

# FP1 107R

## High frequency, high current power inductors



### Product features

- High current carrying capacity
- Low core loss, magnetically shielded
- Tight tolerance DCR for sensing circuits
- Magnetically shielded
- Inductance range from 70 nH to 510 nH
- Current range from 42 A to 140 A
- Frequency range up to 2 MHz
- 11 mm x 7.2 mm and 11.2 mm x 8.0 mm footprint surface mount package in 6.5 mm, 7.2 and 7.5 mm heights
- Ferrite core material
- Moisture sensitivity level (MSL): 1

### Applications

- Multi-phase and Vcore regulators
- Voltage Regulator Modules (VRMs)
  - Server and desktop
  - Central processing unit (CPU)
  - Graphics processing unit (GPU)
  - Application specific integrated circuit (ASIC)
  - High power density
- Data networking and storage systems
- Graphics cards and battery power systems
- Point-of-load modules
- DCR Sensing circuits

### Environmental compliance and general specifications

- Storage temperature range (Component): -40 °C to +125 °C
- Operating temperature range: -40 °C to +125 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant



Product Specifications

Part number <sup>9</sup>	OCL <sup>1</sup> (nH) ±10%	FLL <sup>2</sup> (nH) minimum	I <sub>rms</sub> <sup>3</sup> (A)	I <sub>sat</sub> 1 <sup>4</sup> (A)	I <sub>sat</sub> 2 <sup>5</sup> (A)	I <sub>sat</sub> 3 <sup>6</sup> (A)	I <sub>sat</sub> 4 <sup>7</sup> (A)	DCR (mΩ) @ +20°C	K-factor <sup>8</sup>
<b>R1 version</b>									
FP1107R1-R07-R	70	50	55	140	na	na	123	0.29 ±8%	361.1
FP1107R1-R12-R	120	86	55	90	na	na	72	0.29 ±8%	361.1
FP1107R1-R15-R	150	108	55	70	na	na	56	0.29 ±8%	361.1
FP1107R1-R23-R	230	166	55	45	na	na	36	0.29 ±8%	361.1
FP1107R1-R30-R	300	217	55	35	na	na	28	0.29 ±8%	361.1
FP1107R1-R40-R	400	288	55	25	na	na	20	0.29 ±8%	361.1
FP1107R1-R51-R	510	364	55	18	na	na	14.5	0.29 ±8%	361.1
<b>R2 version</b>									
FP1107R2-R07-R	70	50	42	140	na	na	123	0.47 ±6.4%	363.3
FP1107R2-R12-R	120	86	42	90	na	na	72	0.47 ±6.4%	363.3
FP1107R2-R15-R	150	108	42	70	na	na	56	0.47 ±6.4%	363.3
FP1107R2-R23-R	230	166	42	45	na	na	36	0.47 ±6.4%	363.3
FP1107R2-R30-R	300	217	42	35	na	na	28	0.47 ±6.4%	363.3
FP1107R2-R40-R	400	288	42	25	na	na	20	0.47 ±6.4%	363.3
FP1107R2-R51-R	510	364	42	18	na	na	14.5	0.47 ±6.4%	363.3
<b>R4 version</b>									
FP1107R4-R180-R	180	130	50	62	55	53	50	0.29 ±5%	361
<b>R5 version</b>									
FP1107R5-R070-R	70	50	55	140	na	na	123	0.29 ±5%	361.1
FP1107R5-R120-R	120	86	55	90	na	na	72	0.29 ±5%	361.1
FP1107R5-R150-R	150	108	55	70	na	na	56	0.29 ±5%	361.1
FP1107R5-R230-R	230	166	55	45	na	na	36	0.29 ±5%	361.1
FP1107R5-R300-R	300	217	55	35	na	na	28	0.29 ±5%	361.1
FP1107R5-R400-R	400	288	55	25	na	na	20	0.29 ±5%	361.1
FP1107R5-R510-R	510	364	55	18	na	na	14.5	0.29 ±5%	361.1

1. Open circuit inductance (OCL) Test parameters: 100 kHz, 0.1 Vrms, 0.0 Adc, +25 °C

2. Full load inductance (FLL) Test parameters: 100 kHz, 0.1 Vrms, Isat1, +25 °C

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 @ +100 °C

7. I<sub>sat</sub>4: Peak current for approximately 20% rolloff @ +125 °C

8. K-factor: Used to determine Bp-p for core loss (see graph). Bp-p = K \* L \* ΔI \* 10<sup>3</sup>. Bp-p:(Gauss), K: (K-factor from table), L: (Inductance in nH), Symbol I (Peak to peak ripple current in Amps).

