

# FP3

## High current, low profile inductors



### Applications

- Voltage Regulator Modules (VRMs)
- Multi-phase regulators
- Desktop and server VRMs and EVRDs
- Notebook and laptop regulators
- Battery power systems
- Graphics cards
- Point-of-load modules

### Product description

- Low profile high current inductors
- Inductance range 0.1 $\mu$ H to 15 $\mu$ H
- Design utilizes high temperature iron powder alloy material with a non-organic binder to eliminate thermal aging
- 7.25 x 6.7mm footprint surface mount package in a 3.0mm height
- Magnetically shielded, low EMI
- Current rating up to 34.7Adc (Higher peak currents may be attained with a greater rolloff, see rolloff curve)
- Frequency range up to 2MHz

### Environmental data

- Storage temperature range (component): -40°C to +155°C
- Operating temperature range: -40°C to +155°C (ambient plus self temperature rise)
- Solder reflow temperature: J-STD-020D



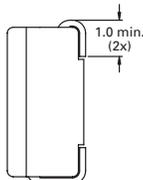
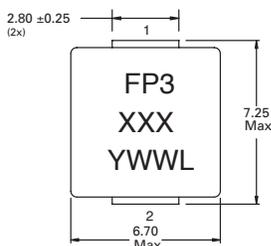
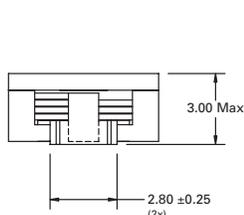
**Product specifications**

Part number <sup>6</sup>	OCL (uH) ± 15%	I <sub>rms</sub> <sup>2</sup> amps	I <sub>sat</sub> <sup>3</sup> amps 10%	I <sub>sat</sub> <sup>4</sup> amps 15%	DCR mOhms @ 20°C typ	DCR mOhms @ 20°C max	K-factor <sup>5</sup>
FP3-R10-R	0.10	19.0	27	34.7	1.00	1.21	803
FP3-R20-R	0.22	15.3	16	20.8	1.54	1.88	482
FP3-R47-R	0.44	10.9	11.6	14.9	3.05	3.67	344
FP3-R68-R	0.72	9.72	9.0	11.6	3.85	4.63	268
FP3-1R0-R	1.10	6.26	7.4	9.5	9.40	11.2	219
FP3-1R5-R	1.50	5.78	6.2	8.0	10.0	13.1	185
FP3-2R0-R	2.00	5.40	5.4	6.9	11.5	15.0	161
FP3-3R3-R	3.20	3.63	4.3	5.5	24.5	30.0	127
FP3-4R7-R	4.70	3.23	3.5	4.2	34.9	40.0	105
FP3-8R2-R	8.5	2.91	2.6	3.4	61.6	74.0	78
FP3-100-R	10.9	2.30	2.3	3.0	84.2	101	69
FP3-150-R	14.9	2.22	2.0	2.5	106.0	127	59

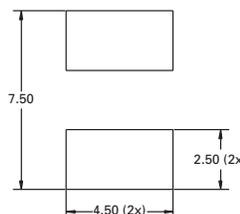
- OCL (Open Circuit Inductance) Test parameters: 100kHz, 0.1Vrms, 0.0Aac
- I<sub>rms</sub> DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 155°C under worst case operating conditions verified in the end application.
- I<sub>sat</sub><sup>3</sup> Amps Peak for approximately 10% rolloff @ 20°C
- I<sub>sat</sub><sup>4</sup> Amps Peak for approximately 15% rolloff @ 20°C

- K-factor: Used to determine Bp-p for core loss (see graph). Bp-p = K\*L\*ΔI.  
Bp-p: (Gauss), K: (K factor from table), L: (Inductance in μH), ΔI (Peak to peak ripple current in Amps).
- Part number definition:  
FP3 = product code and size  
xxx = inductance value in μH  
R = decimal point (if no "R" is present, then last character equals the number of zeros)  
"R" suffix = RoHS complaint

