

HCMA0703

Automotive grade High current power inductors



Description

- Automotive grade 3 qualified
- High current carrying capacity, low core losses
- Magnetically shielded, low EMI
- Frequency range up to 5 MHz
- Inductance range from 0.15 μH to 33 μH
- Current range from 1.8 A to 52 A
- 7.4 mm x 7.0 mm footprint surface mount package in a 3.0 mm height
- Iron powder 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
 - 77 GHz 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 plus self-temperature rise)
- Solder reflow temperature: J-STD-020D compliant



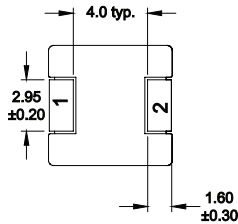
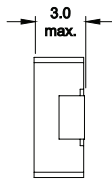
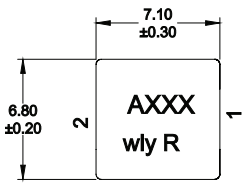
Product Specifications

Part Number ⁶	OCL ¹ (μH) $\pm 20\%$	FLL ² (μH) minimum	I_{rms} ³ (A)	I_{sat} ⁴ (A)	DCR (m Ω) typical @ 20 °C	DCR (m Ω) maximum @ 20 °C	K-factor ⁵
HCMA0703-R15-R	0.15	0.09	26	52	1.9	2.5	1044
HCMA0703-R22-R	0.22	0.13	23	40	2.5	2.8	986
HCMA0703-R47-R	0.47	0.28	17.5	26	4.0	4.2	580
HCMA0703-R68-R	0.68	0.41	15.5	25	5.0	5.5	455
HCMA0703-R82-R	0.82	0.49	13	24	6.7	8.0	439
HCMA0703-1R0-R	1.0	0.60	11	22	9.0	10	374
HCMA0703-1R5-R	1.5	0.90	9.0	18	14	15	366
HCMA0703-2R2-R	2.2	1.32	8.0	14	18	20	281
HCMA0703-3R3-R	3.3	1.98	6.0	13.5	28	30	252
HCMA0703-4R7-R	4.7	2.82	5.5	10	37	40	210
HCMA0703-6R8-R	6.8	4.08	4.5	8.0	54	60	151
HCMA0703-8R2-R	8.2	4.92	4.0	7.5	64	68	142
HCMA0703-100-R	10	6.00	3.2	7.0	71	78	132
HCMA0703-220-R	22	14.1	2.3	3.0	135	149	83
HCMA0703-330-R	33	19.8	1.8	2.2	220	242	76

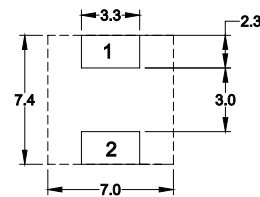
- Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.25 Vrms, 0.0 Adc, +25 °C
- Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.25 Vrms, Isat, +25 °C
- I_{rms} : DC current for an approximate temperature rise of 40 °C without core loss. Derating is necessary for AC currents. PCB layout, 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 @ +25 °C
- K-factor: Used to determine Bp-p for core loss (see graph). $Bp-p = K * L * \Delta I$. Bp-p: (Gauss), K: (K-factor from table), L: (Inductance in μH), ΔI (Peak to peak ripple current in Amps).
- Part Number Definition: HCMA0703-xxx-R
 HCMA0703 = 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

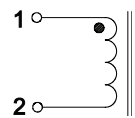
Dimensions (mm)



