FP1107R

High frequency, high current power inductors

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

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

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

Pb HALOGEN HF FREE RoHS

Powering Business Worldwide

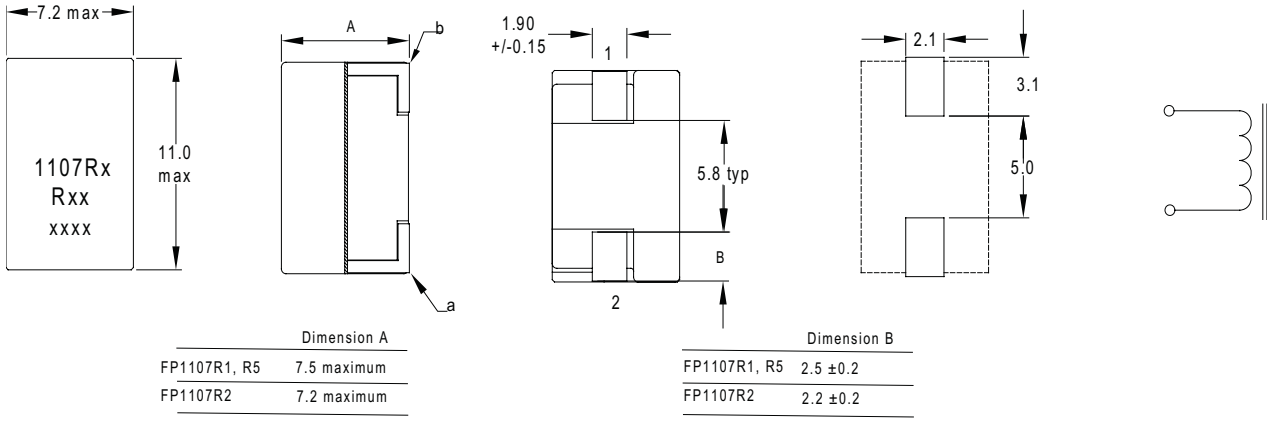
Product Specifications

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_{rms}: 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

