



### 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>                          | $L$              | $\pm 20\%$ | 10    | $\mu$ H    |
| Resistance   | $R_{DC}$         | typ        | 370   | m $\Omega$ |
| Resistance <sub>MAX</sub>                          | $R_{DC\ MAX}$    | max        | 425   | m $\Omega$ |
| Rated Current <sup>(2)</sup>                       | $I_R$            | typ        | 1.3   | A          |
| Saturation Current <sub>25°C</sub> <sup>(3)</sup>  | $I_{SAT\ 25°C}$  | typ        | 1.75  | A          |
| Saturation Current <sub>100°C</sub> <sup>(4)</sup> | $I_{SAT\ 100°C}$ | typ        | 1.75  | A          |
| Resonance Frequency                                | $f_r$            | typ        | 21    | MHz        |

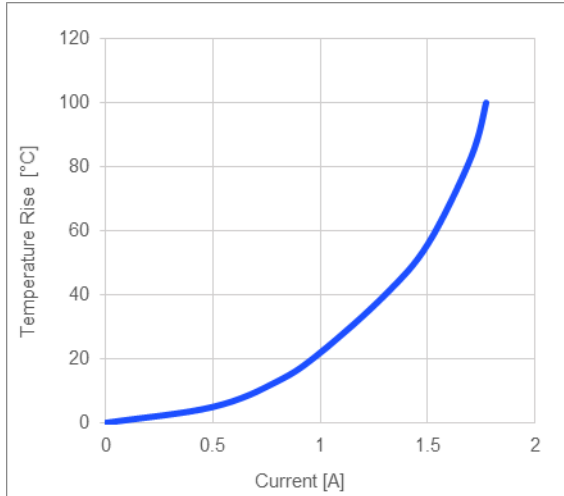
### GENERAL SPECIFICATIONS

|  |  |
|--|--|
| <sup>(1)</sup> Inductance                          | Measured at 100kHz, 100mA  |
| <sup>(2)</sup> Rated Current                       | Rated current will cause the coil temperature rise $\Delta T$ of 40K<br>$I_R$ measured with the inductor soldered in a single-layer PCB. Copper layer thickness 35 $\mu$ m 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   |

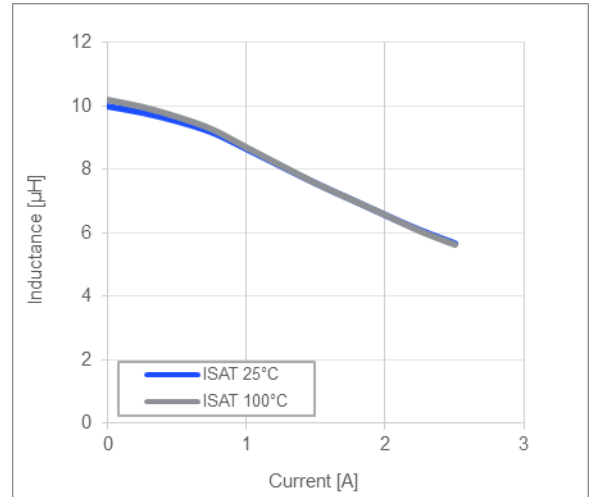
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TYPICAL PERFORMANCE CURVES

