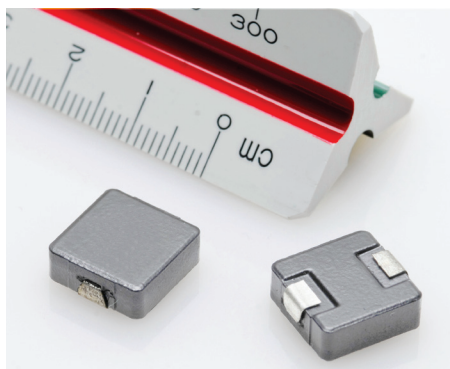


# HCMA1305

## Automotive grade

## High current power inductors



### Product features

- AEC-Q200 qualified
- High current carrying capacity
- Low core losses
- Magnetically shielded, low EMI
- Frequency range up to 5 MHz
- Inductance range from 0.1  $\mu$ H to 33  $\mu$ H
- 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

- Body electronics
  - Central body control module
  - Vehicle access control system
  - Headlamps, tail lamps and interior lighting
  - Heating ventilation and air conditioning controllers (HVAC)
  - Doors, window lift and seat control
- Advanced driver assistance systems
  - Basic and smart surround, and rear and front view camera
  - 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)

### 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 <sup>6</sup> | OCL <sup>1</sup><br>( $\mu$ H) $\pm$ 20% | FLL <sup>2</sup> Min.<br>( $\mu$ H) | $I_{rms}$ <sup>3</sup><br>(A) | $I_{sat}$ <sup>4</sup><br>(A) | DCR (m $\Omega$ )<br>@ +20 °C<br>nominal | DCR (m $\Omega$ )<br>@ +20 °C<br>maximum | K-factor <sup>5</sup> |
|--------------------------|------------------------------------------|-------------------------------------|-------------------------------|-------------------------------|------------------------------------------|------------------------------------------|-----------------------|
| HCMA1305-R10-R           | 0.10                                     | 0.064                               | 55                            | 118                           | 0.52                                     | 0.59                                     | 848                   |
| HCMA1305-R22-R           | 0.22                                     | 0.14                                | 51                            | 110                           | 0.63                                     | 0.72                                     | 843                   |
| HCMA1305-R33-R           | 0.33                                     | 0.21                                | 42                            | 80                            | 0.80                                     | 0.92                                     | 506                   |
| HCMA1305-R47-R           | 0.47                                     | 0.30                                | 38                            | 65                            | 0.80                                     | 0.92                                     | 506                   |
| HCMA1305-R56-R           | 0.56                                     | 0.36                                | 36                            | 55                            | 1.15                                     | 1.33                                     | 500                   |
| HCMA1305-R68-R           | 0.68                                     | 0.44                                | 34                            | 54                            | 1.15                                     | 1.33                                     | 500                   |
| HCMA1305-R82-R           | 0.82                                     | 0.52                                | 31                            | 53                            | 1.40                                     | 1.61                                     | 358                   |
| HCMA1305-1R0-R           | 1.00                                     | 0.64                                | 29                            | 50                            | 2.10                                     | 2.42                                     | 275                   |
| HCMA1305-1R5-R           | 1.50                                     | 0.96                                | 23                            | 48                            | 2.75                                     | 3.16                                     | 225                   |
| HCMA1305-1R8-R           | 1.80                                     | 1.15                                | 21                            | 40                            | 4.00                                     | 4.60                                     | 216                   |
| HCMA1305-2R2-R           | 2.20                                     | 1.41                                | 20                            | 32                            | 4.60                                     | 5.29                                     | 191                   |
| HCMA1305-3R3-R           | 3.30                                     | 2.11                                | 15                            | 32                            | 7.70                                     | 9.20                                     | 170                   |
| HCMA1305-4R7-R           | 4.70                                     | 3.01                                | 12                            | 27                            | 11.0                                     | 12.7                                     | 161                   |
| HCMA1305-5R6-R           | 5.60                                     | 3.58                                | 11.5                          | 22                            | 12.0                                     | 13.8                                     | 142                   |
| HCMA1305-6R8-R           | 6.80                                     | 4.35                                | 11                            | 21                            | 13.0                                     | 15.0                                     | 129                   |
| HCMA1305-7R8-R           | 7.80                                     | 4.99                                | 10                            | 18.5                          | 16.8                                     | 19.4                                     | 117                   |
| HCMA1305-8R2-R           | 8.20                                     | 5.25                                | 9.5                           | 18                            | 17.5                                     | 20.1                                     | 117                   |
| HCMA1305-100-R           | 10.0                                     | 6.40                                | 9.0                           | 16                            | 19.0                                     | 21.9                                     | 90                    |
| HCMA1305-150-R           | 15.0                                     | 9.60                                | 7.7                           | 13                            | 29.0                                     | 33.4                                     | 74                    |
| HCMA1305-220-R           | 22.0                                     | 14.1                                | 6.2                           | 10                            | 45.0                                     | 51.8                                     | 63                    |
| HCMA1305-330-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<sub>rms</sub>, 0.0 Adc, +25 °C.

2. Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.25 V<sub>rms</sub>, I<sub>sat</sub> @ +25 °C.

