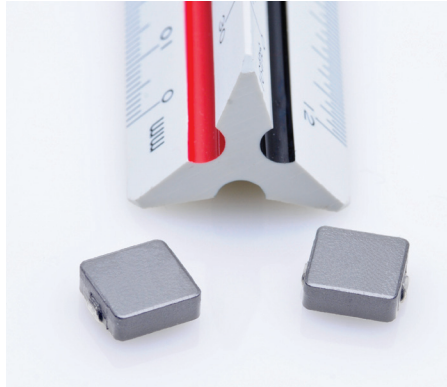


# Coiltronics HCM1104 Series

## High current power inductors



### Product description

- High current carrying capacity
- Low core losses
- Magnetically shielded, low EMI
- Frequency range up to 5MHz
- Inductance range from 0.20 $\mu$ H to 10 $\mu$ H
- Current range from 7.5A to 45A
- 11.5x10.3mm footprint surface mount package in a 4.0mm height
- Powder iron core material
- 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 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 + self-temperature rise)
- Solder reflow temperature: J-STD-020D compliant



Powering Business Worldwide



The Coiltronics brand of magnetics (formerly of the Bussmann Division of Cooper Industries) is now part of Eaton's Electrical Group, Electronics Division.

**Coiltronics is now part of Eaton**  
**Same great products plus even more.**

**Product specifications**

Part Number <sup>7</sup>	OCL <sup>1</sup> ( $\mu\text{H}$ ) $\pm 20\%$	FLL <sup>2</sup> Min. ( $\mu\text{H}$ )	$I_{\text{rms}}$ <sup>3</sup> (amps)	$I_{\text{sat}}$ <sup>4,5</sup> @25°C (amps)	DCR (m $\Omega$ ) @ 20°C typical	DCR (m $\Omega$ ) @ 20°C maximum	K-factor <sup>6</sup>
HCM1104-R20-R	0.20	0.13	32	45	0.63	0.72	411
HCM1104-R36-R	0.36	0.23	30	42	1.04	1.20	269
HCM1104-R45-R	0.45	0.29	29	36	1.07	1.23	219
HCM1104-R56-R	0.56	0.36	25	32	1.56	1.80	230
HCM1104-R90-R	0.90	0.58	22	28	2.17	2.50	236
HCM1104-1R0-R	1.0	0.56	18	28	3.00	3.30	378
HCM1104-1R5-R	1.5	0.84	16	32	3.80	4.20	310
HCM1104-2R2-R	2.2	1.23	12	18	6.00	7.00	253
HCM1104-3R3-R	3.3	1.85	10	16	10.8	11.8	220
HCM1104-4R7-R	4.7	2.63	8.5	15	17.0	20.0	175
HCM1104-100-R	10	5.60	7.5	8.5	27.0	30.0	116

1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.25V<sub>rms</sub>, 0.0Adc, +25°C.

2. Full Load Inductance (FLL) Test Parameters: 100kHz, 0.25V<sub>rms</sub>, I<sub>sat</sub> @ +25°C.

3. 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.

4. I<sub>sat</sub>: Peak current for approximately 20% rolloff at +25°C- HCM1104-R20-R to HCM1104-R90-R.

5. I<sub>sat</sub>: Peak current for approximately 30% rolloff at +25°C- HCM1104-1R0-R to HCM 1104-100-R.

6. K-factor: Used to determine B<sub>pp</sub> for core loss (see graph). B<sub>pp</sub> = K \* L \*  $\Delta I$ . B<sub>pp</sub>: (Gauss), K: (K-factor from table), L: (Inductance in  $\mu\text{H}$ ),  $\Delta I$  (Peak to peak ripple current in amps).

7. Part Number Definition: HCM1104-yyy-R

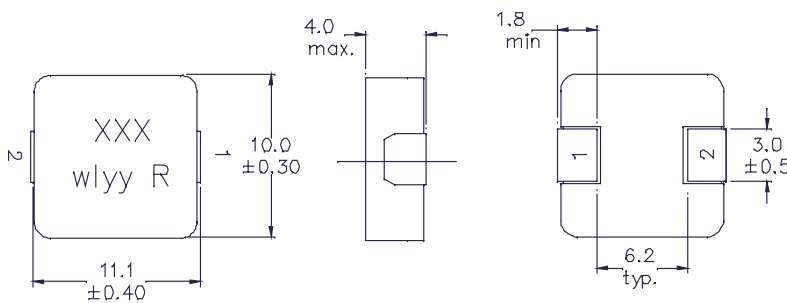
- HCM1104 = Product code and size

- yyy= Inductance value in  $\mu\text{H}$ , R = decimal point,

if no R is present then third character = number of zeros.

