HCM1A0805V3

Automotive grade high current power inductor



Photo is representative

Product features

- AEC-Q200
- High current carrying capacity
- Magnetically shielded, low EMI
- DC-DC converter applications up to 1 MHz
- Filtering applications up to Self resonant frequency (SRF) [See product specification table]
- Inductance range from 0.22 µH to 100 µH
- Current range from 1.4 A to 32 A
- 8.4 mm x 8.0 mm and 8.0 mm x 7.5 mm footprint surface mount package in a 5.4 mm height
- Alloy powder core material
- Moisture sensitivity level (MSL): 1

Applications

- Body electronics
  - Central body control module
  - Vehicle access control system
  - Headlamps, tail lamps and interior lighting and LED lighting
  - Heating ventilation and air conditioning controllers (HVAC)
  - Doors, window lift and seat control
- Advanced driver assistance systems
  - Adaptive cruise control (ACC)
  - Automatic parking control
  - Collision avoidance system/ Car black box system
- Infotainment and cluster electronics
  - Audio subsystem: head unit and trunk amp
  - Digital instrument cluster
  - In-vehicle infotainment (IVI) and navigation
  - Port power/USB HUB for front and rear passengers
- Chassis and safety electronics
  - Airbag control unit
  - Electronic stability control system (ESC)
- Engine and powertrain systems
  - Electric pumps, motor control and auxiliaries
  - Powertrain control module (PCU)/ Engine control unit (ECU)
  - Transmission Control Unit (TCU)

Environmental compliance and general specifications

- Storage temperature (component): -55 °C to +155 °C
- Operating temperature range: -55 °C to +155 °C (ambient plus self-temperature rise)

RoHS HALOGEN HF FREE Pb

Powering Business Worldwide

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Product specifications

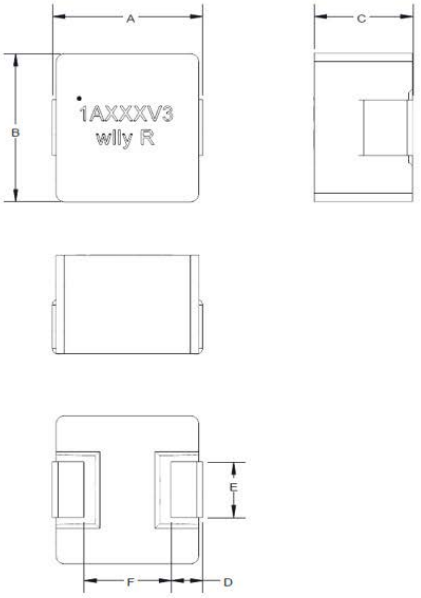
Part number[6]	OCL[1] (µH) ±20%	FLL[2] (µH) minimum	I_{rms1}[3] (A)	I_{rms2}[3] (A)	I_{sat}[4] (A)	DCR (mΩ) maximum @ +20 °C	SRF (MHz) typical	K-factor[5]
HCM1A0805V3-R22-R	0.22	0.14	32	28	50	1.2	165	443
HCM1A0805V3-R47-R	0.47	0.30	21.5	19	26	2.8	105	295
HCM1A0805V3-R68-R	0.68	0.43	19.5	17	22	3.5	80	284
HCM1A0805V3-1R0-R	1.0	0.64	16	14	15	4.8	50	261
HCM1A0805V3-2R2-R	2.2	1.41	11	9.5	9.6	8.5	28	170
HCM1A0805V3-3R3-R	3.3	2.1	10	8.5	7.2	10	21	159
HCM1A0805V3-4R7-R	4.7	3.0	8.0	7.0	8.0	15.6	16.5	118
HCM1A0805V3-100-R	10	6.4	4.3	3.8	6.2	60	12	62
HCM1A0805V3-150-R	15	9.6	4.3	3.8	4.6	52	9.5	65
HCM1A0805V3-220-R	22	14	3.5	3.1	4.0	70	7.5	52
HCM1A0805V3-330-R	33	21	2.8	2.5	4.0	125	6.1	41
HCM1A0805V3-470-R	47	26	2.5	2.2	4.7	147	4.0	52
HCM1A0805V3-680-R	68	38	2.1	1.7	4.3	210	4.0	28
HCM1A0805V3-101-R	100	56	1.8	1.4	3.3	310	2.0	29

1. Open circuit inductance (OCL) test parameters: 100 kHz, 1.0 Vrms, 0.0 Adc, +25 °C
2. Full load inductance (FLL) test parameters: 100 kHz, 1.0 Vrms, Isat, , +25 °C
3. Irms1: DC current for an approximate temperature rise of 40 °C without core loss.
   Irms2: DC current for an approximate temperature rise of 30 °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 +155 °C under worst case operating conditions verified in the end application.
4. Isat: Peak current for approximately 20% rolloff @ +25 °C for R22 to 330, 30% rolloff @ +25 °C for 470, 680 and 101.
5. K-factor: Used to determine Bp-p for core loss (see graph). Bp-p = K * L * ΔI. Bp-p: (Gauss), K: (K-factor from table), L: (Inductance in µH), ΔI (Peak to peak ripple current in Amps).
6. Part Number Definition: HCM1A0805V3-xxx-R
   HCM1A0805V3= Product code and size
   xxx= Inductance value in µH, R= decimal point, if no R is present last digit indicates number of zeros
   -R = RoHS compliant

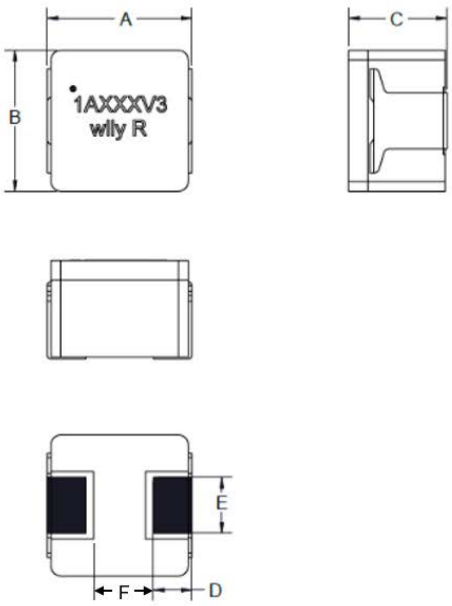
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Dimensions- (mm)

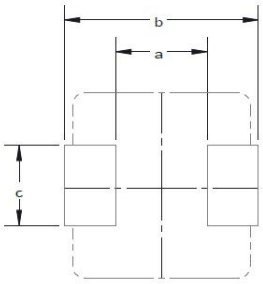
HCM1A0805V3-R22 to 330-R



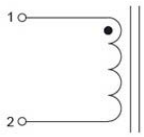
HCM1A0805V3-470 to 101-R



Recommended pad layout



Schematic



Part number	A	B	C	D	E	F	a	b	c
HCM1A0805V3-R22-R	8.1 ±0.3	8.0 max	5.4 max	1.7 ±0.3	2.7 ±0.2	4.7 typ.	4.0 typ.	8.5 typ.	3.2 typ.
HCM1A0805V3-R47 and R68-R	8.1 ±0.3	8.0 max	5.4 max	1.7 ±0.3	1.8 ±0.3	4.7 typ.	4.0 typ.	8.5 typ.	2.4 typ.
HCM1A0805V3-1R0 to 330-R	8.1 ±0.3	8.0 max	5.4 max	1.7 ±0.3	3.0 ±0.2	4.7 typ.	4.0 typ.	8.5 typ.	3.5 typ.
HCM1A0805V3-470 to 101-R	7.7 ±0.3	7.2 ±0.3	5.2 ±0.2	1.7 +0.15/-0.3	3.0 ±0.2	4.3 typ.	3.1 typ.	8.5 typ.	3.5 typ.

