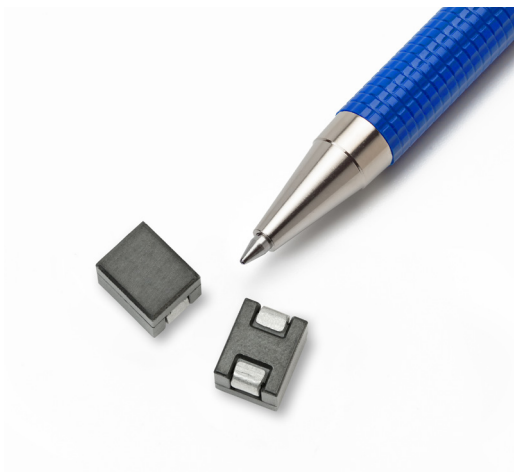


# FP1008R4

## High frequency, high current power inductors



### Product features

- High current carrying capacity
- Low core loss
- Magnetically shielded
- Inductance Range from 150 nH to 180 nH
- Current range from 56 A to 72 A
- 10.8 mm x 8.2 mm footprint surface mount package in an 8.2 mm height
- Moisture Sensitivity Level: 1
- Ferrite core material

### Applications

- Multi-phase and Vcore regulators
- Voltage Regulator Modules (VRMs) and High power density VRMs
  - Server and desktop
  - Central processing unit (CPU)
  - Graphics processing unit (GPU)
  - Application specific integrated circuit (ASIC)
- Data networking and storage systems
- Graphics cards and battery power systems
- Point-of-Load modules (POL)

### Environmental data

- 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: J-STD-020 (latest revision) compliant
- Halogen free, lead free, RoHS compliant



## Product specifications

| Part Number <sup>a</sup> | OCL <sup>1</sup><br>(nH) ±10% | FLL <sup>2</sup><br>(nH) minimum | I <sub>rms</sub> <sup>3</sup><br>(A) | I <sub>sat</sub> 1 <sup>4</sup><br>(A) | I <sub>sat</sub> 2 <sup>5</sup><br>(A) | I <sub>sat</sub> 3 <sup>6</sup><br>(A) | DCR (mΩ)<br>±8% @ 20°C | K-factor <sup>7</sup> |
|--------------------------|-------------------------------|----------------------------------|--------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|------------------------|-----------------------|
| FP1008R4-R150-R          | 150                           | 105                              | 70                                   | 72                                     | 56                                     | 52                                     | 0.125                  | 375.5                 |
| FP1008R4-R180-R          | 180                           | 130                              | 70                                   | 56                                     | 44                                     | 40                                     | 0.125                  | 375.5                 |

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.1 Vrms, 0.0 Adc, +25 °C

2. Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.1 Vrms, I<sub>sat</sub>1, +25 °C

3. I<sub>rms</sub>: DC current for an approximate temperature rise of 40 °C without core loss. 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 +125 °C under worst case operating conditions verified in the end application.

4. I<sub>sat</sub>1: Peak current for approximately 20% rolloff @ +25 °C

5. I<sub>sat</sub>2: Peak current for approximately 20% rolloff @ +100 °C

6. I<sub>sat</sub>3: Peak current for approximately 20% rolloff @ +125 °C

7. K-factor: Used to determine B<sub>pp</sub> for core loss (see graph).

B<sub>pp</sub> = K \* L \* ΔI \* 10<sup>-3</sup>. B<sub>pp</sub> (Gauss), K: (K-factor from table),

L: (Inductance in nH), ΔI (Peak to peak ripple current in Amps).

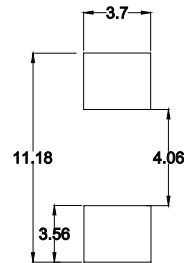
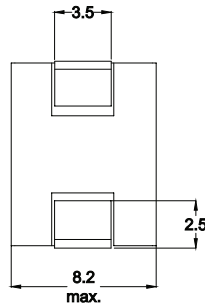
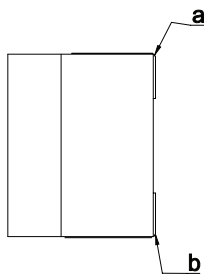
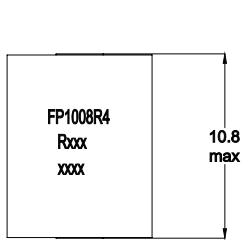
8. Part Number Definition: FP1008R4-Rxxx-R

