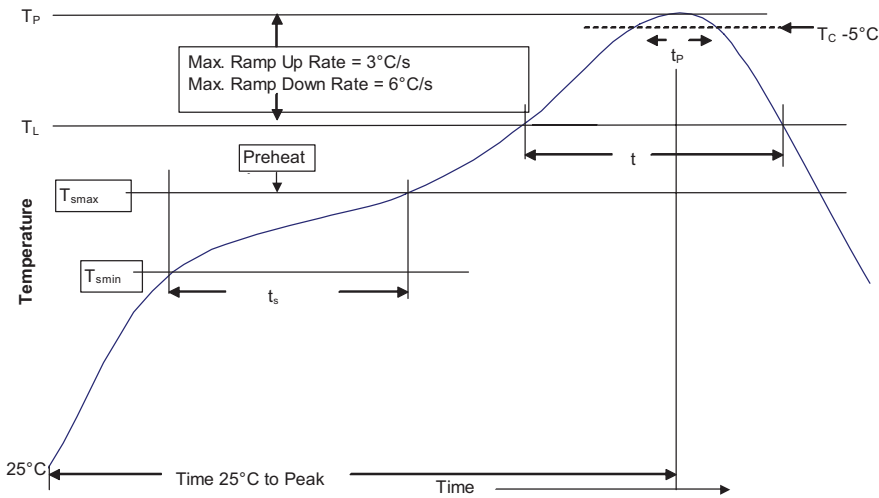
HCM1103-; 8R2-R, 100-R



**Inductance characteristics**



**Solder reflow profile**



**Table 1 - Standard SnPb Solder ( $T_c$ )**

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> ≥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 <sup>3</sup> <350	Volume mm <sup>3</sup> 350 - 2000	Volume mm <sup>3</sup> >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 JEDEC 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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[HCM1103-4R7-R](#) [HCM1103-8R2-R](#) [HCM1103-R12-R](#) [HCM1103-R36-R](#) [HCM1103-R68-R](#) [HCM1103-R47-R](#)