

# FP1108L1 and FP1108L2

## High frequency, high current power inductors



### Applications

- Servers
- Multi-phase and Vcore regulators
- Voltage Regulator Modules (VRMs)
- Desktop VRMs and EVRDs
- Data networking and storage systems
- Graphics cards and battery power systems
- Point-of-Load modules

### Environmental Data

- Storage temperature range (Component): -40°C to +125°C
- Operating temperature range: -40°C to +125°C (ambient + self-temperature rise)
- Solder reflow temperature: J-STD-020D compliant



### Description

- High current carrying capacity
- Low core loss
- Ultra low DCR
- Inductance range from 105nH to 150nH
- Current range from 48 to 81 amps
- 11.0 x 8.2mm footprint surface mount package in an 8.3mm height
- Ferrite core material
- Halogen free, lead free, RoHS compliant

## Product Specifications

| Part Number <sup>8</sup> | OCL <sup>1</sup><br>(nH) $\pm 10\%$ | FLL <sup>2</sup> (nH)<br>minimum | I <sub>rms</sub> <sup>3</sup><br>(amps) | I <sub>sat</sub> 1 <sup>4</sup><br>(amps) | I <sub>sat</sub> 2 <sup>5</sup><br>(amps) | I <sub>sat</sub> 3 <sup>6</sup><br>(amps) | DCR (m $\Omega$ )<br>$\pm 10\% @ 20^\circ\text{C}$ | K-factor <sup>7</sup> |
|--------------------------|-------------------------------------|----------------------------------|---|---|---|---|--|-----------------------|
| <b>L1 Version</b>        |                                     |                                  |   |   |   |   |  |                       |
| FP1108L1-R105-R          | 105                                 | 76                               | 64                                      | 81  | 77  | 72  | 0.10   | 422                   |
| FP1108L1-R150-R          | 150                                 | 108                              | 64                                      | 57  | 49  | 45  | 0.10   | 422                   |
| FP1108L1-R180-R          | 180                                 | 129                              | 64                                      | 47  | 41  | 37  | 0.10   | 422                   |
| <b>L2 Version</b>        |                                     |                                  |   |   |   |   |  |                       |
| FP1108L2-R150-R          | 150                                 | 108                              | 48                                      | 55  | 50  | 46  | 0.18   | 390                   |

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

2. Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1Vrms, @ 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 @ +75°C

6. I<sub>sat</sub>3: Peak current for approximately 20% rolloff @ +100°C

7. K-factor: Used to determine B<sub>p-p</sub> for core loss (see graph). B<sub>p-p</sub> = K \* L \* AI \* 10<sup>3</sup> B<sub>p-p</sub> (Gauss), K: (K-factor from table), L: (Inductance in nH), AI (Peak to peak ripple current in Amps).

