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HCM0703

High current power inductors



Description

- 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 6.8 mm footprint surface mount package in a 3.0 mm height
- Iron powder 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
- 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-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
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	7	4.1	4.5	8.0	54	60	151
HCM0703-8R2-R	8	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

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V_{max} , 0.0 Adc, +25 °C.

2. Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.25 V_{max} , I_{sat} @ +25 °C.

3. 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.

4. I_{sat} : Peak current for approximately 20% rolloff at +25 °C.

5. K-factor: Used to determine B_{pp} for core loss (see graph). $B_{\text{p-p}} = K * L * \Delta I$. B_{pp} : (Gauss), K: (K-factor from table), L: (Inductance in μH), ΔI (Peak to peak ripple current in Amps).

6. Part Number Definition: HCM0703-xxx-R

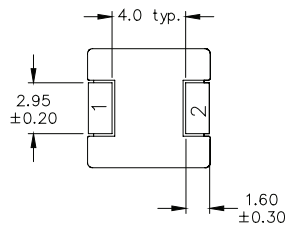
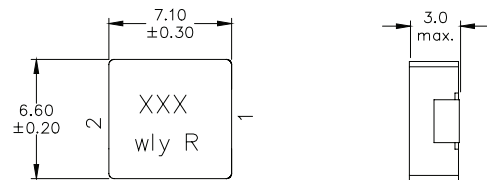
HCM0703 = Product code and size

-xxx= Inductance value in μH , R = decimal point,

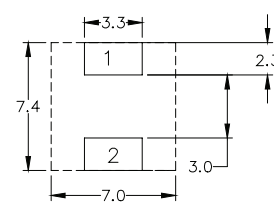
if no R is present then last character equals number of zeros.

"-R" suffix = RoHS compliant

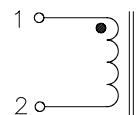
Dimensions (mm)



Recommended Pad Layout



Schematic



Part marking: 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

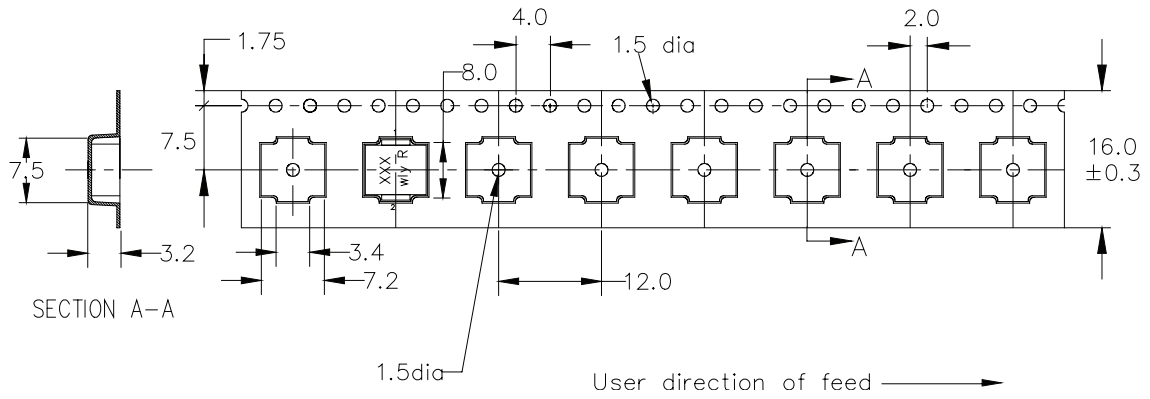
All soldering surfaces to be coplanar within 0.10 millimeters