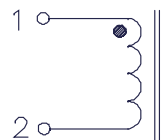
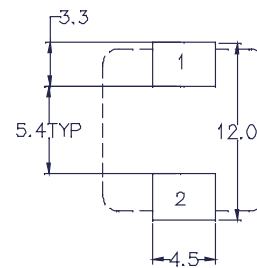
- "-R" suffix = RoHS compliant

**Dimensions - mm**



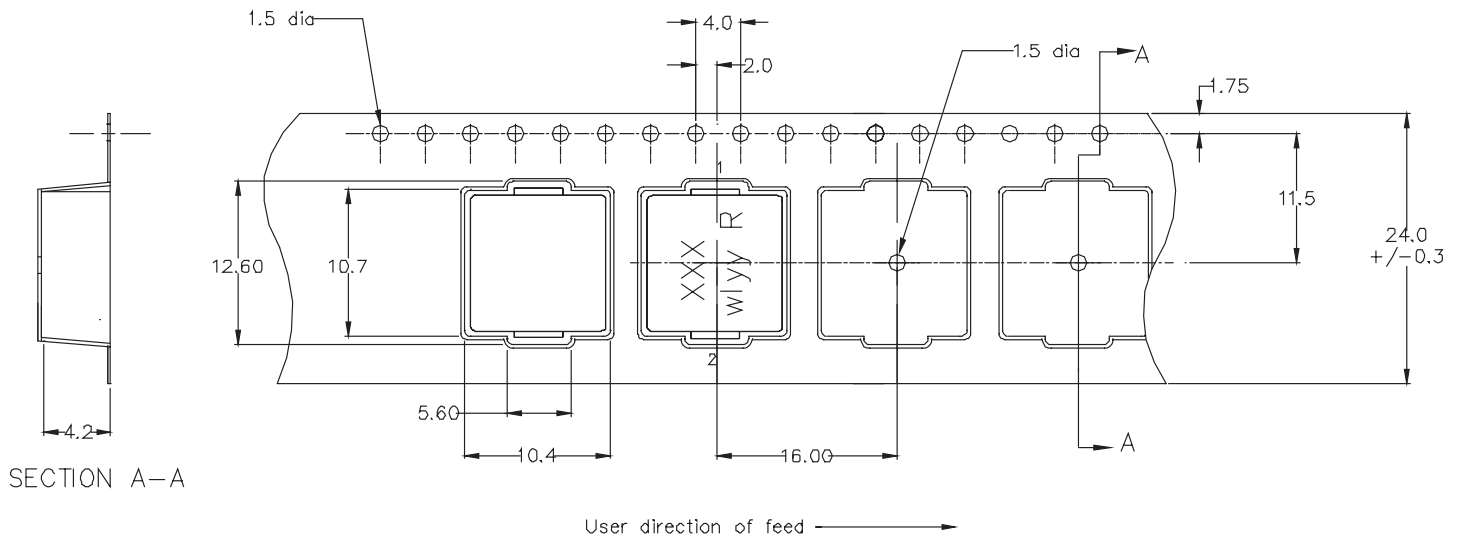
**Recommended pad layout**

**Schematic**



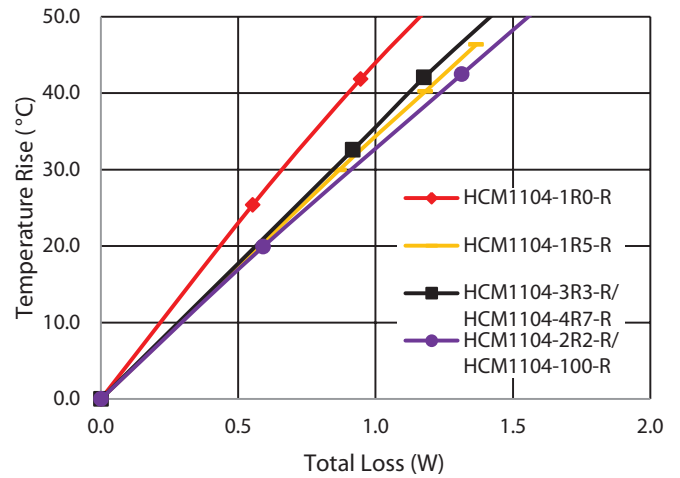
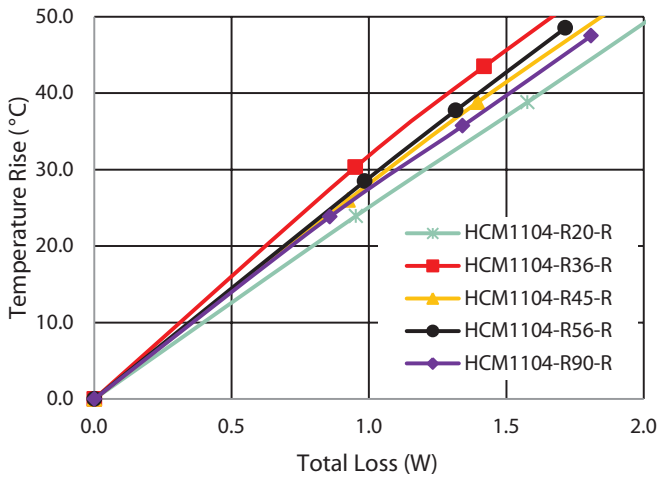
Part marking: xxx = inductance value in  $\mu\text{H}$ , R = decimal point, if