3. I<sub>rms</sub>: 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<sub>sat</sub>: Peak current for approximately 20% rolloff at +25 °C.

5. 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  $\mu$ H),  $\Delta$ I (Peak to peak ripple current in amps).

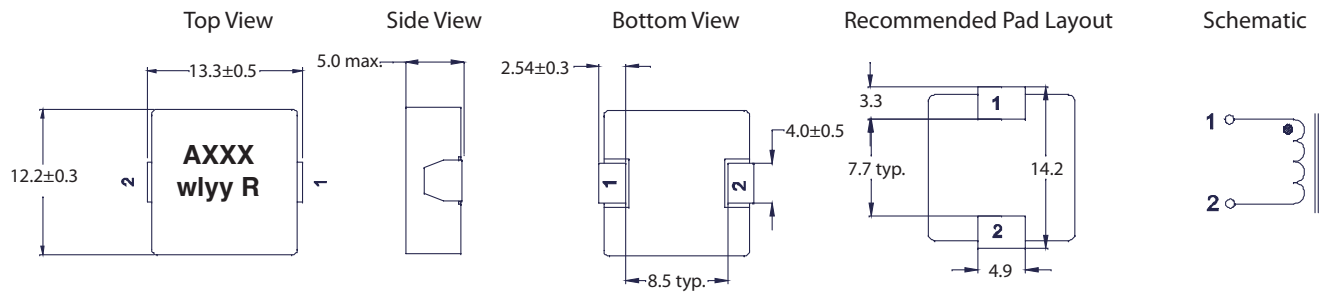
6. Part Number Definition: HCMA1305-yyy-R

- HCMA1305 = Product code and size

yyy= Inductance value in  $\mu$ H, R = decimal point,  
if no R is present then third character equals number of zeros.

“-R” suffix = RoHS compliant

### Dimensions- mm



Part Marking: A = Automotive grade, xxx = Inductance value in  $\mu$ H, R = decimal point, if no R is present, third character equals number of zeros, wlyy = (Date Code), R = (Revision Level) All soldering surfaces to be coplanar within 0.10 millimeters.

Tolerances are  $\pm 0.3$  millimeters unless stated otherwise.

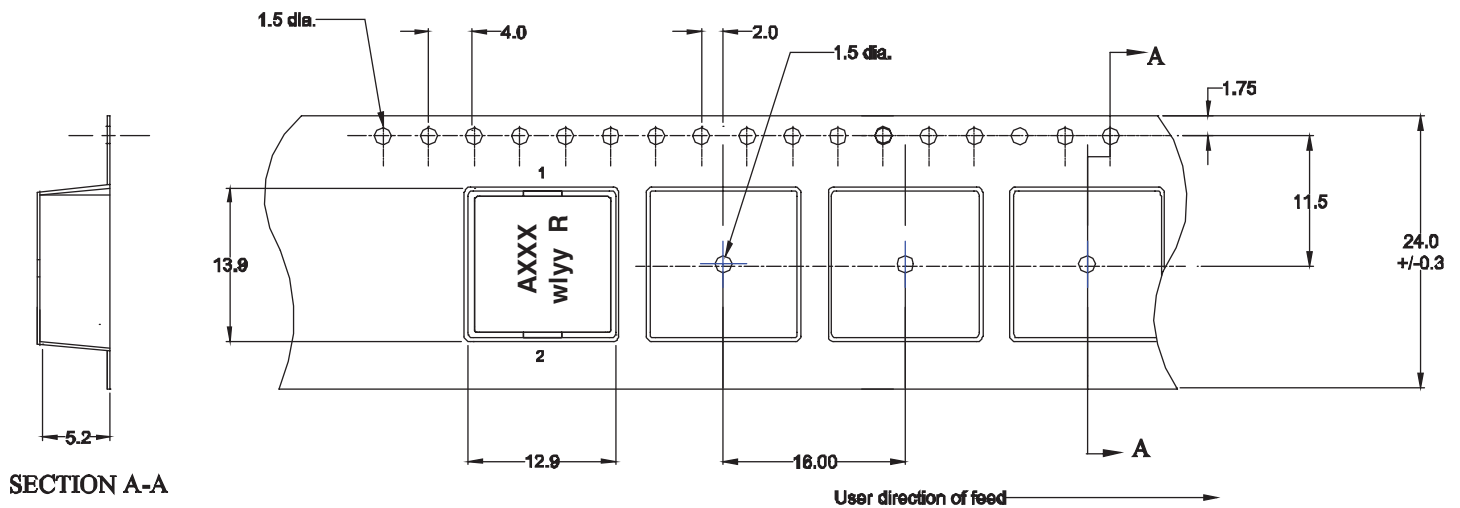
Color: Grey.