Tolerances are ± 0.3 millimeters unless stated otherwise

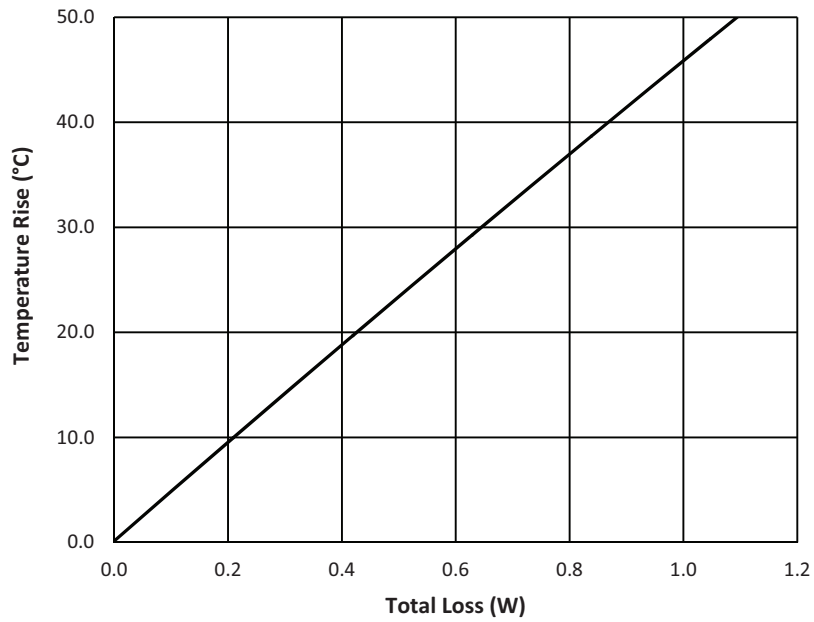
Color: Grey

Packaging information (mm)

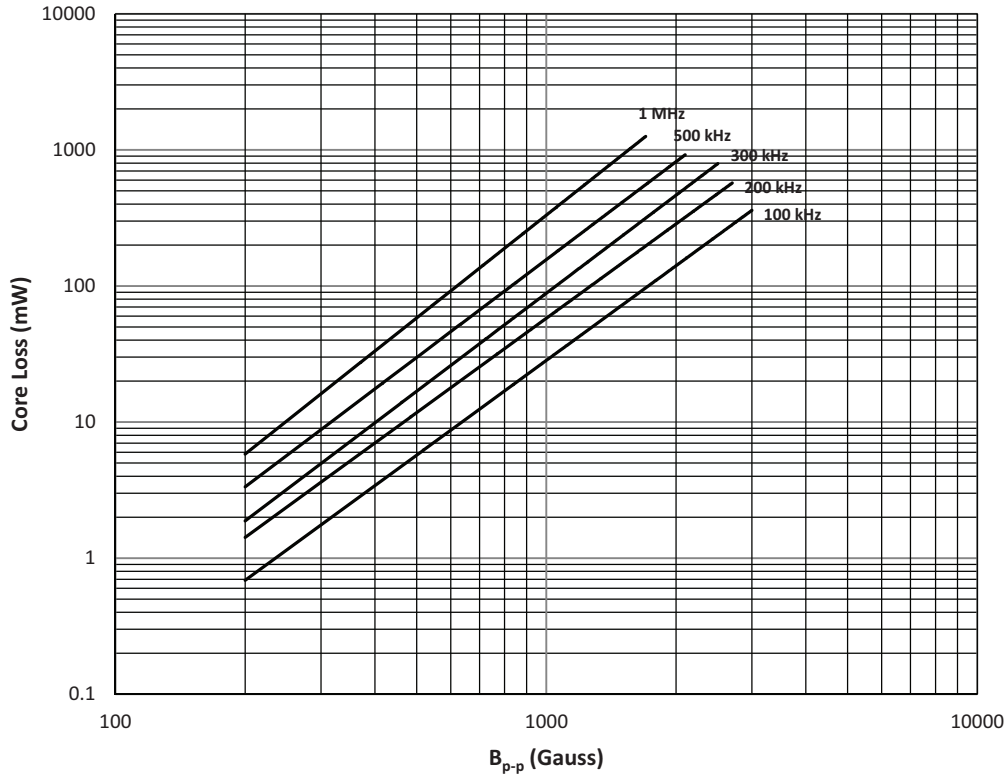
Supplied in tape and reel packaging, 1500 parts per 13" diameter reel.



