

High Frequency, High Current Power Inductors MPA7030 Series









Description

- · Halogen free
- 165°C maximum total temperature operation
- 7.6x7.0x3.0mm maximum surface mount package
- · Magnetically shielded
- Rugged construction
- · Handles high transient inrush current spikes
- Inductance Range from 1.5μH to 8.2μH
- Current range from 3.5 to 17.5 Amps
- RoHS compliant

Applications

- Automotive electronics (under the hood, interior/exterior)
- Voltage Regulator Module (VRM)
- · Multi-phase regulators
- · Point-of-load modules
- Desktop and server VRMs and EVRDs
- Base station equipment
- Notebook regulators
- POL Converters
- Battery power systems
- · Data networking and storage
- · Graphics cards
- LCD Displays, LED drivers

Environmental Data

- Storage temperature range: -55°C to +165°C
- Operating temperature range: -55°C to +165°C (ambient + self-temperature rise)
- Solder reflow temperature: J-STD-020D compliant
- Complies with AEC-Q200 standard

Packaging

• Supplied in tape and reel packaging, 1500 parts per 13" reel

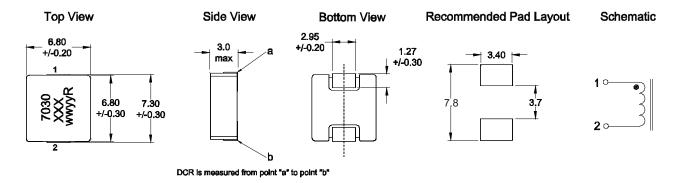
| Product Specifications | | | | | | | | |
|------------------------|------------|---------------------|---------------------|-------------------|-----------|-------------------|-------------------|-----------|
| Part | OCL1 | I _{rms1} ² | I _{rms2} ³ | l _{sat⁴} | SRF (MHz) | DCR (m Ω) | DCR (m Ω) | |
| Number ⁶ | ± 20% (μH) | (Amps) | (Amps) | (Amps) | Minimum | @20°C Typical | @20°C Maximum | K-Factor⁵ |
| MPA7030-1R5-R | 1.5 | 9.20 | 7.60 | 17.5 | 37 | 13.5 | 14.9 | 174.6 |
| MPA7030-2R2-R | 2.2 | 7.70 | 6.30 | 11.0 | 28 | 19.6 | 22.0 | 145.8 |
| MPA7030-3R3-R | 3.3 | 6.20 | 5.40 | 11.0 | 19 | 26.0 | 28.1 | 124.7 |
| MPA7030-4R7-R | 4.7 | 5.50 | 4.70 | 9.50 | 15 | 36.5 | 40.0 | 104.8 |
| MPA7030-6R8-R | 6.8 | 4.50 | 3.80 | 7.50 | 12 | 55.0 | 60.5 | 84.4 |
| MPA7030-8R2-R | 8.2 | 4.00 | 3.50 | 8.00 | 10 | 64.5 | 71.0 | 74.8 |

- 1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.25Vrms, 0.0Adc
- 2. Irms1: DC current for an approximate temperature rise of 40°C without core loss at 85°C ambient temperature. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 165°C under worst case operating conditions verified in the end application.
- 3. Irms2: DC current rating for for 125°C ambient temperature operation. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 165°C under worst case operating conditions verified in the end application.
- 4. Isat: Peak current for approximately 20% rolloff at +25°C (8R2 = 30%)
- K-Factor: Used to determine B_{p-p} for core loss (see graph). B_{p-p} = K * L * Δl. B_{p-p}: (Gauss),
 K: (K-Factor from table), L: (Inductance in μH), Δl (Peak-to-peak ripple current in amps).
- 6. Part Number Definition: MPA7030-xxx-R
- MPA7030 = Product code and size
- xxx= Inductance value in μ H, R = decimal point. If no "R" is present, then third digit equals the number of zeros.
- "-R" suffix = RoHS compliant

