**Product description**

- Automotive grade 3 qualified
- High current carrying capacity, low core losses
- Magnetically shielded, low EMI
- Frequency range up to 5MHz
- Inductance range from 0.10μH to 33μH
- Current range from 5.2A to 118A
- 13.8x12.5mm footprint surface mount package in a 5.0mm height
- Powder iron core material
- Halogen free, lead free, RoHS compliant

**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
  - 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 + self-temperature rise)
- Solder reflow temperature: J-STD-020D compliant

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The Coiltronics brand of magnetics (formerly of the Bussmann Division of Cooper Industries) is now part of Eaton’s Electrical Group, Electronics Division.

Coiltronics is now part of Eaton
Same great products plus even more.
## Technical Data

### HCMA1305 Series

**Automotive grade high current, power inductors**

### Product specifications

<table>
<thead>
<tr>
<th>Part Number6</th>
<th>OCL$^1$ (μH) ± 20%</th>
<th>FLL$^2$ Min. (μH)</th>
<th>$I_{\text{rms}}$ $^3$ (amps)</th>
<th>$I_{\text{sat}}$ $^4$ (amps)</th>
<th>DCR (mΩ) @ 20°C ± nominal</th>
<th>DCR (mΩ) @ 20°C maximum</th>
<th>K-factor$^5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCMA1305-R10-R</td>
<td>0.10</td>
<td>0.064</td>
<td>55</td>
<td>118</td>
<td>0.52</td>
<td>0.59</td>
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<tr>
<td>HCMA1305-R22-R</td>
<td>0.22</td>
<td>0.14</td>
<td>51</td>
<td>110</td>
<td>0.63</td>
<td>0.72</td>
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<td>0.33</td>
<td>0.21</td>
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<td>80</td>
<td>0.80</td>
<td>0.92</td>
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<td>HCMA1305-R47-R</td>
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<td>0.30</td>
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<td>65</td>
<td>0.80</td>
<td>0.92</td>
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<td>HCMA1305-R56-R</td>
<td>0.56</td>
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<td>55</td>
<td>1.15</td>
<td>1.33</td>
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<td>HCMA1305-R68-R</td>
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<td>54</td>
<td>1.15</td>
<td>1.33</td>
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<td>HCMA1305-R82-R</td>
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<td>HCMA1305-1R0-R</td>
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<tr>
<td>HCMA1305-1R5-R</td>
<td>1.50</td>
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<td>23</td>
<td>48</td>
<td>2.75</td>
<td>3.16</td>
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<tr>
<td>HCMA1305-1R8-R</td>
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<td>1.15</td>
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<td>40</td>
<td>4.00</td>
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<tr>
<td>HCMA1305-2R2-R</td>
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<td>1.41</td>
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<td>4.60</td>
<td>5.29</td>
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<tr>
<td>HCMA1305-3R3-R</td>
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<td>2.11</td>
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<td>7.70</td>
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<td>HCMA1305-4R7-R</td>
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<td>3.01</td>
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<td>11.0</td>
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<td>HCMA1305-5R6-R</td>
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<td>3.58</td>
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<td>22</td>
<td>12.0</td>
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<td>HCMA1305-6R8-R</td>
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<td>4.35</td>
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<td>21</td>
<td>13.0</td>
<td>15.0</td>
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<tr>
<td>HCMA1305-7R8-R</td>
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<td>4.99</td>
<td>10</td>
<td>18.5</td>
<td>16.8</td>
<td>19.4</td>
<td>117</td>
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<tr>
<td>HCMA1305-8R2-R</td>
<td>8.20</td>
<td>5.25</td>
<td>9.5</td>
<td>18</td>
<td>17.5</td>
<td>20.1</td>
<td>117</td>
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<td>HCMA1305-100-R</td>
<td>10.0</td>
<td>6.40</td>
<td>9.0</td>
<td>16</td>
<td>19.0</td>
<td>21.9</td>
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<td>HCMA1305-150-R</td>
<td>15.0</td>
<td>9.60</td>
<td>7.7</td>
<td>13</td>
<td>29.0</td>
<td>33.4</td>
<td>74</td>
</tr>
<tr>
<td>HCMA1305-220-R</td>
<td>22.0</td>
<td>14.1</td>
<td>6.2</td>
<td>10</td>
<td>45.0</td>
<td>51.8</td>
<td>63</td>
</tr>
<tr>
<td>HCMA1305-330-R</td>
<td>33.0</td>
<td>21.1</td>
<td>5.2</td>
<td>8</td>
<td>74.5</td>
<td>85.5</td>
<td>48</td>
</tr>
</tbody>
</table>

1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.25Vrms, 0.0Adc, +25°C.
2. Full Load Inductance (FLL) Test Parameters: 100kHz, 0.25Vrms, $I_{\text{sat}}$, @ +25°C.
3. $I_{\text{rms}}$: 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, airflow, 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. $I_{\text{sat}}$: Peak current for approximately 20% rolloff at +25°C.
5. K-factor: Used to determine $B_{\text{pp}}$ for core loss (see graph). $B_{\text{pp}}$ = $K \times L \times \Delta I$.
6. Part Number Definition: HCMA1305-yyy-R
   - HCMA1305 = 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
HCMA1305 Series
Automotive grade high current, power inductors

Dimensions - mm

Top View  Side View  Bottom View  Recommended Pad Layout  Schematic

Part Marking: A = Automotive grade, xxx = Inductance value in µH, R = decimal point, if no R is present, third character = number of zeros, wlyy = (Date Code), R = (Revision Level)

All soldering surfaces to be coplanar within 0.10 millimeters.

