# 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 µH to 22.0 µH
- 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

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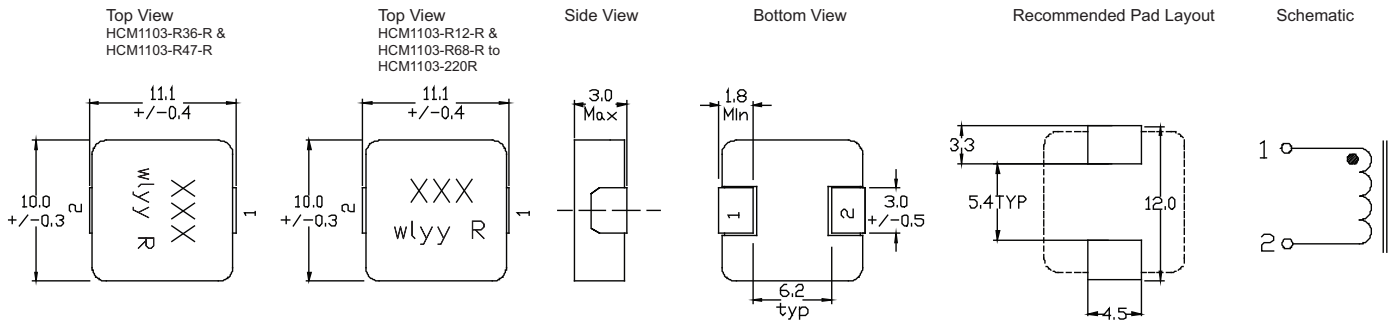
## Product Specifications

| Part Number[6] | OCL[1] ±20% (µH) | FLL min.[2] (µH) | $I_{rms}$[3] (A) | $I_{sat}$[4] @ +25 °C (A) | DCR (mΩ) @ +20 °C Typical | DCR (mΩ) @ +20 °C Maximum | K-Factor[5] |
|---|---|---|---|---|---|---|---|
| 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 |

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 $V_{rms}$, 0.0 Adc @ +25 °C
2. Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.25 $V_{rms}$, $I_{sat}$ @ +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 30% 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: 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

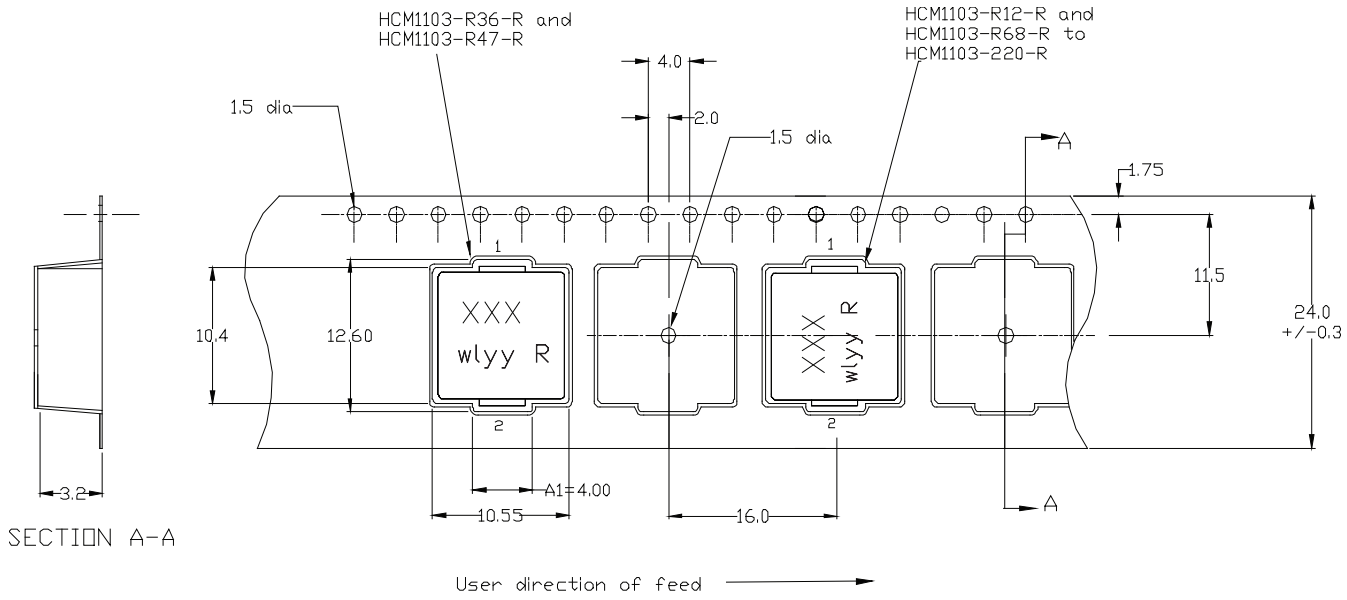
## Dimensions (mm)



