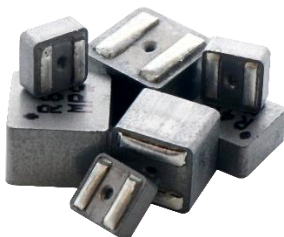


### APPLICATIONS



- 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 <sup>(1)</sup>                          | $L$              | ±20% | 1.5   | μH   |
| Resistance                                         | $R_{DC}$         | typ  | 14.5  | mΩ   |
| Resistance <sub>MAX</sub>                          | $R_{DC\ MAX}$    | max  | 15.9  | mΩ   |
| Rated Current <sup>(2)</sup>                       | $I_R$            | typ  | 6.4   | A    |
| Saturation Current <sub>25°C</sub> <sup>(3)</sup>  | $I_{SAT\ 25°C}$  | typ  | 7.1   | A    |
| Saturation Current <sub>100°C</sub> <sup>(4)</sup> | $I_{SAT\ 100°C}$ | typ  | 7.1   | A    |
| Resonance Frequency                                | $f_r$            | typ  | 53    | MHz  |

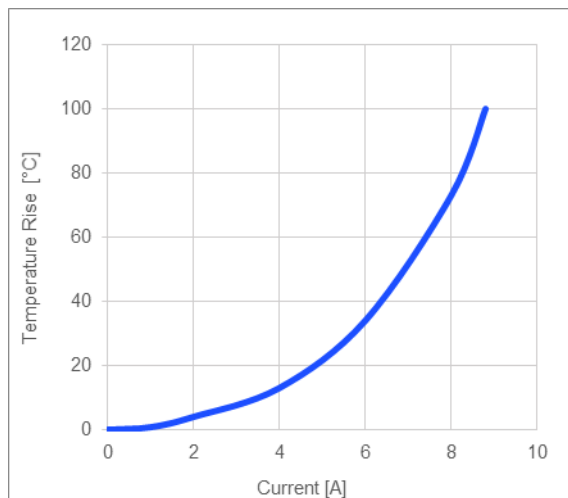
### GENERAL SPECIFICATIONS

|                                                    |                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <sup>(1)</sup> Inductance                          | Measured at 100kHz, 100mA                                                                                                                                                                                                                                                                                            |
| <sup>(2)</sup> Rated Current                       | Rated current will cause the coil temperature rise ΔT of 40K<br>$I_R$ 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. |
| <sup>(3)</sup> Saturation Current <sub>25°C</sub>  | Saturation current will cause L to drop from 30% at 25°C ambient temperature                                                                                                                                                                                                                                         |
| <sup>(4)</sup> 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)<br>Should not exceed +155°C under worst-case operation conditions                                                                                                                                                                                       |
| Storage Condition                                  | Tape and Reel packaging: -10°C to +40°C<br>Humidity: <50% RH                                                                                                                                                                                                                                                         |

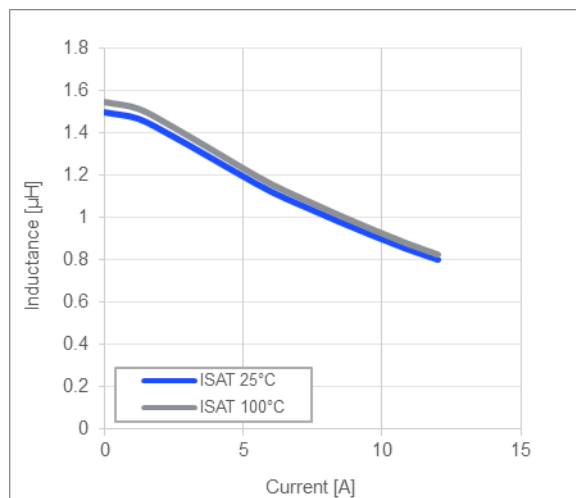
All MPS parts are lead-free, halogen-free, and adhere to the RoHS directive. For MPS green status, please visit the MPS website under Quality Assurance. "MPS", the MPS logo, and "Simple, Easy Solutions" are registered trademarks of Monolithic Power Systems, Inc. or its subsidiaries.

