

# Coiltronics HCM0703 Series

## High current power inductors



### Product description

- High current carrying capacity
- Low core losses
- Magnetically shielded, low EMI
- Frequency range up to 5MHz
- Inductance range from 0.15 $\mu$ H to 33 $\mu$ 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

- Voltage Regulator Module (VRM)
- Multi-phase regulators
- Point-of-load modules
- Desktop and server VRMs and EVRDs
- Base station equipment
- 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 + self-temperature rise)
- Solder reflow temperature: J-STD-020D compliant



Powering Business Worldwide



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**  
**Same great products plus even more.**

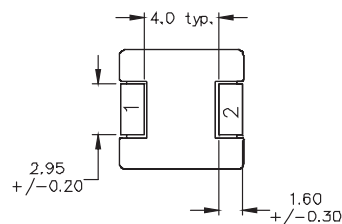
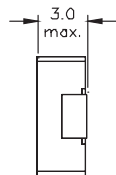
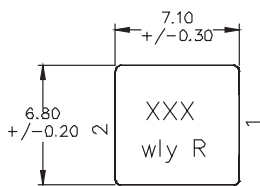
**Product specifications**

Part Number <sup>6</sup>	OCL <sup>1</sup> ( $\mu\text{H}$ ) $\pm 20\%$	FLL min. <sup>2</sup> ( $\mu\text{H}$ )	$I_{\text{rms}}$ <sup>3</sup> (amps)	$I_{\text{sat}}$ <sup>4</sup> (amps)	DCR (m $\Omega$ ) @ 20°C Typical	DCR (m $\Omega$ ) @ 20°C Maximum	K-factor <sup>5</sup>
HCM0703-R15-R	0.15	0.09	26.0	52.0	1.90	2.50	1044
HCM0703-R22-R	0.22	0.13	23.0	40.0	2.50	2.80	986
HCM0703-R47-R	0.47	0.28	17.5	26.0	4.00	4.20	580
HCM0703-R68-R	0.68	0.41	15.5	25.0	5.00	5.50	455
HCM0703-R82-R	0.82	0.49	13.0	24.0	6.70	8.00	439
HCM0703-1R0-R	1.00	0.60	11.0	22.0	9.00	10.0	374
HCM0703-1R5-R	1.50	0.90	9.00	18.0	14.0	15.0	366
HCM0703-2R2-R	2.20	1.32	8.00	14.0	18.0	20.0	281
HCM0703-3R3-R	3.30	1.98	6.00	13.5	28.0	30.0	252
HCM0703-4R7-R	4.70	2.82	5.50	10.0	37.0	40.0	210
HCM0703-6R8-R	6.80	4.08	4.50	8.00	54.0	60.0	151
HCM0703-8R2-R	8.20	4.92	4.00	7.50	64.0	68.0	142
HCM0703-100-R	10.0	6.00	3.20	7.00	70.5	77.6	132
HCM0703-220-R	22.0	14.1	2.30	3.00	135.3	148.8	83
HCM0703-330-R	33.0	19.8	1.80	2.20	220	242	76

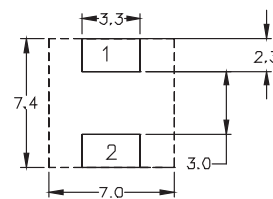
- Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.25V<sub>rms</sub>, 0.0Adc, +25°C.
- Full Load Inductance (FLL) Test Parameters: 100kHz, 0.25V<sub>rms</sub>, I<sub>sat</sub> @ +25°C.
- I<sub>rms</sub>: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary 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>pp</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-yyy-R  
 - HCM0703 = Product code and size  
 - yyy= Inductance value in  $\mu\text{H}$ , R = decimal point,  
 if no R is present then third character = number of zeros.  
 - "-R" suffix = RoHS compliant

