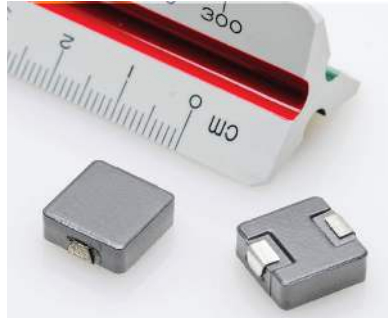


HCM1305

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 0.10 μH to 33 μH
- Current range from 5.2 A to 118 A
- 13.8 mm x 12.5 mm footprint surface mount package in a 5.0 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
- 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 plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant



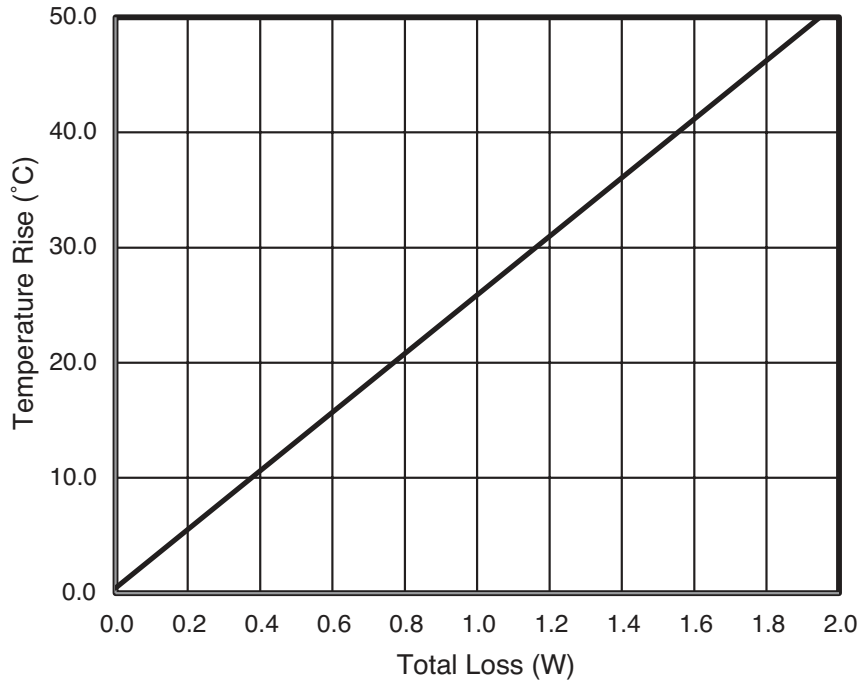
Product specifications

Part Number ⁶	OCL ¹ (μH) $\pm 20\%$	FLL ² Min. (μH)	I_{rms}^3 (A)	I_{sat}^4 (A)	DCR (m Ω) @ +20 °C \pm nominal	DCR (m Ω) @ +20 °C maximum	K-factor ⁵
HCM1305-R10-R	0.10	0.064	55	118	0.52	0.59	848
HCM1305-R22-R	0.22	0.14	51	110	0.63	0.72	843
HCM1305-R33-R	0.33	0.21	42	80	0.80	0.92	506
HCM1305-R47-R	0.47	0.30	38	65	0.80	0.92	506
HCM1305-R56-R	0.56	0.36	36	55	1.15	1.33	500
HCM1305-R68-R	0.68	0.44	34	54	1.15	1.33	500
HCM1305-R82-R	0.82	0.52	31	53	1.40	1.61	358
HCM1305-1R0-R	1.00	0.64	29	50	2.10	2.42	275
HCM1305-1R5-R	1.50	0.96	23	48	2.75	3.16	225
HCM1305-1R8-R	1.80	1.15	21	40	4.00	4.60	216
HCM1305-2R2-R	2.20	1.41	20	32	4.60	5.29	191
HCM1305-3R3-R	3.30	2.11	15	32	7.70	9.20	170
HCM1305-4R7-R	4.70	3.01	12	27	11.0	12.7	161
HCM1305-5R6-R	5.60	3.58	11.5	22	12.0	13.8	142
HCM1305-6R8-R	6.80	4.35	11	21	13.0	15.0	129
HCM1305-7R8-R	7.80	4.99	10	18.5	16.8	19.4	117
HCM1305-8R2-R	8.20	5.25	9.5	18	17.5	20.1	117
HCM1305-100-R	10.0	6.40	9.0	16	19.0	21.9	90
HCM1305-150-R	15.0	9.60	7.7	13	29.0	33.4	74
HCM1305-220-R	22.0	14.1	6.2	10	45.0	51.8	63
HCM1305-330-R	33.0	21.1	5.2	8	74.5	85.5	48

