HCMA1104

Automotive grade
High current power inductors

Product features

- AEC-Q200 qualified
- High current carrying capacity
- 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

Applications

- Body electronics
  - Central body control module
  - Vehicle access control system
  - Headlamps, tai lamps and interior lighting
  - Heating ventilation and air conditioning controllers (HVAC)
  - Doors, window lift and seat control
- Advanced driver assistance systems
  - Adaptive cruise control (ACC)
  - Automatic parking control
  - Collision avoidance system
  - Car black box system
- Infotainment and cluster electronics
  - Audio subsystem: head unit and trunk amp
  - Digital instrument cluster
  - In-vehicle infotainment (IVI) and navigation
- Chassis and safety electronics
  - Airbag control unit
  - Electronic stability control system (ESC)
  - Electric parking brake Voltage Regulator Module (VRM)

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

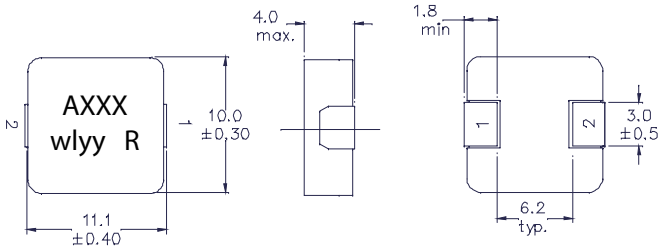
Powering Business Worldwide

Product Specifications

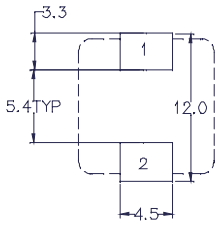
Part Number[7]	OCL[1] (µH) ± 20%	FLL[2] (µH) minimum	I_{rms}[3] (A)	I_{sat}[4,5] (A)	DCR (mΩ) typical @ +20 °C	DCR (mΩ) maximum @ +20 °C	K-factor[6]
HCMA1104-R20-R	0.20	0.13	32	45	0.63	0.72	411
HCMA1104-R36-R	0.36	0.23	30	42	1.04	1.20	269
HCMA1104-R45-R	0.45	0.29	29	36	1.07	1.23	219
HCMA1104-R56-R	0.56	0.36	25	32	1.56	1.80	230
HCMA1104-R90-R	0.90	0.58	22	28	2.17	2.50	236
HCMA1104-1R0-R	1.0	0.56	18	28	3.0	3.3	378
HCMA1104-1R5-R	1.5	0.84	16	32	3.8	4.2	310
HCMA1104-2R2-R	2.2	1.23	12	18	6.0	7.0	253
HCMA1104-3R3-R	3.3	1.85	10	16	10.8	11.8	220
HCMA1104-4R7-R	4.7	2.63	8.5	15	17	20	175
HCMA1104-100-R	10	5.60	7.5	8.5	27	30	116
HCMA1104-220-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

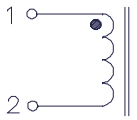
Dimensions (mm)



