

Coiltronics HCMA0703 Series

Automotive grade High current power inductors



Product description

- Automotive grade 3 qualified
- High current carrying capacity, low core losses
- Magnetically shielded, low EMI
- Frequency range up to 5MHz
- Inductance range from 0.15 μ H to 33 μ H
- Current range from 1.8A to 52A
- 7.4x7.0mm footprint surface mount package in a 3.0mm 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
 - 77GHz radar systems
 - Adaptive cruise control (ACC)
 - Automatic parking control
 - Collision avoidance system
 - Car black box system
- Infotainment and cluster electronics
 - Active Noise Cancellation (ANC)
 - Audio subsystem: head unit and trunk amp
 - Digital instrument cluster
 - In-Vehicle Infotainment (IVI) and navigation
 - Port power/USB HUB for front and rear passengers
- Chassis and safety electronics
 - Airbag control unit
 - Electronic Stability Control System (ESC)

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

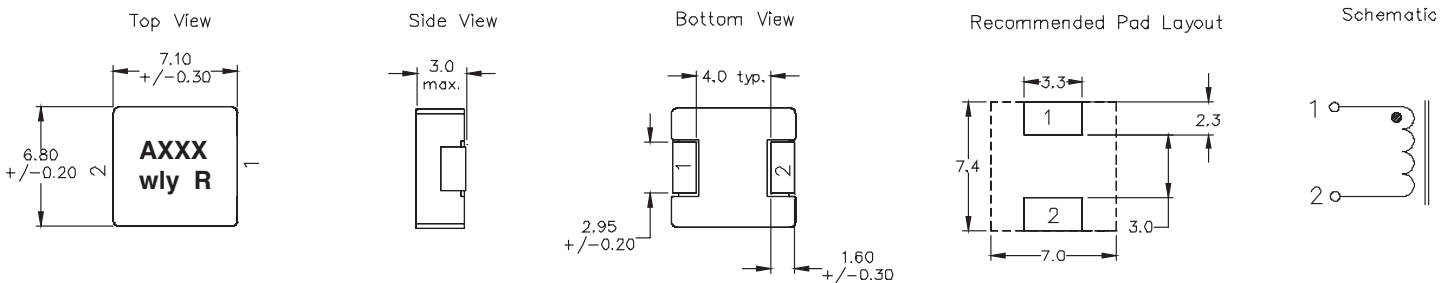
Product specifications

Part Number ⁶	OCL ¹ (μH) $\pm 20\%$	FLL min. ² (μH)	I_{rms}^3 (amps)	I_{sat}^4 (amps)	DCR ($\text{m}\Omega$) @ 20°C Typical	DCR ($\text{m}\Omega$) @ 20°C Maximum	K-factor ⁵
HCMA0703-R15-R	0.15	0.09	26.0	52.0	1.90	2.50	1044
HCMA0703-R22-R	0.22	0.13	23.0	40.0	2.50	2.80	986
HCMA0703-R47-R	0.47	0.28	17.5	26.0	4.00	4.20	580
HCMA0703-R68-R	0.68	0.41	15.5	25.0	5.00	5.50	455
HCMA0703-R82-R	0.82	0.49	13.0	24.0	6.70	8.00	439
HCMA0703-1R0-R	1.00	0.60	11.0	22.0	9.00	10.0	374
HCMA0703-1R5-R	1.50	0.90	9.00	18.0	14.0	15.0	366
HCMA0703-2R2-R	2.20	1.32	8.00	14.0	18.0	20.0	281
HCMA0703-3R3-R	3.30	1.98	6.00	13.5	28.0	30.0	252
HCMA0703-4R7-R	4.70	2.82	5.50	10.0	37.0	40.0	210
HCMA0703-6R8-R	6.80	4.08	4.50	8.00	54.0	60.0	151
HCMA0703-8R2-R	8.20	4.92	4.00	7.50	64.0	68.0	142
HCMA0703-100-R	10.0	6.00	3.20	7.00	70.5	77.6	132
HCMA0703-330-R	33.0	19.8	1.80	2.00	220	242	76

- Open Circuit Inductance (OCL) Test Parameters: 100kHz, $0.25V_{\text{rms}}$, 0.0Adc, +25°C.
- Full Load Inductance (FLL) Test Parameters: 100kHz, $0.25V_{\text{rms}}$, 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.

