HCM1A1307V3

Automotive grade high current power inductor

Photo is representative

Product features

- AEC-Q200
- High current carrying capacity
- Magnetically shielded, low EMI
- Filtering applications up to Self resonant frequency (SRF) [See product specification table]
- Inductance range from 0.22 µH to 56 µH
- Current range from 4.0 A to 100 A
- 13.8 mm x 12.9 mm footprint surface mount package in a 6.5 mm height
- Alloy powder core material
- Moisture sensitivity level (MSL): 1

Applications

- Body electronics
  - Central body control module
  - 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
- Chassis and safety electronics
  - Airbag control unit
  - Electronic stability control system (ESC)
  - Electric parking brake
  - Electronic power steering (EPS)
- 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

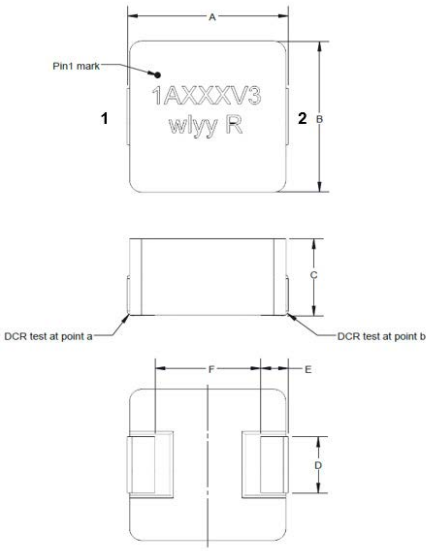
Powering Business Worldwide

Product specifications

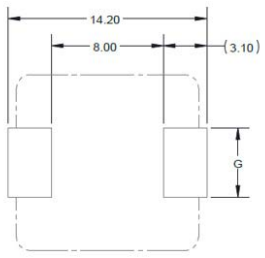
Part number[6]	OCL[1] (µH) ±20%	FLL[2] (µH) minimum	I_{rms}[3] (A)	I_{sat}[4] (A)	DCR (mΩ) typical @ +20 °C	DCR (mΩ) maximum @ +20 °C	SRF (MHz) typical	K-factor[5]
HCM1A1307V3-R22-R	0.22	0.14	52	100	0.46	0.60	135	298
HCM1A1307V3-R33-R	0.33	0.21	47	70	0.58	0.69	80	254
HCM1A1307V3-R47-R	0.47	0.30	43	56	0.73	0.87	59	209
HCM1A1307V3-1R0-R	1.0	0.64	28	34	1.49	1.75	43	192
HCM1A1307V3-1R2-R	1.2	0.76	22.5	30	1.78	2.10	41	164
HCM1A1307V3-1R5-R	1.5	0.96	21	25	2.04	2.40	33	177
HCM1A1307V3-1R8-R	1.8	1.15	19	24	2.55	2.94	31	260
HCM1A1307V3-2R2-R	2.2	1.40	18.5	23	2.62	3.10	28	260
HCM1A1307V3-3R3-R	3.3	2.11	16.5	18	3.55	4.10	18	239
HCM1A1307V3-4R7-R	4.7	3.00	13	20	6.25	7.25	17	172
HCM1A1307V3-5R6-R	5.6	3.58	12	18	7.21	8.30	15	113
HCM1A1307V3-6R8-R	6.8	4.35	10	15	9.50	11.5	13	266
HCM1A1307V3-7R8-R	7.8	4.99	10	16	10.25	11.78	12	244
HCM1A1307V3-8R2-R	8.2	5.25	10	14	10.3	11.85	11	244
HCM1A1307V3-100-R	10	6.40	8.3	13.5	15	17.2	9.0	113
HCM1A1307V3-120-R	12	7.68	8.0	12.5	16.41	18.9	8.5	109
HCM1A1307V3-150-R	15	9.60	7.0	11	20.3	23.4	7.5	165
HCM1A1307V3-220-R	22	14.1	6.0	8.0	28.8	33.1	5.0	61
HCM1A1307V3-330-R	33	21	5.0	7.5	40.8	45	4.5	74
HCM1A1307V3-560-R	56	35.8	4.0	4.3	55	65	3.0	54

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, Isat, , +25 °C
3. Irms: 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
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: HCM1A1307V3-xxx-R
   HCM1A1307V3= 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

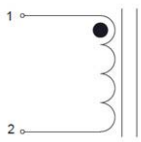
Dimensions- (mm)



Recommended pad layout



Schematic



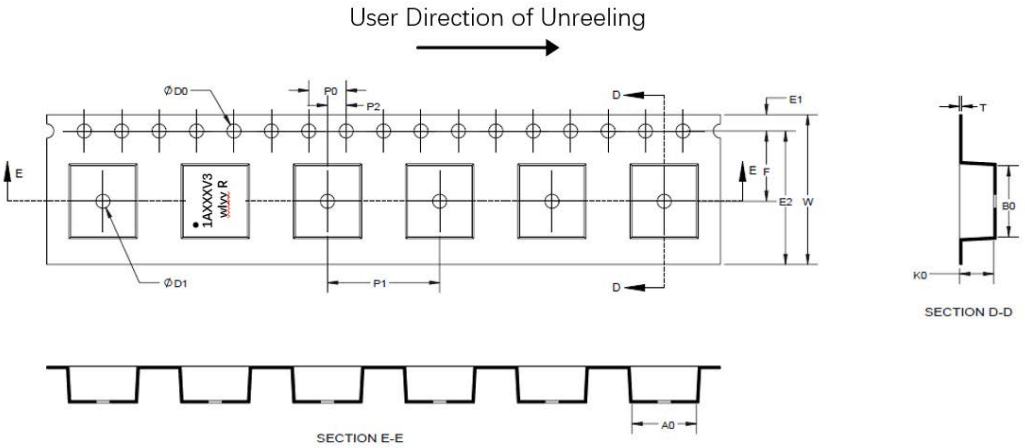
Part number	A	B	C	D	E	F	G
HCM1A1307V3-R	13.45 ±0.35	12.6 ±0.3	6.5 maximum	4.4 ±0.3 (R22 to R47) 3.68 ±0.3 (1R0 to 3R3) 4.7 ±0.3 (4R7 to 560)	2.3 ±0.35	8.85 typ.	4.95 typ. (R22 to R47) 4.3 typ. (1R0 to 3R3) 5.3 typ. (4R7 to 560)

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, wlyy R= Lot code
All soldering surfaces to be coplanar within 0.1 millimeters
Tolerances are ±0.15 millimeters unless stated otherwise
Pad layout tolerances are ±0.10 millimeters unless stated otherwise
DCR measured from point "a" to point "b"
Traces or vias underneath the inductor is not recommended

Packaging information (mm)

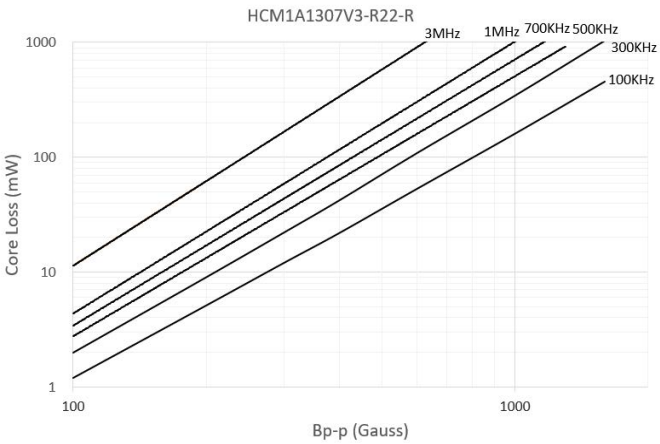
Drawing not to scale

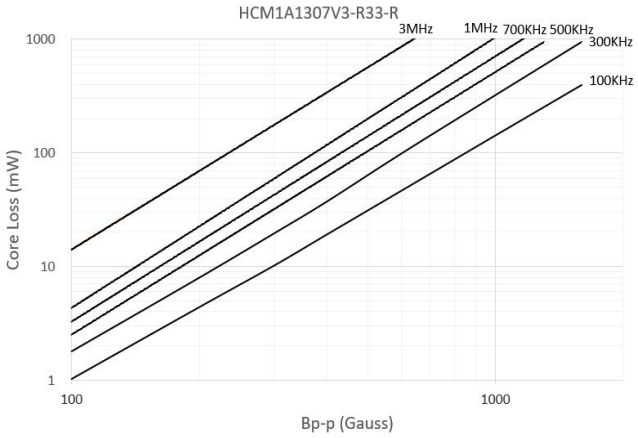
Supplied in tape and reel packaging, 250 parts per 13" diameter reel