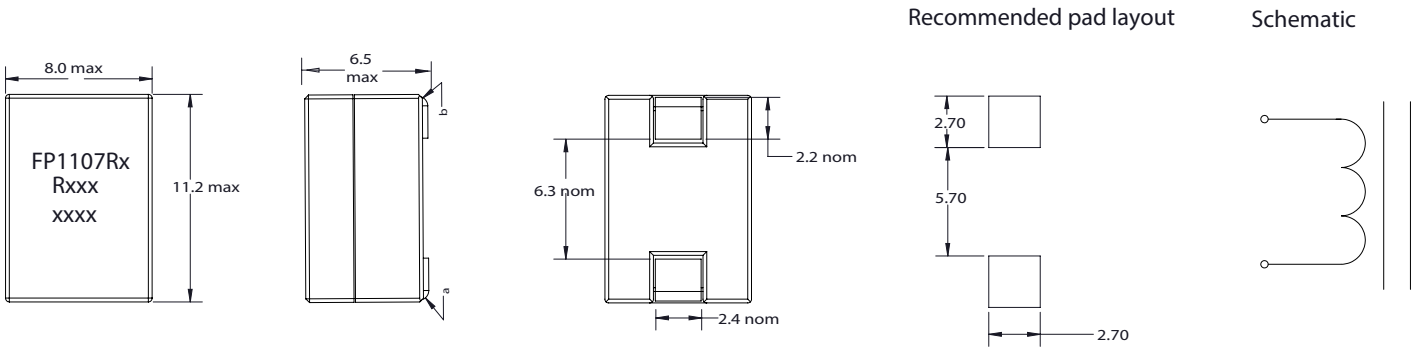


Dimension A	
FP1107R1, R5	7.5 maximum
FP1107R2	7.2 maximum

Dimension B	
FP1107R1, R5	2.5 ±0.2
FP1107R2	2.2 ±0.2

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

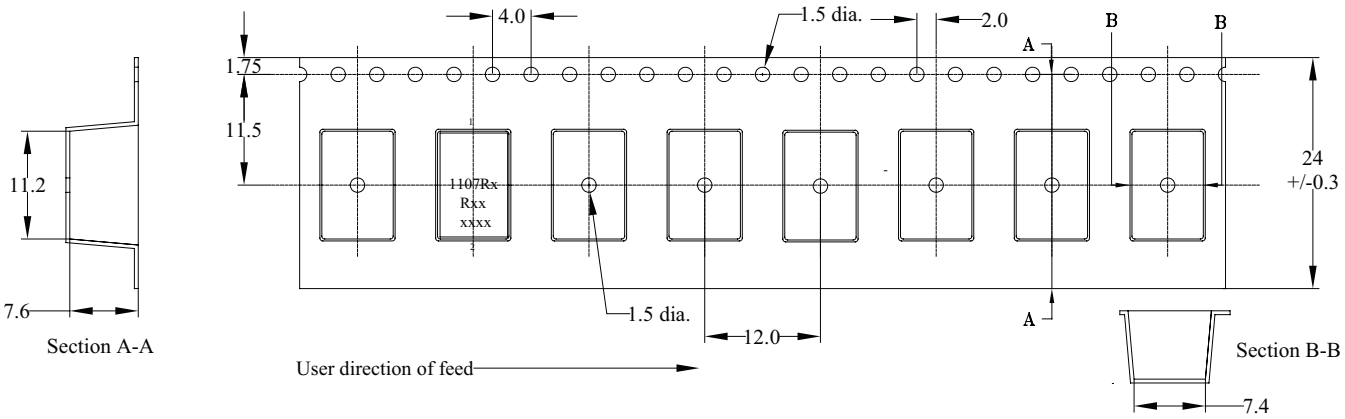
FP1107R4



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 0.1millimeters
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)

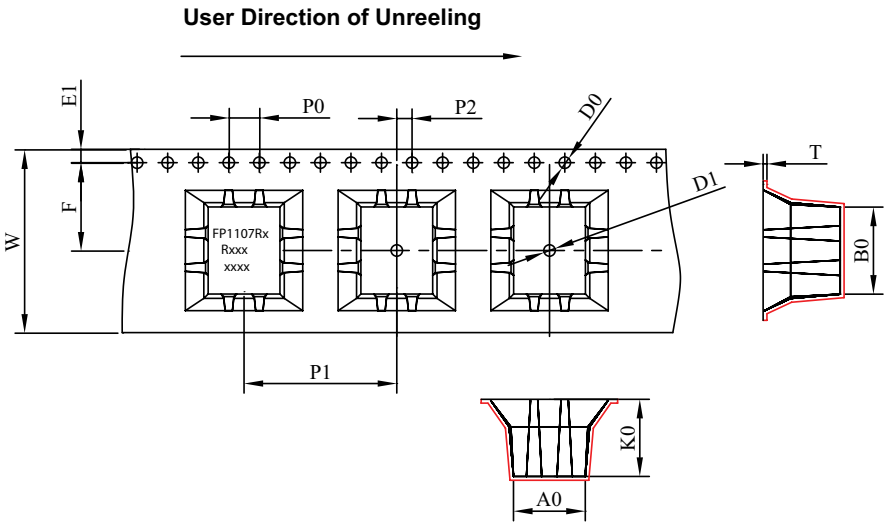
FP1107R1, R2 Supplied in tape and reel packaging , 640 parts per 13" diameter reel
FP1107R5 Supplied in tape and reel packaging , 600 parts per 13" diameter reel