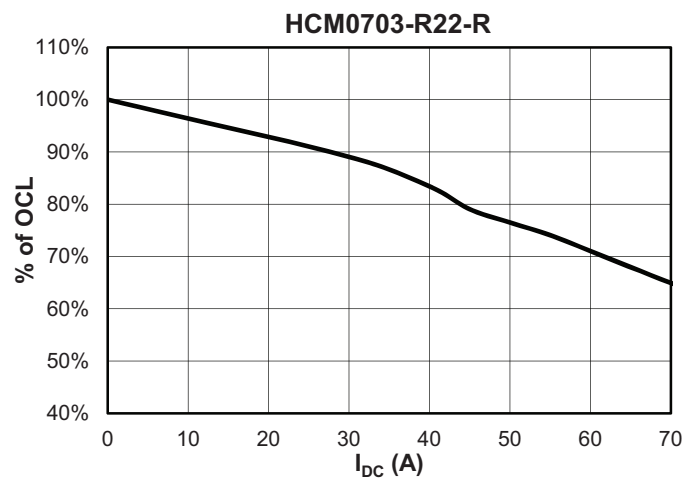
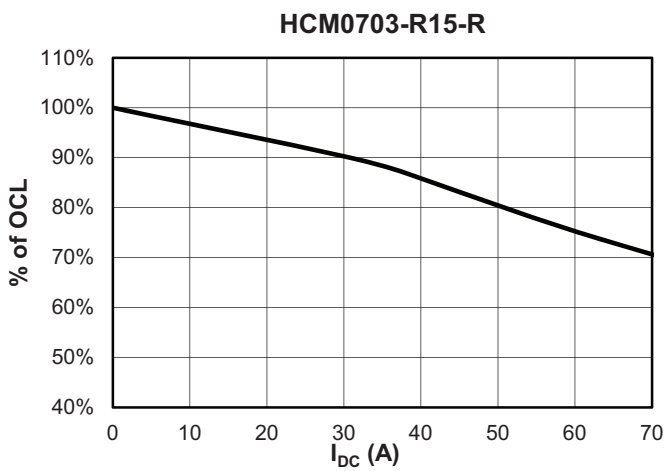
Temperature rise vs. total loss