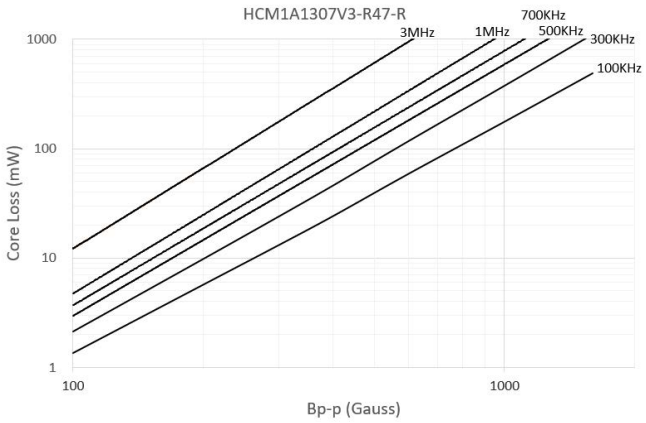


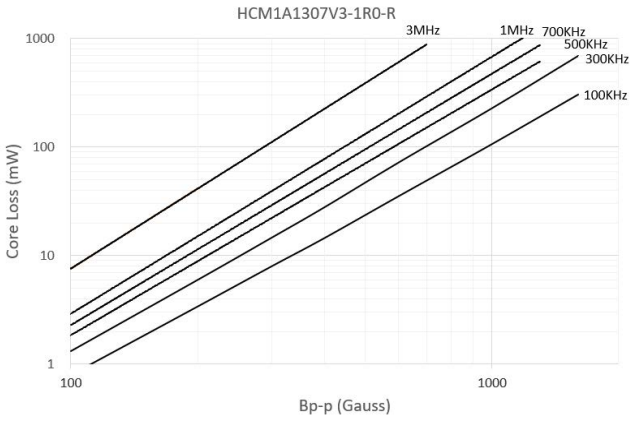
Dimension	Value
W ±0.30	24.0
F ±0.10	11.5
E1 ±0.10	1.75
E2 Min	22.25
P0 ±0.10	4.0
P1 ±0.10	16.0
P2 ±0.10	2.0
D0 +0.10/-0	1.5
D1 +0.10/-0	1.5
A0	13.4±0.10
B0	14.1±0.10
K0	6.9±0.15
T	0.5±0.05

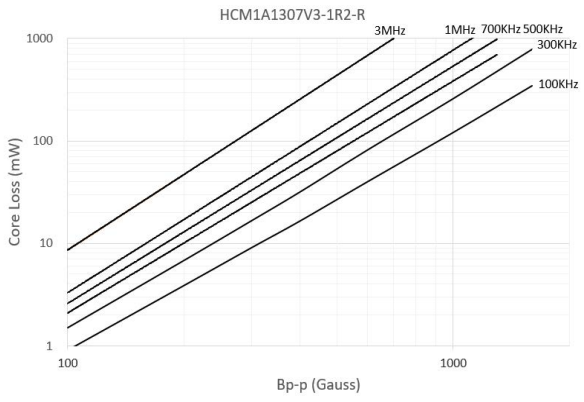
Core loss vs. Bp-p

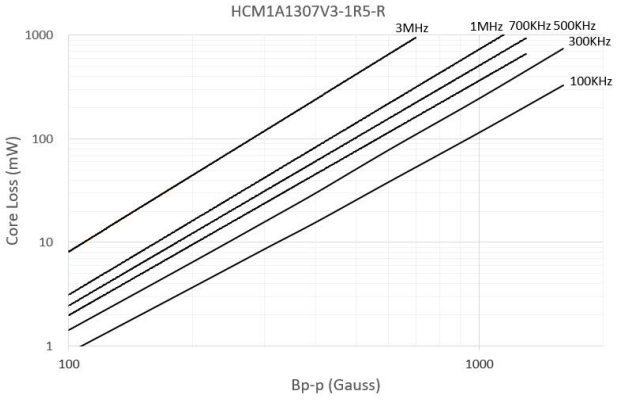












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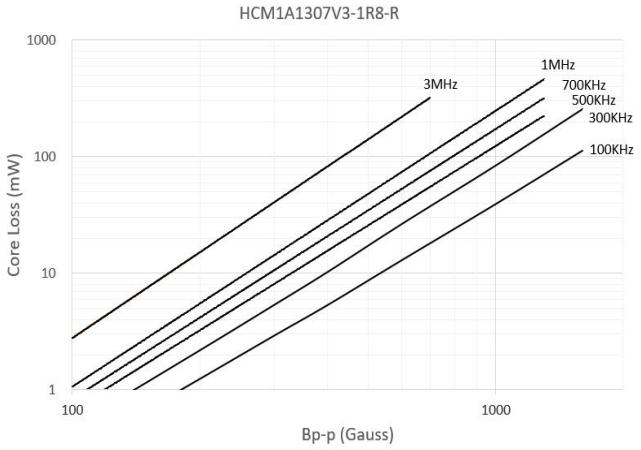