Recommended pad layout



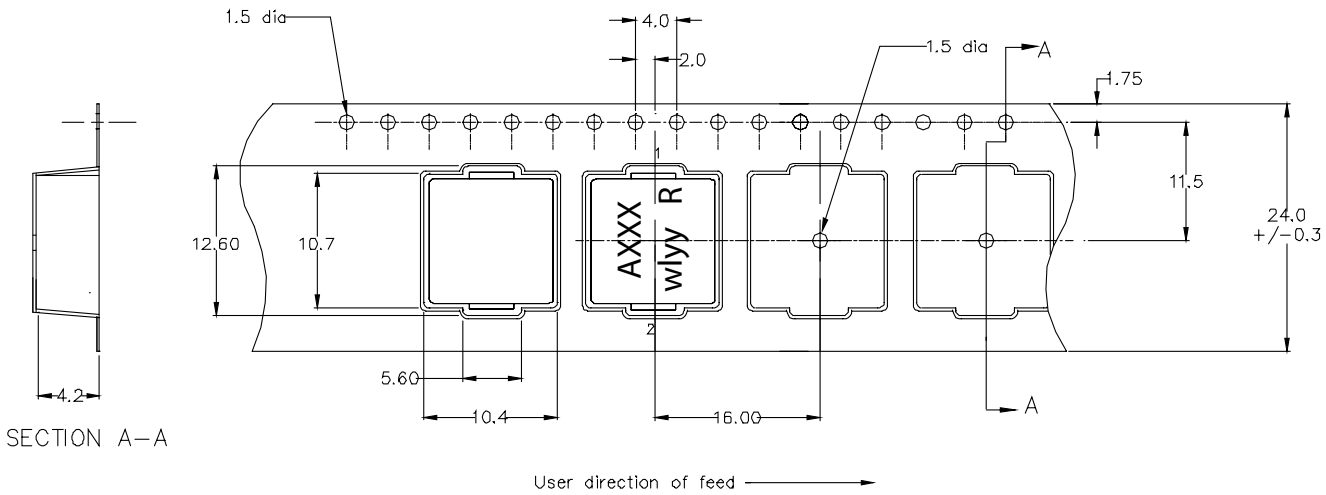
Schematic



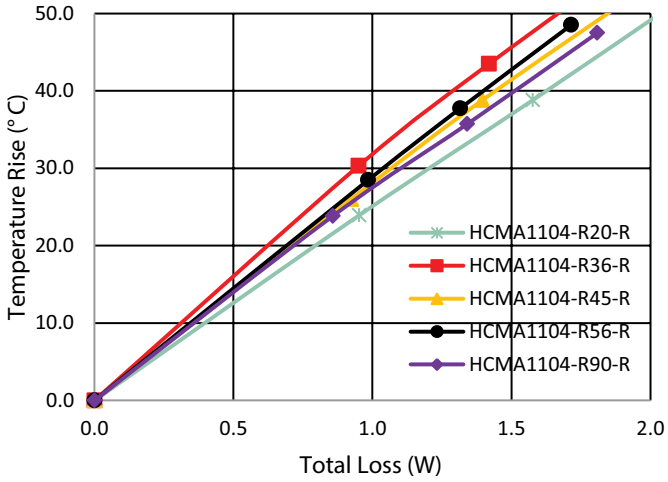
Part marking: A=automotive grade, xxx=inductance value in uH, R= decimal point. If no R is present then last character equals number of zeros.
wlyy=date code, R=revision level
All soldering surfaces to be coplanar within 0.1 millimeters
Tolerances are ±0.3 millimeters unless stated otherwise
Color: Grey
Do not route traces or vias underneath the inductor

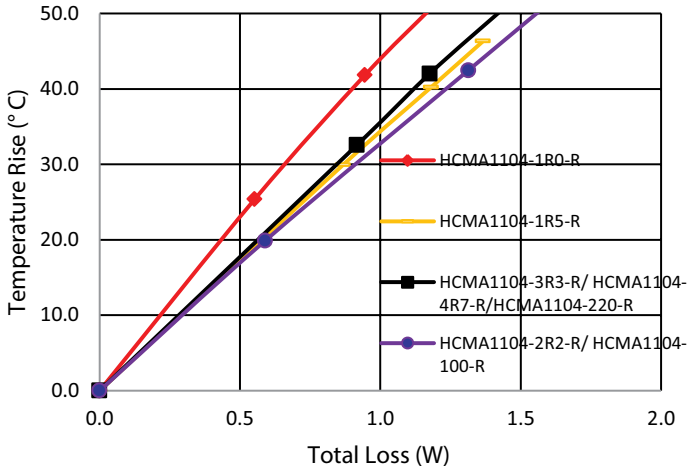
Packaging information (mm)