Do not route traces or vias underneath the inductor

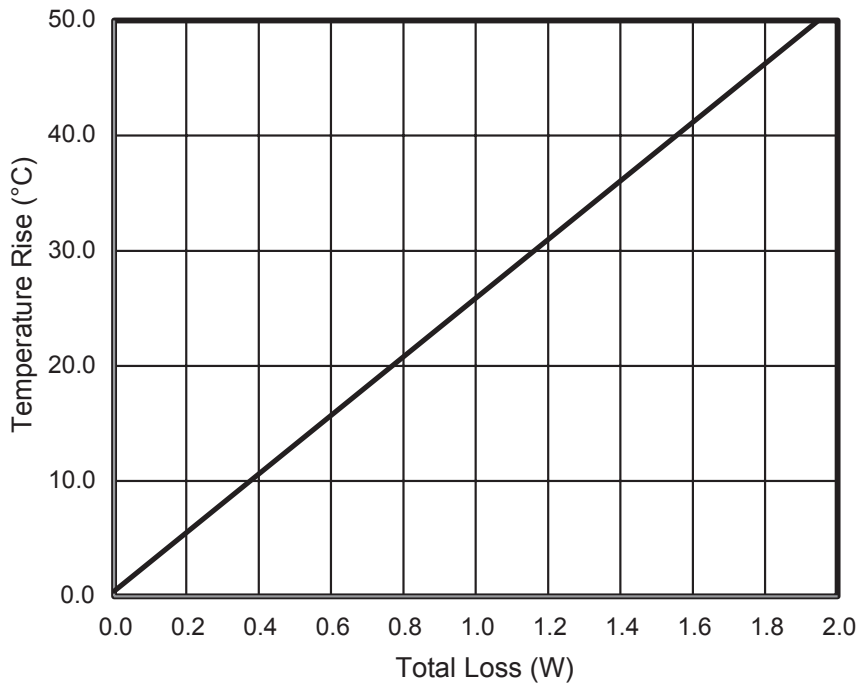
### Packaging information- mm

Drawing not to scale

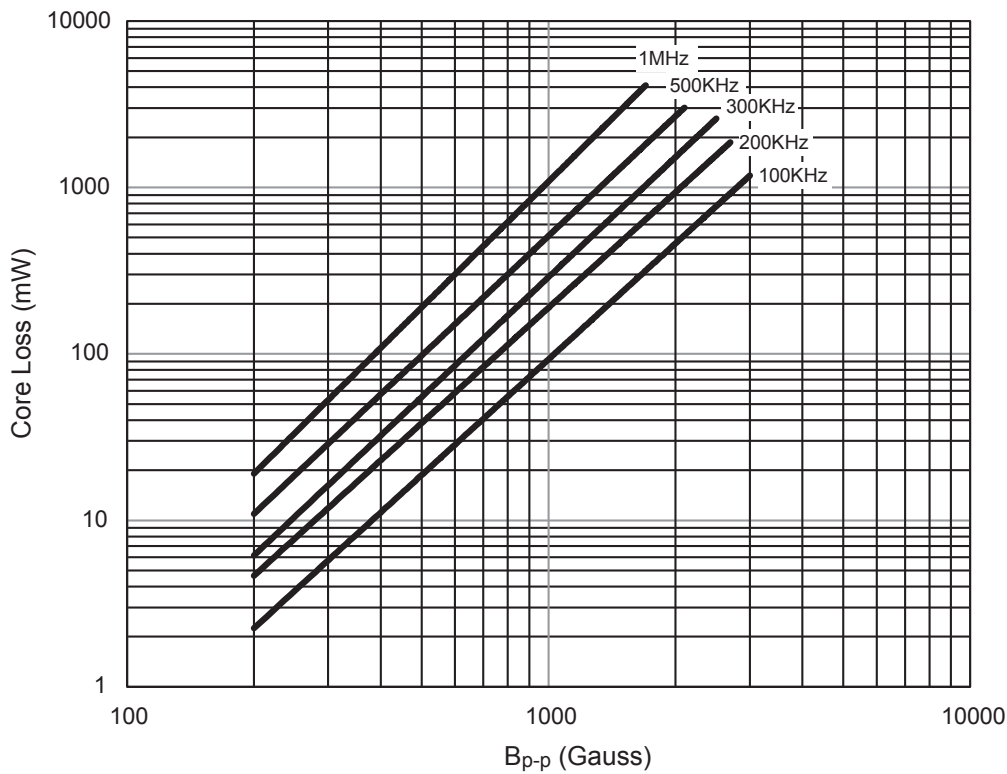
Supplied in tape and reel packaging, 400 parts per 13" diameter reel