Core loss vs. B_{p-p}

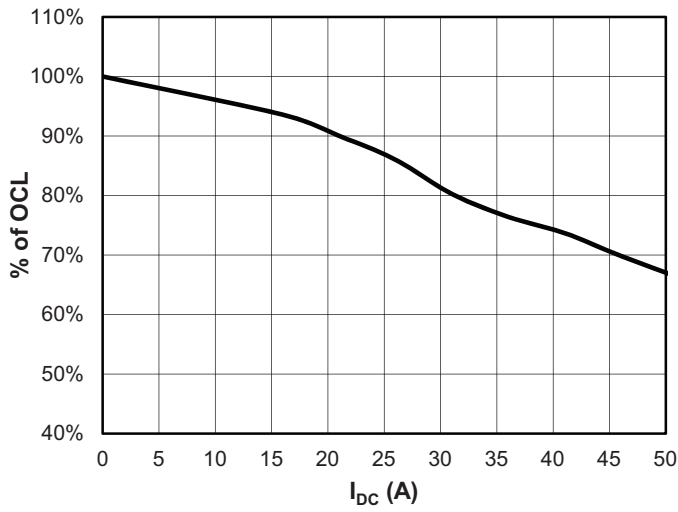


Inductance characteristics

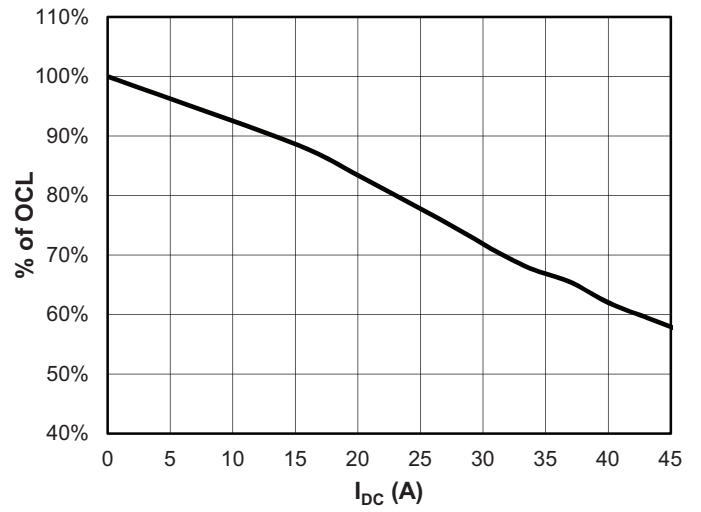


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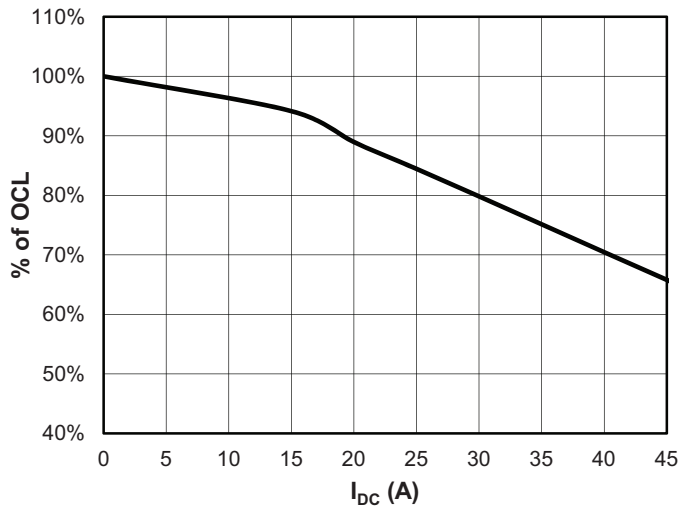
HCM0703-R47-R



