HCM1104

High current power inductors

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

Product features

- High current carrying capacity
- Low core losses
- Magnetically shielded, low EMI
- Frequency range up to 5 MHz
- Inductance range from 0.2 µH to 22 µH
- Current range from 5 A to 45 A
- 11.5 mm x 10.3 mm footprint surface mount package in a 4.0 mm height
- Iron powder core material

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-020 (latest revision) compliant

Pb HALOGEN HF FREE RoHS

Powering Business Worldwide

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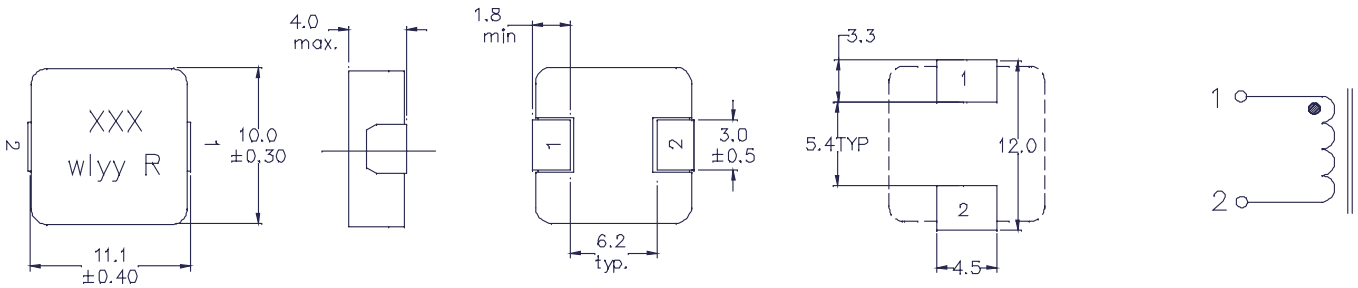
Product Specifications

Part Number[7]	OCL[1] (µH) ± 20%	FLL[2] (µH) minimum	I_{rms}[3] (A)	I_{sat}[4,5] (A)	DCR (mΩ) typical @ +20 °C	DCR (mΩ) maximum @ +20 °C	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	3.0	3.3	378
HCM1104-1R5-R	1.5	0.84	16	32	3.8	4.2	310
HCM1104-2R2-R	2.2	1.23	12	18	6.0	7.0	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	20	175
HCM1104-100-R	10	5.60	7.5	8.5	27	30	116
HCM1104-220-R	22	12.3	5.0	5.5	60	66	92

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 Vrms, 0.0 Adc, @ +25 °C
2. Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.25 Vrms, @ 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 20% rolloff @ +25 °C- HCM1104-R20-R to HCM1104-R90-R
5. I_{sat}: Peak current for approximately 30% rolloff @ +25 °C HCM1104-1R0-R to HCM1104-220-R
6. K-factor: Used to determine B_{p-p} for core loss (see graph). Bp-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 ,
   If no R is present then last character equals 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 last character equals number of zeros.
wlyy=date code, R=revision level
All soldering surfaces to be coplanar within 0.1 millimeters
Tolerances are ±0.3 millimeters unless stated otherwise
Color: Grey
Do not route traces or vias underneath the inductor

