

# FP1 1 10V

## High frequency, high current power inductors



### Description

- Vertical design utilizes less board space
- Controlled DCR for sensing circuits
- Inductance Range from 195 nH to 320nH
- Current range from 42 to 70 amps
- 10.7 x 7.5mm and 10.5 x 6.2mm footprint surface mount package in a 9.5mm height
- Ferrite core material
- Halogen free, lead free, RoHS compliant

### Applications

- Servers
- Multi-phase and Vcore regulators
- Voltage Regulator Modules (VRMs)
- Desktop VRMs and EVRDs
- Data networking and storage 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



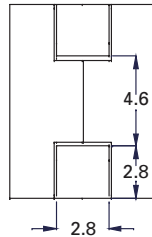
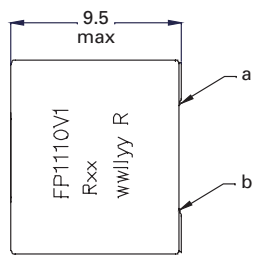
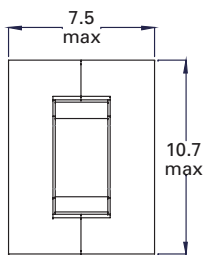
Product specifications

Part Number <sup>7</sup>	OCL <sup>1</sup> (nH) ±10%	FLL <sup>2</sup> minimum (nH)	I <sub>rms</sub> <sup>3</sup> (amps)	I <sub>sat1</sub> <sup>4</sup> (amps)	I <sub>sat2</sub> <sup>5</sup> (amps)	DCR (mΩ) ±5% @ +20°C	K-factor <sup>6</sup>
<b>V1-10.7 x 7.5 x 9.5mm</b>							
FP1110V1-R20-R	195	140	61	70	58	0.23	278
FP1110V1-R22-R	220	158	61	64	51	0.23	278
FP1110V1-R27-R	270	173	61	55	44	0.23	278
FP1110V1-R32-R	320	230	61	42	34	0.23	278
<b>V2-10.5 x 6.2 x 9.5mm</b>							
FP1110V2-R200-R	200	144	61	65	52	0.18	328

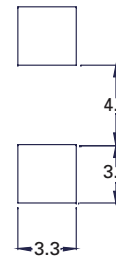
1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.1Vrms, 0.0Aac, +25°C
2. Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1Vrms, @ I<sub>sat1</sub>, @ +25°C
3. I<sub>lim</sub>: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. 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>sat1</sub>: Peak current for approximately 20% rolloff @ +25°C

5. I<sub>sat</sub>: Peak current for approximately 20% rolloff @ +100°C
6. K-factor: Used to determine B<sub>ps</sub> for core loss (see graph). B<sub>ps</sub> = K \* L \* ΔI \* 10<sup>3</sup>.  
B<sub>ps</sub> (Gauss), K: (K-factor from table), L: (Inductance in nH), ΔI (Peak to peak ripple current in Amps).
7. Part Number Definition: FP1110Vx-Rxx(x)-R  
FP1110V = Product code  
x = DCR indicator  
Rxx(x) = Inductance value in uH, R = decimal point  
-R suffix = RoHS compliant

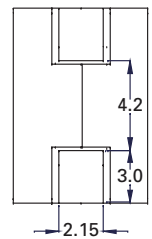
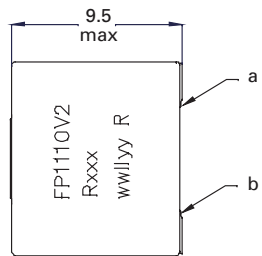
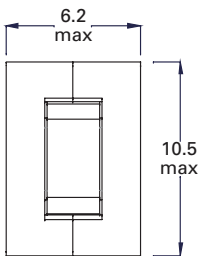
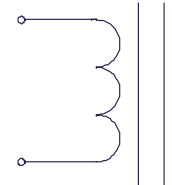
Dimensions (mm)



