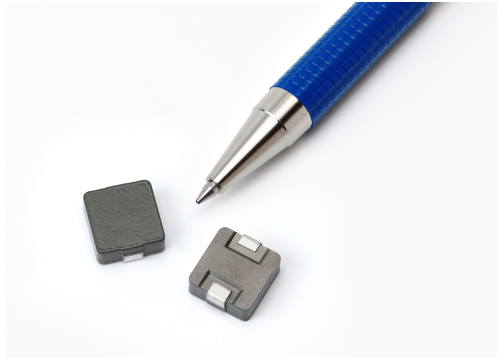


# HCM1103

## 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



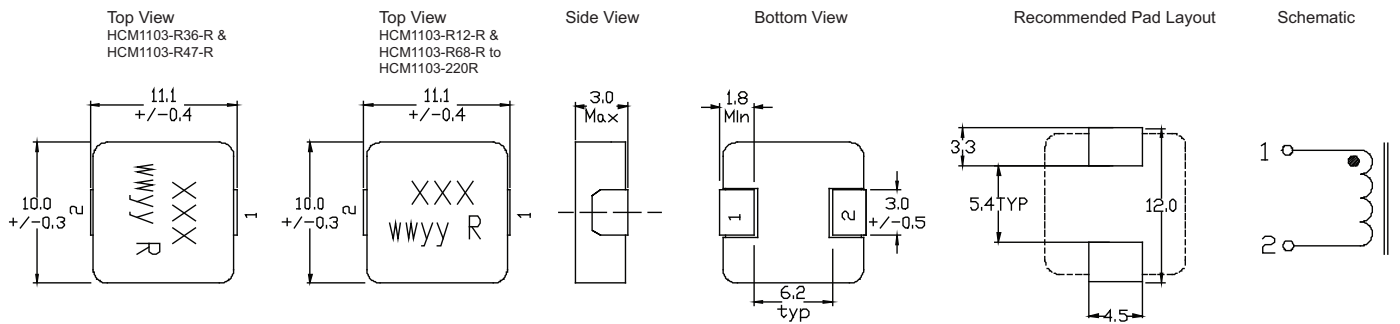
**Product Specifications**

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

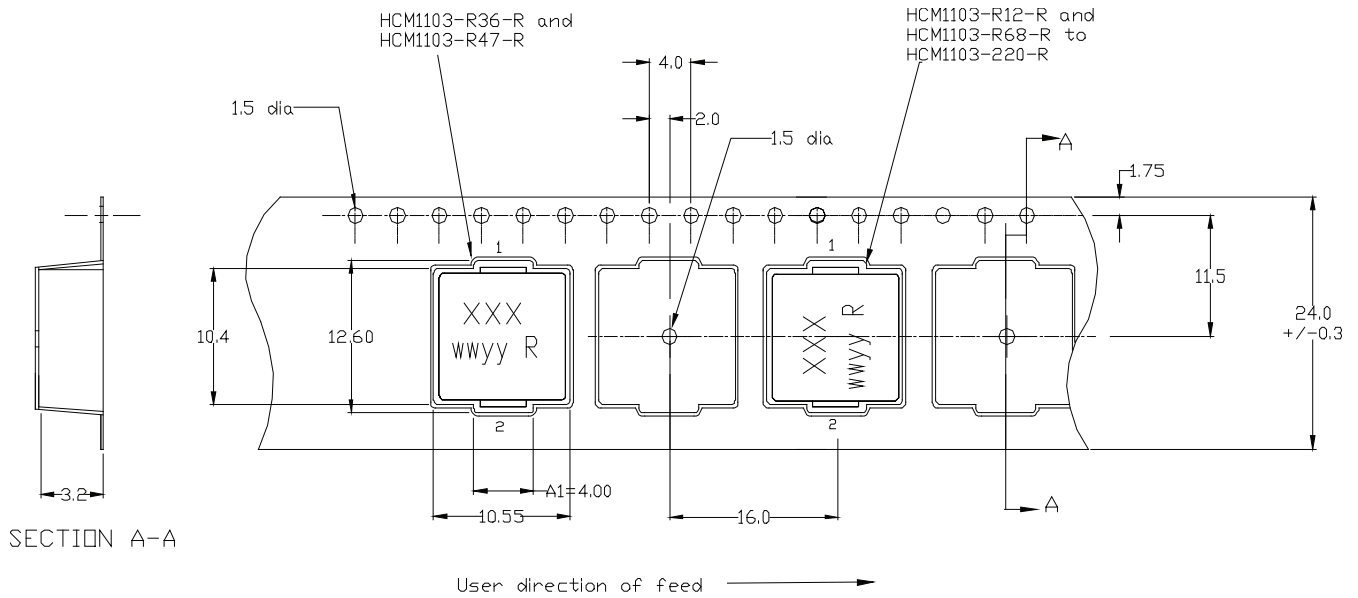
**Dimensions (mm)**



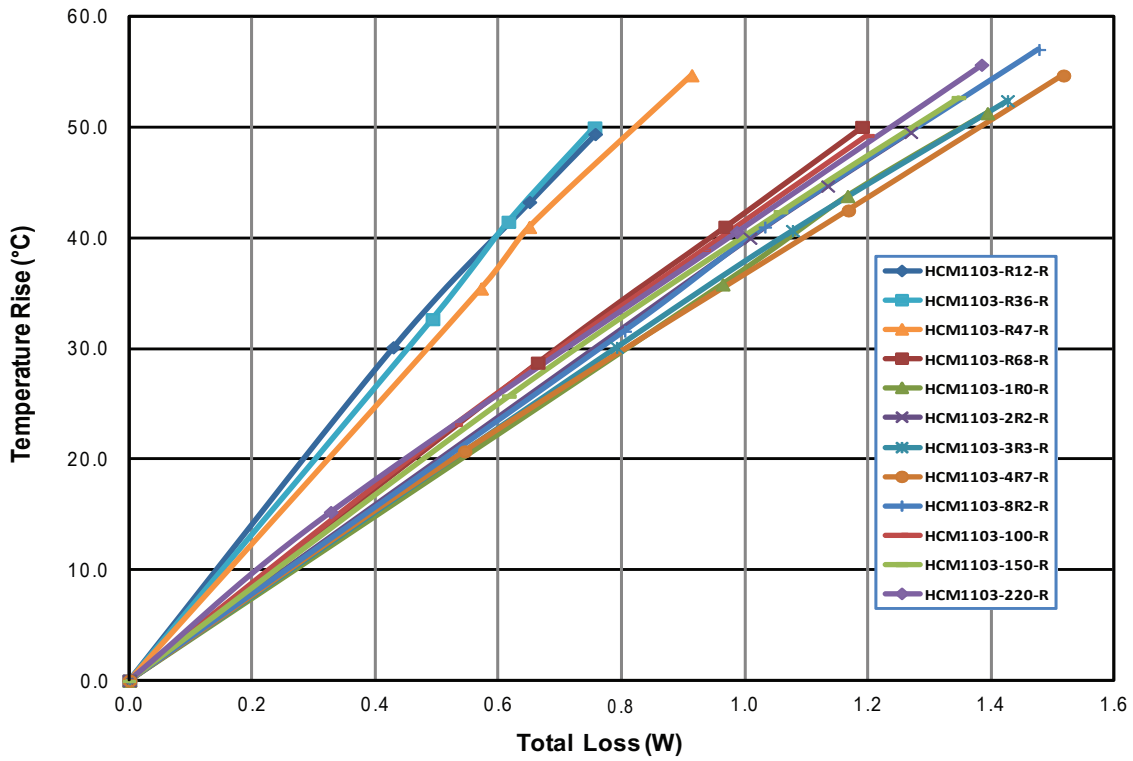
Part Marking: xxx = Inductance value in uH, R = decimal point, if no R is present then third character = # of zeros.  
 wwww = (Date code), R = Revision Level  
 All soldering surfaces to be coplanar within 0.10 millimeters.  
 Tolerances are ±0.3 millimeters unless stated otherwise.  
 HCM1103-R36-R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

### Packaging information (mm)

Supplied in tape and reel packaging, 1000 parts per 13" diameter reel.