9. Part Number Definition: FP1107Rx-Rxxx-R

FP1107R= Product code and size

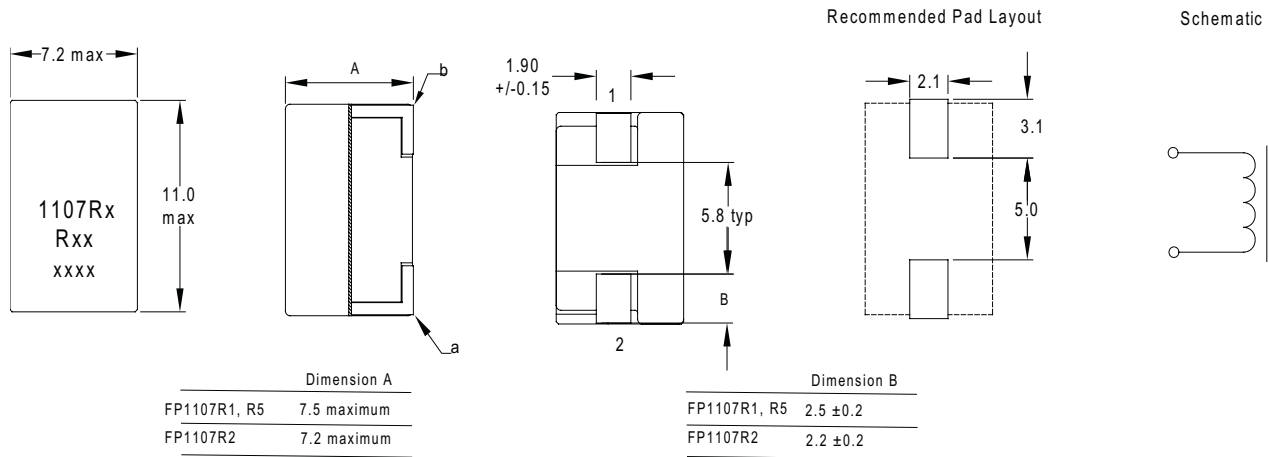
x= Version indicator

-Rxxx= Inductance value in μH, R= decimal point

-R suffix = RoHS compliant

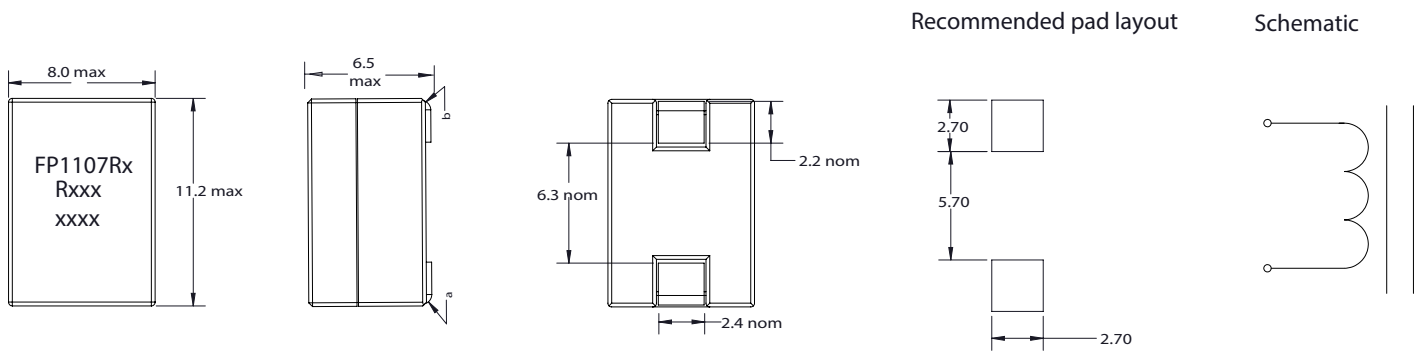
**Dimensions (mm)**

**FP1107R1, R2, R5**



Part marking: 1107Rx (x = Version indicator), Rxxx = Inductance value in uH (R= decimal point)  
xxxx= lot code  
Tolerances are ±0.15 millimeters unless stated otherwise  
All soldering surfaces to be coplanar within 0.1016 millimeters  
Pad layout tolerances are ±0.1 millimeters unless stated otherwise  
DCR measured from point "a" to point "b"  
Traces or vias underneath the inductor is not recommended

