

# FP1007

## High frequency, high current power inductors



### Product description

- High current carrying capacity
- Low core loss
- Frequency range up to 2MHz
- Inductance Range from 115 nH to 300nH
- Current range from 32 to 94 amps
- 10.4 x 8.0mm footprint surface mount package in 6.5, 7.0 or 7.5mm 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
- Graphics cards and battery power 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



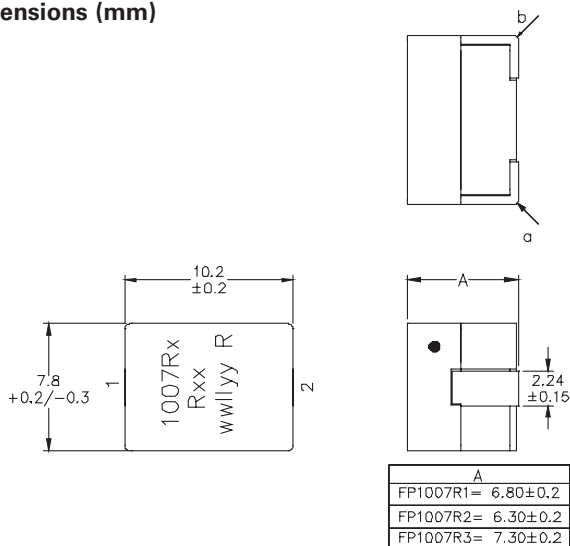
Product specifications

Part Number <sup>7</sup>	OCL <sup>1</sup> (nH)±10%	FLL <sup>2</sup> (nH) minimum	I <sub>rms</sub> <sup>3</sup> (amps)	I <sub>sat,1</sub> <sup>4</sup> (amps)	I <sub>sat,2</sub> <sup>5</sup> (amps)	DCR (mΩ) @ 20°C ±5%	K-factor <sup>8</sup>
<b>R1 version</b>							
FP1007R1-R12-R	120	86	60	81	65	0.29 ± 10%	371
FP1007R1-R14-R	140	100	60	72	56	0.29 ± 10%	371
FP1007R1-R17-R	170	122	60	58	46	0.29 ± 10%	371
FP1007R1-R22-R	215	155	60	50	36	0.29 ± 10%	371
FP1007R1-R30-R	300	216	60	32	26	0.29 ± 10%	371
<b>R2 version</b>							
FP1007R2-R12-R	120	86	51	81	65	0.48 ± 8%	368
FP1007R2-R14-R	140	100	51	72	56	0.48 ± 8%	368
FP1007R2-R17-R	170	122	51	58	46	0.48 ± 8%	368
FP1007R2-R22-R	215	155	51	50	36	0.48 ± 8%	368
FP1007R2-R30-R	300	216	51	32	26	0.48 ± 8%	368
<b>R3 version</b>							
FP1007R3-R12-R	115	83	61	94	86	0.29 ± 5%	354
FP1007R3-R15-R	150	108	61	76	70	0.29 ± 5%	354
FP1007R3-R17-R	175	126	61	66	60	0.29 ± 5%	354
FP1007R3-R22-R	215	155	61	50	43	0.29 ± 5%	354
FP1007R3-R23-R	230	165	61	48	40	0.29 ± 5%	354
FP1007R3-R27-R	270	194	61	40	34	0.29 ± 5%	354
FP1007R3-R30-R	300	216	61	35	30	0.29 ± 5%	354

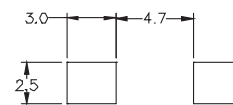
- Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.1Vrms, 0.0Aac, +25°C
- Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1Vrms, I<sub>sat,1</sub>, +25°C
- I<sub>rms</sub>: Irms: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. 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.
- I<sub>sat,1</sub>: Peak current for approximately 20% rolloff @ +25°C
- I<sub>sat,2</sub>: Peak current for approximately 20% rolloff @ +125°C

- K-factor: Used to determine B<sub>pp</sub> for core loss (see graph).  
B<sub>pp</sub> = K \* L \* ΔI \* 10<sup>-3</sup>. B<sub>pp</sub> (Gauss), K: (K-factor from table),  
L: (Inductance in nH), ΔI (Peak-to-peak ripple current in Amps).
- Part Number Definition: FP1007Rx-Rxx-R  
FP1007R= Product code and size  
x = DCR indicator  
Rxx = Inductance value in μH, R= decimal point  
-R suffix = RoHS compliant

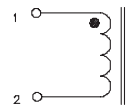
Dimensions (mm)