FP1008R4= Product code and size

Rxxx= Inductance value in μH, R= decimal point

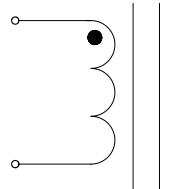
-R suffix = RoHS compliant

## Dimensions (mm)



## Recommended Pad Layout

## Schematic



Part marking: FP1008R4, Rxxx (xxx = Inductance value in μH, R = decimal point),  
xxxx=Lot code

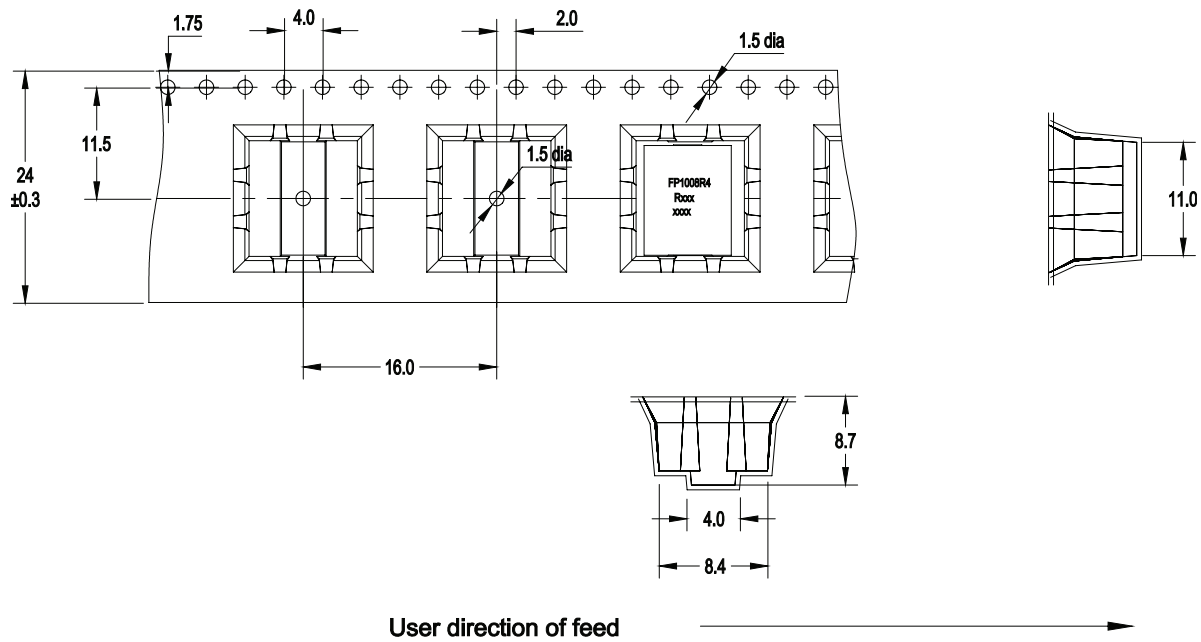
All soldering surface to be coplanar within 0.1 millimeters

DCR measured between point "a" to point "b"