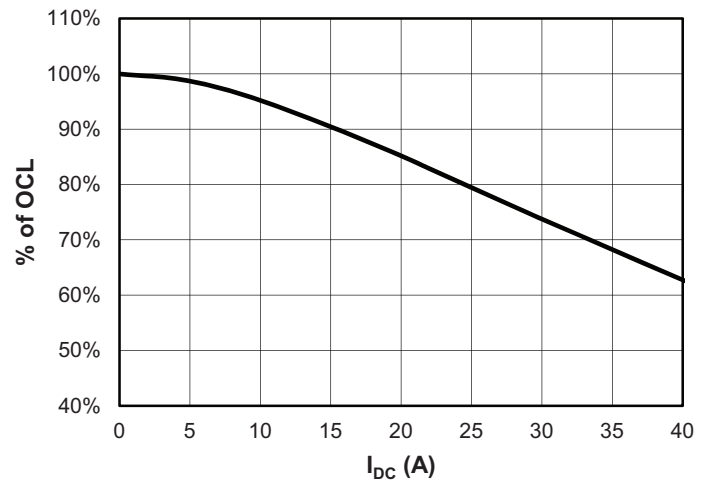
HCM0703-R68-R



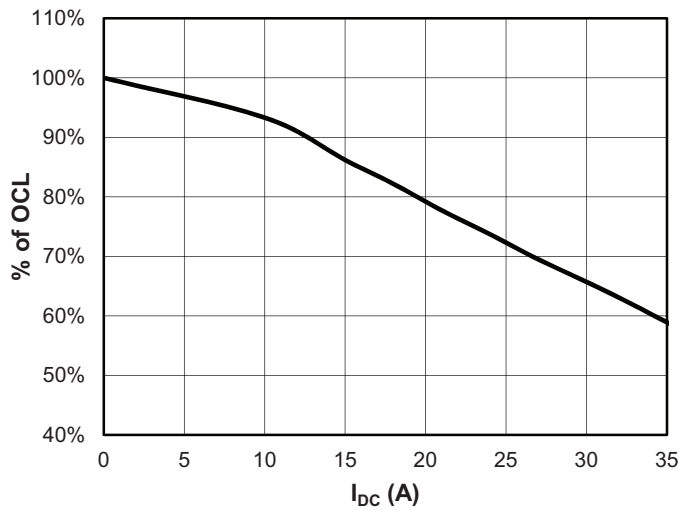
HCM0703-R82-R



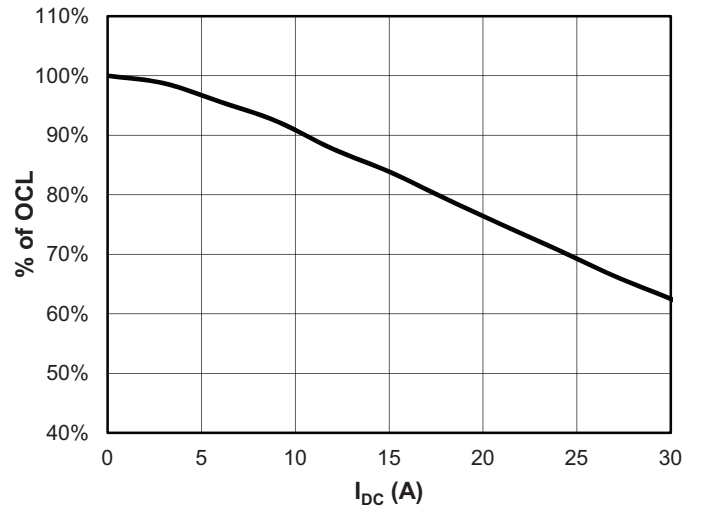
HCM0703-1R0-R



HCM0703-1R5-R

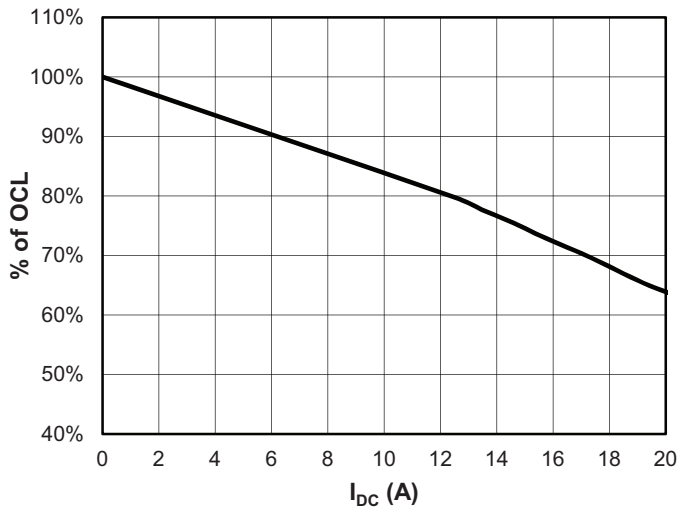


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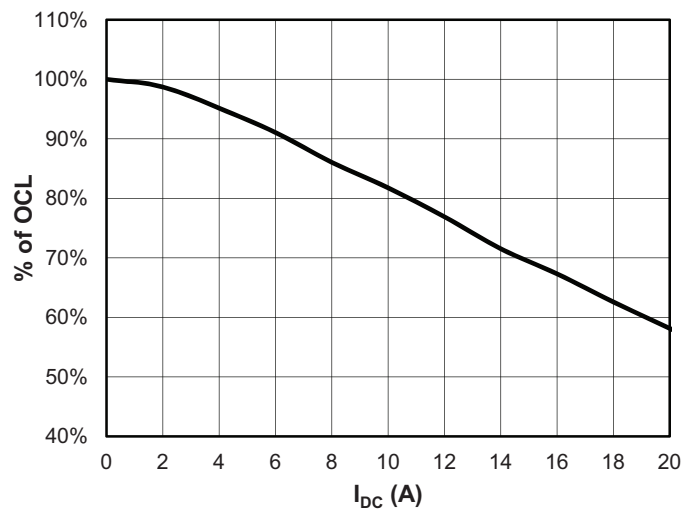