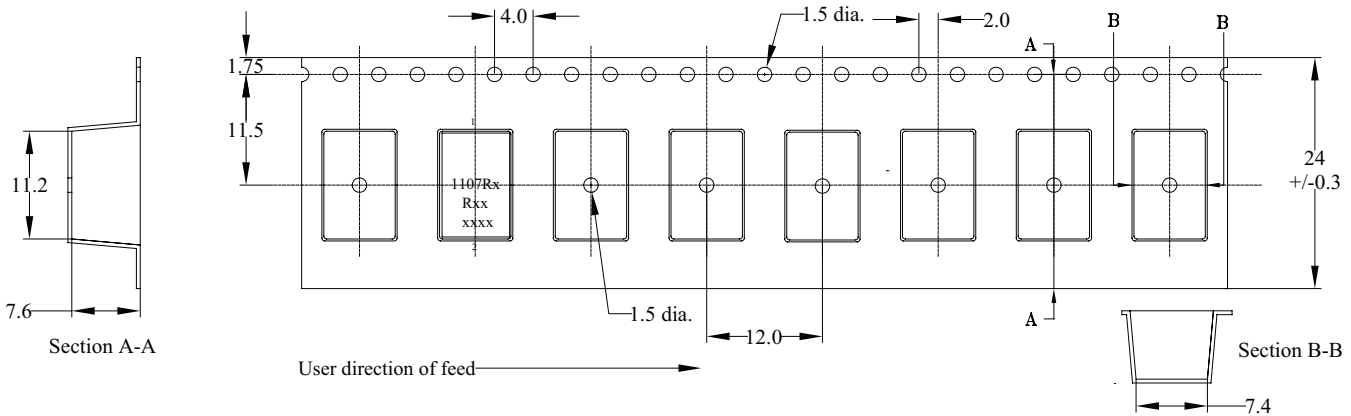
**FP1107R4**



Part marking: FP1107Rx (x = Version indicator), Rxxx = Inductance value in uH (R= decimal point)  
xxxx= lot code  
Tolerances are ±0.15 millimeters unless stated otherwise  
All soldering surfaces to be coplanar within 0.1 millimeters  
Pad layout tolerances are ±0.1 millimeters unless stated otherwise  
DCR measured from point "a" to point "b"  
Traces or vias underneath the inductor is not recommended

**Packaging information (mm)**

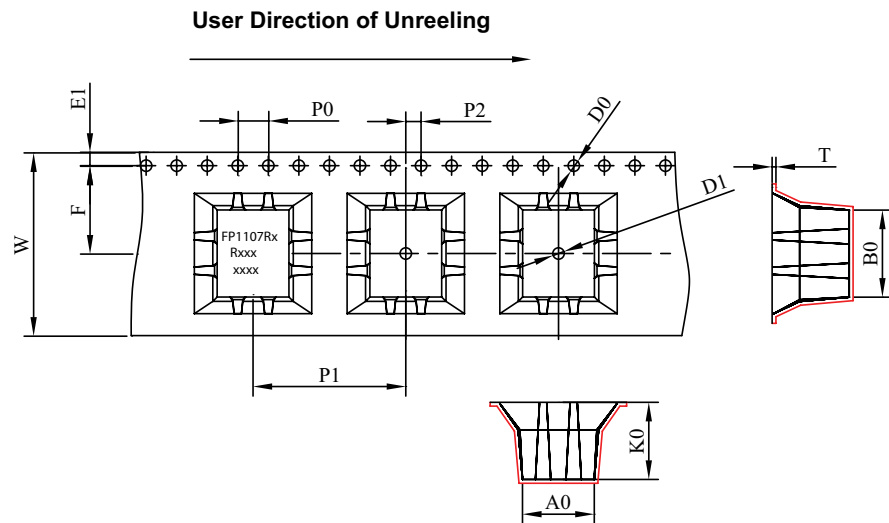
**FP1107R1, R2** Supplied in tape and reel packaging , 640 parts per 13" diameter reel  
**FP1107R5** Supplied in tape and reel packaging , 600 parts per 13" diameter reel



