

Coiltronics HCMA1104 Series

Automotive grade high current power inductors



Product description

- AEC-Q200 grade 3 qualified
- High current carrying capacity
- Low core losses
- Magnetically shielded, low EMI
- Frequency range up to 5MHz
- Inductance range from 0.20 μ H to 10 μ H
- Current range from 7.5A to 45A
- 11.5x10.3mm footprint surface mount package in a 4.0mm height
- Powder iron core material
- Halogen free, lead free, RoHS compliant

Applications

- Body electronics
 - Central body control module
 - Vehicle access control system
 - Headlamps, tail 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

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-020D compliant



The Coiltronics brand of magnetics (formerly of the Bussmann Division of Cooper Industries) is now part of Eaton's Electrical Group, Electronics Division.

Coiltronics is now part of Eaton
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Powering Business Worldwide

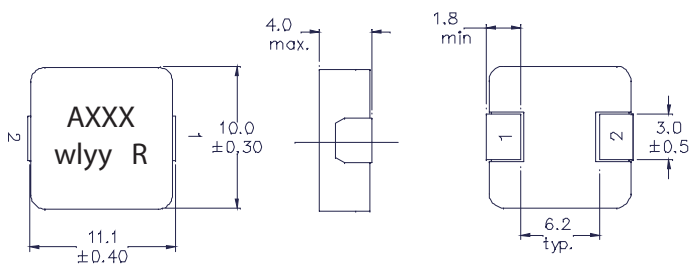
Product specifications

Part Number ⁷	OCL ¹ (μH) $\pm 20\%$	FLL ² Min. (μH)	I_{rms}^3 (amps)	$I_{\text{sat}}^{4,5}$ @25°C (amps)	DCR (m Ω) @ 20°C typical	DCR (m Ω) @ 20°C maximum	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	3.00	3.30	378
HCMA1104-1R5-R	1.5	0.84	16	32	3.80	4.20	310
HCMA1104-2R2-R	2.2	1.23	12	18	6.00	7.00	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	17.0	20.0	175
HCMA1104-100-R	10	5.60	7.5	8.5	27.0	30.0	116

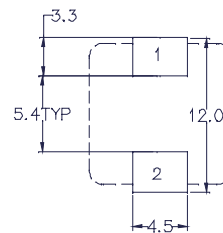
- Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.25V_{rms}, 0.0Adc, +25°C.
- Full Load Inductance (FLL) Test Parameters: 100kHz, 0.25V_{rms}, I_{sat} @ +25°C.
- I_{rms}: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB layout, 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.
- I_{sat}: Peak current for approximately 20% rolloff at +25°C- HCMA1104-R20-R to HCMA1104-R90-R.

- I_{sat}: Peak current for approximately 30% rolloff at +25°C- HCMA1104-1R0-R to HCMA1104-100-R.
- K-factor: Used to determine B_{pp} for core loss (see graph). B_{pp} = K * L * ΔI . B_{pp}: (Gauss), K: (K-factor from table), L: (Inductance in μH), ΔI (Peak to peak ripple current in amps).
- Part Number Definition: HCMA1104-yyy-R
 - HCMA1104 = Product code and size
 - yyy= Inductance value in μH , R = decimal point, if no R is present then third character = number of zeros.
 - "-R" suffix = RoHS compliant

