



### APPLICATIONS

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

### FEATURES

- Size 3.5mmx3.2mmx1.8mm
- Molded Construction
- Low Audible Noise
- Soft Saturation
- Stable Over High Temperatures
- Max Operating Temp +125°C
- RoHS/REACH-Compliant, Halogen-Free

### ELECTRICAL CHARACTERISTICS

| Parameter                                          |                  |      | Value | Unit |
|----------------------------------------------------|------------------|------|-------|------|
| Inductance <sup>(1)</sup>                          | $L$              | ±20% | 0.68  | μH   |
| Resistance                                         | $R_{DC}$         | typ  | 26    | mΩ   |
| Resistance <sub>MAX</sub>                          | $R_{DC\ MAX}$    | max  | 30    | mΩ   |
| Rated Current <sup>(2)</sup>                       | $I_R$            | typ  | 5.15  | A    |
| Saturation Current <sub>25°C</sub> <sup>(3)</sup>  | $I_{SAT\ 25°C}$  | typ  | 8.6   | A    |
| Saturation Current <sub>100°C</sub> <sup>(4)</sup> | $I_{SAT\ 100°C}$ | typ  | 8.6   | A    |
| Resonance Frequency                                | $f_r$            | typ  | 99    | MHz  |

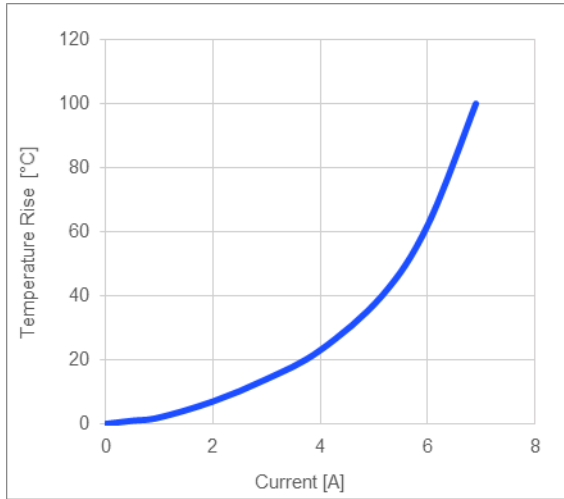
### GENERAL SPECIFICATIONS

|                                                    |                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <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 +125°C (including temp rise)<br>Should not exceed +125°C under worst-case operation conditions                                                                                                                                                                                       |
| Storage Condition                                  | Tape and Reel packaging: -10°C to +40°C<br>Humidity: <50% RH                                                                                                                                                                                                                                                         |

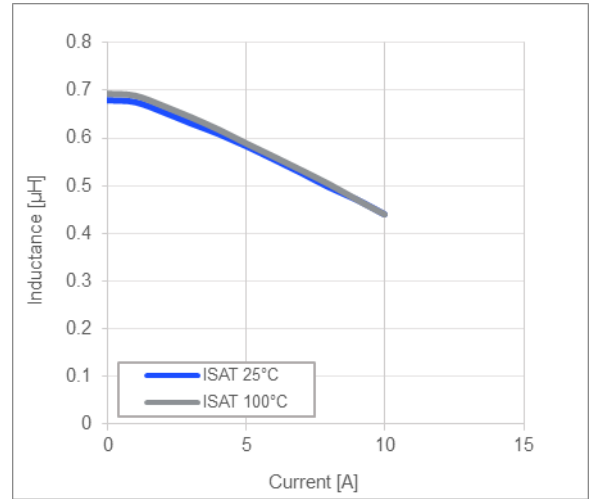
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TYPICAL PERFORMANCE CURVES