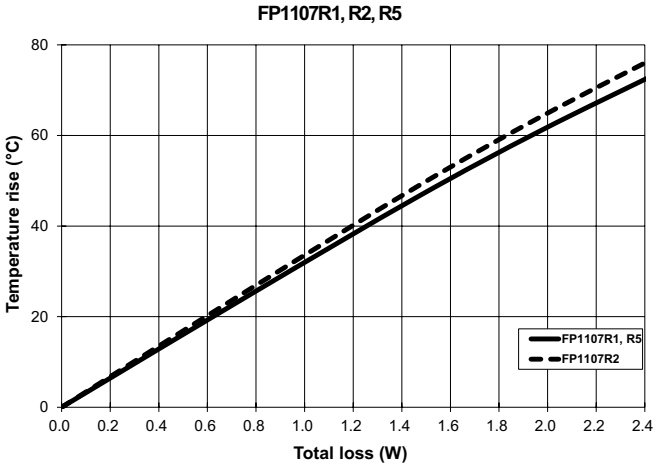
Packaging information (mm)

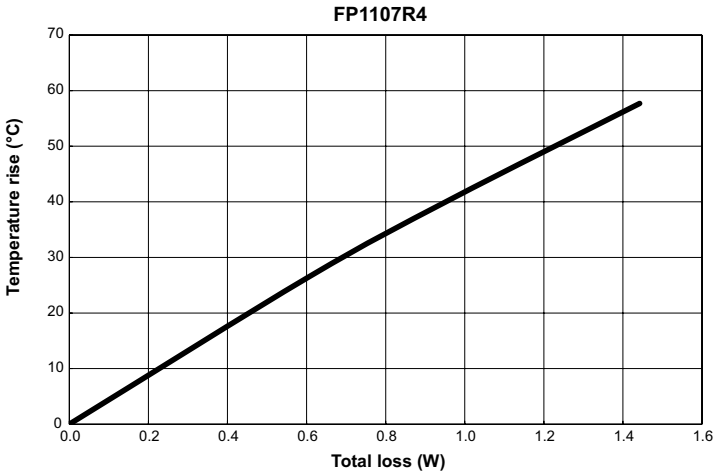
FP1107R4 Supplied in tape and reel packaging , 750 parts per 13" diameter reel

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	
B0±0.1	11.5
B1±0.1	
K0±0.1	6.7
T±0.05	0.4