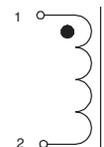
**Dimensions—mm**



RECOMMENDED PAD LAYOUT



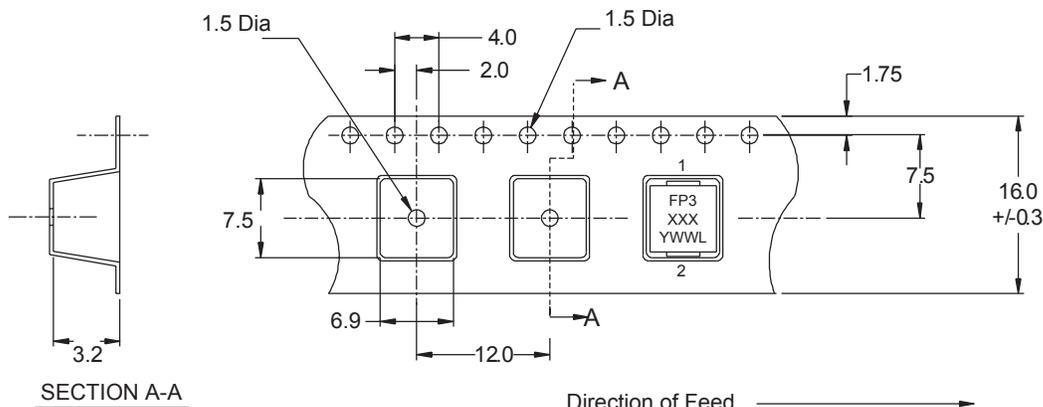
SCHEMATIC



Part marking: FP3 (Product code and size), xxx=(inductance value in μH), R=decimal point (if no "R" is present, then last character equals the number of zeroes, YWW=Date code, L=Location code