Recommended Pad Layout



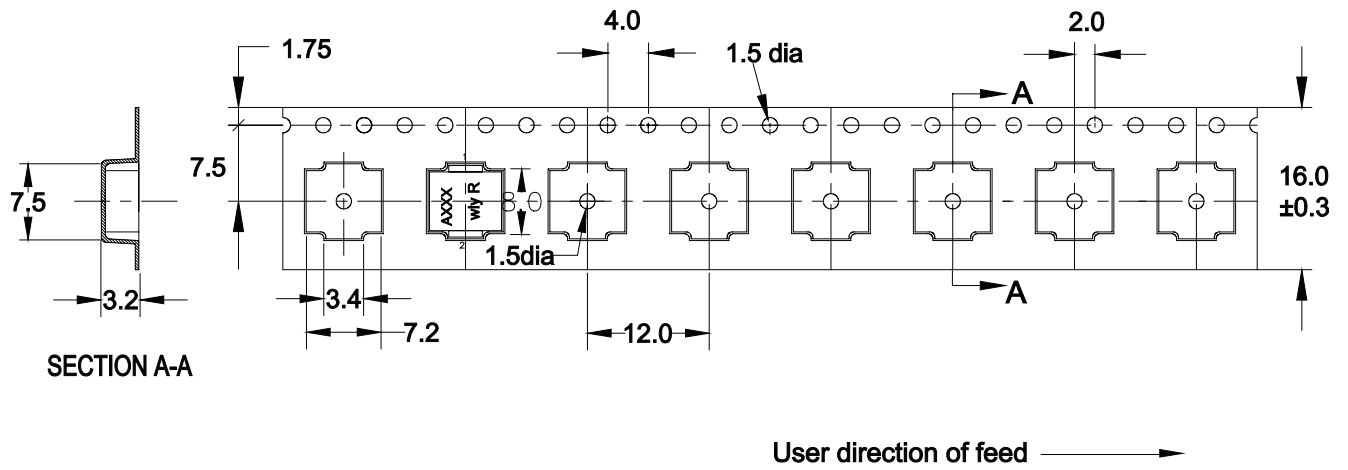
Schematic



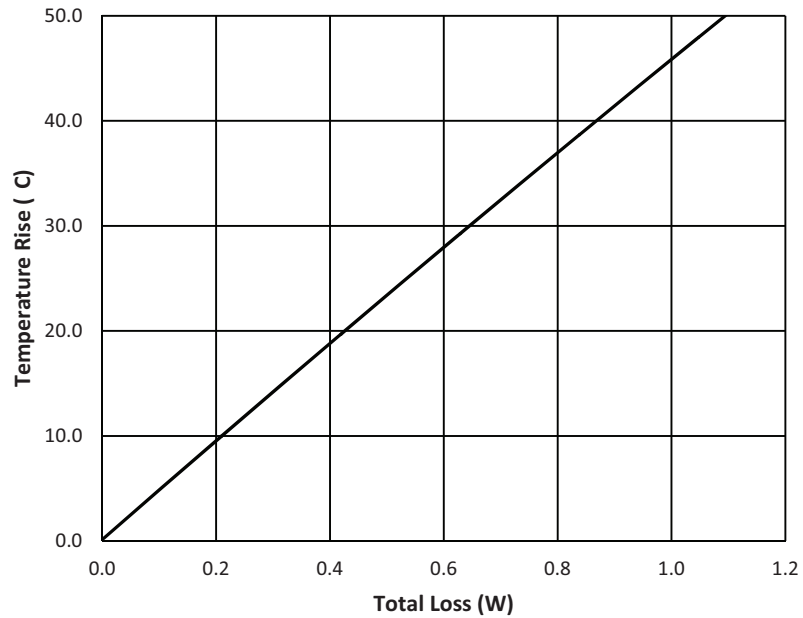
Part marking: A= Automotive grade, xxx= inductance value in μH , R= decimal point. If no R is present then last character equals number of zeros
 wly= date code, R=revision level
 All soldering surfaces to be coplanar within 0.1 millimeters.
 Tolerances are ± 0.3 millimeters unless stated otherwise.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

Packaging information (mm)

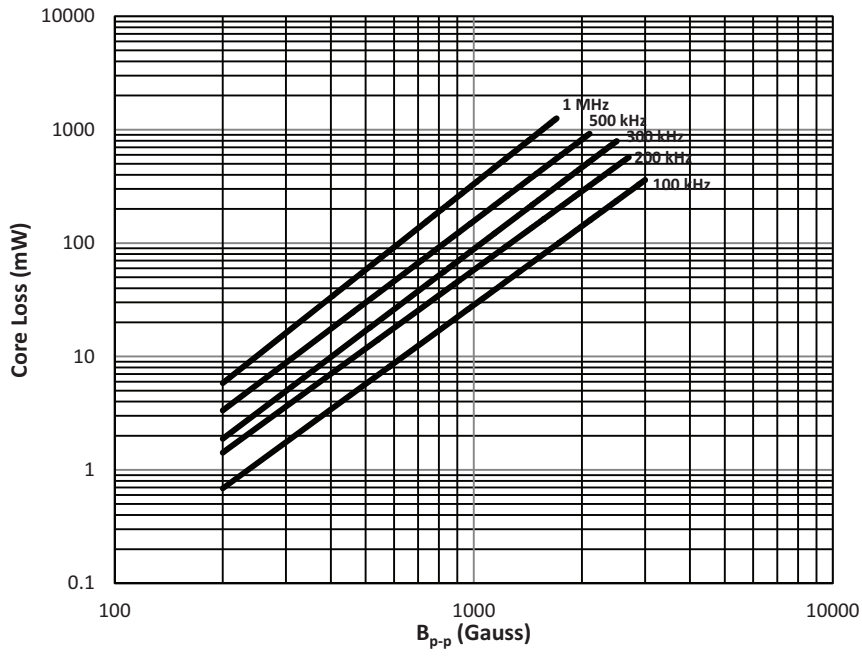
Supplied in tape and reel packaging , 1500 parts per 13" diameter reel