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



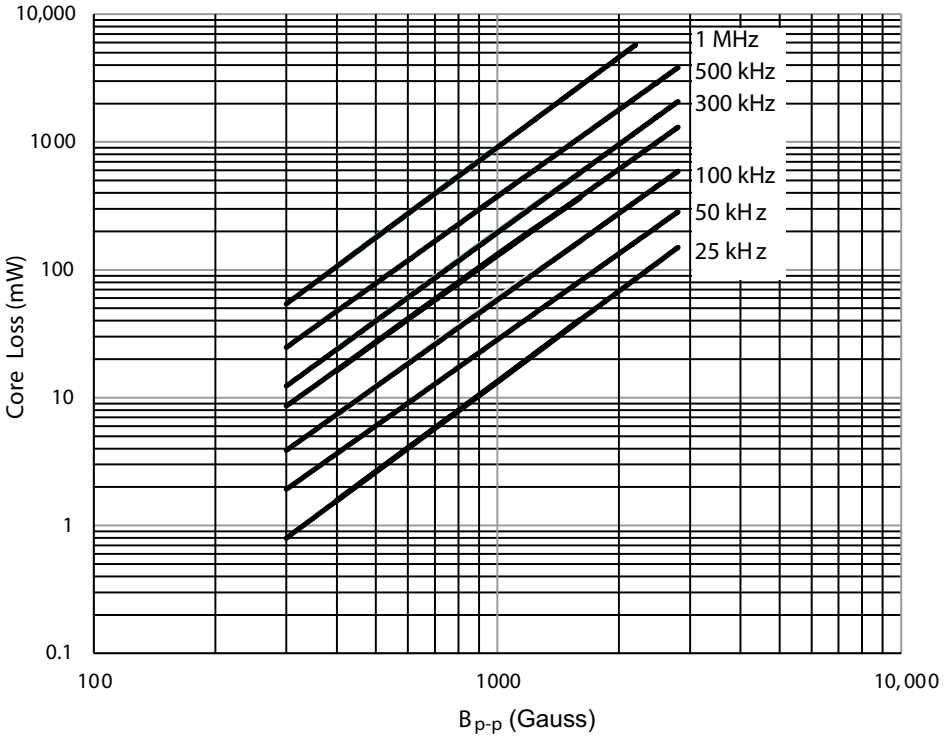
Temperature rise vs. total loss



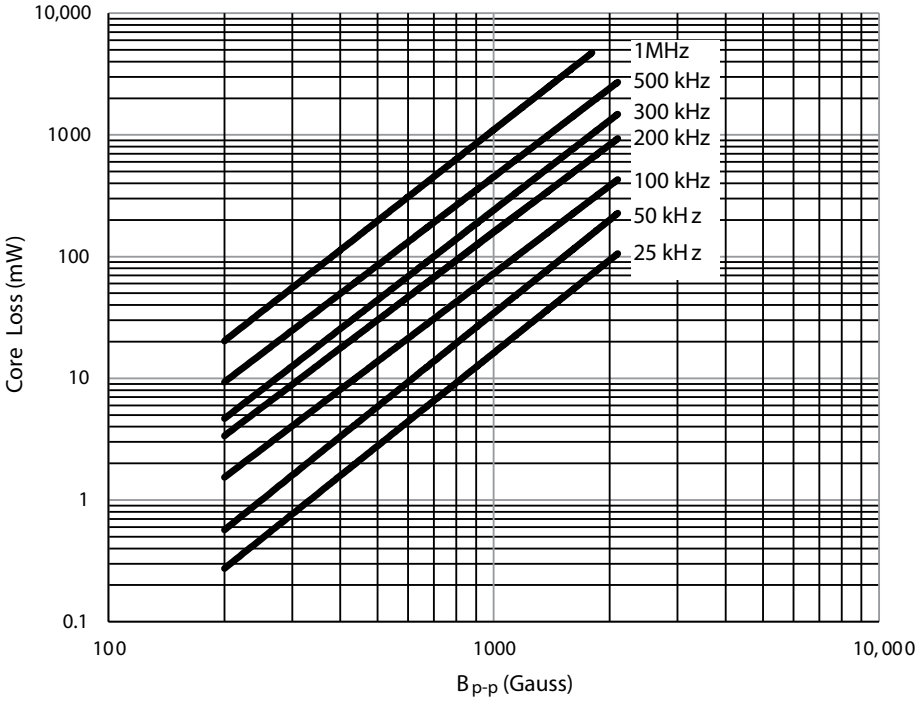


Core loss vs. B_{p-p}

HCMA1104-R20-R to HCMA1104-R90-R

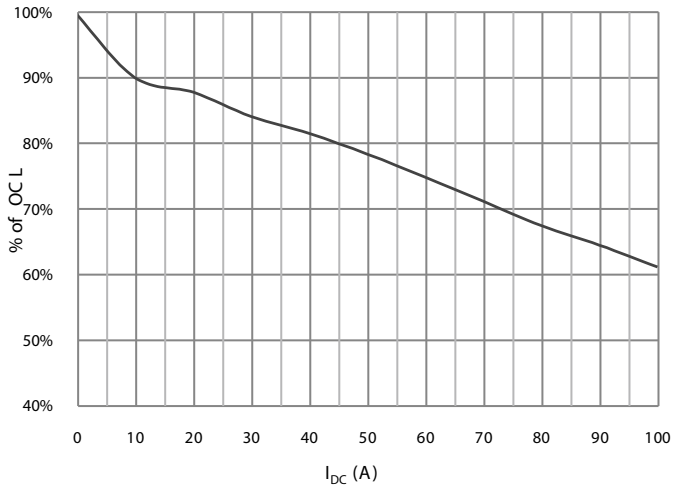


HCMA1104-1R0-R to HCMA1104-220-R