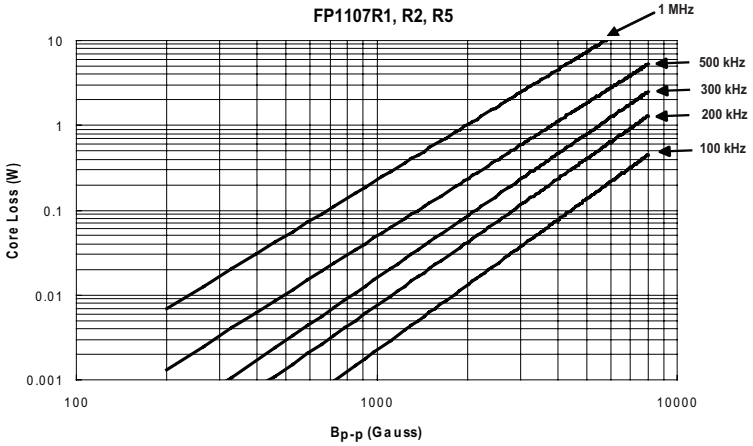


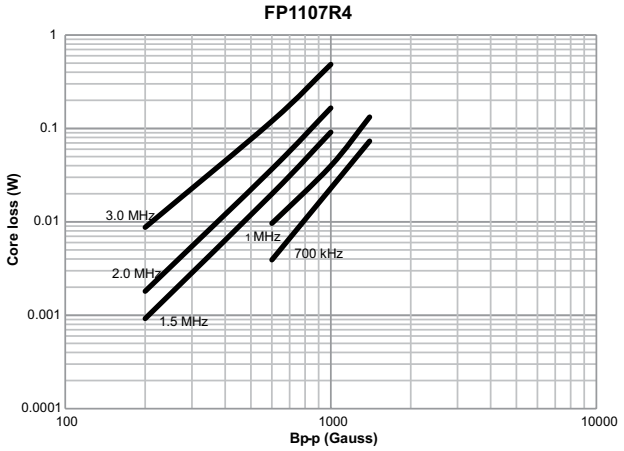
Temperature rise vs. total loss



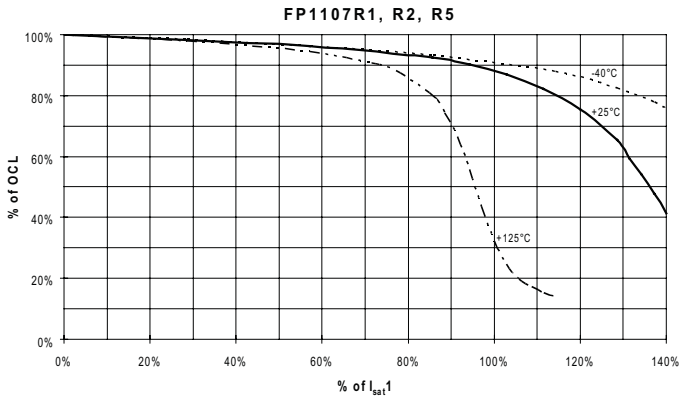


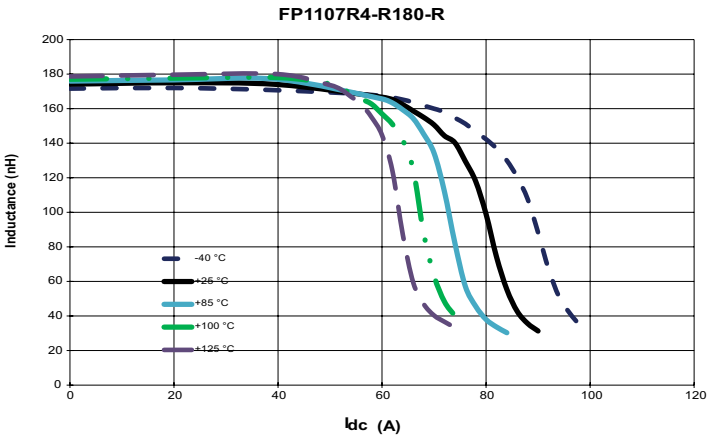
Core loss vs. B_{p-p}





Inductance characteristics





Solder reflow profile

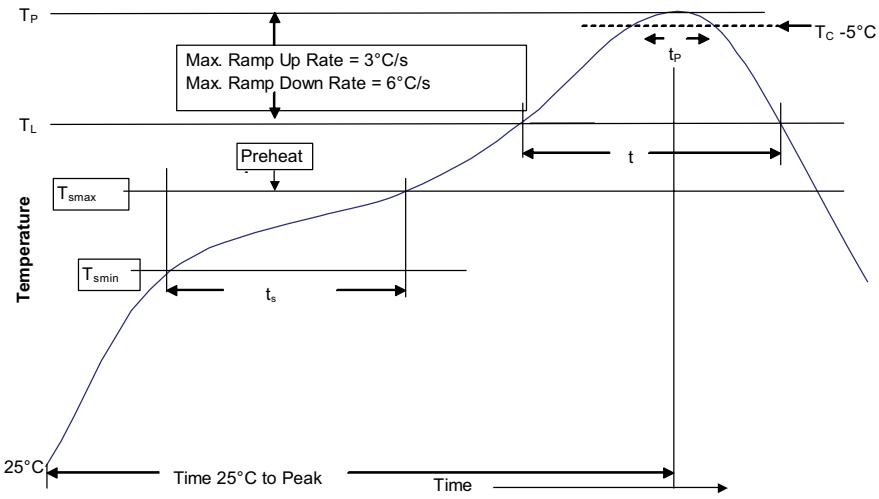


Table 1 - Standard SnPb solder (T_C)

Package thickness	Volume mm3 <350	Volume mm3 ≥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 mm³ <350	Volume mm³ 350 - 2000	Volume mm³ >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) Time (t_L) maintained above T_L		183 °C 60-150 seconds	217 °C 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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