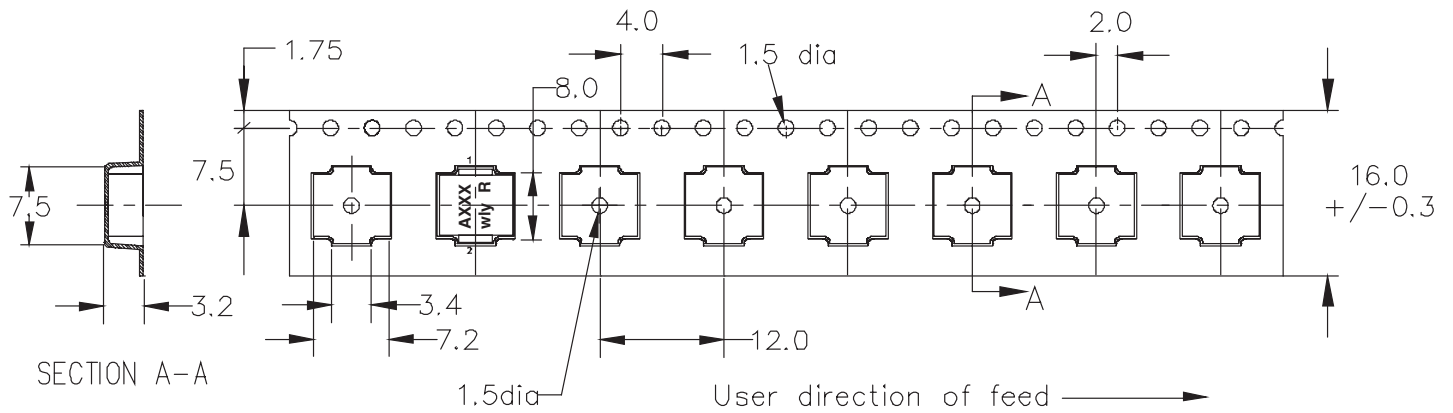
- I_{sat} : Peak current for approximately 20% rolloff at +25°C.
- K-factor: Used to determine B_{pp} for core loss (see graph). $B_{\text{pp}} = K * L * \Delta I$. B_{pp} : (Gauss), K: (K-factor from table), L: (Inductance in μH), ΔI (Peak to peak ripple current in amps).
- Part Number Definition: HCMA0703-yyy-R
 - HCMA0703 = 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



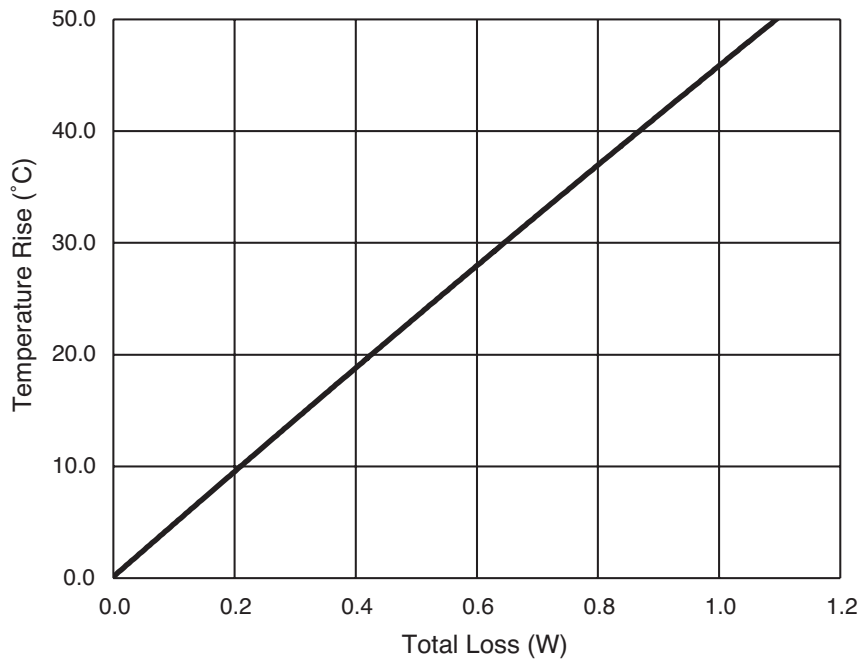
Part marking: A = Automotive grade, xxx= Inductance value in μH , R= decimal point, If no R is present then last digit is # of zeroes
 wly= Date code, R= Revision level
 All soldering surfaces to be coplanar within 0.10 millimeters
 Tolerances are ± 0.2 millimeters unless stated otherwise.
 Color: Grey