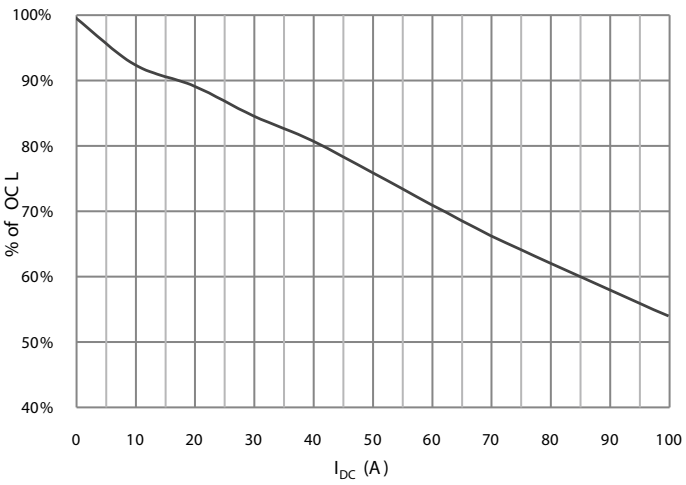


Inductance characteristics

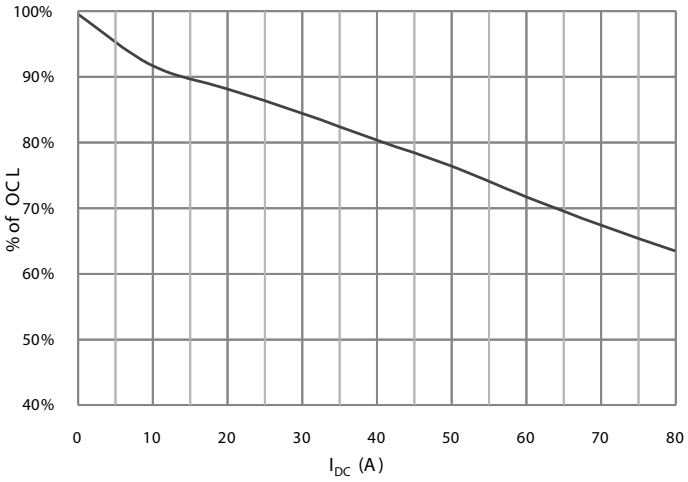
HCMA1104-R20-R



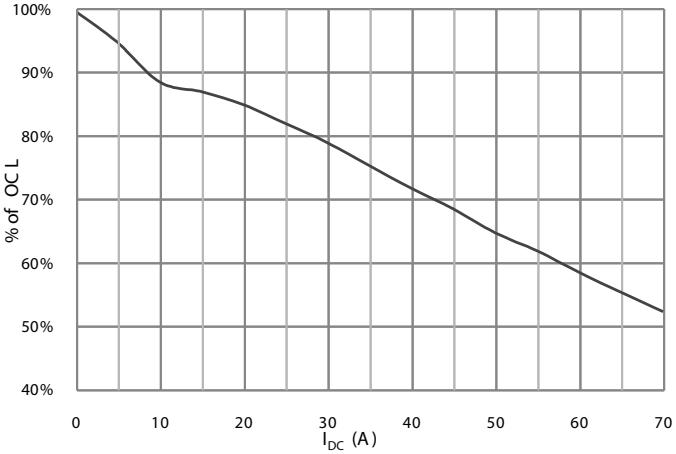
HCMA1104-R36-R



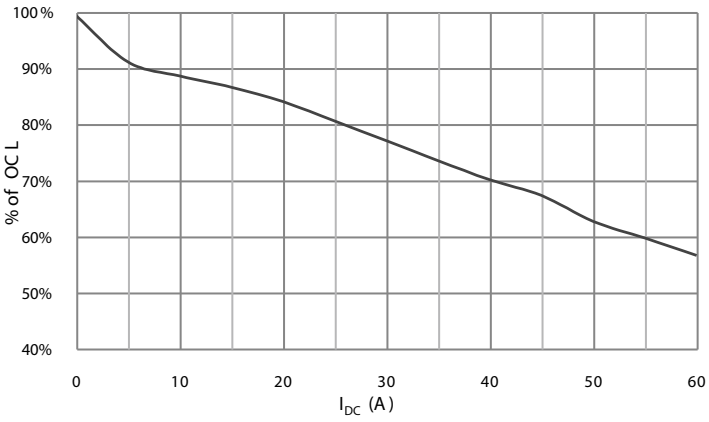
HCMA1104-R45-R



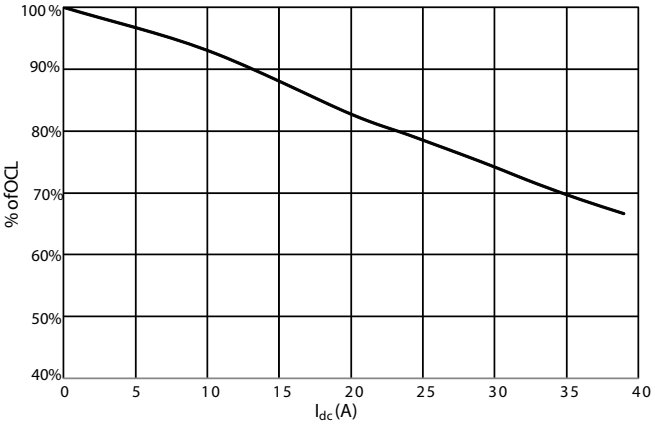
HCMA1104-R56-R