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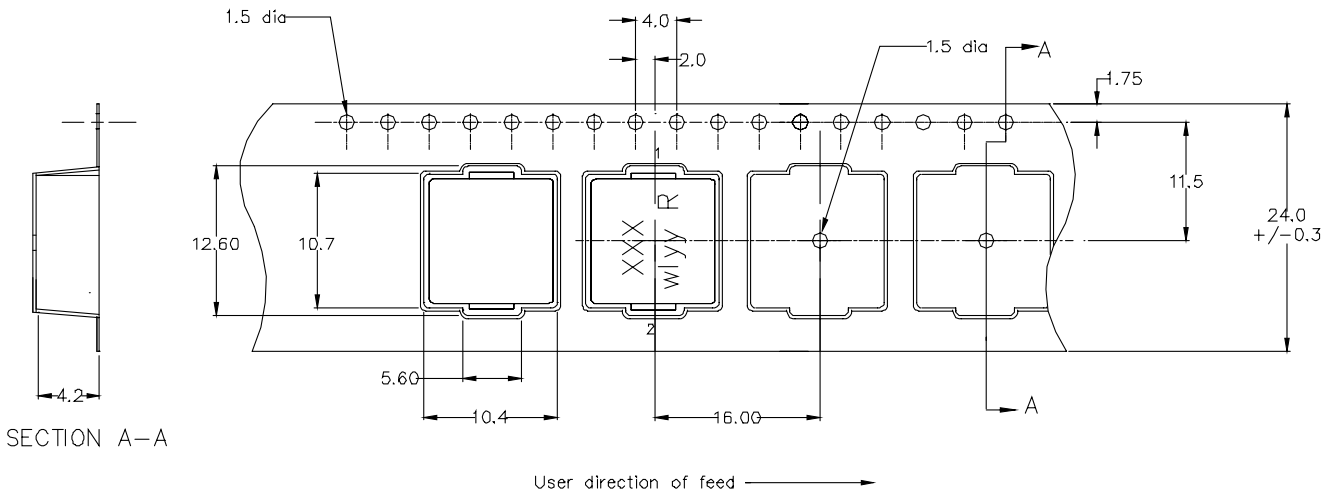
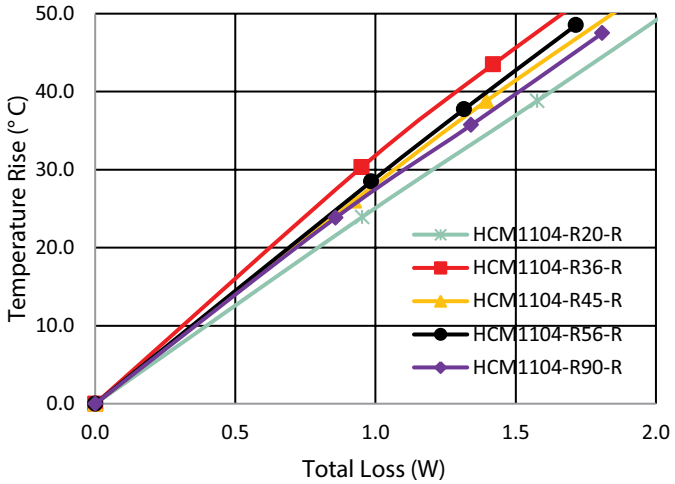
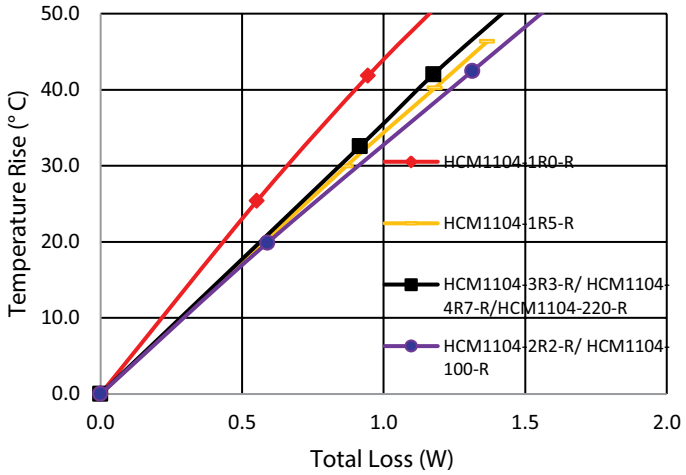
Packaging information (mm)