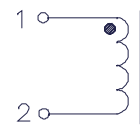
Dimensions - mm



Recommended pad layout

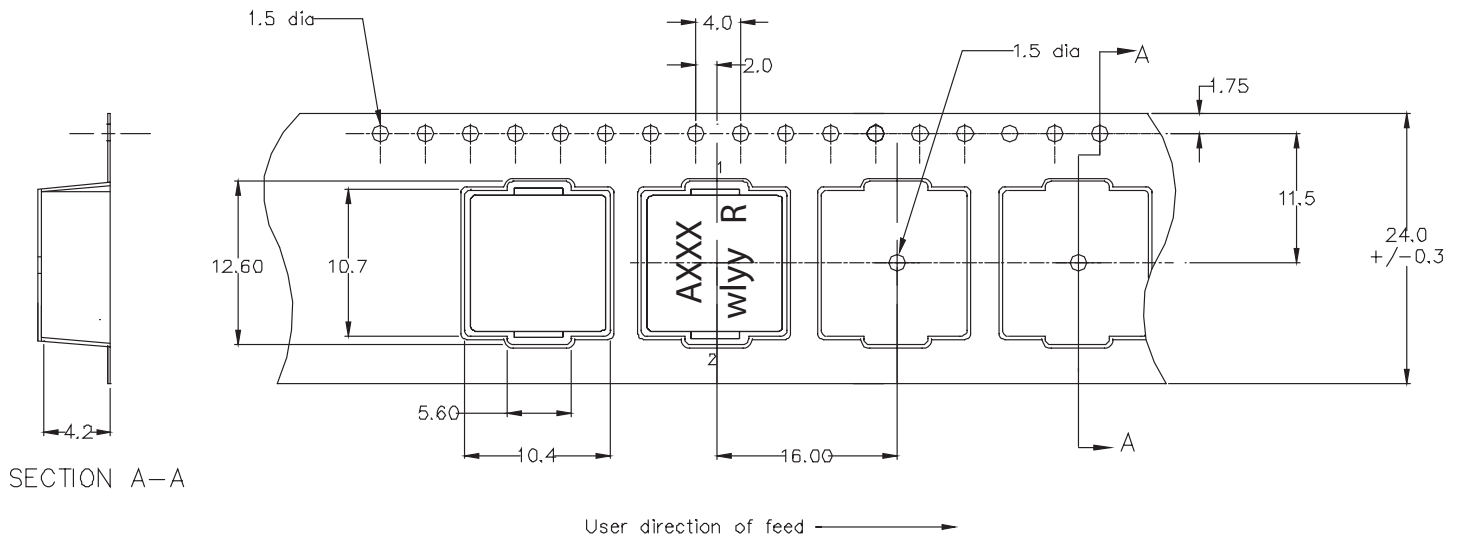


Schematic



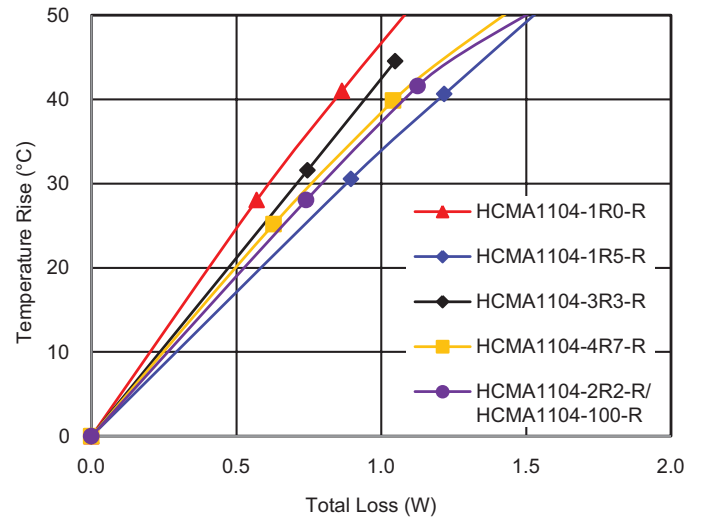
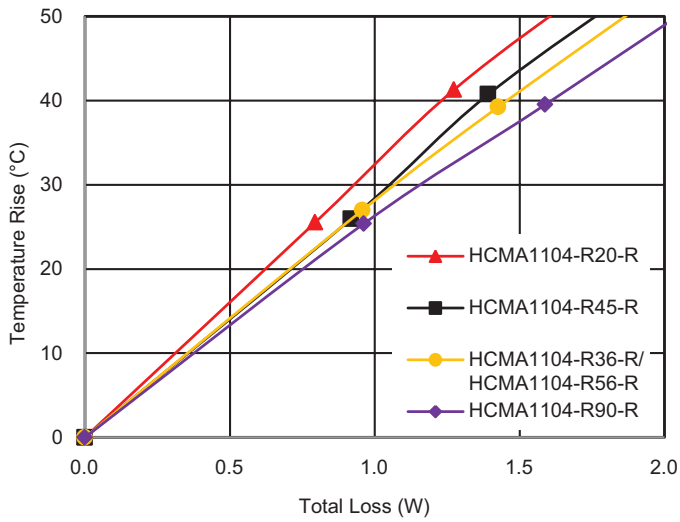
Part marking: A = automotive grade, xxx = inductance value in μH , R = decimal point, if no R is present, third character = number of zeros, wlyy = date code, R = revision level
 All soldering surfaces to be coplaner within 0.10 millimeters
 Tolerances are ± 0.3 millimeters unless stated otherwise
 Color: Grey

