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We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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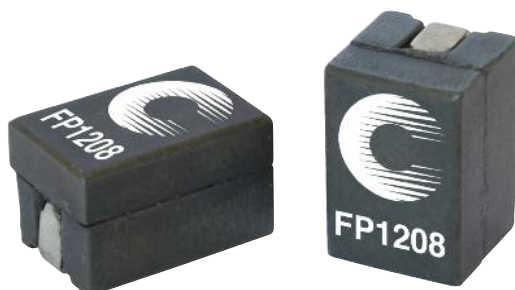
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# High Frequency, High Current Power Inductors

## Flat-Pac™ FP1208 Series



### Description

- Halogen free, lead free, RoHS compliant
- 125°C maximum total temperature operation
- 12.1x8.0x8.0mm maximum surface mount package
- Ferrite core material
- Controlled DCR for sensing circuits
- Inductance range from 150nH to 250nH
- Current range from 44 to 85 Amps

### Applications

- Multi-phase regulators
- Voltage Regulator Modules (VRMs)
- Desktop and server VRMs and EVRDs
- Notebook regulators
- Data networking and storage systems
- Graphics cards and battery power systems
- Point-of-Load modules
- DCR Sensing circuits

### 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

### Packaging

- Supplied in tape-and reel packaging, 500 parts per 13" diameter reel

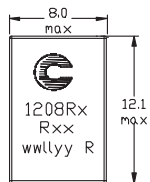
| Product Specifications   |                              |                               |   |  |  |  |                    |                       |
|--------------------------|------------------------------|-------------------------------|---|--|--|--|--------------------|-----------------------|
| Part Number <sup>8</sup> | OCL <sup>1</sup><br>(nH)±10% | FLL min. <sup>2</sup><br>(nH) | I <sub>rms</sub> <sup>3</sup><br>(Amps) | I <sub>sat</sub> <sup>14</sup><br>(Amps) | I <sub>sat</sub> <sup>25</sup><br>(Amps) | I <sub>sat</sub> <sup>36</sup><br>(Amps) | DCR<br>(mΩ) @ 20°C | K-factor <sup>7</sup> |
| FP1208R1-R15-R           | 150                          | 114                           | 50                                      | 85                                       | 79                                       | 72                                       | 0.29±5%            | 283                   |
| FP1208R1-R18-R           | 180                          | 137                           |   | 72                                       | 66                                       | 63                                       |                    | 283                   |
| FP1208R1-R21-R           | 210                          | 160                           |   | 65                                       | 57                                       | 55                                       |                    | 283                   |
| FP1208R1-R23-R           | 230                          | 176                           |   | 61                                       | 53                                       | 50                                       |                    | 283                   |
| FP1208R1-R25-R           | 250                          | 191                           |   | 55                                       | 48                                       | 44                                       |                    | 283                   |

1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.1V<sub>rms</sub>, 0.0Adc@25°C
2. Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1V<sub>rms</sub>, I<sub>sat</sub>1
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

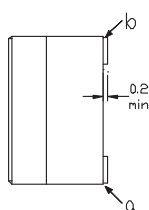
5. I<sub>sat</sub>2: Peak current for approximately 20% rolloff @ 85°C
6. I<sub>sat</sub>3: Peak current for approximately 20% rolloff @ 125°C
7. K-factor: Used to determine B<sub>p-p</sub> for core loss (see graph).  
 $B_{p-p} = K * L * \Delta I * 10^{-3}$ . B<sub>p-p</sub>:(Gauss), K: (K-factor from table), L: (Inductance in nH), ΔI (Peak to peak ripple current in Amps).
8. Part Number Definition: FP1208Rx-Rxx-R:  
 - FP1208= Product code and size  
 - Rx= DCR indicator  
 - Rxx= Inductance value in μH  
 - "-R" suffix = RoHS compliant

## Dimensions - mm

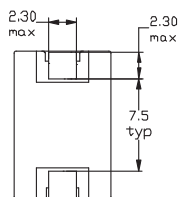
Top View



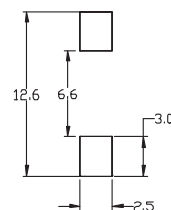
Side View



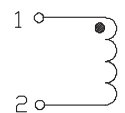
Bottom View



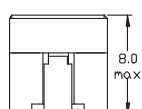
Recommended Pad Layout



Schematic



Front View



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

Part marking: Coiltronics logo, 1208Rx (Rx= DCR indicator), Rxx = Inductance value in uH (R= decimal point)