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



Temperature rise vs. total loss





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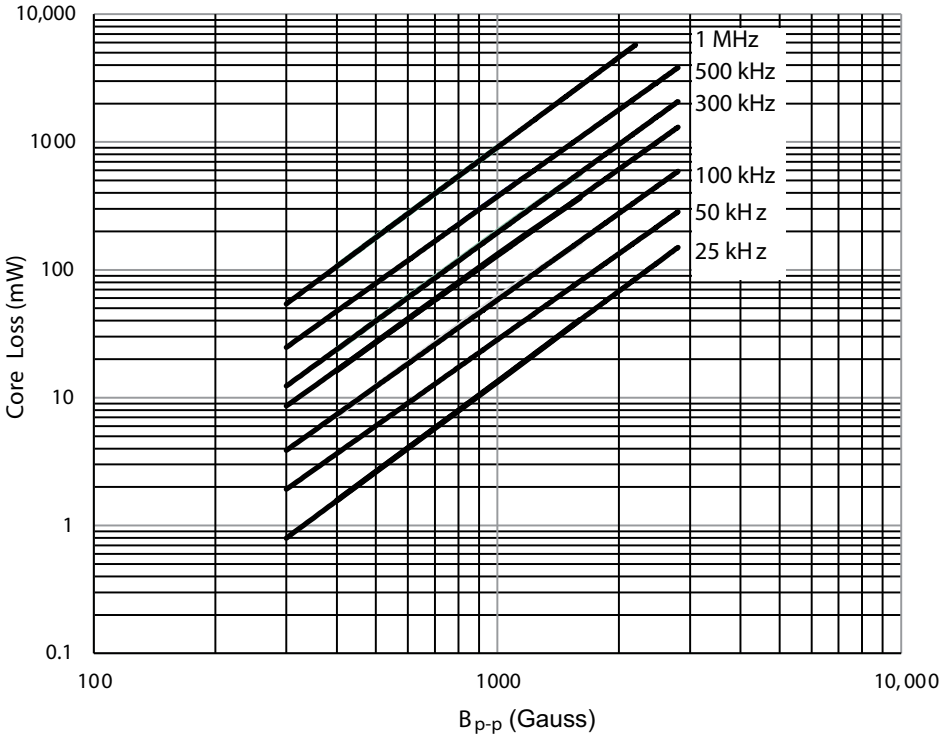
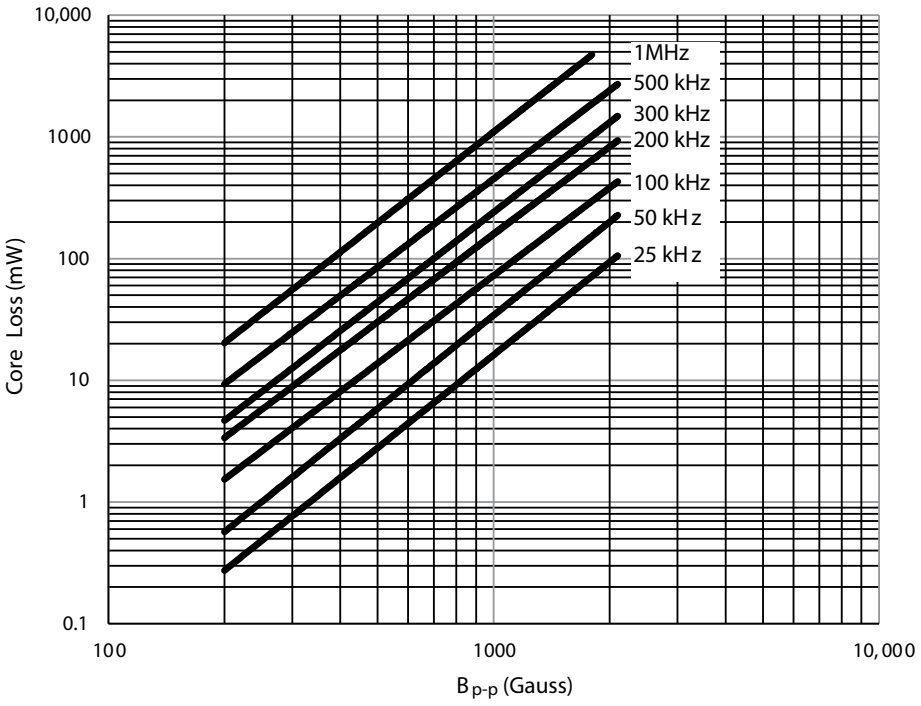
Core loss vs. B_{p-p}

