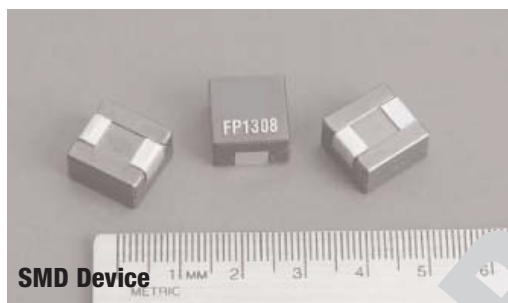


# FP1308

## High frequency, high current power inductors



SMD Device

### Product features

- 13.7 x 12.9 x 8.0mm surface mount package
- High current handling capability from 32 to 120A
- Ferrite core material
- Inductance range from 0.110  $\mu$ H to 0.440  $\mu$ H
- Current range from 32 to 120A
- Frequency range up to 2MHz
- Halogen free, lead free, RoHS compliant

### Applications

- Voltage regulator modules (VRMs) for servers and microprocessors
- Multi-phase buck converters
- High frequency, high current switching power supplies

### Environmental

- Storage temperature range (component): -40 °C to +125 °C
- Operating temperature range: -40 °C to +125 °C (ambient plus self-temperature rise)
- Solder reflow temperature: 260 °C
- IEC 60068-2-020 (latest revision) compliant



### Product Specifications

| Part Number <sup>5</sup> | Rated Inductance ( $\mu$ H) | OCL <sup>1</sup> $\pm$ 10% ( $\mu$ H) | $I_{rms}$ <sup>2</sup> (Amps) | $I_{sat}$ <sup>3</sup> (Amps) | DCR (m $\Omega$ ) @ 25°C Typical | DCR (m $\Omega$ ) @ 25°C Max | K-factor <sup>4</sup> |
|--------------------------|-----------------------------|---------------------------------------|-------------------------------|-------------------------------|----------------------------------|------------------------------|-----------------------|
| FP1308-R11-R             | 0.110                       | 0.110                                 | 68                            | 120                           | 0.20                             | 0.24                         | 21.330                |
| FP1308-R21-R             | 0.210                       | 0.210                                 | 68                            | 72                            | 0.20                             | 0.24                         | 21.333                |
| FP1308-R26-R             | 0.260                       | 0.260                                 | 68                            | 60                            | 0.20                             | 0.24                         | 21.335                |
| FP1308-R32-R             | 0.320                       | 0.320                                 | 68                            | 45                            | 0.20                             | 0.24                         | 21.340                |
| FP1308-R44-R             | 0.440                       | 0.440                                 | 68                            | 32                            | 0.20                             | 0.24                         | 21.366                |

1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, 1.0V<sub>rms</sub>, 0.0Adc

2  $I_{rms}$ : DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.

3  $I_{sat}$ : Peak current for approximately 20% rolloff at +25°C.

4 K-factor: Used to determine  $B_{p-p}$  for core loss (see graph).  $B_{p-p} = K \cdot L \cdot \Delta I$ .  $B_{p-p}$  (mT): (Gauss), K: (K-factor from table), L: (inductance in  $\mu$ H),  $\Delta I$  (peak-to-peak ripple current in amps).

