HCM0503

High current power inductors

Product features

- High current carrying capacity
- Low core losses
- Magnetically shielded, low EMI
- Frequency range up to 1 MHz
- Inductance range from 0.2 µH to 22 µH
- Current range from 1.9 A to 22 A
- 5.5 mm x 5.3 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
- Notebook and laptop 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-020 (latest revision) compliant

Pb HALOGEN HF FREE RoHS

Powering Business Worldwide

Product Specifications

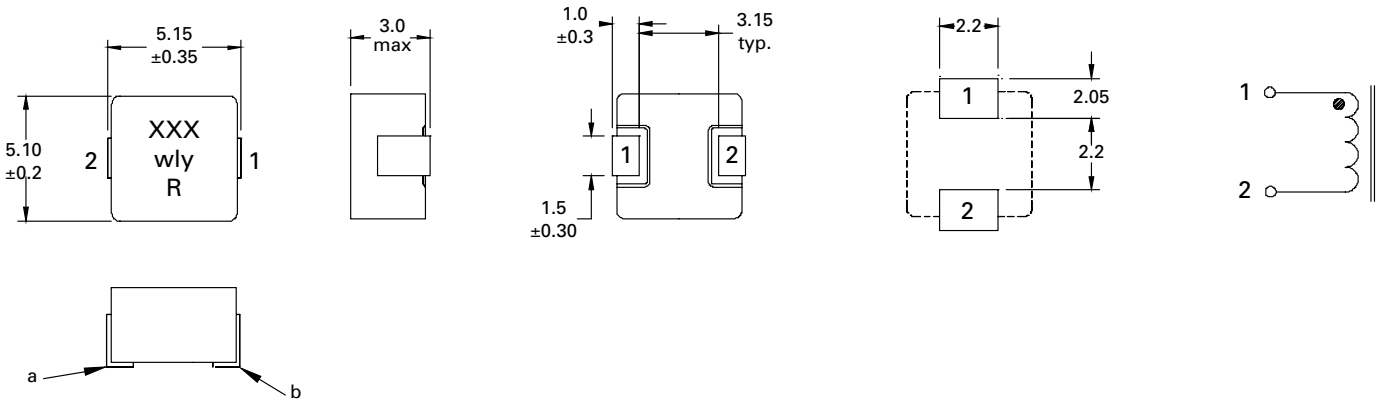
Part Number[6]	OCL[1] (µH) ± 20%	FLL[2] (µH) minimum	I_{rms}[3] (A)	I_{sat}[4] (A)	DCR (mΩ) typical @ +20 °C	DCR (mΩ) maximum @ +20 °C	K-factor[5]
HCM0503-R20-R	0.20	0.13	22.2	21.0	2	2.3	1764
HCM0503-R35-R	0.35	0.22	16.6	14.9	4	4.3	1259
HCM0503-R47-R	0.47	0.30	12.0	11.5	6	7.2	820
HCM0503-R75-R	0.75	0.48	11.3	9.7	8	9.4	801
HCM0503-1R0-R	1.0	0.64	10.1	8.5	10	12	588
HCM0503-1R5-R	1.5	0.96	7.5	7.0	17	19	393
HCM0503-2R2-R	2.2	1.4	6.8	6.5	23	25	325
HCM0503- 3R3-R	3.3	2.1	5.5	6.0	36	41	273
HCM0503-4R7-R	4.7	3.0	4.5	5.5	54	60	226
HCM0503-5R6-R	5.6	3.6	4.3	3.5	63	71	206
HCM0503-100-R	10	6.4	2.8	2.3	122	132	158
HCM0503-150-R	15	9.6	2.4	2.1	138	166	127
HCM0503-220-R	22	14	1.9	1.9	260	270	106

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 Vrms, 0.0 Adc, @ +25 °C
2. Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.25 Vrms, @ 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 @ +25 °C
5. K-factor: Used to determine B_{p-p} for core loss (see graph). Bp-p = K * L * ΔI. B_{p-p}: (Gauss), K: (K-factor from table), L: (Inductance in µH), ΔI (Peak to peak ripple current in Amps).
6. Part Number Definition: HCM0503-xxx-R
   HCM0503 = 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