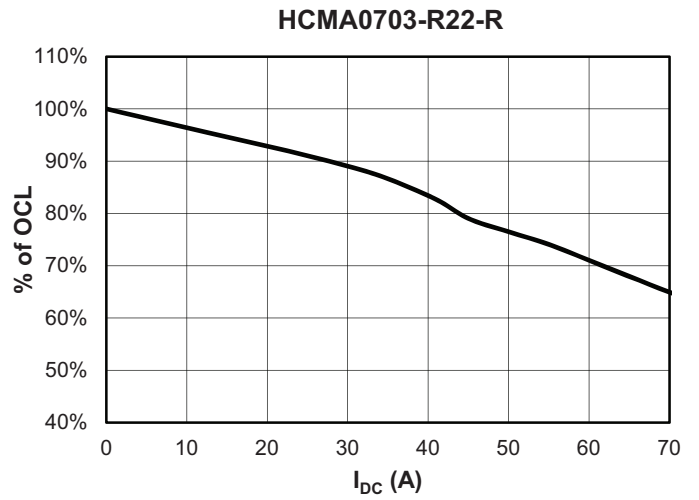
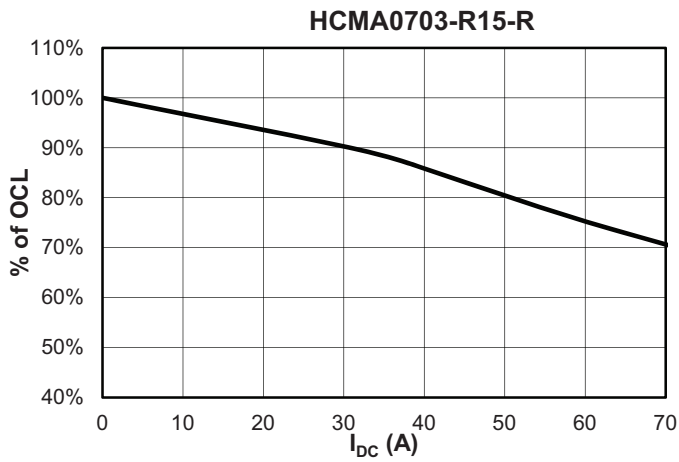
Temperature rise vs. total loss