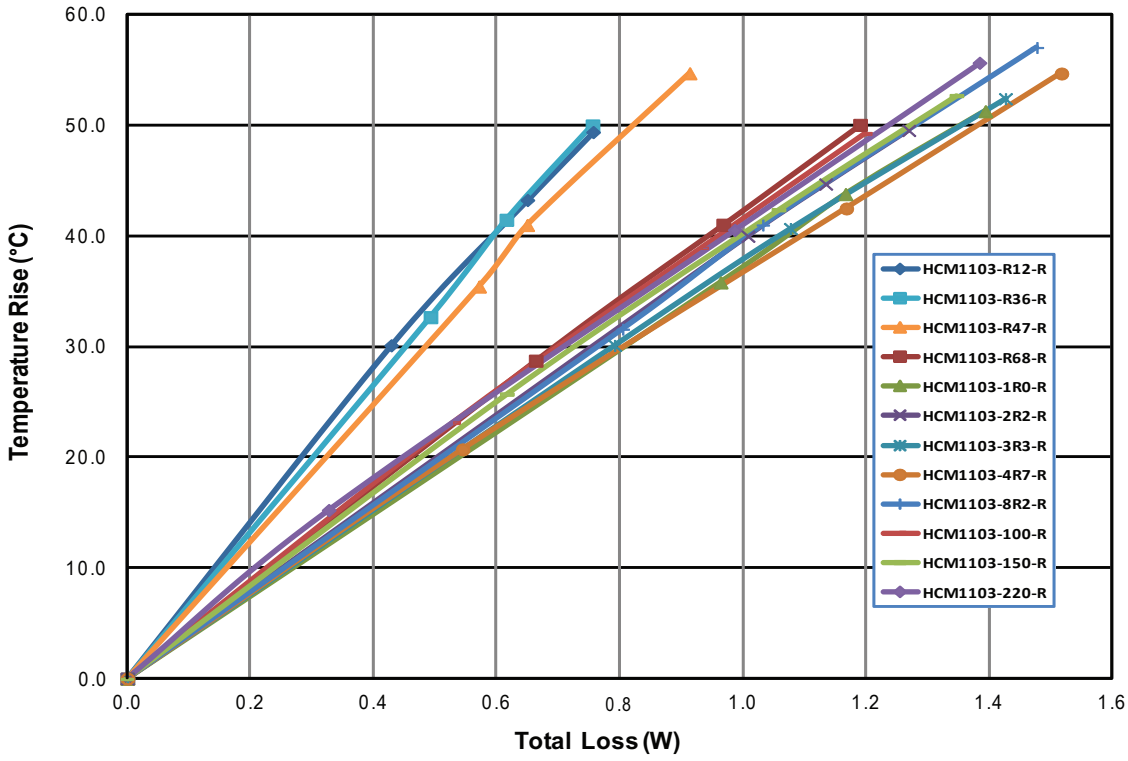

Part Marking: xxx = Inductance value in uH, R = decimal point, if no R is present then third character = # of zeros.
wlyy = (Date code), R = Revision Level
All soldering surfaces to be coplanar within 0.10 millimeters.
Tolerances are ±0.3 millimeters unless stated otherwise.
HCM1103-R36-R and HCM1103-R47-R 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