Packaging information - mm

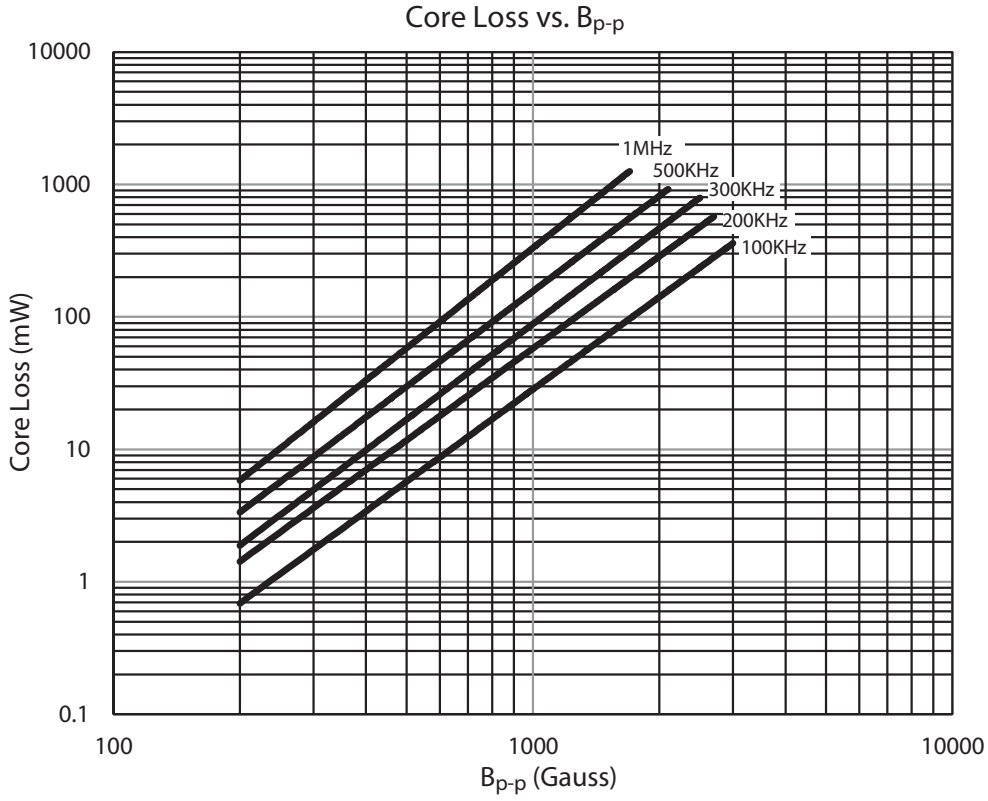


Supplied in tape and reel packaging, 1500 parts per 13" diameter reel.