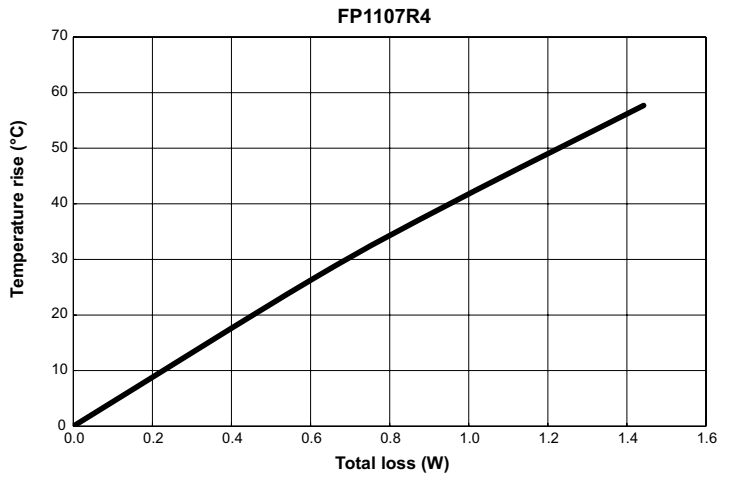
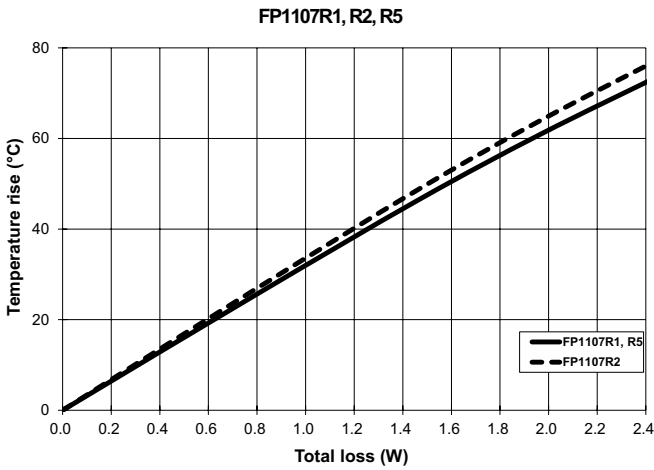
**Packaging information (mm)**

**FP1107R4** Supplied in tape and reel packaging , 750 parts per 13" diameter reel

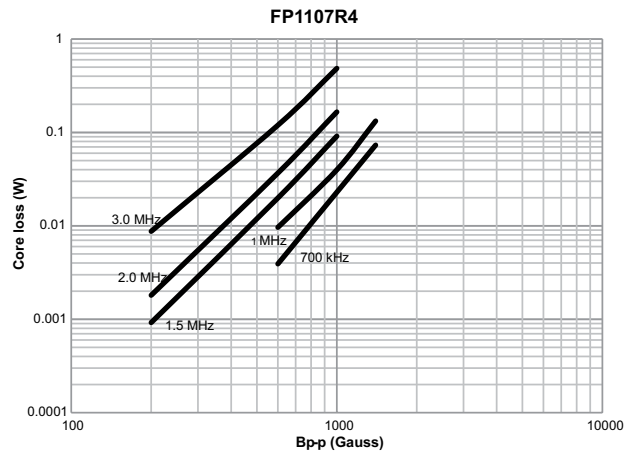
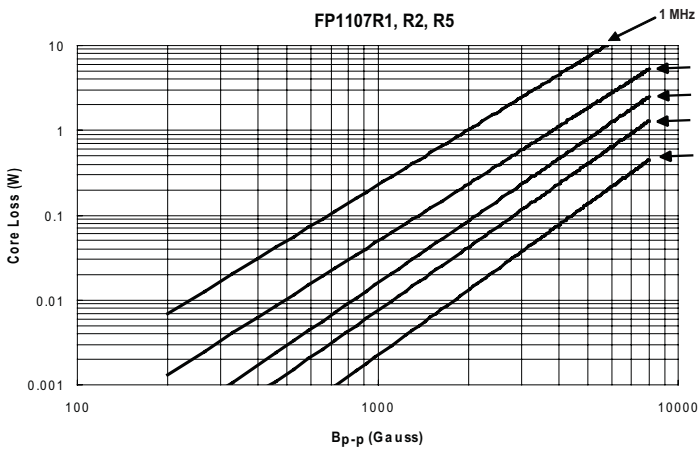
<b>W±0.3</b>	<b>24.00</b>
<b>F±0.1</b>	<b>11.50</b>
<b>E1 ±0.1</b>	<b>1.75</b>
<b>P0±0.1</b>	<b>4.00</b>
<b>P1±0.1</b>	<b>12.00</b>
<b>P2±0.1</b>	<b>2.00</b>
<b>D0</b>	$\begin{matrix} 0.1 \\ 0.0 \end{matrix}$ <b>1.50</b>
<b>D1</b>	$\begin{matrix} 0.1 \\ 0.0 \end{matrix}$ <b>1.50</b>
<b>A0±0.1</b>	<b>8.3</b>
<b>A1±0.1</b>	
<b>B0±0.1</b>	<b>11.5</b>
<b>B1±0.1</b>	
<b>K0±0.1</b>	<b>6.7</b>
<b>T±0.05</b>	<b>0.4</b>