no R is present, third character = number of zeros, wlyy = date code, R = revision level  
All soldering surfaces to be coplanar within 0.10 millimeters  
Tolerances are  $\pm 0.3$  millimeters unless stated otherwise  
Color: Grey

**Packaging information - mm**



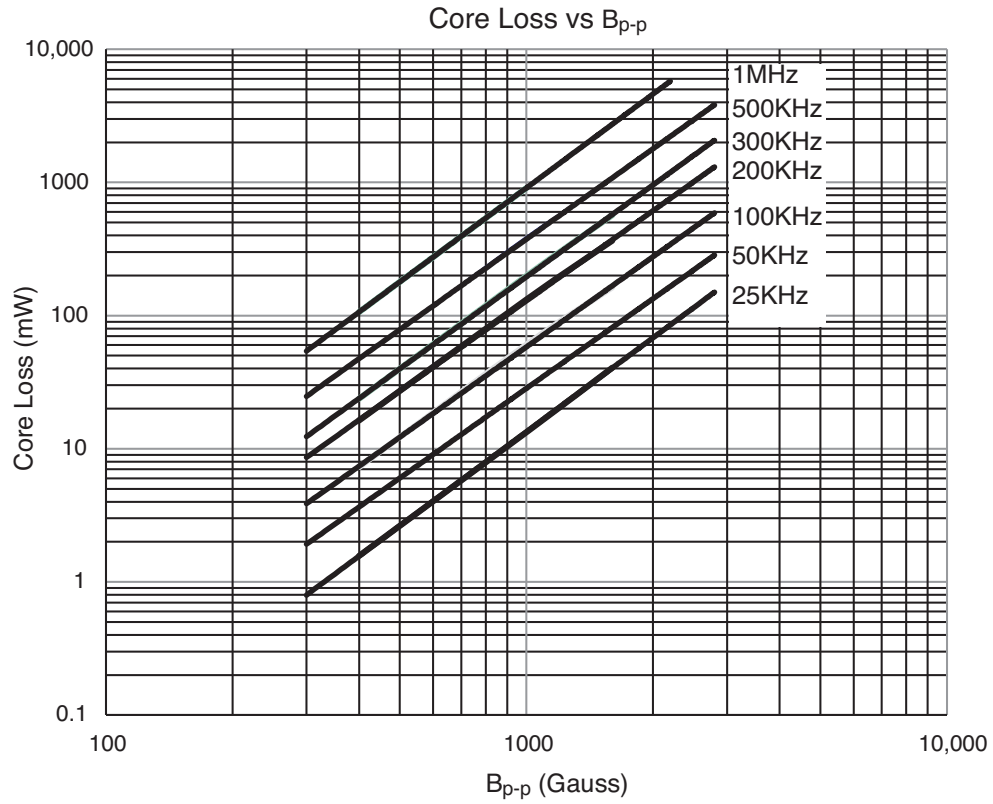
Supplied in tape and reel packaging, 850 parts per 13" diameter reel.