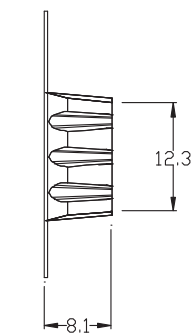
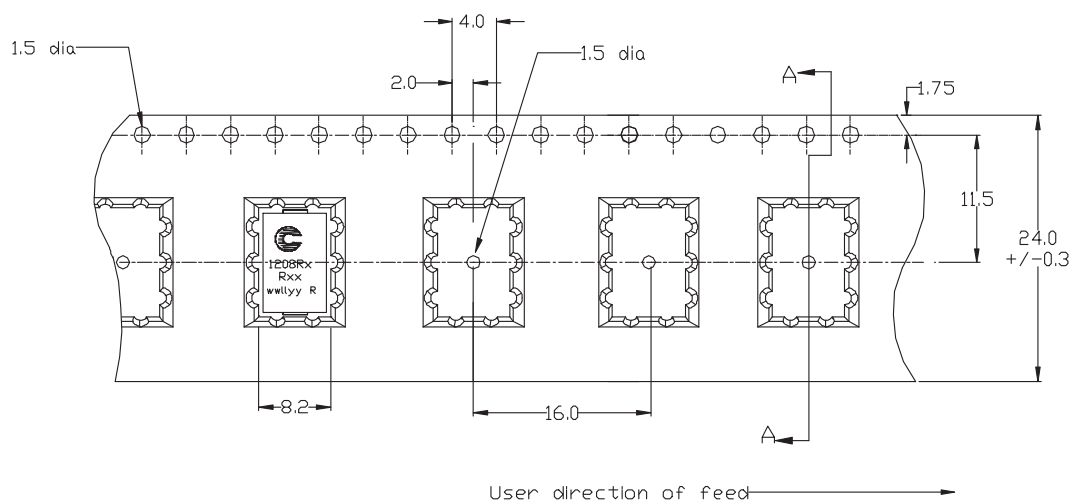
wwlyy= date code, r= revision level

Tolerances are +/- 0.15 millimeters unless stated otherwise.

PCB tolerances are +/- 0.10 millimeters unless stated otherwise.

All soldering surfaces to be coplanar within 0.1 millimeters.