Part marking: Pin 1 indicator dot, 1AxxxV3 xxx= inductance value in µH, R= decimal point, if no R is present then last digit is the number of zeros, wlly R= Lot code
All soldering surfaces to be coplanar within 0.1 millimeters
Traces or vias underneath the inductor is not recommended

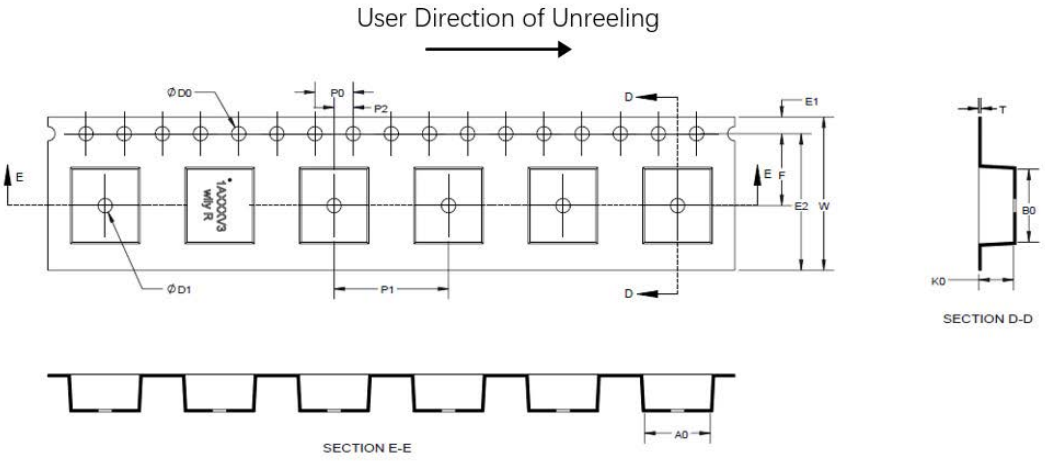
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Packaging information (mm)

Drawing not to scale

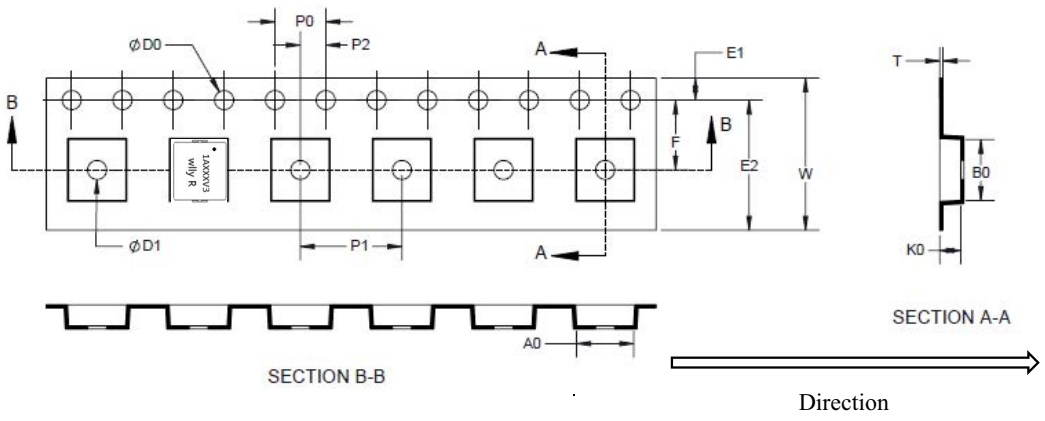
Supplied in tape and reel packaging, 500 parts per 13" diameter reel

HCM1A0805V3-R22 to 330-R



Dimension	Value
W ±0.30	16.0
F ±0.10	7.5
E1 ±0.10	1.75
E2 Min	14.25
P0 ±0.10	4.0
P1 ±0.10	12.0
P2 ±0.10	2.0
D0 +0.10/-0	1.5
D1 +0.10/-0	1.5
A0	8.5 ±0.10
B0	8.7 ±0.10
K0	6.0 ±0.15
T	0.5 ±0.05