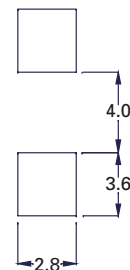
Recommended Pad Layout



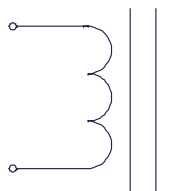
Schematic



Recommended Pad Layout



Schematic



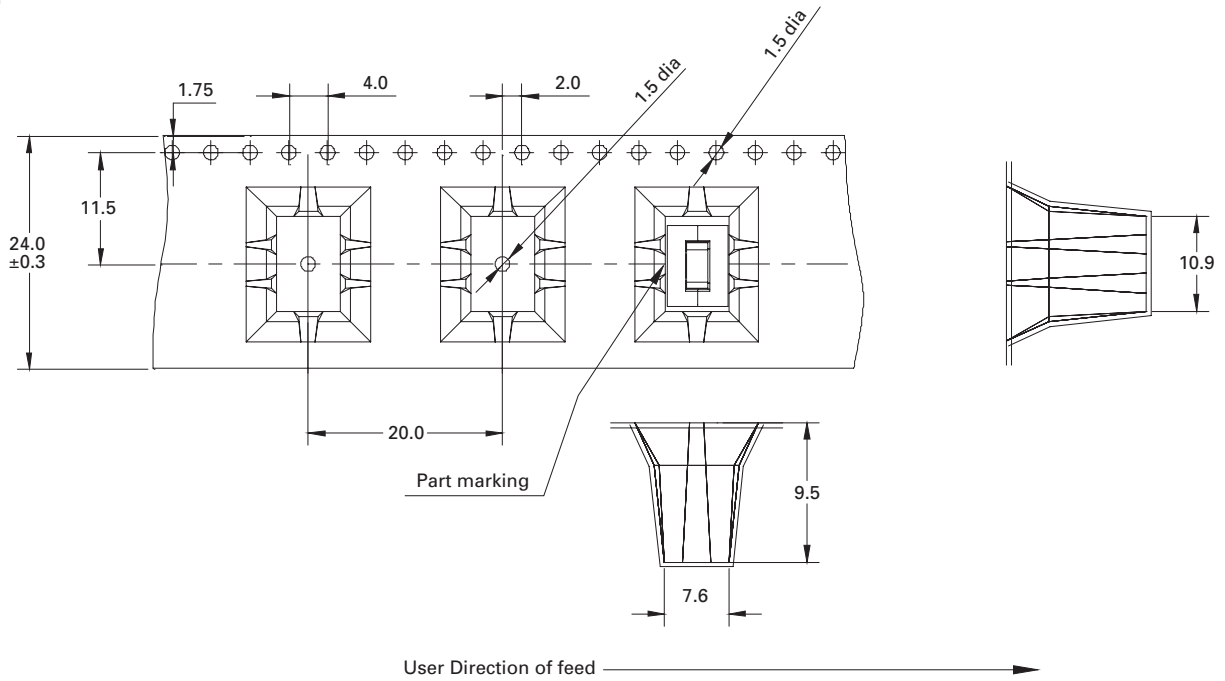
Part marking: FP1110V1 or V2, Rxx(x)=inductance value in μH, R=decimal point  
wwllyy= date code, R=revision level  
DCR measured from point "a" to point "b"  
Soldering surfaces to be coplanar within 0.10 millimeters  
Do not route traces or vias underneath the inductor.

**Packaging information (mm)**

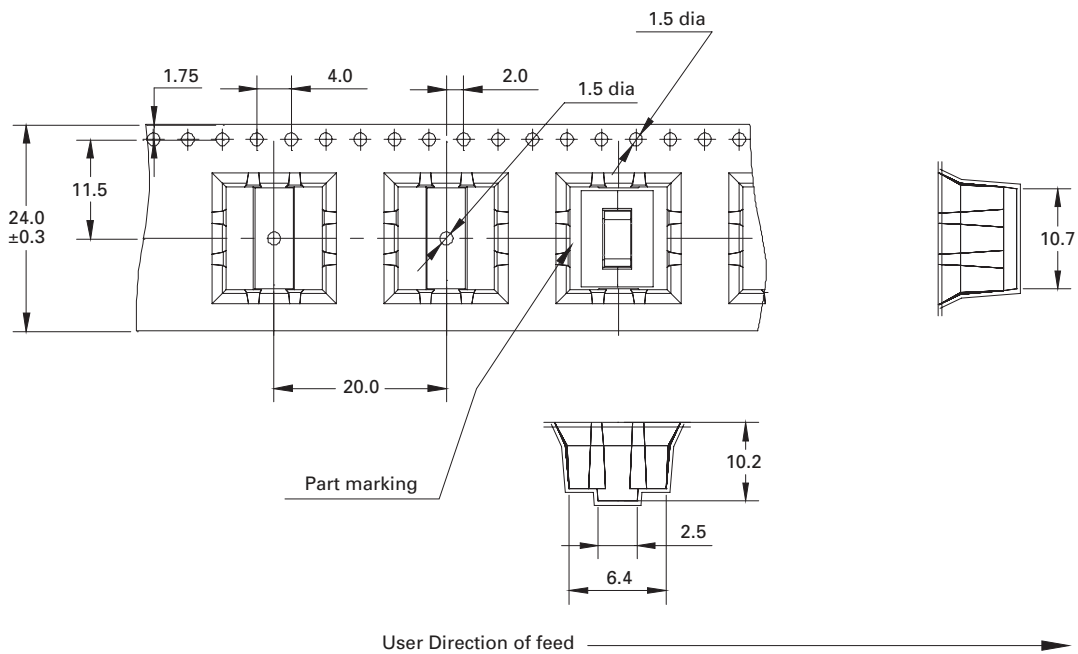
(Drawing not to scale)