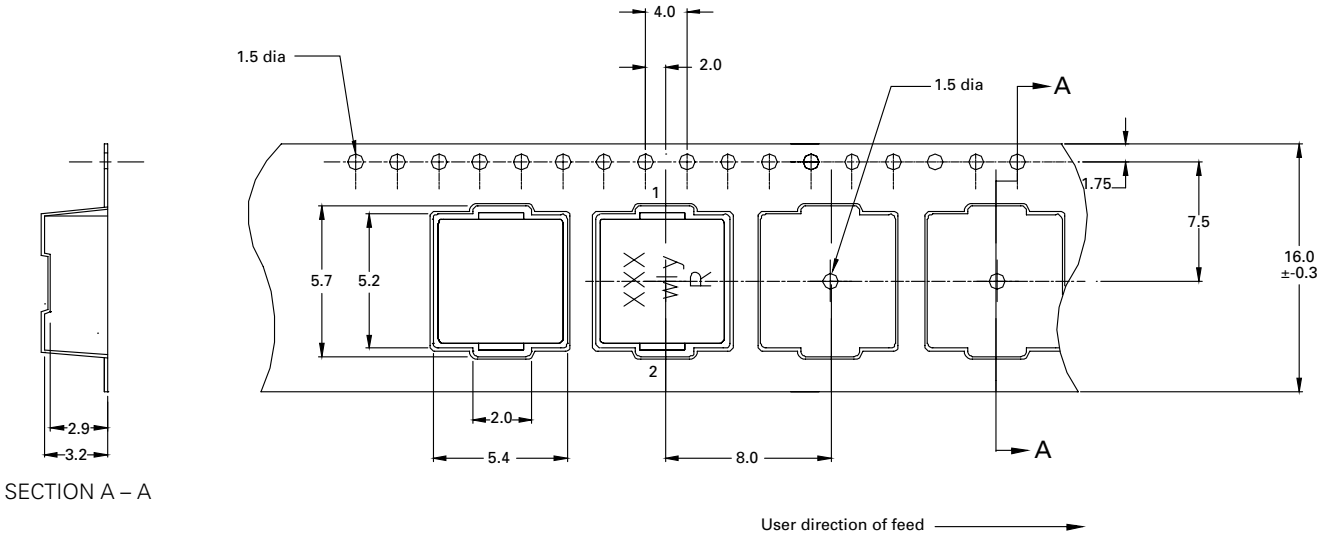
Schematic



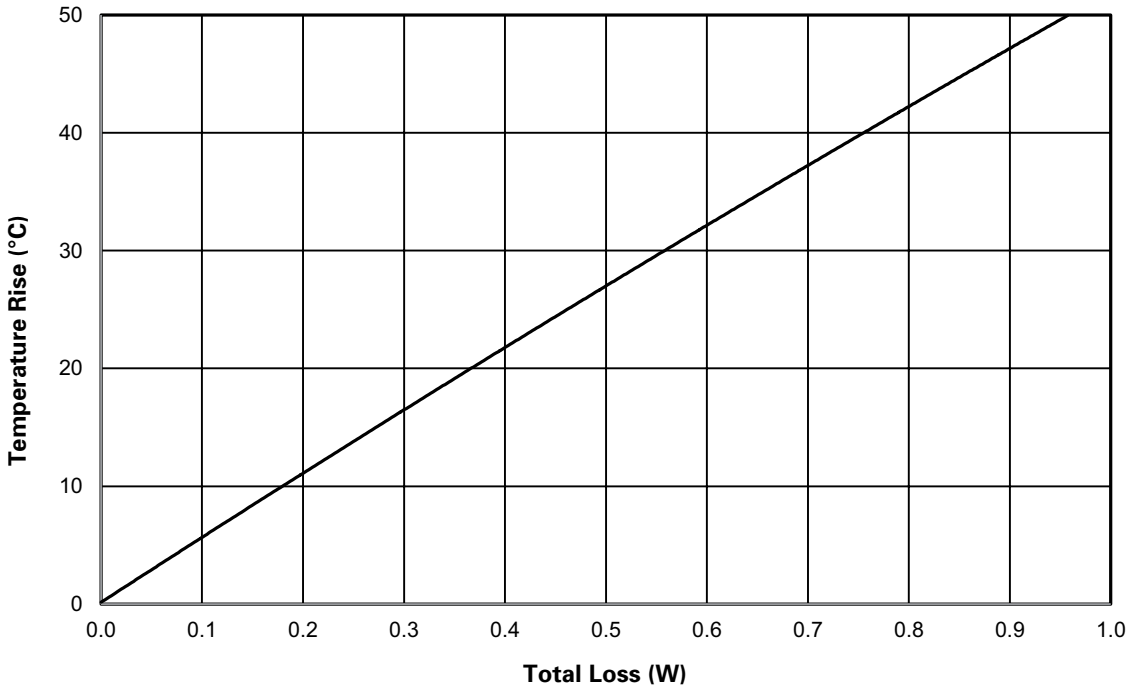
Part marking: xxx=inductance value in uH, R= decimal point. If no R is present then last character equals number of zeros.
wly=date code, R=revision level
All soldering surfaces to be coplanar within 0.1 millimeters
Tolerances are ±0.2 millimeters unless stated otherwise
DCR measured from point “a” to point “b”
Color: Grey
Do not route traces or vias underneath the inductor