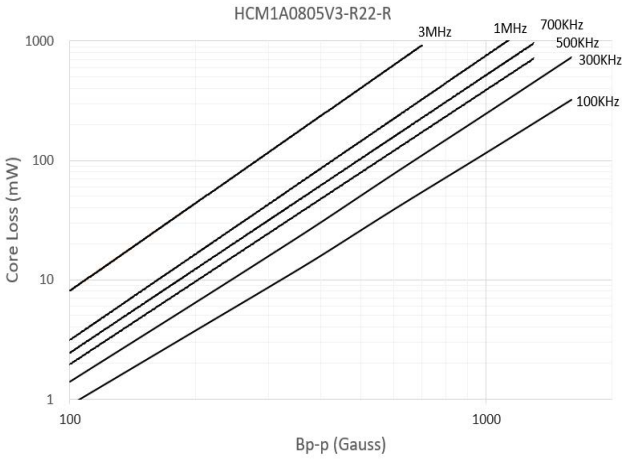
HCM1A0805V3-470 to 101-R

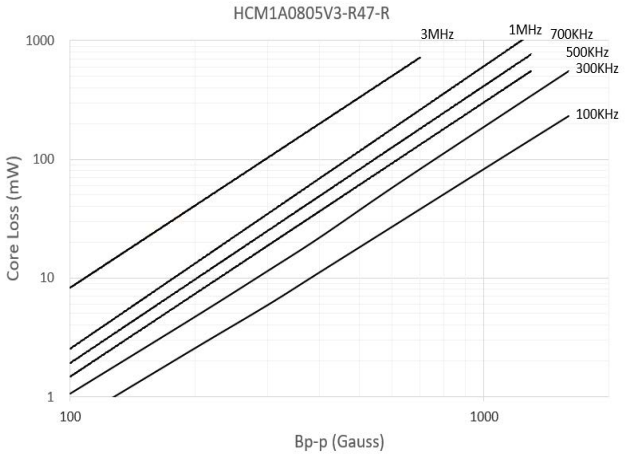


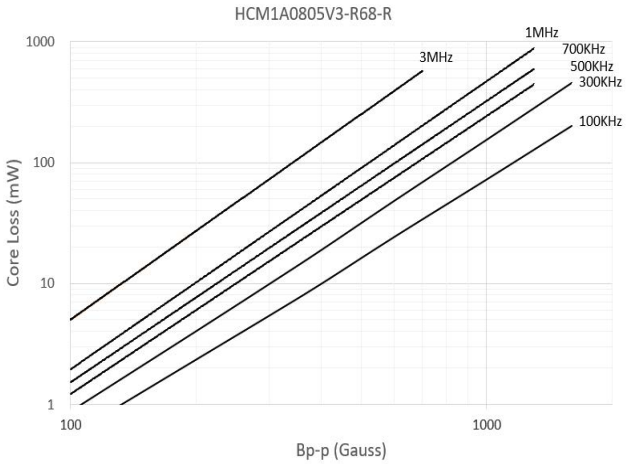
Dimension	Value
W ±0.30	16.0
F ±0.10	7.5
E1 ±0.10	1.75
E2 Min	14.25
P0 ±0.10	4.0
P1 ±0.10	12.0
P2 ±0.10	2.0
D0 ±0.10	1.55
D1 ±0.10	1.55
A0	7.7 ±0.10
B0	8.2 ±0.10
K0	5.7 ±0.10
T	0.45 ±0.05

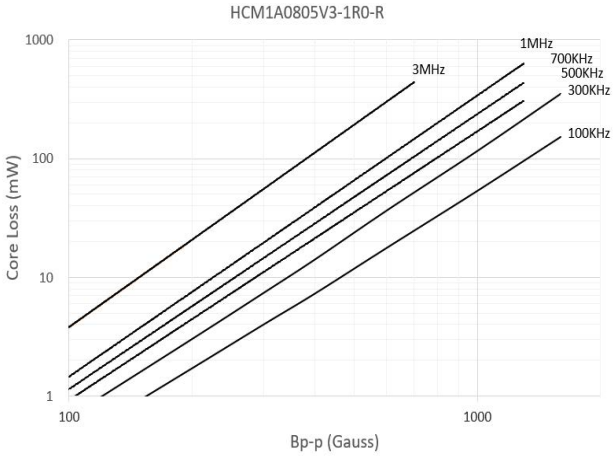
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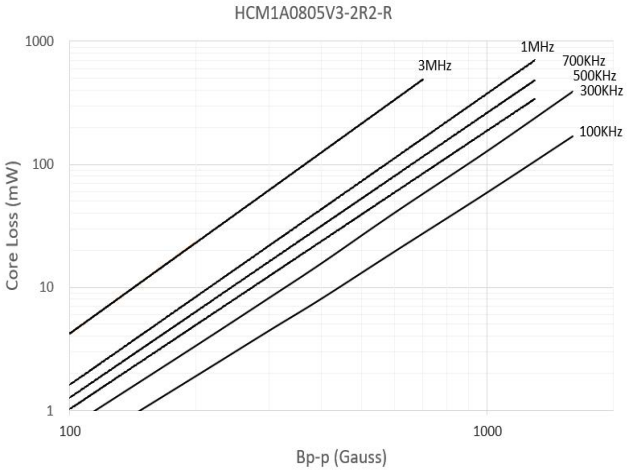
Core loss vs. Bp-p

