

# HCM1A1307

## Automotive grade High current power inductors



### Product features

- AEC-Q200 Grade 1 qualified
- High current carrying capacity
- Magnetically shielded, low EMI
- Frequency range up to 1 MHz
- Inductance range from 0.22  $\mu$ H to 56  $\mu$ H
- Current range from 4.6 A to 100 A
- 13.7 mm x 13.0 mm footprint surface mount-package in a 6.5 mm height
- Moisture Sensitivity Level (MSL): 1
- Alloy powder core material
- Halogen free, lead free, RoHS compliant

### Applications

- Body electronics
  - Central body control module
  - Headlamps, tail lamps and interior 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
- 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 Data

- Storage temperature range (Component): -55 °C to +155 °C
- Operating temperature range: -55 °C to +155 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant



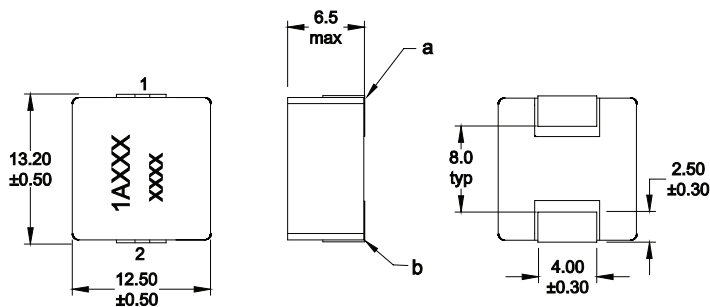
Product Specifications

Part Number <sup>6</sup>	OCL <sup>1</sup> ( $\mu\text{H}$ ) $\pm 20\%$	FLL <sup>2</sup> ( $\mu\text{H}$ ) minimum	$I_{\text{rms}}^3$ (A)	$I_{\text{sat}}^4$ (A)	DCR (m $\Omega$ ) typical @ +20 °C	DCR (m $\Omega$ ) maximum @ +20 °C	K-factor <sup>5</sup>
HCM1A1307-R22-R	0.22	0.14	48	100	0.58	0.70	261
HCM1A1307-R33-R	0.33	0.21	44	72	0.83	0.92	222
HCM1A1307-R47-R	0.47	0.30	36.5	72	0.90	1.05	237
HCM1A1307-1R0-R	1.0	0.64	28	30	1.65	1.77	139
HCM1A1307-1R2-R	1.2	0.76	21.8	28	1.98	2.12	116
HCM1A1307-1R5-R	1.5	0.96	20.5	26	2.1	2.35	123
HCM1A1307-1R8-R	1.8	1.15	19.1	25	2.75	2.94	95
HCM1A1307-2R2-R	2.2	1.4	17.6	22	2.96	3.3	97
HCM1A1307-3R3-R	3.3	2.11	15.6	20	3.7	4.3	99
HCM1A1307-4R7-R	4.7	3.00	11	15	6.7	7.5	78
HCM1A1307-5R6-R	5.6	3.58	10	17	7.5	9.0	65
HCM1A1307-6R8-R	6.8	4.35	9.0	20	10	11.5	48
HCM1A1307-7R8-R	7.8	4.99	8.8	16	10	11.5	52
HCM1A1307-8R2-R	8.2	5.25	8.2	13	11.5	13	47
HCM1A1307-100-R	10	6.40	6.3	12	15.5	17.5	40
HCM1A1307-120-R	12	7.68	6.1	11	17	19	39
HCM1A1307-150-R	15	9.60	5.5	10	22	25	36
HCM1A1307-220-R	22	14.1	4.8	8.0	31.3	35	29
HCM1A1307-330-R	33	21.0	4.7	6.0	42	45	24
HCM1A1307-560-R	56	35.8	4.6	4.6	55	65	18

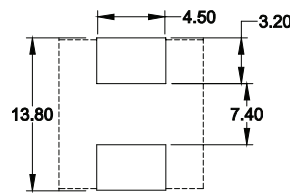
- Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V<sub>rms</sub>, 0.0 Adc, +25 °C
- Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.25 V<sub>rms</sub>, I<sub>sat</sub>, +25 °C
- I<sub>sat</sub>: DC current for an approximate temperature rise of 30 °C without core loss. Derating is 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.

- I<sub>sat</sub>: Peak current for approximately 20% rolloff @ +25 °C
- K-factor: Used to determine B<sub>pp</sub> for core loss (see graph). B<sub>pp</sub> = K \* L \*  $\Delta I$ . B<sub>pp</sub>: (Gauss), K: (K-factor from table), L: (Inductance in  $\mu\text{H}$ ),  $\Delta I$  (Peak to peak ripple current in Amps).
- Part Number Definition: HCM1A1307-xxx-R  
HCM1A1307 = Product code and size  
xxx= inductance value in  $\mu\text{H}$ , R= decimal point,  
If no R is present then last character equals number of zeros  
-R suffix = RoHS compliant

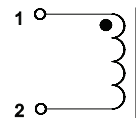
Dimensions (mm)



Recommended Pad Layout



Schematic

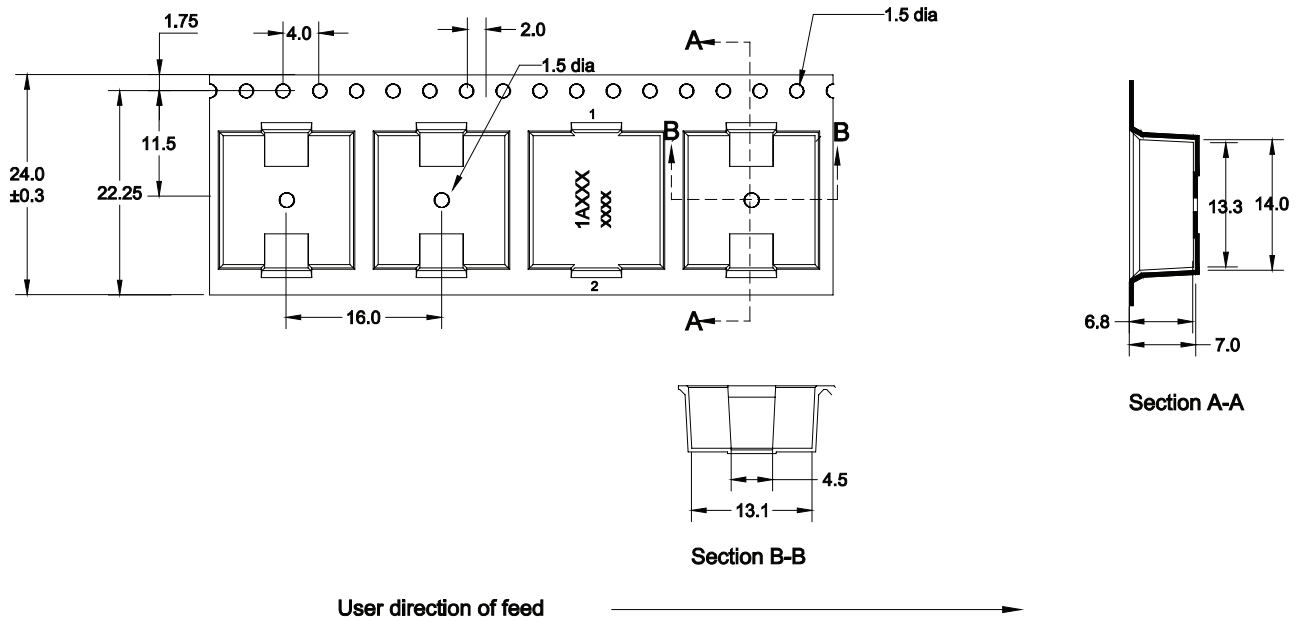


Part marking: 1AXXX=automotive grade, XXX=inductance value in  $\mu\text{H}$ , R=decimal point. If no R is present then last character equals number of zeros.  
 xxxx=Lot code  
 All soldering surfaces to be coplanar within 0.1 millimeters  
 Tolerances are  $\pm 0.3$  millimeters unless stated otherwise  
 DCR measured from point "a" to point "b"  
 Color: Grey  
 Do not route traces or vias underneath the inductor