Packaging information (mm)

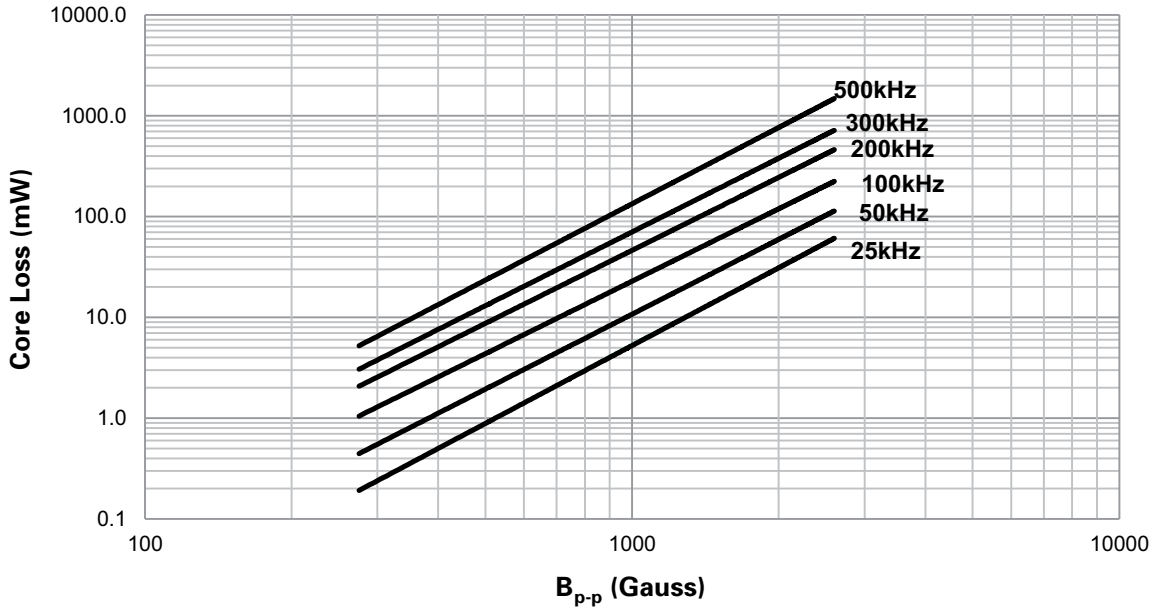
Supplied in tape and reel packaging, 2,000 parts per 13" diameter reel