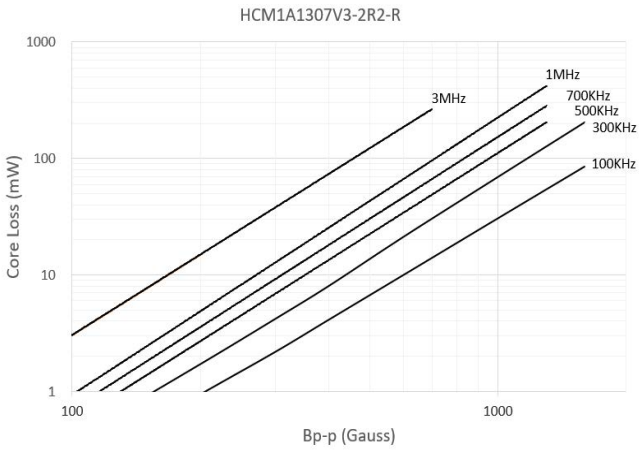

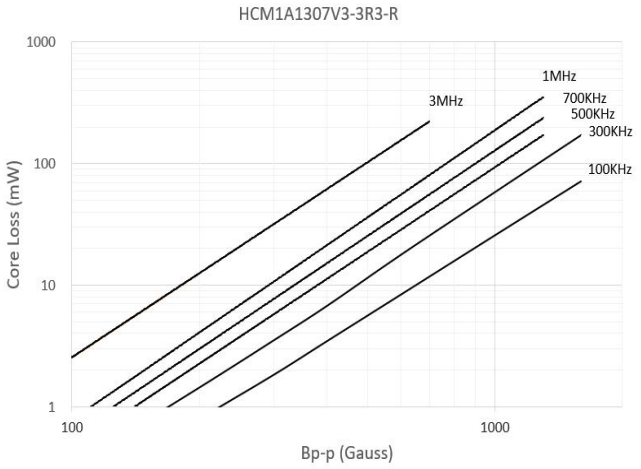

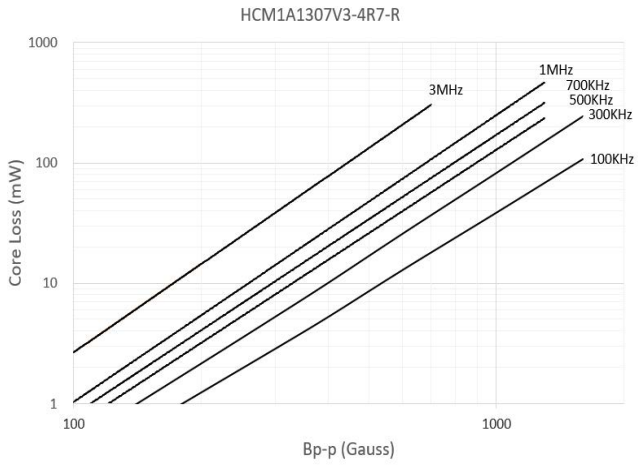

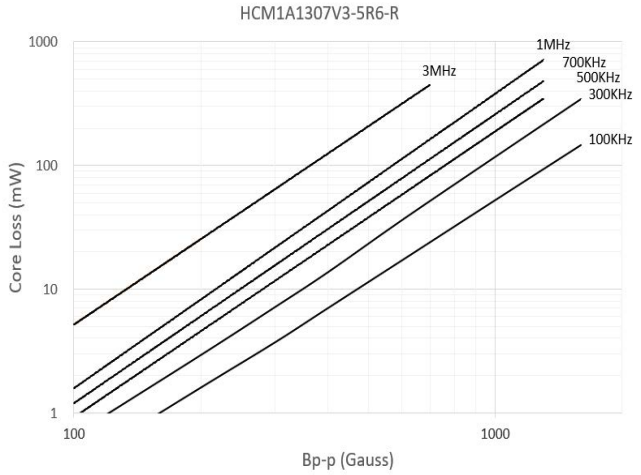

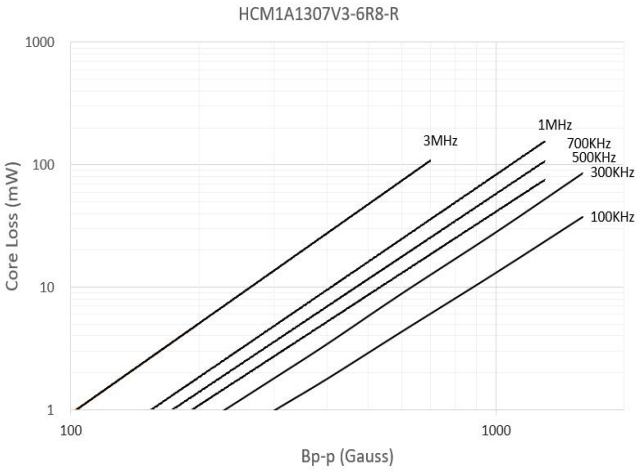

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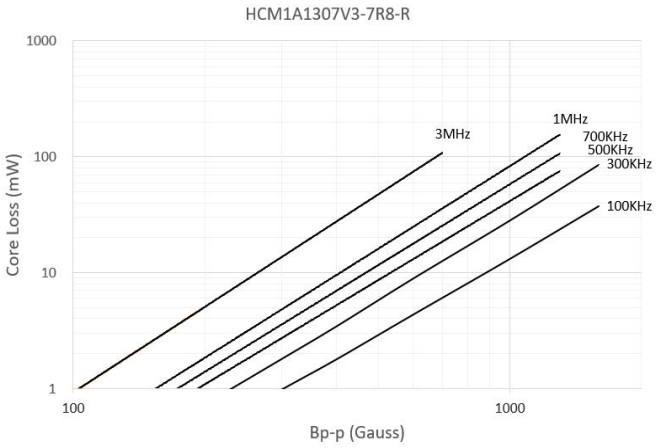