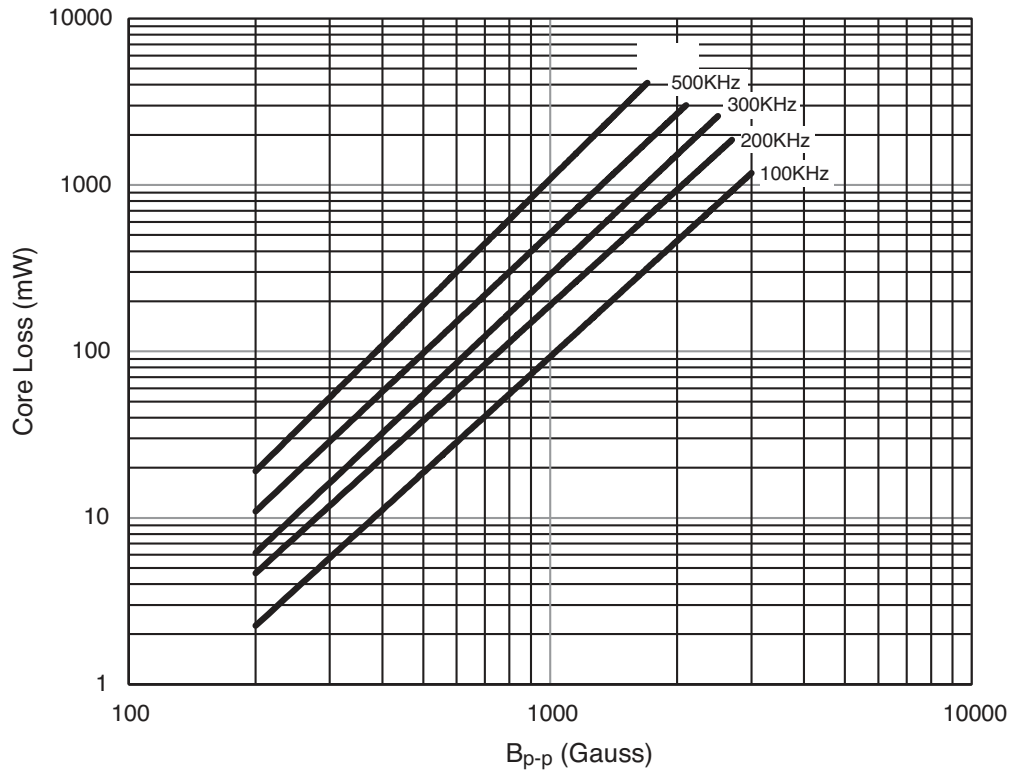
1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V_{rms} , 0.0 Adc, +25 °C.
2. Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.25 V_{rms} , I_{sat} @ +25 °C.
3. I_{rms} : DC current for an approximate temperature rise of 40 °C without core loss. Derating is necessary for AC currents. 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). $B_{\text{pp}} = K * L * \Delta I$.
 B_{pp} : (Gauss), K: (K-factor from table), L: (Inductance in μH), ΔI (Peak to peak ripple current in amps).
6. Part Number Definition: HCM1305-yyy-R
- HCM1305 = Product code and size
yyy= Inductance value in μH , R = decimal point,
if no R is present then third character = number of zeros.
“-R” suffix = RoHS compliant