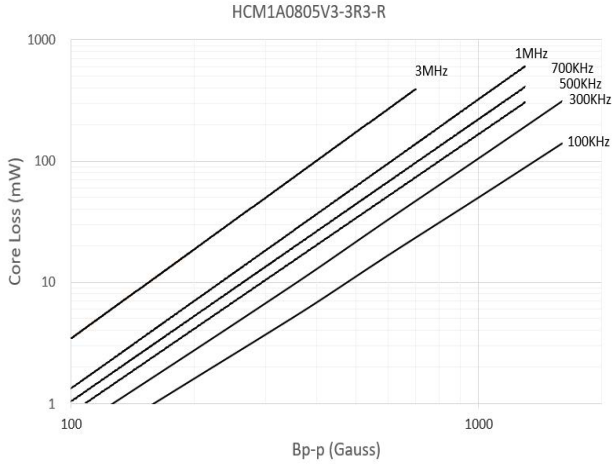






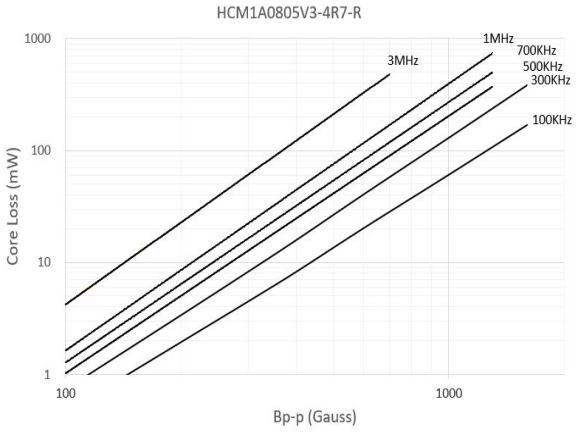


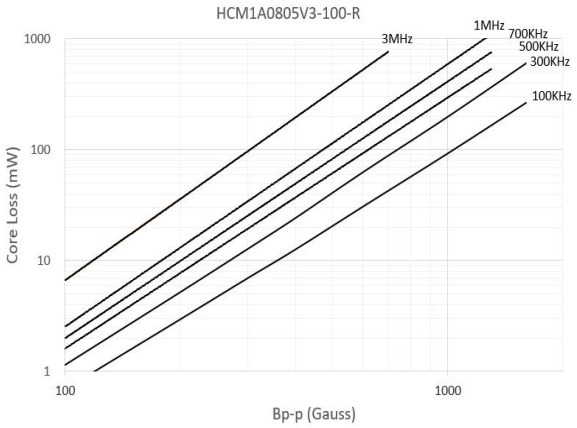


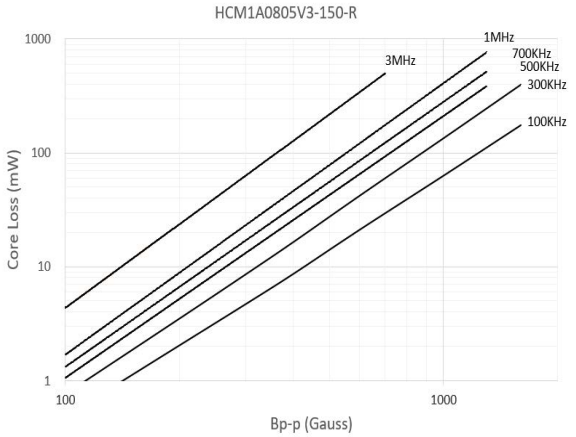


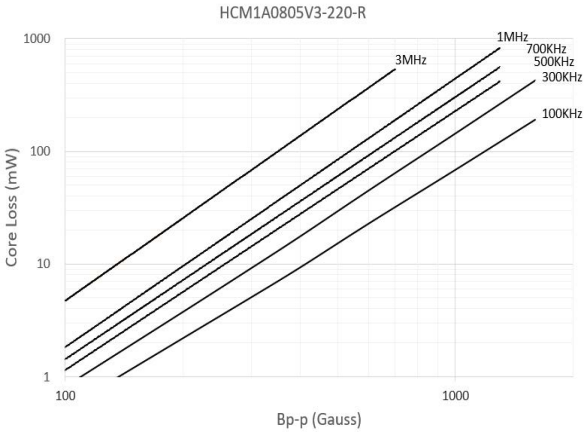
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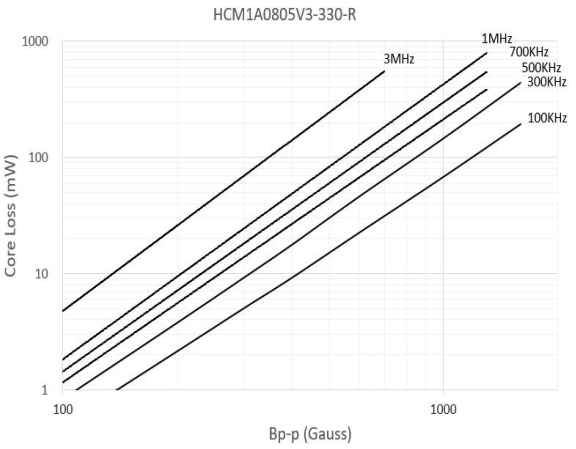
Core loss vs. Bp-p

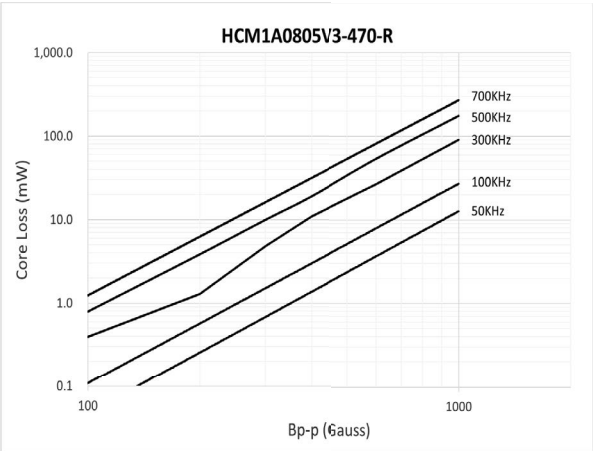






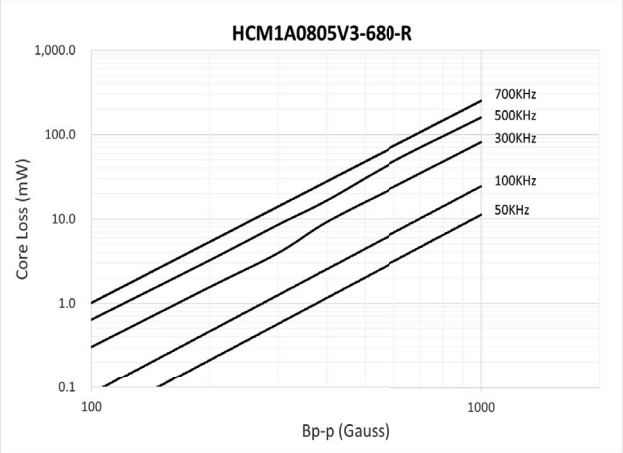


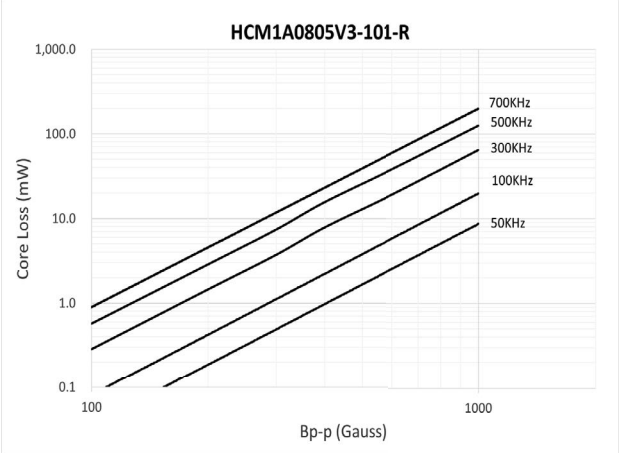




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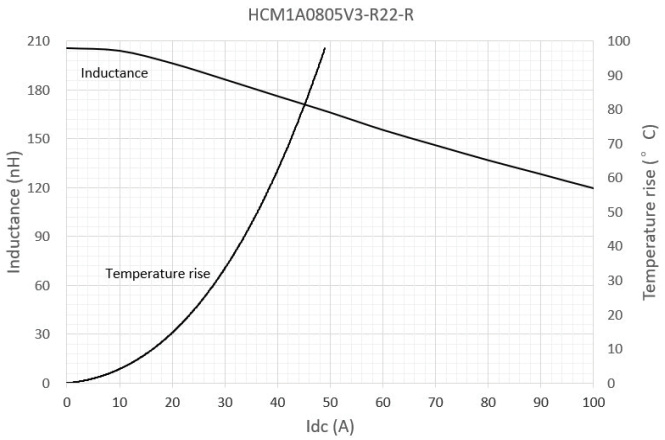
Core loss vs. Bp-p