**TYPICAL PERFORMANCE CURVES**

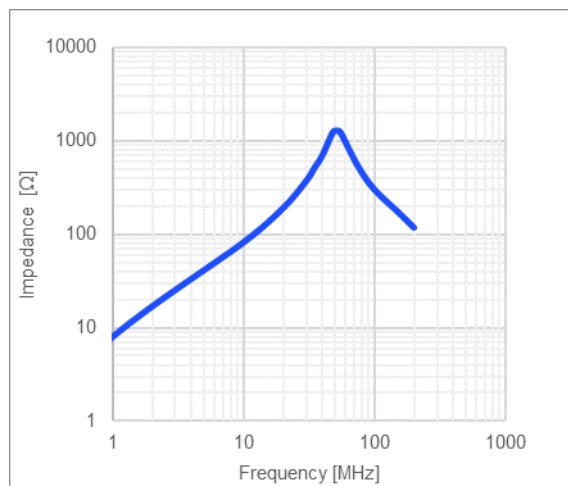
**Temperature Rise vs. Current**



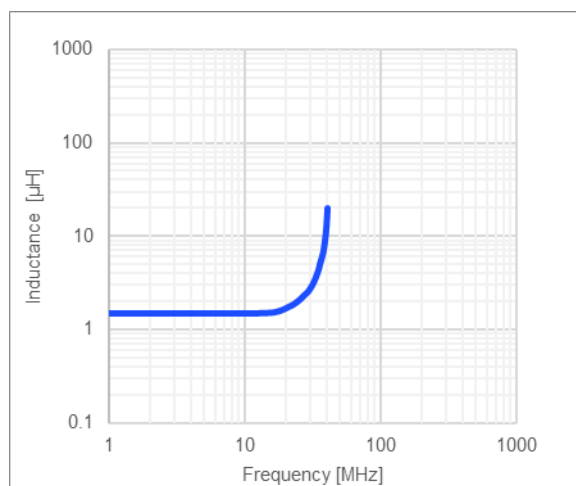
**Inductance vs. Current**



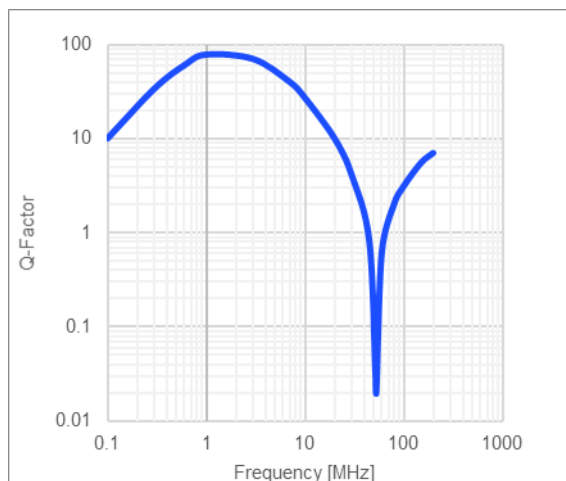
**Impedance vs. Frequency**



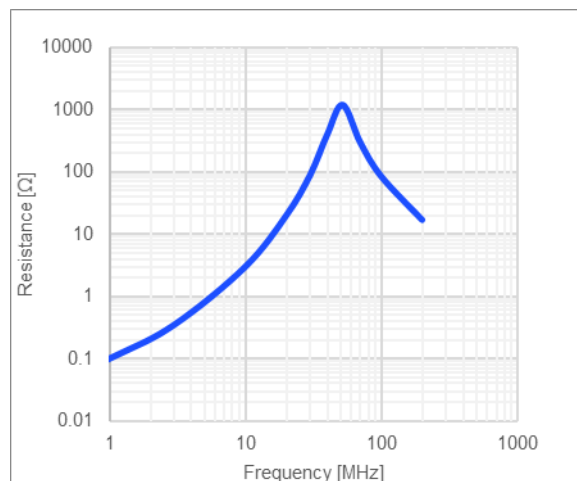
**Inductance vs. Frequency**



**Quality Factor vs. Frequency**



**AC Resistance vs. Frequency**

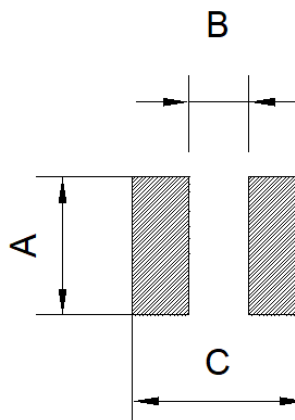


## LAND PATTERN

### Dimensions

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

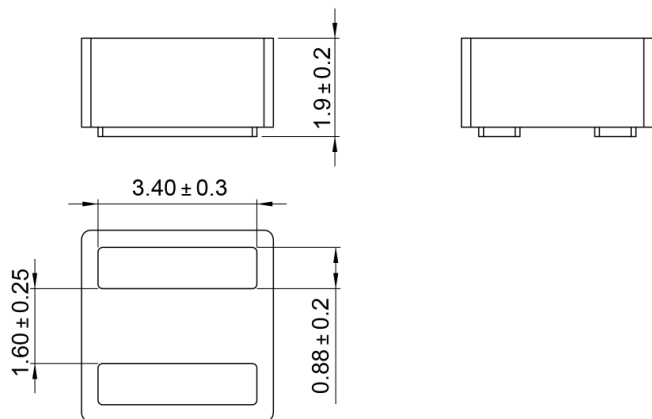
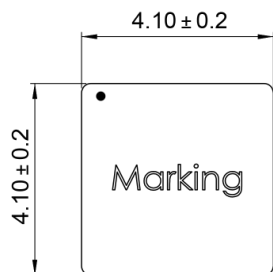
(unit in mm)



## 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

|                                                           |                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>(1) Inductance</b>                                     | Measured at 100kHz, 100mA                                                                                                                                                                                                                                                                                                                      |
| <b>(2) Rated Current</b>                                  | Rated current will cause the coil temperature rise $\Delta T$ of 40K<br><i><math>I_R</math> 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.</i> |
| <b>(3) Saturation Current <math>_{25^\circ C}</math></b>  | Saturation current will cause L to drop from 30% at 25°C ambient temperature                                                                                                                                                                                                                                                                   |
| <b>(4) Saturation Current <math>_{100^\circ C}</math></b> | Saturation current will cause L to drop from 30% at 100°C ambient temperature                                                                                                                                                                                                                                                                  |
| <b>Temperature Test Condition</b>                         | Electrical specifications measured at 25°C, 35% RH if not given differently                                                                                                                                                                                                                                                                    |
| <b>Operating Condition</b>                                | Operating temperature: -40°C to +155°C (including temp rise)<br>Should not exceed +155°C under worst-case operation conditions                                                                                                                                                                                                                 |
| <b>Storage Condition</b>                                  | Tape and Reel packaging: -10°C to +40°C<br>Humidity: <50% RH                                                                                                                                                                                                                                                                                   |

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