Packaging information - mm



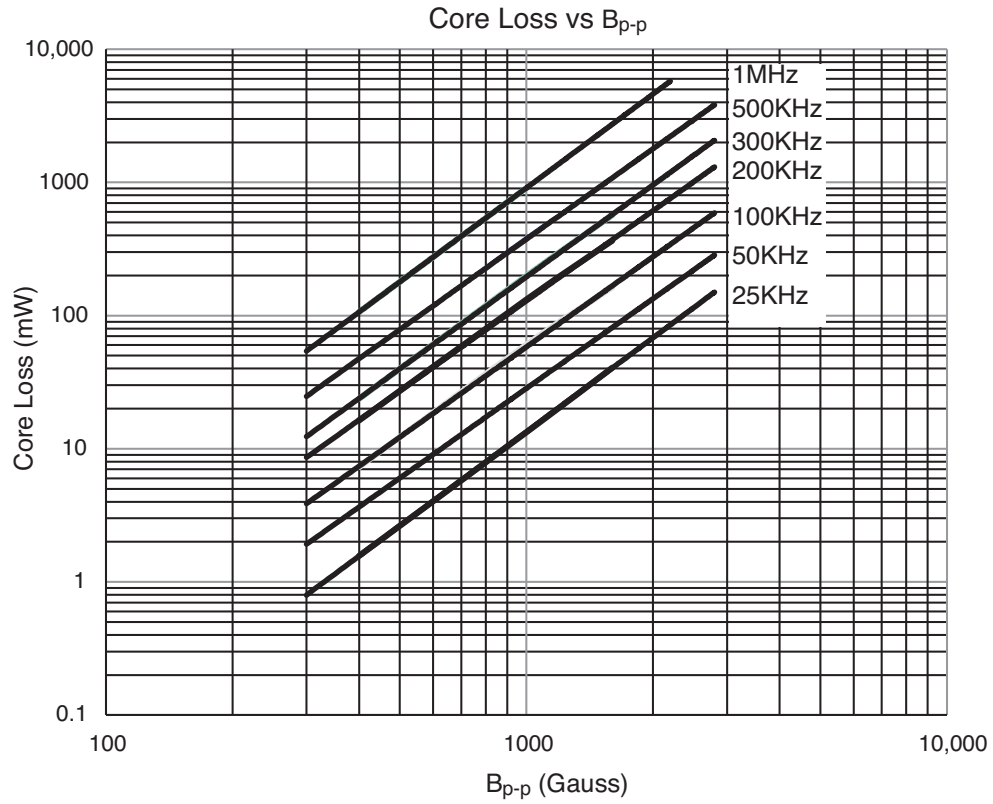
Supplied in tape and reel packaging, 850 parts per 13" diameter reel.