Inductance characteristics

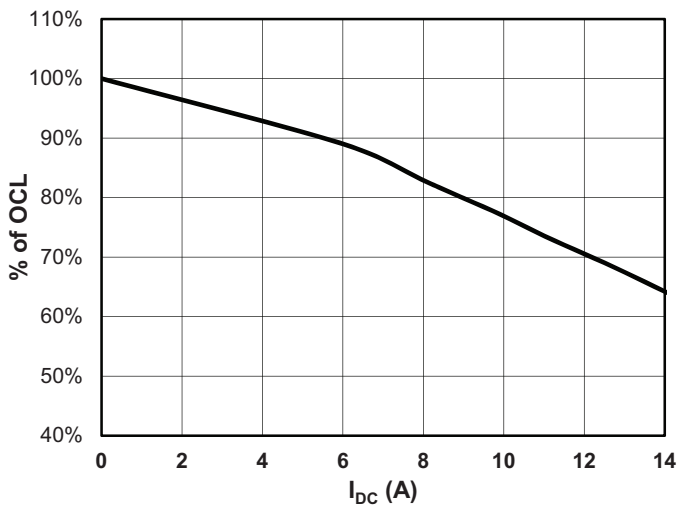
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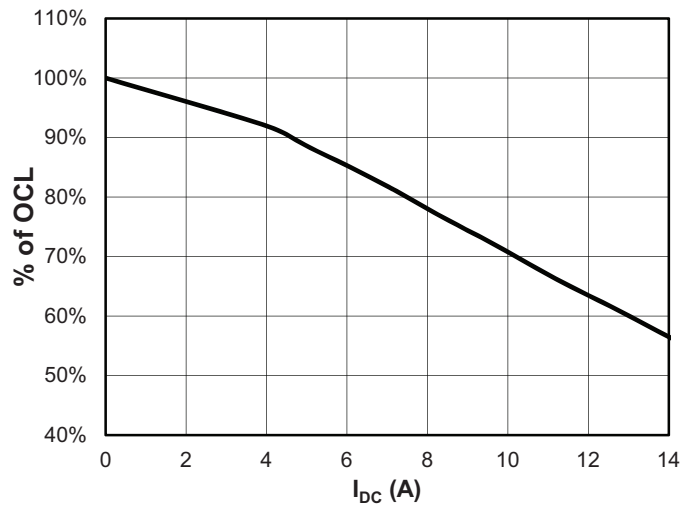
HCM0703-4R7-R