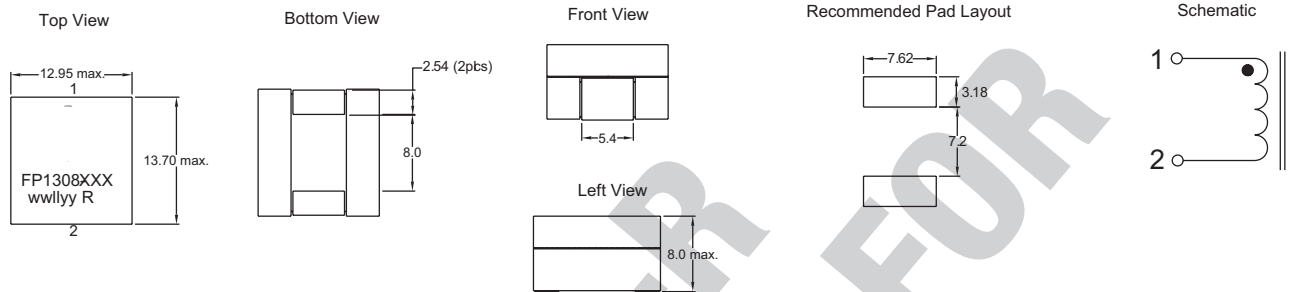
5 Part Number Definition: FP1308-xxx-R

- FP1308 = Product code and size
- xxx= Inductance value in  $\mu$ H, R = decimal point. If no "R" is present, then third character = # of zeros.
- "-R" suffix = RoHS compliant



Powering Business Worldwide

## Dimensions - mm



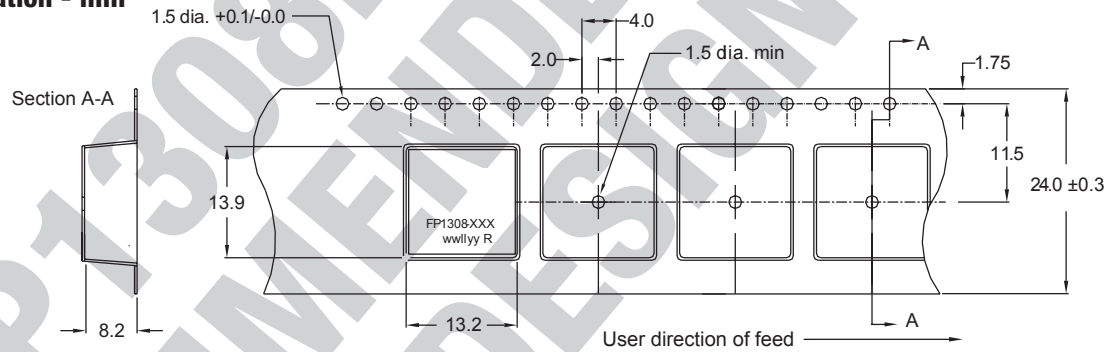
Part Marking: FP1308

xxx = Inductance value in  $\mu\text{H}$ . (R = Decimal point). If no "R" is present, then last character is # Of zeros