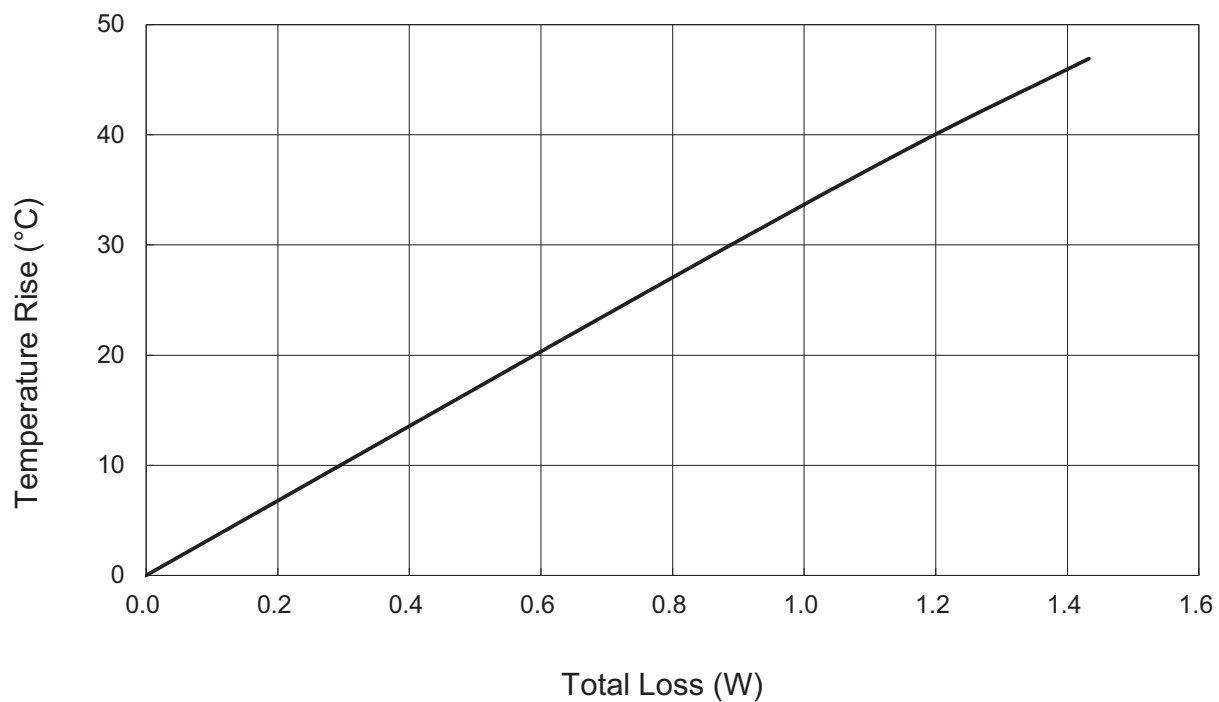
## Packaging Information - mm



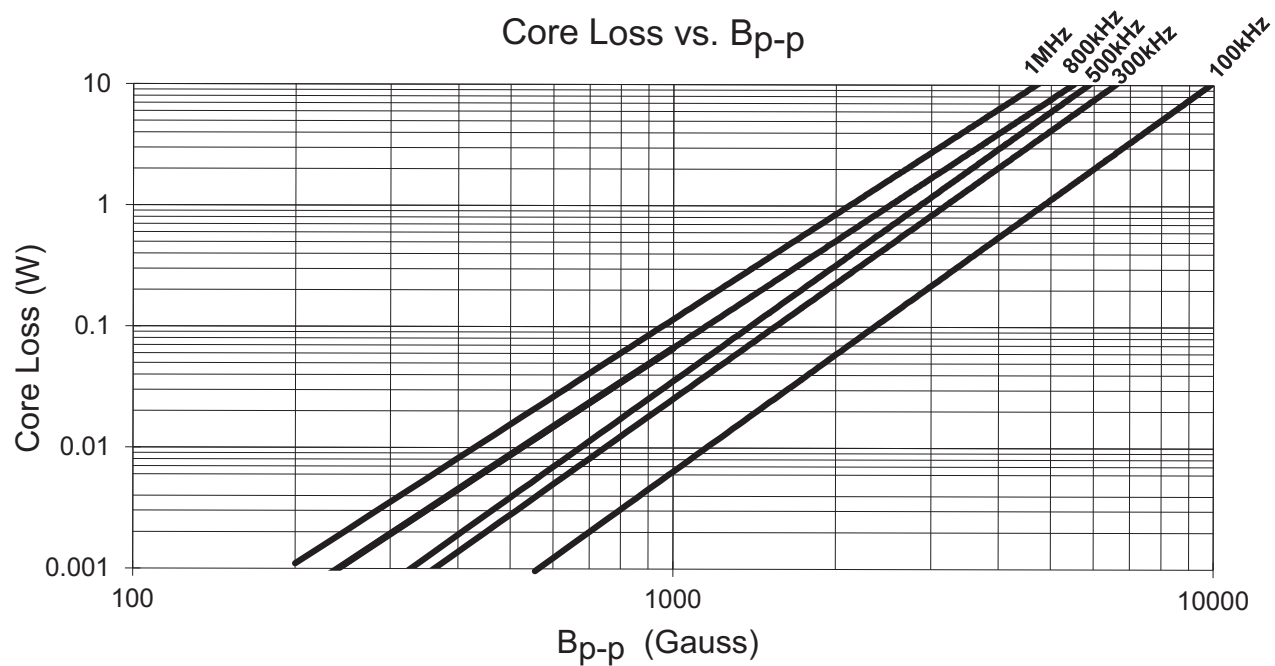
Section A-A

Supplied in tape and reel packaging, 500 parts on a 13" diameter reel.

