

# HCM0703

## High current power inductors



### Product features

- High current carrying capacity
- Low core losses
- Magnetically shielded, low EMI
- Frequency range up to 5 MHz
- Inductance range from 0.15  $\mu\text{H}$  to 33  $\mu\text{H}$
- Current range from 1.8 A to 52 A
- 7.4 mm x 6.8 mm footprint surface mount package in a 3.0 mm height
- Iron powder core material

### Applications

- Voltage Regulator Module (VRM)
- Multi-phase regulators
- Point-of-load modules
- Desktop and server VRMs and EVRDs
- Base station equipment
- Laptop and notebook regulators
- Battery power systems
- Graphics cards
- Data networking and storage systems

### 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-020 compliant (Latest revision)



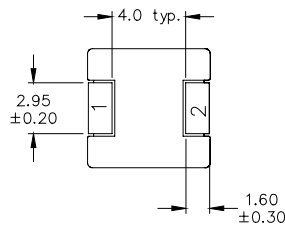
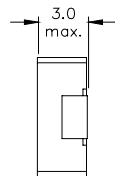
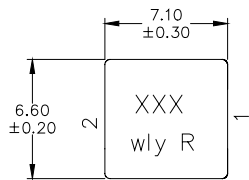
**Product Specifications**

Part Number <sup>6</sup>	OCL <sup>1</sup> ( $\mu\text{H}$ ) $\pm 20\%$	FLL <sup>2</sup> ( $\mu\text{H}$ ) minimum	$I_{\text{rms}}^3$ (A)	$I_{\text{sat}}^4$ (A)	DCR (m $\Omega$ ) typical @ +20 °C	DCR (m $\Omega$ ) maximum @ +20 °C	K-factor <sup>5</sup>
HCM0703-R15-R	0.15	0.09	26	52	1.9	2.5	1044
HCM0703-R22-R	0.22	0.13	23	40	2.5	2.8	986
HCM0703-R47-R	0.47	0.28	17.5	26	4.0	4.2	580
HCM0703-R68-R	0.68	0.41	15.5	25	5.0	5.5	455
HCM0703-R82-R	0.82	0.49	13	24	6.7	8.0	439
HCM0703- 1R0-R	1.0	0.60	11	22	9.0	10	374
HCM0703- 1R5-R	1.5	0.90	9.0	18	14	15	366
HCM0703- 2R2-R	2.2	1.3	8.0	14	18	20	281
HCM0703- 3R3-R	3.3	2.0	6.0	13.5	28	30	252
HCM0703- 4R7-R	4.7	2.8	5.5	10	37	40	210
HCM0703- 6R8-R	6.8	4.1	4.5	8.0	54	60	151
HCM0703- 8R2-R	8.2	4.9	4.0	7.5	64	68	142
HCM0703- 100-R	10	6.0	3.2	7.0	71	78	132
HCM0703- 150-R	14.9 $\pm$ 15%	10.1	2.2	5.0	113	127	105
HCM0703- 220-R	22	14.1	2.3	3.0	135	149	83
HCM0703- 330-R	33	19.8	1.8	2.2	220	242	76

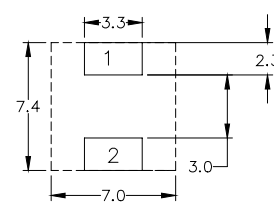
- Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V<sub>rms</sub>, 0.0 Adc, +25°C.
- Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.25 V<sub>rms</sub>, I<sub>sat</sub> @ +25 °C.
- I<sub>rms</sub>: DC current for an approximate temperature rise of 40 °C without core loss. Derating 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<sub>sat</sub>: Peak current for approximately 20% rolloff at +25 °C.
- K-factor: Used to determine B<sub>pp</sub> for core loss (see graph). B<sub>p-p</sub> = K \* L \*  $\Delta$ I. B<sub>pp</sub>: (Gauss), K: (K-factor from table), L: (Inductance in  $\mu\text{H}$ ),  $\Delta$ I (Peak to peak ripple current in Amps).
- Part Number Definition: HCM0703-xxx-R  
HCM0703 = Product code and size  
-xxx= Inductance value in  $\mu\text{H}$ , R = decimal point,  
if no R is present then last character equals number of zeros.  
"-R" suffix = RoHS compliant