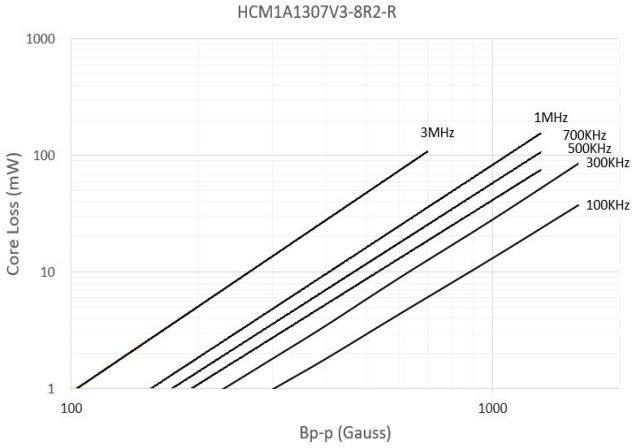

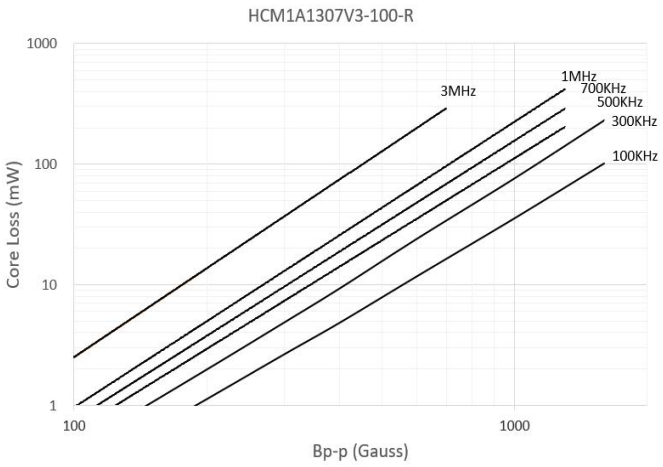

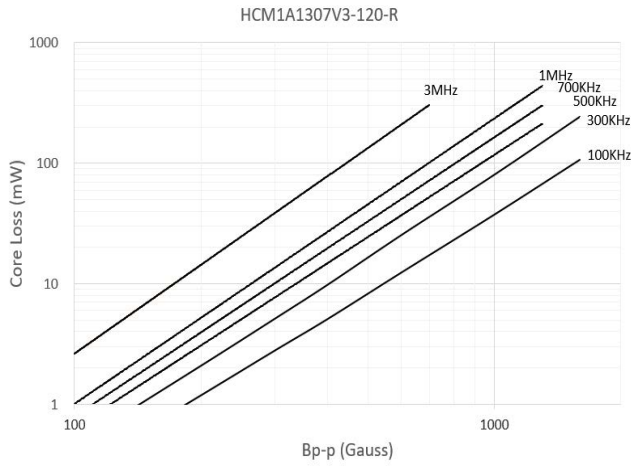

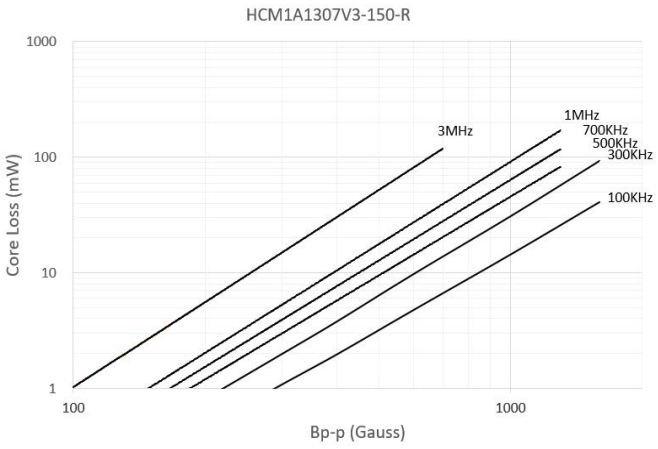

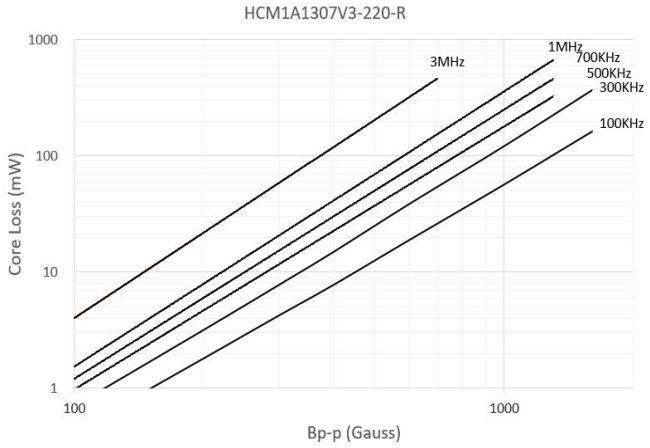

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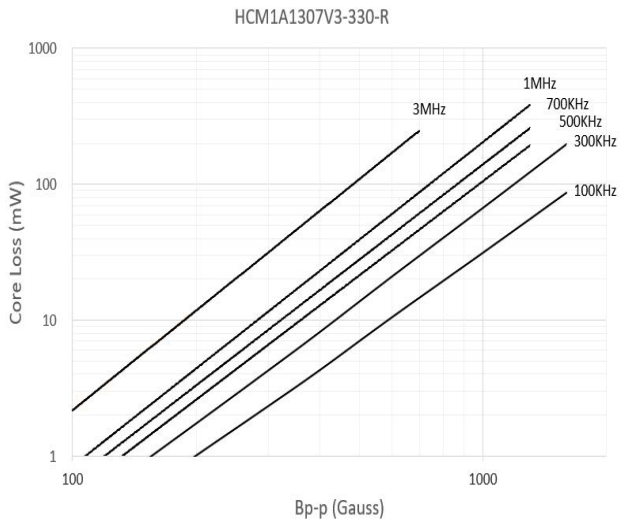
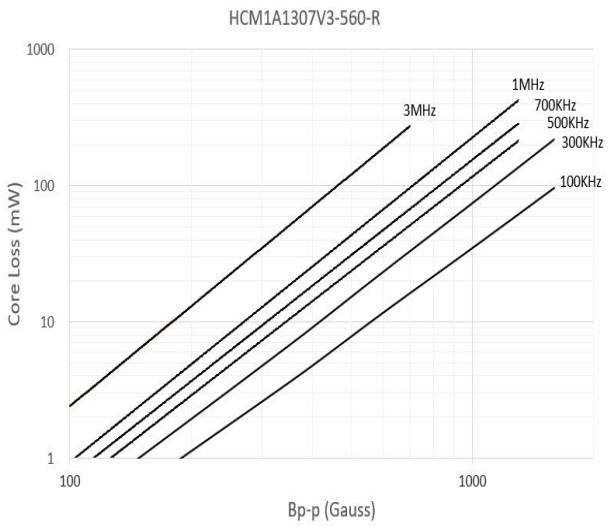
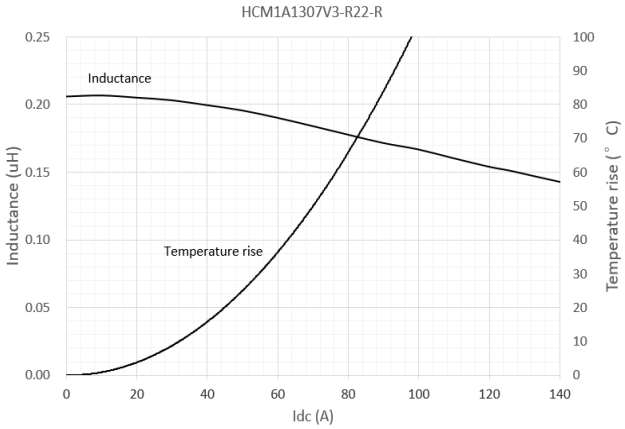
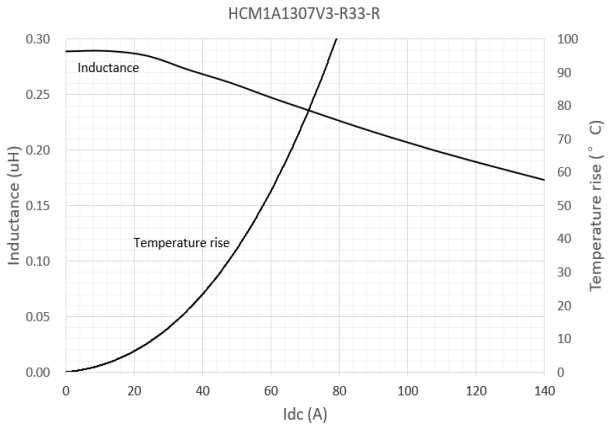
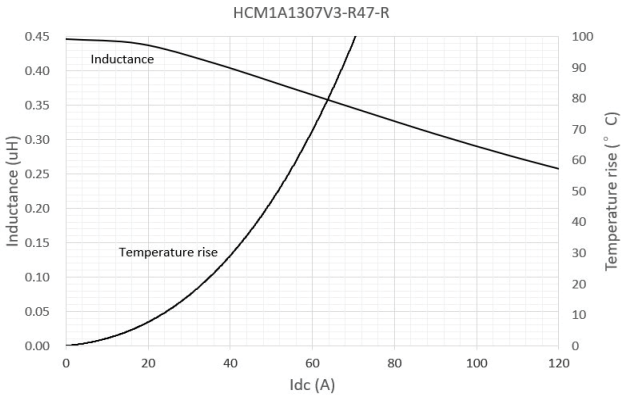