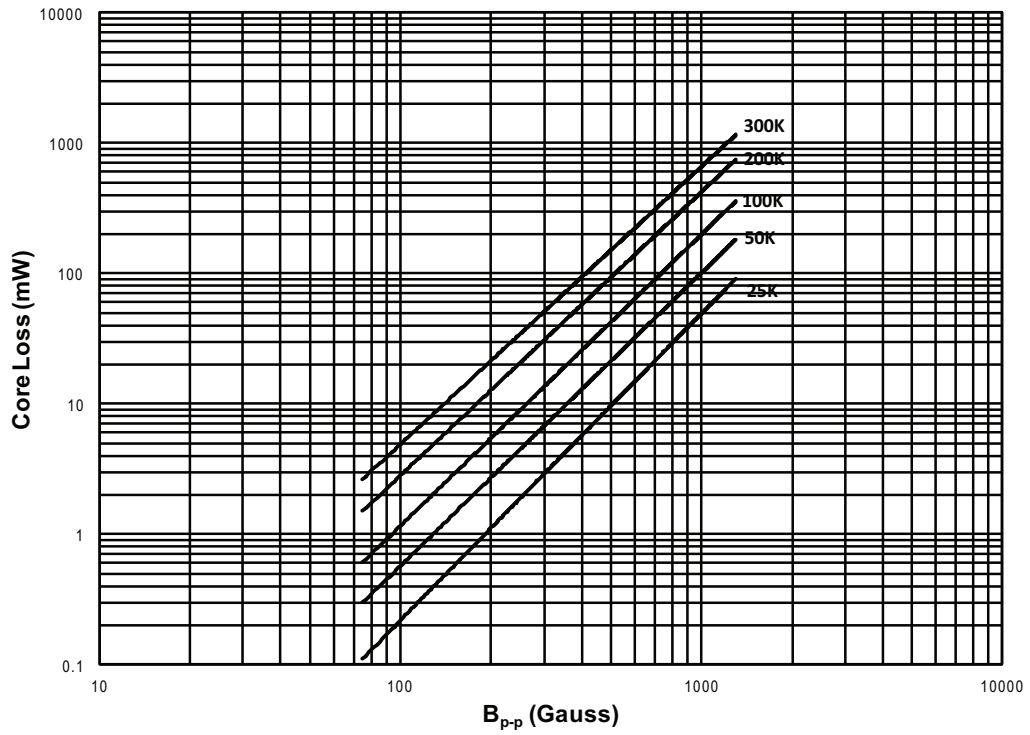


### Temperature rise vs. total loss

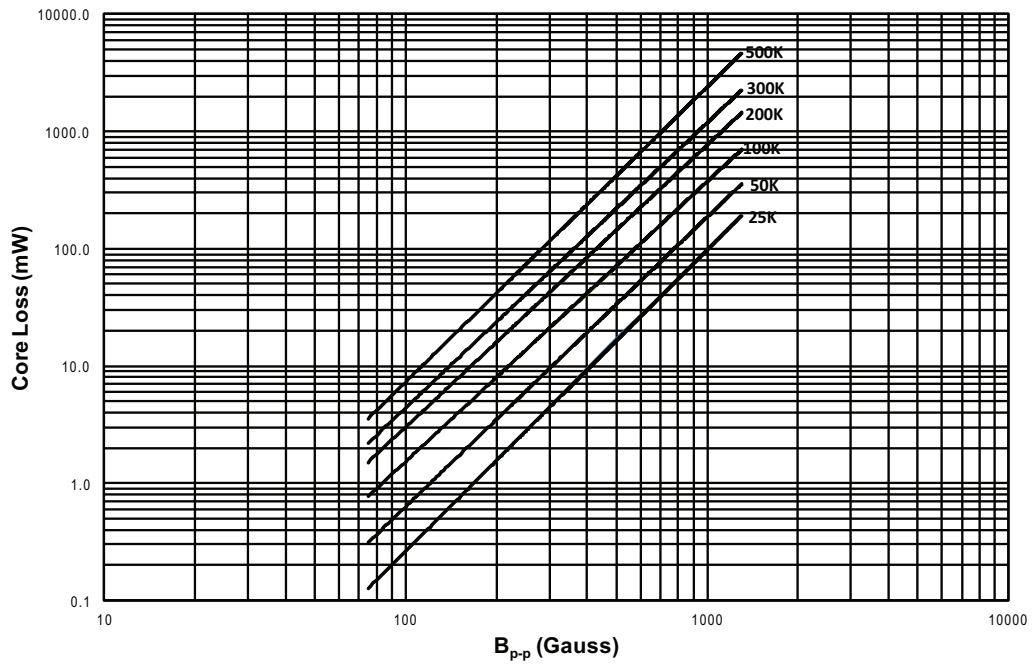


Core loss vs.  $B_{p-p}$

HCM1103-; R36-R and R47-R

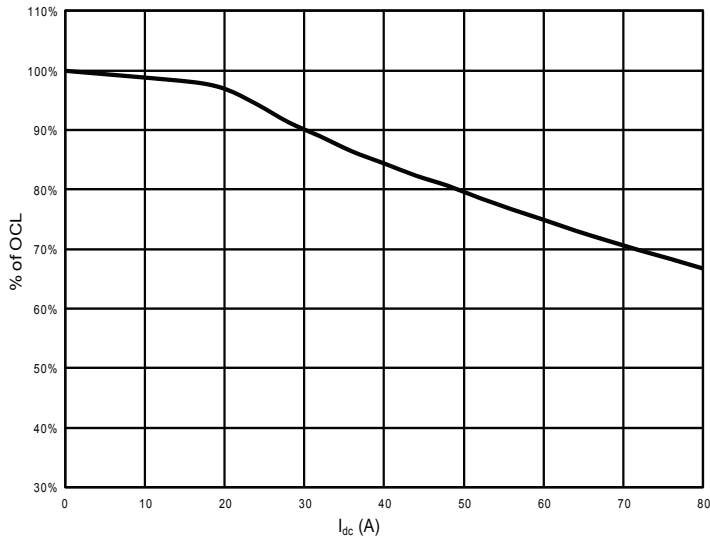


HCM1103-; R12-R, R68-R through 220-R

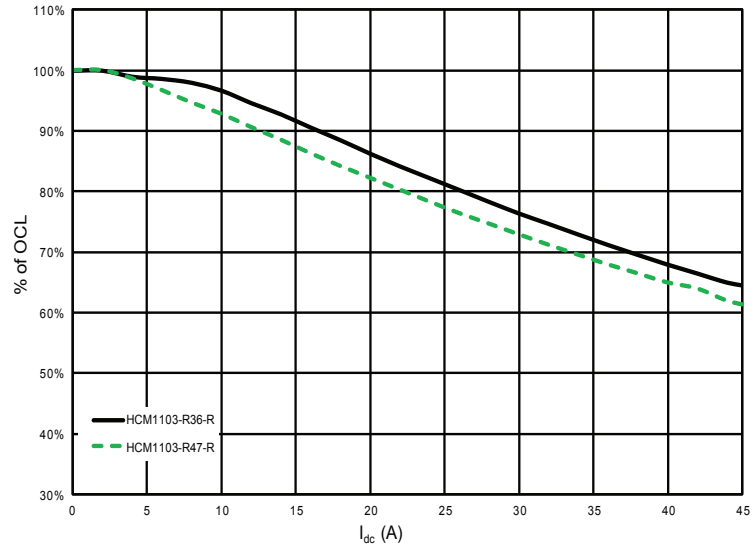


Inductance characteristics

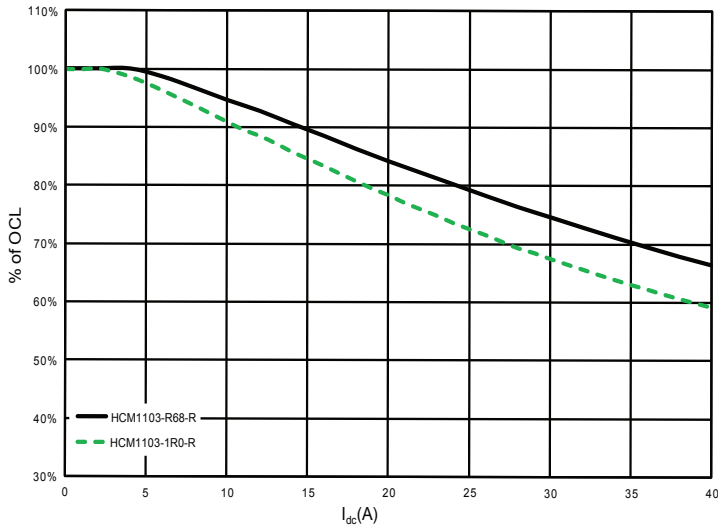