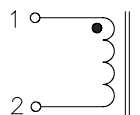
**Dimensions (mm)**



Recommended Pad Layout



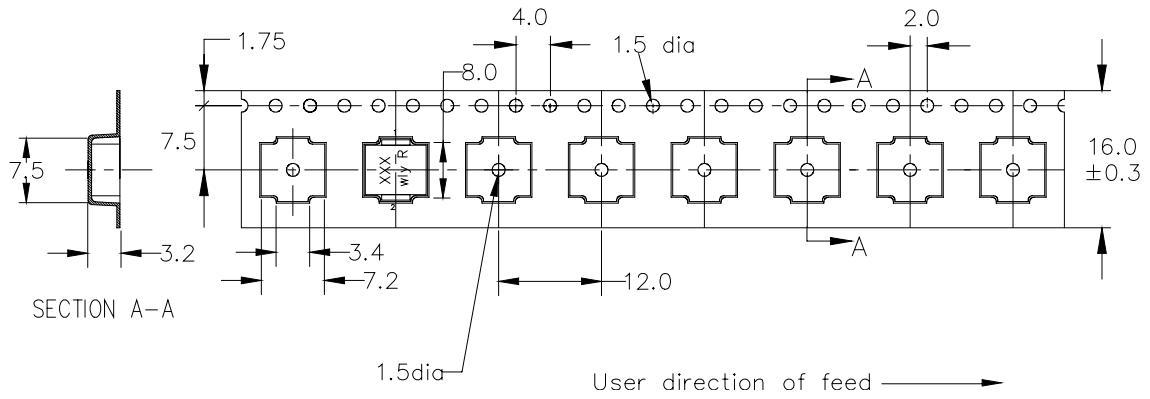
Schematic



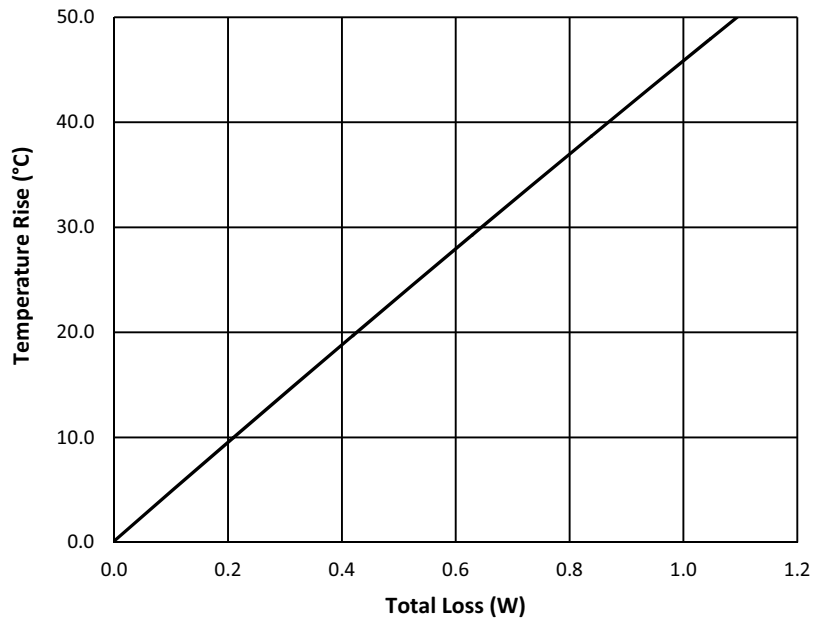
Part marking: XXX=Inductance value in uH, R= decimal point. If no R is present then last character equals number of zeros.  
wly=date code, R=revision level  
All soldering surfaces to be coplanar within 0.10 millimeters  
Tolerances are  $\pm 0.3$  millimeters unless stated otherwise  
Color: Grey

