**APPLICATIONS**

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

## FEATURES

- Size 4.1mmx4.1mmx1.9mm
- 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</td>
<td>( R_{DC} ) typ</td>
<td>9.0</td>
</tr>
<tr>
<td>Resistance MAX</td>
<td>( R_{DC , MAX} ) max</td>
<td>9.8</td>
</tr>
<tr>
<td>Rated Current (2)</td>
<td>( I_R ) typ</td>
<td>8.4</td>
</tr>
<tr>
<td>Saturation Current 25°C (3)</td>
<td>( I_{SAT , 25°C} ) typ</td>
<td>9.5</td>
</tr>
<tr>
<td>Saturation Current 100°C (4)</td>
<td>( I_{SAT , 100°C} ) typ</td>
<td>9.5</td>
</tr>
<tr>
<td>Resonance Frequency</td>
<td>( f_r ) typ</td>
<td>68</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 over 1.9mm when operated at the rated current \( I_R \) 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

## Operating Test Condition

- **Operating temperature:** -40°C to +155°C (including temp rise)
- **Humidity:** <50% RH
- **Storage Condition:** Tape and Reel packaging: -10°C to +40°C

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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

AC Resistance vs. Frequency
LAND PATTERN

Dimensions

<table>
<thead>
<tr>
<th>A</th>
<th>3.80 ref.</th>
</tr>
</thead>
<tbody>
<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

Dimensions

(unit in mm)

TOP MARKING

Marking

Start of Winding · (dot)
Inductance Code R82
MPS Code MPS
## 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^\circ C}) ((^{3})) typ (A)</th>
<th>I(_{SAT,100^\circ C}) ((^{4})) typ (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPL-AL4020-R47</td>
<td>0.47</td>
<td>6.2</td>
<td>9.2</td>
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<tr>
<td>MPL-AL4020-R68</td>
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<td>7.5</td>
<td>8.7</td>
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<tr>
<td>MPL-AL4020-R82</td>
<td>0.82</td>
<td>9.0</td>
<td>8.4</td>
<td>9.5</td>
<td>9.5</td>
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<tr>
<td>MPL-AL4020-1R0</td>
<td>1.0</td>
<td>10.1</td>
<td>7.9</td>
<td>8.6</td>
<td>8.6</td>
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<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>
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<tr>
<td>MPL-AL4020-1R5</td>
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<td>7.1</td>
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<td>MPL-AL4020-2R2</td>
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<td>6.2</td>
<td>6.2</td>
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<tr>
<td>MPL-AL4020-3R3</td>
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<td>34.5</td>
<td>4.4</td>
<td>5.2</td>
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<tr>
<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
\(I_R\) 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 \(25^\circ C\)
Saturation current will cause L to drop from 30% at 25°C ambient temperature

### (4) Saturation Current \(100^\circ C\)
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