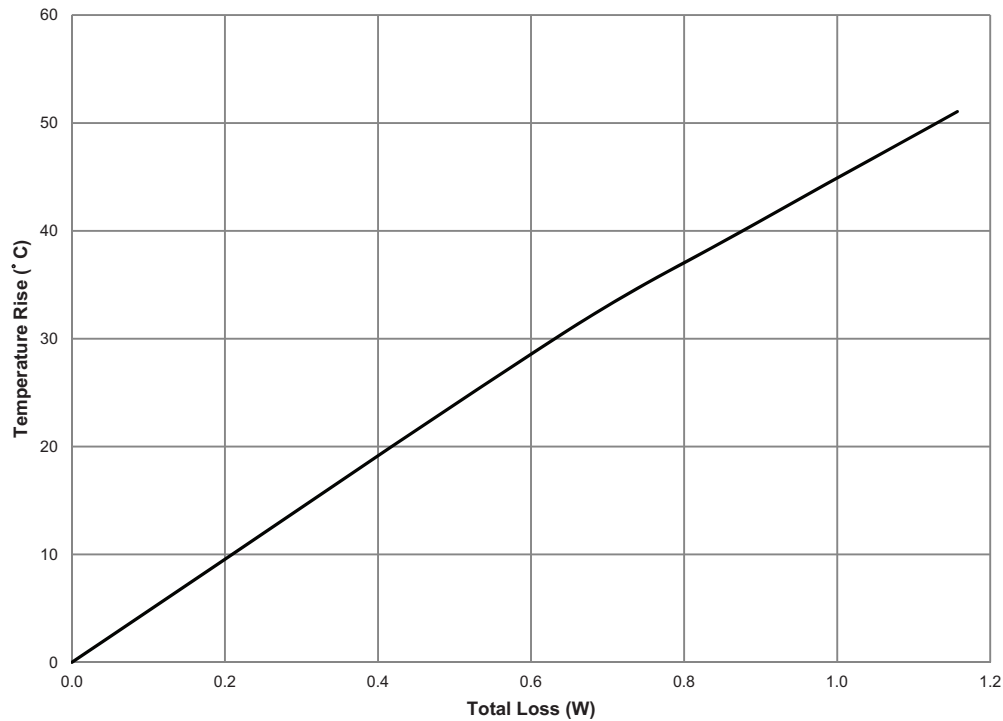
Do not route traces or vias underneath the inductor

Packaging information (mm)

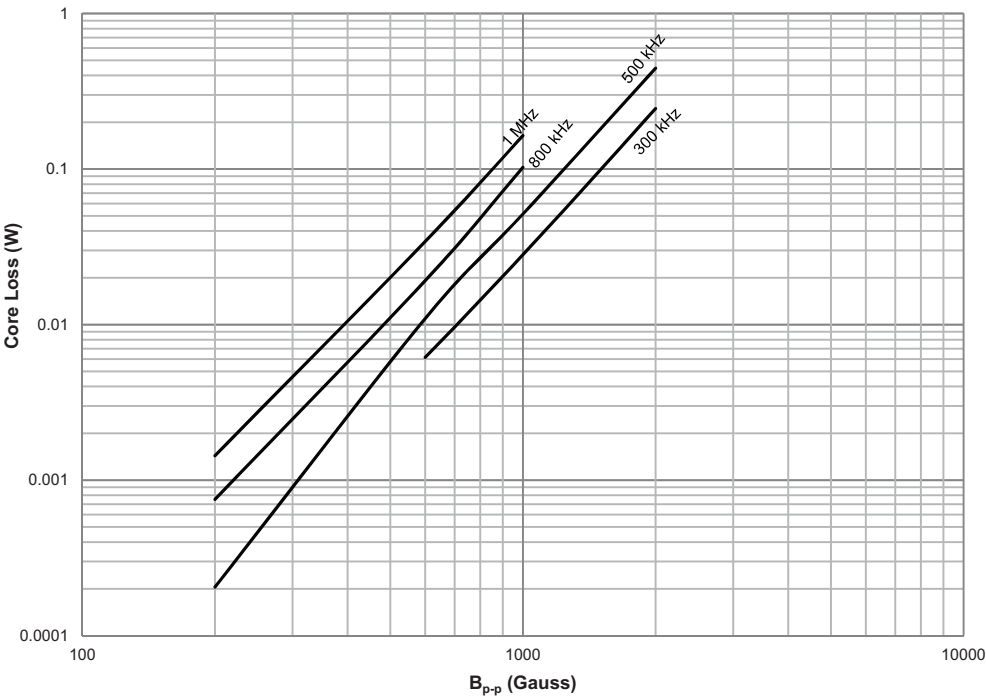
Supplied in tape and reel packaging , 400 parts per 13" diameter reel