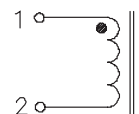
**Dimensions - mm**



Recommended Pad Layout

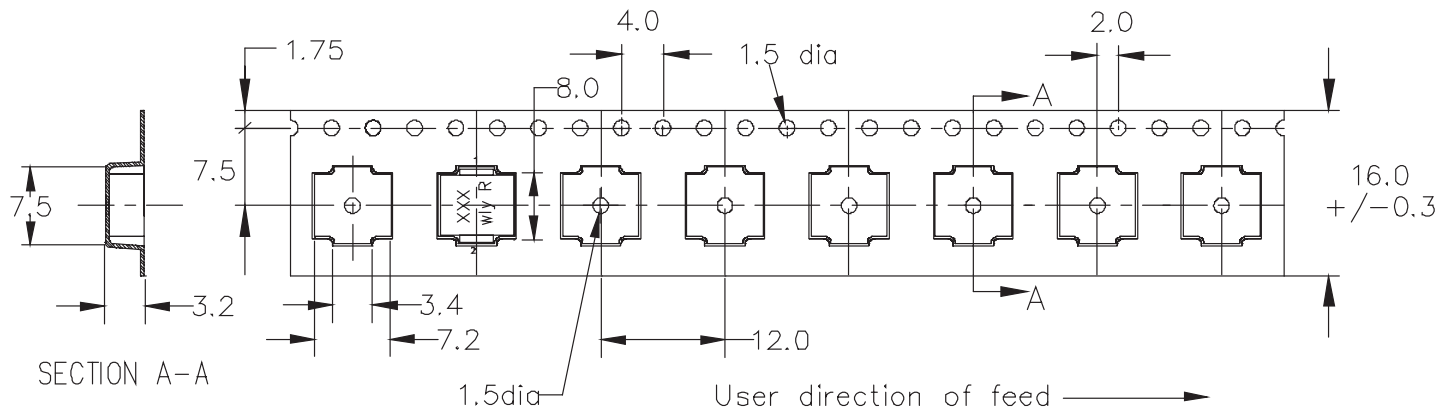


Schematic



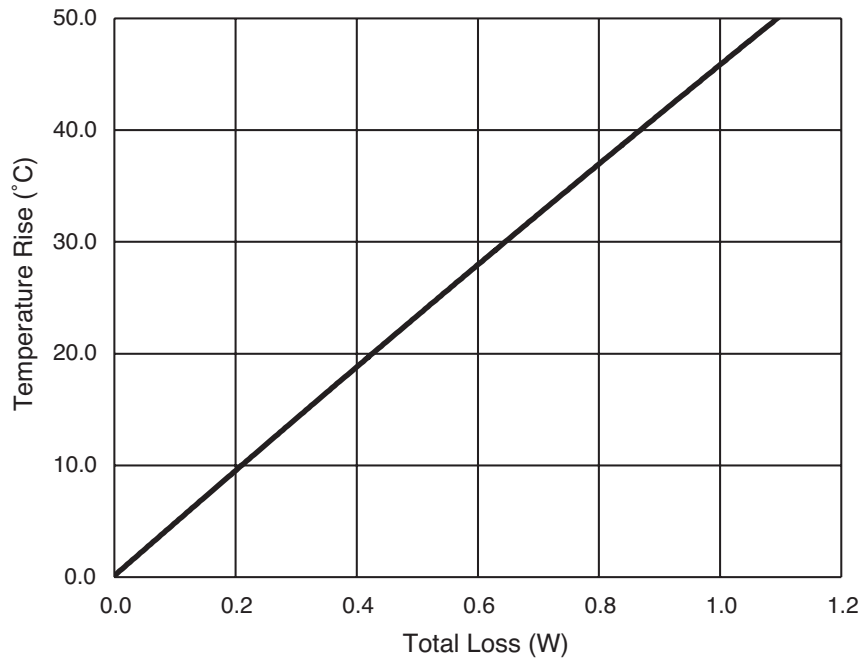
Part marking: xxx= Inductance value in  $\mu\text{H}$ , R= decimal point, If no R is present then last digit is # of zeroes  
 wly= Date code, R= Revision level  
 All soldering surfaces to be coplanar within 0.10 millimeters  
 Tolerances are  $\pm 0.3$  millimeters unless stated otherwise.  
 Color: Grey