(Supplied in tape and reel packaging, 300 parts per 13" diameter reel)

**FP1110V1**

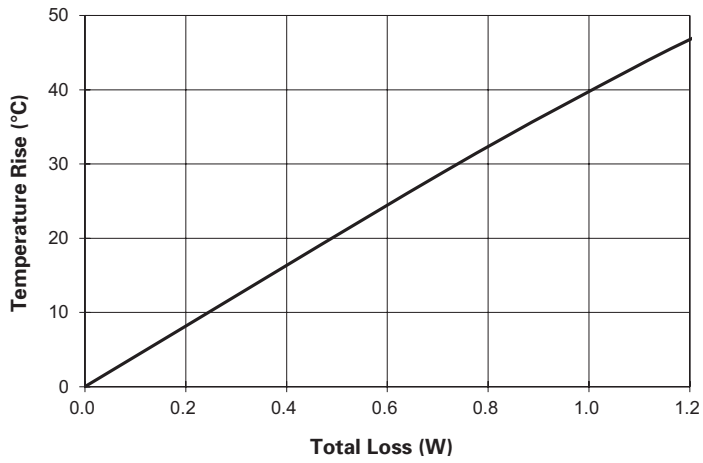


**FP1110V2**

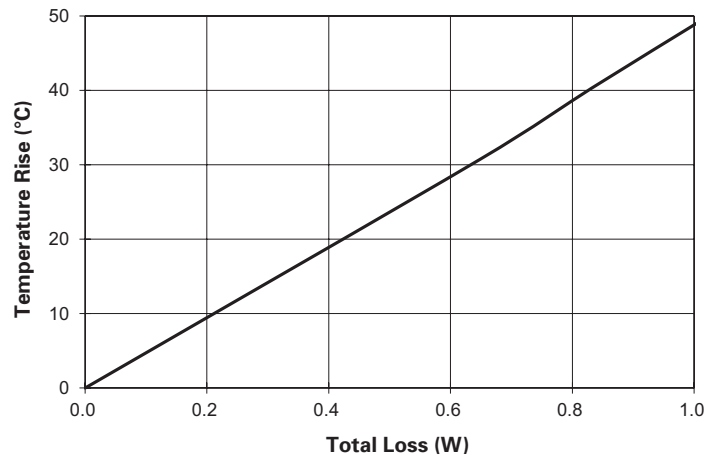


Temperature rise vs. total loss

FP1110V1

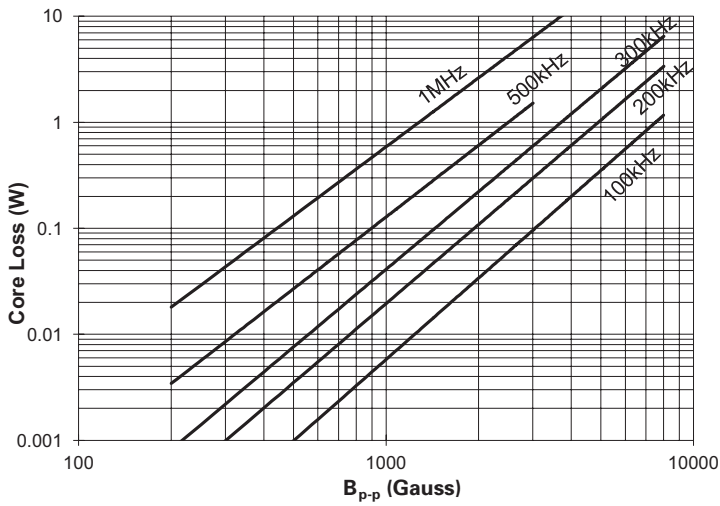


FP1110V2

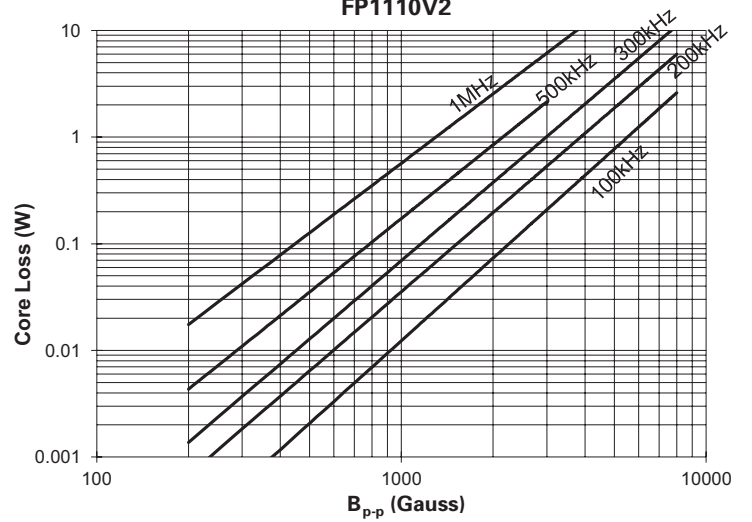


Core loss vs.  $B_{p-p}$

FP1110V1

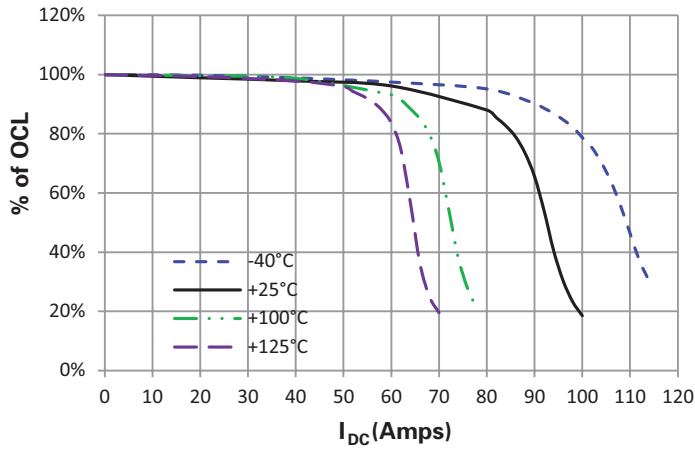


FP1110V2

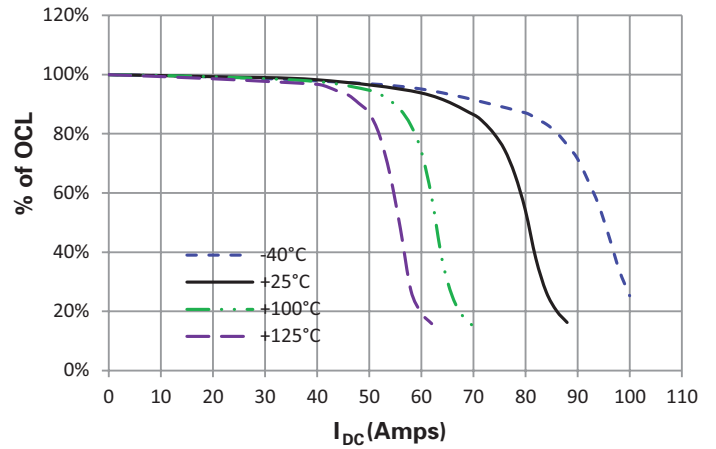


Inductance characteristics

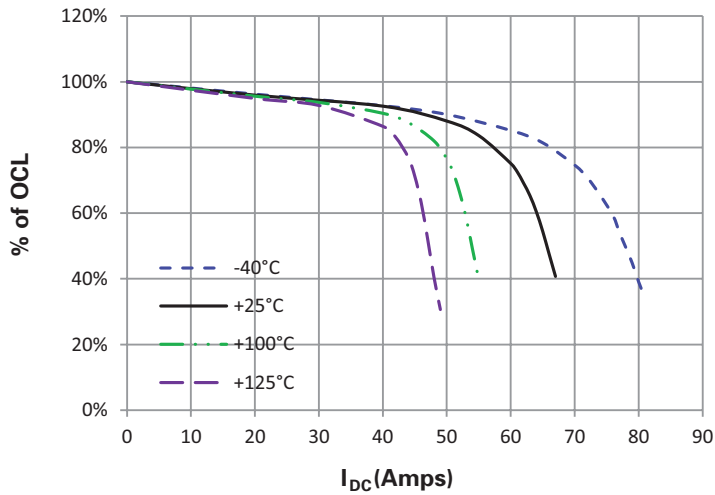