Recommended Pad Layout



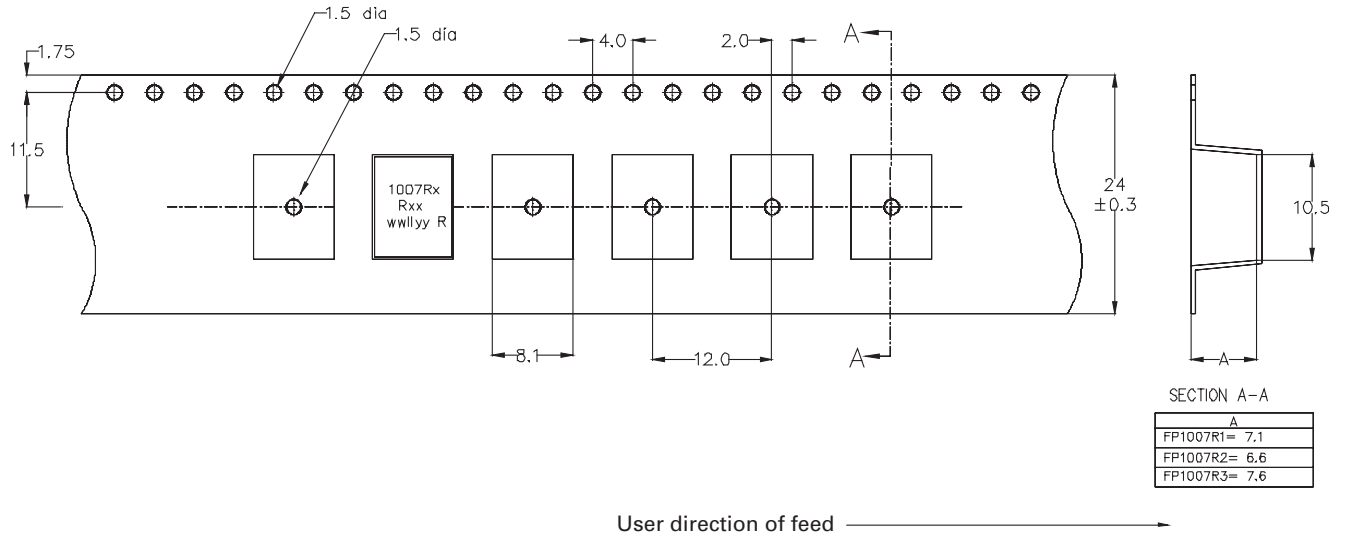
Schematic



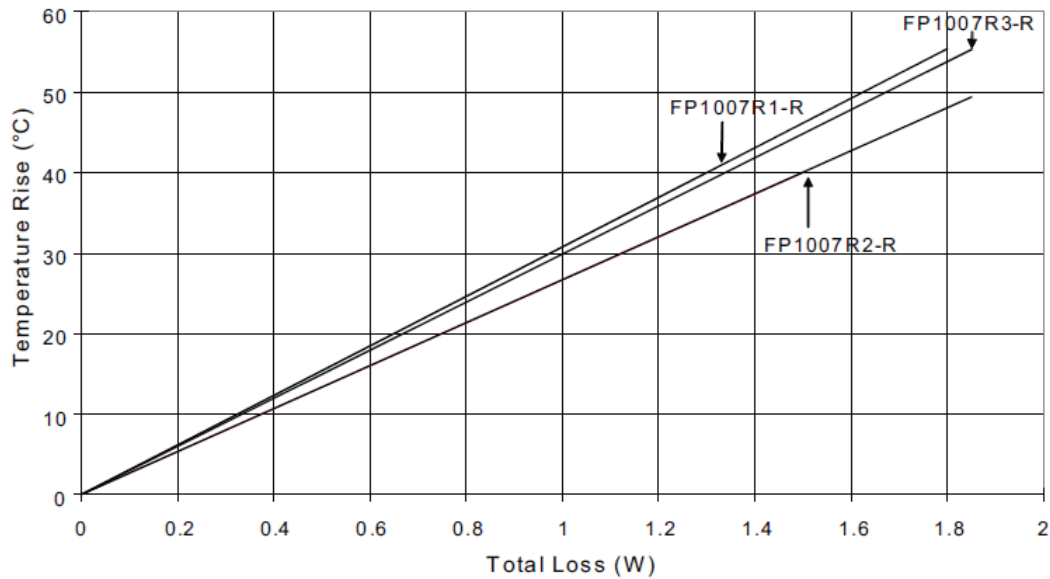
Part marking: 1007Rx (x = DCR indicator), Rxx (xx = inductance value in μH, R = decimal point, wwlllyy = date code, R = revision level)  
Tolerances are ±0.25 millimeters unless stated otherwise.  
PCB tolerances are ±0.1 millimeters unless stated otherwise  
All soldering surfaces to be coplanar within 0.1 millimeter  
DCR measured from point "a" to point "b"  
Do not route traces or vias underneath the inductor

