MPL-AL5050-6R8
Low-Resistance Molded Inductor 6.8µH

APPLICATIONS

- Battery-powered devices
- Embedded computing
- High-current SMPS
- High-frequency SMPS
- POL converters
- FPGA

FEATURES

- Size 5.5mmx5.3mmx4.8mm
- Low DCR
- Low AC Losses
- Low Audible Noise
- Molded Construction
- Soft Saturation
- Stable Over High Temperatures
- Max Operating Temp +155°C
- RoHS/REACH-Compliant, Halogen-Free

ELECTRICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inductance (1)</td>
<td>L</td>
<td>±20% 6.8 µH</td>
</tr>
<tr>
<td>Resistance</td>
<td>R&lt;sub&gt;DC&lt;/sub&gt; typ</td>
<td>25 mΩ</td>
</tr>
<tr>
<td>Resistance&lt;sub&gt;MAX&lt;/sub&gt;</td>
<td>R&lt;sub&gt;DC MAX&lt;/sub&gt; max</td>
<td>28.7 mΩ</td>
</tr>
<tr>
<td>Rated Current (2)</td>
<td>I&lt;sub&gt;R&lt;/sub&gt; typ</td>
<td>6.1 A</td>
</tr>
<tr>
<td>Saturation Current&lt;sub&gt;25°C&lt;/sub&gt; (3)</td>
<td>I&lt;sub&gt;SAT 25°C&lt;/sub&gt; typ</td>
<td>7.6 A</td>
</tr>
<tr>
<td>Saturation Current&lt;sub&gt;100°C&lt;/sub&gt; (4)</td>
<td>I&lt;sub&gt;SAT 100°C&lt;/sub&gt; typ</td>
<td>7.6 A</td>
</tr>
<tr>
<td>Resonance Frequency</td>
<td>f&lt;sub&gt;r&lt;/sub&gt; typ</td>
<td>15 MHz</td>
</tr>
</tbody>
</table>

GENERAL SPECIFICATIONS

(1) Inductance
Measured at 100kHz, 100mA

(2) Rated Current
Rated current will cause the coil temperature rise ΔT of 40K
I<sub>R</sub> measured with the inductor soldered in a single-layer PCB. Copper layer thickness 35µm Cu / PCB size 30x50mm. Temperature behavior dependent on circuit design, PCB layout, proximity to other components, and trace dimensions and thickness.

(3) Saturation Current<sub>25°C</sub>
Saturation current will cause L to drop from 30% at 25°C ambient temperature

(4) Saturation Current<sub>100°C</sub>
Saturation current will cause L to drop from 30% at 100°C ambient temperature

Temperature Test Condition
Electrical specifications measured at 25°C, 35% RH if not given differently

Operating Condition
Operating temperature: -40°C to +155°C (including temp rise)
Should not exceed +155°C under worst-case operation conditions

Storage Condition
Tape and Reel packaging: -10°C to +40°C
Humidity: <50% RH

All MPS parts are lead-free, halogen-free, and adhere to the RoHS directive. For MPS green status, please visit the MPS website under Quality Assurance. "MPS", the MPS logo, and "Simple, Easy Solutions" are registered trademarks of Monolithic Power Systems, Inc. or its subsidiaries.
TYPICAL PERFORMANCE CURVES

Temperature Rise vs. Current

Inductance vs. Current

Impedance vs. Frequency

Inductance vs. Frequency
Quality Factor vs. Frequency

![Quality Factor vs. Frequency Graph](image1)

AC Resistance vs. Frequency

![AC Resistance vs. Frequency Graph](image2)
LAND PATTERN

<table>
<thead>
<tr>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
</tr>
<tr>
<td>B</td>
</tr>
<tr>
<td>C</td>
</tr>
</tbody>
</table>

(unit in mm)

PRODUCT PACKAGE AND DIMENSIONS

<table>
<thead>
<tr>
<th>Dimensions</th>
</tr>
</thead>
</table>

(unit in mm)

TOP MARKING

<table>
<thead>
<tr>
<th>Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of Winding</td>
</tr>
<tr>
<td>Inductance Code</td>
</tr>
<tr>
<td>MPS Code</td>
</tr>
</tbody>
</table>
## GENERAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Part Number</th>
<th>L (^{(1)}) (\text{typ (µH)})</th>
<th>(R_{DC}) (\text{typ (mΩ)})</th>
<th>(I_R) (\text{typ (A)})</th>
<th>(I_{SAT\ 25°C}) (\text{typ (A)})</th>
<th>(I_{SAT\ 100°C}) (\text{typ (A)})</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPL-AL5050-5R6</td>
<td>5.6</td>
<td>20</td>
<td>6.8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>MPL-AL5050-6R8</td>
<td>6.8</td>
<td>25</td>
<td>6.1</td>
<td>7.6</td>
<td>7.6</td>
</tr>
<tr>
<td>MPL-AL5050-8R2</td>
<td>8.2</td>
<td>28</td>
<td>5.8</td>
<td>7.2</td>
<td>7.2</td>
</tr>
<tr>
<td>MPL-AL5050-100</td>
<td>10</td>
<td>37</td>
<td>4.8</td>
<td>5.5</td>
<td>5.5</td>
</tr>
</tbody>
</table>

\(^{(1)}\) Inductance

- Measured at 100kHz, 100mA

\(^{(2)}\) Rated Current

- Rated current will cause the coil temperature rise \(ΔT\) of 40K
- \(I_R\) measured with the inductor soldered in a single-layer PCB. Copper layer thickness 35µm Cu / PCB size 30x50mm. Temperature behavior dependent on circuit design, PCB layout, proximity to other components, and trace dimensions and thickness.

\(^{(3)}\) Saturation Current \(25°C\)

- Saturation current will cause L to drop from 30% at 25°C ambient temperature

\(^{(4)}\) Saturation Current \(100°C\)

- Saturation current will cause L to drop from 30% at 100°C ambient temperature

**Temperature Test Condition**

- Electrical specifications measured at 25°C, 35% RH if not given differently

**Operating Condition**

- Operating temperature: -40°C to +155°C (including temp rise)
- Should not exceed +155°C under worst-case operation conditions

**Storage Condition**

- Tape and Reel packaging: -10°C to +40°C
- Humidity: <50% RH