FP1110V1-R20-R



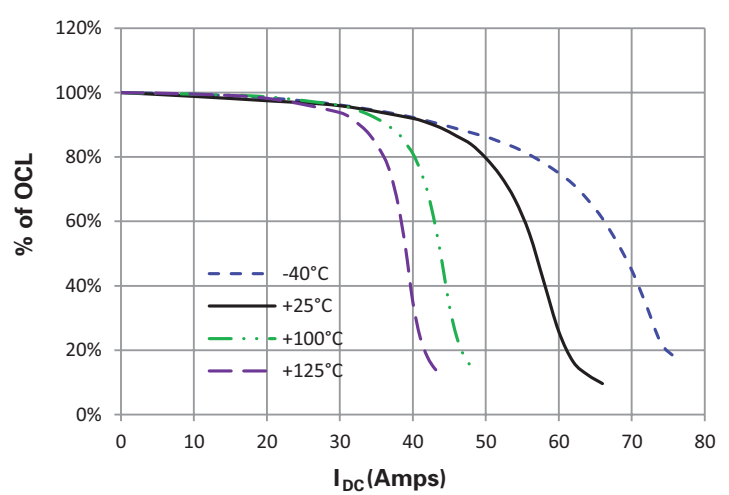
FP1110V1-R22-R



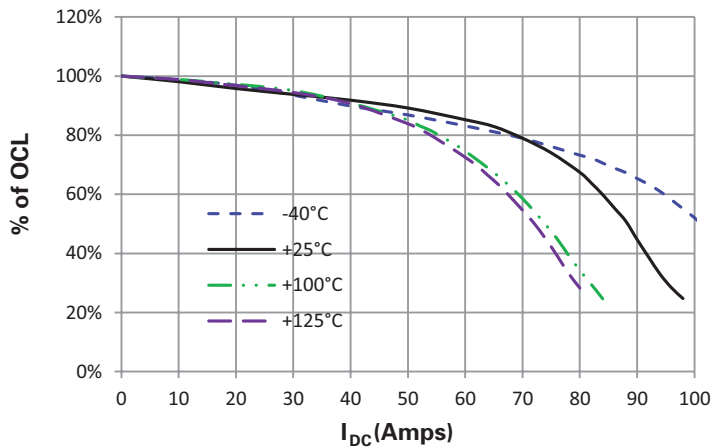
FP1110V1-R27-R



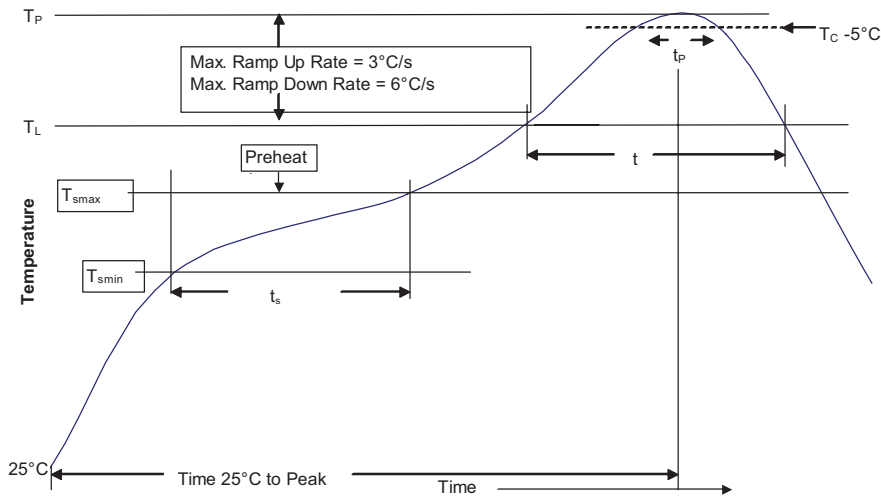
FP1110V1-R32-R



FP1110V2-R200-R



**Solder reflow profile**



**Table 1 - Standard SnPb Solder (T<sub>C</sub>)**

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<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	150°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 (T <sub>L</sub> )	183°C	217°C
Time at liquidous (t <sub>L</sub> )	60-150 Seconds	60-150 Seconds
Peak package body temperature (T <sub>p</sub> )*	Table 1	Table 2
Time (t <sub>p</sub> )** within 5 °C of the specified classification temperature (T <sub>C</sub> )	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>p</sub>) is defined as a supplier minimum and a user maximum.

\*\* Tolerance for time at peak profile temperature (t<sub>p</sub>) is defined as a supplier minimum and a user maximum.

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