**Packaging information (mm)**

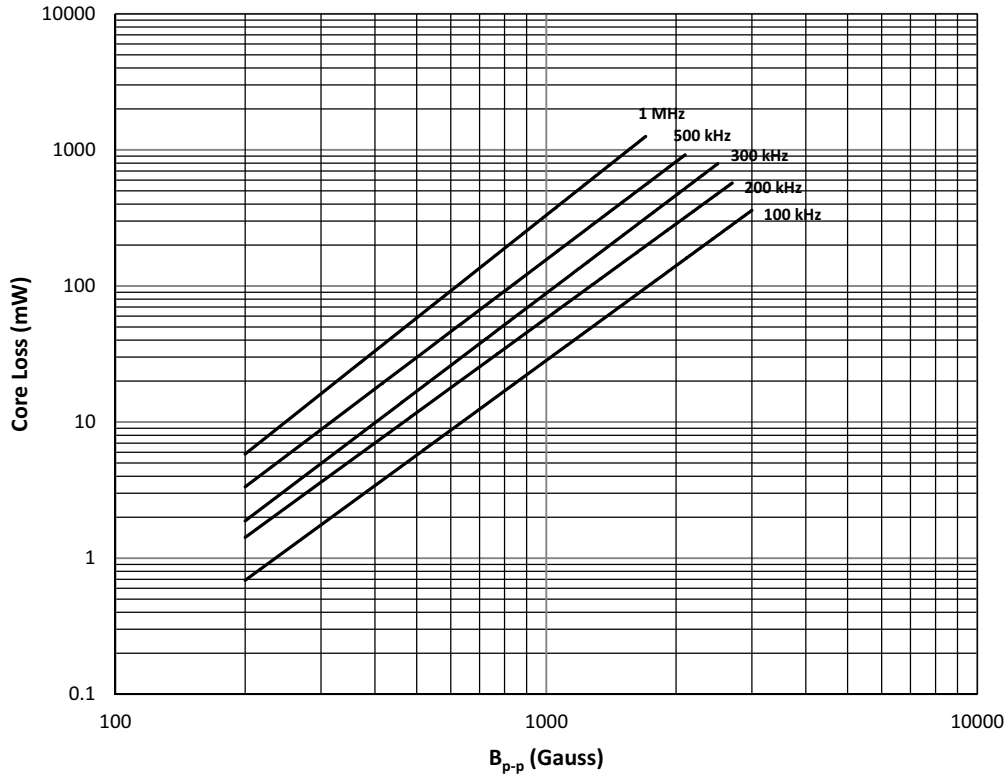
Supplied in tape and reel packaging, 1500 parts per 13" diameter reel.



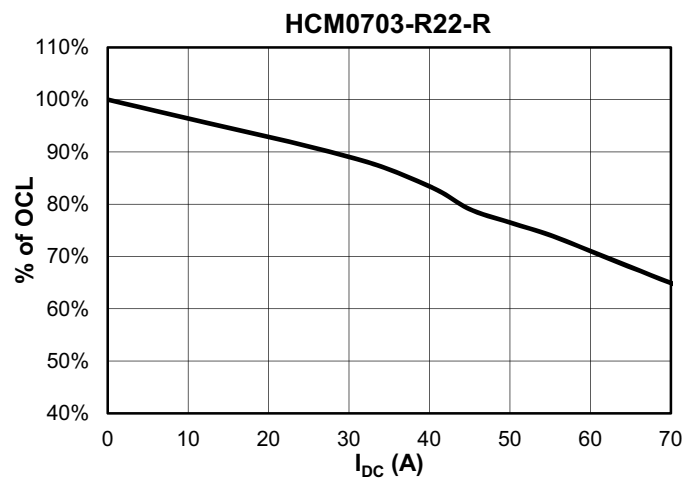
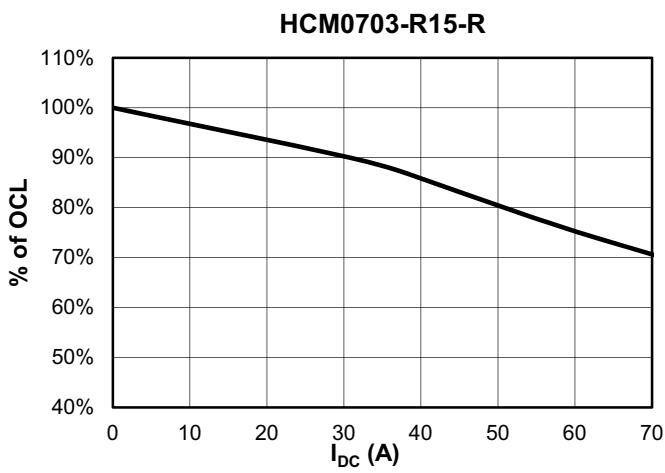
**Temperature rise vs. total loss**