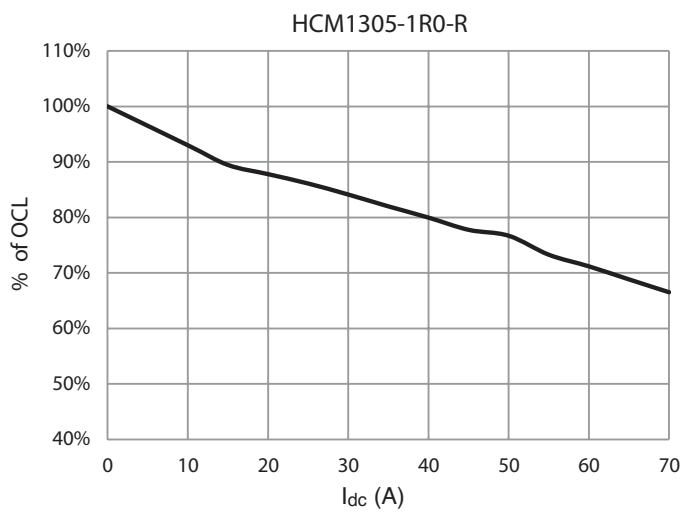
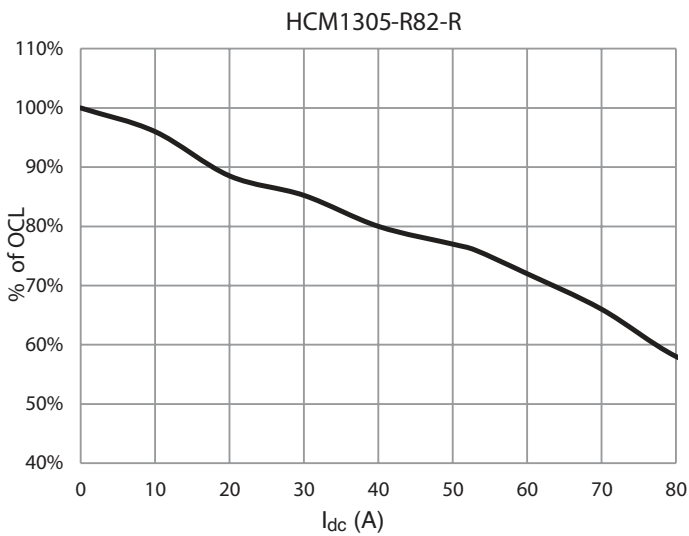
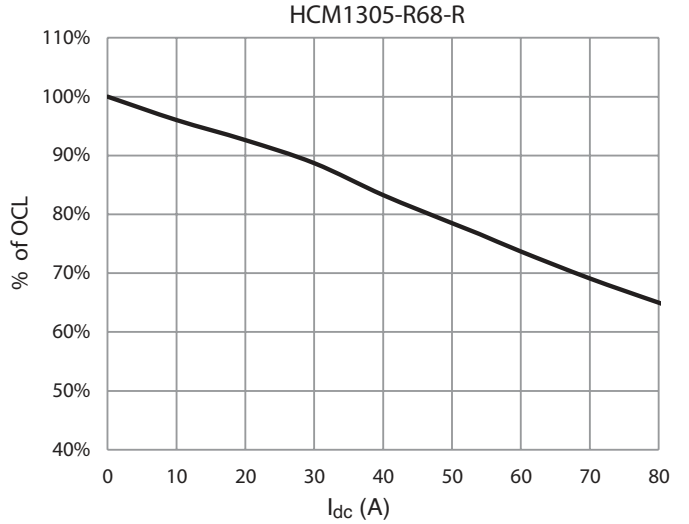
