

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

| Parameter | | | Value | Unit |
|--|------------------------|------------|-------|------------|
| Inductance ⁽¹⁾ | L | $\pm 20\%$ | 1.5 | μ H |
| Resistance | R_{DC} | typ | 14.5 | m Ω |
| Resistance _{MAX} | $R_{DC\ MAX}$ | max | 15.9 | m Ω |
| Rated Current ⁽²⁾ | I_R | typ | 6.4 | A |
| Saturation Current _{25°C} ⁽³⁾ | $I_{SAT\ 25^\circ C}$ | typ | 7.1 | A |
| Saturation Current _{100°C} ⁽⁴⁾ | $I_{SAT\ 100^\circ C}$ | typ | 7.1 | A |
| Resonance Frequency | f_r | typ | 53 | MHz |

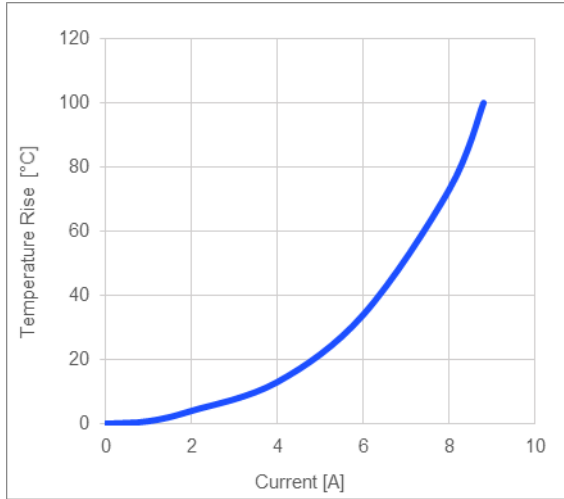
GENERAL SPECIFICATIONS

| | |
|--|--|
| ⁽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 35 μ 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 _{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 |

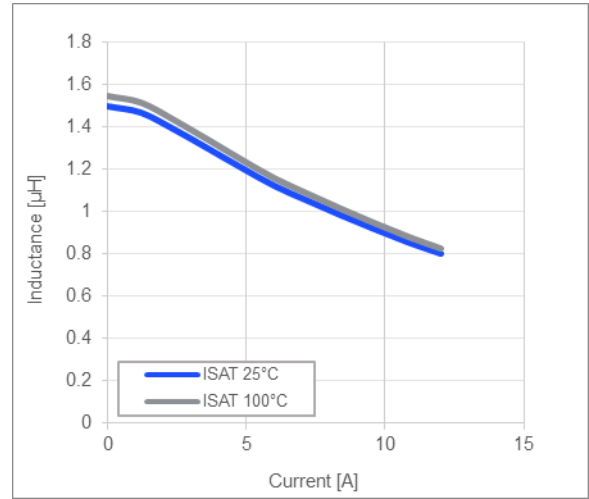
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TYPICAL PERFORMANCE CURVES