wwlyy = Date code

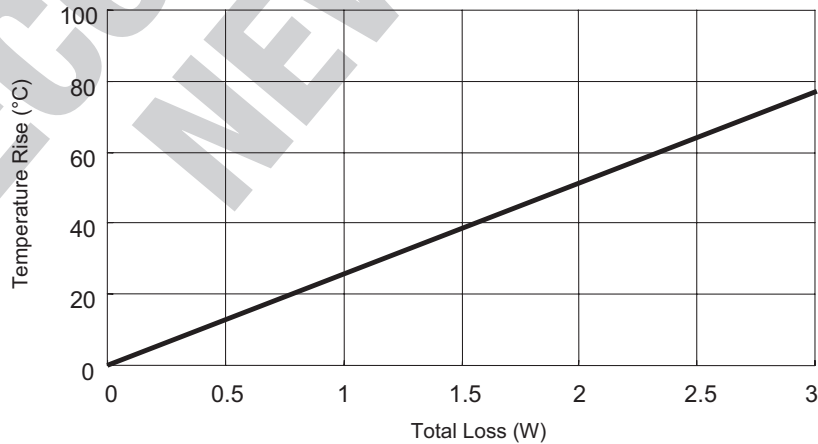
R = Revision level

## Packaging Information - mm

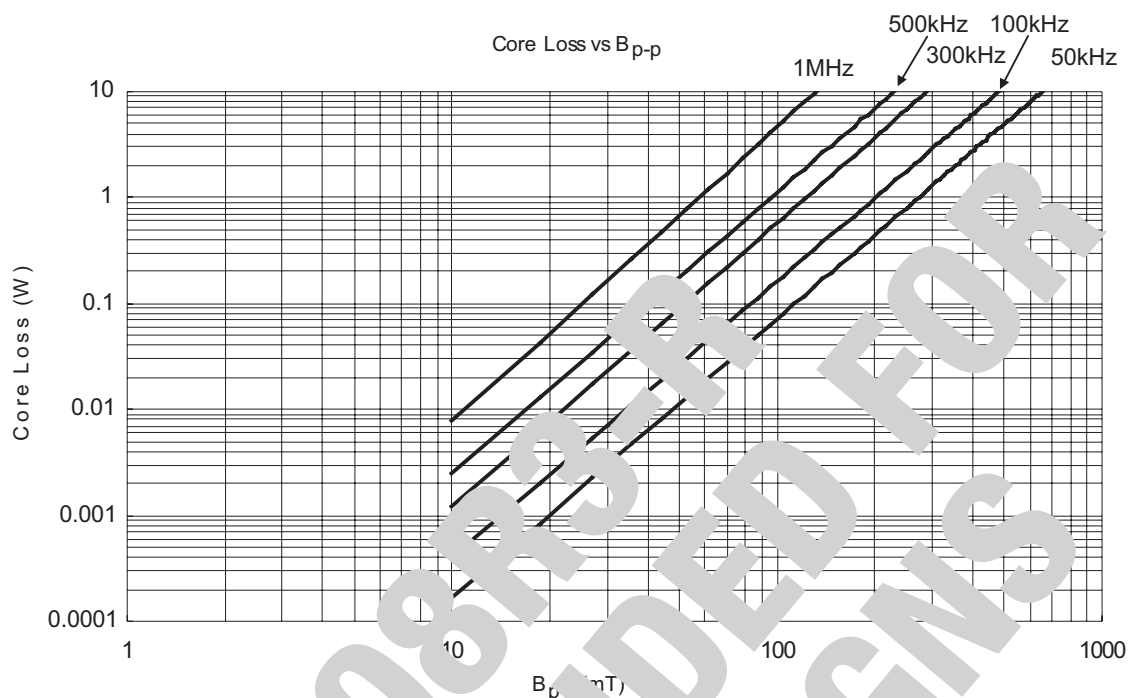


Supplied in tape-and-reel packaging, 400 parts per reel, 13" diameter reel.