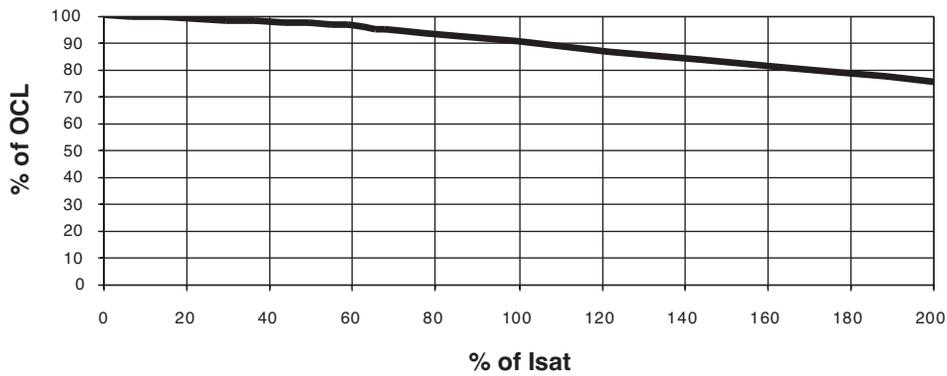
**Packaging information (mm)**

Supplied in tape and reel packaging, 1700 parts per 13" diameter reel

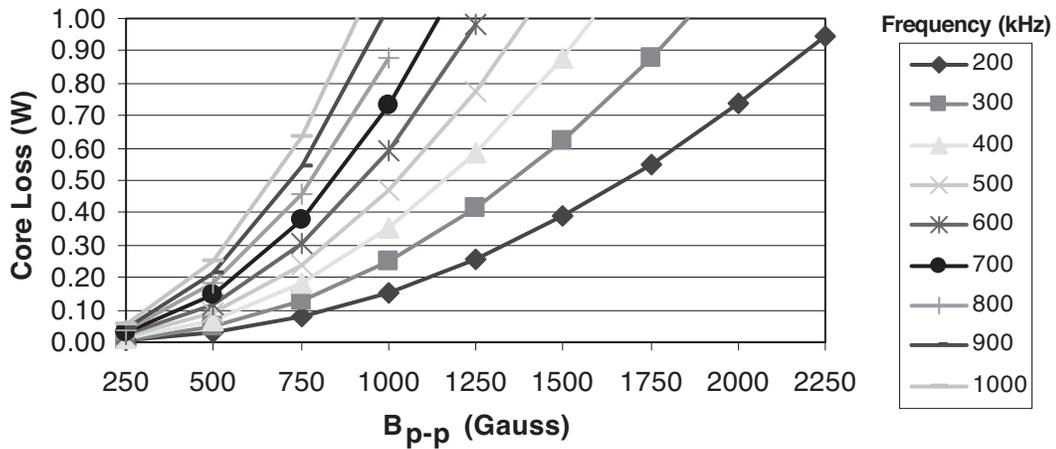


Inductance characteristics

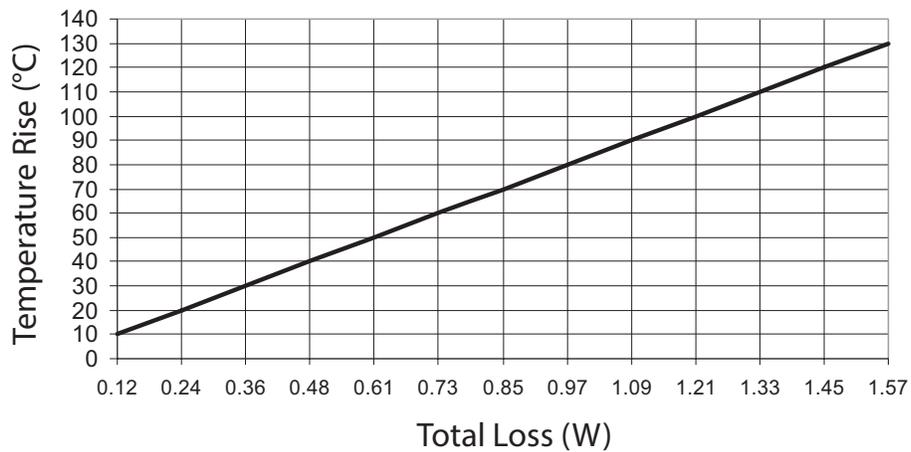
OCL vs. Isat



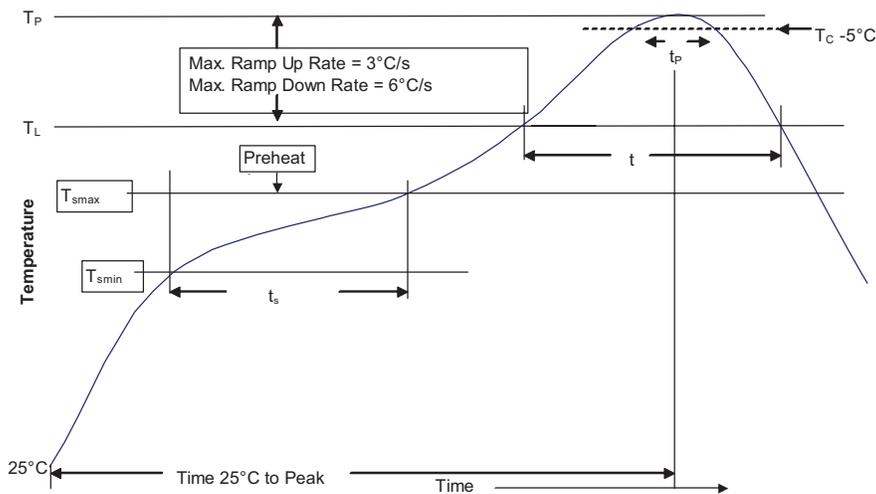
Core loss



Temperature rise vs. total loss



**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		
• 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.

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/elx

© 2015 Eaton  
All Rights Reserved  
Printed in USA  
Publication No. 4118 BU-SB13475  
October 2015

Eaton is a registered trademark.

All other trademarks are property of their respective owners.