HCM1104-R20-R to HCM1104-R90-R



HCM1104-1R0-R to HCM1104-220-R



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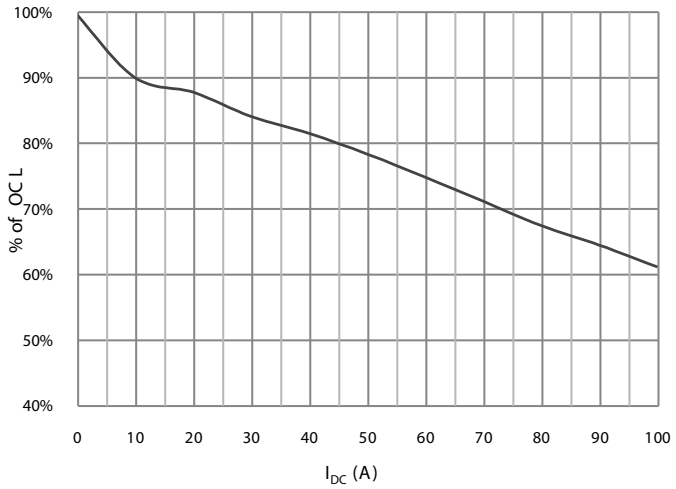
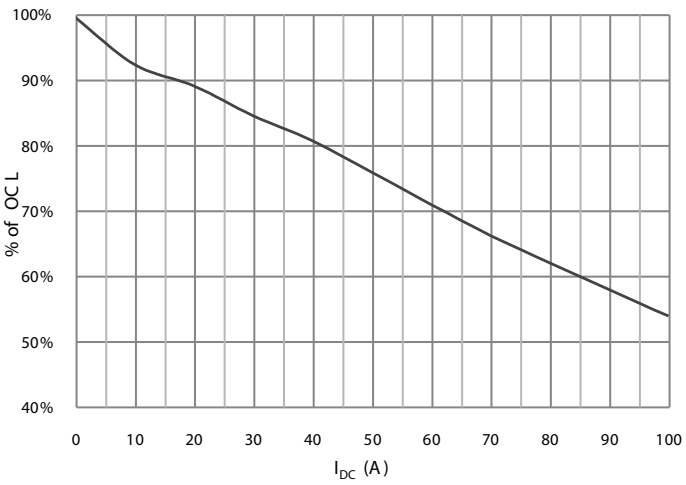
Inductance characteristics