Core loss vs. B_{p-p}

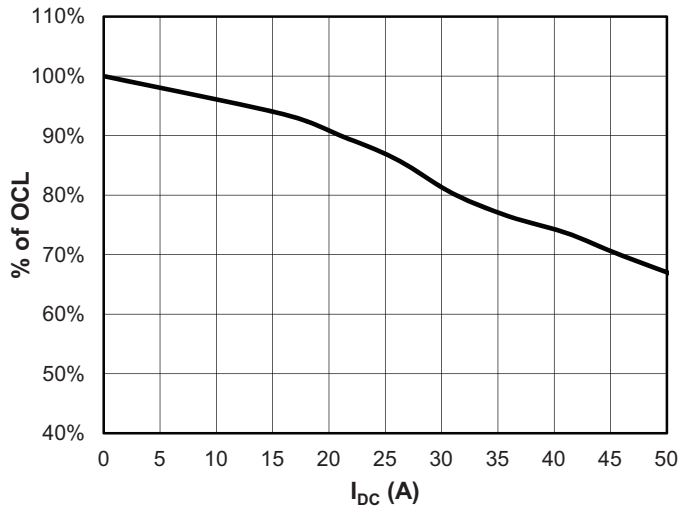


Inductance characteristics

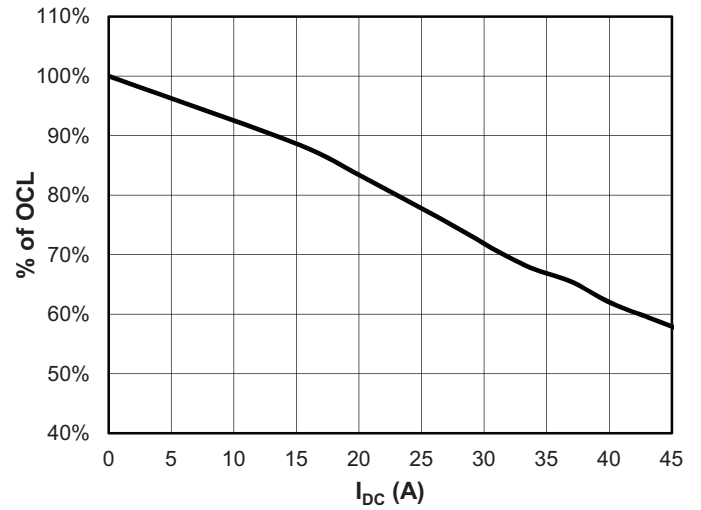


Inductance characteristics

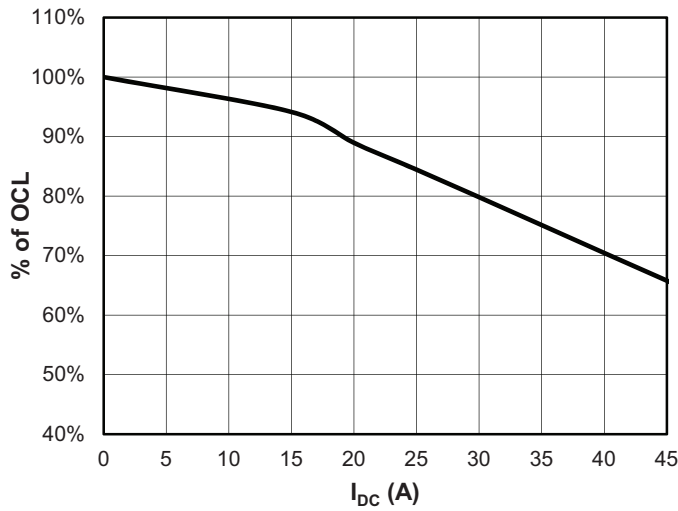
HCMA0703-R47-R



