

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 ⁹	OCL ¹ (nH) ±10%	FLL ² (nH) minimum	I _{rms} ³ (A)	I _{sat} 1 ⁴ (A)	I _{sat} 2 ⁵ (A)	I _{sat} 3 ⁶ (A)	I _{sat} 4 ⁷ (A)	DCR (mΩ) @ +20°C	K-factor ⁸
R1 version									
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
R2 version									
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
R4 version									
FP1107R4-R180-R	180	130	50	62	55	53	50	0.29 ±5%	361
R5 version									
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_{avg}: 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_{sat}1: Peak current for approximately 20% rolloff @ +25 °C

5. I_{sat}2: Peak current for approximately 20% rolloff @ +85 °C

6. I_{sat}3: Peak current for approximately 20% rolloff @ +100 °C

7. I_{sat}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 * 10⁻³. 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

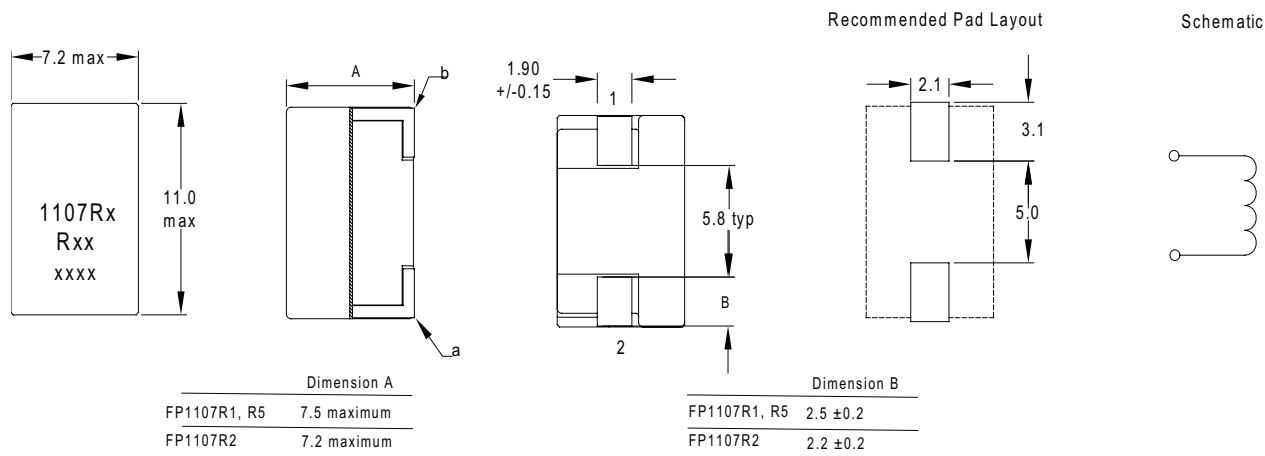
x= Version indicator

-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

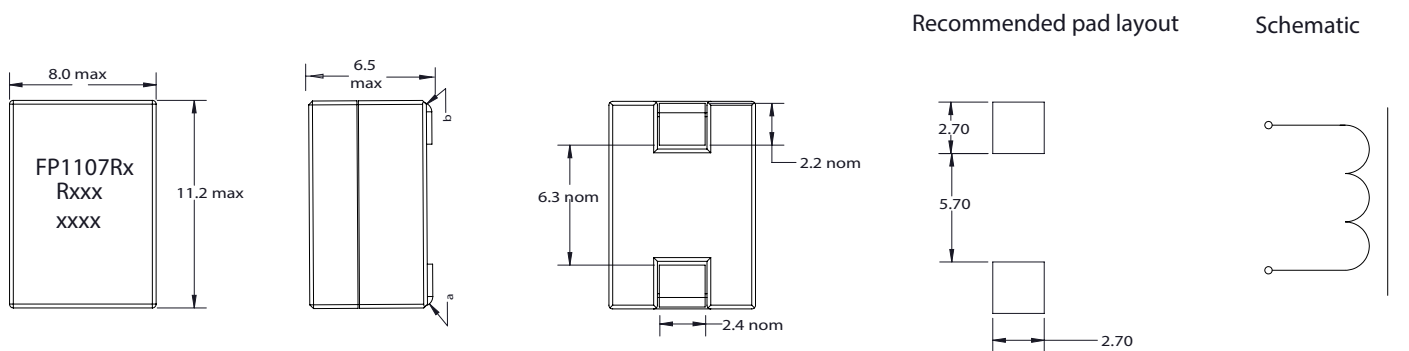
All soldering surfaces to be coplanar within 0.1016 millimeters