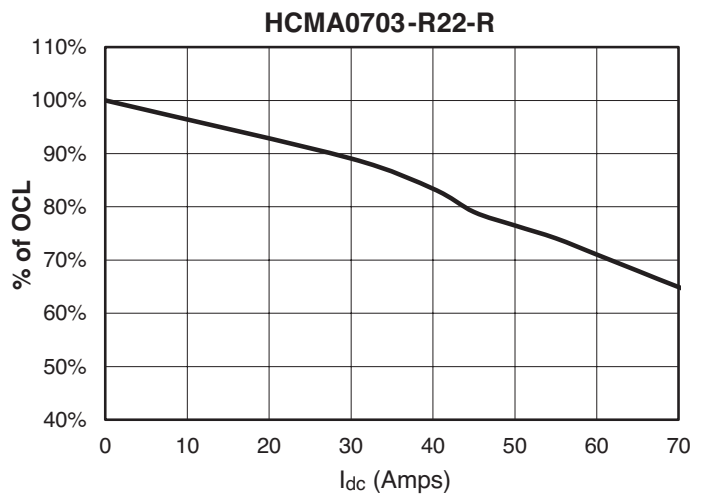
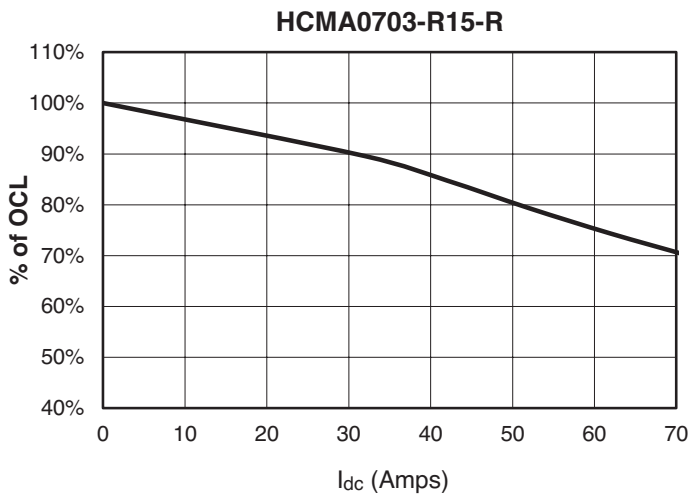
Temperature rise vs. total loss