Core loss vs.  $B_{p-p}$

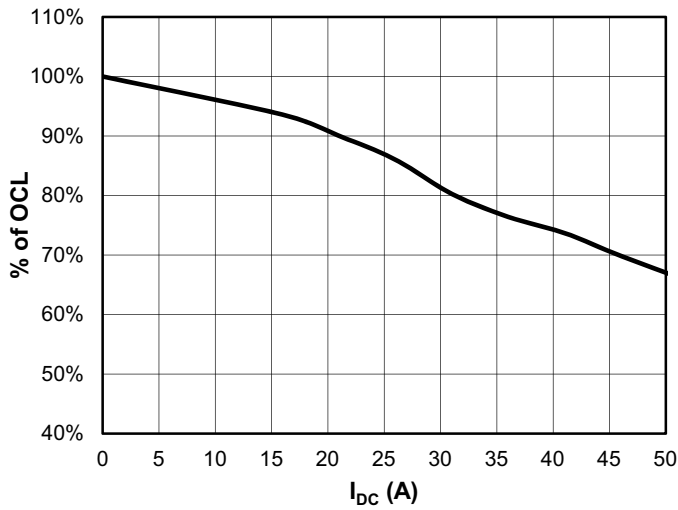


Inductance characteristics

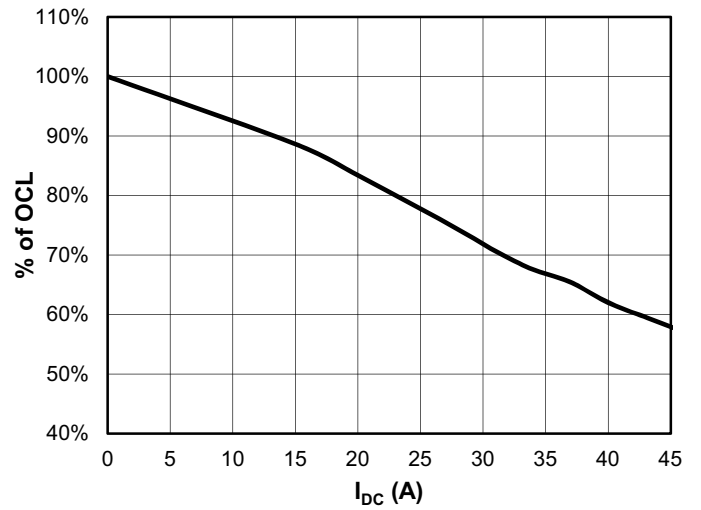


Inductance characteristics

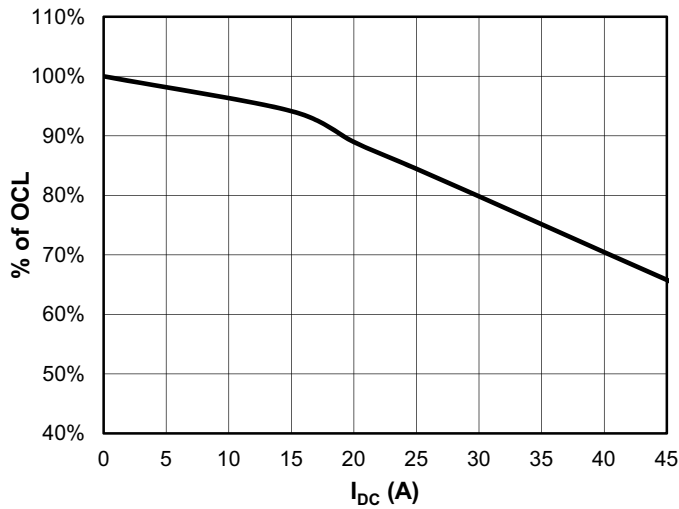
HCM0703-R47-R



