

High Current Power Inductors

HCM1104 Series



Description

- Halogen free, lead free, RoHS compliant
- 125°C maximum total operating temperature
- 11.5x 10.3 x 4.0mm maximum surface mount package
- Powder Iron core material
- Magnetically shielded, low EMI
- High current carrying capacity, low core losses
- Inductance range 0.20μH to 10.0μH
- Current range from 7.5 to 45 Amps
- Frequency range up to 5MHz

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, 850 parts per 13" reel

Product Specifications

Part Number ⁷	OCL ¹ ± 20% (μH)	FLL ² Min (μH)	I _{rms} ³ (Amps)	I _{sat} ^{4,5} @25°C (Amps)	DCR (mΩ) @20°C Nominal	DCR (mΩ) @20°C Maximum	K-factor ⁶
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	10.0	5.60	7.5	8.5	27.0	30.0	116

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 approx. 20% rolloff at +25°C - HCM1104-R20-R to HCM1104-R90-R.

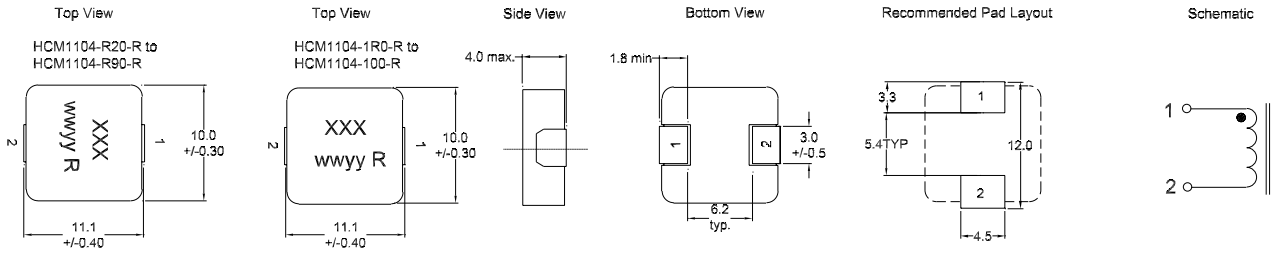
5. I_{sat}: Peak current for approx. 30% rolloff at +25°C - HCM1104-1R0-R to HCM 1104-100-R.

6. 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).

7. Part Number Definition: HCM1104-xxx-R

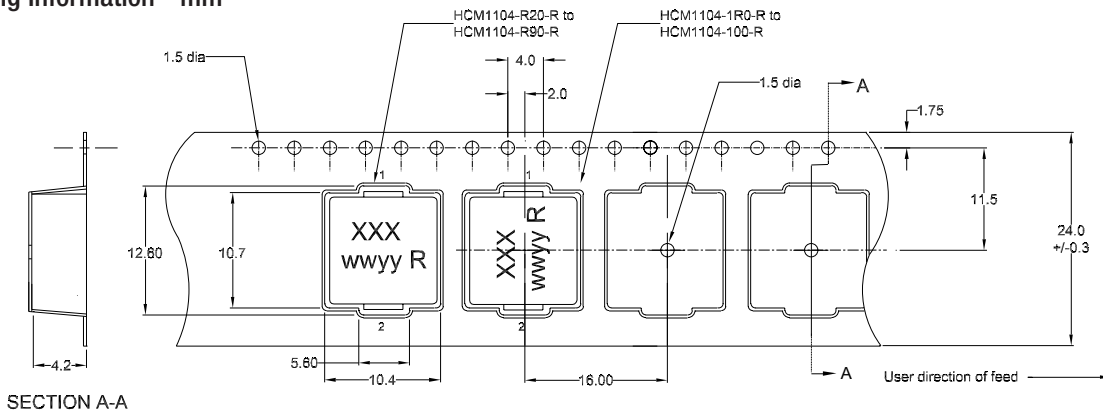
- HCM1104 = Product code and size
- xxx= Inductance value in μH, R = decimal point
- "-R" suffix = RoHS compliant