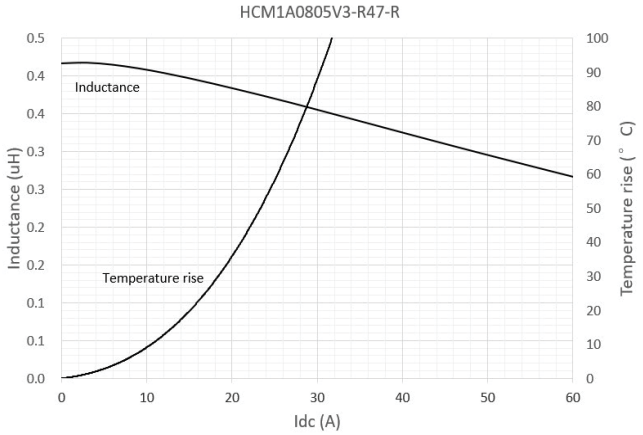


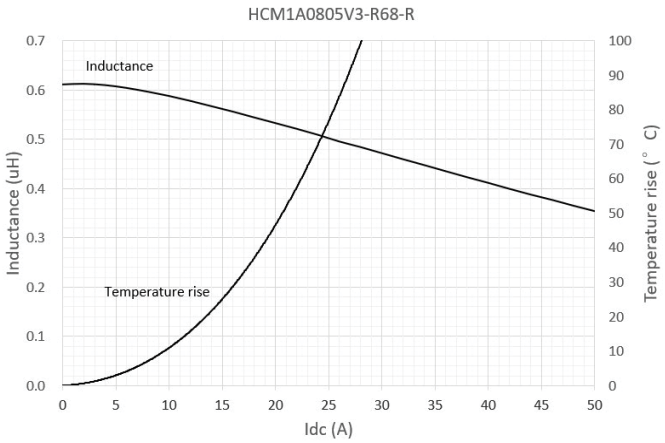


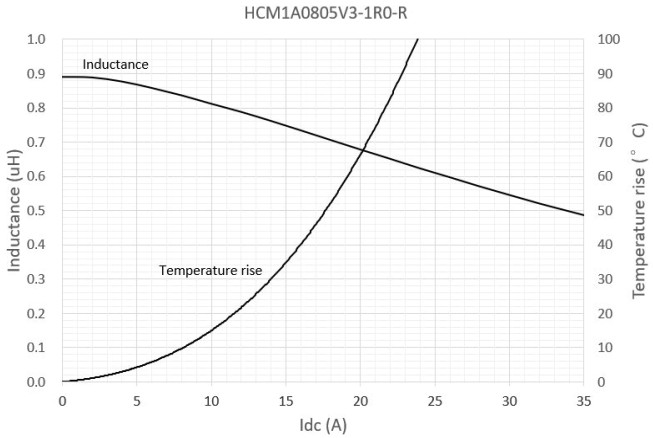
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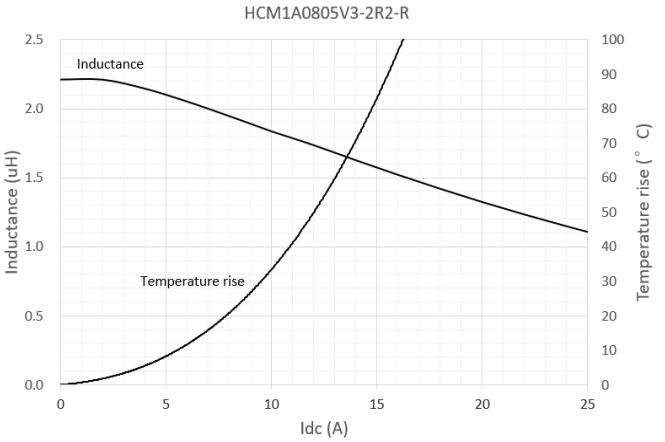
Inductance and temperature rise vs. Idc