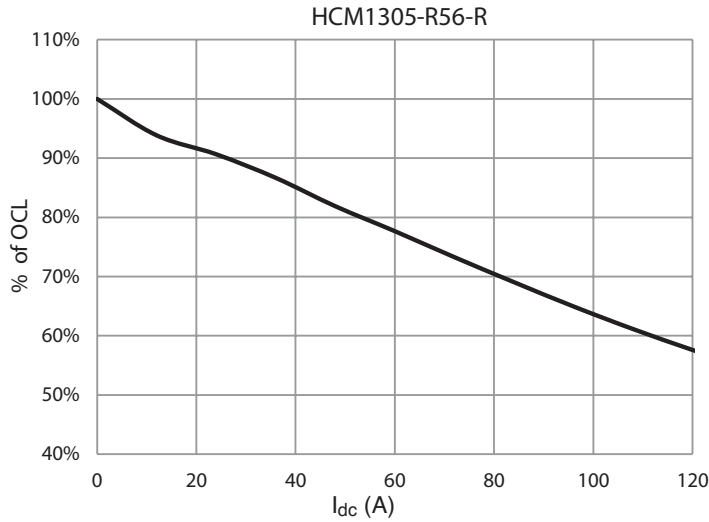
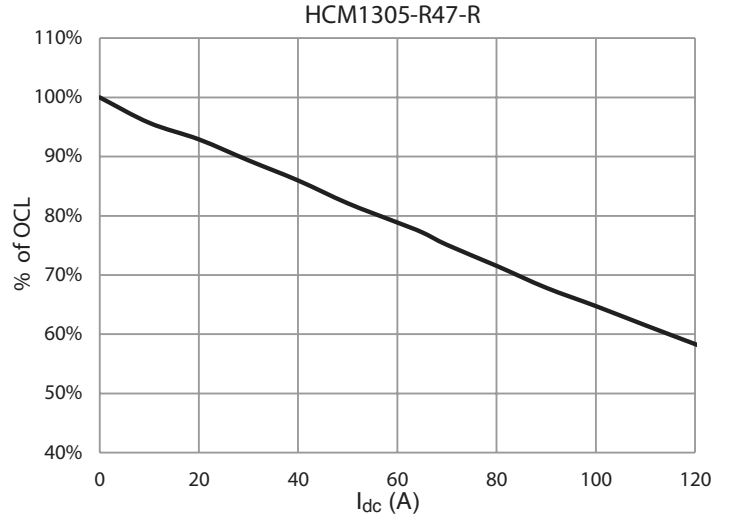
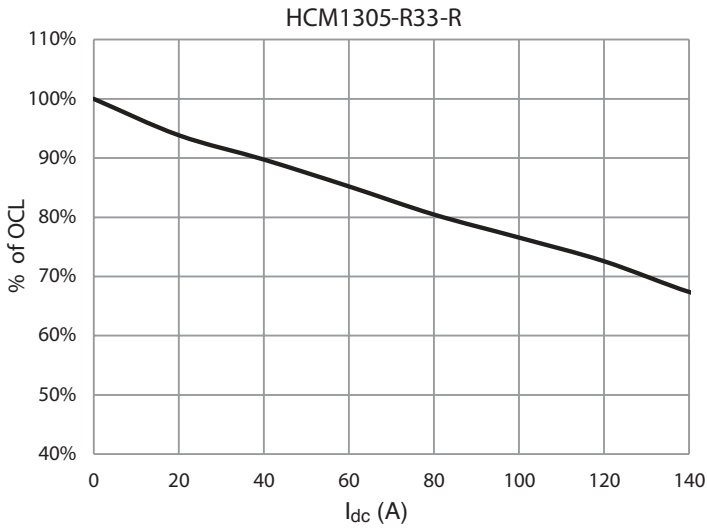
Temperature rise vs. total loss