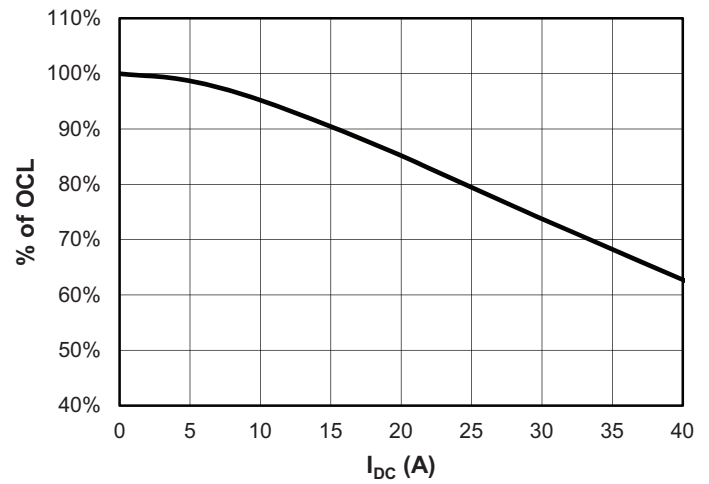
HCMA0703-R68-R



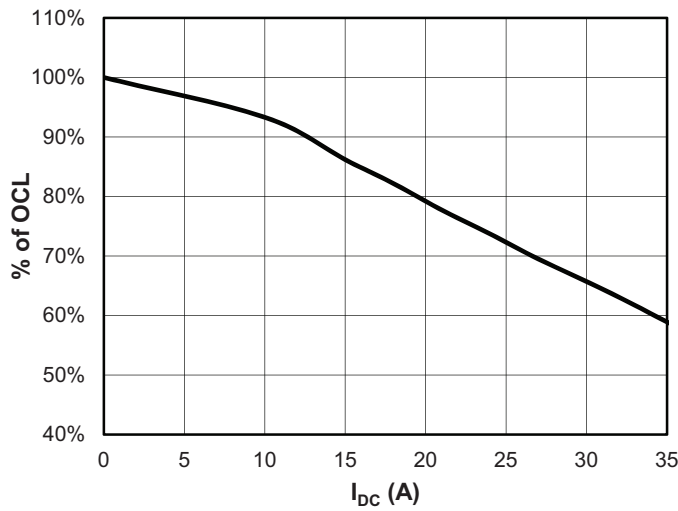
HCMA0703-R82-R



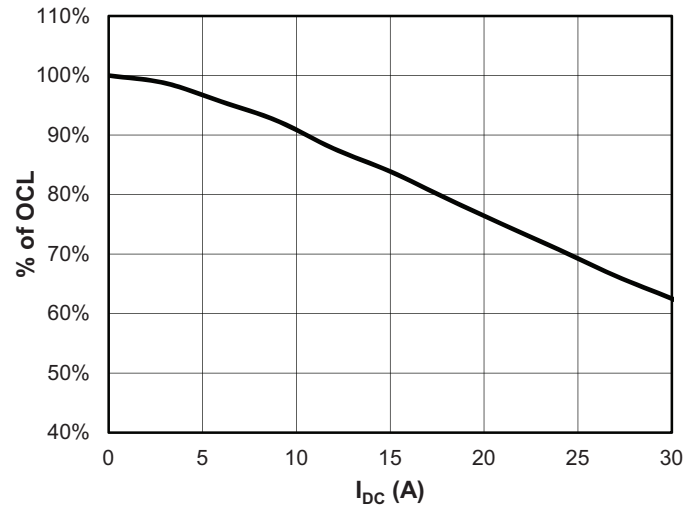
HCMA0703-1R0-R



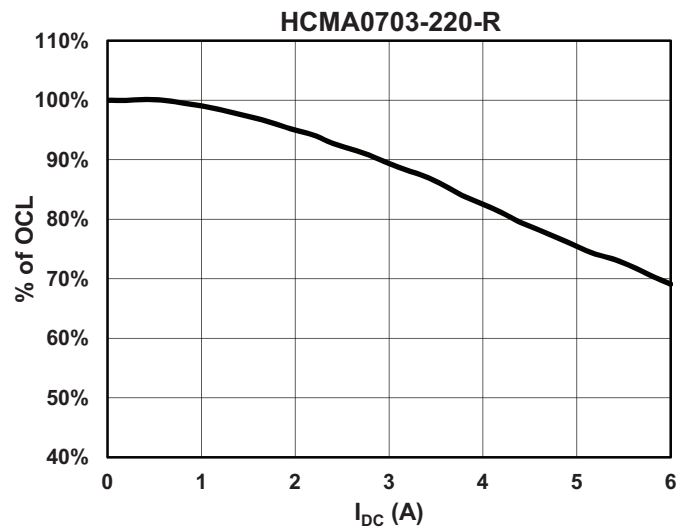
