MPL-AL4020-R68
Low-Resistance Molded Inductor 0.68µH

APPLICATIONS

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

FEATURES

- Size 4.1mm x 4.1mm x 1.9mm
- 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%</td>
</tr>
<tr>
<td>Resistance (2)</td>
<td>( R_{DC} ) typ</td>
<td>7.5</td>
</tr>
<tr>
<td>Resistance MAX (3)</td>
<td>( R_{DC , MAX} ) max</td>
<td>8.3</td>
</tr>
<tr>
<td>Rated Current (2)</td>
<td>( I_R ) typ</td>
<td>8.7</td>
</tr>
<tr>
<td>Saturation Current 25°C (3)</td>
<td>( I_{SAT , 25°C} ) typ</td>
<td>11</td>
</tr>
<tr>
<td>Saturation Current 100°C (4)</td>
<td>( I_{SAT , 100°C} ) typ</td>
<td>11</td>
</tr>
<tr>
<td>Resonance Frequency</td>
<td>( f_r ) typ</td>
<td>74</td>
</tr>
</tbody>
</table>

GENERAL SPECIFICATIONS

(1) Inductance

Rated current will cause the coil temperature rise \( \Delta T \) 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.

(2) Rated Current

(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

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TYPICAL PERFORMANCE CURVES

Temperature Rise vs. Current

Inductance vs. Current

Impedance vs. Frequency

Inductance vs. Frequency
Quality Factor vs. Frequency

AC Resistance vs. Frequency

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

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

<table>
<thead>
<tr>
<th>Dimensions</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>3.80 ref.</td>
</tr>
<tr>
<td>B</td>
<td>1.40 ref.</td>
</tr>
<tr>
<td>C</td>
<td>3.40 ref.</td>
</tr>
</tbody>
</table>

(unit in mm)

**PRODUCT PACKAGE AND DIMENSIONS**

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

(unit in mm)

**TOP MARKING**

<table>
<thead>
<tr>
<th>Marking</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of Winding</td>
<td>· (dot)</td>
</tr>
<tr>
<td>Inductance Code</td>
<td>R68</td>
</tr>
<tr>
<td>MPS Code</td>
<td>MPS</td>
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MPL-AL4020-R68 – LOW-RESISTANCE MOLDED INDUCTOR 0.68µH

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## ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part Number</th>
<th>$L$ (1) typ (µH)</th>
<th>$R_{DC}$ typ (mΩ)</th>
<th>$I_R$ (2) typ (A)</th>
<th>$I_{SAT,25°C}$ (3) typ (A)</th>
<th>$I_{SAT,100°C}$ (4) typ (A)</th>
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</thead>
<tbody>
<tr>
<td>MPL-AL4020-R47</td>
<td>0.47</td>
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<td>MPL-AL4020-R68</td>
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<td>8.7</td>
<td>11</td>
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<tr>
<td>MPL-AL4020-R82</td>
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<td>MPL-AL4020-1R0</td>
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<td>7.9</td>
<td>8.6</td>
<td>8.6</td>
</tr>
<tr>
<td>MPL-AL4020-1R2</td>
<td>1.2</td>
<td>12.2</td>
<td>7.4</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>MPL-AL4020-1R5</td>
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<td>14.5</td>
<td>6.4</td>
<td>7.1</td>
<td>7.1</td>
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<td>MPL-AL4020-2R2</td>
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<td>21.5</td>
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<td>6.2</td>
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<td>34.5</td>
<td>4.4</td>
<td>5.2</td>
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<td>MPL-AL4020-4R7</td>
<td>4.7</td>
<td>52.2</td>
<td>3.65</td>
<td>4.2</td>
<td>4.2</td>
</tr>
</tbody>
</table>

## GENERAL SPECIFICATIONS

### (1) Inductance
Measured at 100kHz, 100mA

### (2) Rated Current
Rated current will cause the coil temperature rise $\Delta T$ of 40K

$\Delta T \leq 40K$

Measured with the inductor soldered in a single-layer PCB. Copper layer thickness

$35\,\mu$m Cu / PCB size 30x50mm. Temperature behavior dependent on circuit design, 

PCB layout, proximity to other components, and trace dimensions and thickness.

### (3) Saturation Current

- **$I_{SAT\,25°C}$**

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

### (4) Saturation Current

- **$I_{SAT\,100°C}$**

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

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