0611 BU-SB11644 Page 1 of 5 Data Sheet: 4421 **COOPER Bussmann**

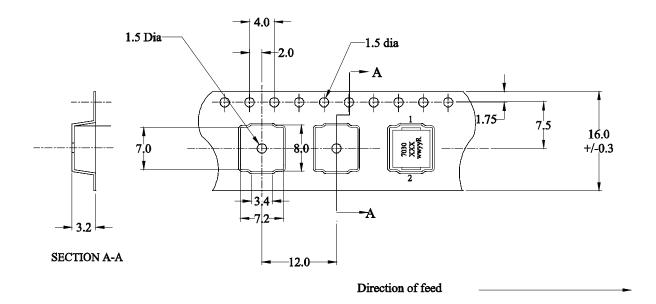


Dimensions - mm



Part Marking: 7030= Size Code, XXX= Inductance value in uH, R=Decimal Point, If no R is present 3rd digit equals number of zeros, wwyy= Date Code, R= Revision Level Tolerance are +/- 0.3 mm unless otherwise specified Soldering surfaces to be coplanar within 0.10 mm

Packaging Information - mm



Supplied in tape and reel packaging, 1500 parts per 13" diameter reel.

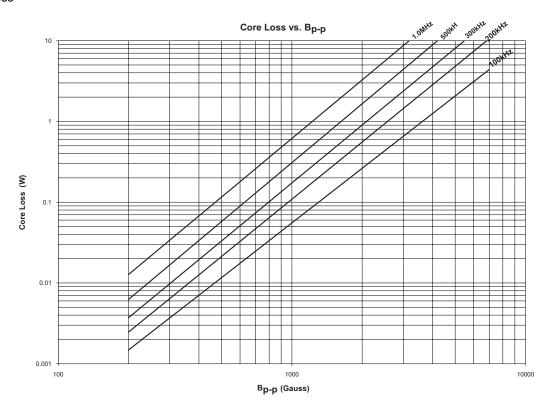
0611 BU-SB11644 Page 2 of 5 Data Sheet: 4421 **COOPER Bussmann**



Temperature Rise vs. Total Loss



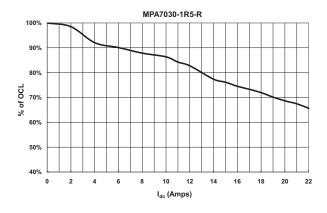
Core Loss

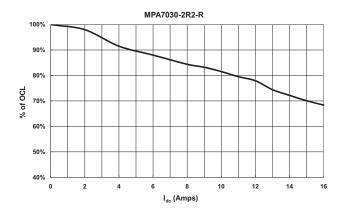


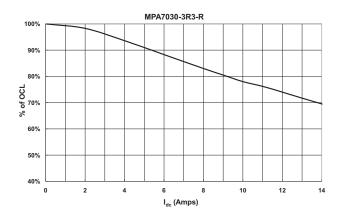
0611 BU-SB11644 Page 3 of 5 Data Sheet: 4421 **COOPER Bussmann**

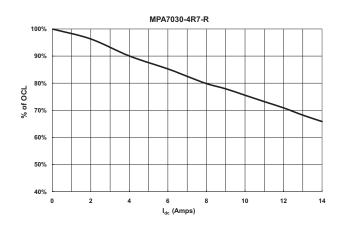


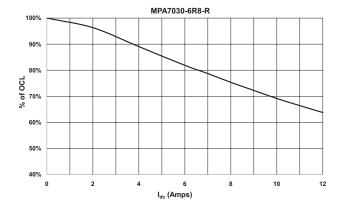
Inductance Characteristics - % of OCL vs. I_{DC}