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

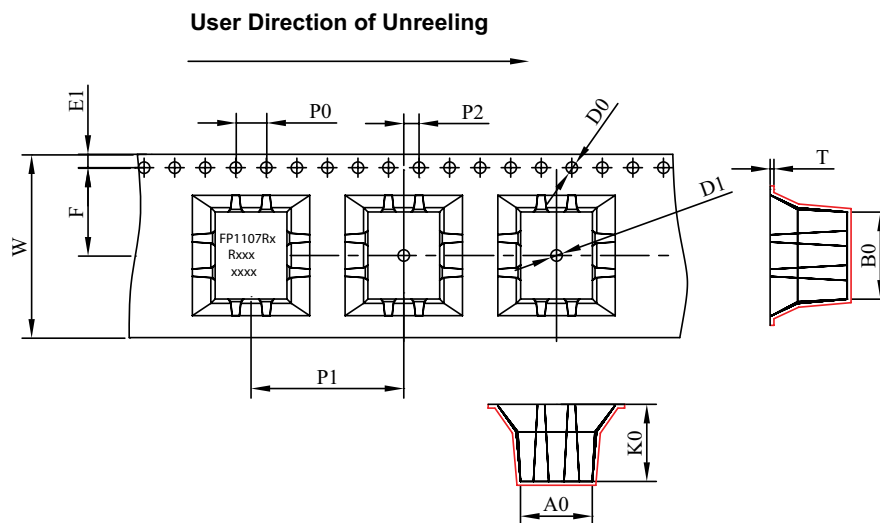
DCR measured from point "a" to point "b"

Traces or vias underneath the inductor is not recommended

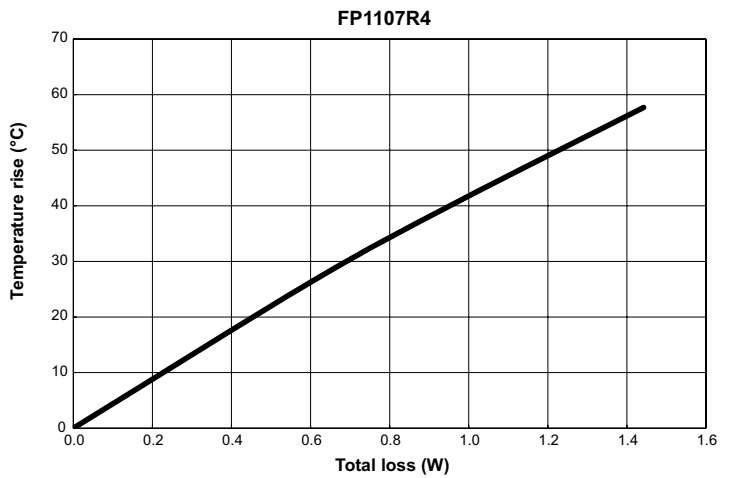
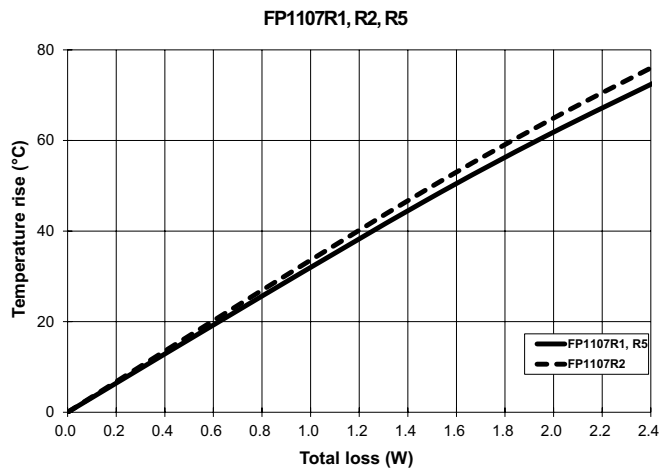
FP1107R1, R2 Supplied in tape and reel packaging , 640 parts per 13" diameter reel
FP1107R5 Supplied in tape and reel packaging , 600 parts per 13" diameter reel



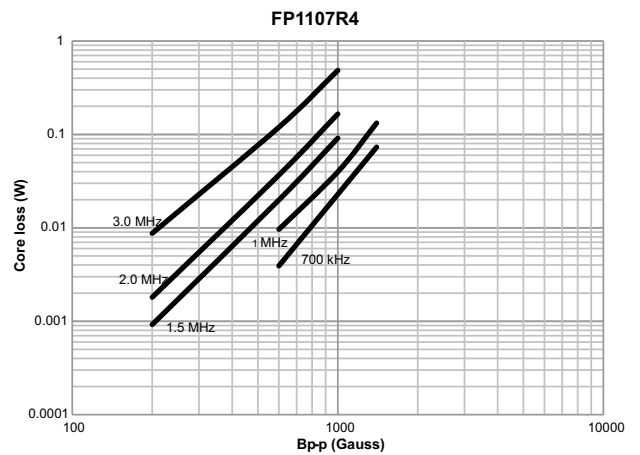
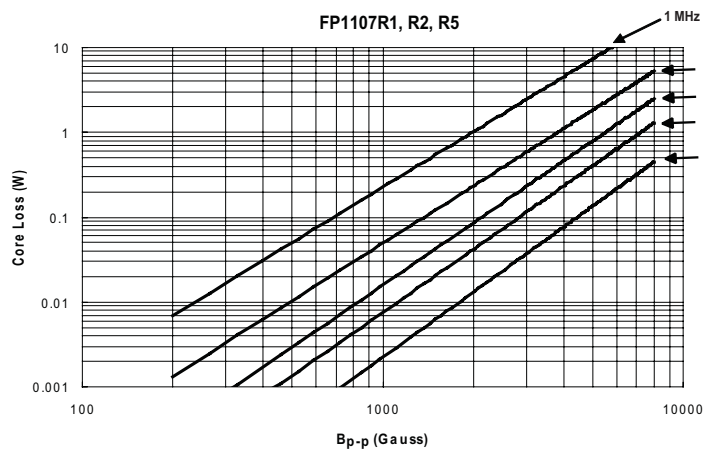
W±0.3	24.00
F±0.1	11.50
E1 ±0.1	1.75
P0±0.1	4.00
P1±0.1	12.00
P2±0.1	2.00
D0 ^{0.1} / _{0.0}	1.50
D1 ^{0.1} / _{0.0}	1.50
A0±0.1	8.3
A1±0.1	
B±0.1	11.5
B1±0.1	
K0±0.1	6.7
T±0.05	0.4