Dimensions - mm



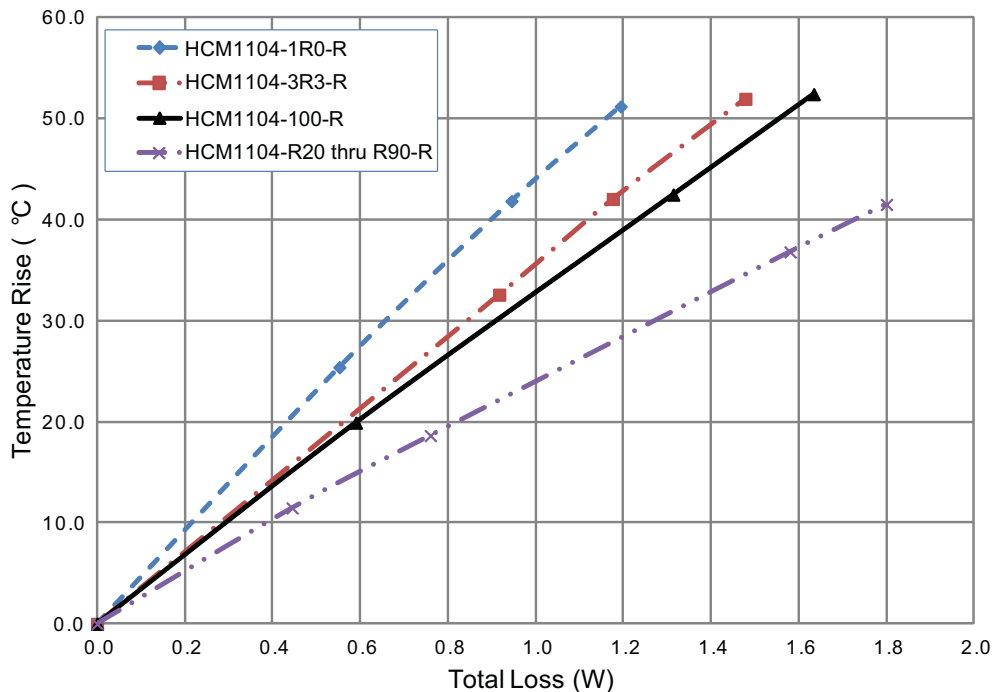
Part Marking: xxx = Inductance value in uH, R=decimal point, If no R is present third character = # of zeros. wwyy = (Date Code) R= (Revision Level)
 All soldering surfaces to be coplanar within 0.10 millimeters.
 Tolerances are +/- 0.3 millimeters unless stated otherwise.
 HCM1104-R20-R to HCM1104-R90-R Color: Black
 HCM1104-R20-R to HCM1104-R90-R Color: Top Grey