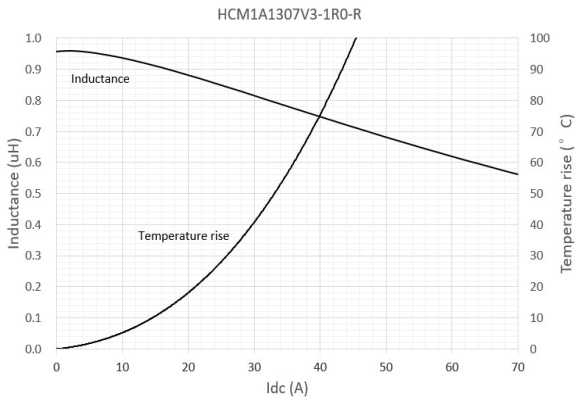


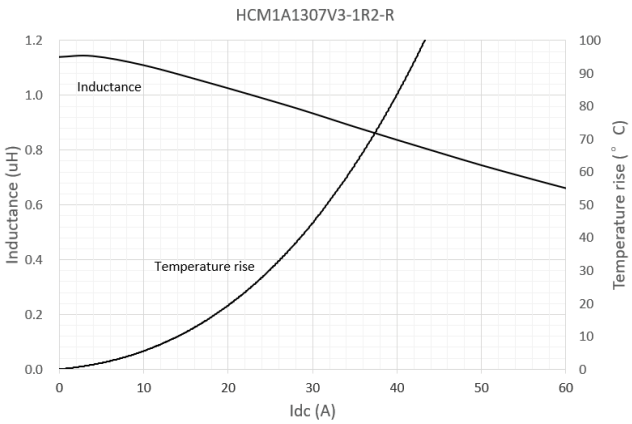
Inductance and temperature rise vs. Idc

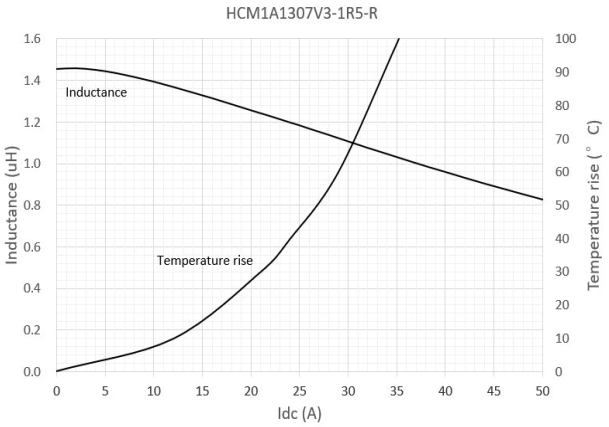




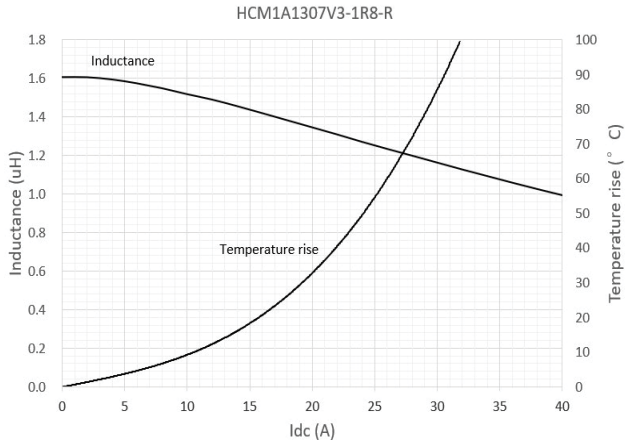


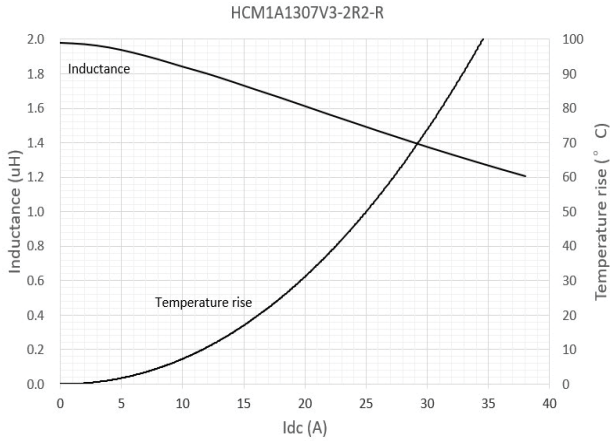


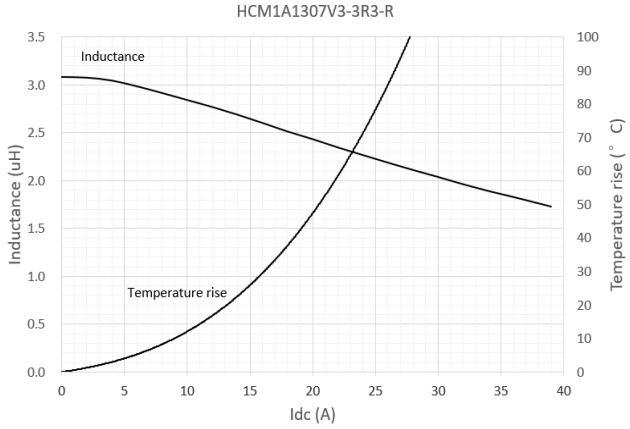


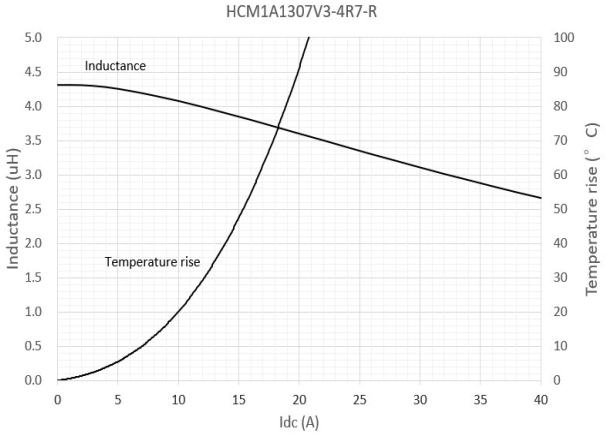


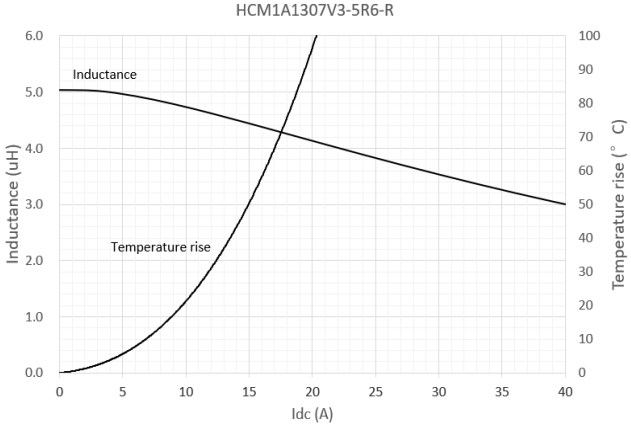
Inductance and temperature rise vs. Idc

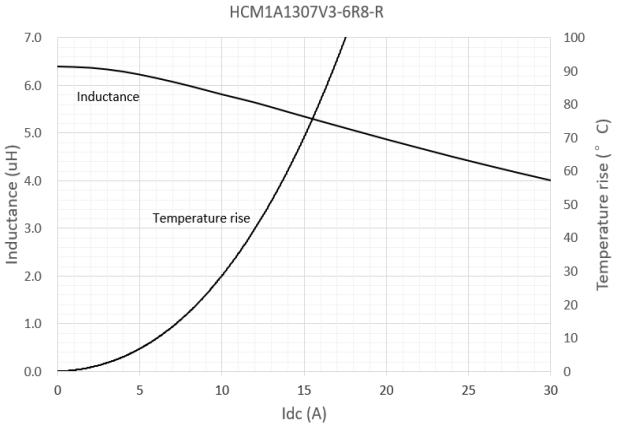




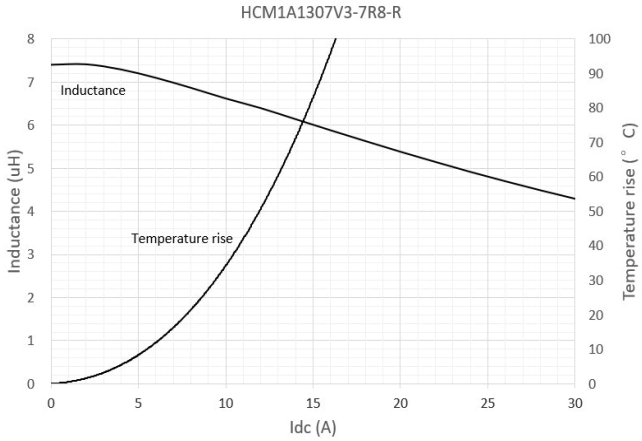


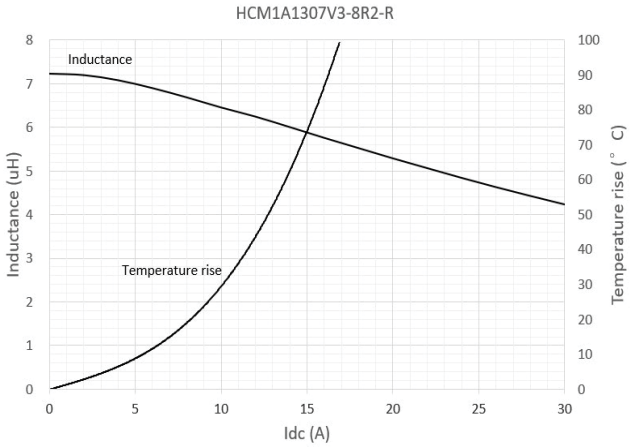