**Packaging information - mm**

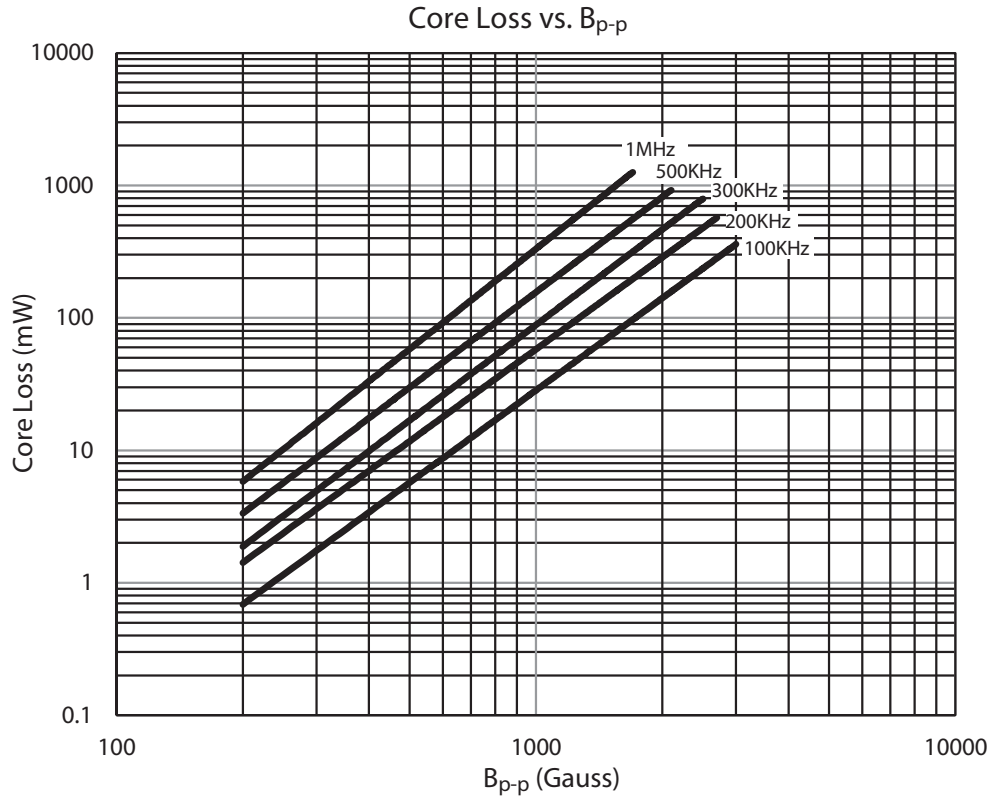


Supplied in tape and reel packaging, 1500 parts per 13" diameter reel.