8. Part Number Definition: FP1108Lx-Rxxx-R

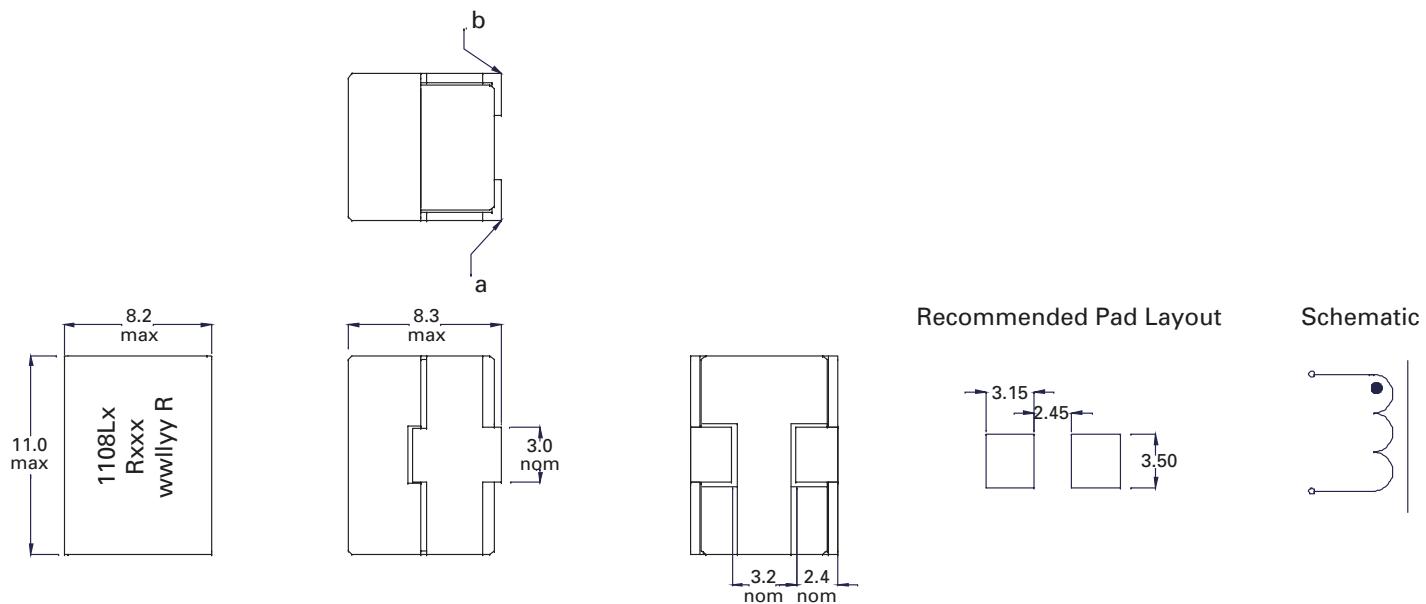
FP1108L = Product code and size

x= Version indicator

Rxxx= inductance value in uH, R= decimal point ,

-R suffix = RoHS compliant

## Dimensions (mm)



Part marking: 1108Lx (x = Version indicator), Rxxx = Inductance value in uH (R= decimal point)  
wwllyy = date code, R = revision level

All soldering surfaces to be coplanar within 0.1 millimeters

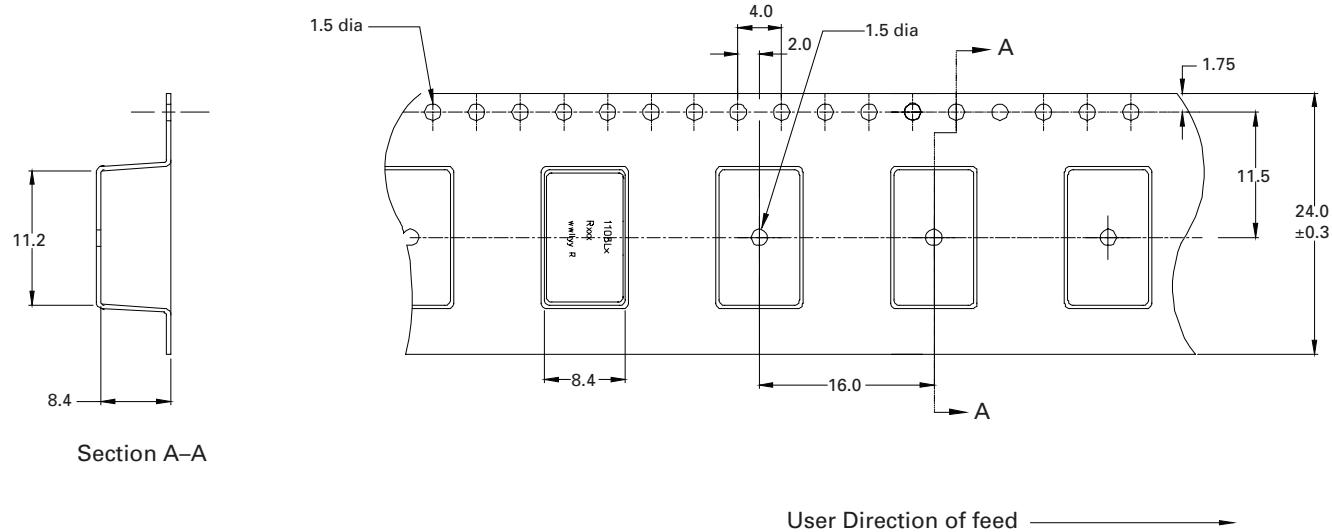
PCB tolerances are  $\pm 0.1$  millimeters unless otherwise specified

DCR measured from point "a" to point "b"