Core loss vs. B_{p-p}

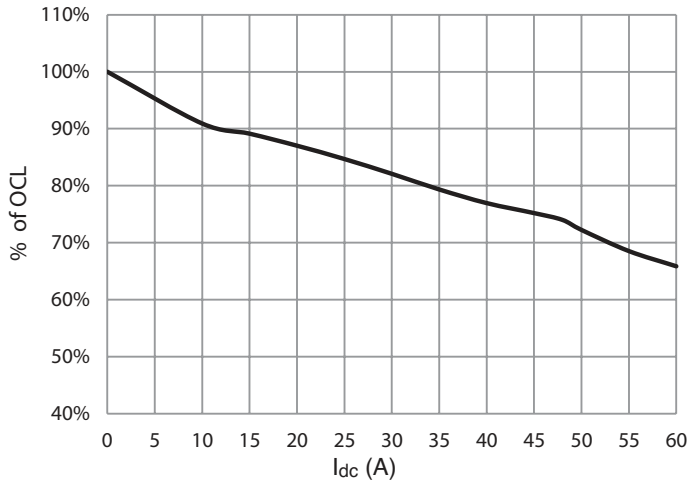


Inductance characteristics

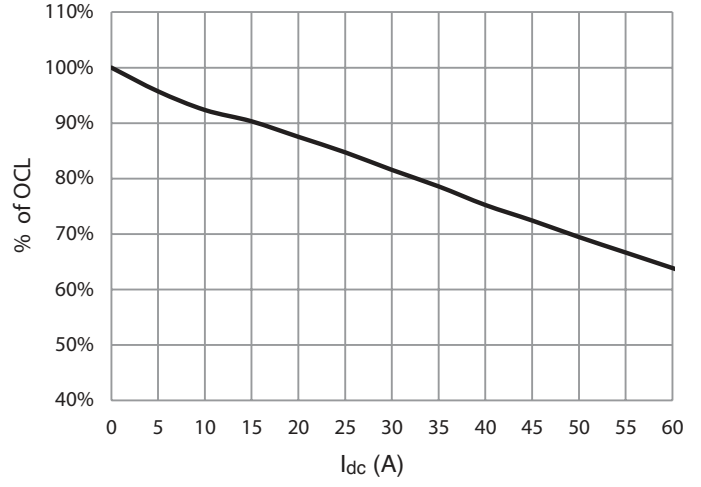


Inductance characteristics

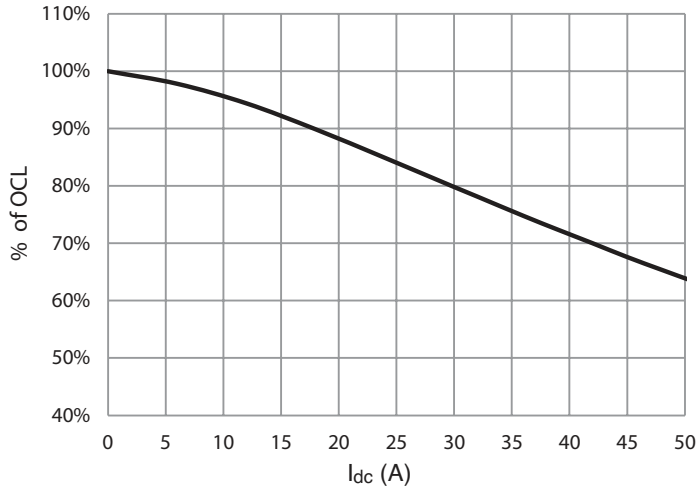
HCM1305-1R5-R