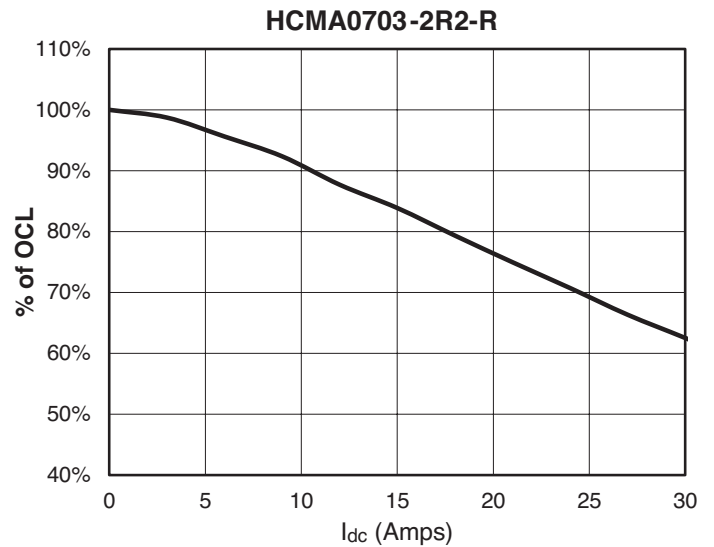
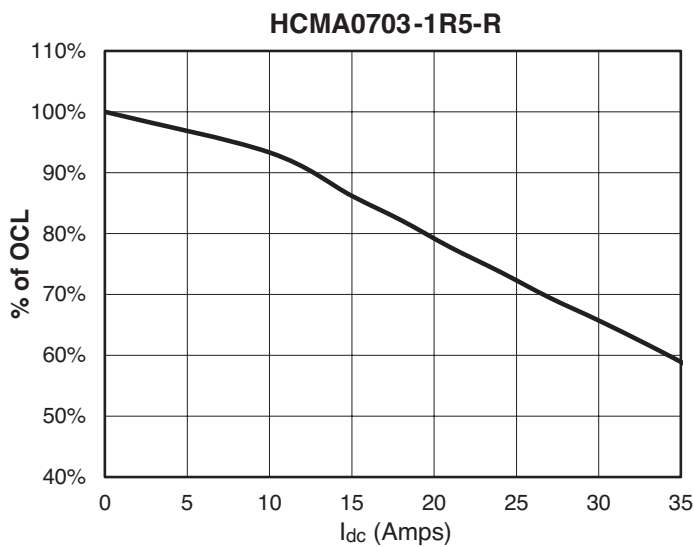
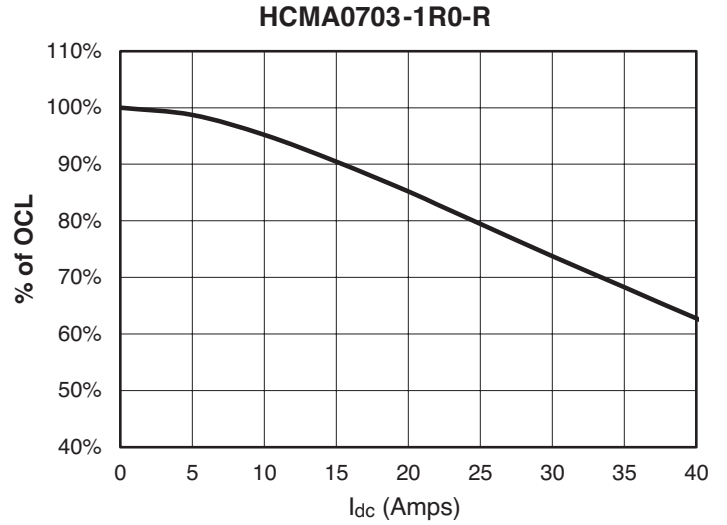
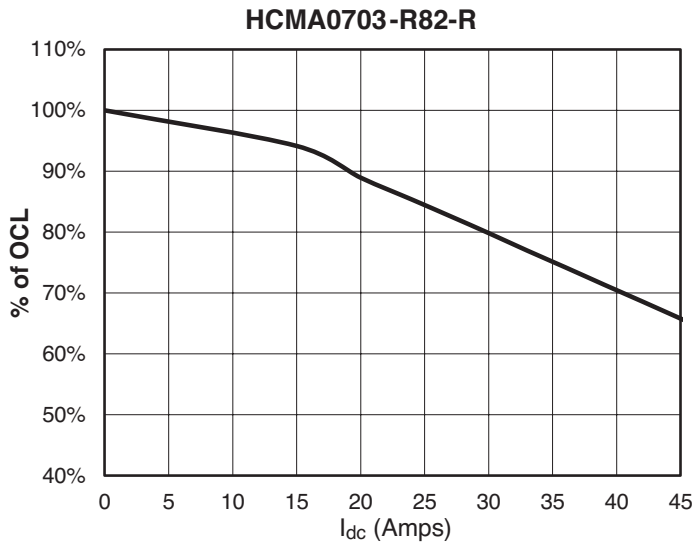
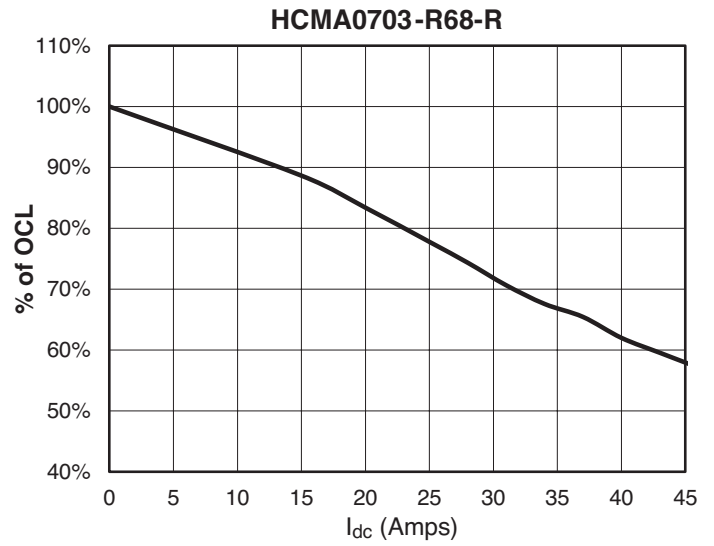
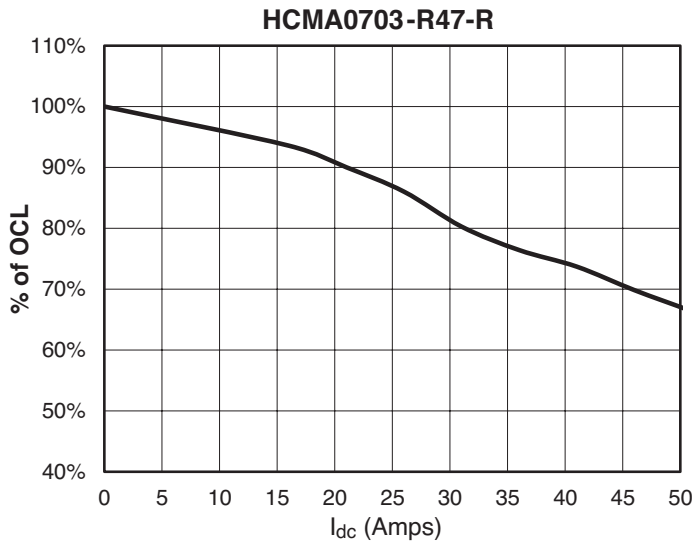
Core loss