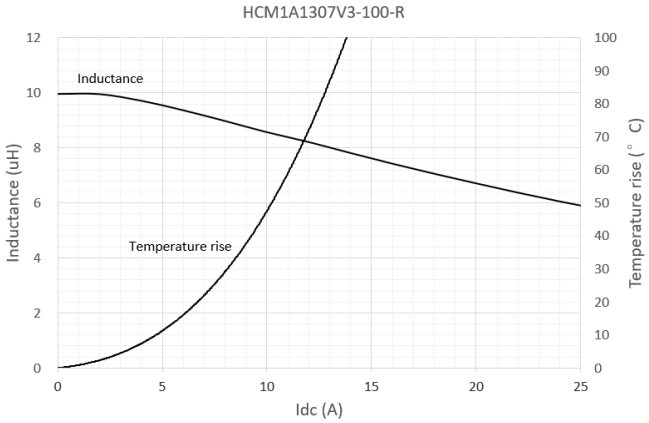


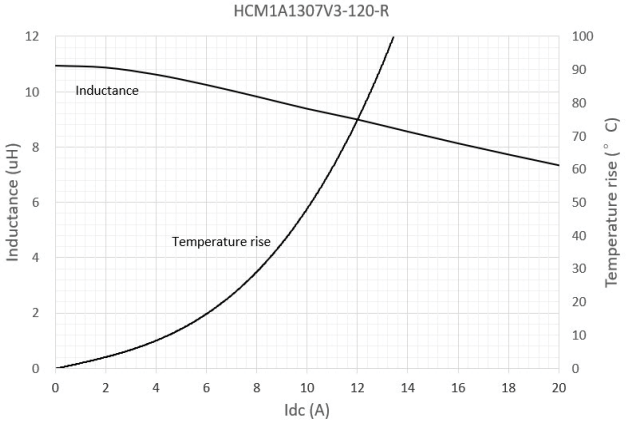


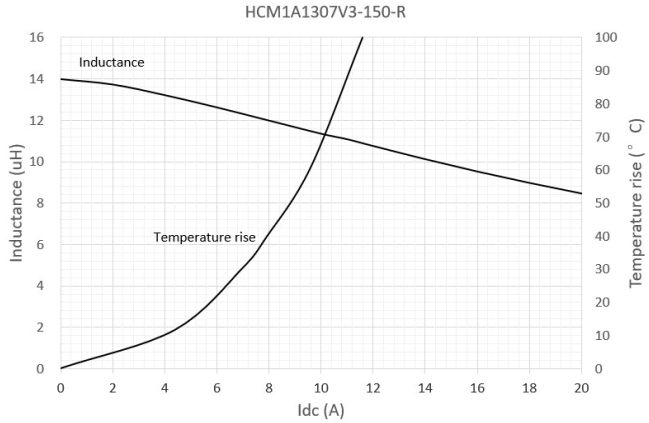
Inductance and temperature rise vs. Idc

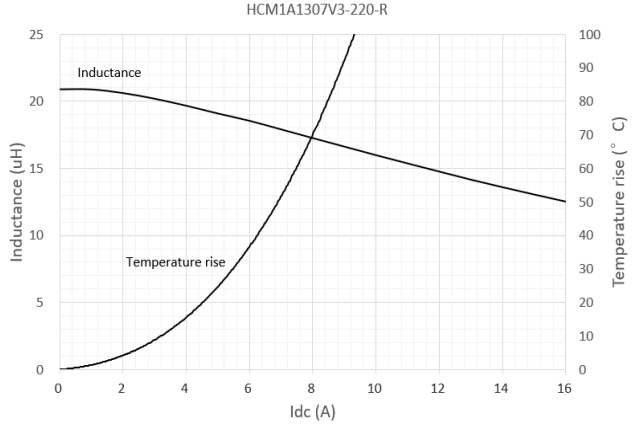




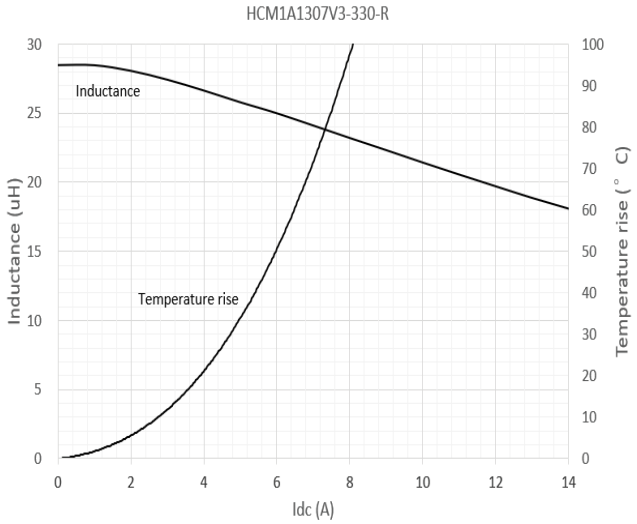


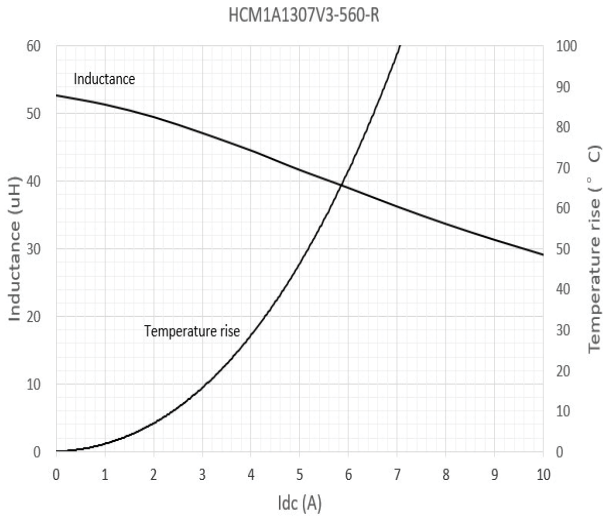




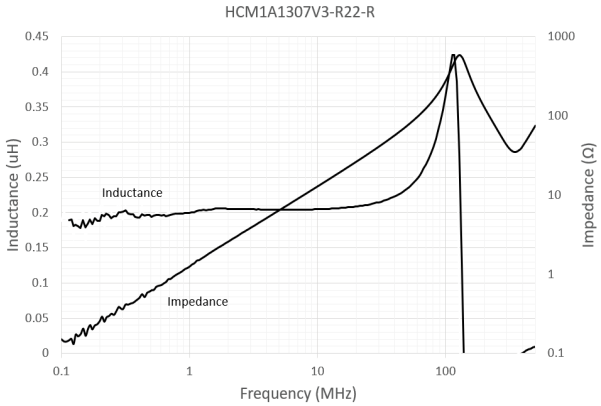


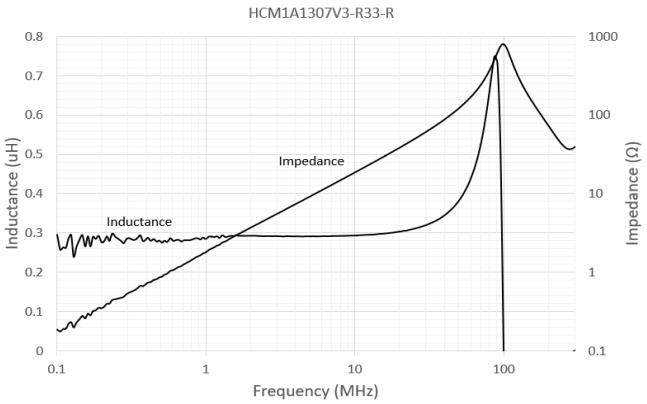
Inductance and temperature rise vs. Idc

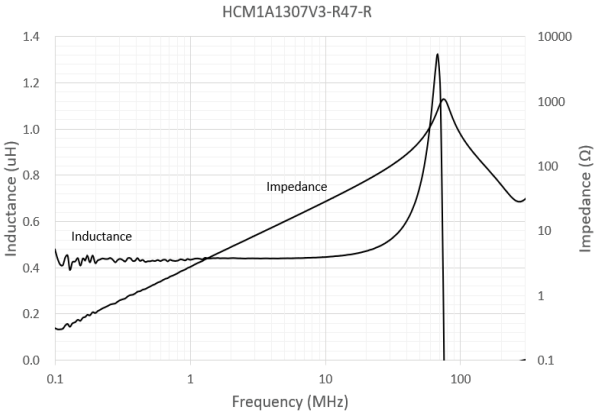


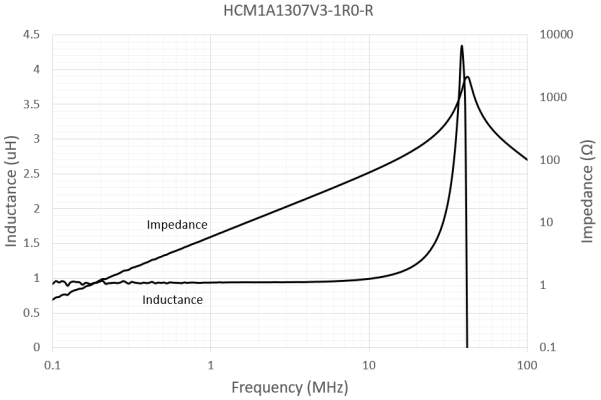


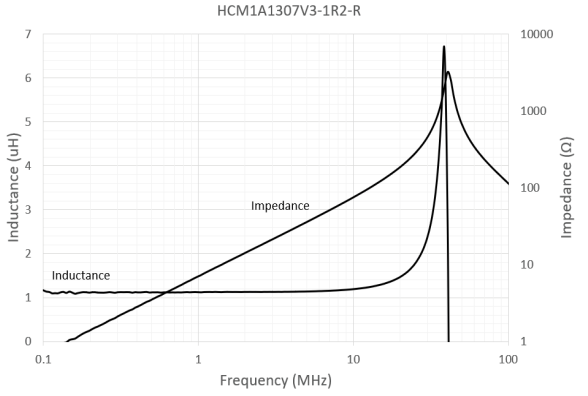