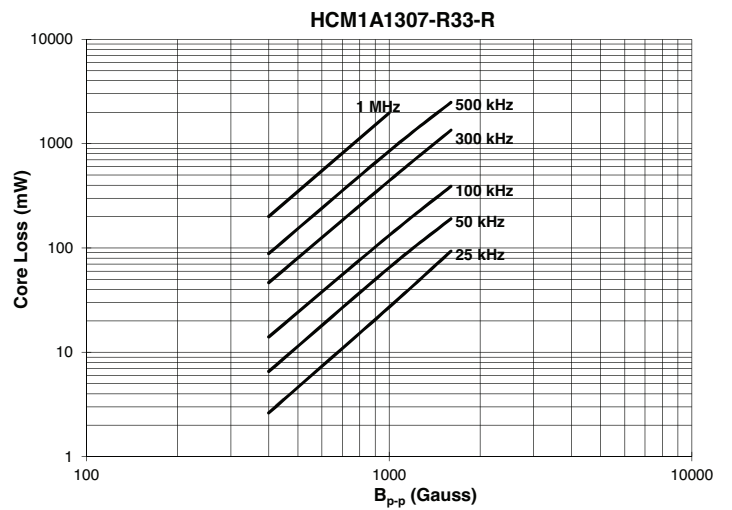
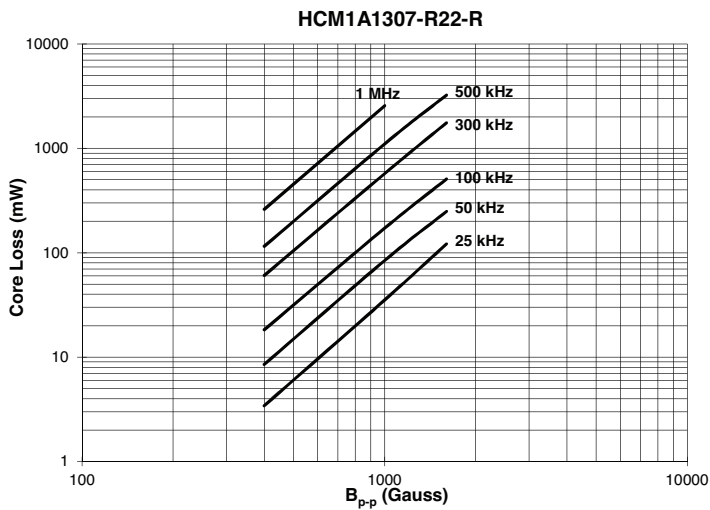
**Packaging information (mm)**

Drawing not to scale

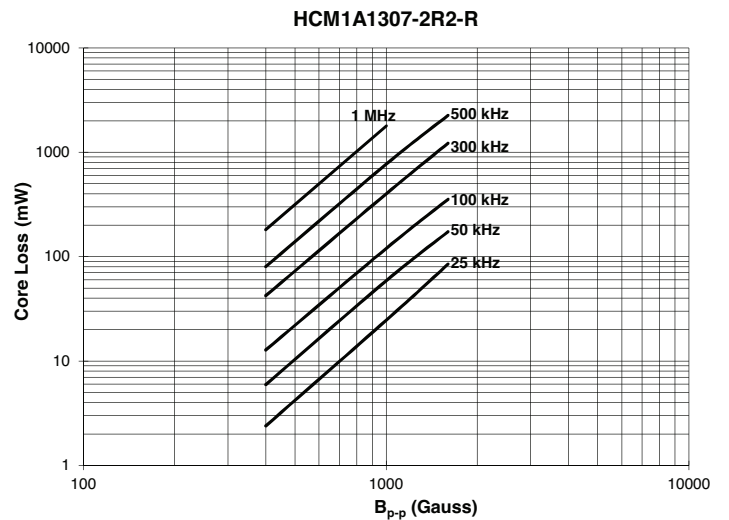
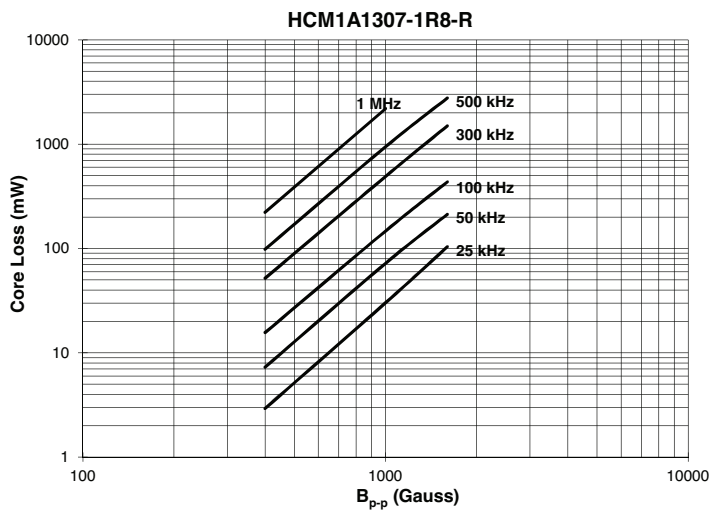
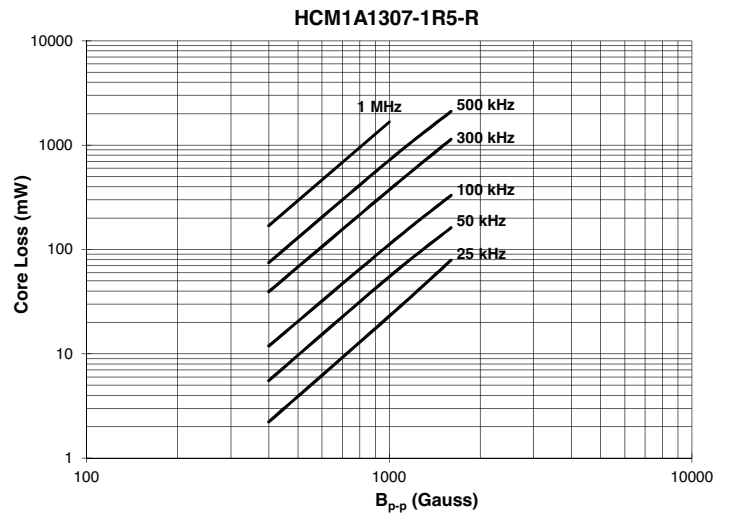
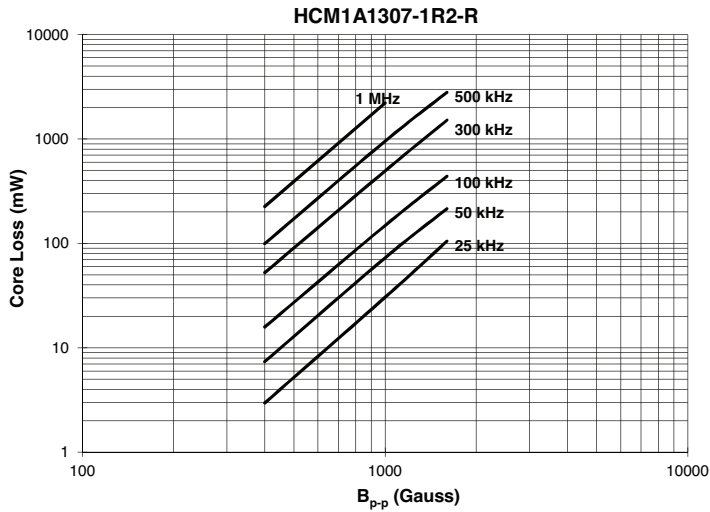
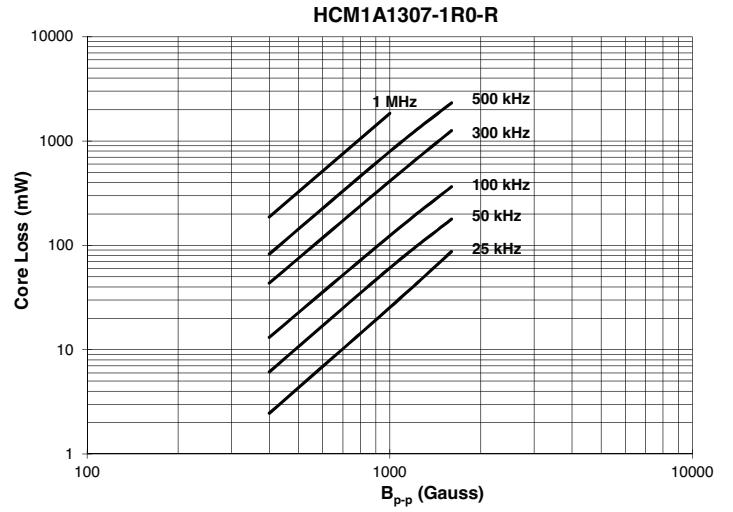
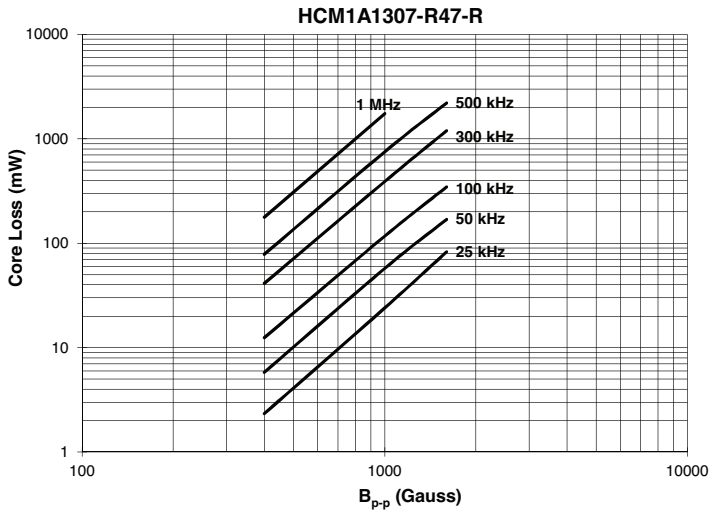
Supplied in tape and reel packaging, 250 parts per 13" diameter reel