Temperature rise vs. total loss

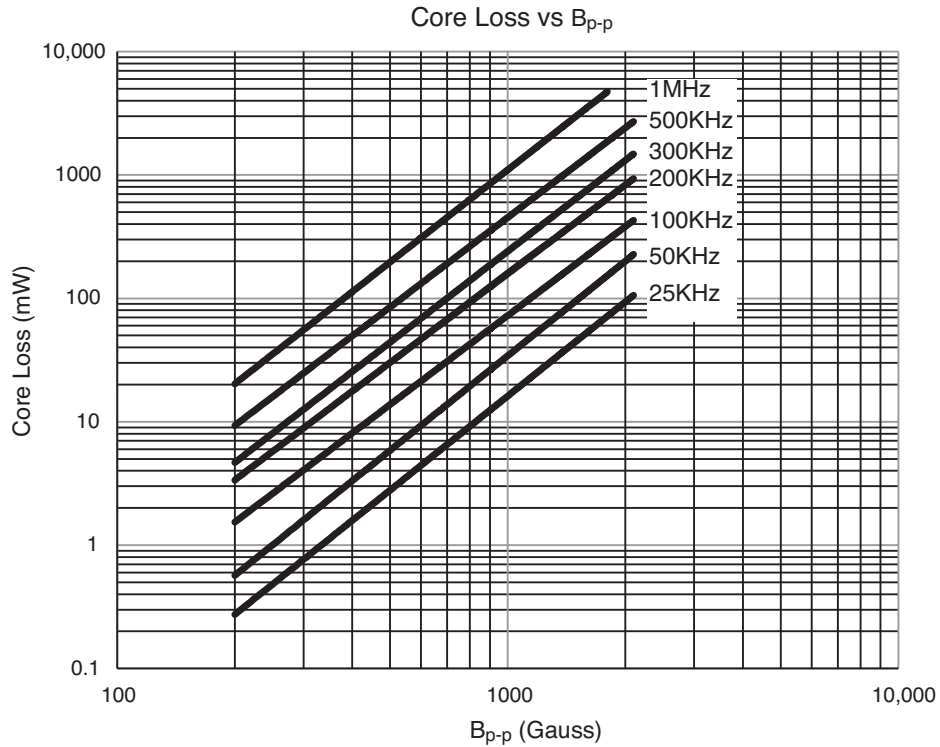


Core loss

HCMA1104-R20-R to HCMA1104-R90-R

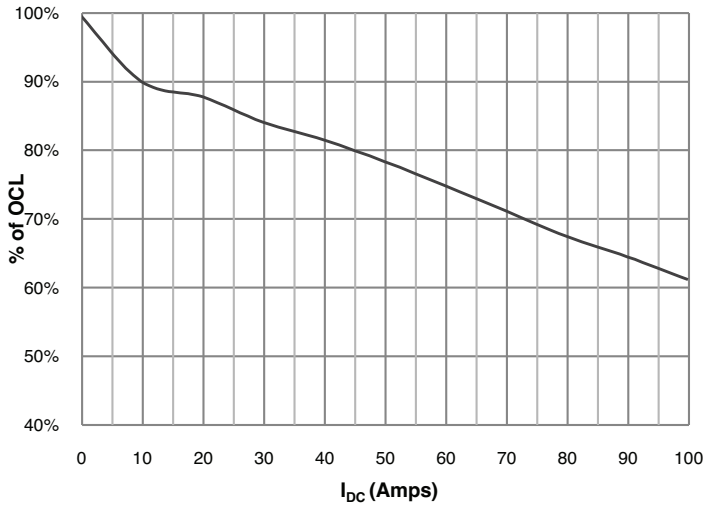


HCMA1104-1R0-R to HCMA1104-100-R

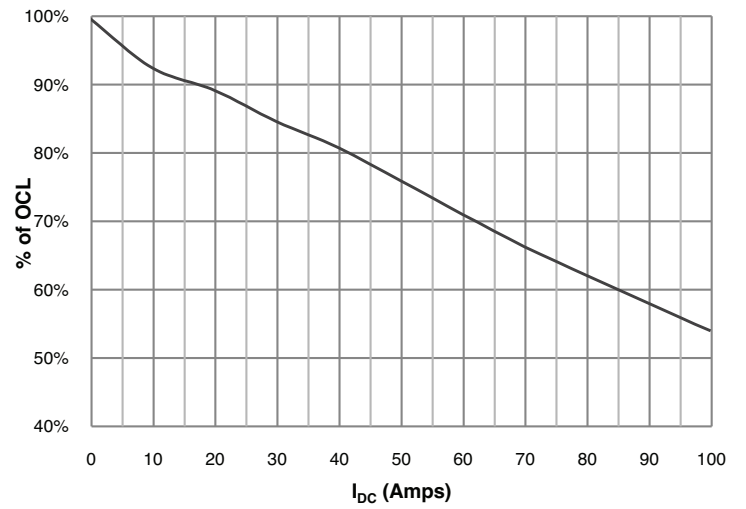