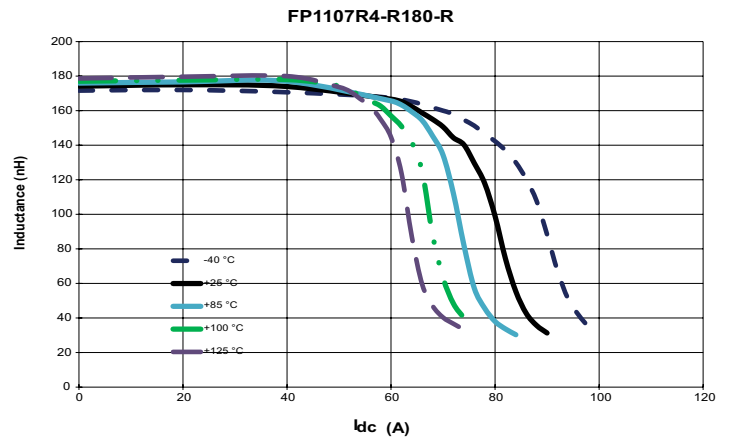
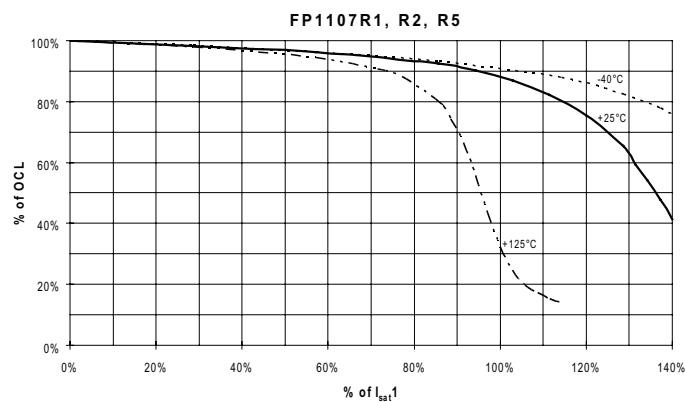
Temperature rise vs. total loss



Core loss vs. B_{p-p}



Inductance characteristics



Solder reflow profile

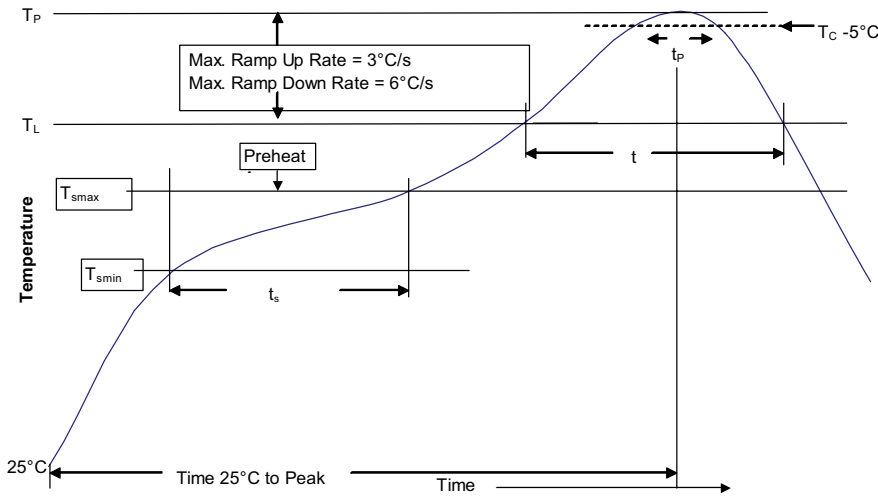


Table 1 - Standard SnPb solder (T_C)

Package thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

Table 2 - Lead (Pb) free solder (T_C)

Package thickness	Volume mm ³ <350	Volume mm ³ 350 - 2000	Volume 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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