Inductance and impedance vs. frequency

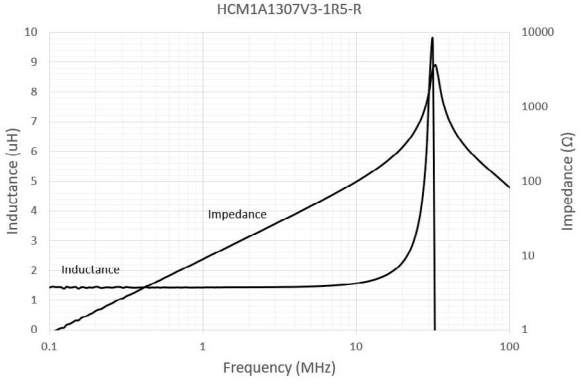




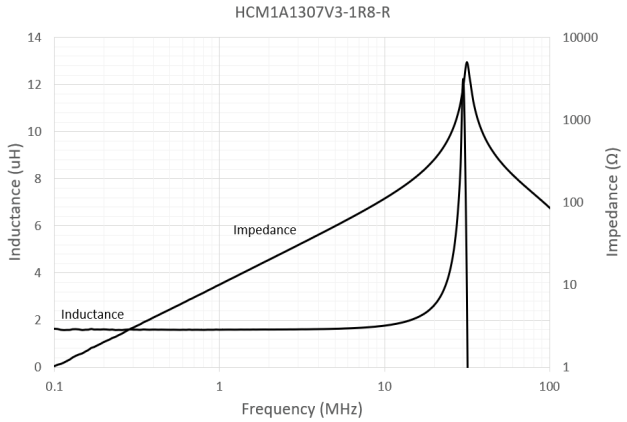


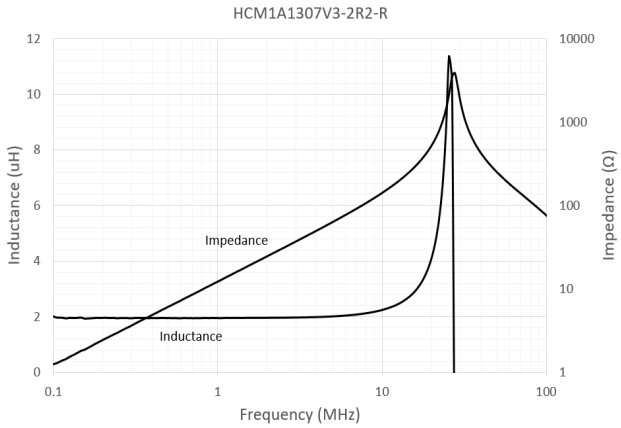


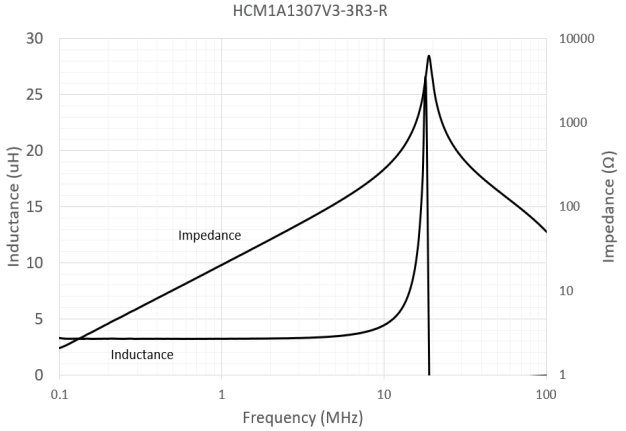


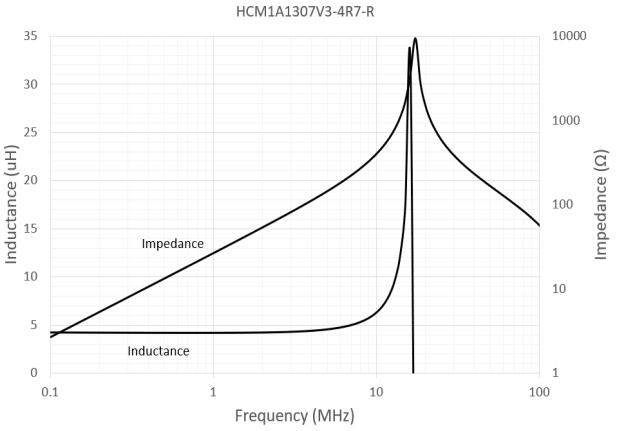


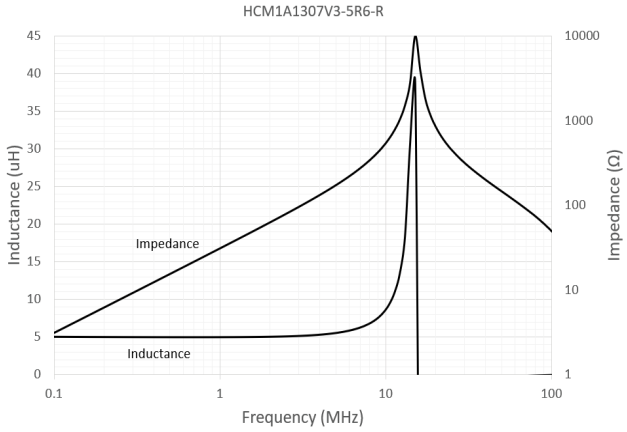
Inductance and impedance vs frequency

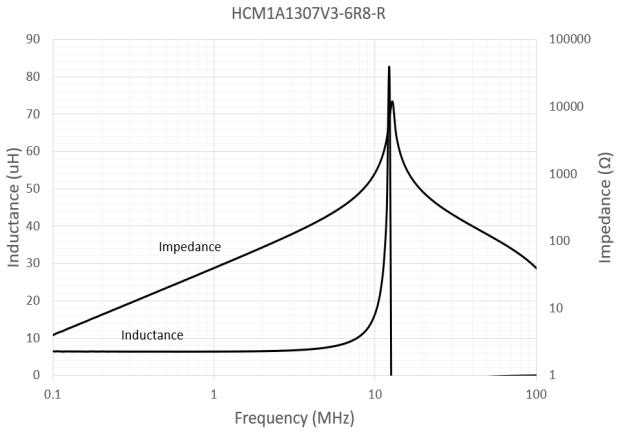




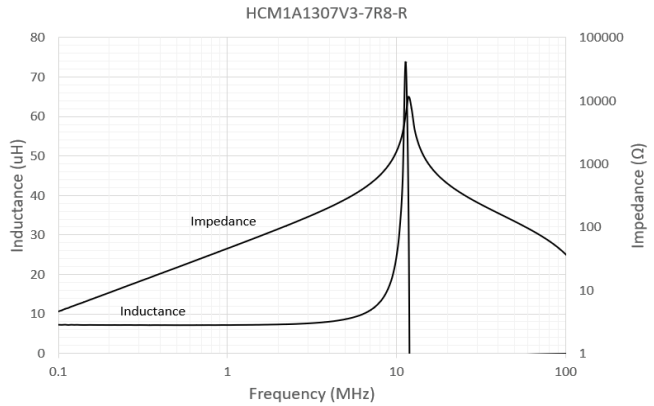


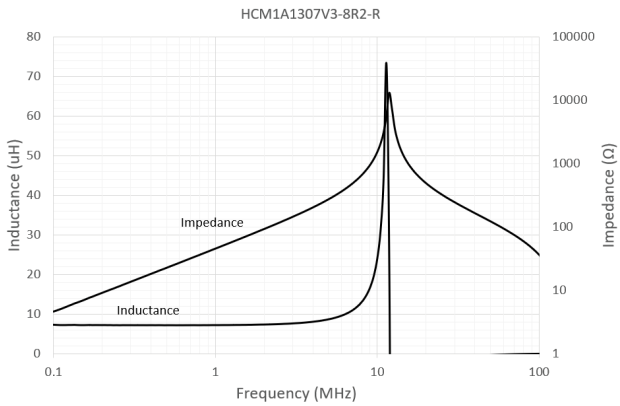


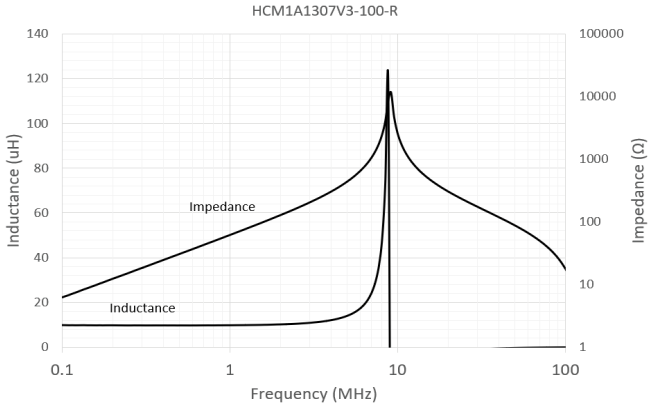


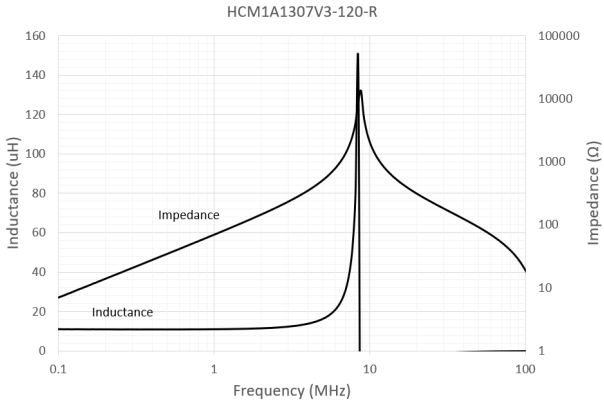