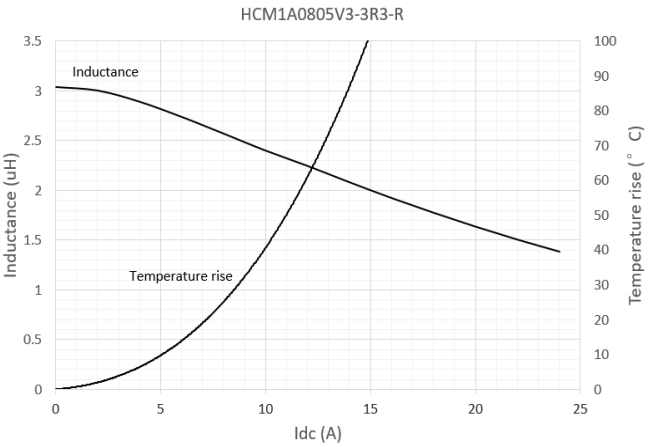






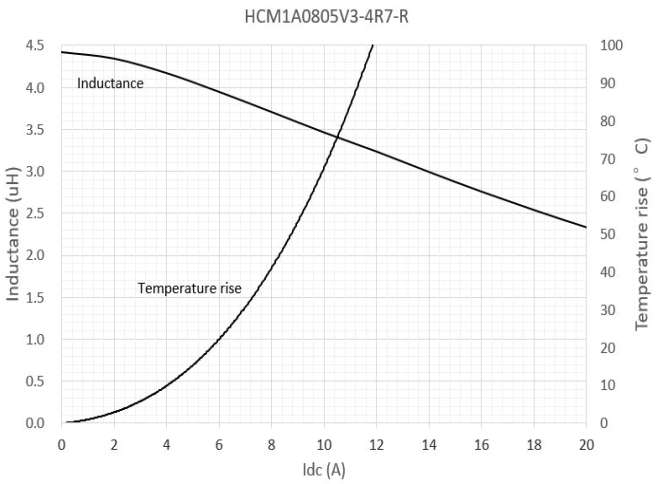


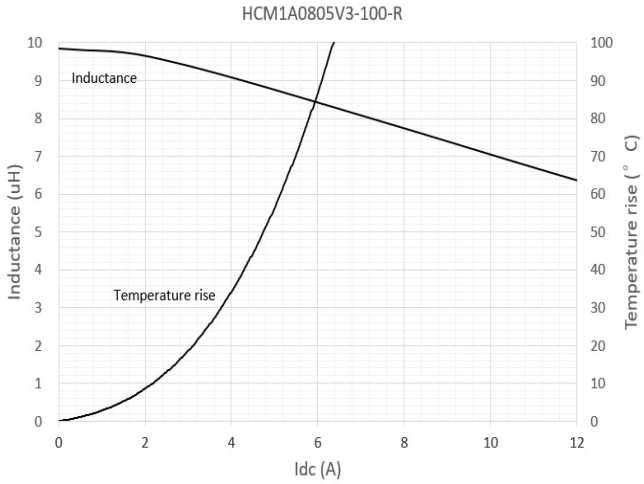


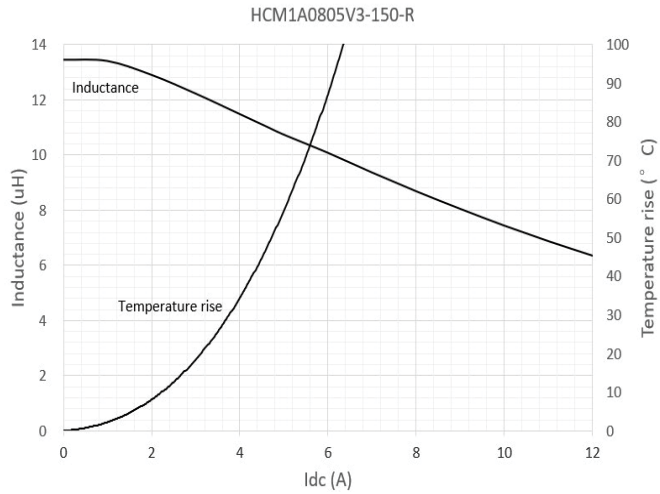


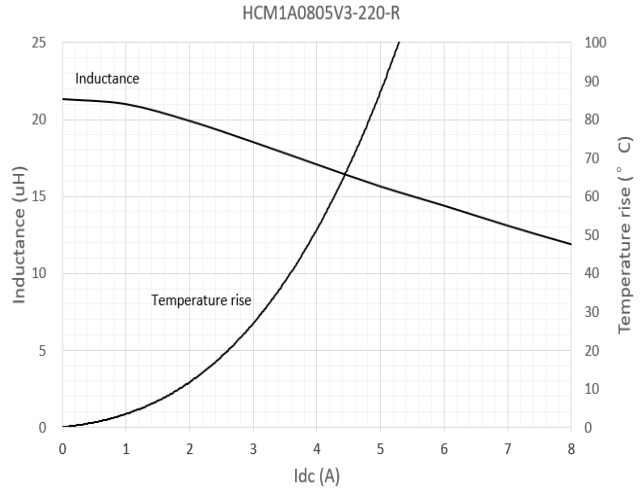
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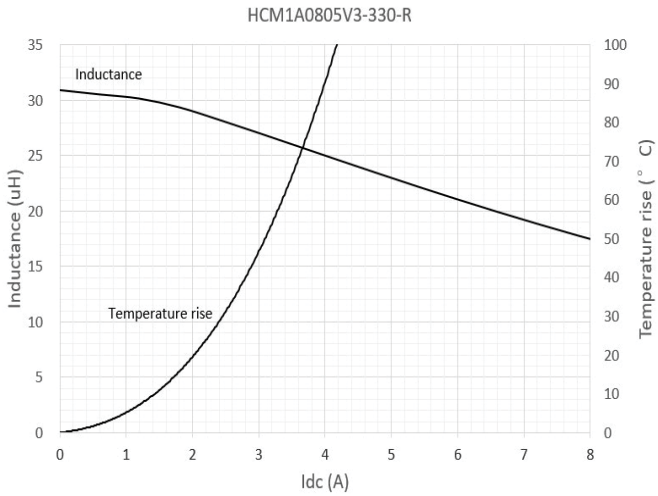
Inductance and temperature rise vs. Idc

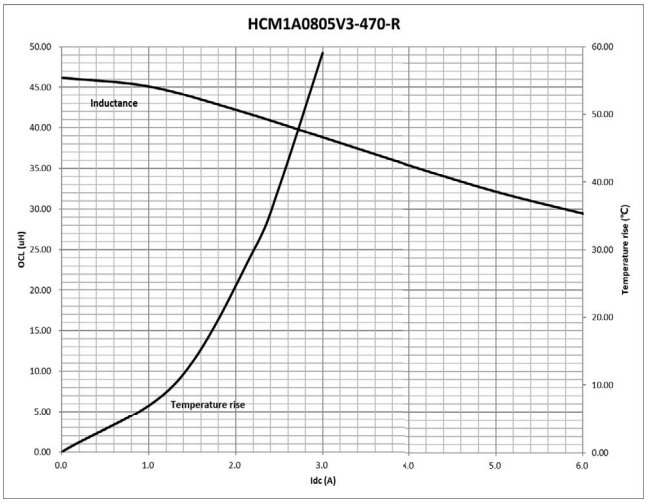






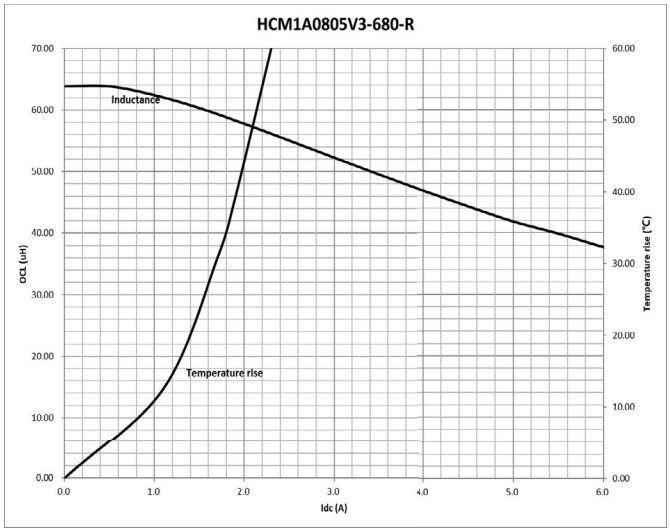


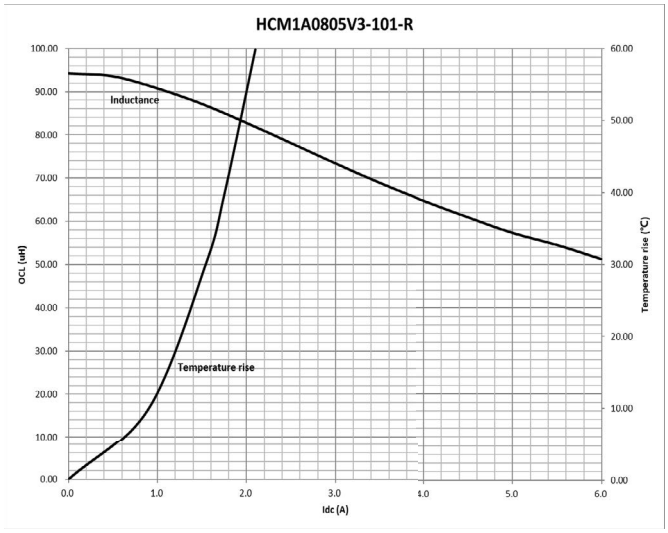




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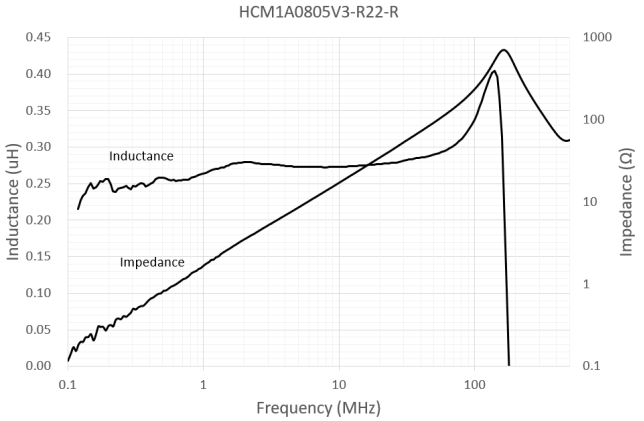
Inductance and temperature rise vs. Idc