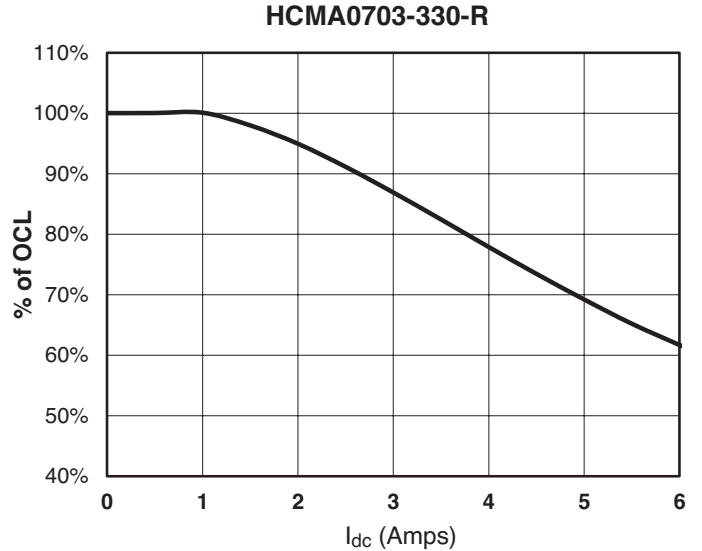
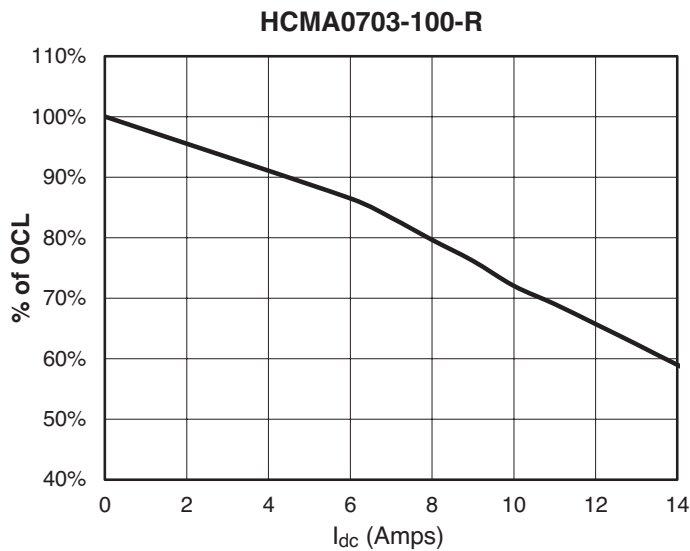
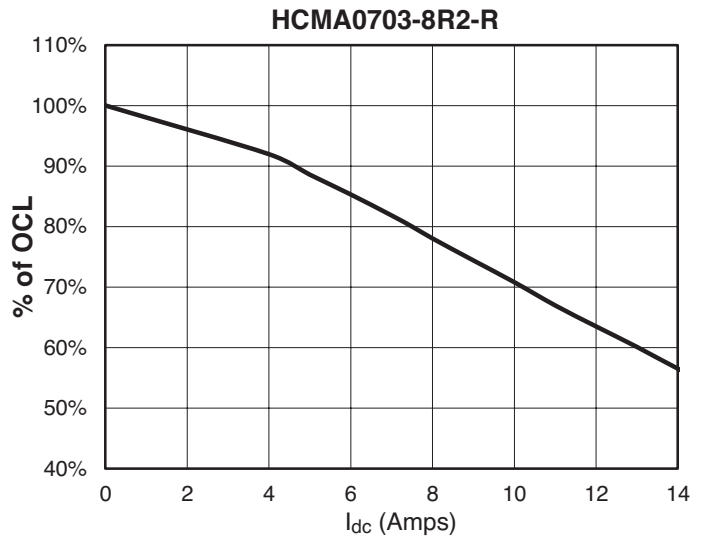