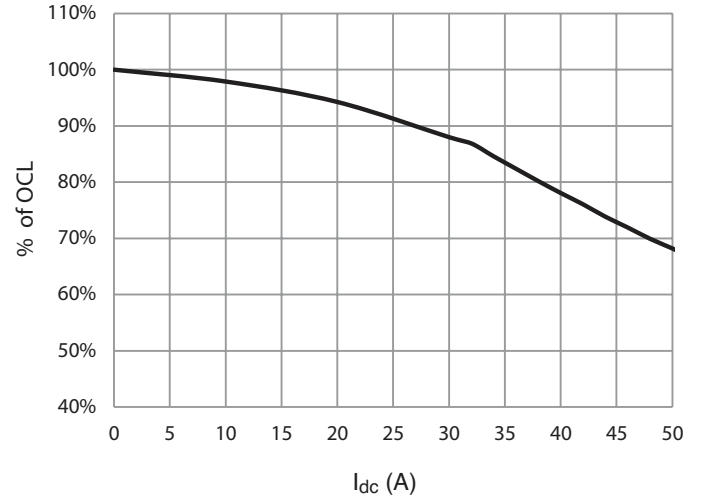
HCM1305-1R8-R



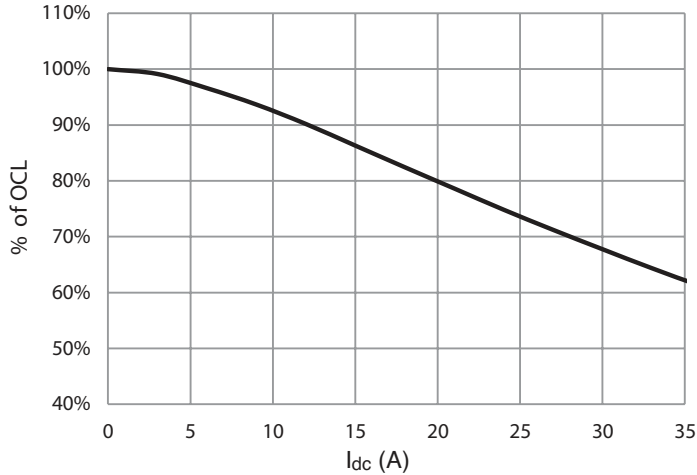
HCM1305-2R2-R



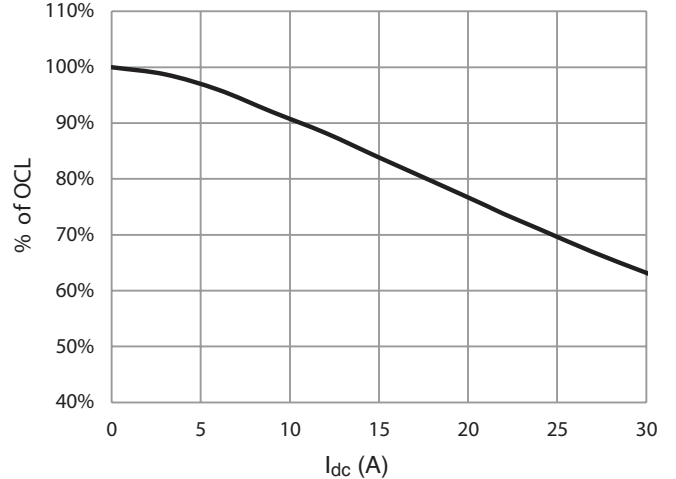
HCM1305-3R3-R



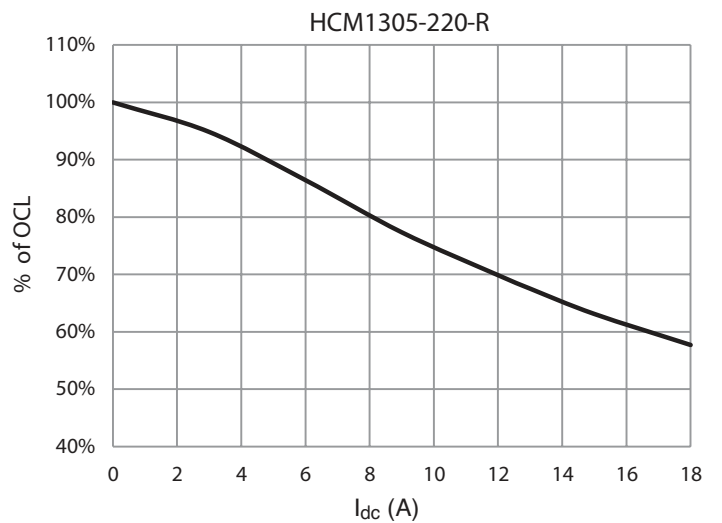