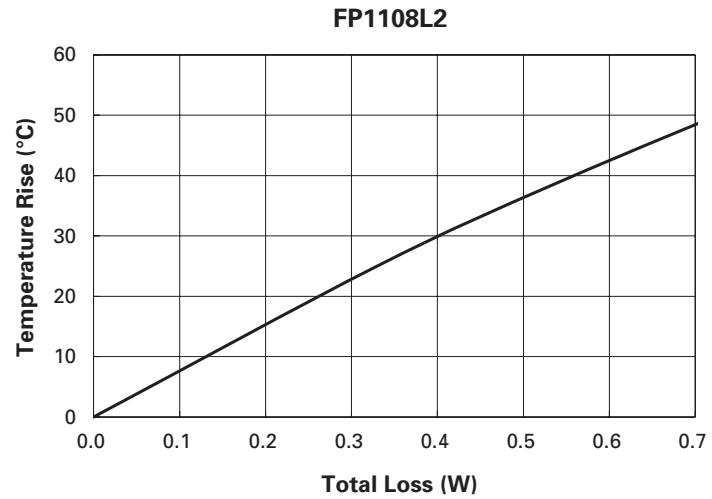
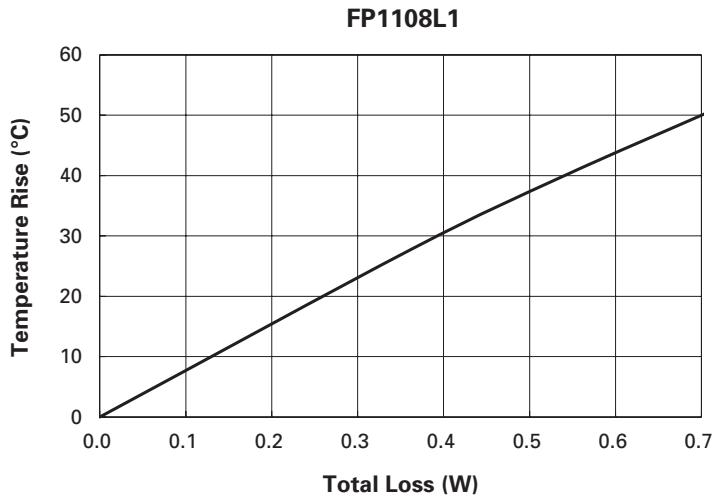
Do not route traces or vias underneath the inductor

**Packaging information (mm)**

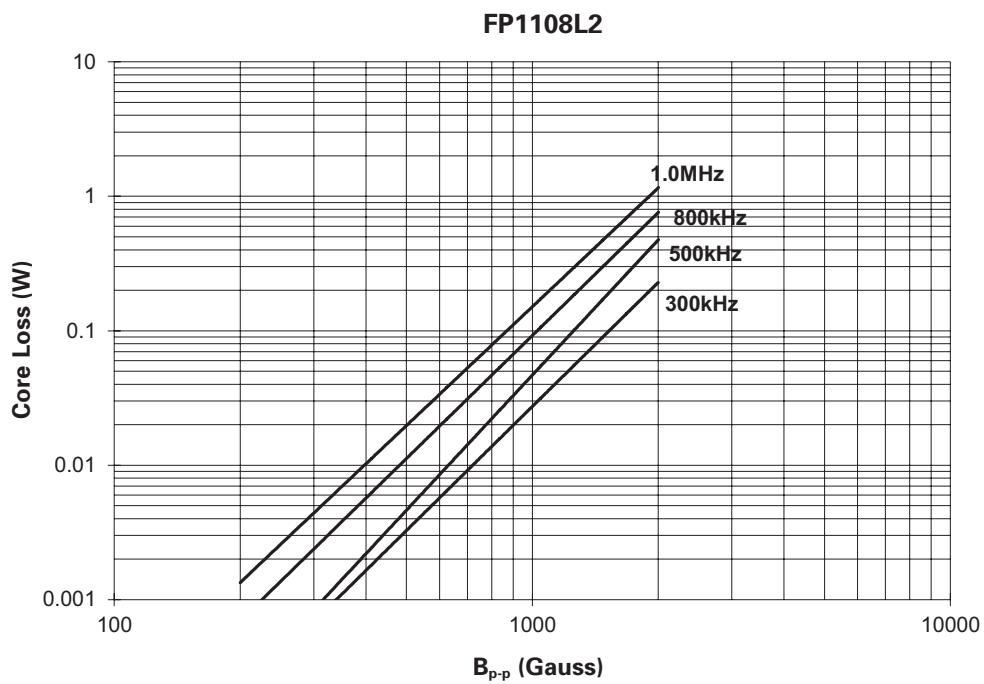
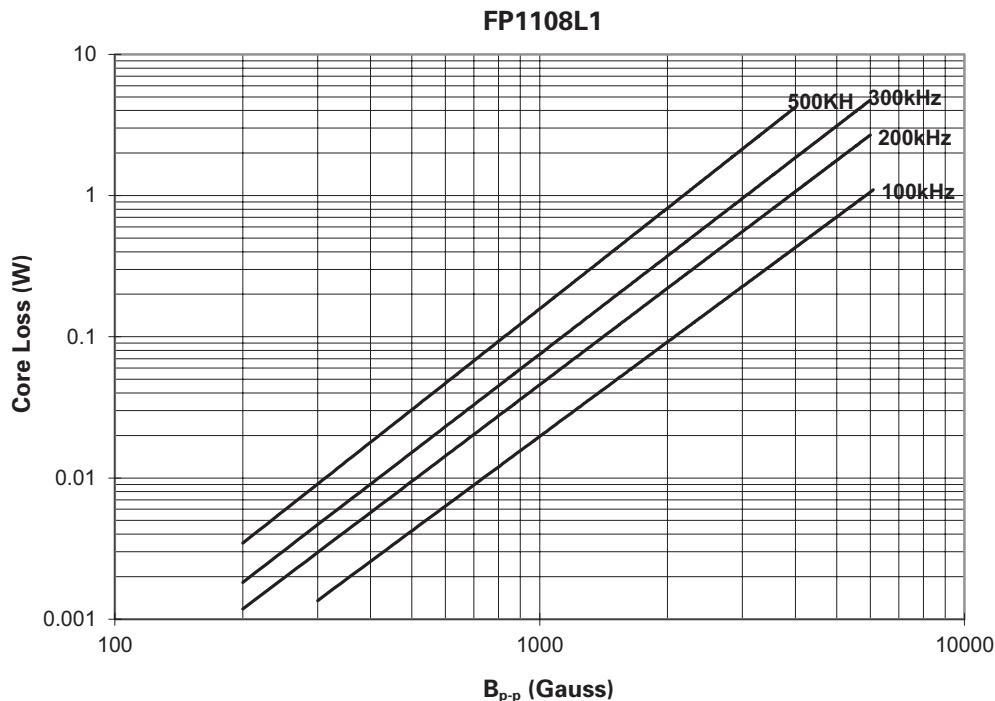
Supplied in tape and reel packaging, 450 parts per 13" diameter reel