## Temperature Rise vs. Total Loss

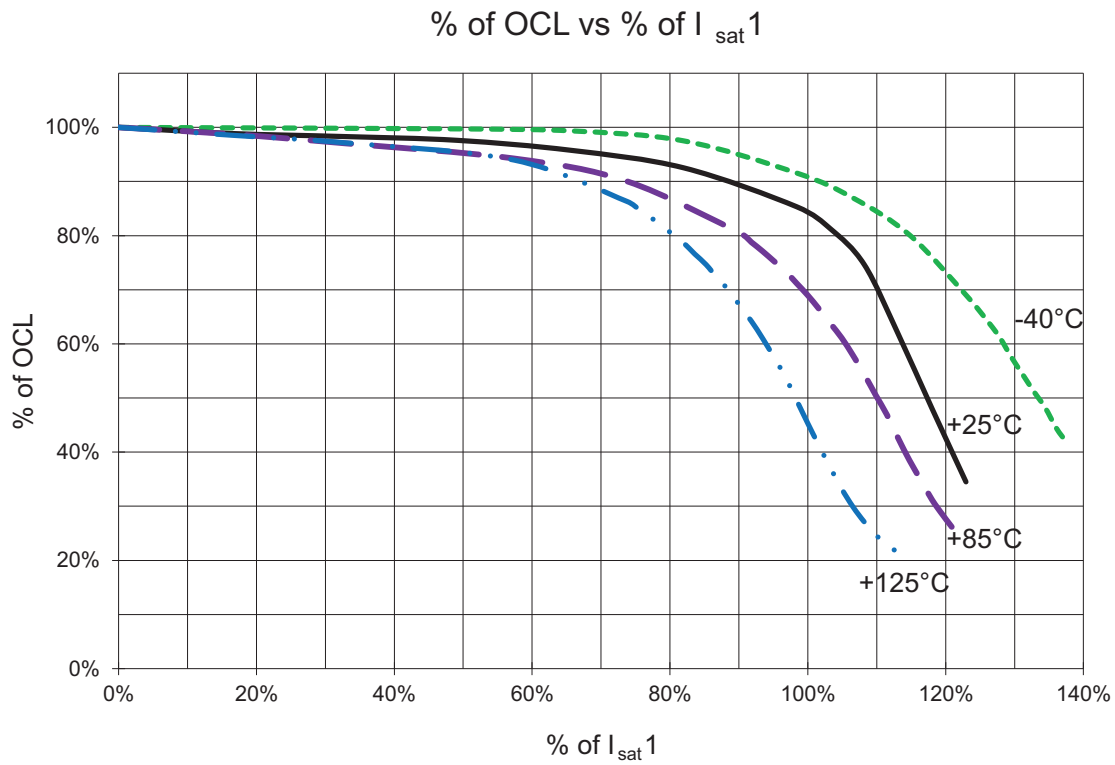


## Core Loss





## Inductance Characteristics



## Solder Reflow Profile

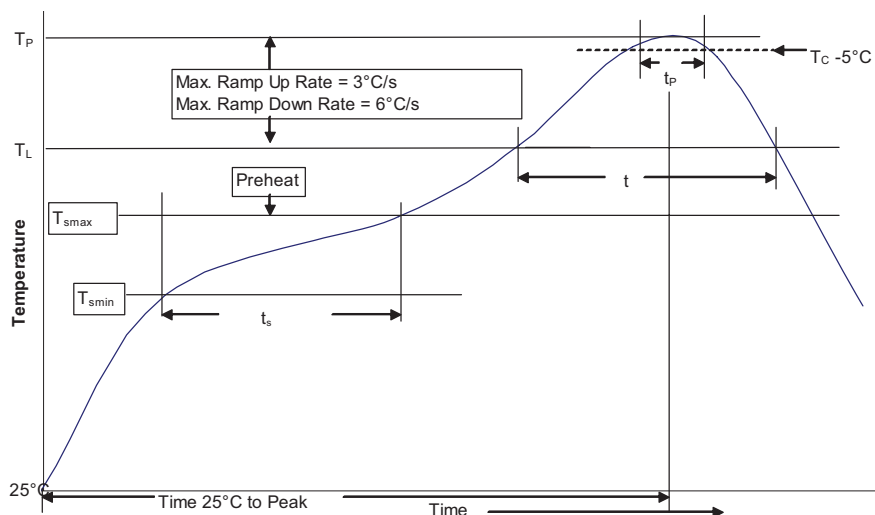


Table 1 - Standard SnPb Solder ( $T_c$ )

| Package Thickness   | Volume $\text{mm}^3$ <350 | Volume $\text{mm}^3$ $\geq 350$ |
|---------------------|---------------------------|---------------------------------|
| <2.5mm              | 235°C                     | 220°C                           |
| $\geq 2.5\text{mm}$ | 220°C                     | 220°C                           |

Table 2 - Lead (Pb) Free Solder ( $T_c$ )

| Package Thickness | Volume $\text{mm}^3$ <350 | Volume $\text{mm}^3$ 350 - 2000 | Volume $\text{mm}^3$ >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 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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