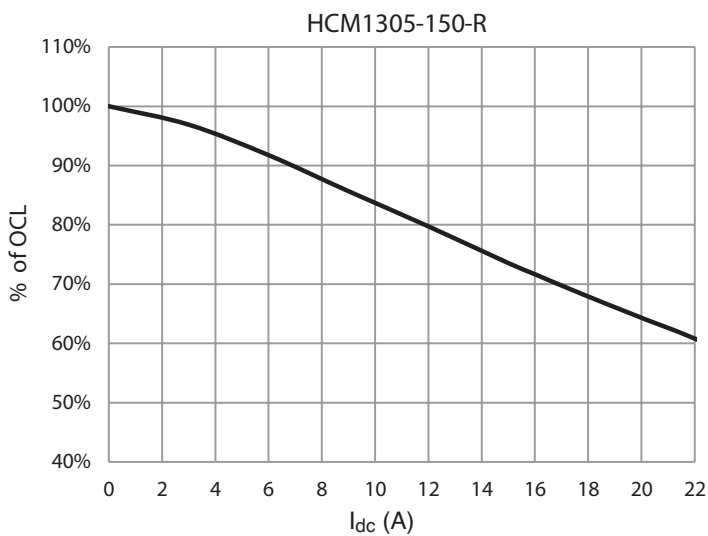
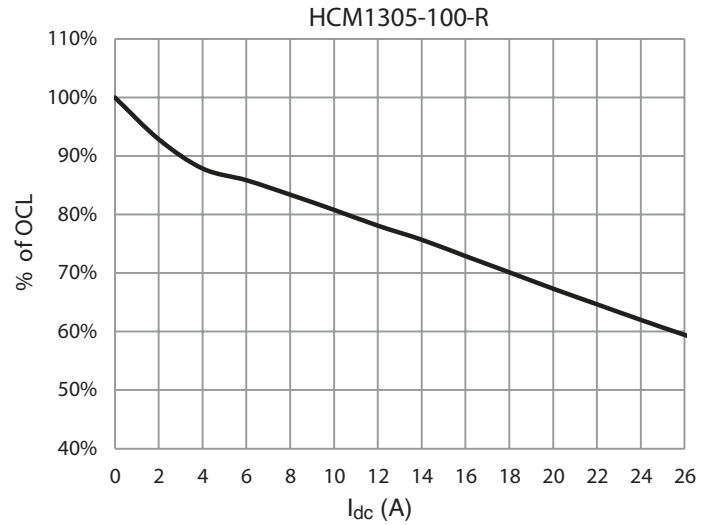
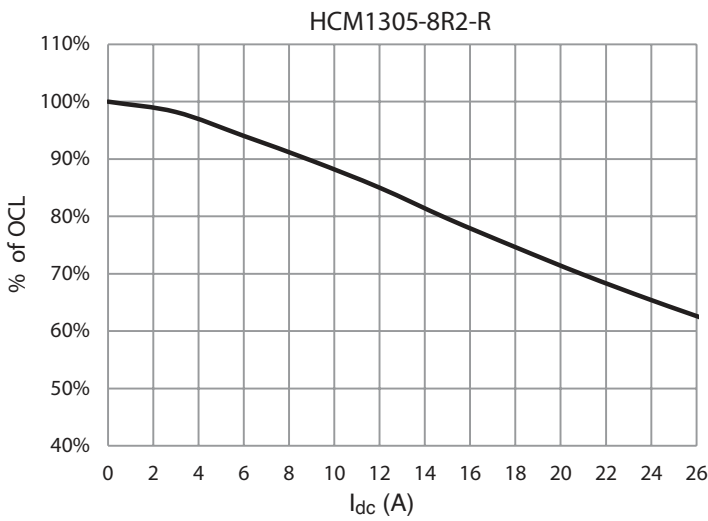
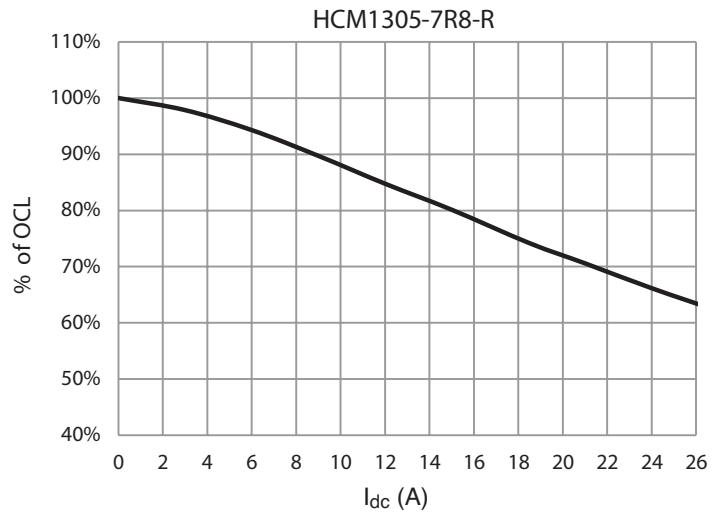
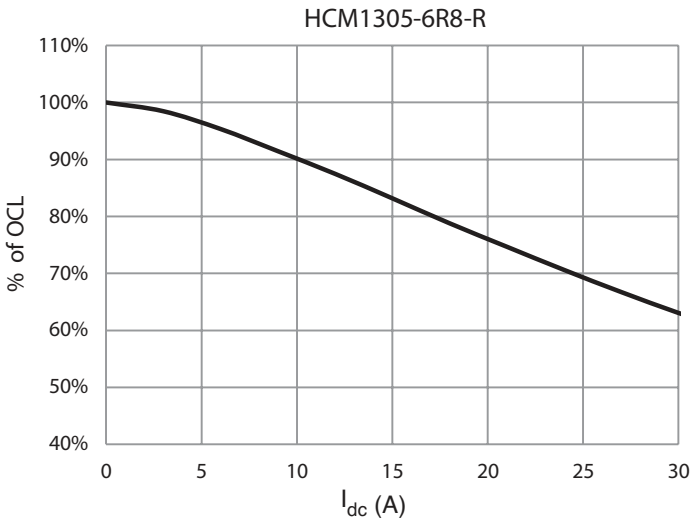
HCM1305-4R7-R



