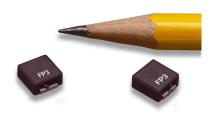
#### Effective October 2015 Supersedes April 2013

# **FP3** High current, low profile inductors



#### **Product description**

- · Low profile high current inductors
- Inductance range 0.1µh to 15µh
- 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

#### 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

#### **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%	ا <sub>sat</sub> 4 amps 15%	DCR mOhms @ 20°C typ	DCR mOhms @ 20°C max	K-factor⁵
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

1. OCL (Open Circuit Inductance) Test parameters: 100kHz, 0.1Vrms, 0.0Adc

2. I \_ \_ DC current for an approximate  $\Delta T$  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.

3.  $\rm I_{sat}$  Amps Peak for approximately 10% rolloff @ 20°C

4. I Amps Peak for approximately 15% rolloff @ 20°C

**Dimensions-mm** 

Bpp: (Gauss), K: (K factor from table), L: (Inductance in  $\mu$ H),  $\Delta$ I (Peak to peak ripple current in Amps).

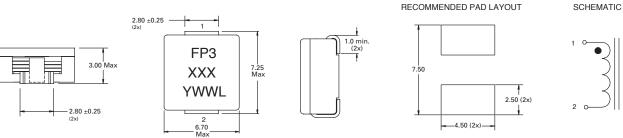
5. K-factor: Used to determine Bp-p for core loss (see graph). Bp-p =K\*L\*ΔI.

6. Part number definition:

FP3 = product code and size

xxx = inductance value in µH

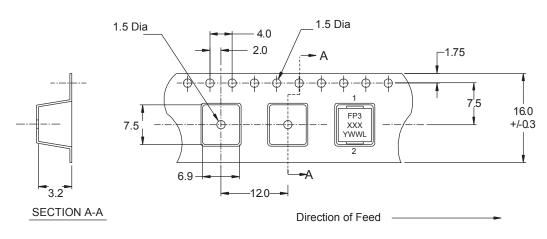
R = decimal point (if no "R" is present, then last character equals the number of zeros) "-R" suffix = RoHS complaint



Part marking: FP3 (Product code and size), xxx=(inductance value in  $\mu$ H), 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)

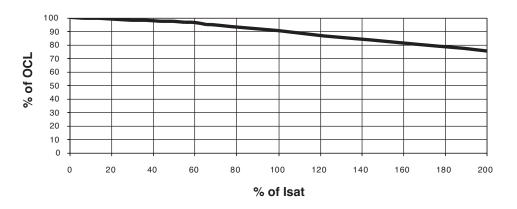
Supplied in tape and reel packaging, 1700 parts per 13" diameter reel



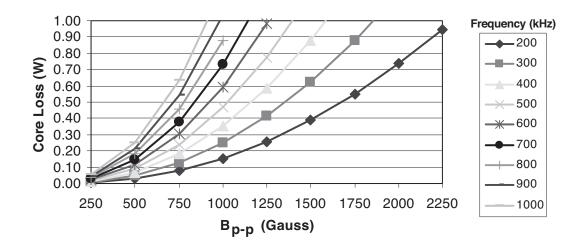
2 www.eaton.com/elx Downloaded from Arrow.com.

#### Inductance characteristics

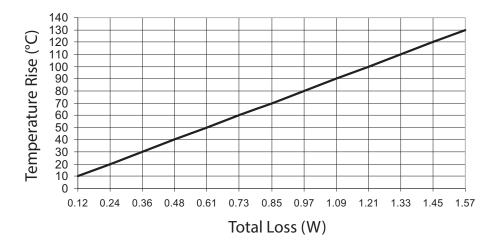
OCL vs. Isat



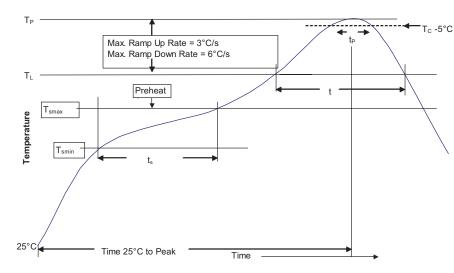
**Core loss** 



#### Temperature rise vs. total loss



#### Solder reflow profile



## $-_{T_c - 5^{\circ}C}$ Table 1 - Standard SnPb Solder (T<sub>c</sub>)

Package Thickness	Volume mm3 <350	Volume mm3 ≥350
<2.5mm)	235°C	220°C
≥2.5mm	220°C	220°C

#### Table 2 - Lead (Pb) Free Solder (T<sub>c</sub>)

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 <sub>smin</sub> )	100°C		
• Temperature max. (T <sub>smax</sub> )	150°C	200°C	
• Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )	60-120 Seconds	60-120 Seconds	
Average ramp up rate T <sub>smax</sub> to T <sub>p</sub>	3°C/ Second Max.	3°C/ Second Max.	
Liquidous temperature (TL) Time at liquidous (tL)	183°C 60-150 Seconds	217°C 60-150 Seconds	
Peak package body temperature (Tp)*	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 <sub>p</sub> to T <sub>smax</sub> )	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<sub>n</sub>) is defined as a supplier minimum and a user maximum.

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

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