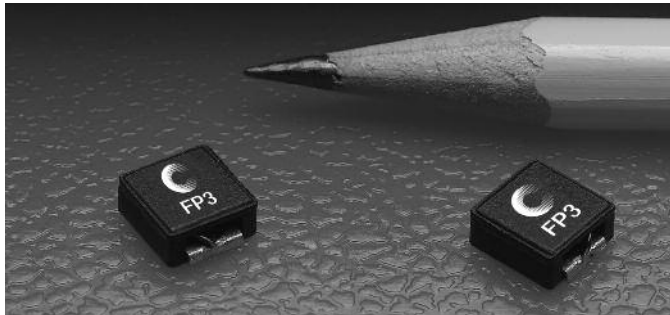


High Current, Low Profile Inductors

Flat-Pac™ FP3 Series



Description

- Lead free and RoHS compliant
- 155°C maximum total temperature operation
- Low profile high current inductors
- Inductance range 0.1µH to 15µH
- Design utilizes high temperature powder iron alloy material with a non-organic binder to eliminate thermal aging
- 7.25x6.7x3.0mm Surface mount package
- 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 regulators
- Battery power systems
- Graphics cards
- Point-of-load modules

Environmental Data

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

Packaging

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

Product Specifications

| Part Number ⁽⁶⁾ | OCL ⁽¹⁾ µH ± 15% | I _{rms} ⁽²⁾ Amps | I _{sat} ⁽³⁾ Amps | | DCR mOhms @ 20°C Typ. | DCR mOhms @ 20°C Max. | K-factor (5) |
|----------------------------|--------------------------------|---|--------------------------------------|------|-----------------------------|-----------------------------|--------------|
| | | | 10% | 15% | | | |
| 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, 0.1V_{rms}, 0.0Adc

2) I_{rms} 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.

3) I_{sat}⁽³⁾ Amps Peak for approximately 10% rolloff @ 20°C

4) I_{sat}⁽⁴⁾ Amps Peak for approximately 15% rolloff @ 20°C

5) K-factor: Used to determine B_{p-p} for core loss (see graph). B_{p-p} = K*L*ΔI B_{p-p}:(Gauss), K: (K factor from table), L: (Inductance in µH), ΔI (Peak to peak ripple current in Amps).

6) Part number definition:

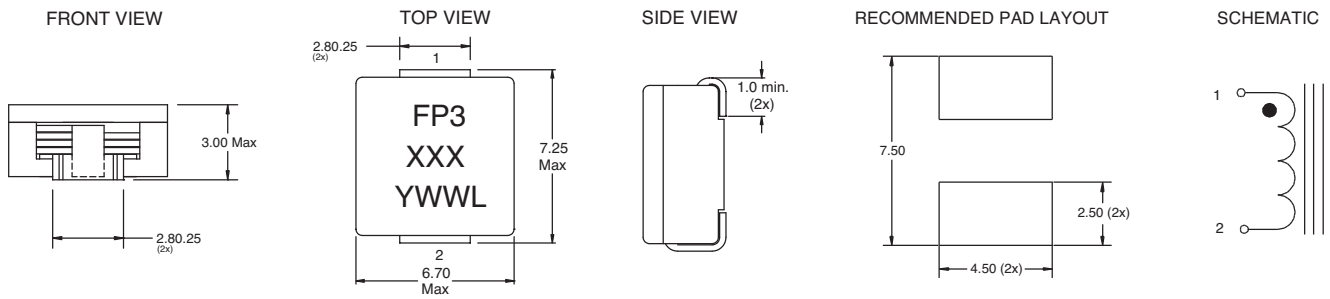
FP3 = product code and size

xxx = inductance value in µH

R = decimal point (if no "R" is present, the 3rd digit equals the number of zeros)