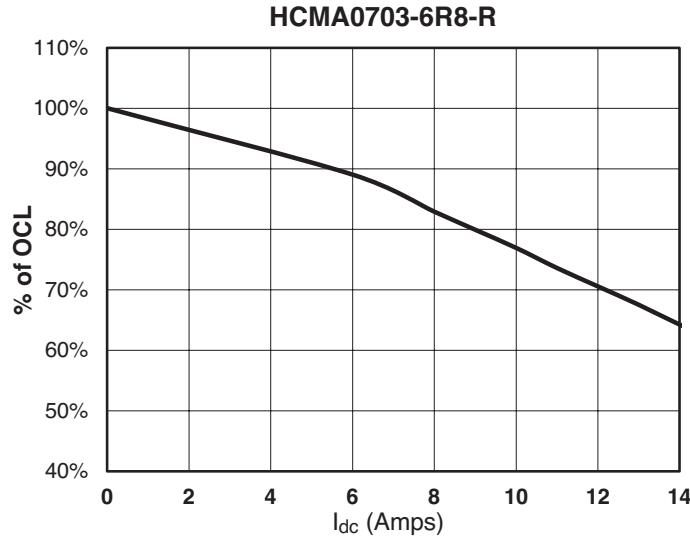
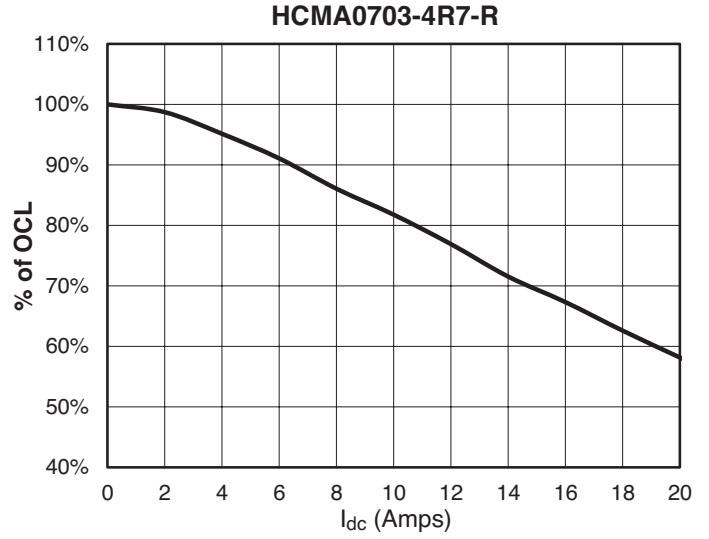
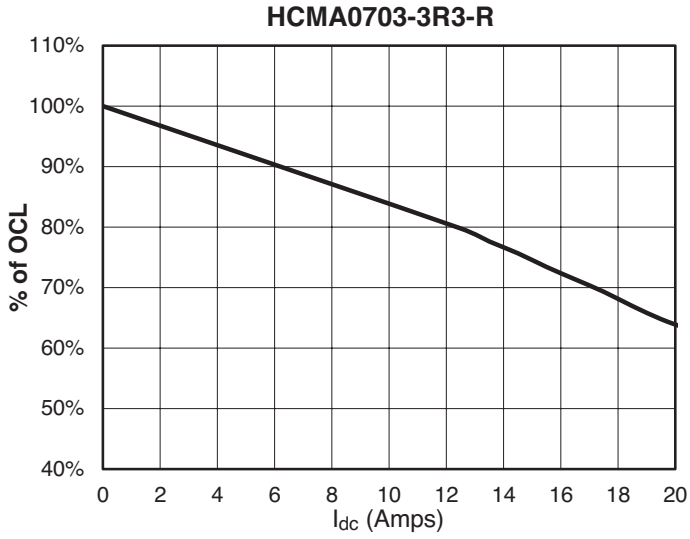
Inductance characteristics