Tolerances are ±0.3 millimeters unless stated otherwise.

Color: Grey.

Packaging information - mm

Supplied in tape and reel packaging, 400 parts per 13" diameter reel.
Temperature rise vs. total loss

![Temperature Rise vs. Total Loss Graph]

Core loss

![Core Loss vs. B_{p-p} Graph]
HCMA1305 Series
Automotive grade high current, power inductors

Inductance characteristics

HCMA1305-R10-R

HCMA1305-R22-R

HCMA1305-R33-R

HCMA1305-R47-R

HCMA1305-R56-R

HCMA1305-R68-R

HCMA1305-1R0-R
Inductance characteristics

HCMA1305 Series
Automotive grade high current, power inductors

Idc (Amps)
HCMA1305 Series
Automotive grade high current, power inductors

Inductance characteristics

HCMA1305-4R7-R

% of OCL vs. I\text{dc} (Amps)

HCMA1305-5R6-R

% of OCL vs. I\text{dc} (Amps)

HCMA1305-6R8-R

% of OCL vs. I\text{dc} (Amps)

HCMA1305-7R8-R

% of OCL vs. I\text{dc} (Amps)

HCMA1305-8R2-R

% of OCL vs. I\text{dc} (Amps)

HCMA1305-100-R

% of OCL vs. I\text{dc} (Amps)

HCMA1305-150-R

% of OCL vs. I\text{dc} (Amps)

HCMA1305-220-R

% of OCL vs. I\text{dc} (Amps)

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HCMA1305 Series
Automotive grade high current, power inductors

Inductance characteristics

HCMA1305 -150-R

HCMA1305 -220-R

HCMA1305 -330-R

Idc (Amps)
**HCMA1305 Series**  
**Automotive grade high current, power inductors**

**Solder reflow profile**

![Solder reflow profile diagram](image)

**Table 1 - Standard SnPb Solder (T_P)**

<table>
<thead>
<tr>
<th>Package Thickness</th>
<th>Volume (mm³)</th>
<th>Volume (mm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2.5mm</td>
<td>235°C</td>
<td>220°C</td>
</tr>
<tr>
<td>≥2.5mm</td>
<td>220°C</td>
<td>220°C</td>
</tr>
</tbody>
</table>

**Table 2 - Lead (Pb) Free Solder (T_P)**

<table>
<thead>
<tr>
<th>Package Thickness</th>
<th>Volume (mm³)</th>
<th>Volume (mm³)</th>
<th>Volume (mm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1.6mm</td>
<td>260°C</td>
<td>260°C</td>
<td>260°C</td>
</tr>
<tr>
<td>1.6 – 2.5mm</td>
<td>250°C</td>
<td>245°C</td>
<td>245°C</td>
</tr>
<tr>
<td>&gt;2.5mm</td>
<td>250°C</td>
<td>245°C</td>
<td>245°C</td>
</tr>
</tbody>
</table>

**Reference JDEC J-STD-020D**

<table>
<thead>
<tr>
<th>Profile Feature</th>
<th>Standard SnPb Solder</th>
<th>Lead (Pb) Free Solder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preheat and Soak</td>
<td>Temperature min. (T_min) 100°C</td>
<td>150°C</td>
</tr>
<tr>
<td></td>
<td>Temperature max. (T_max) 150°C</td>
<td>200°C</td>
</tr>
<tr>
<td></td>
<td>Time (T_min to T_max) (t_s) 60-120 Seconds</td>
<td>60-120 Seconds</td>
</tr>
<tr>
<td>Average ramp up rate T_max to T_P</td>
<td>3°C/ Second Max.</td>
<td>3°C/ Second Max.</td>
</tr>
<tr>
<td>Liquidous temperature (T_L)</td>
<td>183°C</td>
<td>217°C</td>
</tr>
<tr>
<td>Time at liquidous (t_L)</td>
<td>60-150 Seconds</td>
<td>60-150 Seconds</td>
</tr>
<tr>
<td>Peak package body temperature (T_P)*</td>
<td>Table 1</td>
<td>Table 2</td>
</tr>
<tr>
<td>Time (T_P)** within 5°C of the specified classification temperature (T_C)</td>
<td>20 Seconds**</td>
<td>30 Seconds**</td>
</tr>
<tr>
<td>Average ramp-down rate (T_P to T_max)</td>
<td>6°C/ Second Max.</td>
<td>6°C/ Second Max.</td>
</tr>
<tr>
<td>Time 25°C to Peak Temperature</td>
<td>6 Minutes Max.</td>
<td>8 Minutes Max.</td>
</tr>
</tbody>
</table>

* Tolerance for peak profile temperature (T_P) is defined as a supplier minimum and a user maximum.

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