### Packaging information (mm)

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

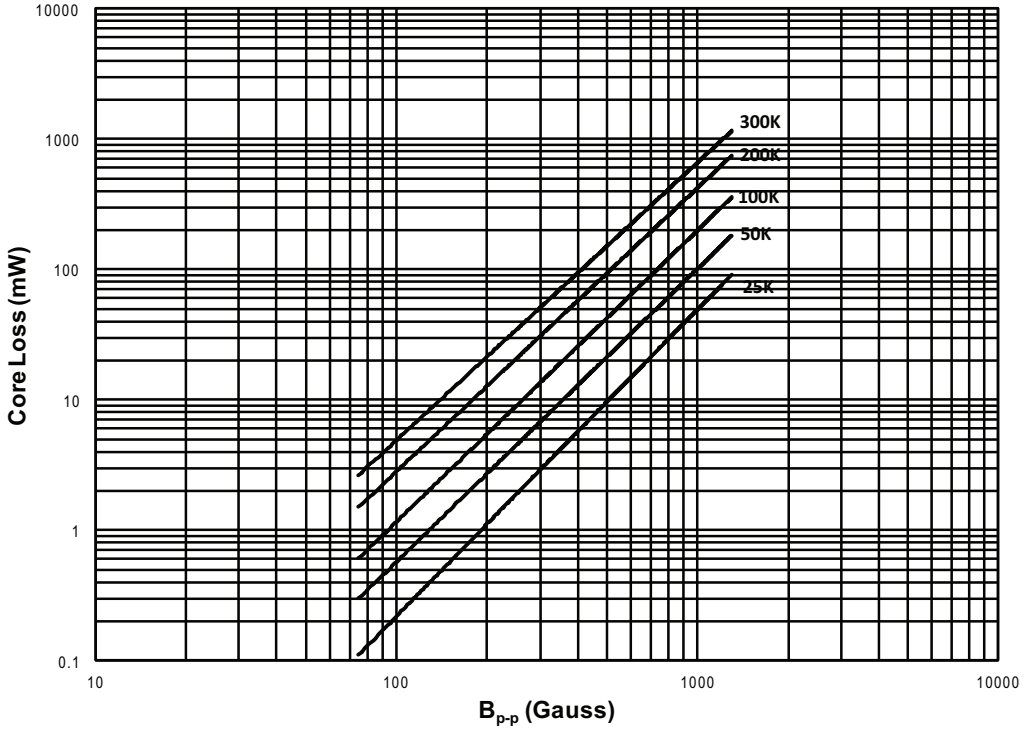



### Temperature rise vs. total loss

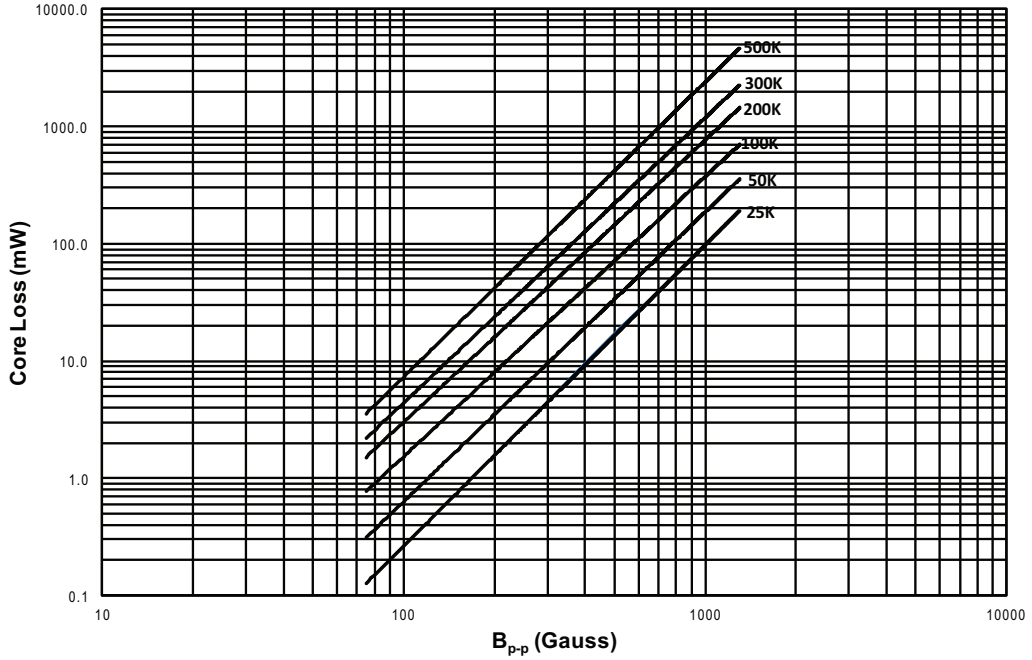


**Core loss vs. $B_{p-p}$**

**HCM1103-; R36-R and R47-R**

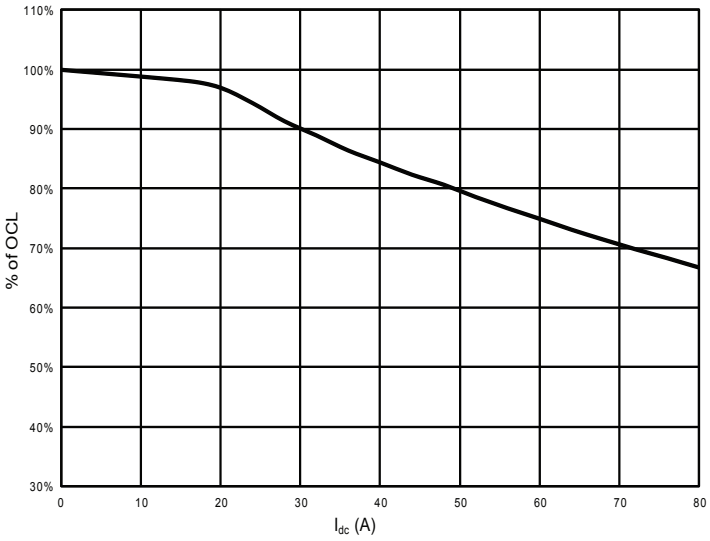



**HCM1103-; R12-R, R68-R through 220-R**

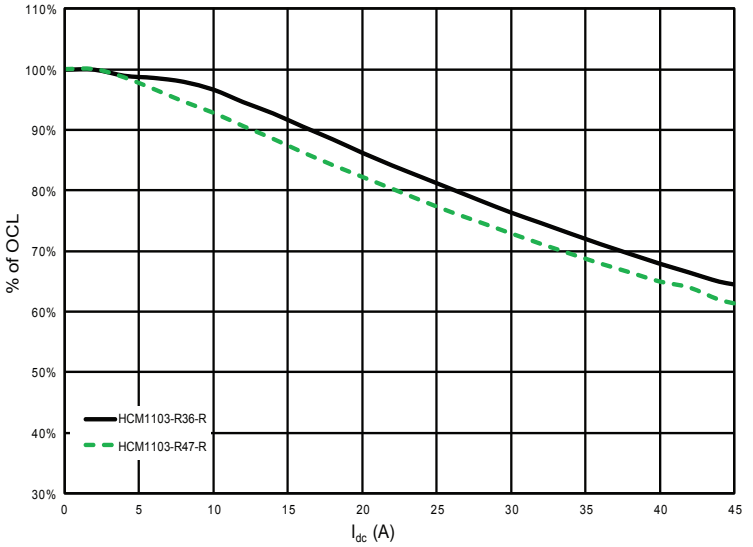