Inductance characteristics

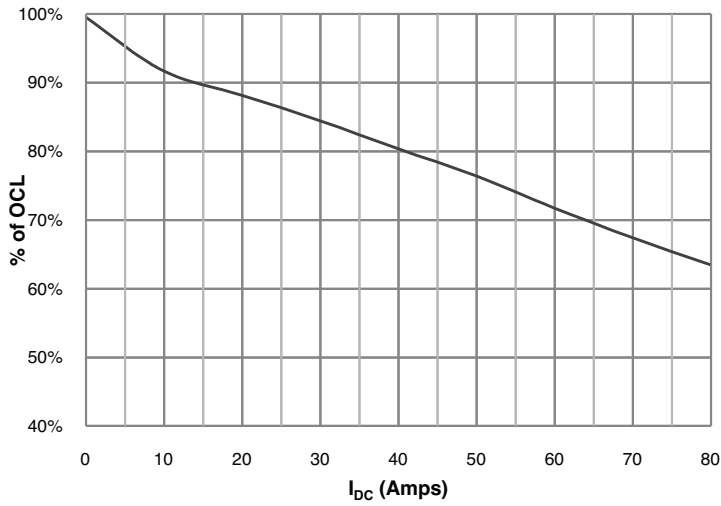
HCMA1104-R20-R



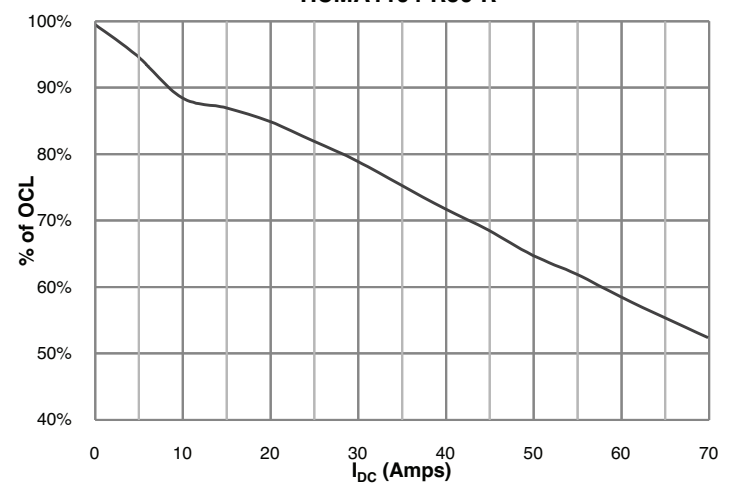
HCMA1104-R36-R



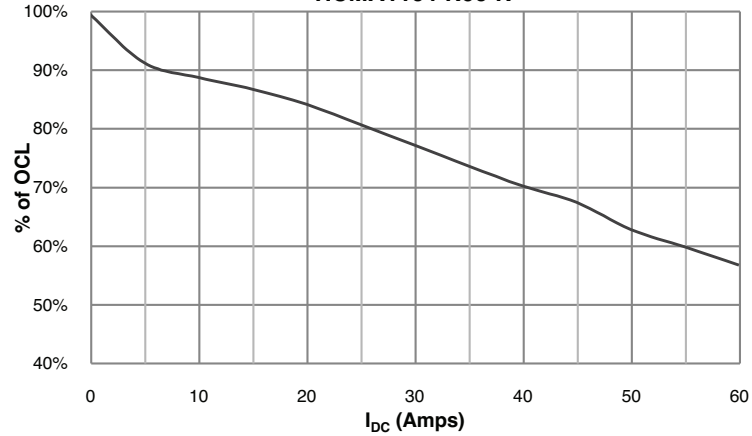
HCMA1104-R45-R



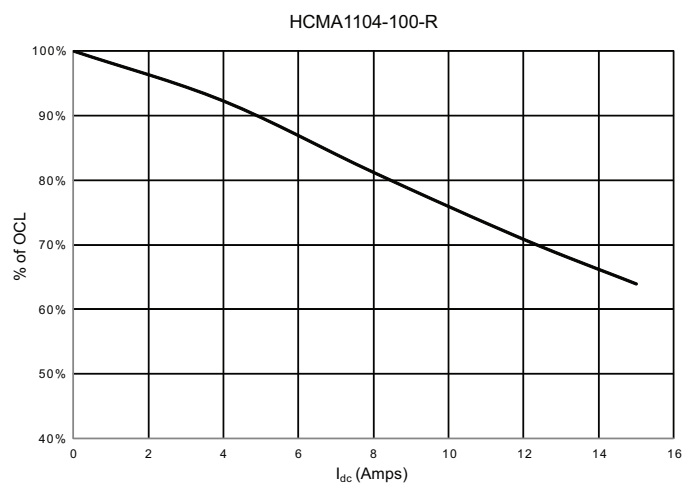