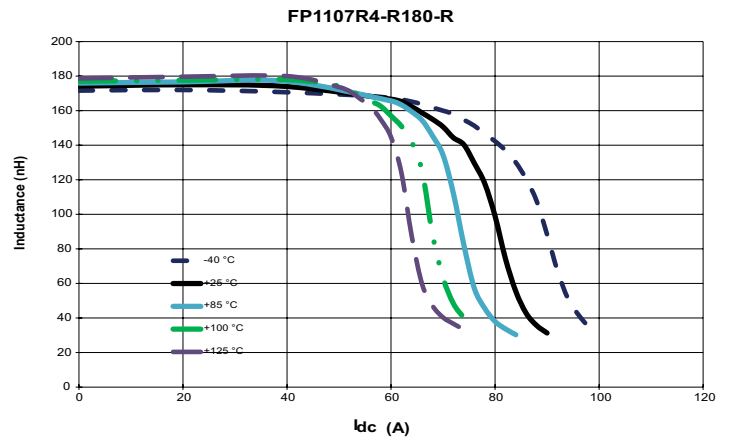
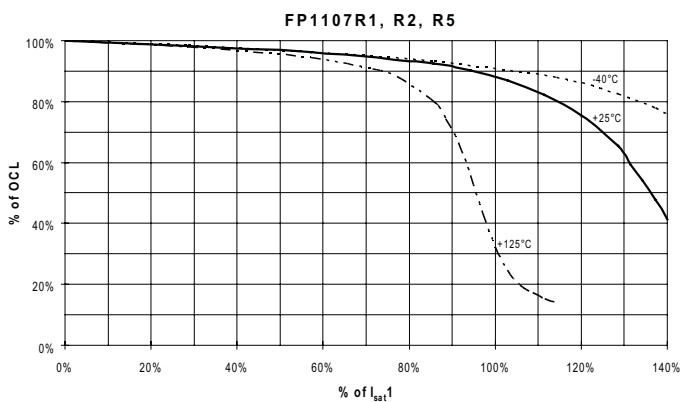
Temperature rise vs. total loss



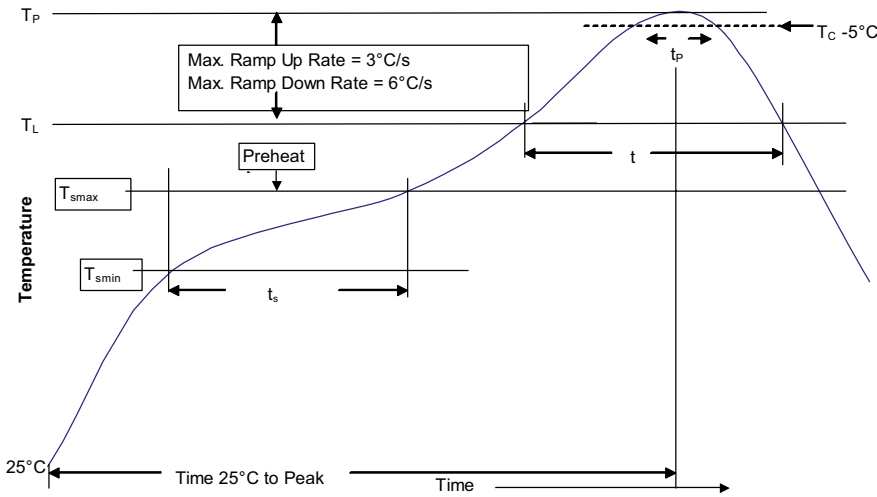
Core loss vs.  $B_{p-p}$



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
<2.5 mm	235 °C	220 °C
$\geq$ 2.5 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
<1.6 mm	260 °C	260 °C	260 °C
1.6 – 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

**Reference J-STD-020**

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
Ramp up rate $T_L$ to $T_p$	3 °C/ second max.	3 °C/ second max.
Liquidous temperature ( $T_L$ )	183 °C	217 °C
Time ( $t_L$ ) maintained above $T_L$	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*
Ramp-down rate ( $T_p$ to $T_L$ )	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.

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