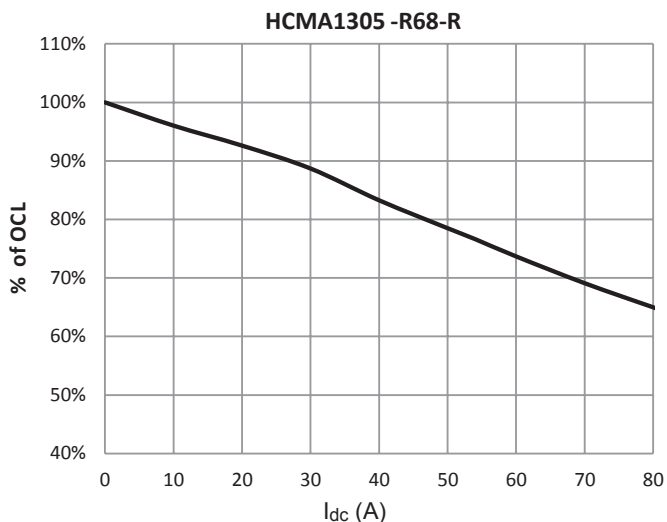
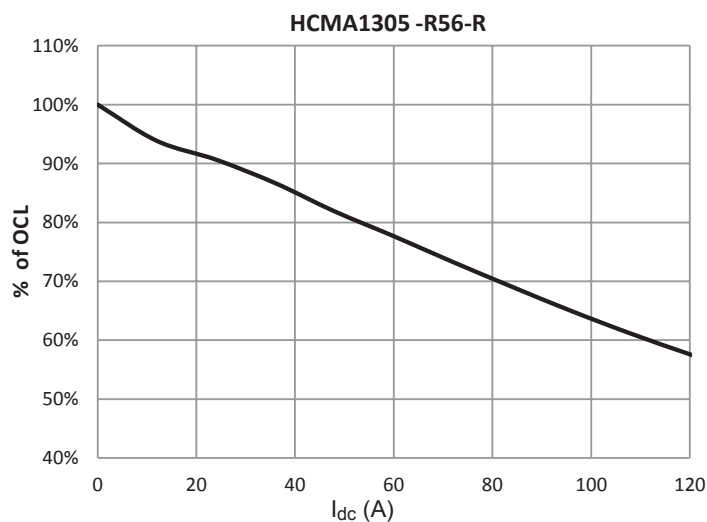
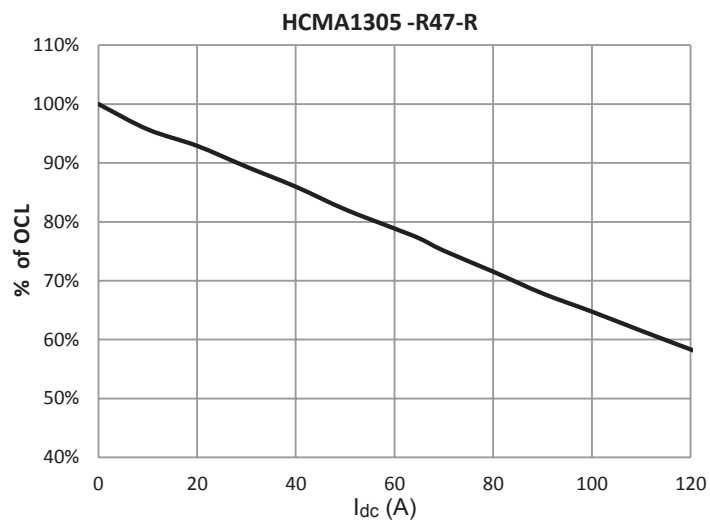
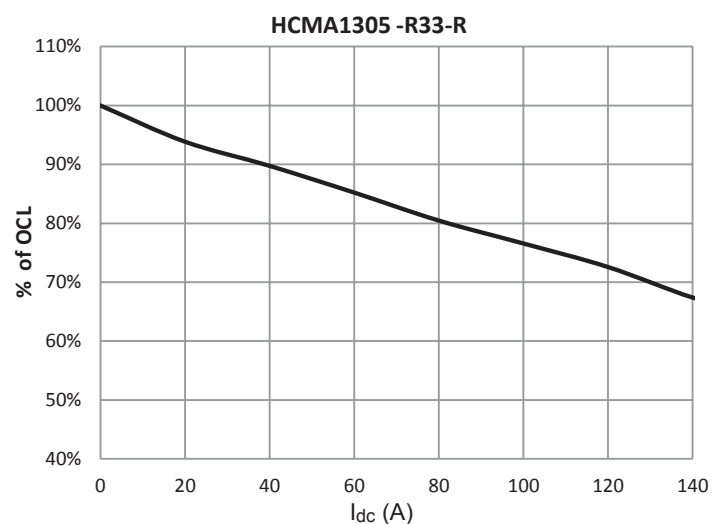
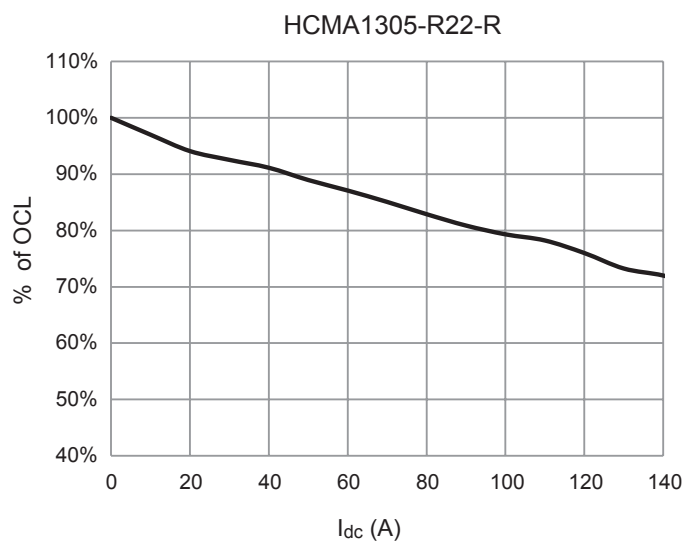
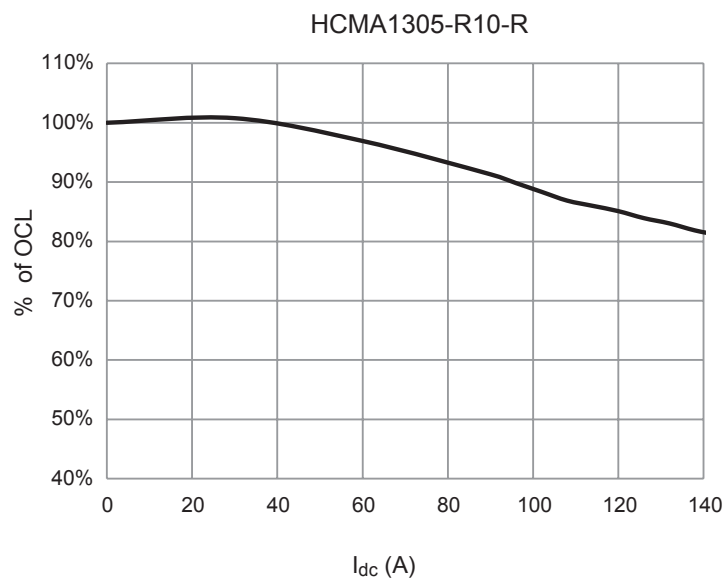
Temperature rise vs. total loss