**Packaging information (mm)**

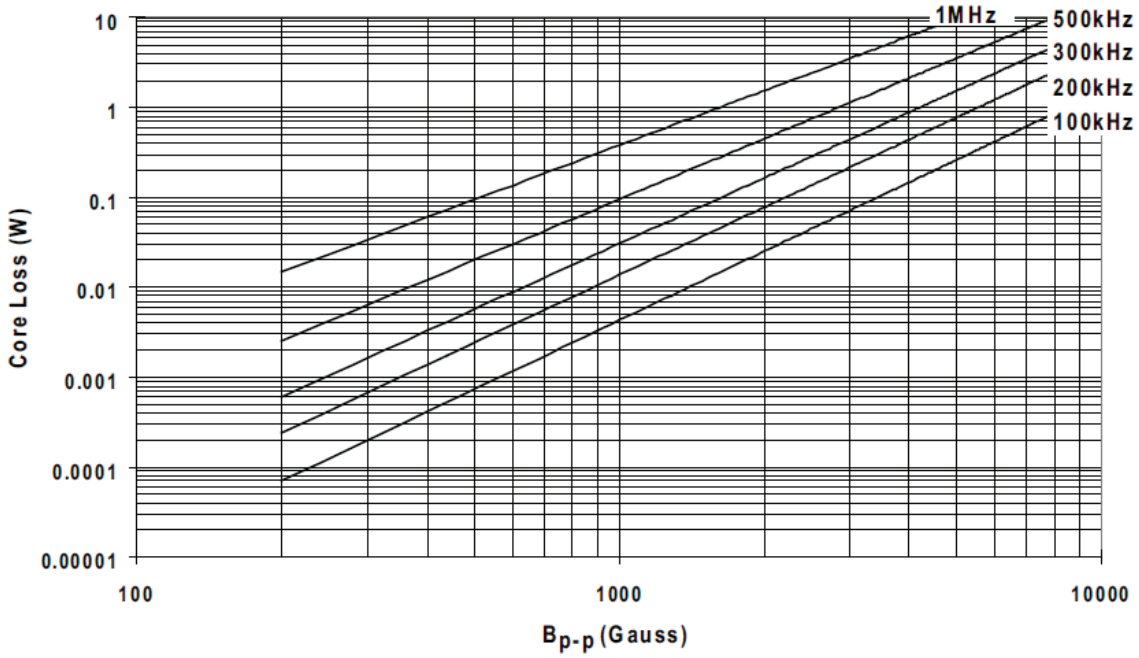
Supplied in tape and reel packaging,  
 FP1007R1 700 parts per 13 " diameter reel  
 FP1007R2 750 parts per 13 " diameter reel  
 FP1007R3 650 parts per 13 " diameter reel



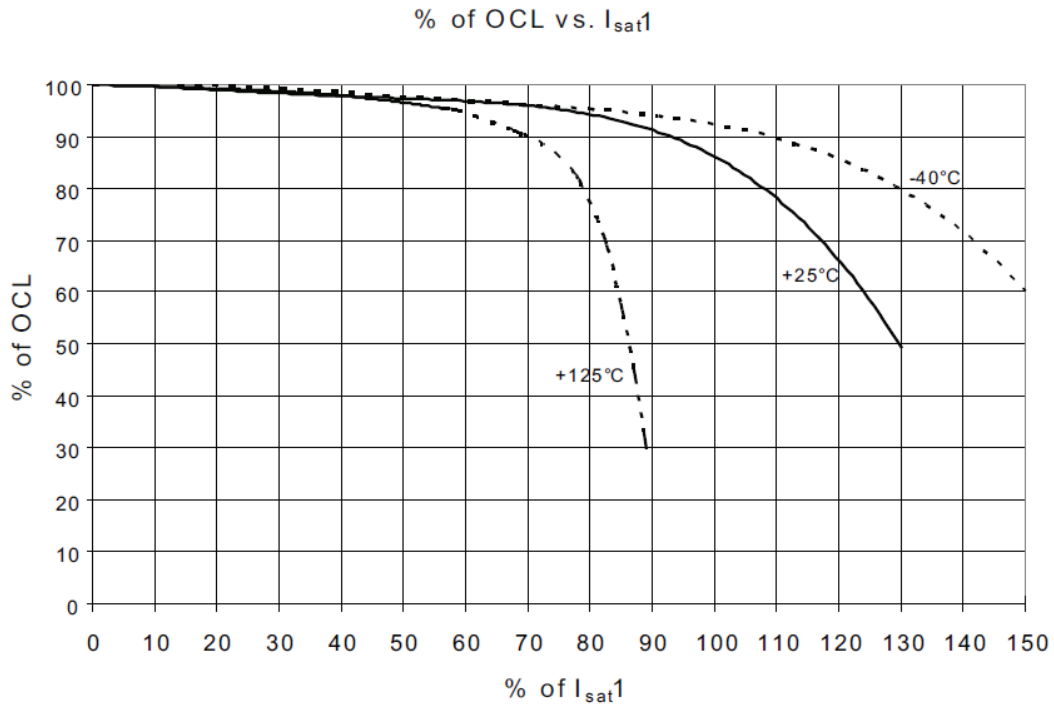
**Temperature rise vs. total loss**



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
<2.5mm)	235°C	220°C
$\geq$ 2.5mm	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
<1.6mm	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. ( $T_{smin}$ )	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
Average ramp up rate $T_{smax}$ to $T_p$	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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