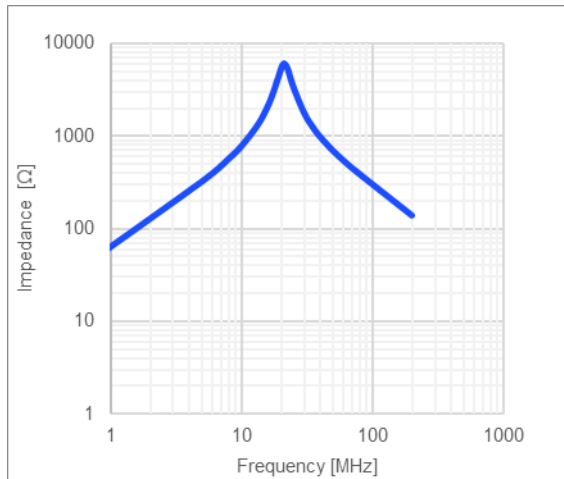
Temperature Rise vs. Current



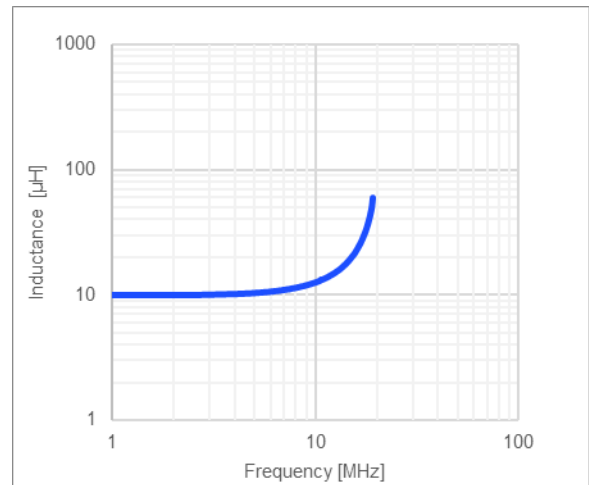
Inductance vs. Current



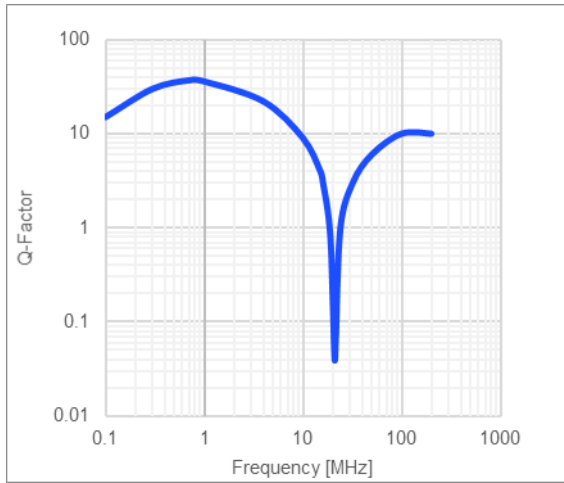
Impedance vs. Frequency



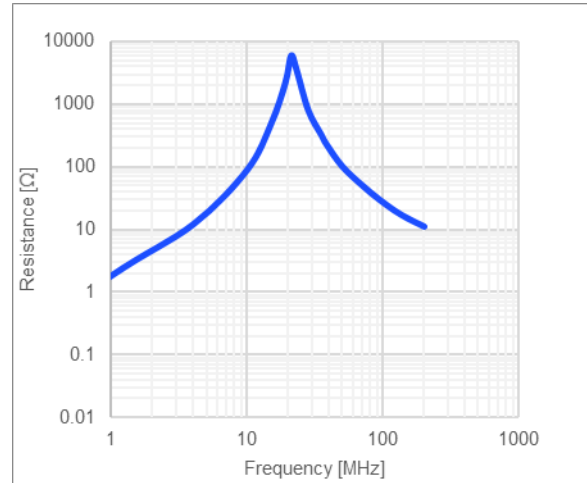
Inductance vs. Frequency



**Quality Factor vs. Frequency**



**AC Resistance vs. Frequency**



**LAND PATTERN**

**Dimensions**

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

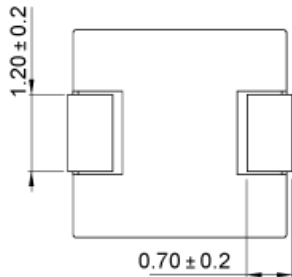
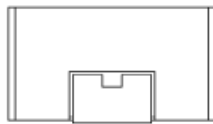
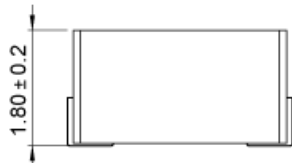
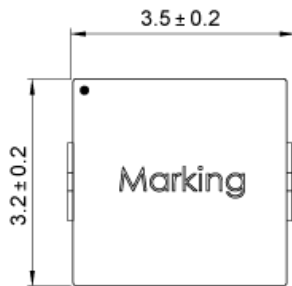
(unit in mm)



**PRODUCT PACKAGE AND DIMENSIONS**

**Dimensions**

(unit in mm)



**TOP MARKING**

**Marking**

|                  |         |
|------------------|---------|
| Start of Winding | · (dot) |
| Inductance Code  | 10      |

**ORDERING INFORMATION**

| Part Number    | $L^{(1)}$<br>typ (μH) | $R_{DC}$<br>typ (mΩ) | $I_R^{(2)}$<br>typ (A) | $I_{SAT\ 25^{\circ}C}^{(3)}$<br>typ (A) | $I_{SAT\ 100^{\circ}C}^{(4)}$<br>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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