"-R" suffix = RoHS compliant

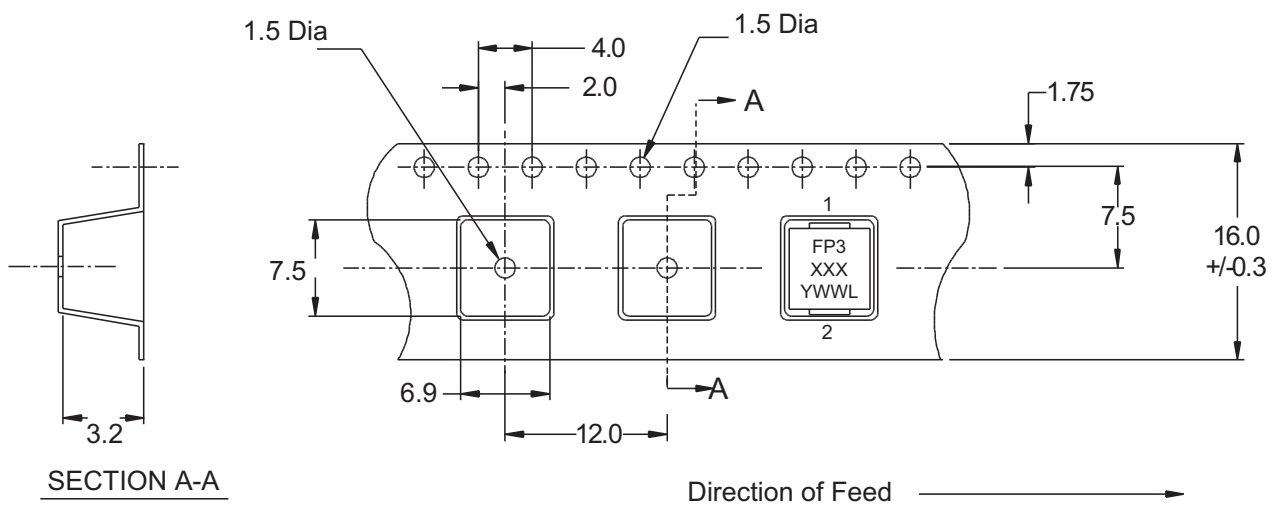
Dimensions - mm



Part Marking:

- FP3 (Product code and size)
- xxx = (Inductance=(Inductance value in μH)
- R = decimal point (if no "R" is present, the 3rd digit equals the number of zeros)
- YWW = Date code
- L = Location code

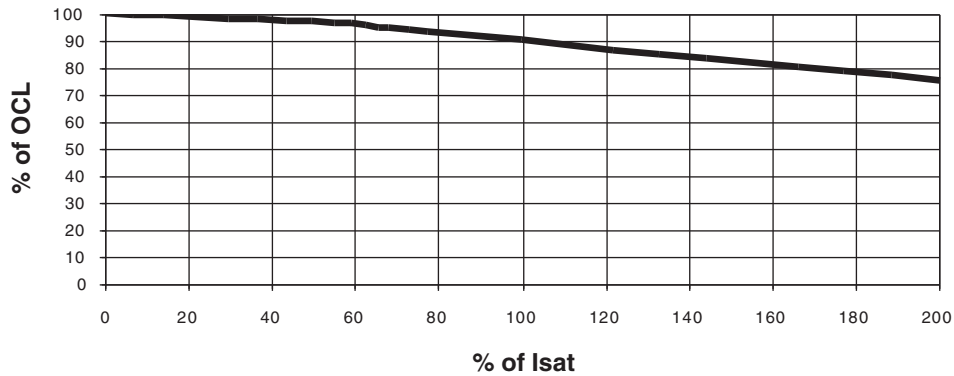
Packaging Information - mm



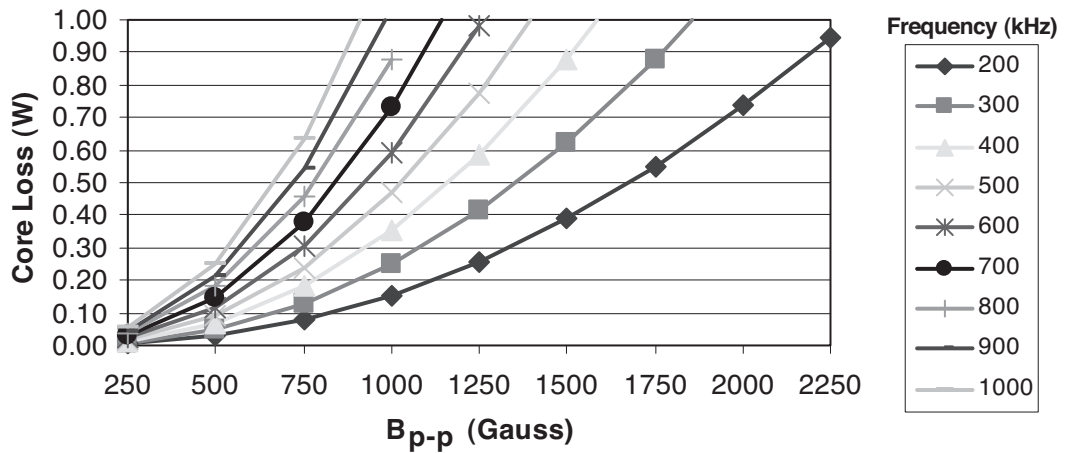
Supplied in tape and reel packaging, 1700 parts on a 13" diameter reel.