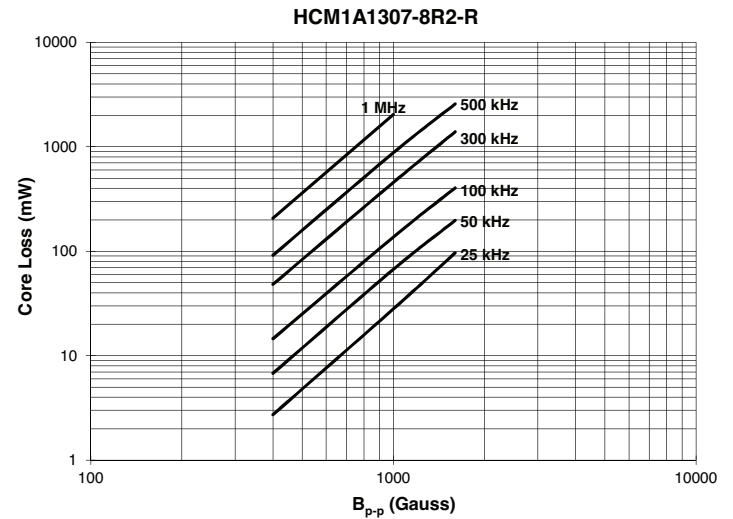
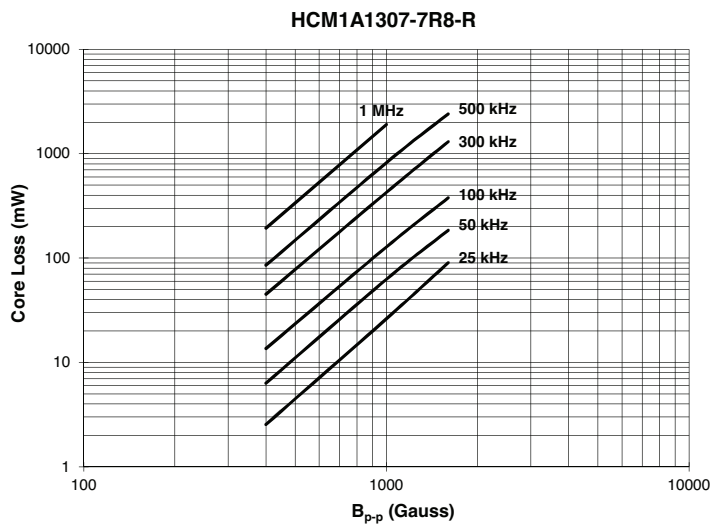
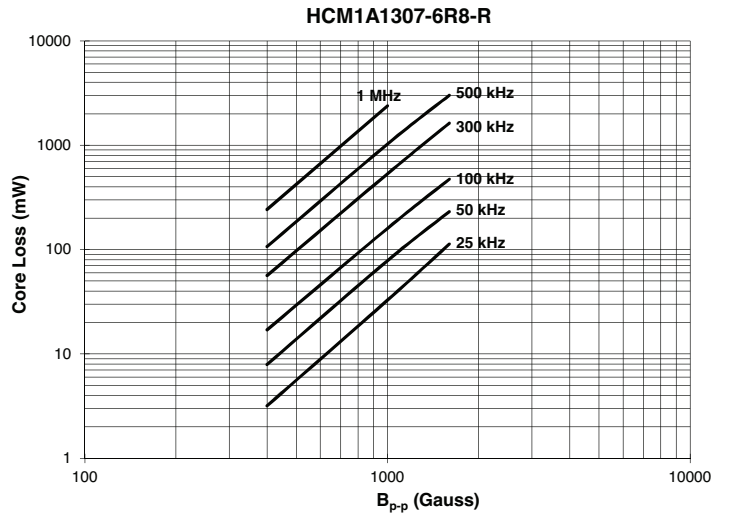
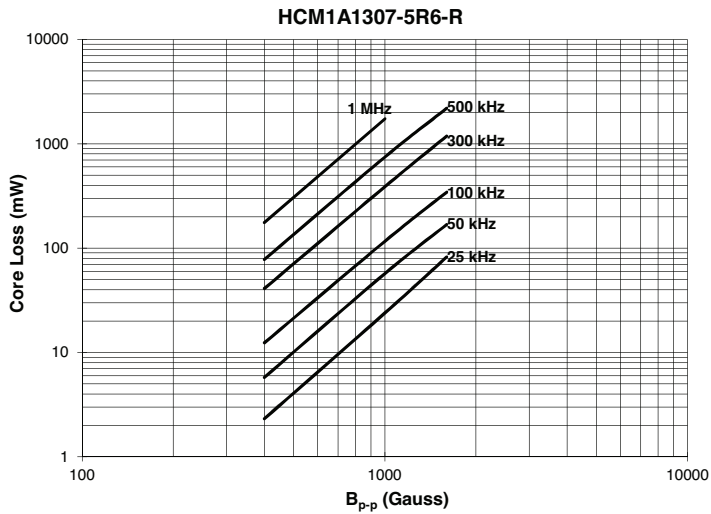
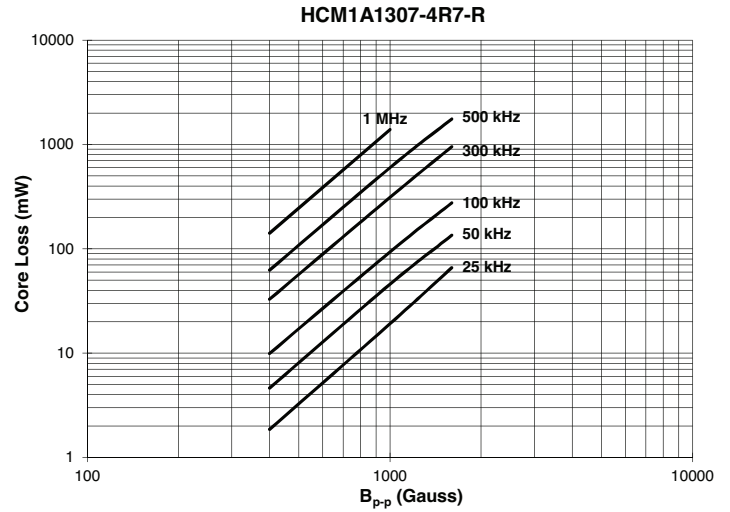
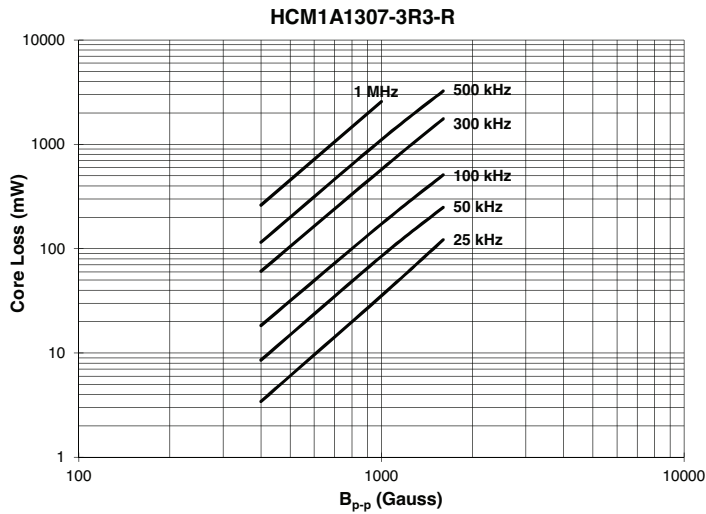
**Core loss vs  $B_{p-p}$**