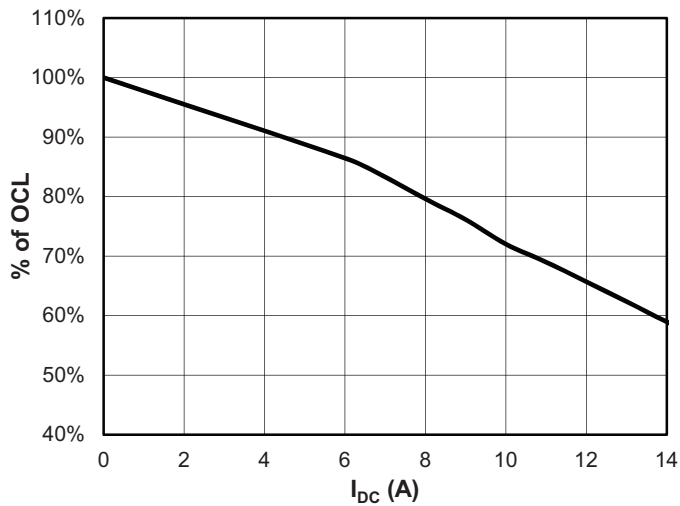
HCM0703-6R8-R



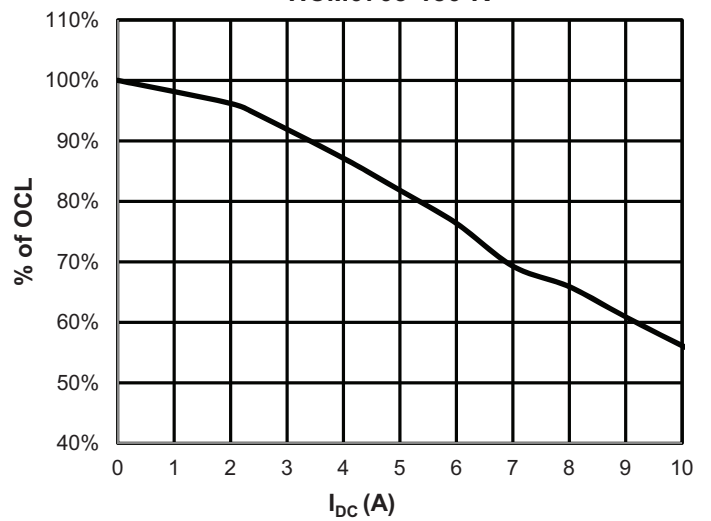
HCM0703-8R2-R



HCM0703-100-R

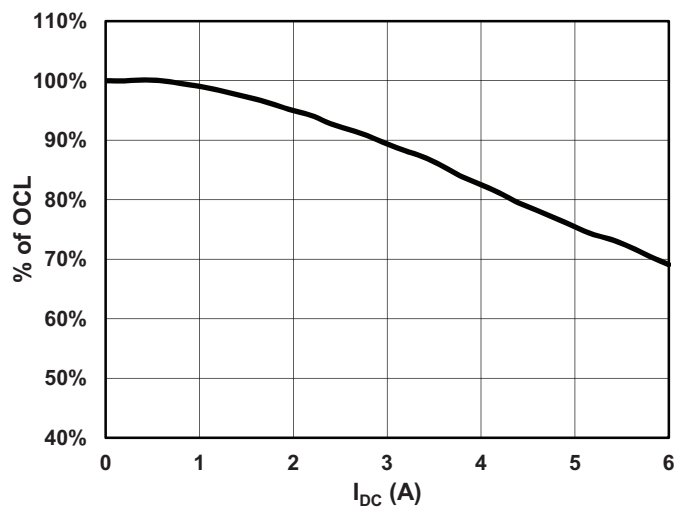


HCM0703-150-R

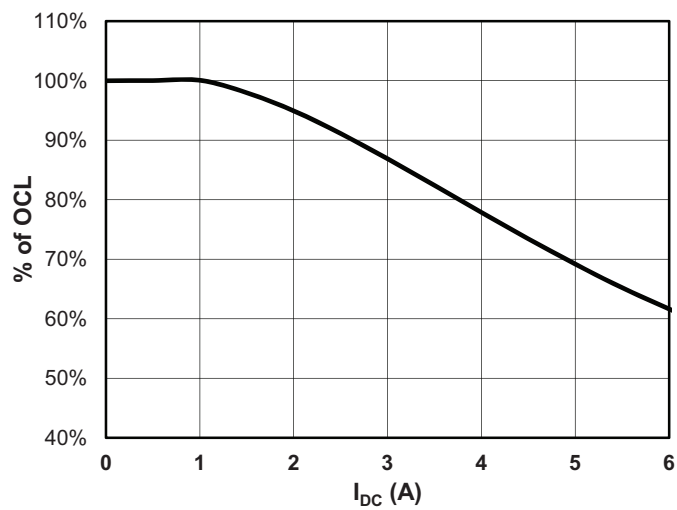


Inductance characteristics

HCM0703-220-R



HCM0703-330-R



Solder reflow profile

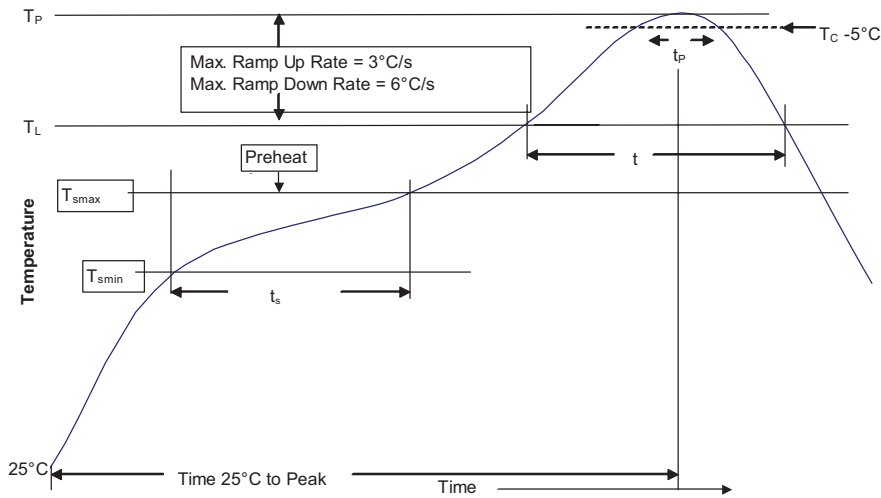


Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume 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.

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