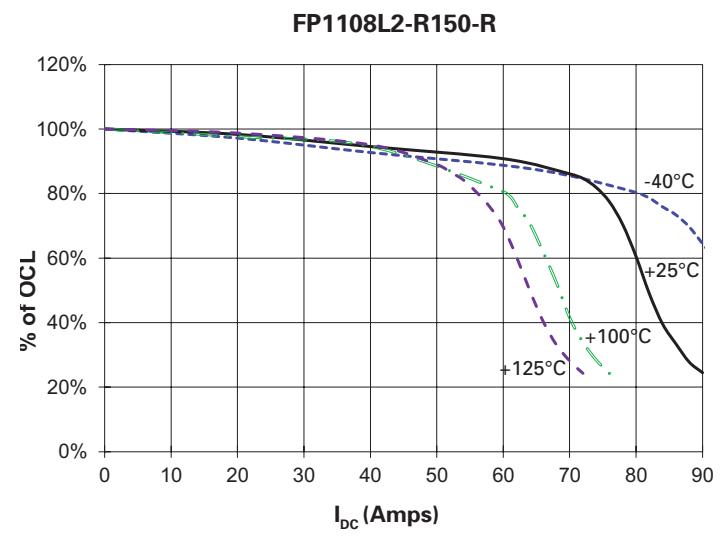
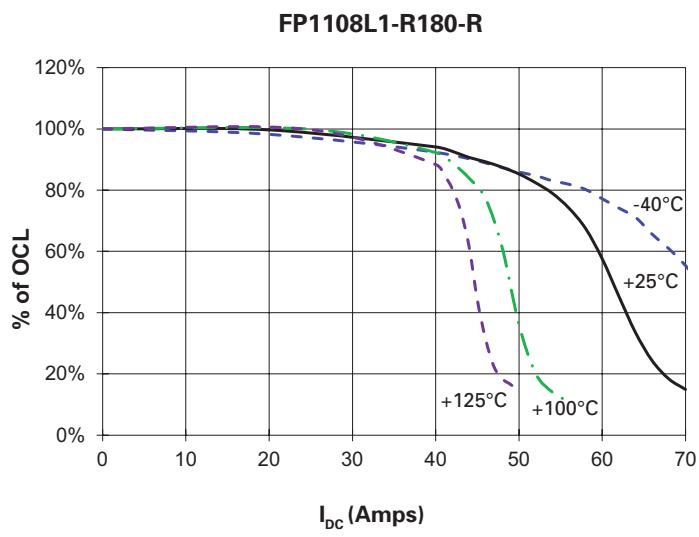
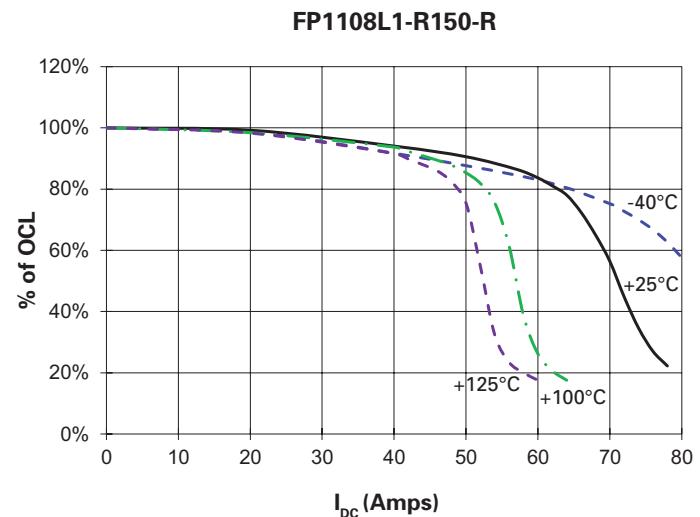
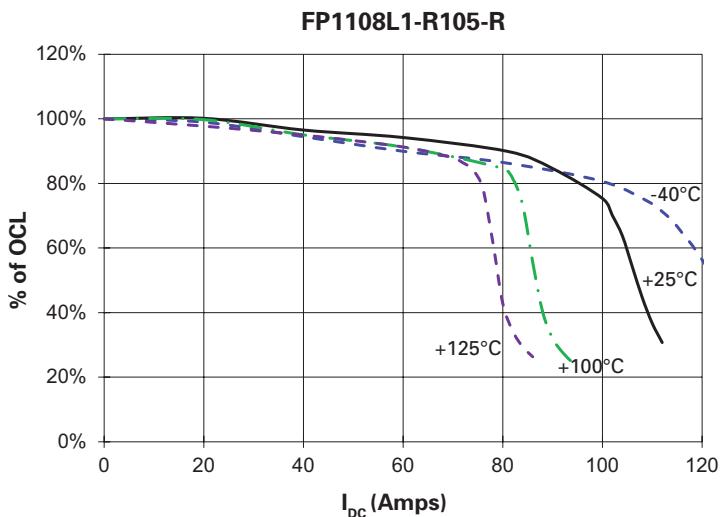
**Temperature rise vs. total loss**