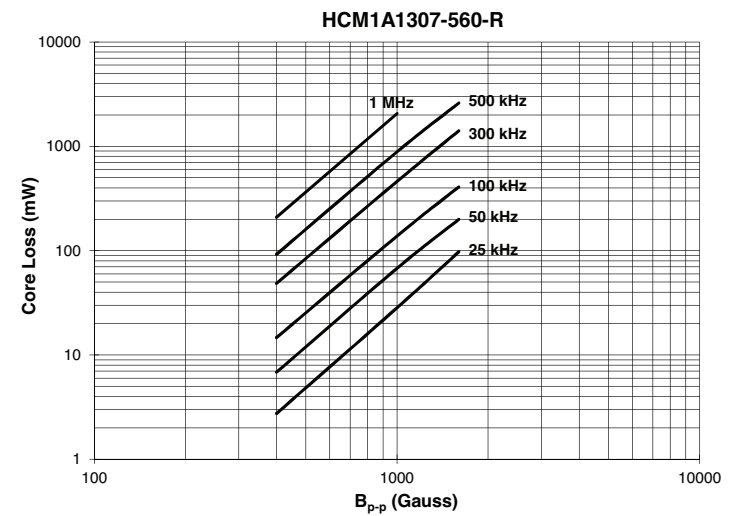
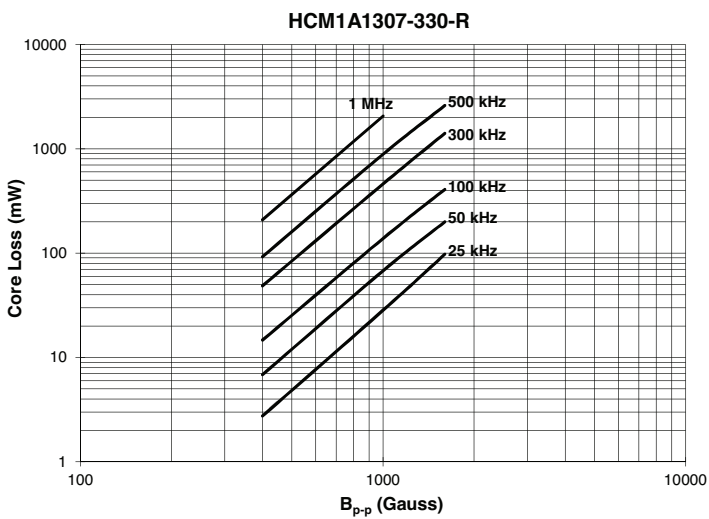
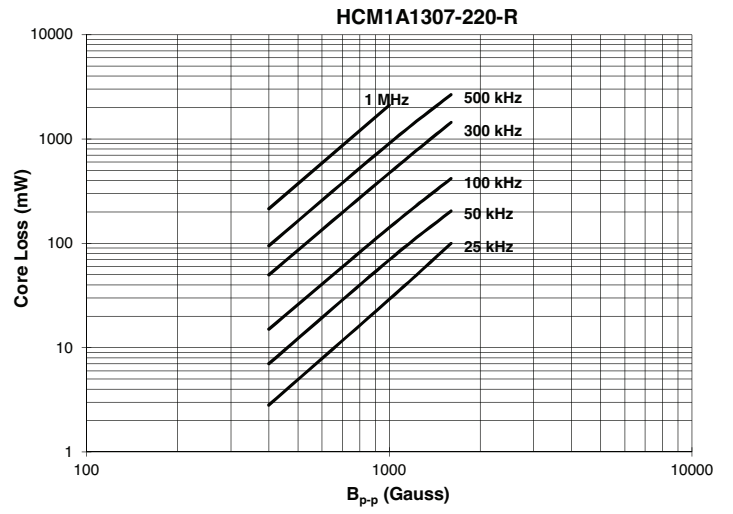
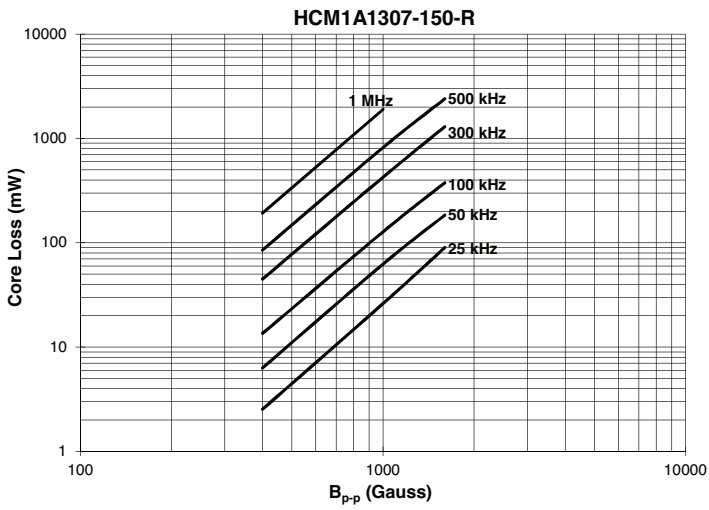
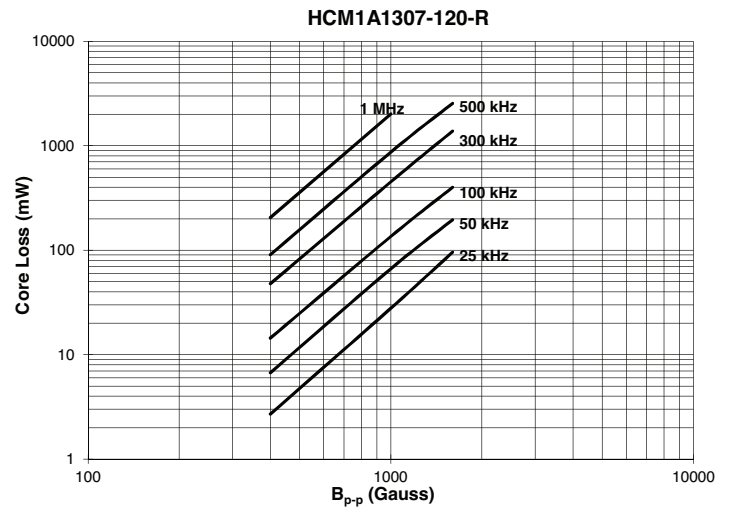
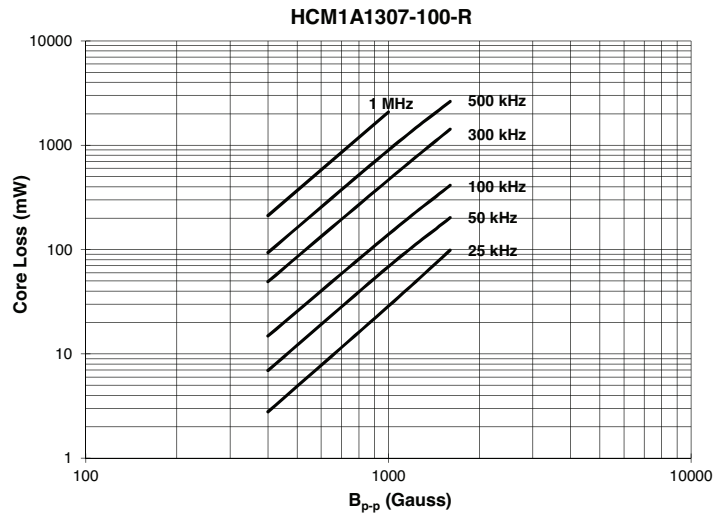
Core loss vs  $B_{p-p}$