Temperature rise vs. total loss

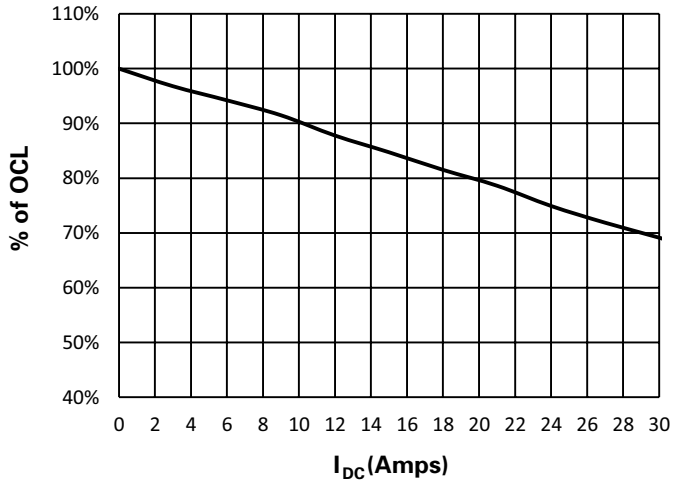


Core loss vs. B_{p-p}

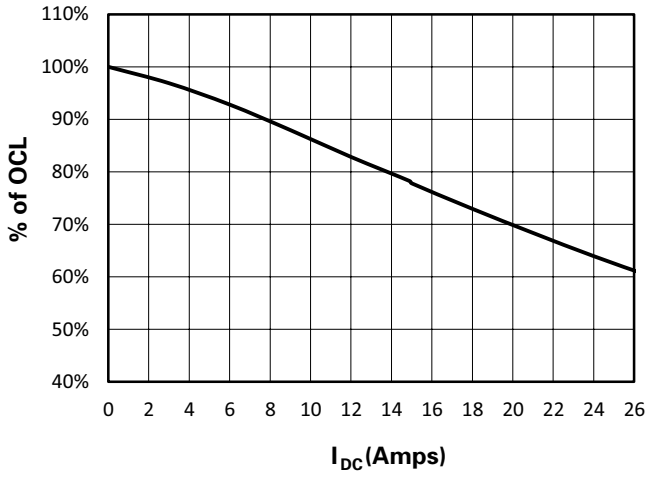


Inductance characteristics

HCM0503-R20-R

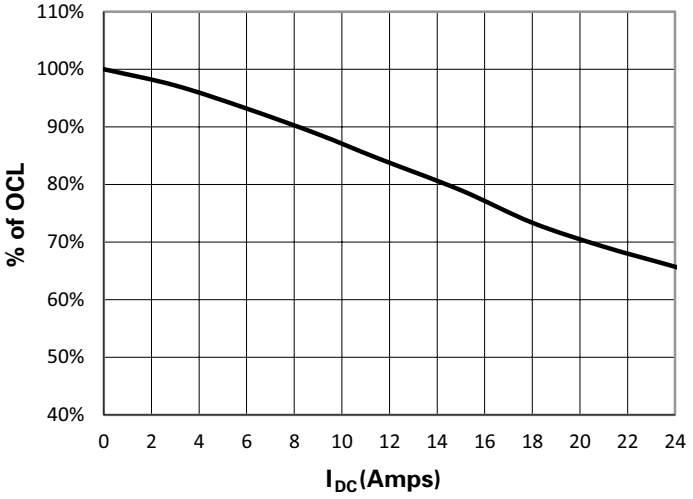


HCM0503-R35-R

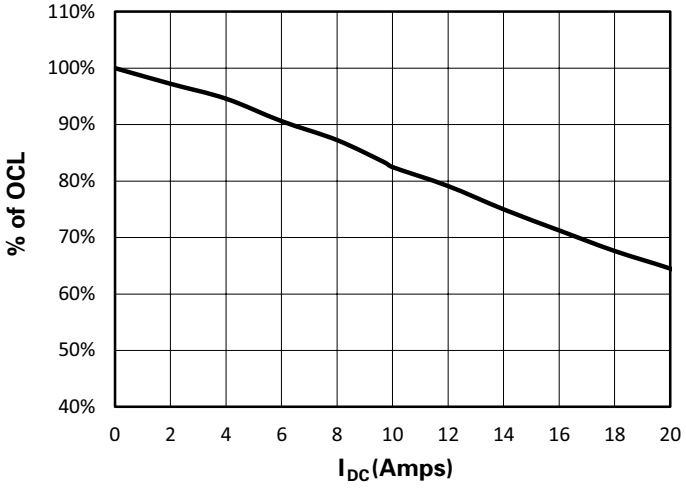