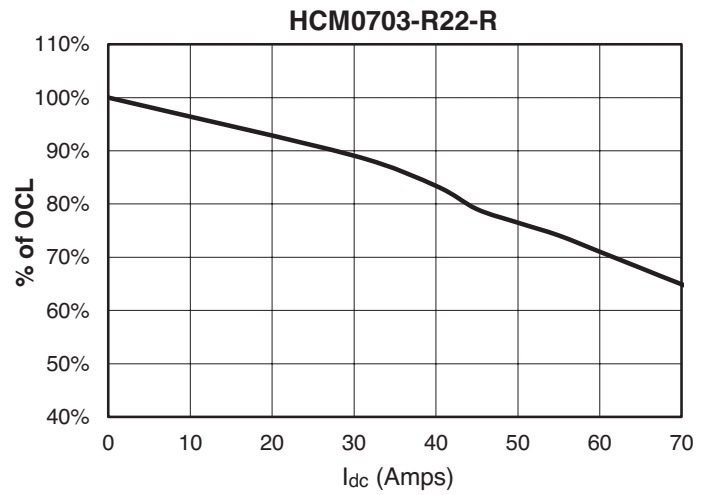
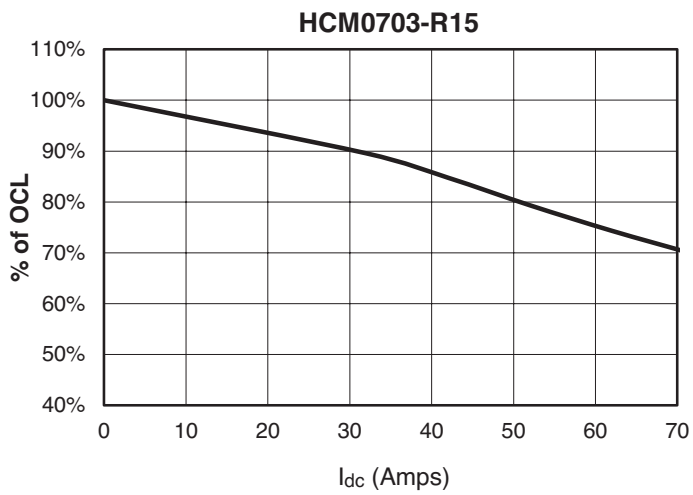
**Temperature rise vs. total loss**