## Inductance characteristics

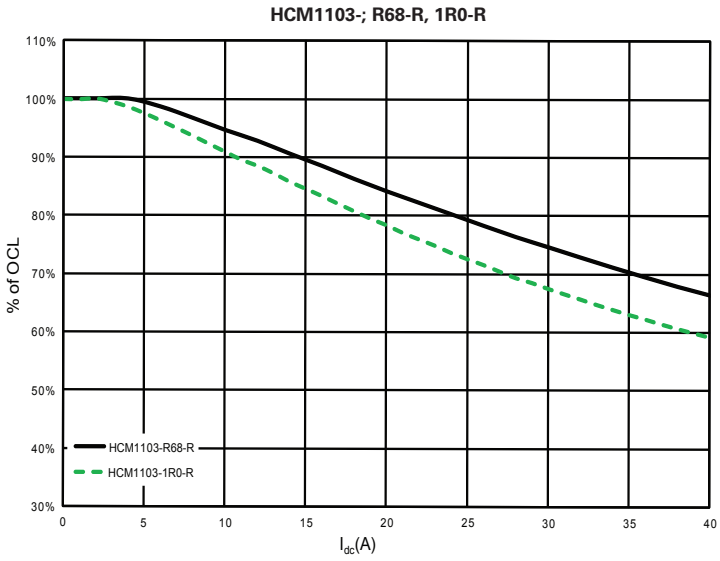
### HCM1103-R12-R



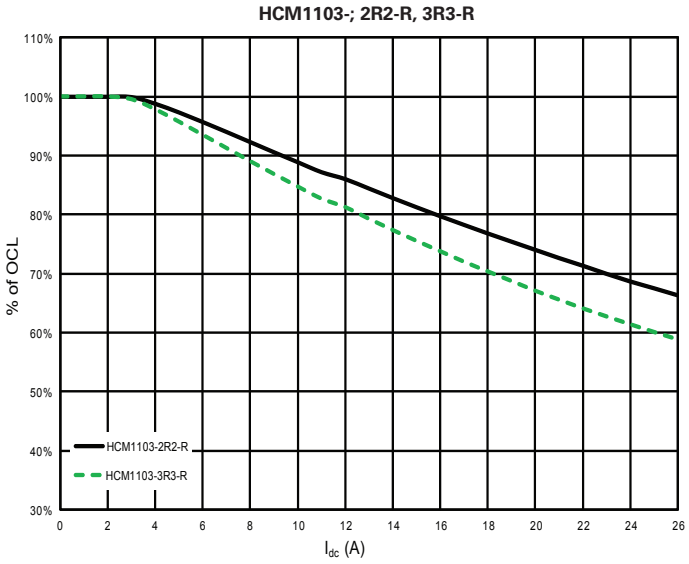

### HCM1103-; R36-R, R47-R



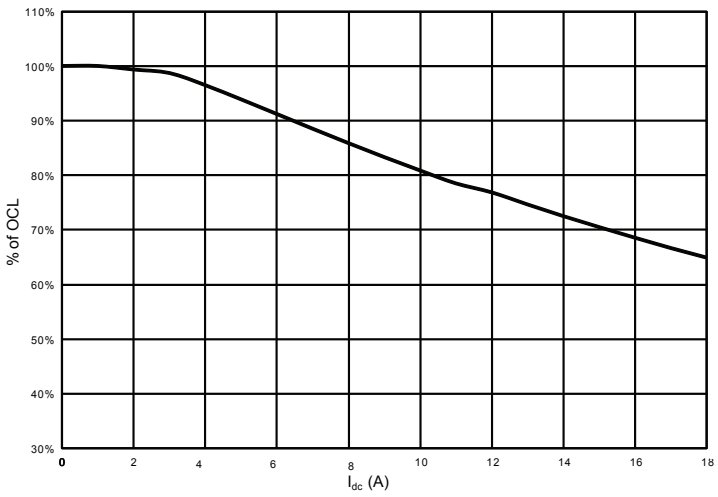

### HCM1103-; R68-R, 1R0-R



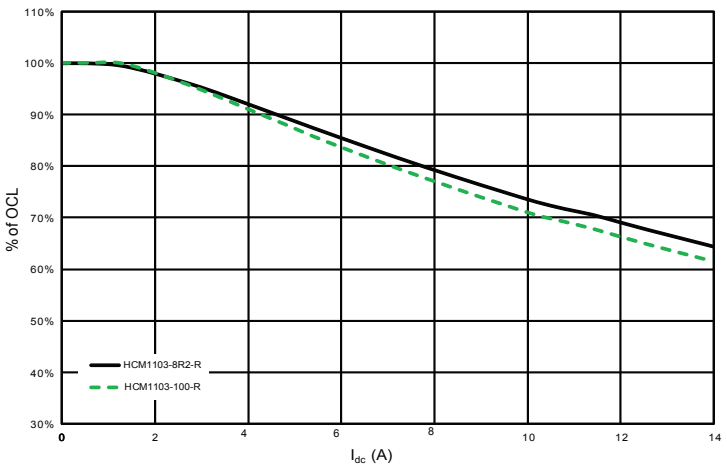

### HCM1103-; 2R2-R, 3R3-R



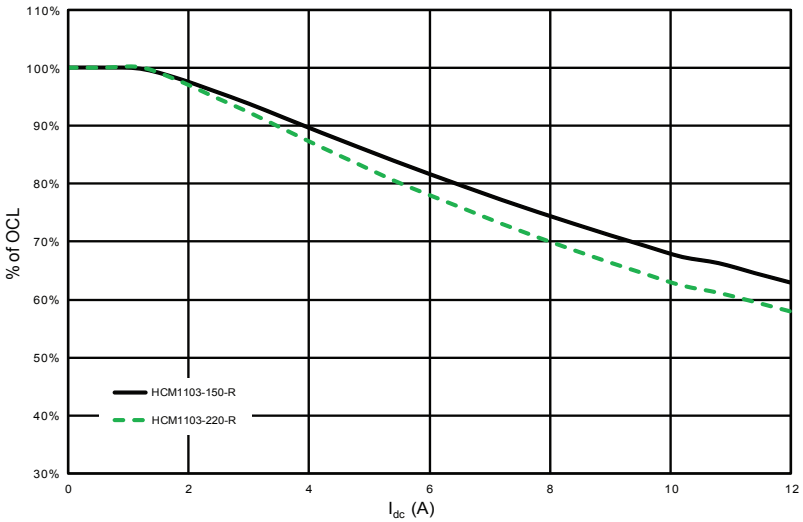