 0611
 BU-SB11644
 Page 4 of 5
 Data Sheet: 4421
 COOPER Bussmann



Solder Reflow Profile

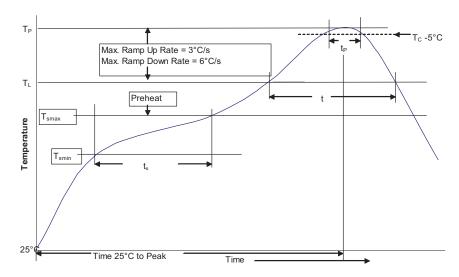


Table 1 - Standard SnPb Solder (T_c)

| Daalaasa | Volume | Volume |
|-----------|--------|--------|
| Package | mm³ | mm³ |
| Thickness | <350 | ≥350 |
| <2.5mm | 235°C | 220°C |
| ≥2.5mm | 220°C | 220°C |

Table 2 - Lead (Pb) Free Solder (Tc)

| Package Thickness | Volume mm³ <350 | Volume mm³ 350 - 2000 | Volume mm³ >2000 |
|----------------------|-----------------------|-----------------------------|------------------------|
| <1.6mm | 260°C | 260°C | 260°C |
| 1.6 - 2.5mm | 260°C | 250°C | 245°C |
| >2.5mm | 250°C | 245°C | 245°C |

Reference JDEC J-STD-020D

| Profile Feature | | Standard SnPb Solder | Lead (Pb) Free Solder |
|---|--|-------------------------|-------------------------|
| Preheat and Soak | • Temperature min. (T _{smin}) | 100°C | 150°C |
| | Temperature max. (T _{smax}) | 150°C | 200°C |
| | • Time (T _{smin} to T _{smax}) (t _s) | 60-120 Seconds | 60-120 Seconds |
| Average ramp up rat | te T _{smax} to T _p | 3°C/ Second Max. | 3°C/ Second Max. |
| Liquidous temperatu Time at liquidous (t _L | | 183°C 60-150 Seconds | 217°C 60-150 Seconds |
| Peak package body | temperature (T _P)* | Table 1 | Table 2 |
| Time $(t_p)^{**}$ within 5 °C of the specified classification temperature (T_c) | | 20 Seconds** | 30 Seconds** |
| Average ramp-down | rate (T _p to T _{smax}) | 6°C/ Second Max. | 6°C/ Second Max. |
| Time 25°C to Peak Temperature | | 6 Minutes Max. | 8 Minutes Max. |

 $^{^{\}star}$ Tolerance for peak profile temperature (T_p) is defined as a supplier minimum and a user maximum.

North America Cooper Electronic Technologies 1225 Broken Sound Parkway NW Boca Raton, FL 33487-3533 Tel: 1-561-998-4100 Fax: 1-561-241-6640 Toll Free: 1-888-414-2645

Cooper Bussmann P.O. Box 14460 St. Louis, MO 63178-4460 Tel: 1-636-394-2877 Fax: 1-636-527-1607

EuropeCooper Electronic Technologies Cooper (UK) Limited Burton-on-the-Wolds Leicestershire • LE12 5TH UK Tel: +44 (0) 1509 882 737 Fax: +44 (0) 1509 882 786

Cooper Electronic Technologies Avda. Santa Eulalia, 290 08223 Terrassa, (Barcelona), Spain

Tel: +34 937 362 812 +34 937 362 813 Fax: +34 937 362 719

Asia Pacific Cooper Electronic Technologies 1 Jalan Kilang Timor #06-01 Pacific Tech Centre Singapore 159303 Tel: +65 278 6151 Fax: +65 270 4160

The only controlled copy of this Data Sheet is the electronic read-only version located on the Cooper Bussmann Network Drive. All other copies of this document are by definition uncontrolled. This bulletin is intended to clearly present comprehensive product data and provide technical information that will help the end user with design applications. Cooper Bussmann reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Cooper Bussmann also reserves the right to change or update, without notice, any technical information contained in this bulletin. Once a product has been selected, it should be tested by the user in all possible applications.

Life Support Policy: Cooper Bussmann does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

© 2011 Cooper Bussmann www.cooperbussmann.com









^{**} Tolerance for time at peak profile temperature (t_{Ω}) is defined as a supplier minimum and a user maximum.