Inductance characteristics



Inductance characteristics



Solder reflow profile

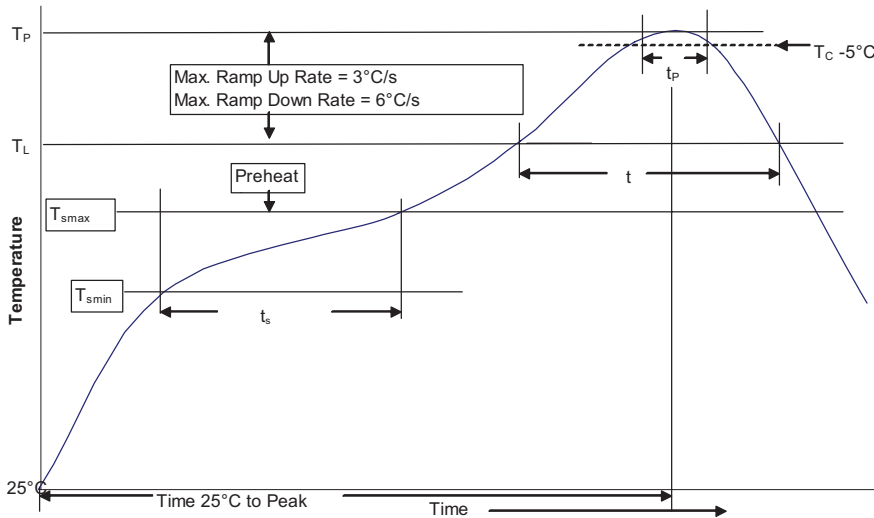


Table 1 - Standard SnPb Solder (T_c)

Package Thickness	Volume mm^3 <350	Volume mm^3 ≥ 350
<2.5mm	235°C	220°C
$\geq 2.5\text{mm}$	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
$\geq 2.5\text{mm}$	250°C	245°C	245°C

Reference JDEC J-STD-020D

Profile Feature	Standard SnPb Solder	Lead (Pb) Free Solder
Preheat and Soak	<ul style="list-style-type: none"> Temperature min. (T_{smin}) Temperature max. (T_{smax}) Time (T_{smin} to T_{smax}) (t_s) 	<ul style="list-style-type: none"> 150°C 200°C 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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Publication No. 10282 — BU-SB14566
August 2014



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