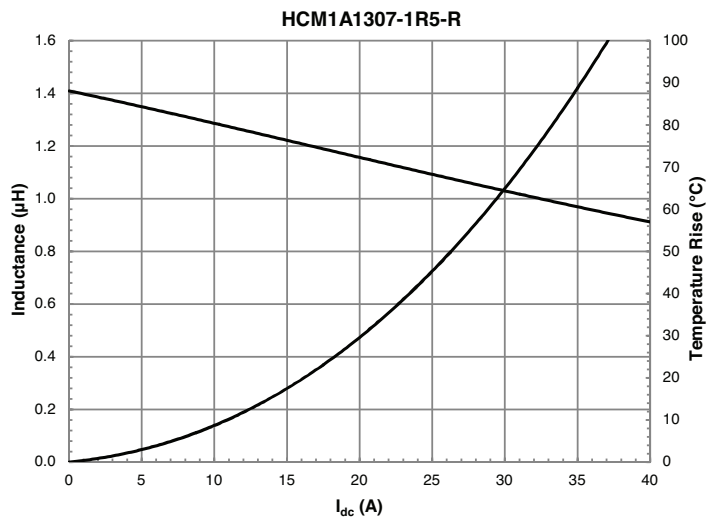
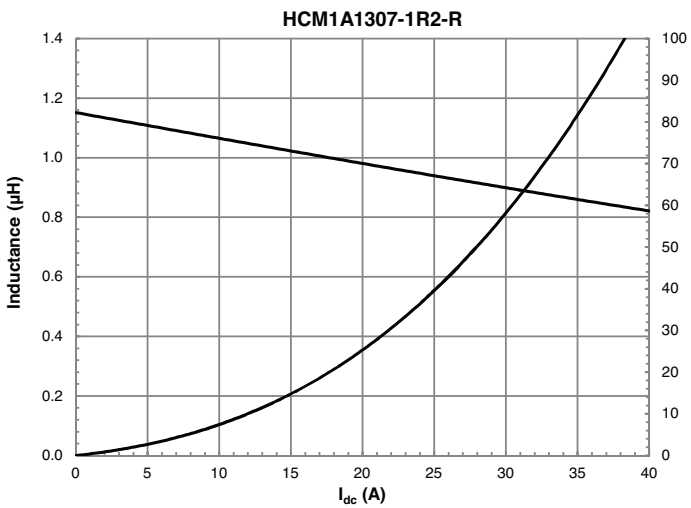
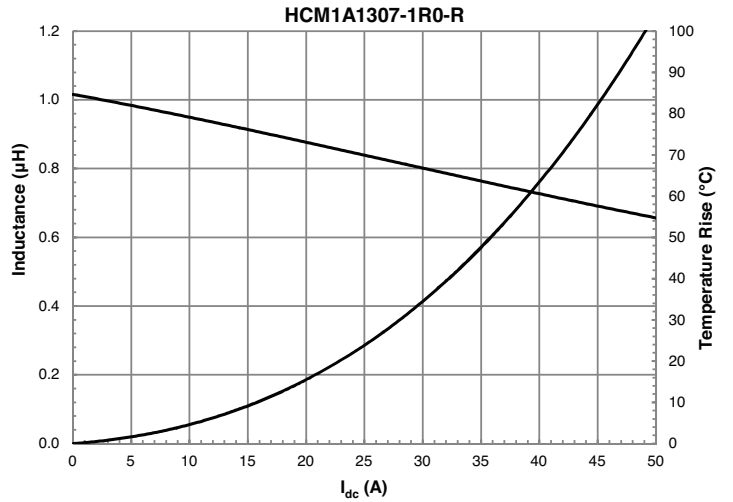
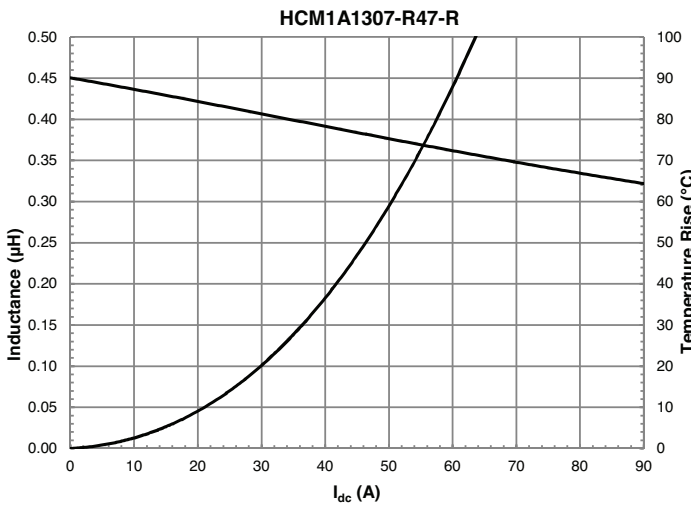
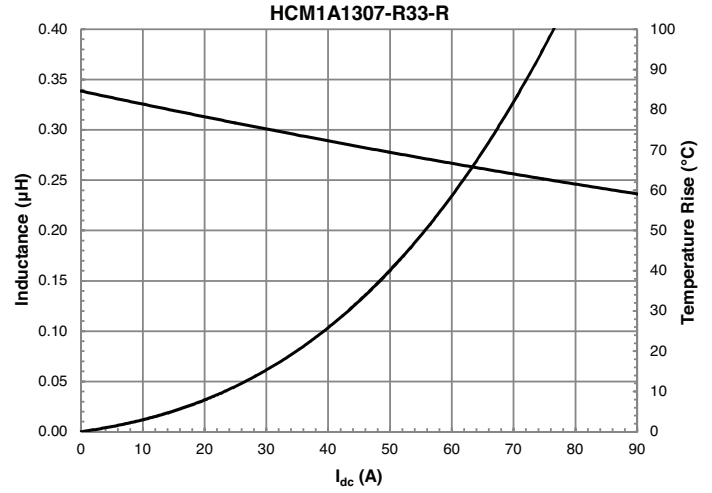
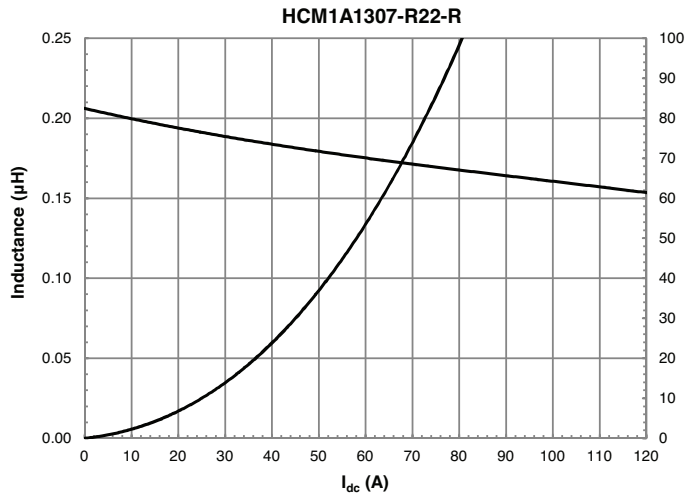
Core loss vs  $B_{p-p}$