**Temperature rise vs. total loss**

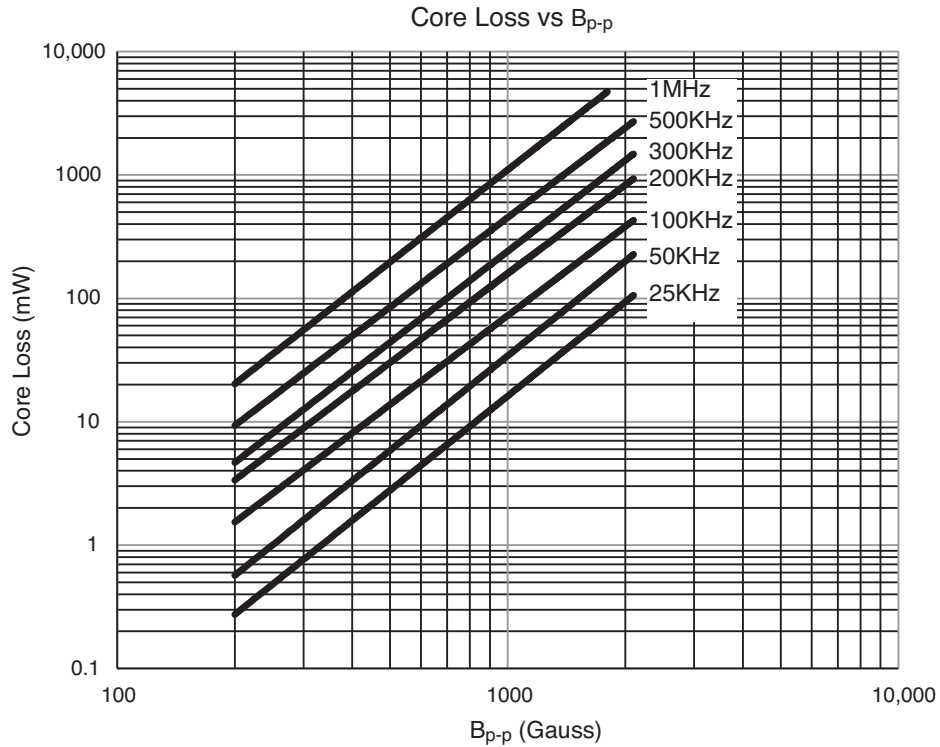


**Core loss**

HCM1104-R20-R to HCM1104-R90-R

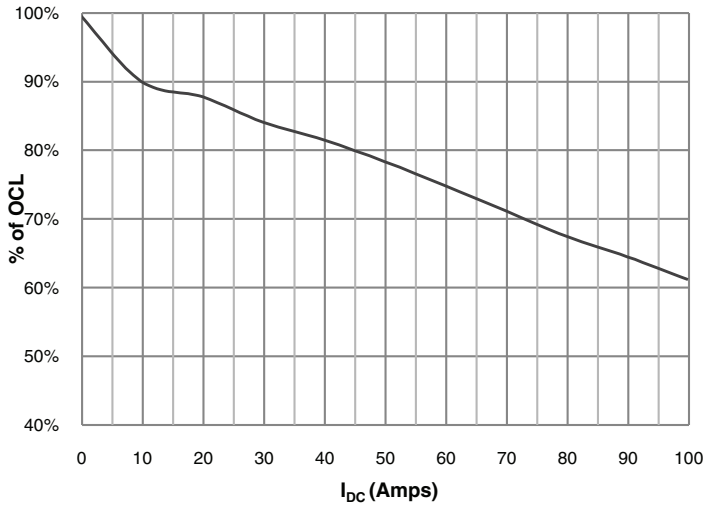


HCM1104-1R0-R to HCM1104-100-R

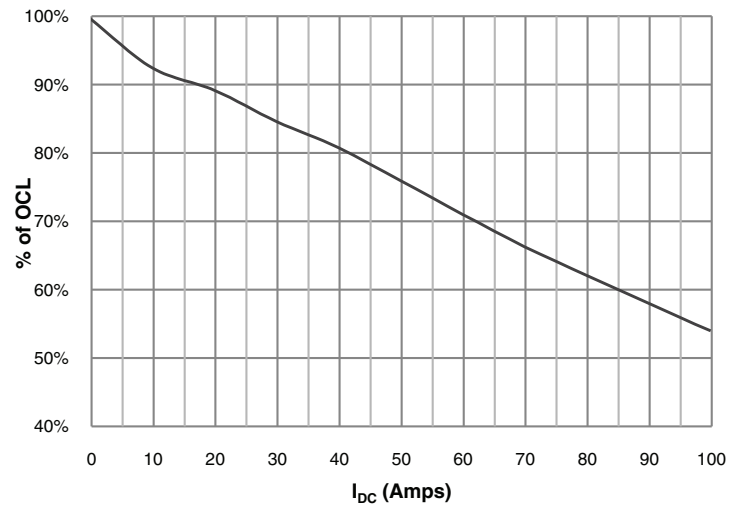