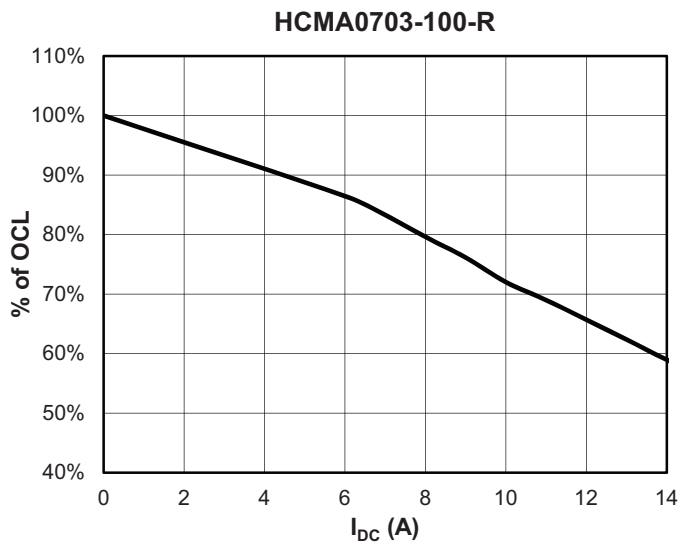
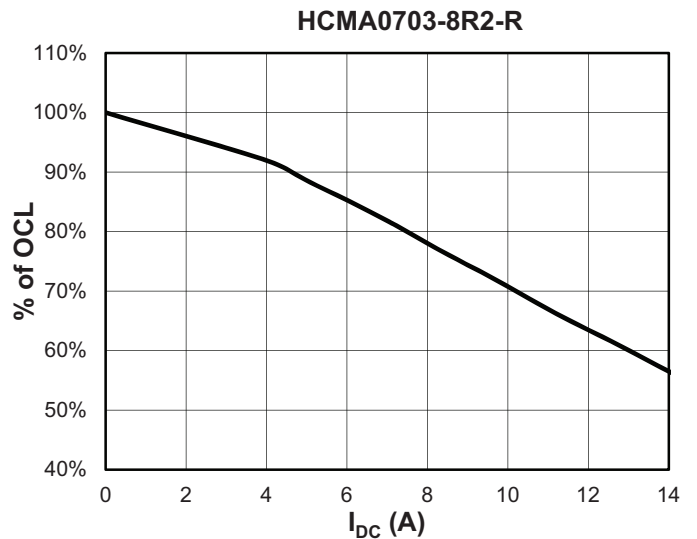
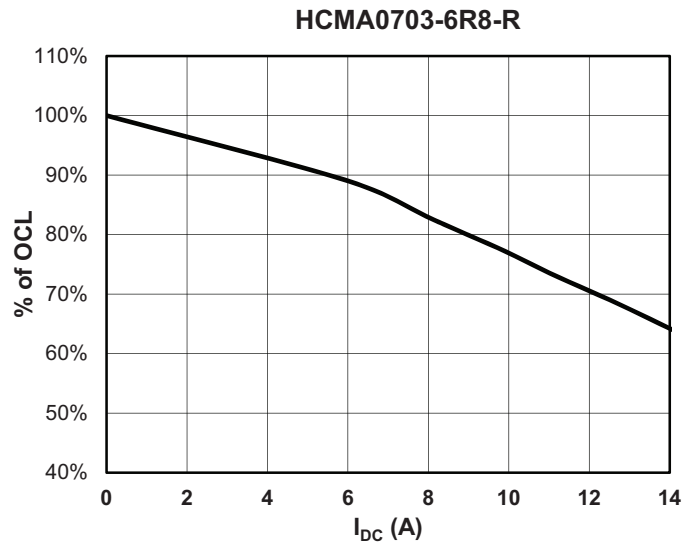
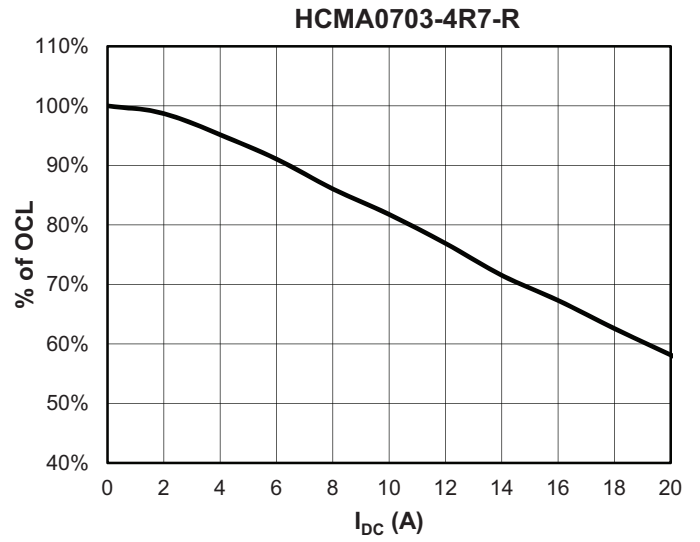
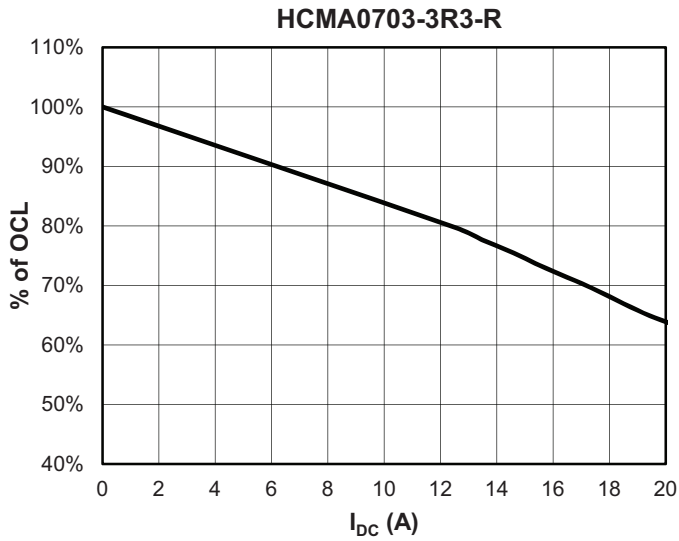
HCMA0703-1R5-R