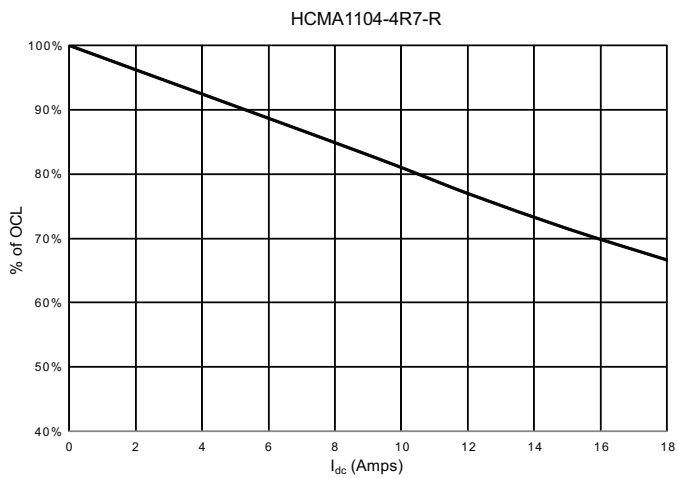
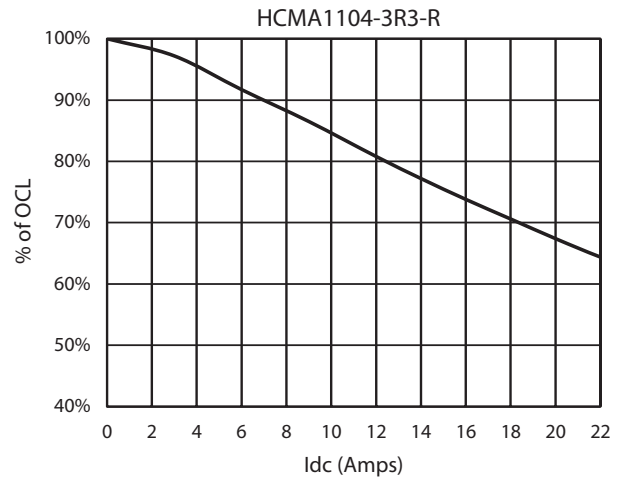
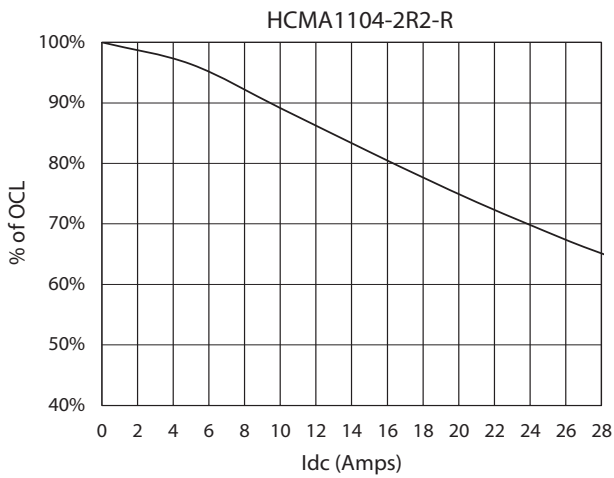
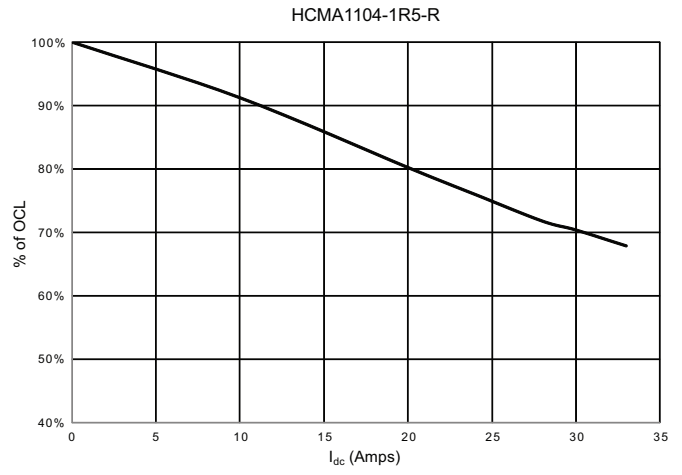
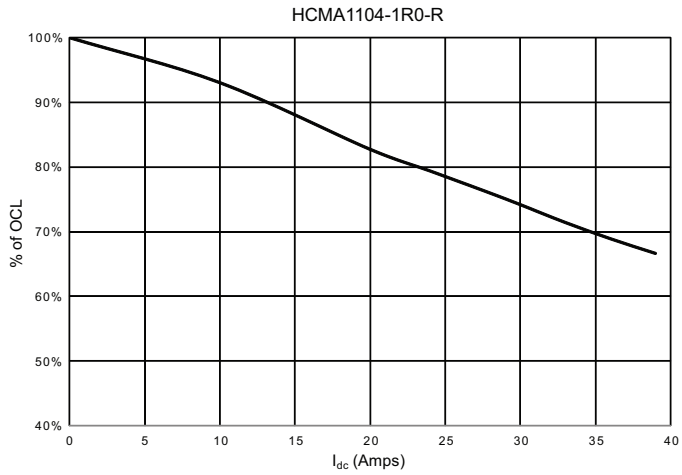
HCMA1104-R56-R