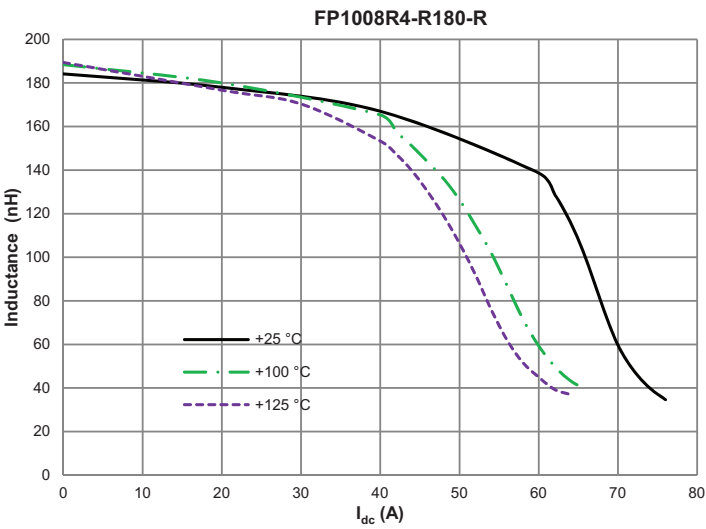
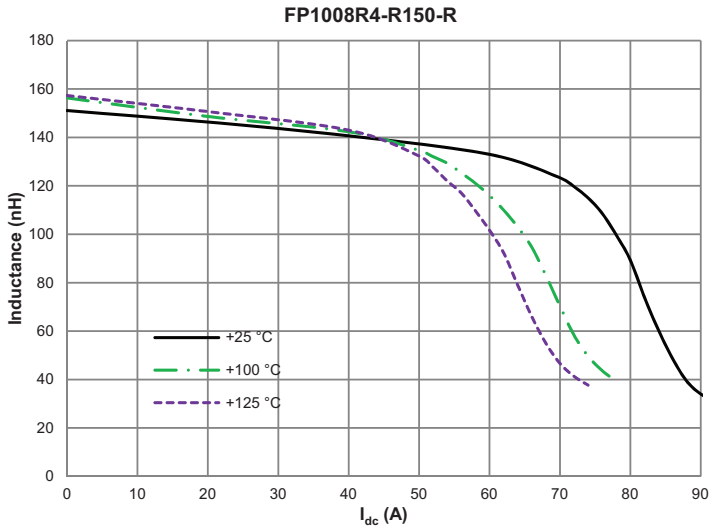
Temperature rise vs. total loss



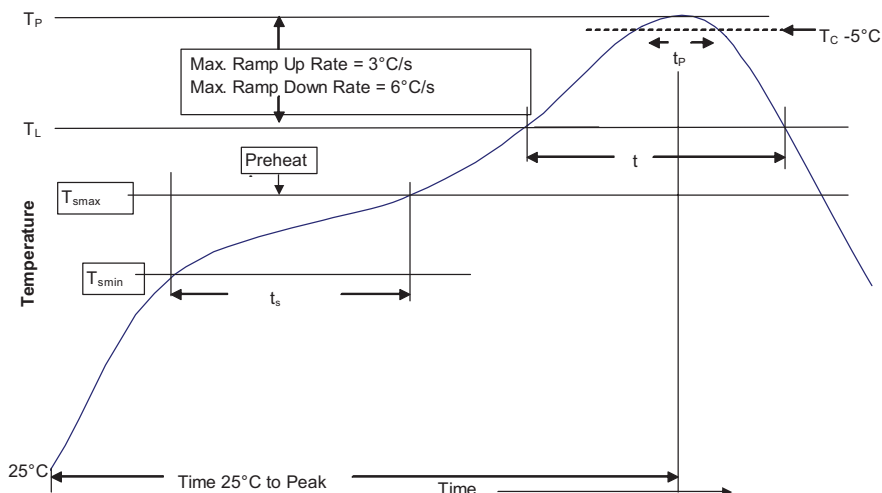
Core loss vs.  $B_{p-p}$



Inductance characteristics



## Solder reflow profile



**Table 1 - Standard SnPb Solder ( $T_C$ )**

| Package Thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> ≥350 |
|-------------------|-----------------------------|-----------------------------|
| <2.5mm)           | 235 °C                      | 220 °C                      |
| ≥2.5mm            | 220 °C                      | 220 °C                      |

**Table 2 - Lead (Pb) Free Solder ( $T_C$ )**

| Package Thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> 350 - 2000 | Volume mm <sup>3</sup> >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-020

| 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 rate $T_{smax}$ to $T_p$                                           | 3°C/ Second Max.     | 3 °C/ Second Max.     |
| Liquidous temperature ( $T_L$ )                                                    | 183 °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 ( $T_C$ ) | 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.        |

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

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

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Printed in USA  
Publication No. 10499 BU-MC16135  
November 2016