HCM1103-R12-R



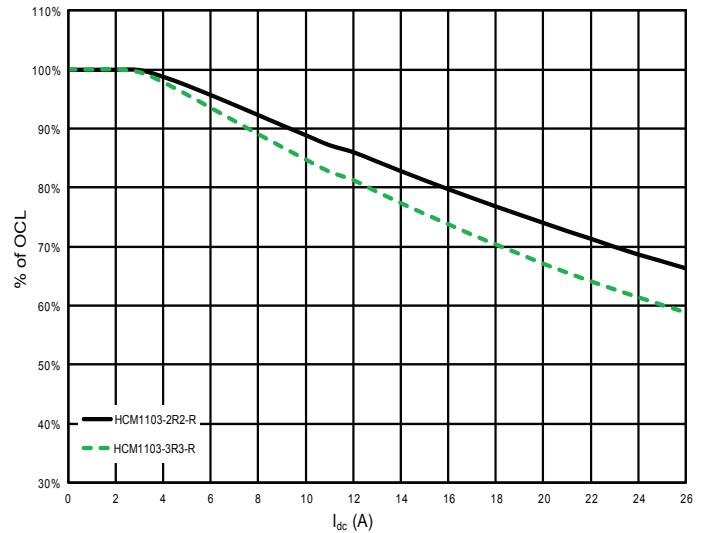
HCM1103-; R36-R, R47-R



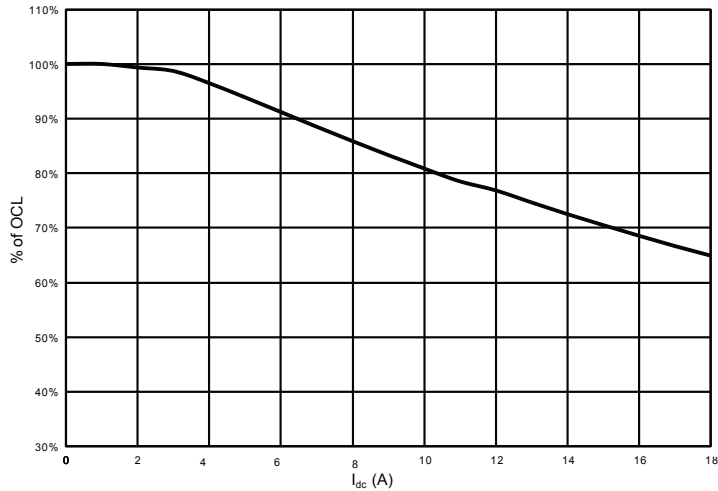
HCM1103-; R68-R, 1R0-R



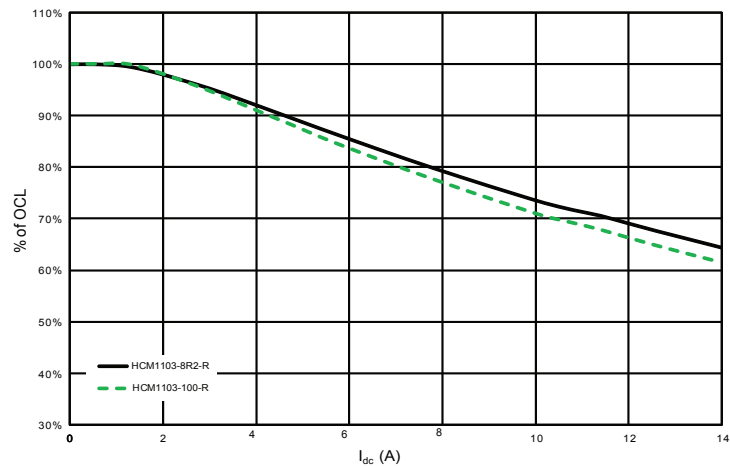
HCM1103-; 2R2-R, 3R3-R



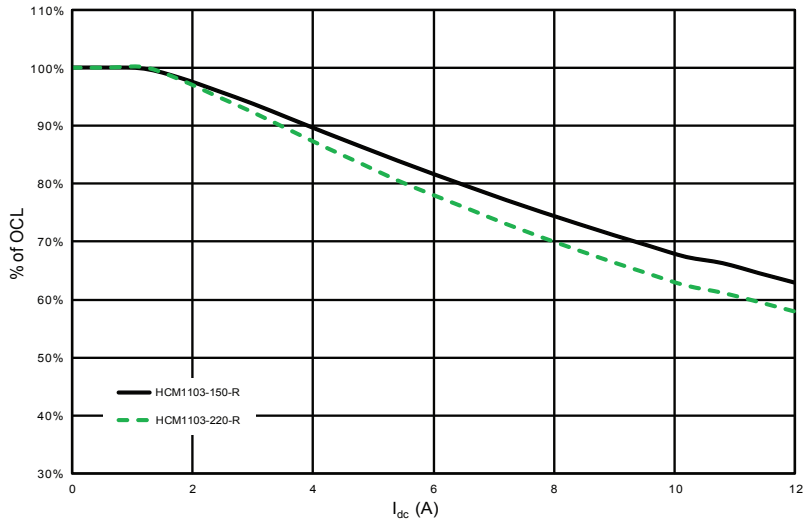
HCM1103-4R7-R



HCM1103-; 8R2-R, 100-R



**Inductance characteristics**



Solder reflow profile

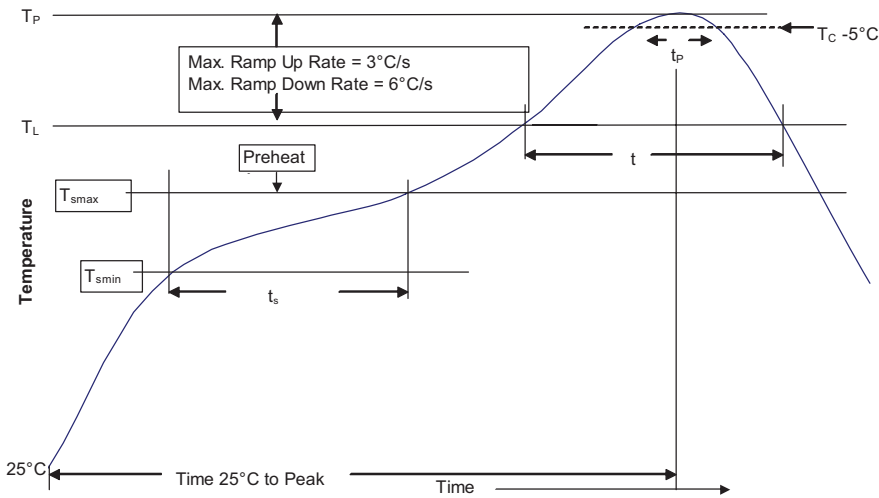


Table 1 - Standard SnPb Solder ( $T_C$ )

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 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.

Life Support Policy: Eaton does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

Eaton reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Eaton also reserves the right to change or update, without notice, any technical information contained in this bulletin.

**Eaton**  
Electronics Division  
1000 Eaton Boulevard  
Cleveland, OH 44122  
United States  
www.eaton.com/electronics

© 2017 Eaton  
All Rights Reserved  
Printed in USA  
Publication No. 4449 BU-SB12434  
July 2017

Eaton is a registered trademark.

All other trademarks are property of their respective owners.