Inductance characteristics

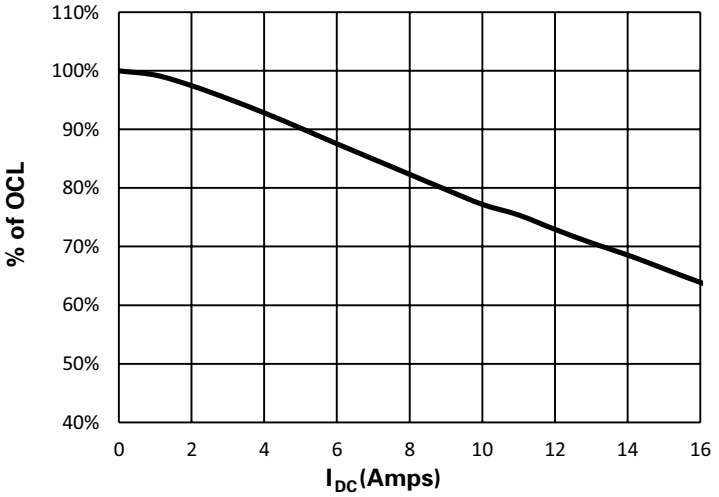
HCM0503-R47-R



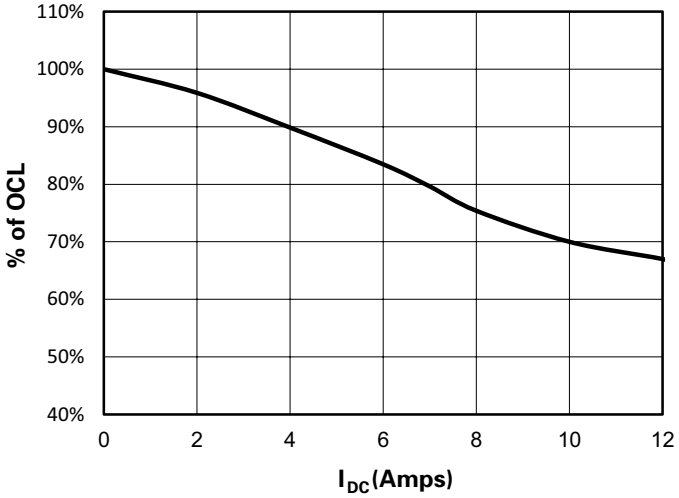
HCM0503-R75-R



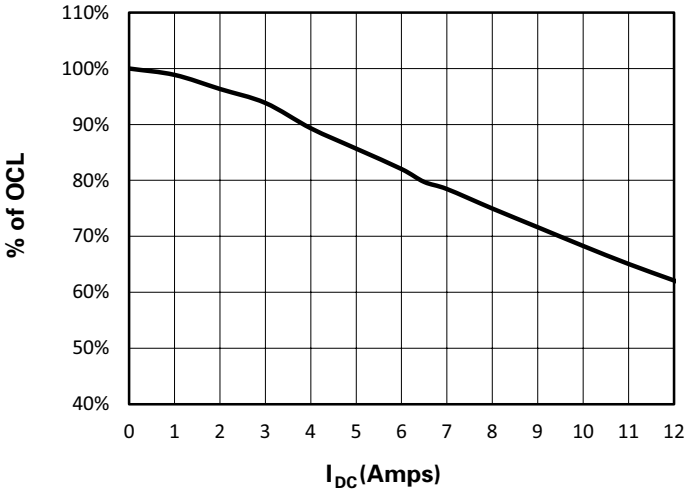
HCM0503-1R0-R



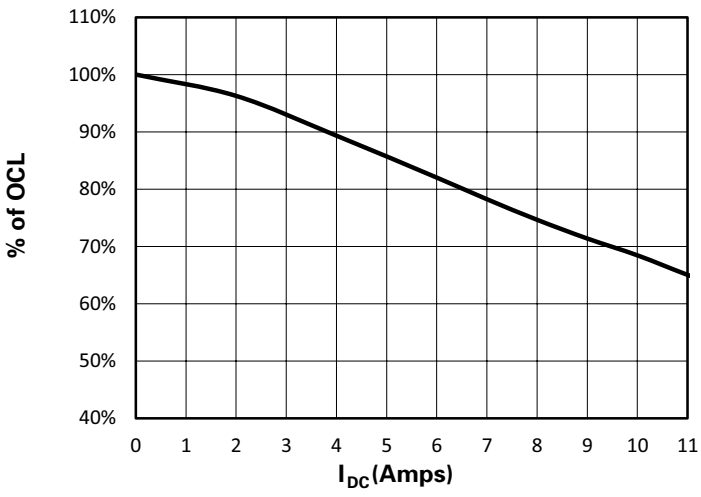
HCM0503-1R5-R



HCM0503-2R2-R