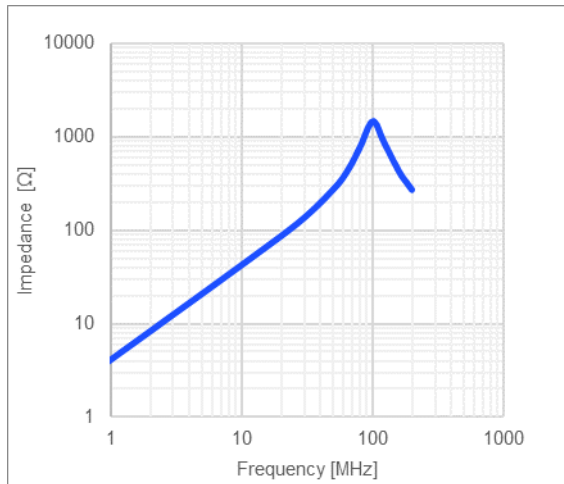
Temperature Rise vs. Current



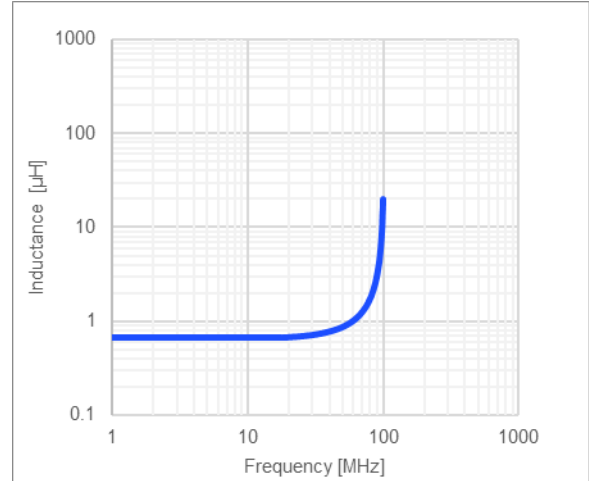
Inductance vs. Current



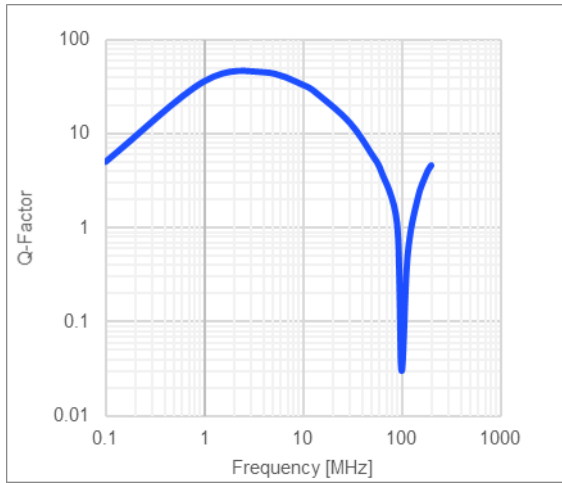
Impedance vs. Frequency



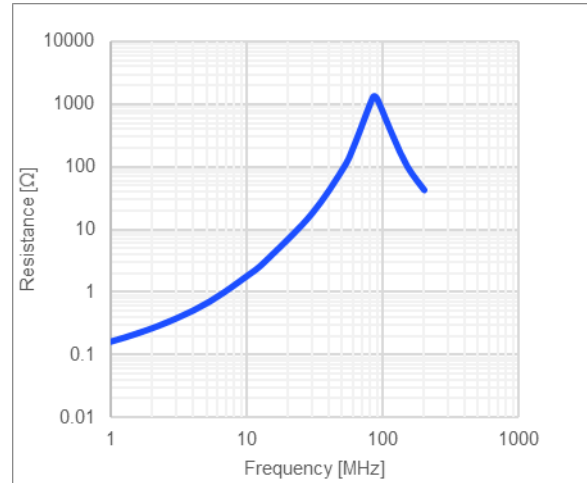
Inductance vs. Frequency



**Quality Factor vs. Frequency**



**AC Resistance vs. Frequency**



**LAND PATTERN**

**Dimensions**

|   |           |
|---|-----------|
| A | 1.45 ref. |
| B | 1.90 ref. |
| C | 4.10 ref. |

(unit in mm)



**PRODUCT PACKAGE AND DIMENSIONS**

**Dimensions**

(unit in mm)



**TOP MARKING**

**Marking**

|                  |         |
|------------------|---------|
| Start of Winding | · (dot) |
| Inductance Code  | .68     |

**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-AY3020-R47 | 0.47      | 19.5     | 6.3         | 9                           | 9                            |
| MPL-AY3020-R68 | 0.68      | 26       | 5.15        | 8.6                         | 8.6                          |
| MPL-AY3020-R82 | 0.82      | 28       | 4.7         | 8                           | 8                            |
| MPL-AY3020-1R0 | 1.0       | 30       | 4.3         | 6.2                         | 6.2                          |
| MPL-AY3020-1R5 | 1.5       | 35       | 3.4         | 5.9                         | 5.9                          |
| MPL-AY3020-2R2 | 2.2       | 64       | 3.0         | 5.3                         | 5.3                          |
| MPL-AY3020-3R3 | 3.3       | 121      | 2.5         | 3.7                         | 3.7                          |
| MPL-AY3020-4R7 | 4.7       | 173      | 2.0         | 3.1                         | 3.1                          |
| MPL-AY3020-5R6 | 5.6       | 209      | 1.8         | 2.8                         | 2.8                          |
| MPL-AY3020-6R8 | 6.8       | 250      | 1.65        | 2.6                         | 2.6                          |
| MPL-AY3020-8R2 | 8.2       | 345      | 1.4         | 1.95                        | 1.95                         |
| MPL-AY3020-100 | 10        | 370      | 1.3         | 1.75                        | 1.75                         |

**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 +125°C (including temp rise)<br>Should not exceed +125°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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