Inductance Characteristics

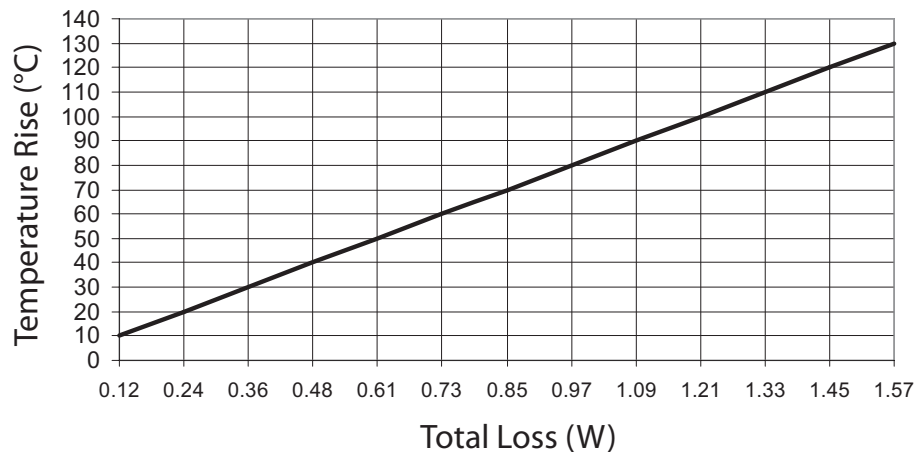
OCL vs. Isat



Core Loss



Temperature Rise vs. Watt Loss



Solder Reflow Profile

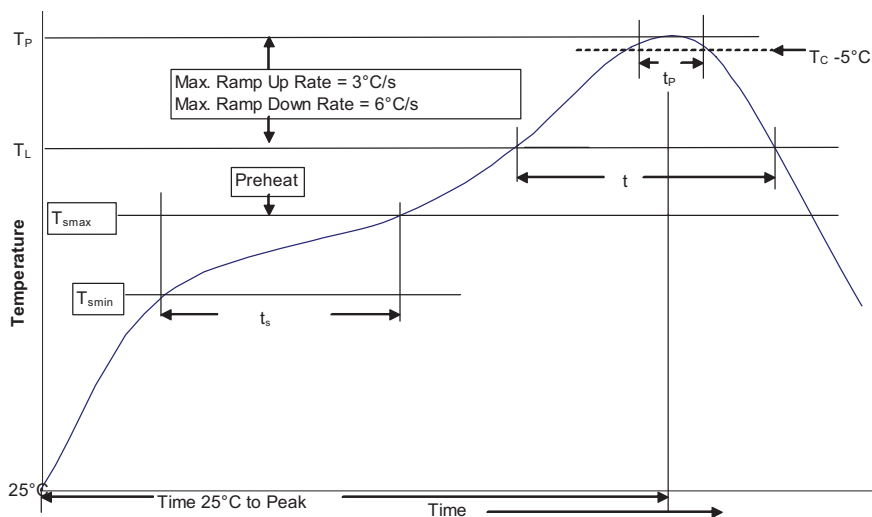


Table 1 - Standard SnPb Solder (T_c)

| Package Thickness | Volume ≤ 350 mm ³ | Volume ≥ 350 mm ³ |
|-------------------|-----------------------------------|-----------------------------------|
| <2.5mm | 235°C | 220°C |
| ≥ 2.5 mm | 220°C | 220°C |

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

| Package Thickness | Volume ≤ 350 mm ³ | Volume 350 - 2000 mm ³ | Volume > 2000 mm ³ |
|-------------------|-----------------------------------|-----------------------------------|---------------------------------|
| <1.6mm | 260°C | 260°C | 260°C |
| 1.6 - 2.5mm | 260°C | 250°C | 245°C |
| > 2.5 mm | 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"> Temperature min. (T_{smin}) Temperature max. (T_{smax}) Time (T_{smin} to T_{smax}) (t_s) | <ul style="list-style-type: none"> 100°C 150°C 60-120 Seconds |
| Average ramp up rate T_{smin} to T_{smax} | 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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