### HCM1103-4R7-R




### HCM1103-; 8R2-R, 100-R



**Inductance characteristics**



## Solder reflow profile

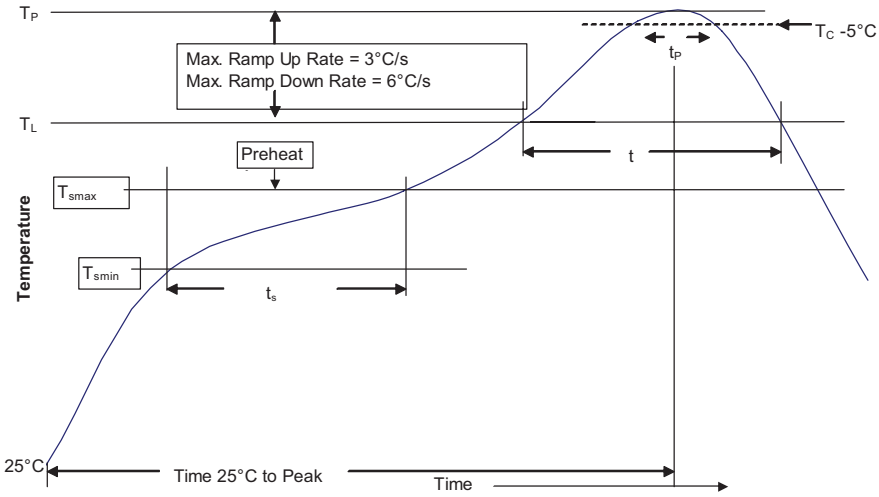



**Table 1 - Standard SnPb Solder ($T_C$)**

| Package Thickness | Volume mm3 <350 | Volume mm3 ≥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-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 ($T_L$)<br>Time at liquidous ($t_L$) | | 183°C<br>60-150 Seconds | 217°C<br>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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Powering Business Worldwide

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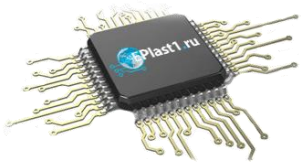


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