Packaging Information - mm

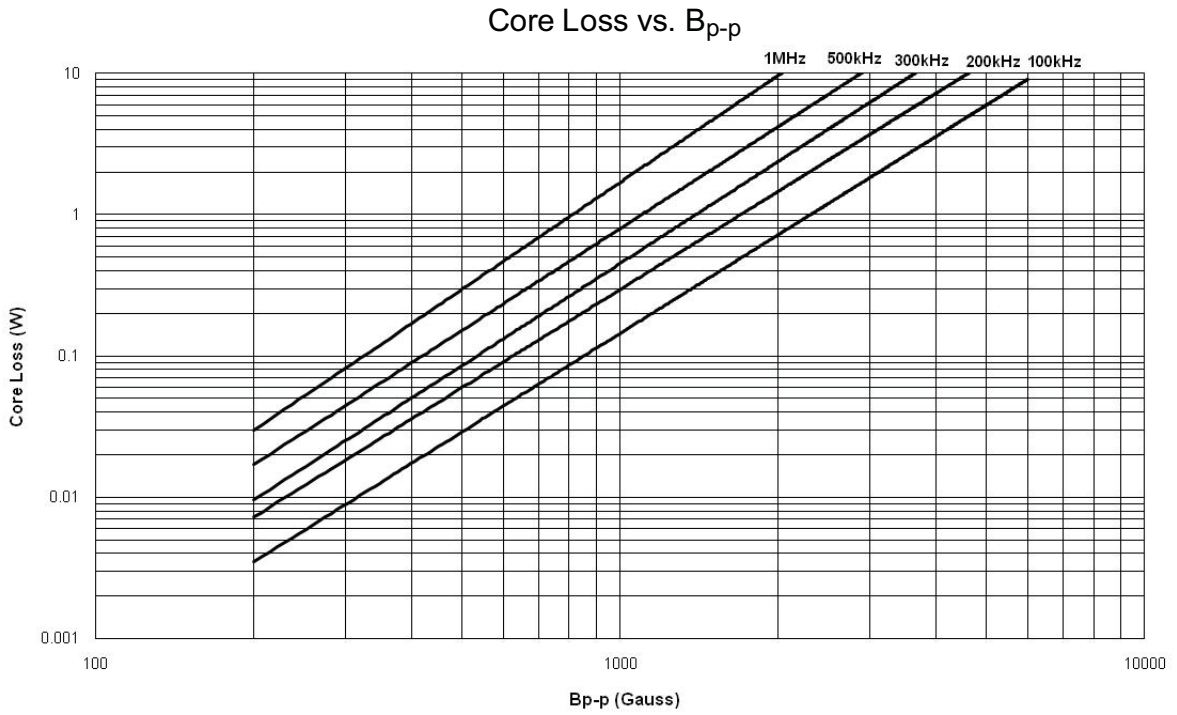


Supplied in tape and reel packaging, 850 parts per 13" diameter reel.