**Core loss**

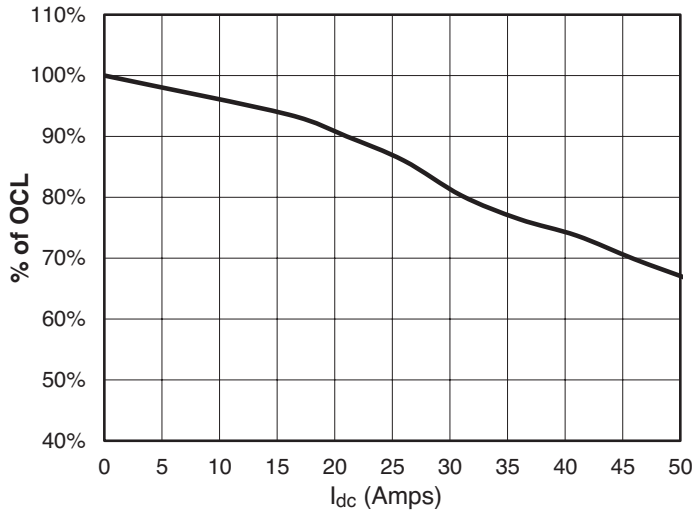


**Inductance characteristics**

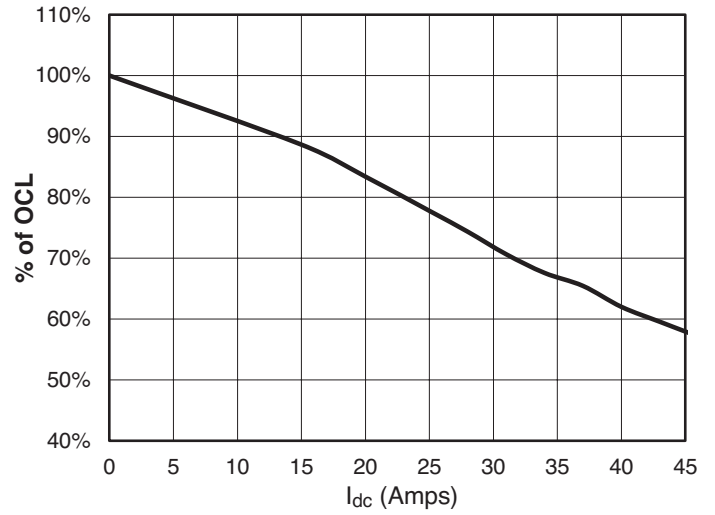


Inductance characteristics

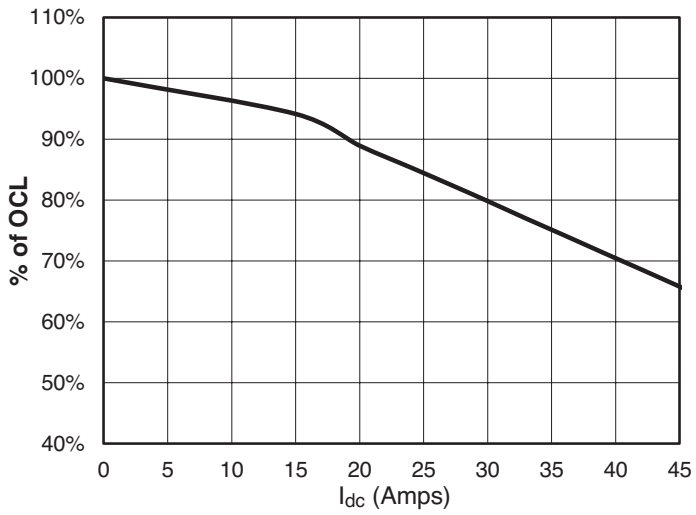
HCM0703-R47-R



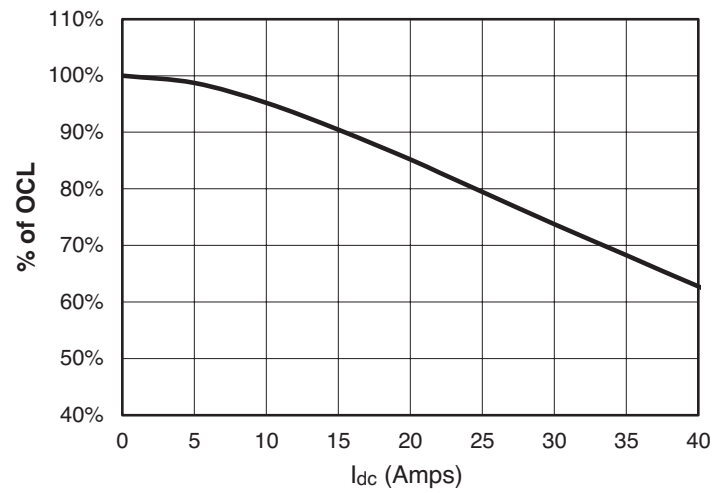
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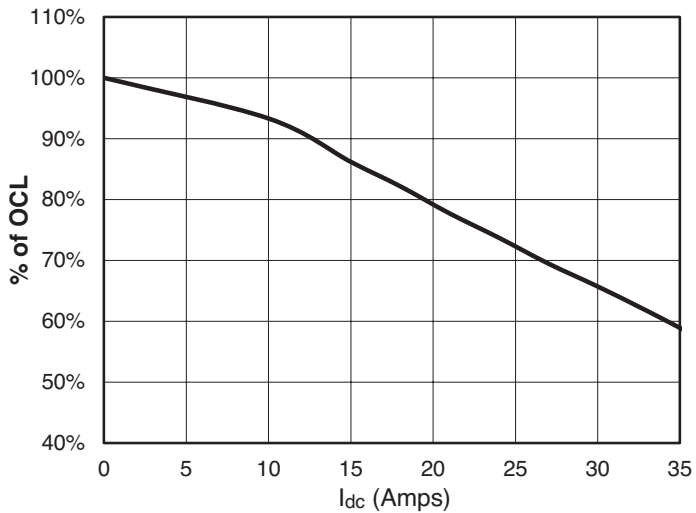
HCM0703-R82-R