HCMA1104-R90-R



Inductance characteristics



Solder reflow profile

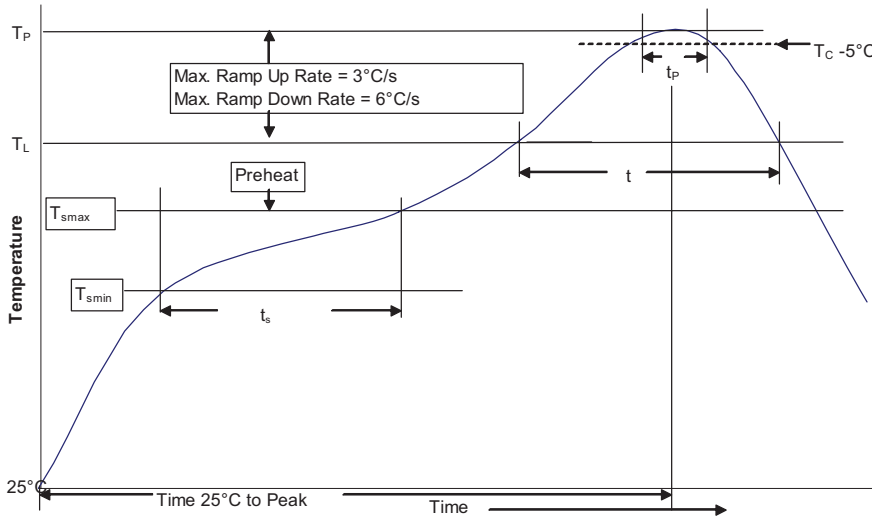


Table 1 - Standard SnPb Solder (T_c)

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
> 2.5 mm	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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