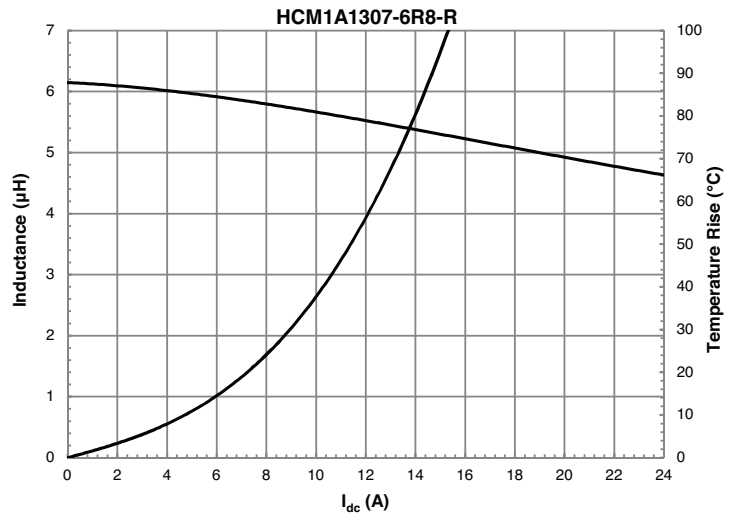
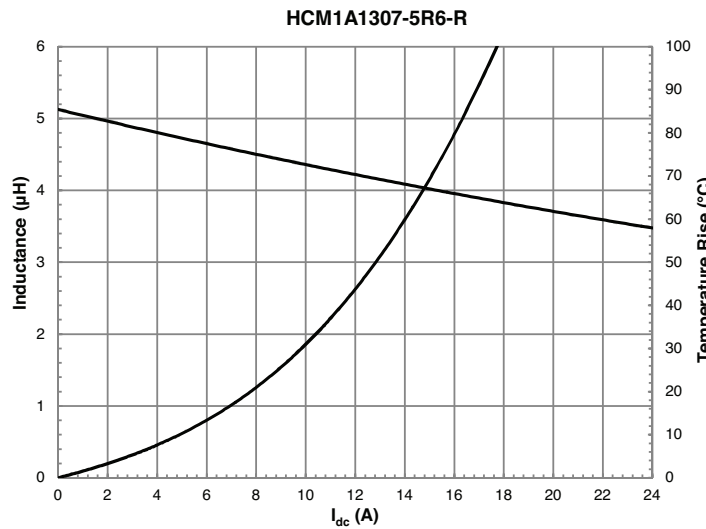
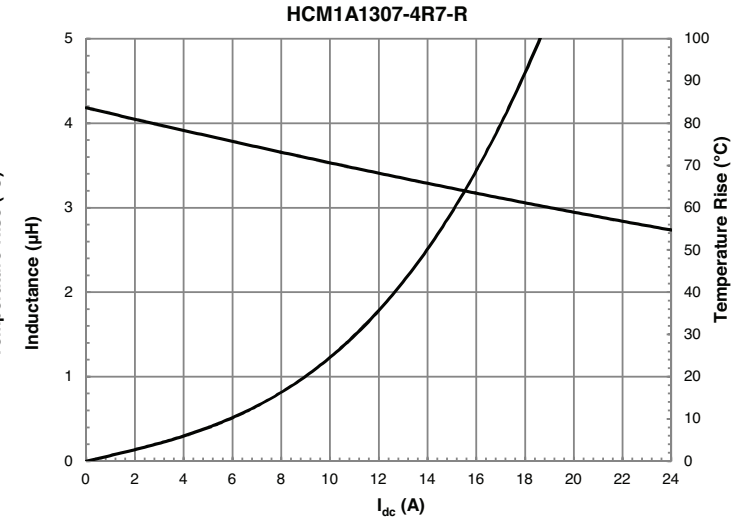
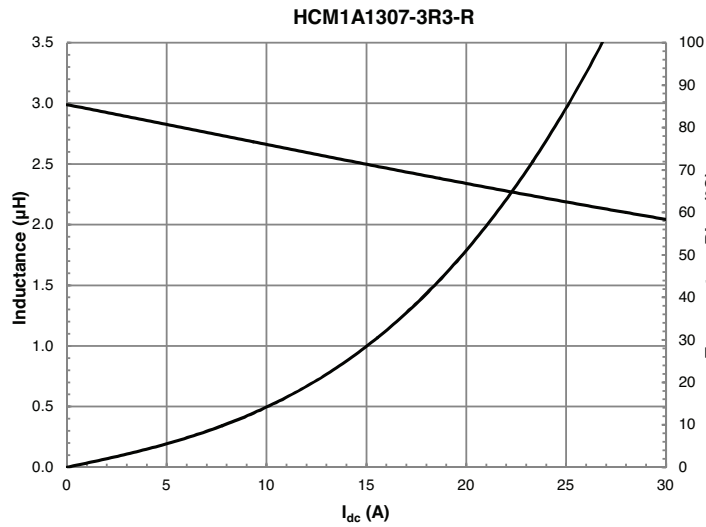
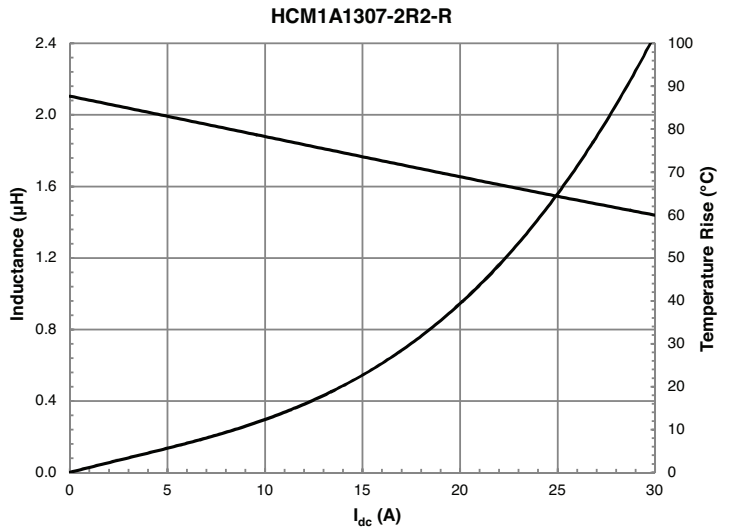
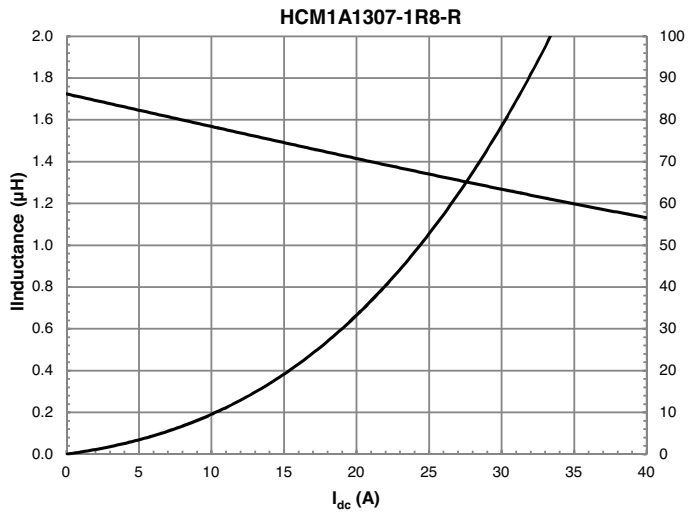
Core loss vs  $B_{p-p}$