Inductance characteristics

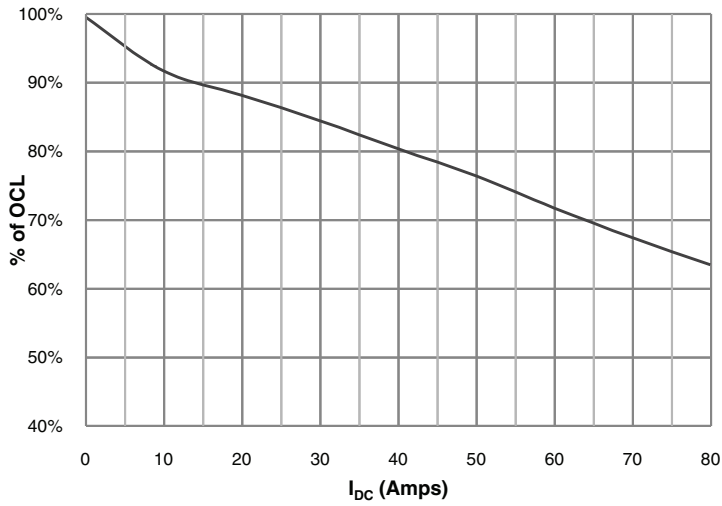
HCM1104-R20-R



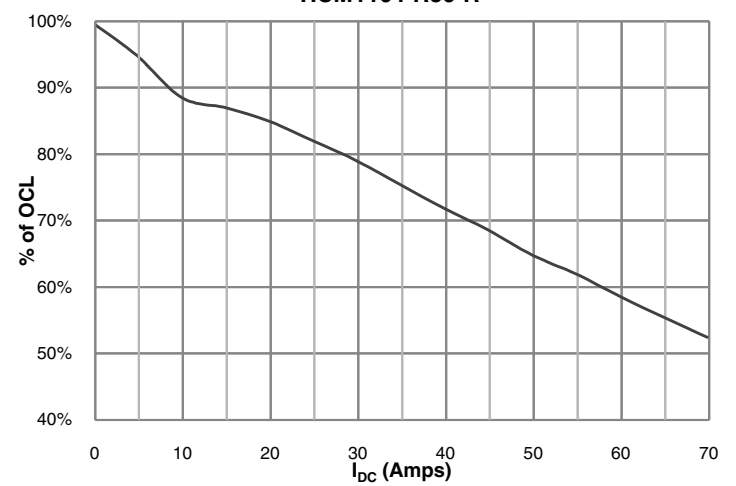
HCM1104-R36-R



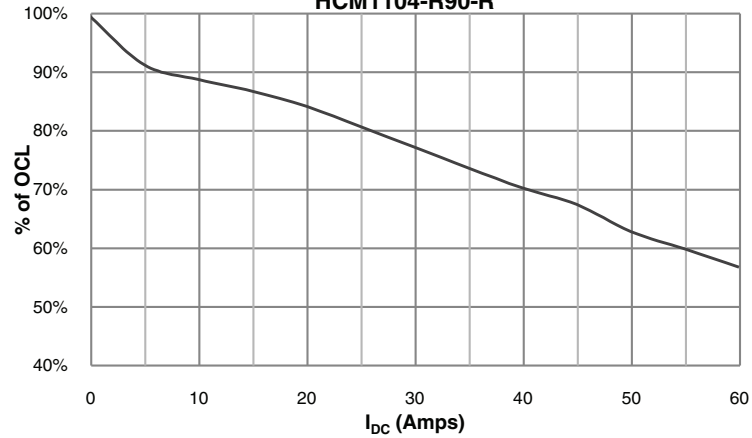
HCM1104-R45-R



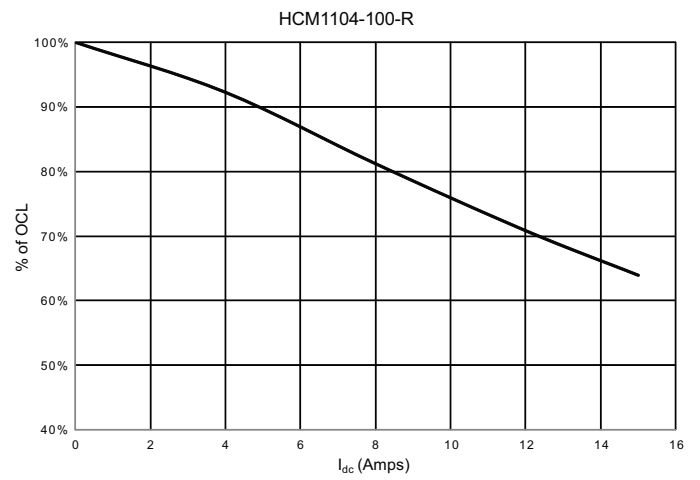