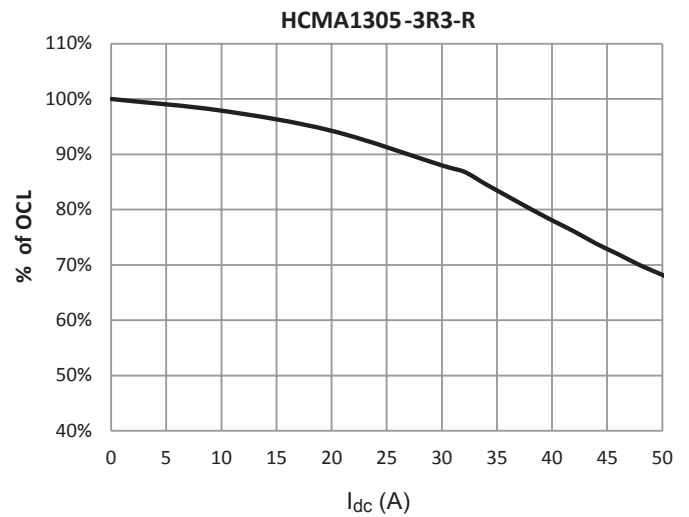
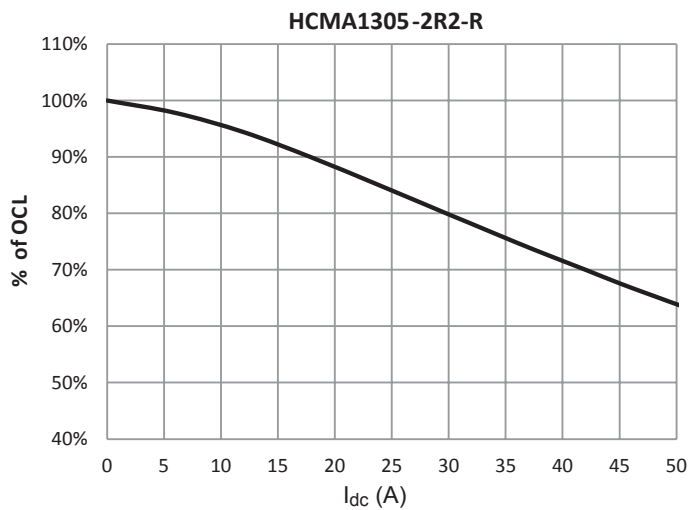
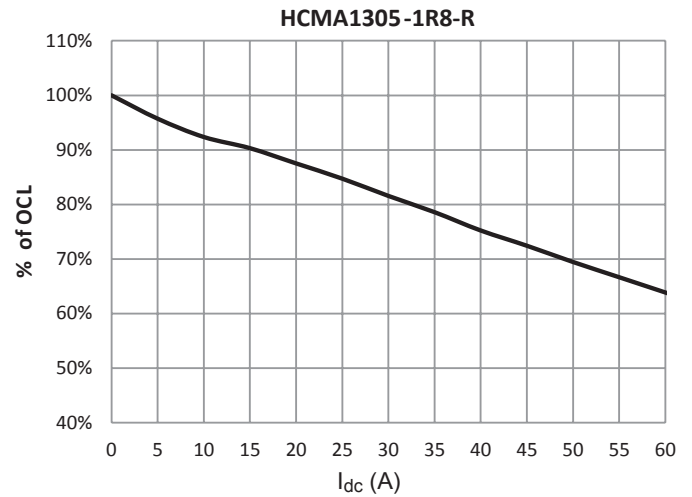
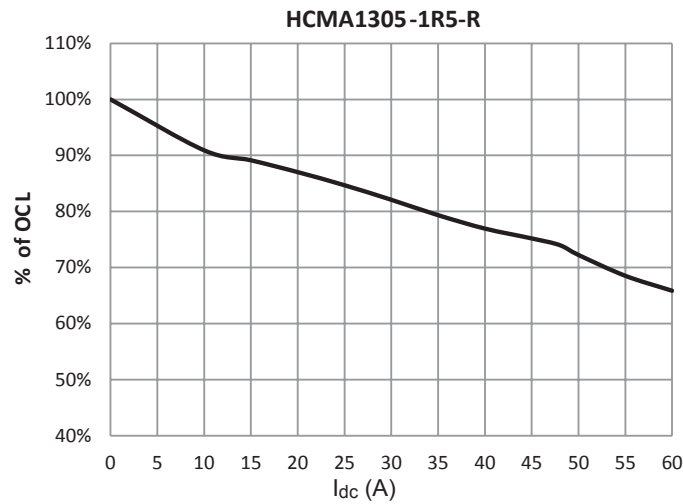
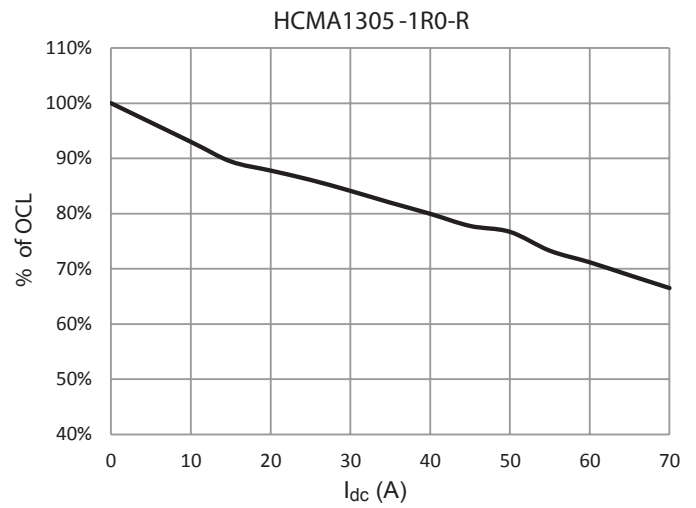
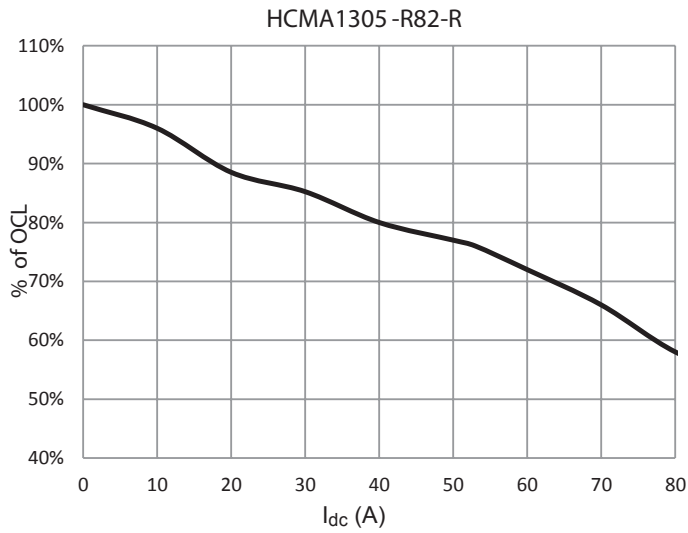
Core loss vs  $B_{p-p}$