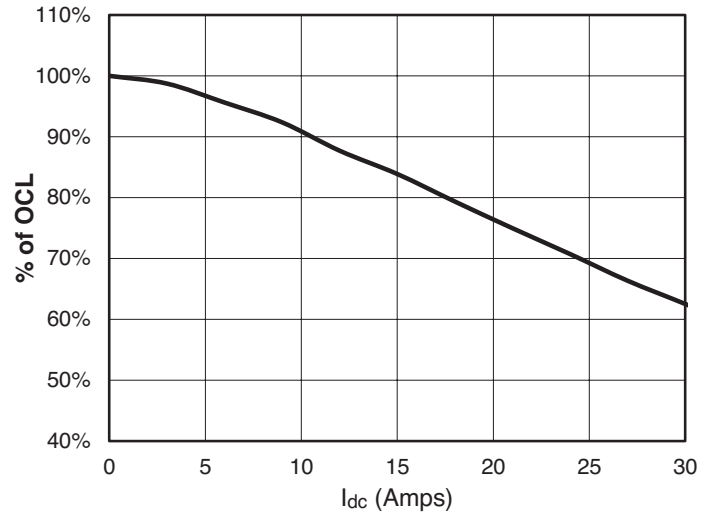
HCM0703-1R0-R



HCM0703-1R5-R

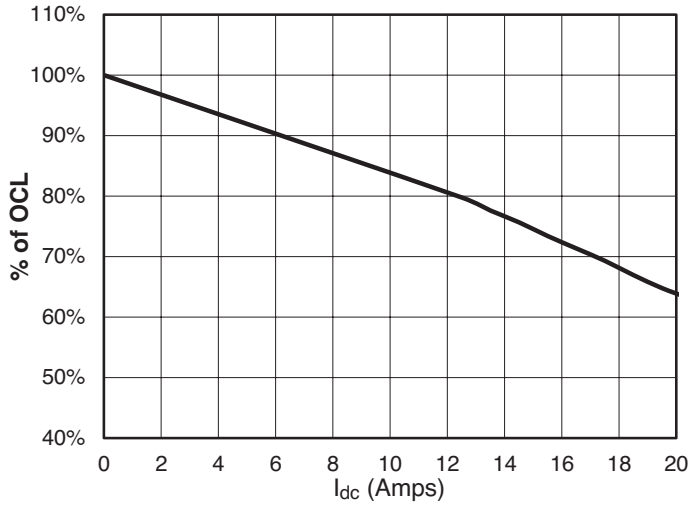


HCM0703-2R2-R

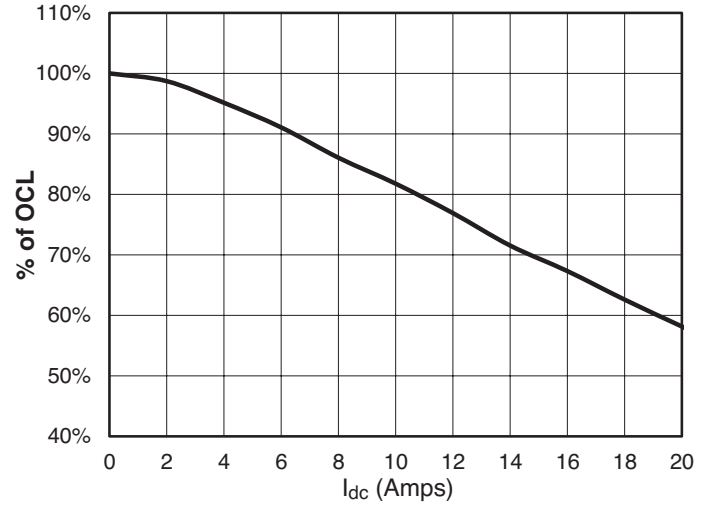


Inductance characteristics

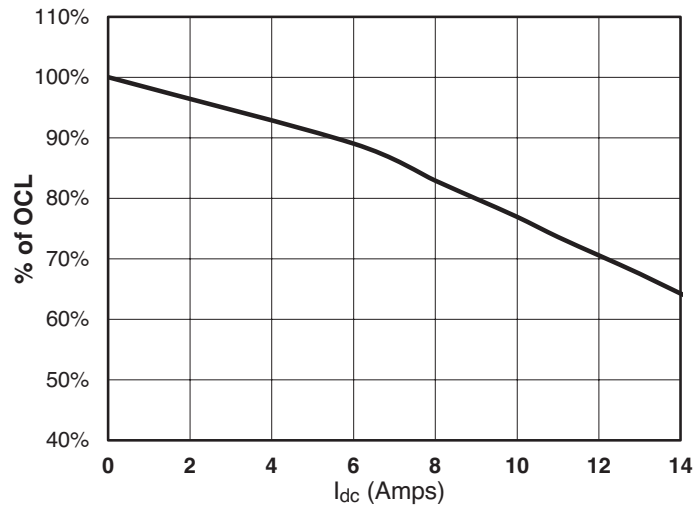