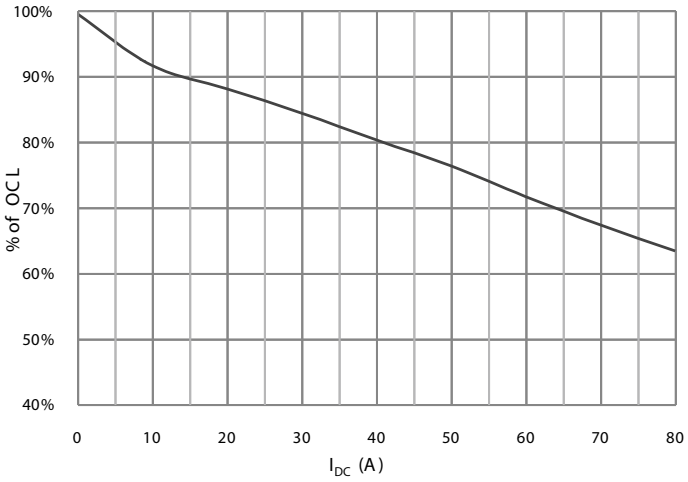
HCM1104-R20-R



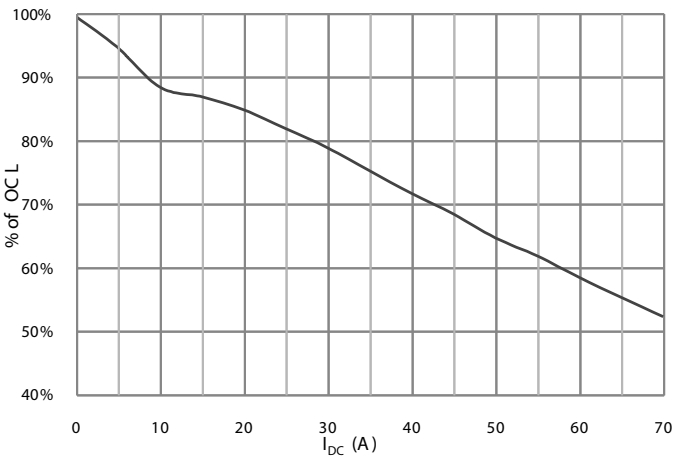
HCM1104-R36-R



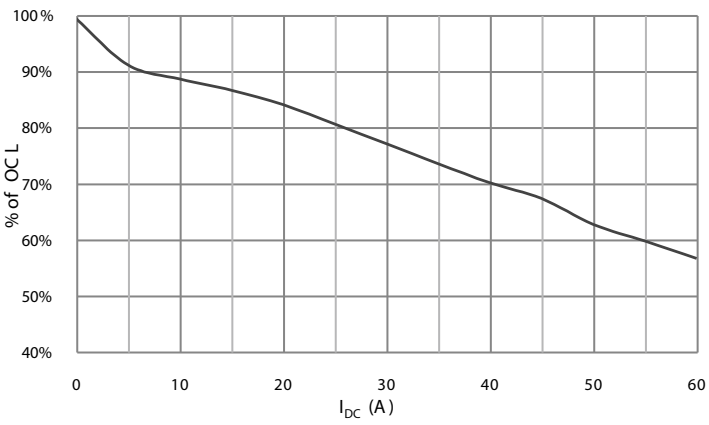
HCM1104-R45-R



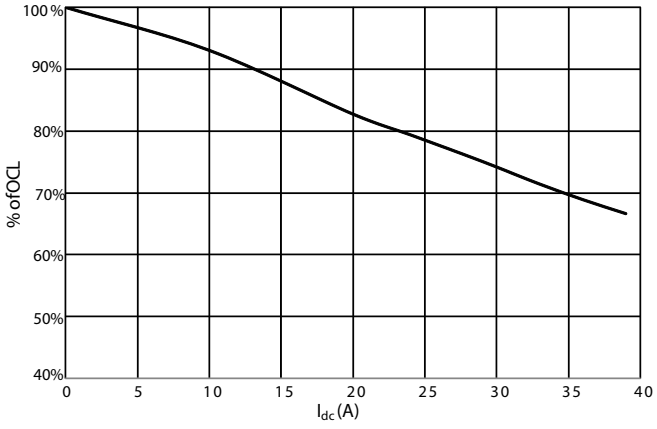
HCM1104-R56-R



HCM1104-R90-R



HCM1104-1R0-R



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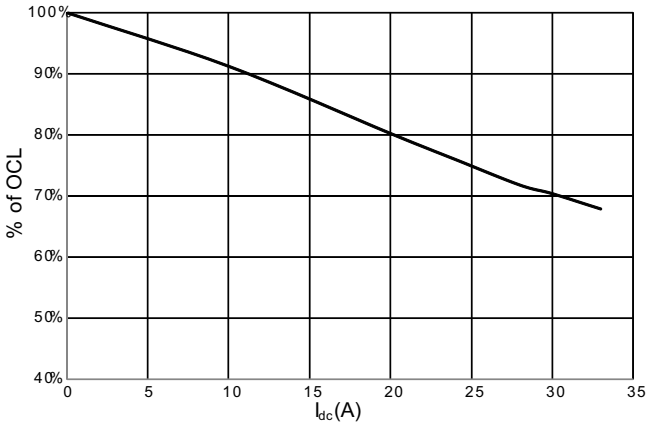
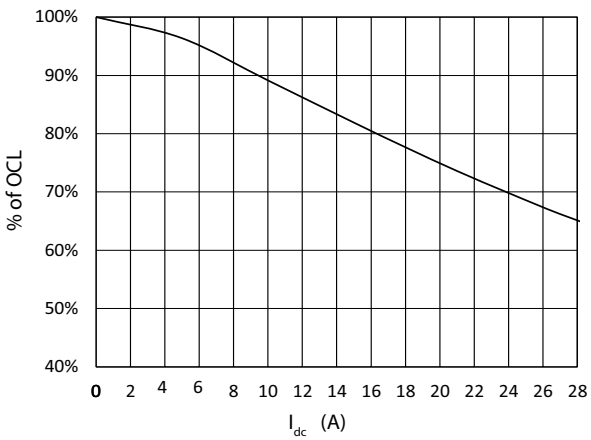
Inductance characteristics