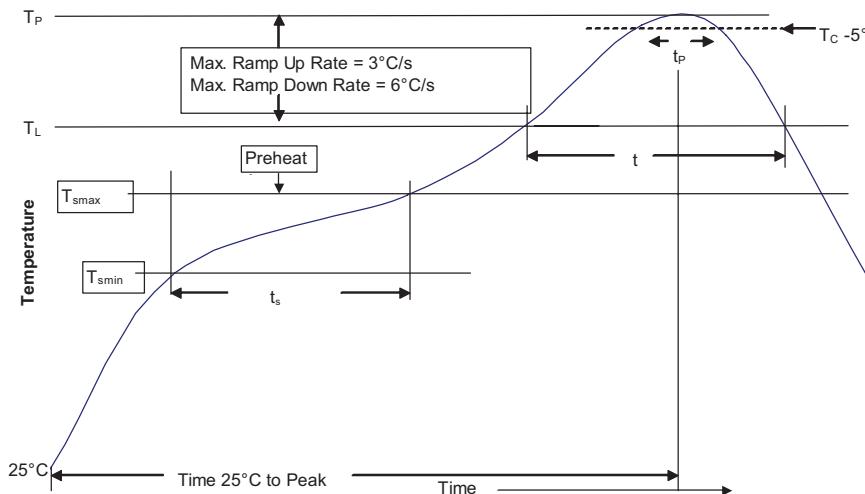


Core loss vs.  $B_{p-p}$



**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-020D**

| Profile Feature  | Standard SnPb Solder   | Lead (Pb) Free Solder                              |
|--|--|--|
| Preheat and Soak   | <ul style="list-style-type: none"> <li>Temperature min. (<math>T_{smin}</math>)</li> <li>Temperature max. (<math>T_{smax}</math>)</li> <li>Time (<math>T_{smin}</math> to <math>T_{smax}</math>) (<math>t_s</math>)</li> </ul> | 100°C<br>150°C<br>60-120 Seconds<br>60-120 Seconds |
| Average ramp up rate $T_{smax}$ to $T_p$   | 3°C/ Second Max.   | 3°C/ Second Max.                                   |
| Liquidus 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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