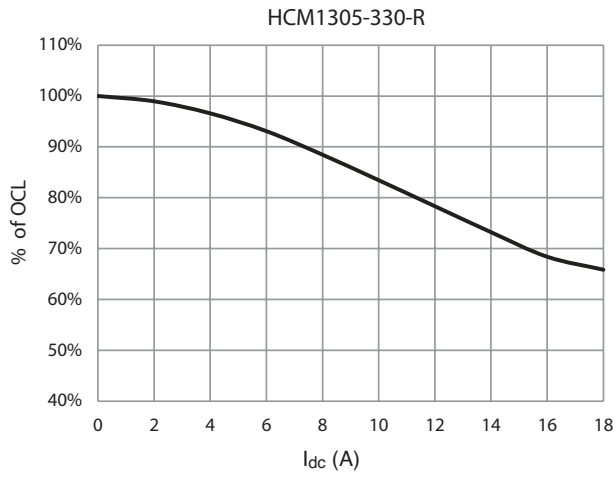
HCM1305-5R6-R



Inductance characteristics



Inductance characteristics



Solder Reflow Profile

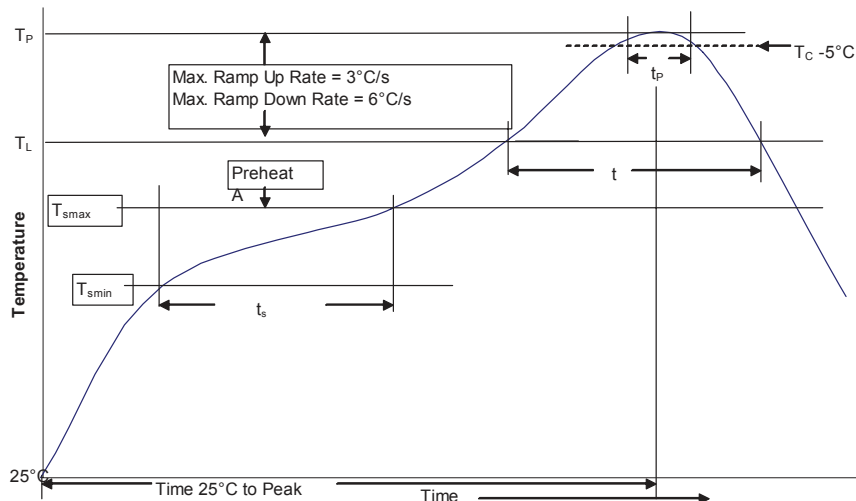


Table 1 - Standard SnPb Solder (T_p)

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

Table 2 - Lead (Pb) Free Solder (T_p)

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
	• Temperature max. (T_{smax})	150°C
	• Time (T_{smin} to T_{smax}) (t_s)	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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