Inductance and temperature rise vs. current

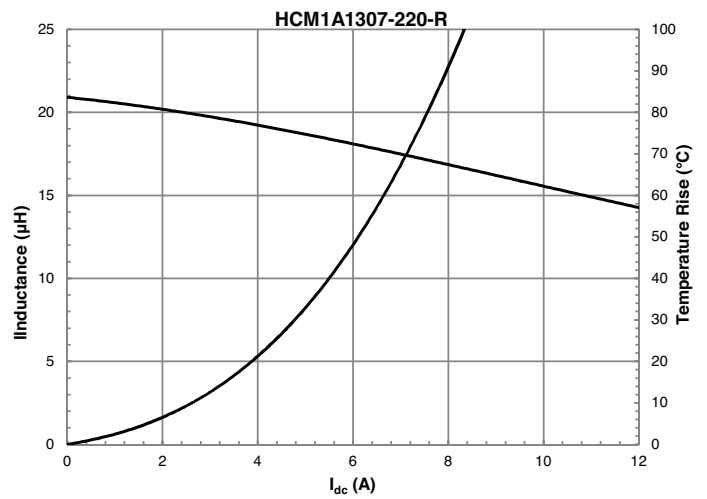
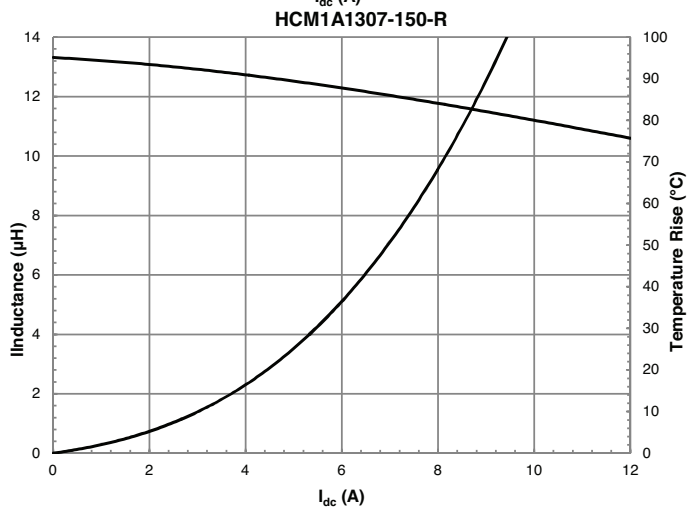
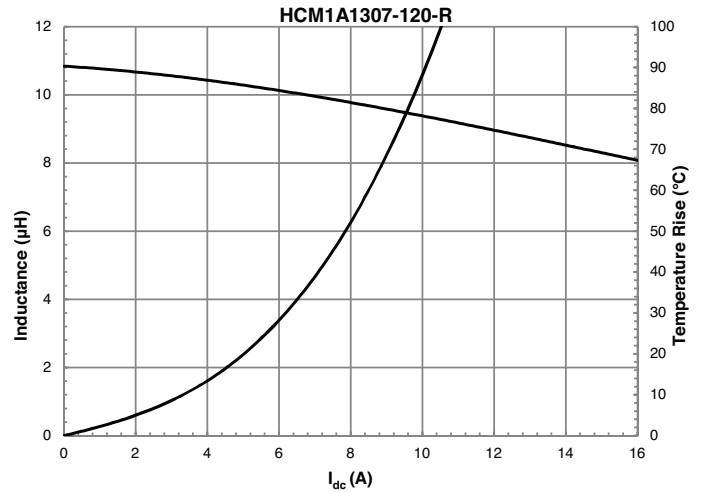
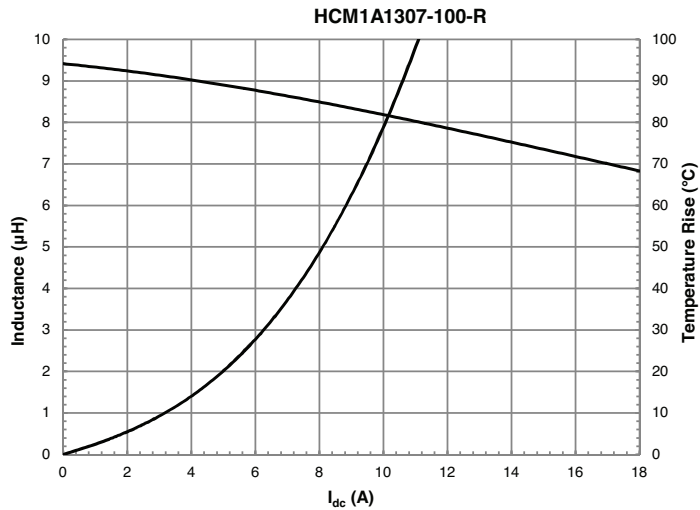
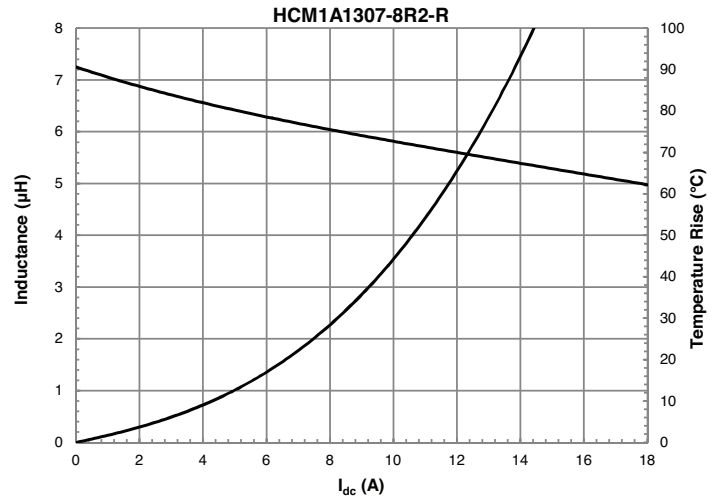
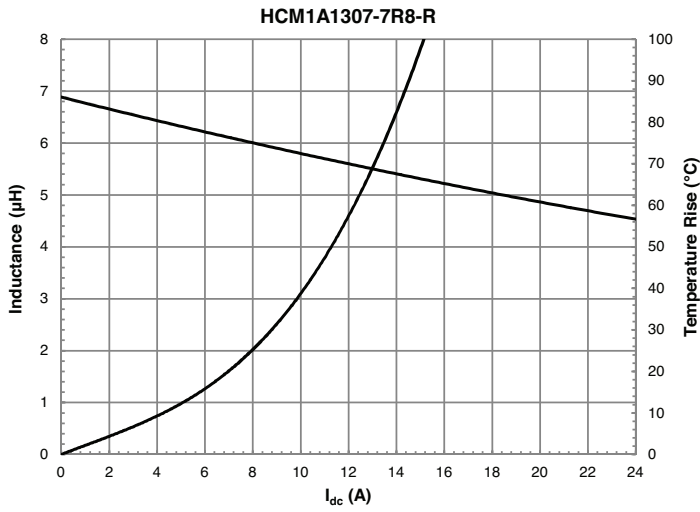