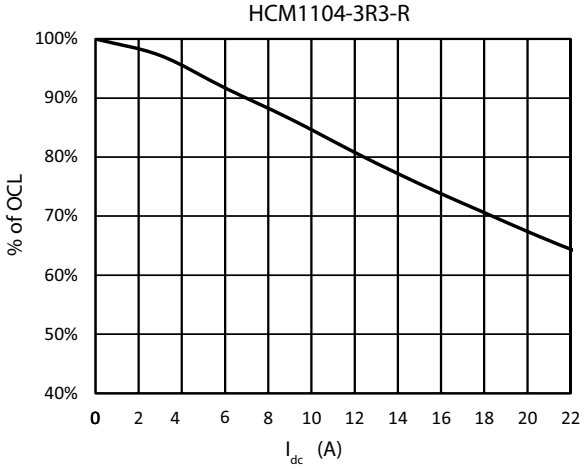
HCM1104-1R5-R



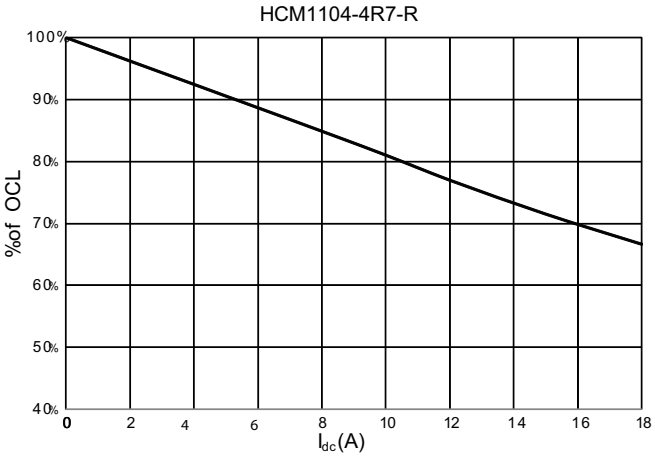
HCM1104-2R2-R



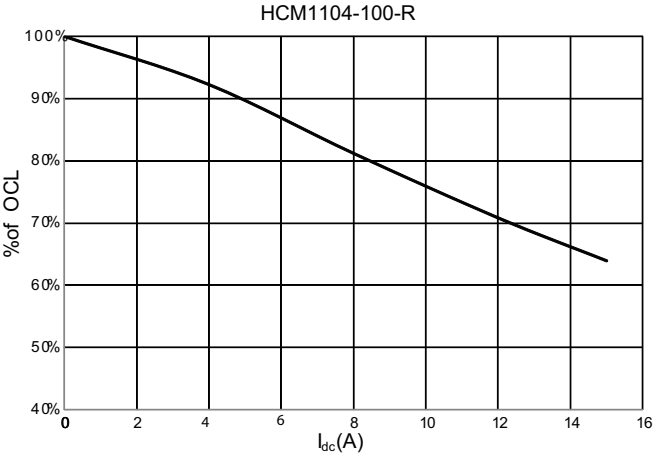
HCM1104-3R3-R



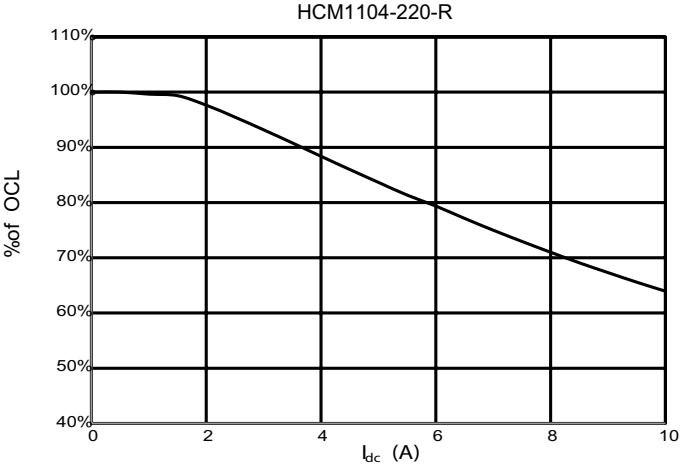
HCM1104-4R7-R



HCM1104-100-R



HCM1104-220-R



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Solder reflow profile

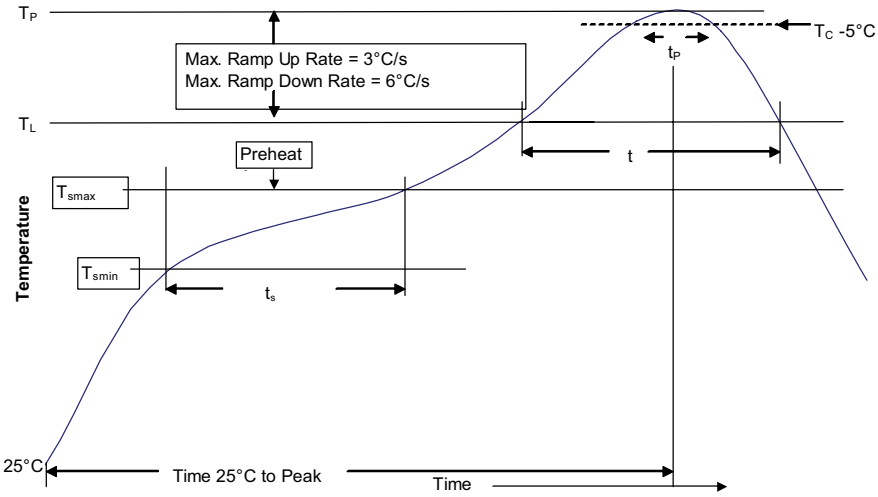

Table 1 - Standard SnPb Solder (T_C)

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) Time at liquidous (t_L)		183°C 60-150 Seconds	217°C 60-150 Seconds
Peak package body temperature (Tp)*		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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