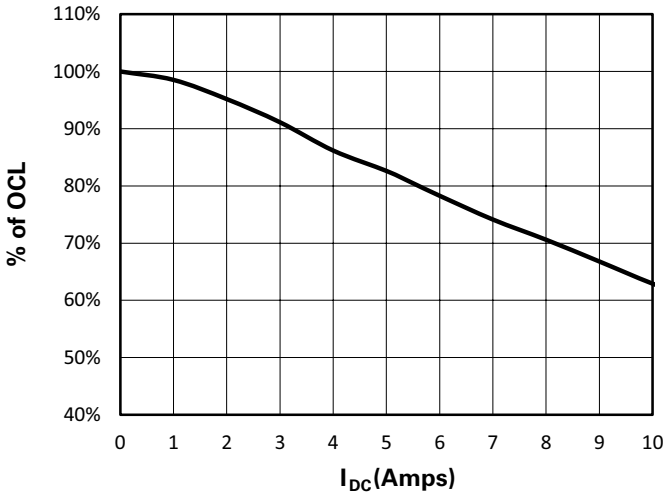


HCM0503-3R3-R



Inductance characteristics

HCM0503-4R7-R



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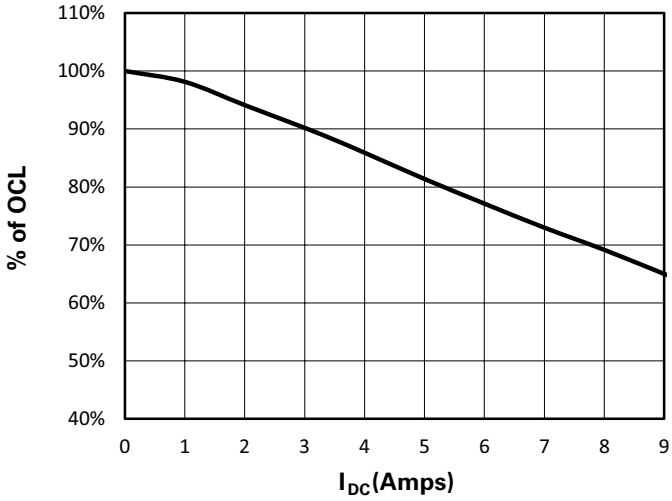
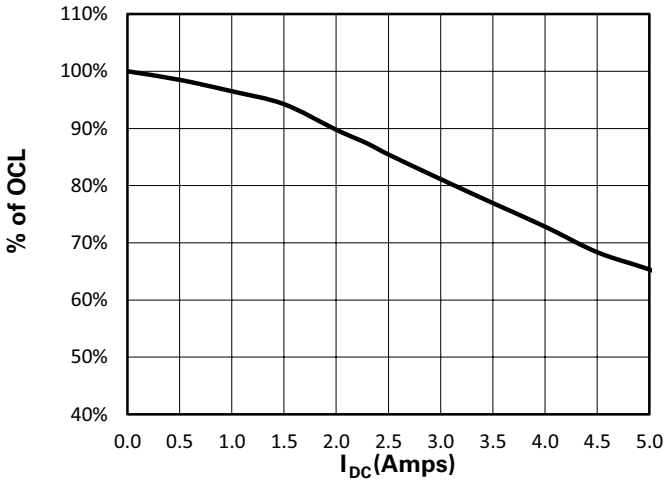
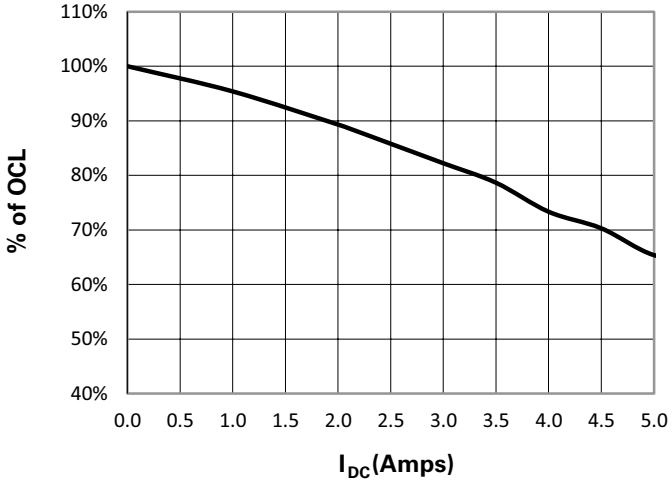