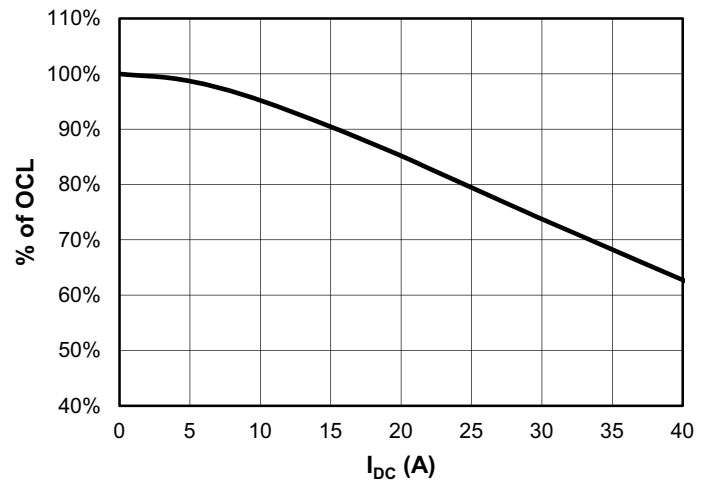
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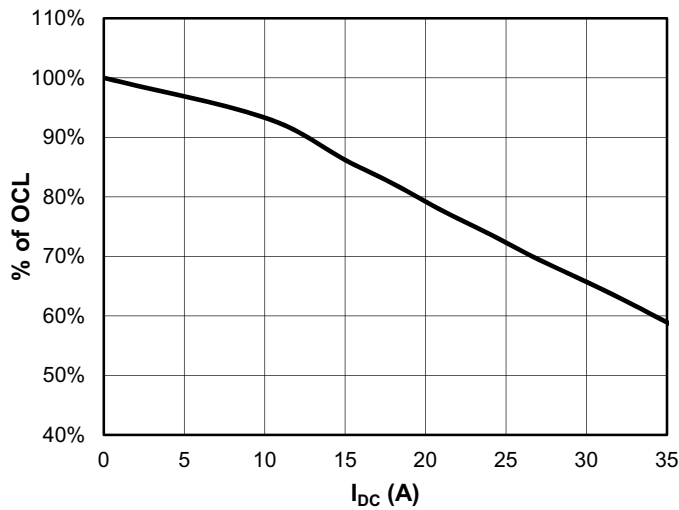
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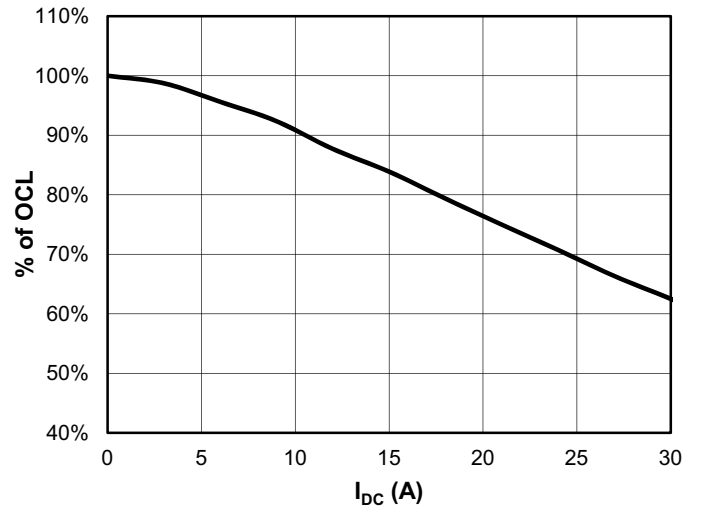
HCM0703-1R0-R