HCMA1104-R90-R

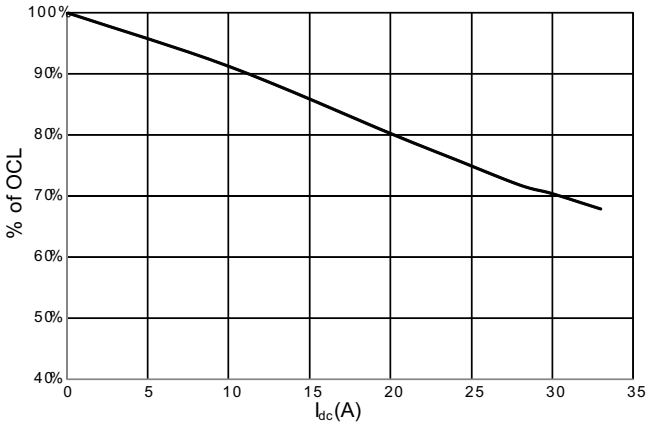


HCMA1104-1R0-R

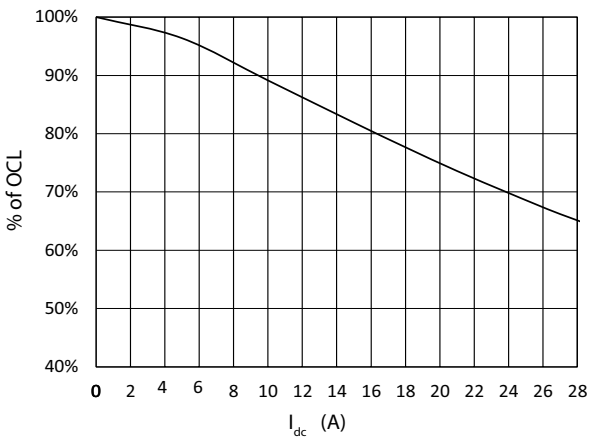


Inductance characteristics

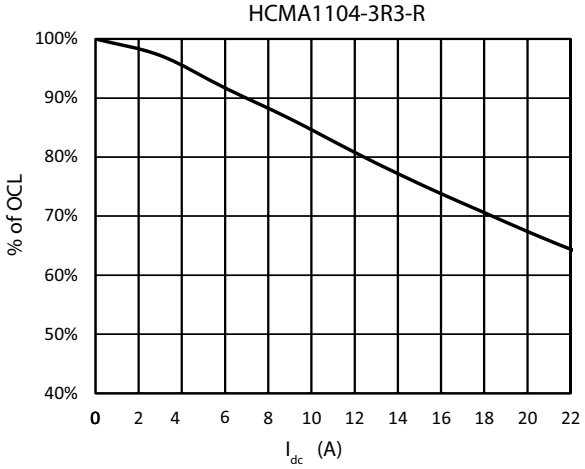
HCMA1104-1R5-R



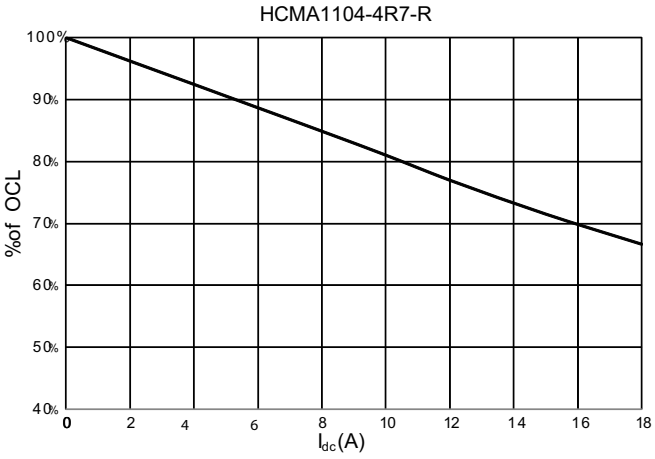
HCMA1104-2R2-R



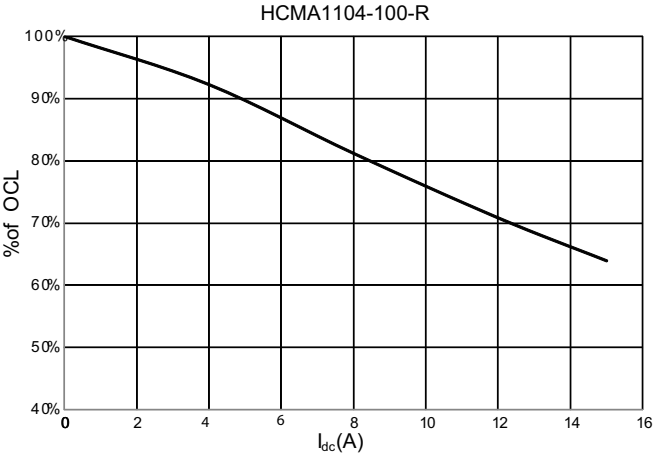
HCMA1104-3R3-R