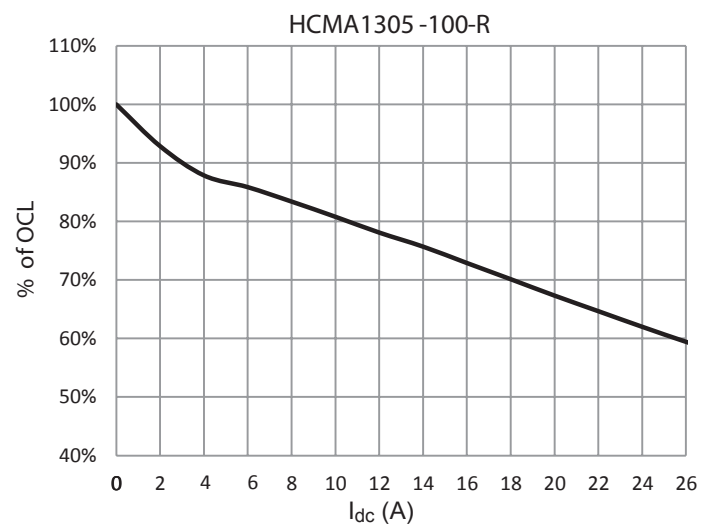
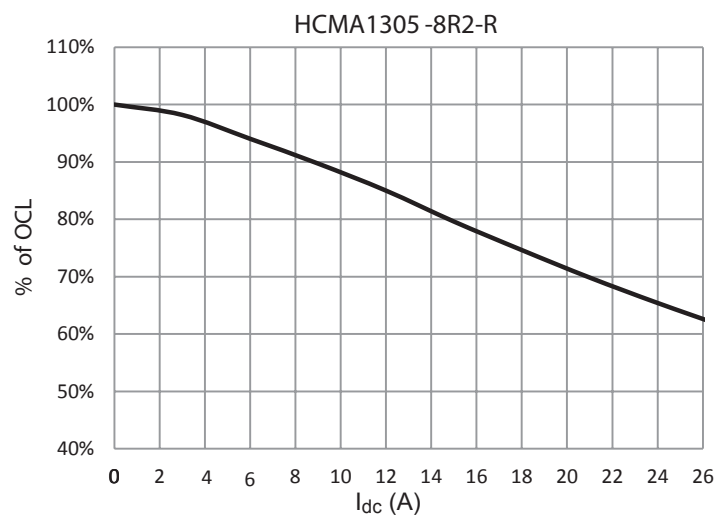
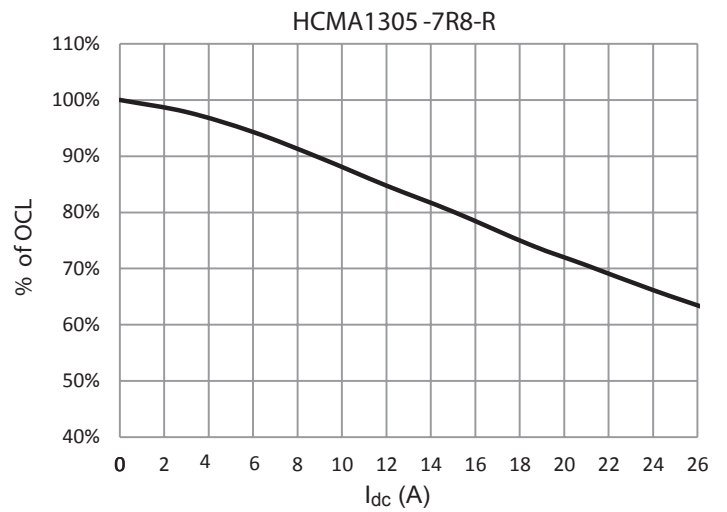
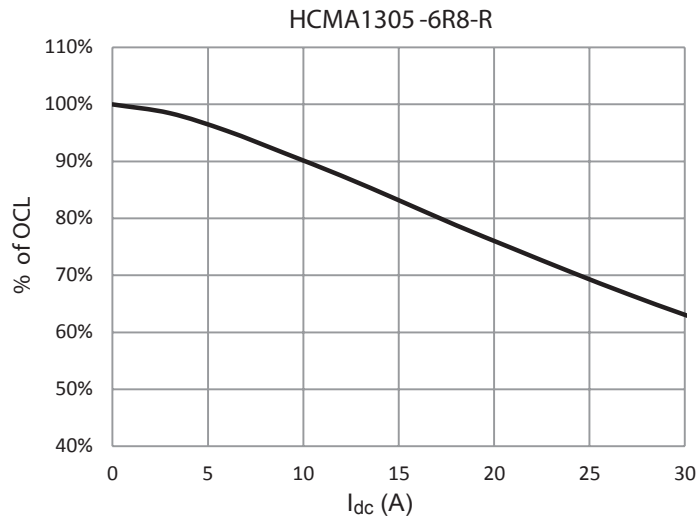
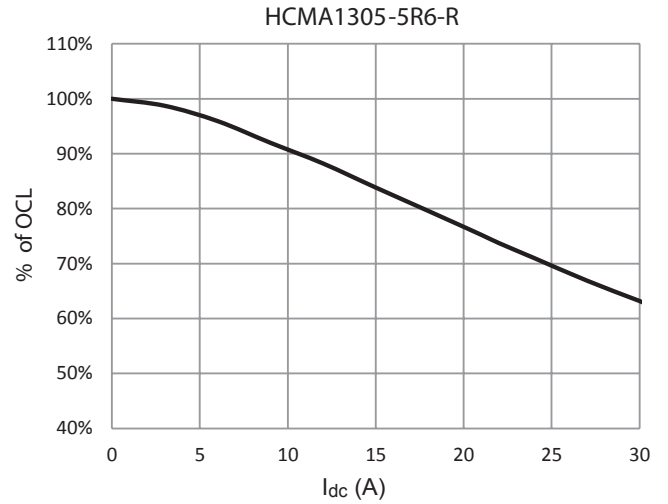
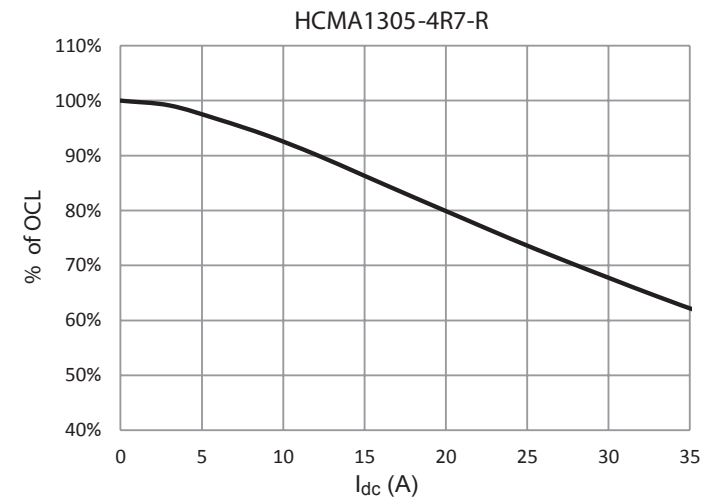
Inductance characteristics