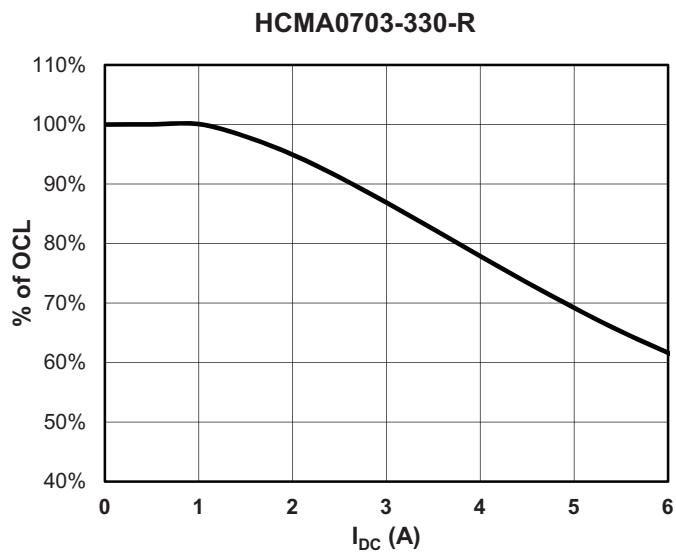
HCMA0703-2R2-R



Inductance characteristics



Inductance characteristics



Solder reflow profile

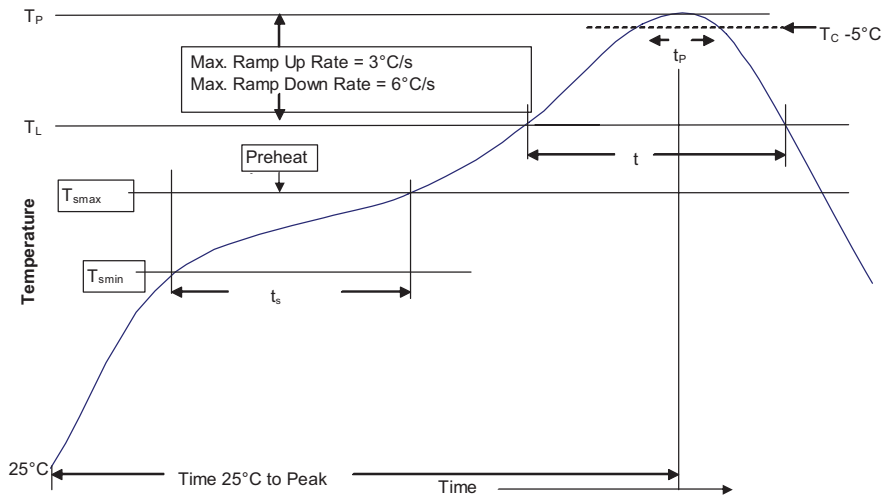


Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5mm)	235°C	220°C
≥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-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.

Life Support Policy: Eaton does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

Eaton reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Eaton also reserves the right to change or update, without notice, any technical information contained in this bulletin.

Eaton
Electronics Division
 1000 Eaton Boulevard
 Cleveland, OH 44122
 United States
 www.eaton.com/elx

© 2016 Eaton
 All Rights Reserved
 Printed in USA
 Publication No. 10282 BU-SB14566
 April 2016

Eaton is a registered trademark.

All other trademarks are property of their respective owners.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Eaton:](#)

[HCMA0703-R15-R](#) [HCMA0703-R22-R](#) [HCMA0703-R47-R](#) [HCMA0703-R68-R](#) [HCMA0703-R82-R](#) [HCMA0703-1R0-R](#) [HCMA0703-1R5-R](#) [HCMA0703-2R2-R](#) [HCMA0703-3R3-R](#) [HCMA0703-4R7-R](#) [HCMA0703-6R8-R](#) [HCMA0703-8R2-R](#) [HCMA0703-100-R](#) [HCMA0703-330-R](#)