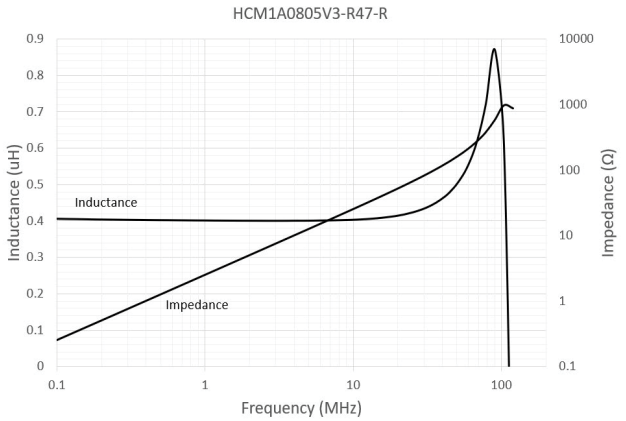


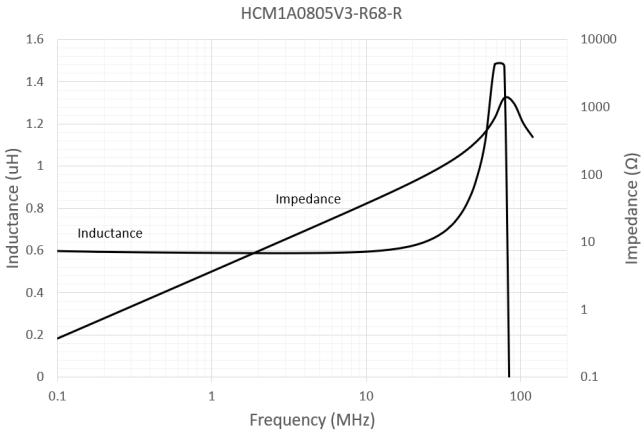


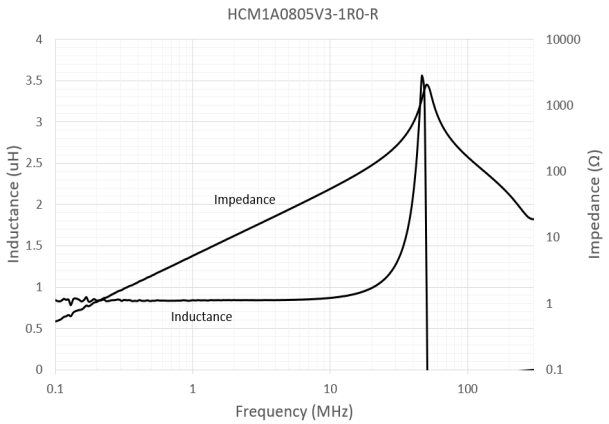
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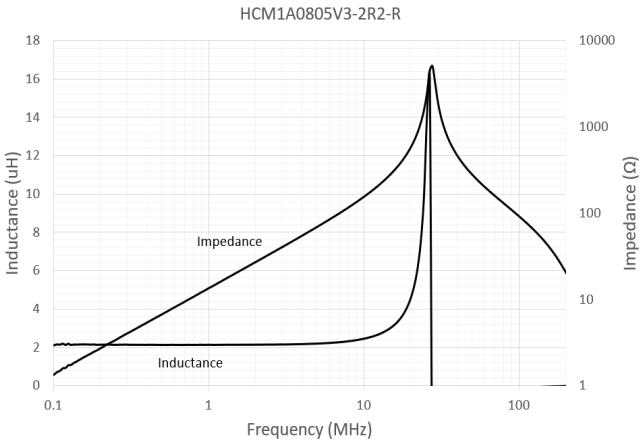
Inductance and impedance vs. frequency