Inductance and temperature rise vs. current

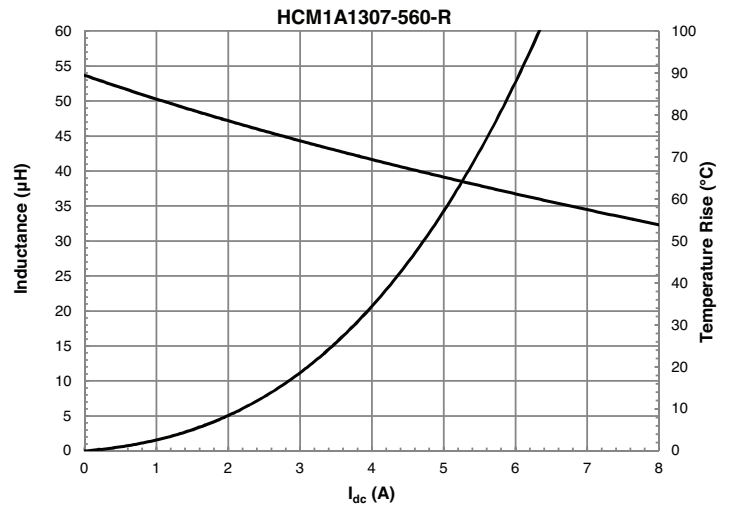
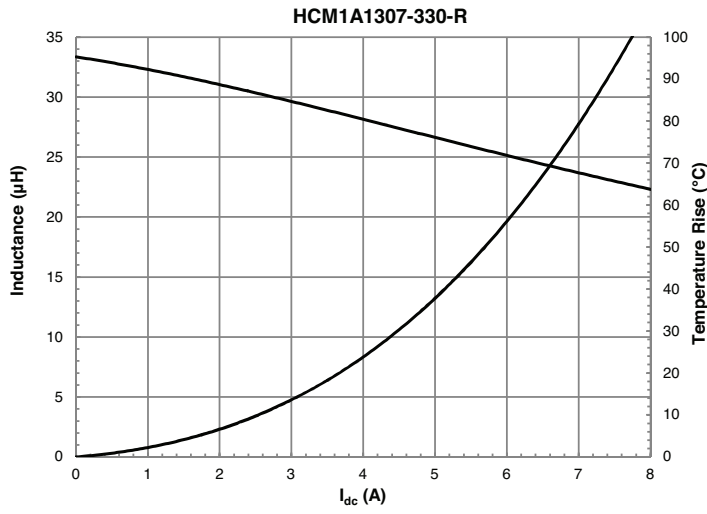




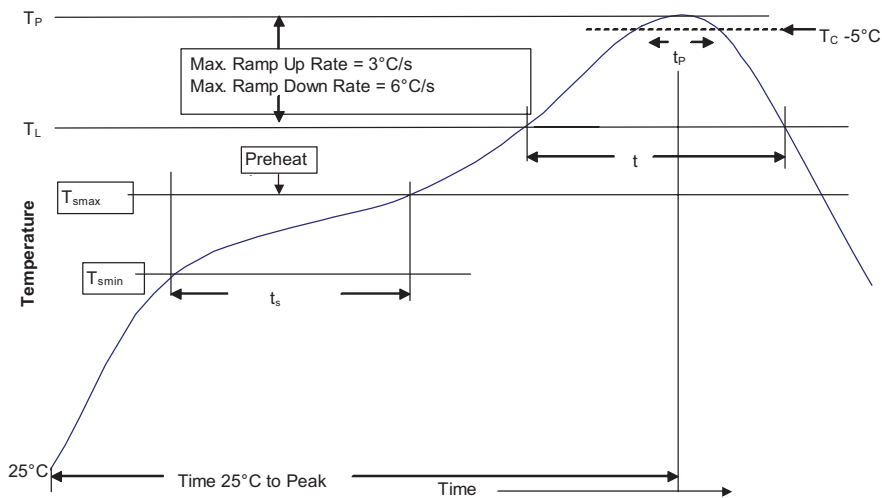
Inductance and temperature rise vs. current



Inductance and temperature rise vs. current



**Solder reflow profile**



**Table 1 - Standard SnPb Solder ( $T_c$ )**

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> ≥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 <sup>3</sup> <350	Volume mm <sup>3</sup> 350 - 2000	Volume mm <sup>3</sup> >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 ( $T_L$ )	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.

Life Support Policy: Eaton does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

Eaton reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Eaton also reserves the right to change or update, without notice, any technical information contained in this bulletin.

**Eaton**  
Electronics Division  
1000 Eaton Boulevard  
Cleveland, OH 44122  
United States  
www.eaton.com/electronics



© 2016 Eaton  
All Rights Reserved  
Publication No. 10552 BU-MC16090  
September 2016

Eaton is a registered trademark.  
All other trademarks are property of their respective owners.

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А