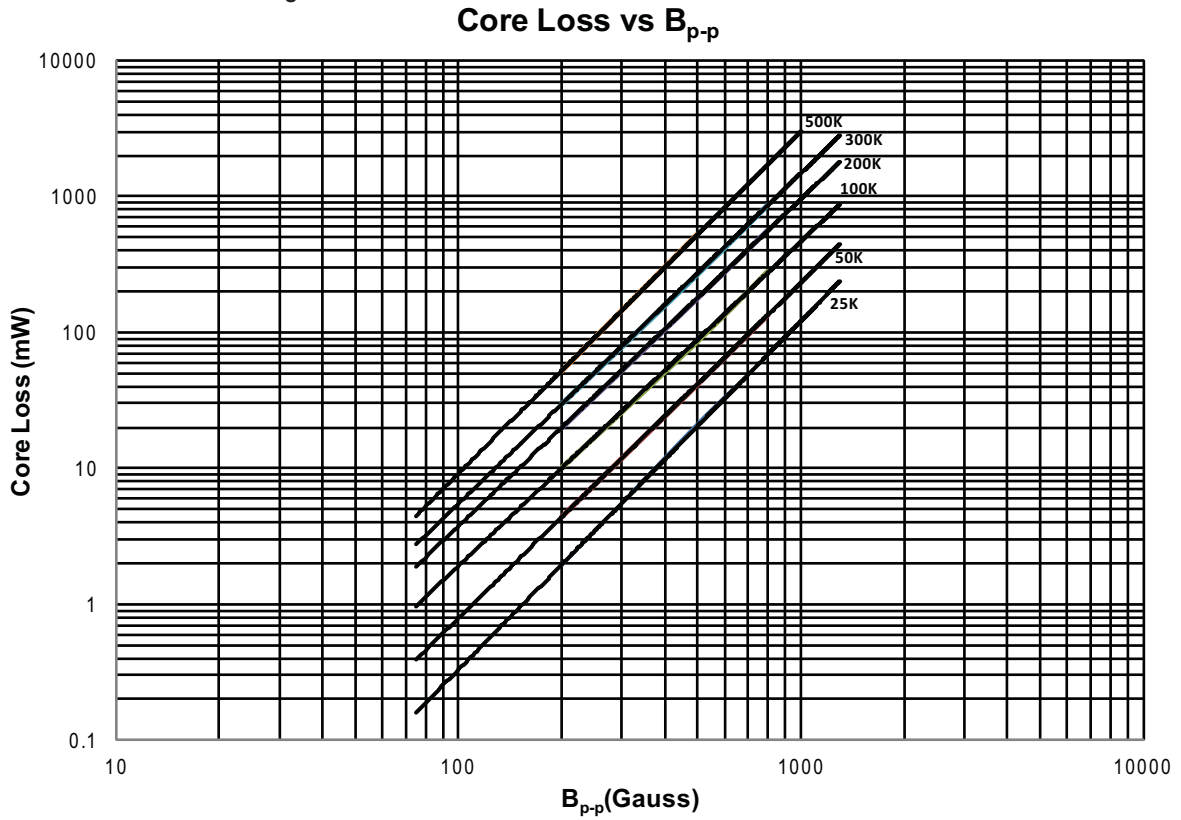
Temperature Rise vs. Total Loss



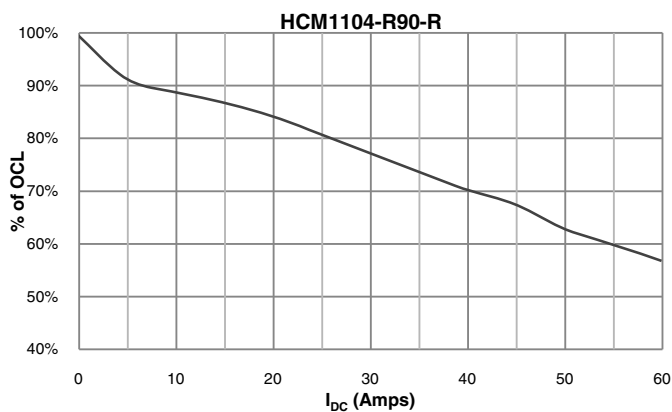
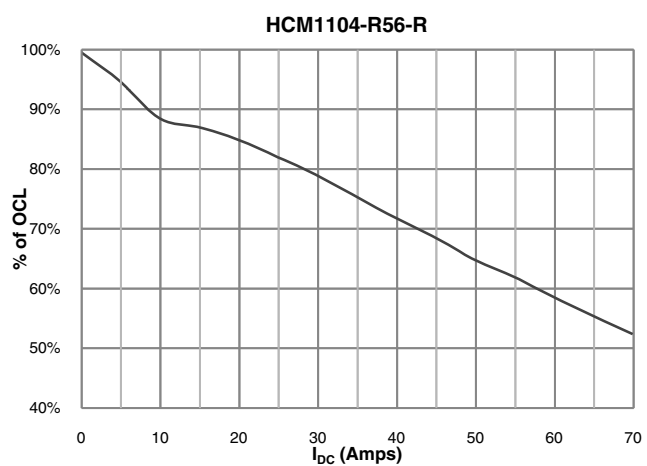
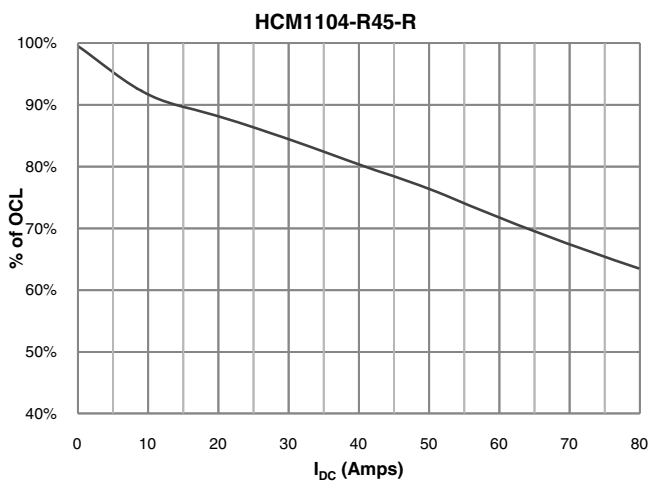
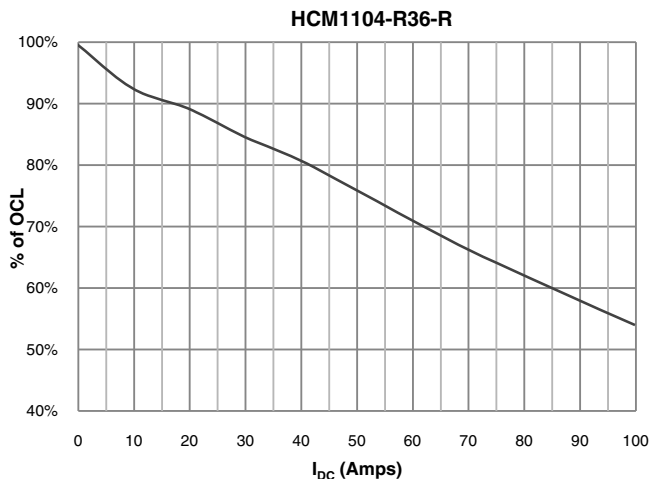
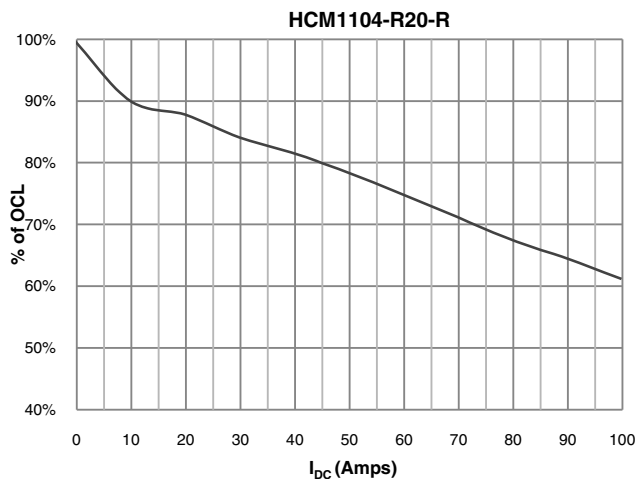
Core Loss - HCM1104-R20-R Through HCM1104-R90-R