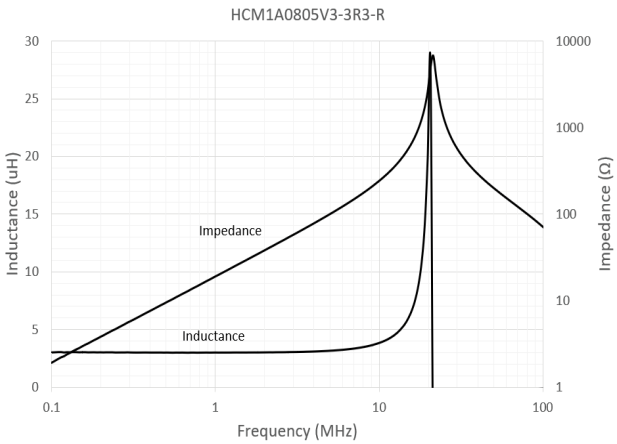






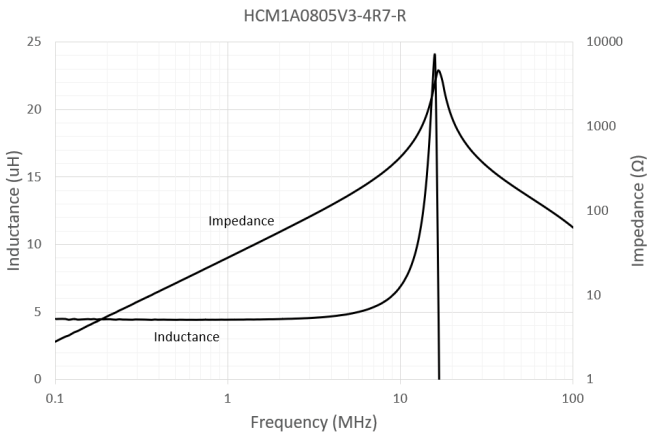


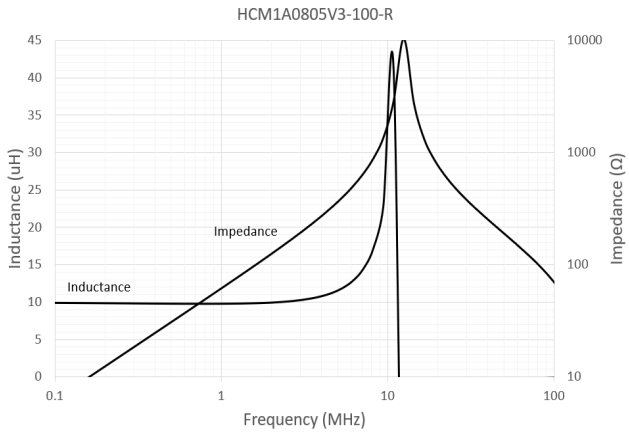


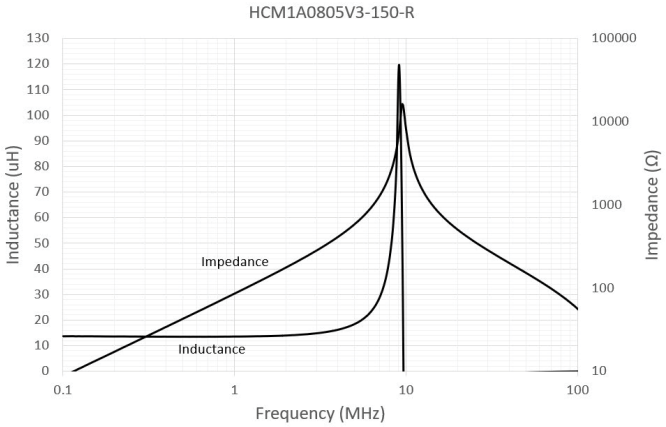


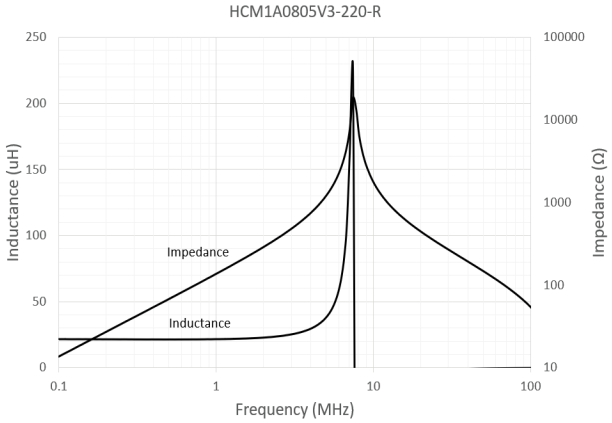
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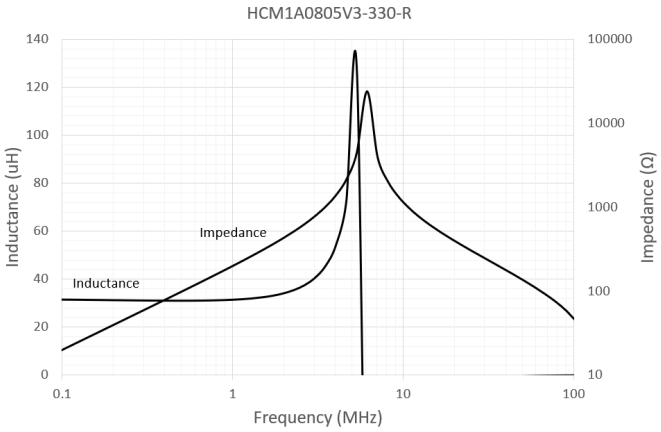
Inductance and impedance vs. frequency

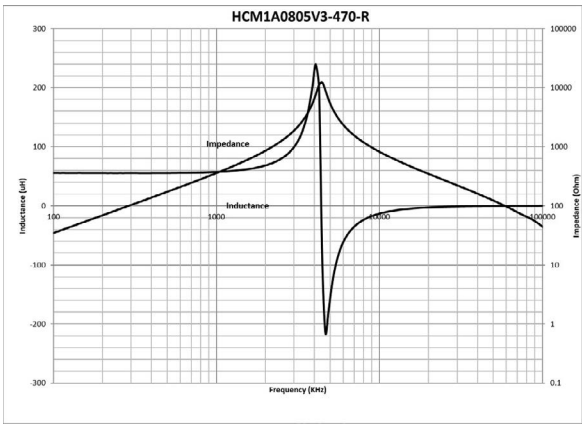






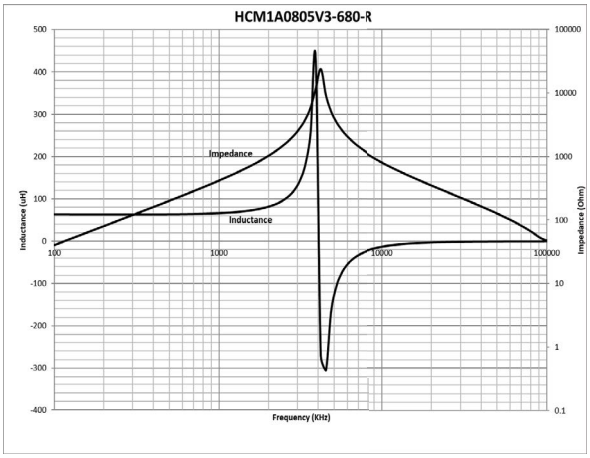


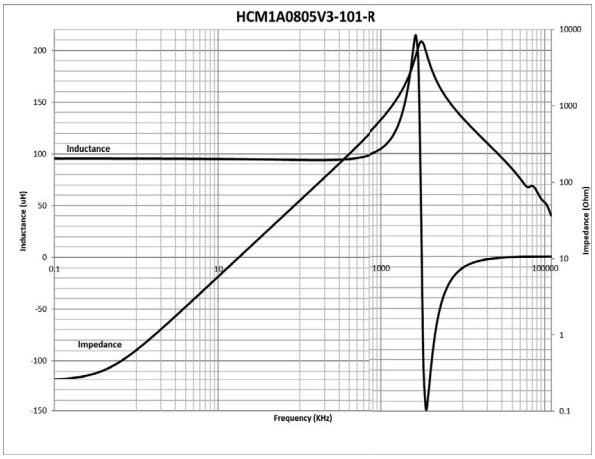




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Inductance and impedance vs. frequency





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Solder reflow profile

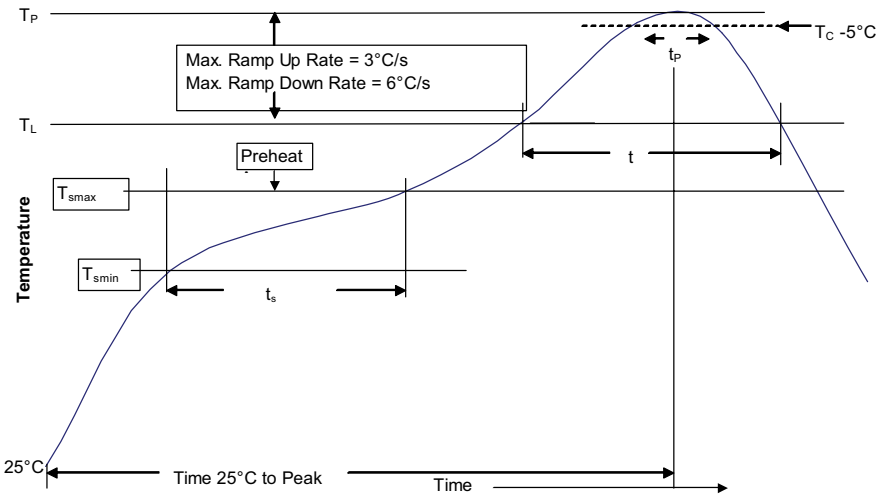


Table 1 - Standard SnPb solder (T_C)

Package thickness	Volume mm3 <350	Volume mm3 ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2 - Lead (Pb) free solder (T_C)

Package thickness	Volume mm³ <350	Volume mm³ 350 - 2000	Volume mm³ >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 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
Ramp up rate T_L to T_p		3 °C/ second max.	3 °C/ second max.
Liquidous temperature (T_L) Time (t_L) maintained above T_L		183 °C 60-150 seconds	217 °C 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*
Ramp-down rate (T_p to T_L)		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.

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