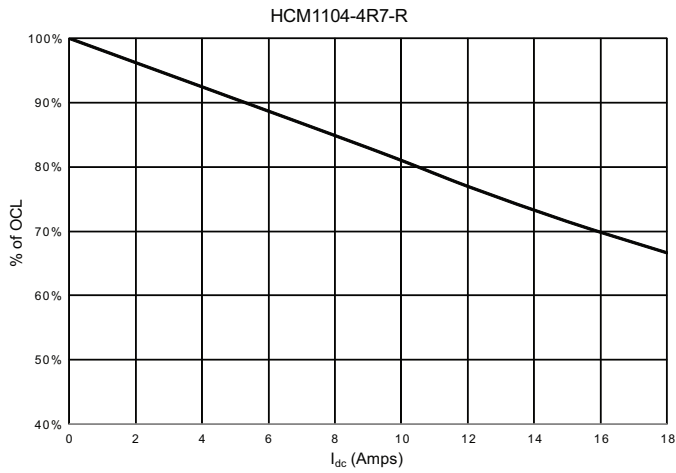
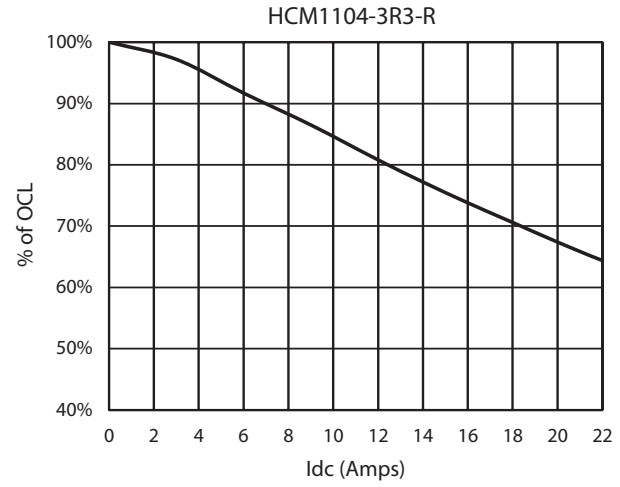
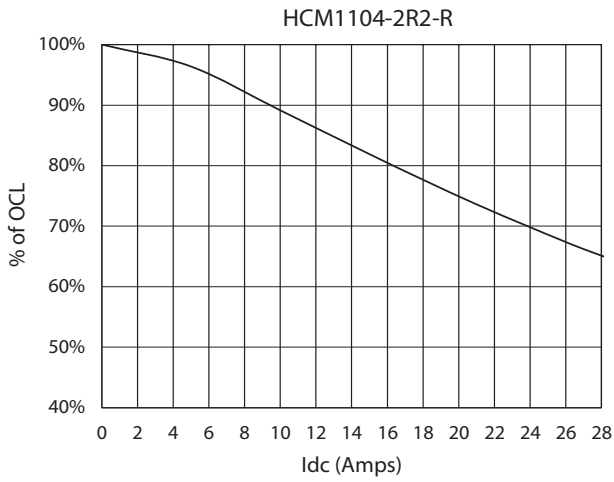
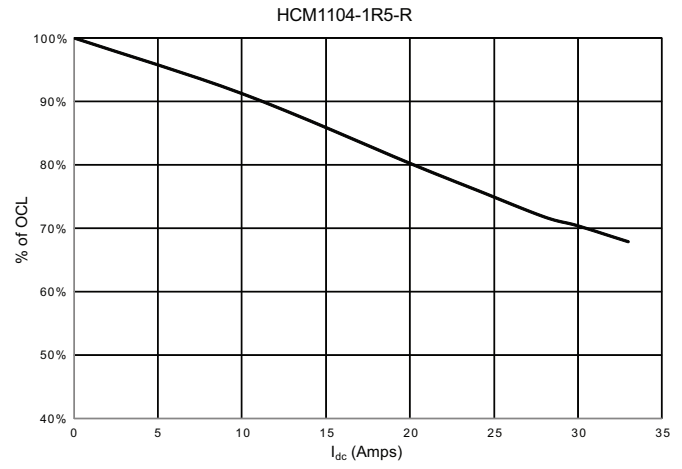
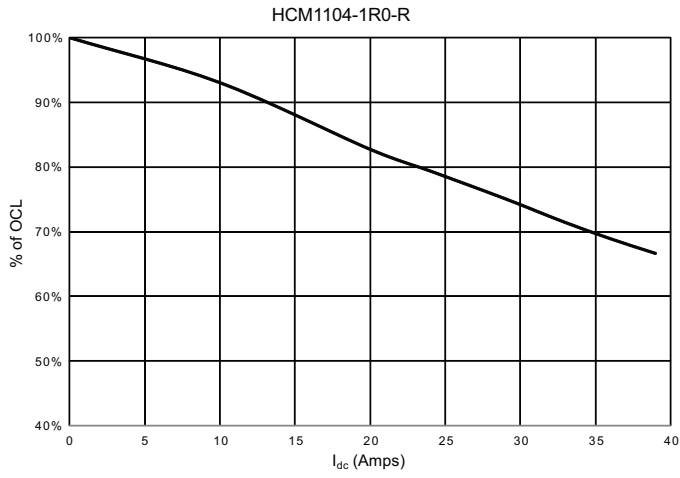
HCM1104-R56-R