HCM0703-1R5-R

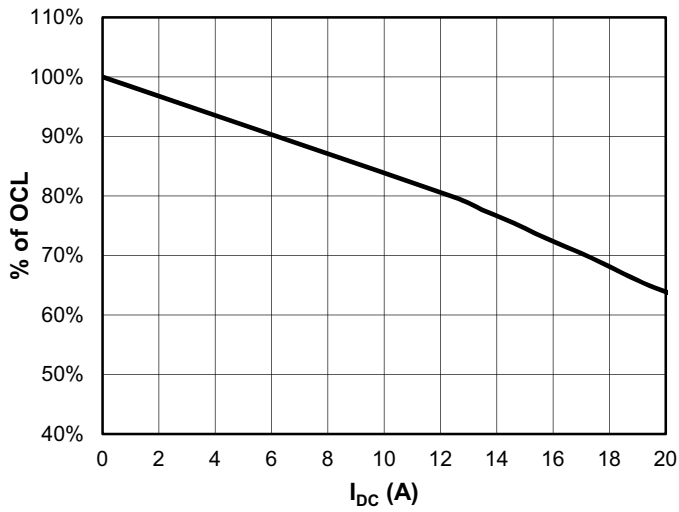


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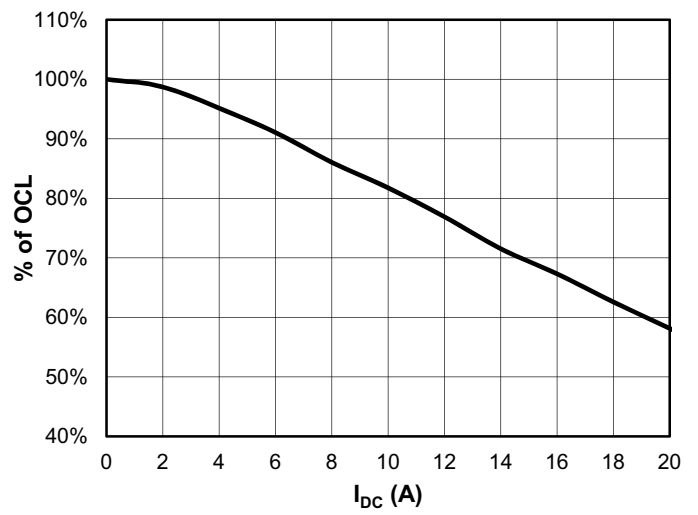