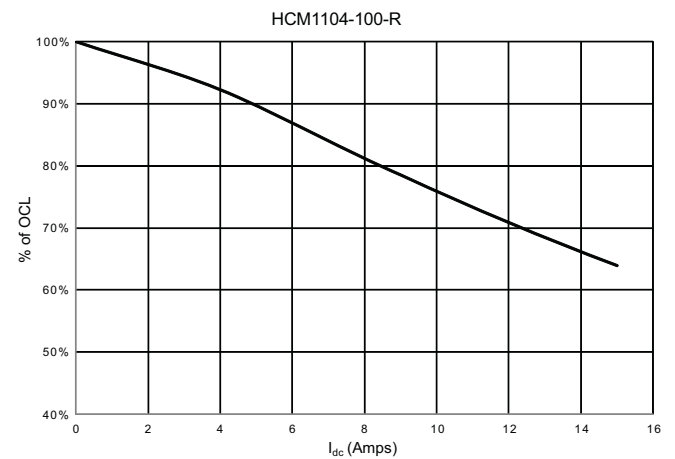
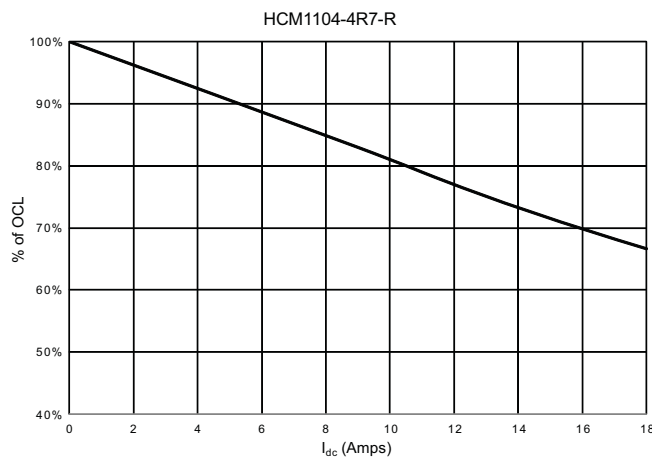
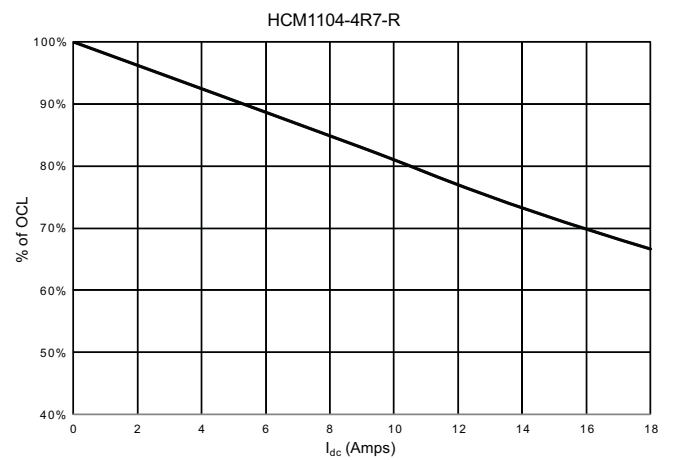
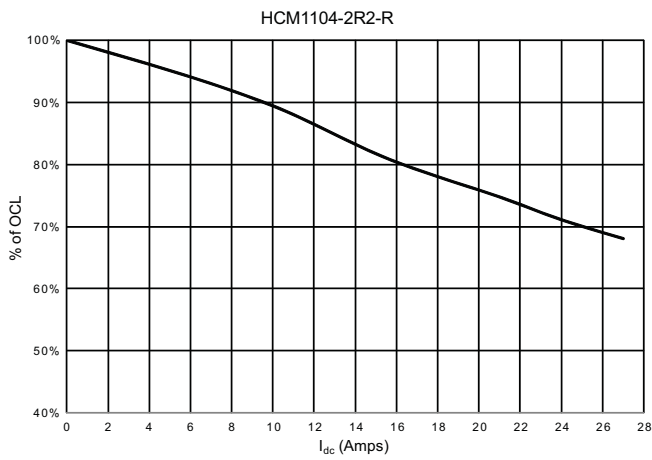
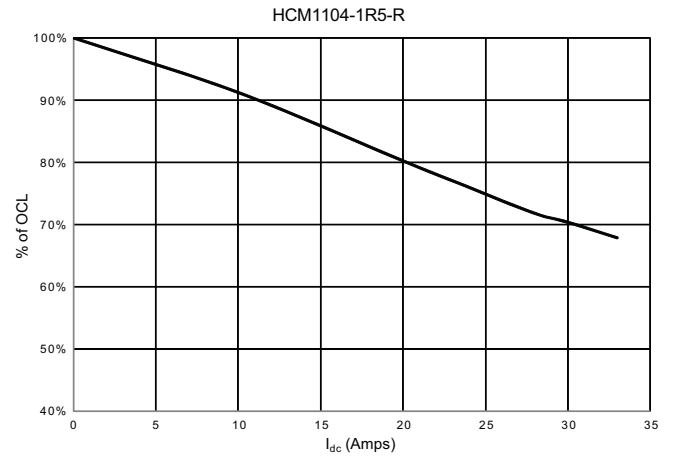
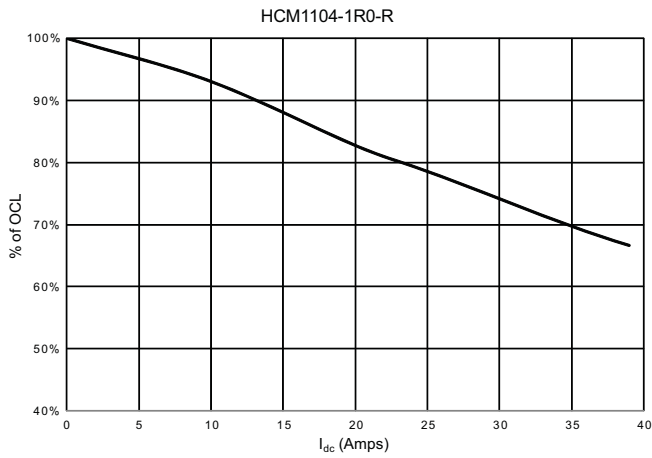
Core Loss - HCM1104-1R0-R Through HCM1104-100-R