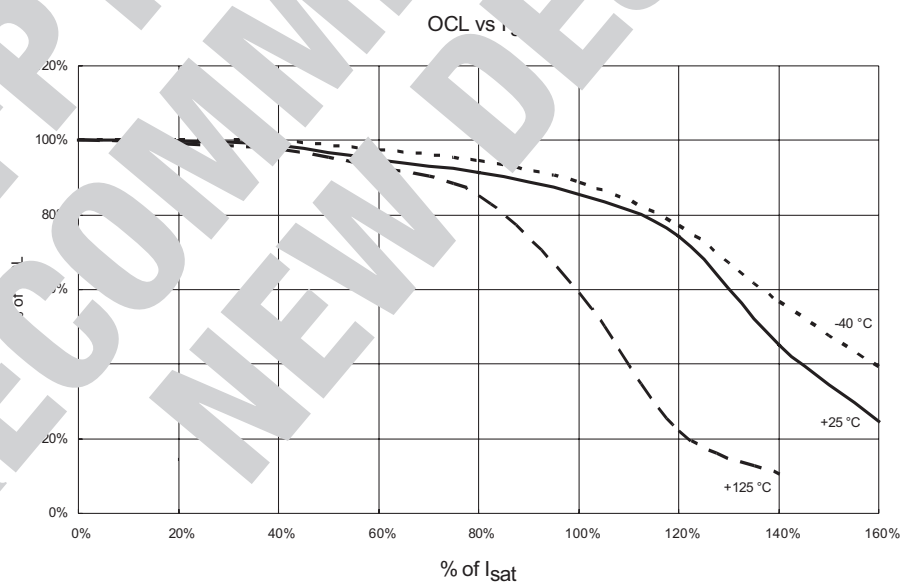
## Temperature Rise vs. Total Loss



## Core Loss



## Inductance Characterist



## Solder Reflow Profile

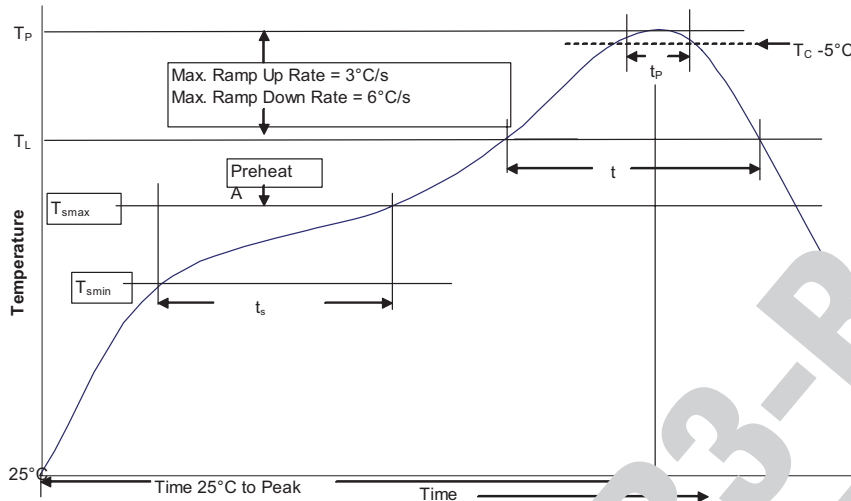


Table 1 - Standard SnPb Solder ( $T_P$ )

| Package Thickness | Volume $\leq 350$ mm <sup>3</sup> | Volume $> 350$ mm <sup>3</sup> |
|-------------------|-----------------------------------|--------------------------------|
| $< 2.5$ mm        | 235°C                             | 220°C                          |
| $\geq 2.5$ mm     | 235°C                             | 220°C                          |

Table 2 - Lead Free Solder ( $T_P$ )

| Package Thickness | Volume $\leq 350$ mm <sup>3</sup> | Volume 350 - 2000 mm <sup>3</sup> | Volume $> 2000$ mm <sup>3</sup> |
|-------------------|-----------------------------------|-----------------------------------|---------------------------------|
| $< 1.6$ mm        | 260°C                             | 260°C                             | 260°C                           |
| 1.6 - 2.5mm       | 260°C                             | 250°C                             | 245°C                           |
| $\geq 2.5$ mm     | 260°C                             | 245°C                             | 245°C                           |

## Reference JDEC J-STD-020

### Profile Feature

| Profile Feature                                                                    | Standard SnPb Solder | Lead Free Solder |
|------------------------------------------------------------------------------------|----------------------|------------------|
| Preheat and Soak                                                                   |                      |                  |
| • Temperature min. ( $T_{smin}$ )                                                  | 150°C                | 150°C            |
| • Temperature max. ( $T_{smax}$ )                                                  | 250°C                | 200°C            |
| • Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )                                      | 60-120 Seconds       | 60-120 Seconds   |
| Average ramp up rate $T_{smax}$ to $T_P$                                           | 3°C/ Second Max.     | 3°C/ Second Max. |
| Liquidous temperature ( $T_L$ )                                                    | 217°C                | 217°C            |
| Time at liquidous ( $t_L$ )                                                        | 60-150 Seconds       | 60-150 Seconds   |
| Peak package body temperature ( $T_P$ )*                                           | Table 1              | Table 2          |
| Time ( $t_p$ )** within 5 °C of the specified classification temperature ( $T_P$ ) | 30 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                                                      | 8 Minutes Max.       | 8 Minutes Max.   |

\* Tolerance for peak profile temperature ( $T_P$ ) is defined as a supplier minimum and a user maximum.

\*\* Tolerance for time at peak profile temperature is defined as a supplier minimum and a user maximum.

Life Support Policy: Eaton 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.

Eaton reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Eaton also reserves the right to change or update, without notice, any technical information contained in this bulletin.

**Eaton**  
Electronics Division  
1000 Eaton Boulevard  
Cleveland, OH 44122  
United States  
www.eaton.com/electronics

© 2017 Eaton  
All Rights Reserved  
Printed in USA  
Publication No. DS4313 BU-SB111090  
June 2017