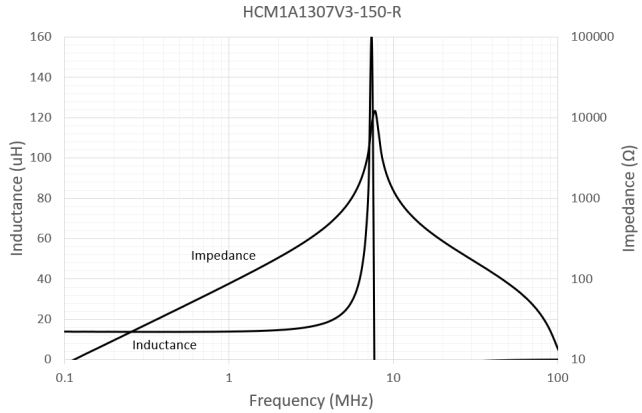
Inductance and impedance vs frequency

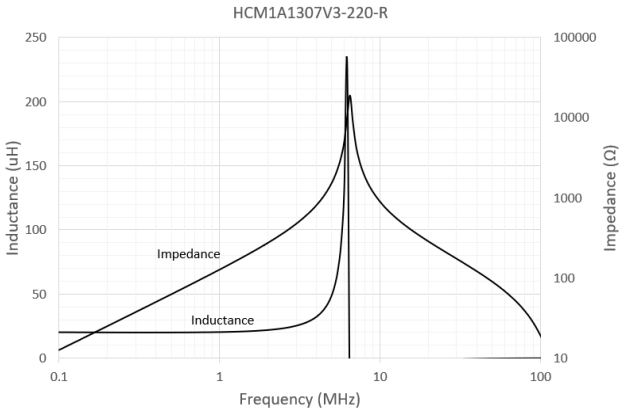




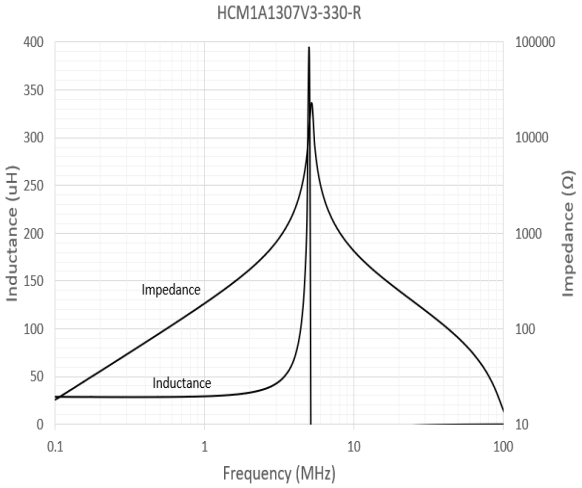


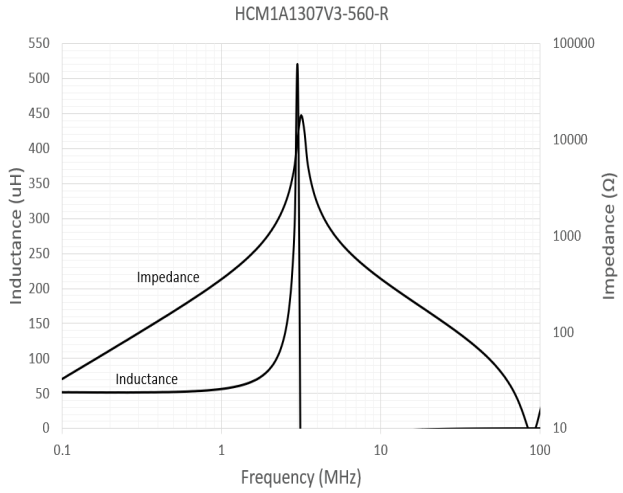






Inductance and impedance vs frequency





Solder reflow profile

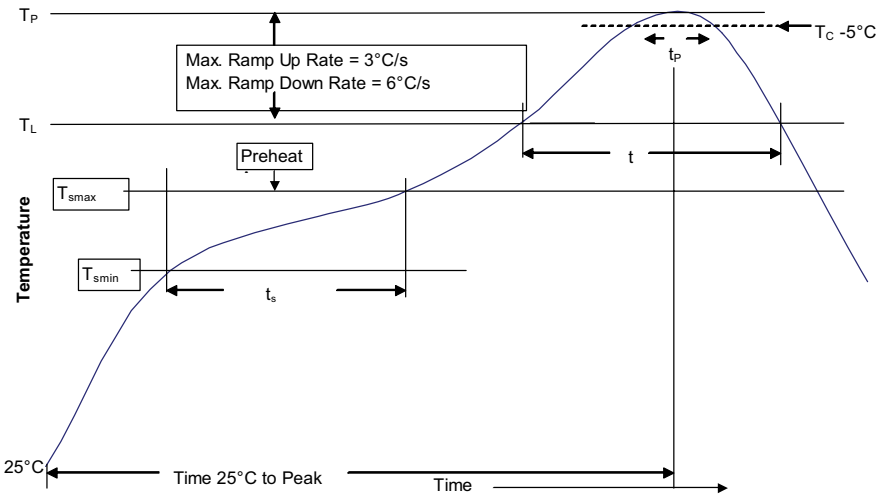


Table 1 - Standard SnPb solder (T_C)

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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Printed in USA
Publication No. ELX1489 BU-ELX22380
November 2024