Inductance Characteristics



Inductance Characteristics



Solder Reflow Profile

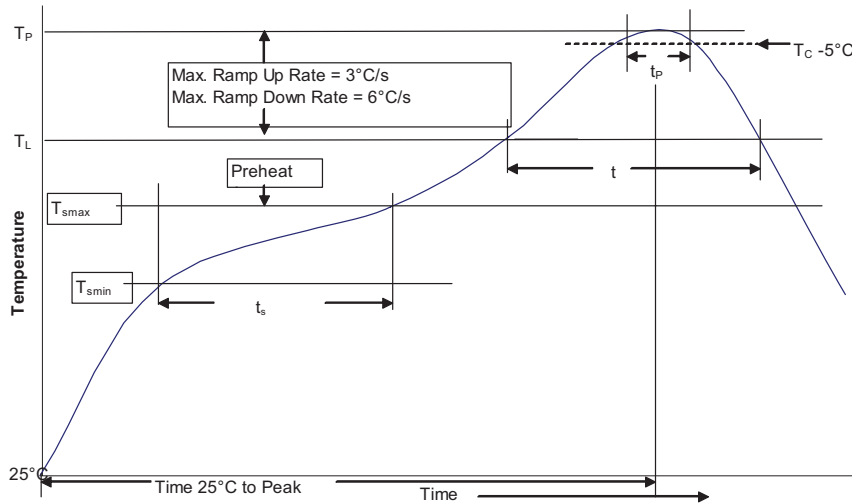


Table 1 - Standard SnPb Solder (T_C)

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