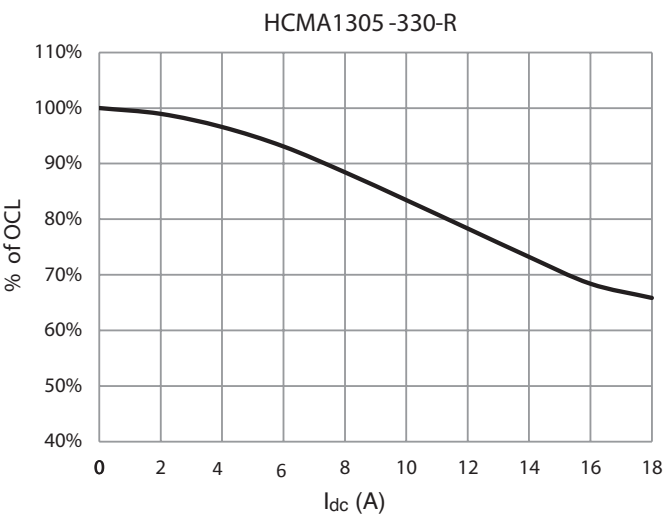
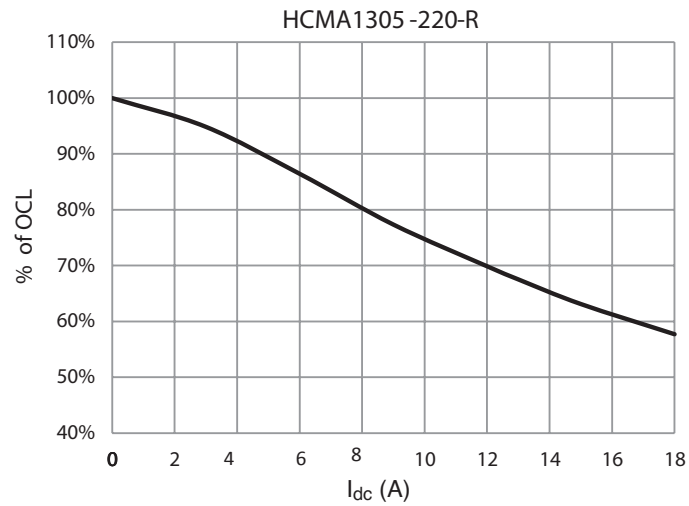
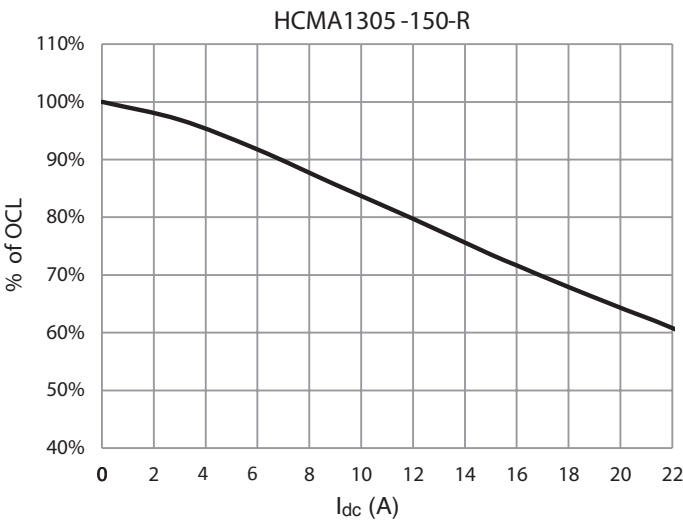
Inductance characteristics