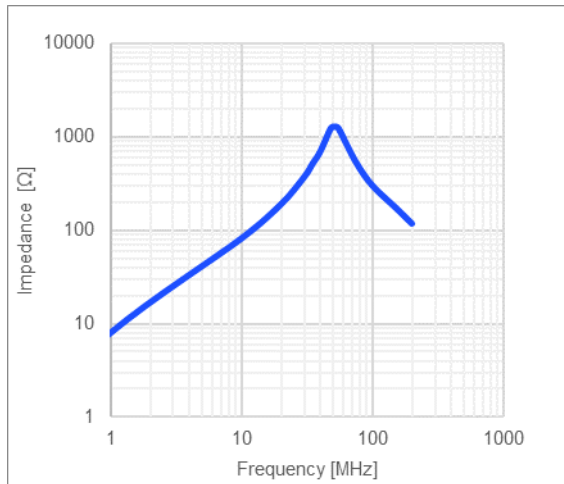
Temperature Rise vs. Current



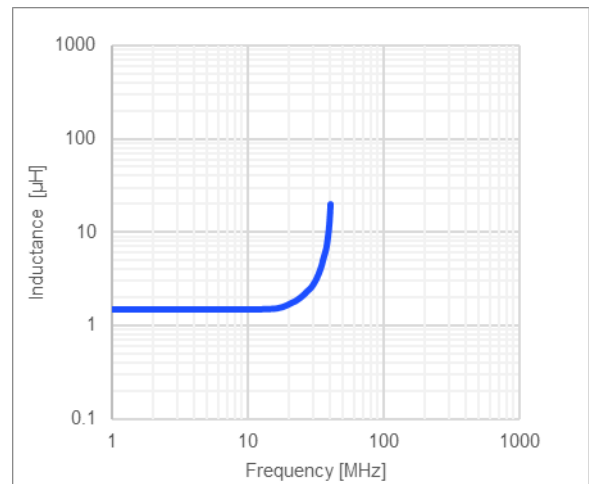
Inductance vs. Current



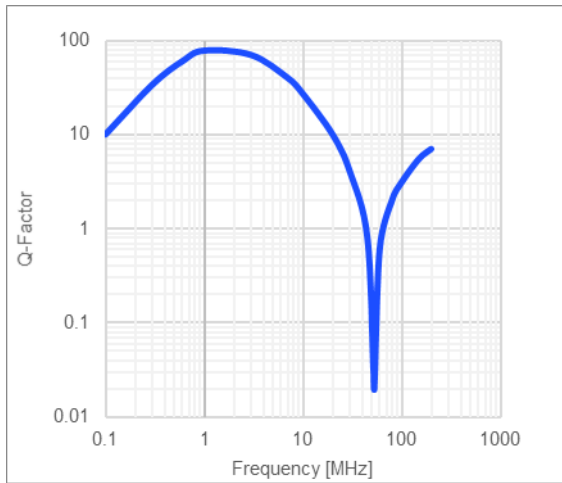
Impedance vs. Frequency



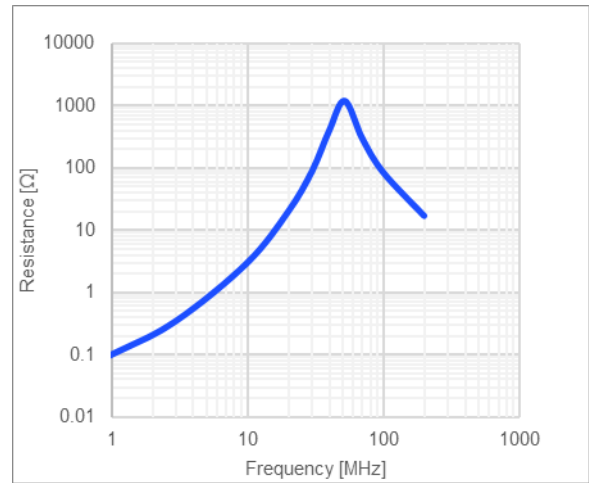
Inductance vs. Frequency



Quality Factor vs. Frequency



AC Resistance vs. Frequency



LAND PATTERN

Dimensions

| | |
|---|-----------|
| A | 3.80 ref. |
| B | 1.40 ref. |
| C | 3.40 ref. |

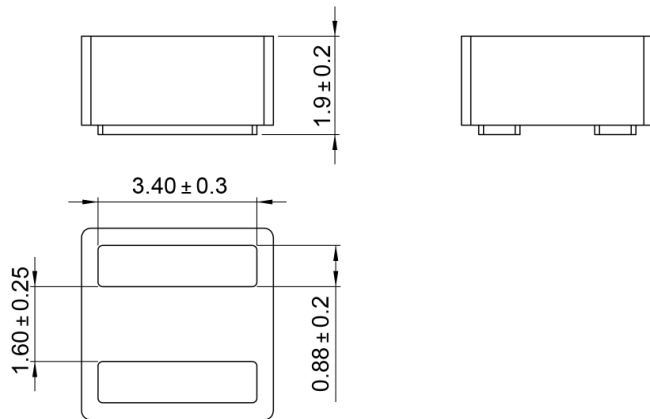
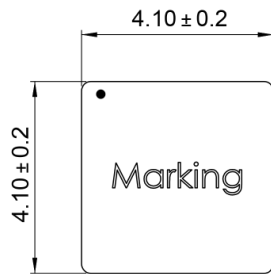
(unit in mm)



PRODUCT PACKAGE AND DIMENSIONS

Dimensions

(unit in mm)



TOP MARKING

Marking

| | |
|------------------|---------|
| Start of Winding | · (dot) |
| Inductance Code | 1R5 |
| MPS Code | MPS |

ORDERING INFORMATION

| Part Number | $L^{(1)}$ | R_{DC} | $I_R^{(2)}$ | $I_{SAT\ 25^\circ C}^{(3)}$ | $I_{SAT\ 100^\circ C}^{(4)}$ |
|----------------|-----------|----------|-------------|-----------------------------|------------------------------|
| | typ (μH) | typ (mΩ) | typ (A) | typ (A) | typ (A) |
| MPL-AL4020-R47 | 0.47 | 6.2 | 9.2 | 12.5 | 12.5 |
| MPL-AL4020-R68 | 0.68 | 7.5 | 8.7 | 11 | 11 |
| MPL-AL4020-R82 | 0.82 | 9.0 | 8.4 | 9.5 | 9.5 |
| MPL-AL4020-1R0 | 1.0 | 10.1 | 7.9 | 8.6 | 8.6 |
| MPL-AL4020-1R2 | 1.2 | 12.2 | 7.4 | 7.5 | 7.5 |
| MPL-AL4020-1R5 | 1.5 | 14.5 | 6.4 | 7.1 | 7.1 |
| MPL-AL4020-2R2 | 2.2 | 21.5 | 5.5 | 6.2 | 6.2 |
| MPL-AL4020-3R3 | 3.3 | 34.5 | 4.4 | 5.2 | 5.2 |
| MPL-AL4020-4R7 | 4.7 | 52.2 | 3.65 | 4.2 | 4.2 |

GENERAL SPECIFICATIONS

(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 $_{25^\circ C}$ 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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