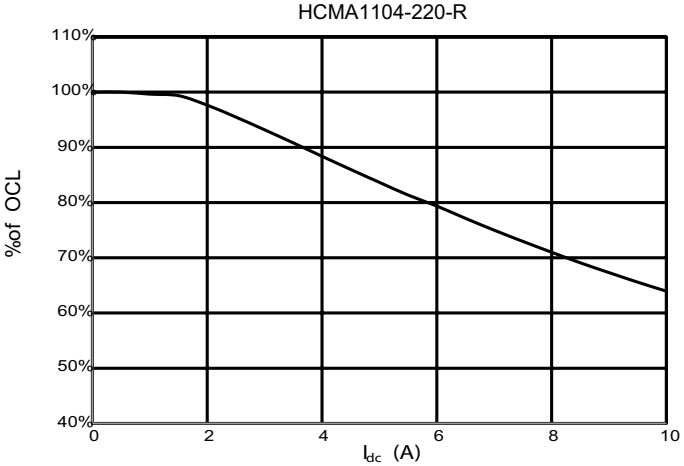
HCMA1104-4R7-R



HCMA1104-100-R



HCMA1104-220-R



Solder reflow profile

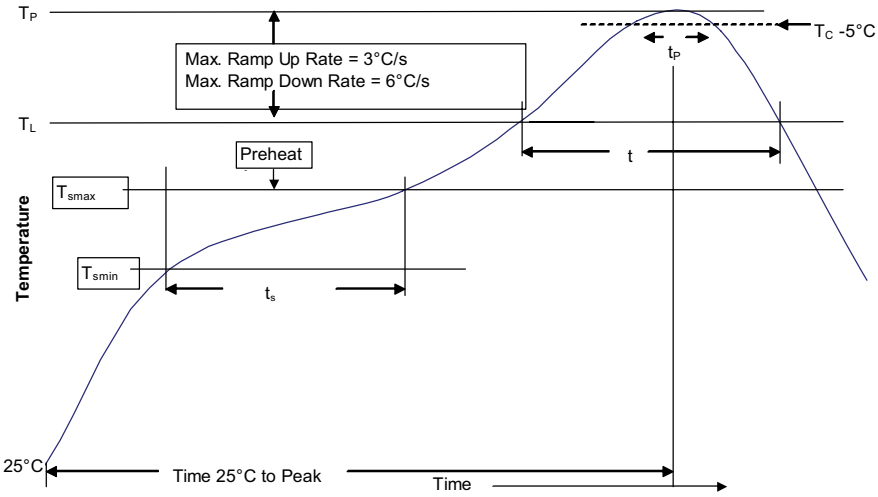


Table 1 - Standard SnPb Solder (T_C)

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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