Inductance characteristics



Inductance characteristics



## Solder reflow profile

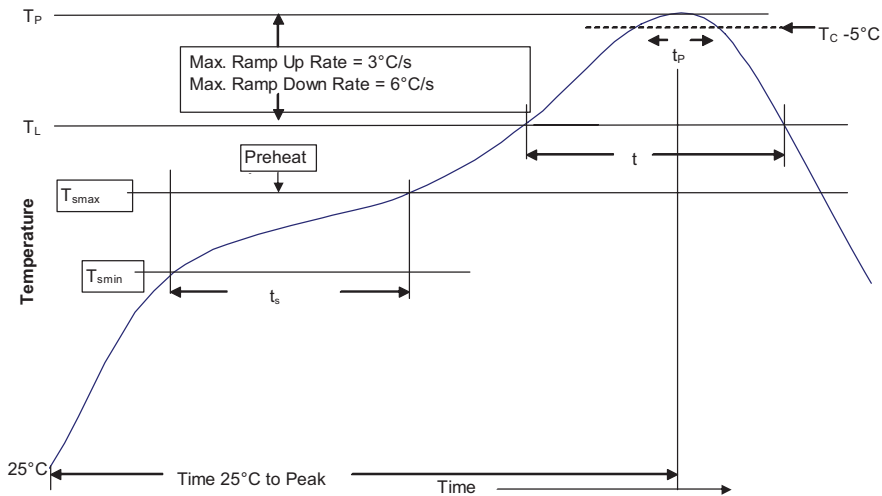


**Table 1 - Standard SnPb Solder ( $T_C$ )**

| 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.

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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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