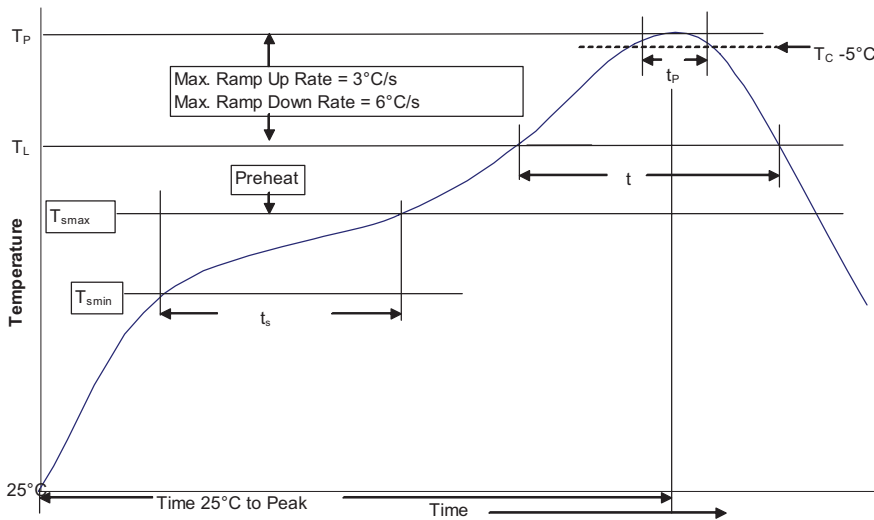
HCM1104-R90-R



Inductance characteristics



**Solder reflow profile**



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

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

**Table 2 - Lead (Pb) Free Solder ( $T_c$ )**

Package Thickness	Volume $<350$ $mm^3$	Volume $350 - 2000$ $mm^3$	Volume $>2000$ $mm^3$
$<1.6mm$	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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Publication No. 4370 — BU-SB14813  
November 2014

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