MPL-A

Molded Inductor 6.8µH

APPLICATIONS

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

FEATURES

- Size 4.45mm x 4.1mm x 1.8mm
- Molded Construction
- Low Audible Noise
- 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>129 mΩ</td>
</tr>
<tr>
<td>Resistance max</td>
<td>$R_{DC , max}$ max</td>
<td>157 mΩ</td>
</tr>
<tr>
<td>Rated Current (2)</td>
<td>$I_R$ typ</td>
<td>2.20 A</td>
</tr>
<tr>
<td>Saturation Current $25°C$ (3)</td>
<td>$I_{SAT , 25°C}$ typ</td>
<td>2.4 A</td>
</tr>
<tr>
<td>Saturation Current $100°C$ (4)</td>
<td>$I_{SAT , 100°C}$ typ</td>
<td>2.4 A</td>
</tr>
<tr>
<td>Resonance Frequency</td>
<td>$f_r$ typ</td>
<td>21 MHz</td>
</tr>
</tbody>
</table>

GENERAL SPECIFICATIONS

(1) Inductance

Rated current will cause the coil temperature rise $\Delta T$ of 40K

(2) 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

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)

Storage Condition

Tape and Reel packaging: -10°C to +40°C

Humidity: <50% RH
**TYPICAL PERFORMANCE CURVES**

**Temperature Rise vs. Current**

![Temperature Rise vs. Current Graph]

**Inductance vs. Current**

![Inductance vs. Current Graph]

**Impedance vs. Frequency**

![Impedance vs. Frequency Graph]

**Inductance vs. Frequency**

![Inductance vs. Frequency Graph]
Quality Factor vs. Frequency

AC Resistance vs. Frequency
### LAND PATTERN

<table>
<thead>
<tr>
<th>Dimensions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2.50 ref.</td>
</tr>
<tr>
<td>B</td>
<td>2.20 ref.</td>
</tr>
<tr>
<td>C</td>
<td>5.20 ref.</td>
</tr>
</tbody>
</table>

(unit in mm)

### PRODUCT PACKAGE AND DIMENSIONS

Dimensions (unit in mm)

### TOP MARKING

<table>
<thead>
<tr>
<th>Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of Winding: · (dot)</td>
</tr>
<tr>
<td>Inductance Code: 6R8</td>
</tr>
</tbody>
</table>
ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Part Number</th>
<th>$L^{(1)}$</th>
<th>$R_{DC}$</th>
<th>$I_{R}^{(2)}$</th>
<th>$I_{SAT,25^\circ C}^{(3)}$</th>
<th>$I_{SAT,100^\circ C}^{(4)}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>MPL-AY4020-5R6</td>
<td>5.6</td>
<td>97</td>
<td>2.45</td>
<td>2.6</td>
<td>2.6</td>
</tr>
<tr>
<td>MPL-AY4020-6R8</td>
<td>6.8</td>
<td>129</td>
<td>2.20</td>
<td>2.4</td>
<td>2.4</td>
</tr>
<tr>
<td>MPL-AY4020-8R2</td>
<td>8.2</td>
<td>136</td>
<td>2.10</td>
<td>2.1</td>
<td>2.1</td>
</tr>
<tr>
<td>MPL-AY4020-100</td>
<td>10</td>
<td>163</td>
<td>1.90</td>
<td>2</td>
<td>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

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