Inductance characteristics

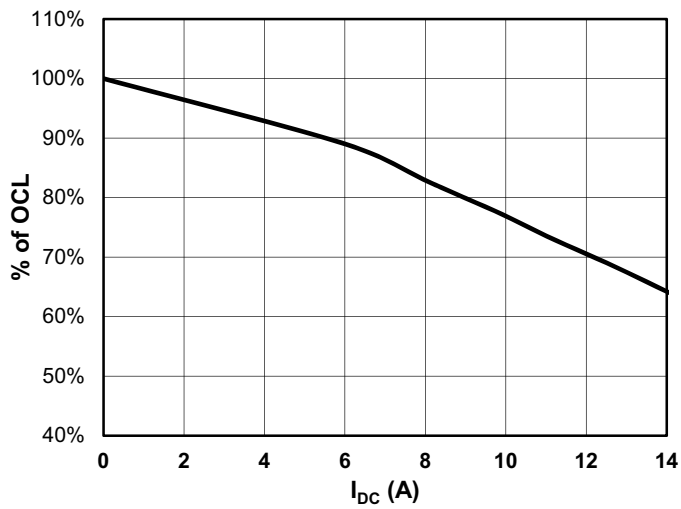
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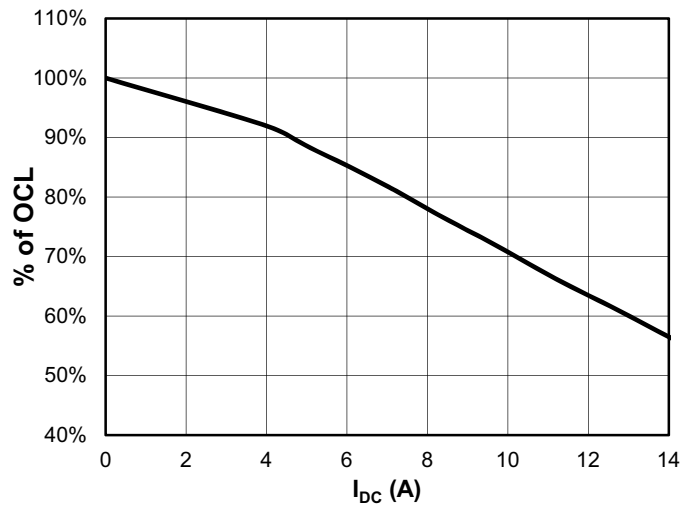
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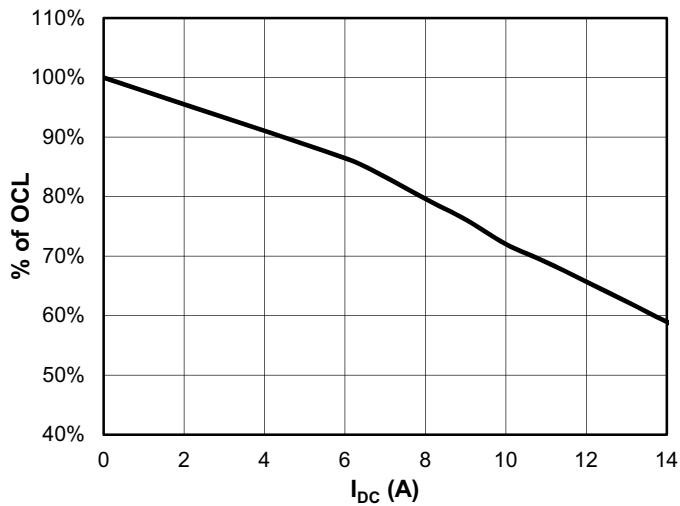
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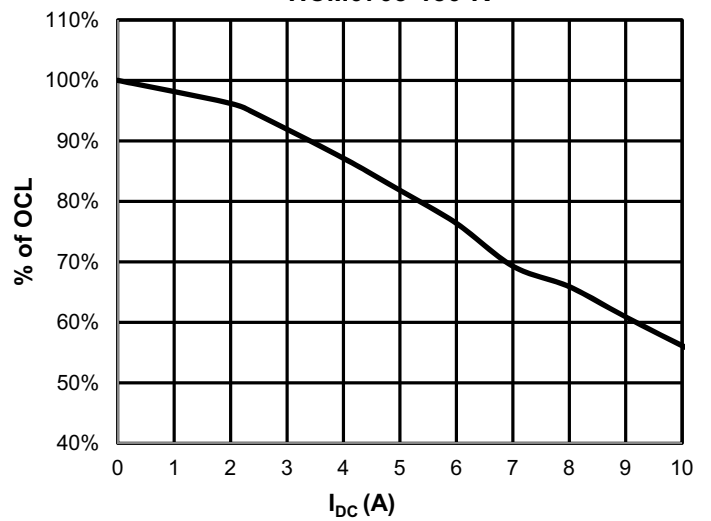
HCM0703-8R2-R