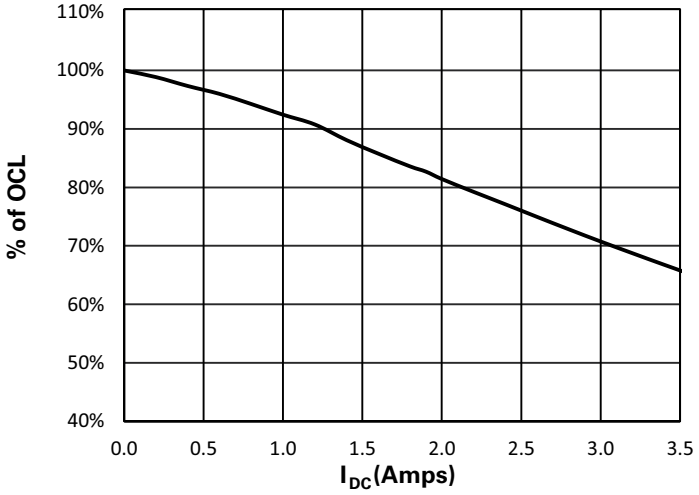
HCM0503-100-R



HCM0503-150-R



HCM0503-220-R



Solder reflow profile

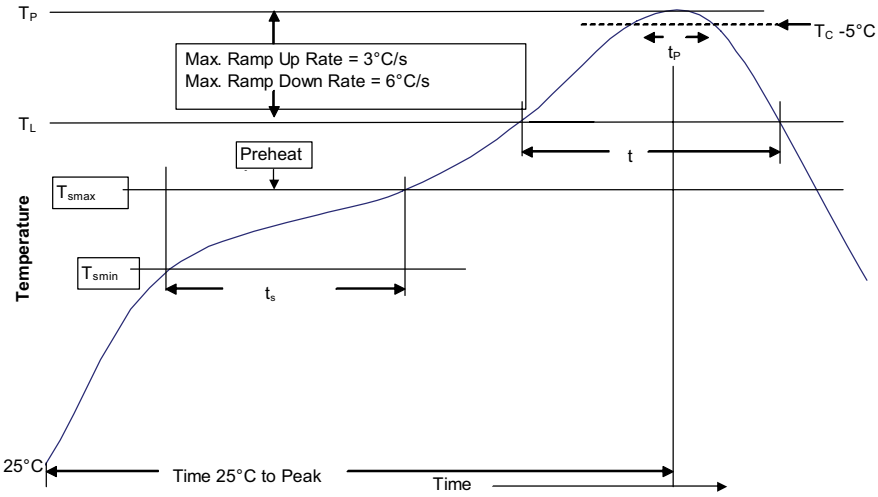


Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume mm3 <350	Volume mm3 ≥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-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) Time at liquidous (t_L)		183°C 60-150 Seconds	217°C 60-150 Seconds
Peak package body temperature (Tp)*		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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