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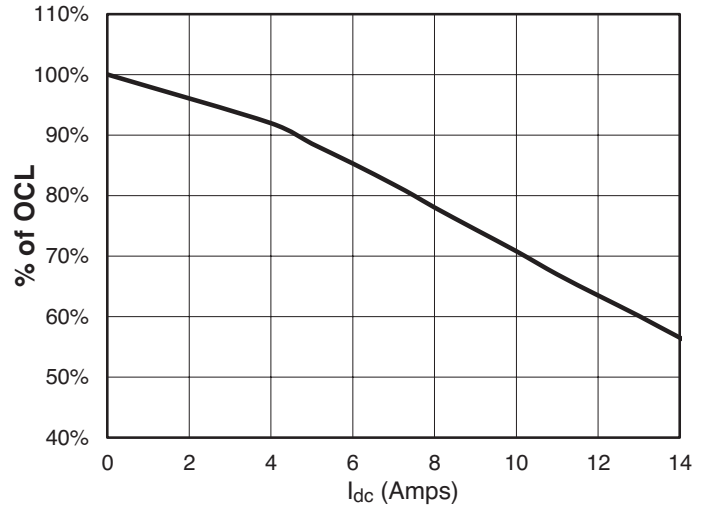
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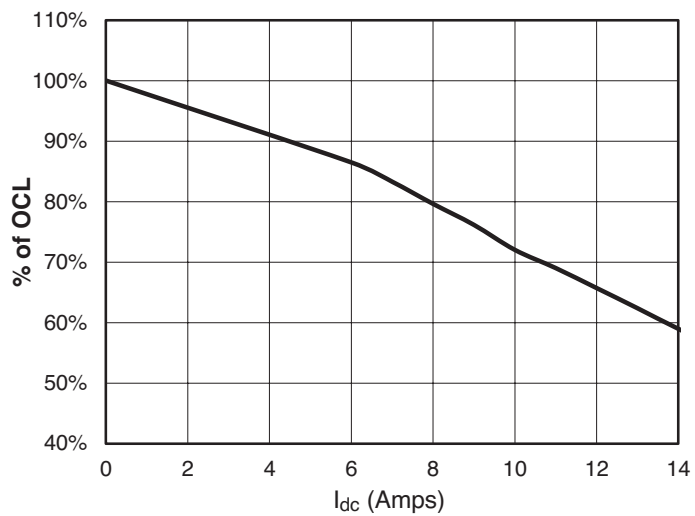
HCM0703-6R8-R