HCM0703-100-R

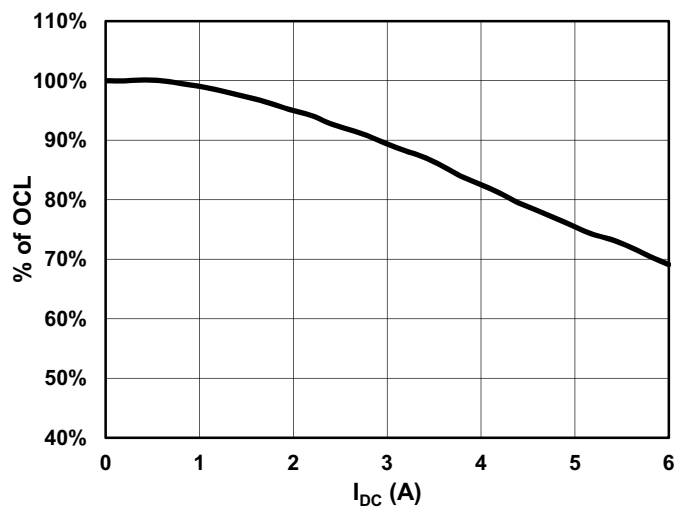


HCM0703-150-R

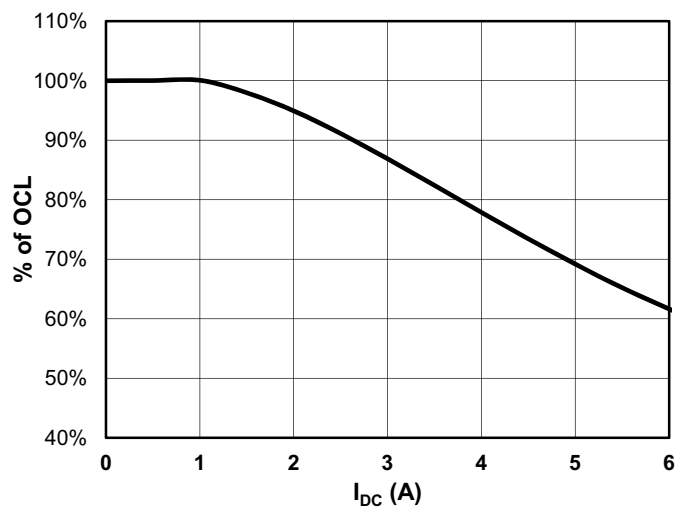


Inductance characteristics

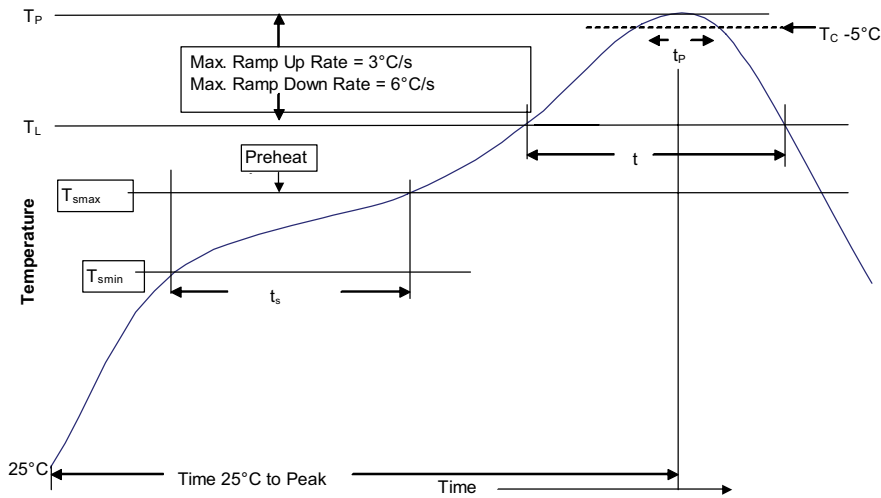
HCM0703-220-R



HCM0703-330-R



**Solder reflow profile**



**Table 1 - Standard SnPb Solder ( $T_c$ )**

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

**Table 2 - Lead (Pb) Free Solder ( $T_c$ )**

Package Thickness	Volume $\text{mm}^3$ <350	Volume $\text{mm}^3$ 350 - 2000	Volume $\text{mm}^3$ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 – 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	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 ( $T_L$ )	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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