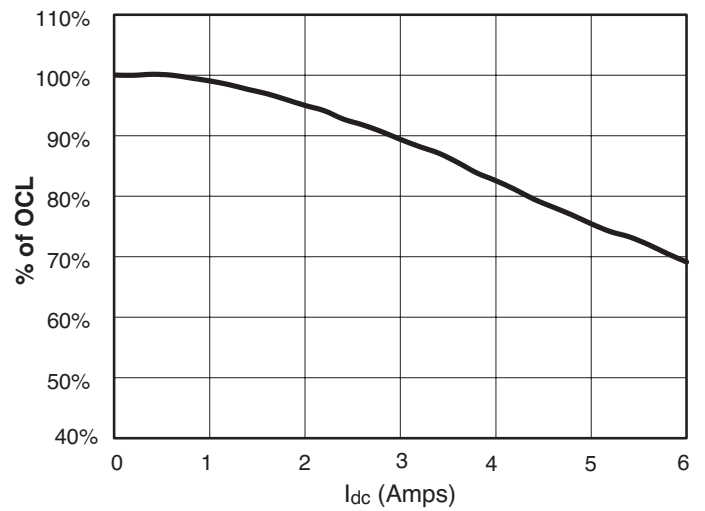
HCM0703-8R2-R



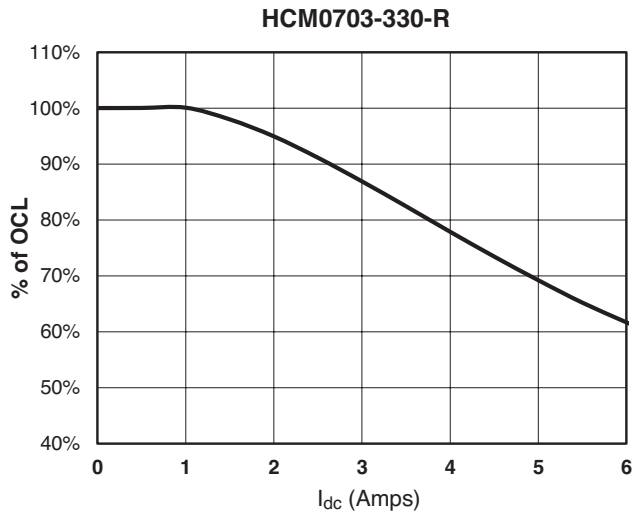
HCM0703-100-R



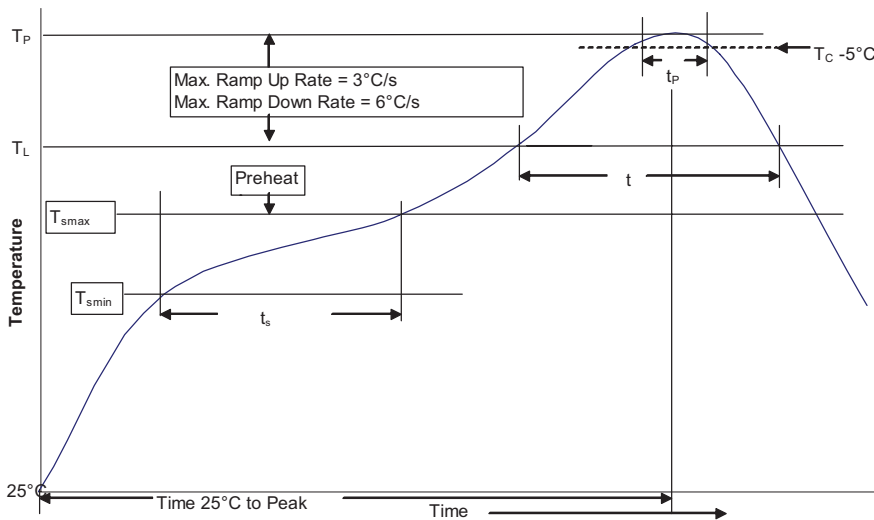
HCM0703-220-R



Inductance characteristics



**Solder reflow profile**



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

Package Thickness	Volume $\text{mm}^3$ <350	Volume $\text{mm}^3$ $\geq 350$
<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 $\text{mm}^3$ <350	Volume $\text{mm}^3$ 350 - 2000	Volume $\text{mm}^3$ >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.

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