

# FP1006

## High frequency, high current power inductors



### Product features

- 10.2 x 8.0 x 6.0mm surface mount package
- Ferrite core material
- High current carrying capacity, Low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 85nH to 220nH
- Current range from 38 to 100 amps
- Frequency range up to 2MHz

### Applications

- Multi-phase regulators
- Voltage Regulator Module (VRM)
- Point-of-load modules
- Desktop and server VRMs and EVRDs
- Data networking and storage systems
- Graphics cards and battery power systems
- DCR sensing

### Environmental data

- 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	OCL <sup>1</sup> ± 10% (nH)	FLL <sup>2</sup> Min. (nH)	I <sub>rms</sub> <sup>3</sup> (Amps)	I <sub>sat</sub> <sup>1</sup> @ 25°C (Amps)	I <sub>sat</sub> <sup>2</sup> @ 125°C (Amps)	DCR (mΩ) @ 20°C	K-factor <sup>4</sup>
<b>R1 Version</b>							
FP1006R1-R08-R	85	61	53	100	70	0.27 ± 12%	454
FP1006R1-R10-R	100	72		85	64		454
FP1006R1-R12-R	120	86		71	53		454
FP1006R1-R16-R	160	115		55	40		454
FP1006R1-R22-R	220	158		38	28		454
<b>R2 Version</b>							
FP1006R2-R08-R	85	61	45	100	70	0.36 ± 8.6%	454
FP1006R2-R10-R	100	72		85	64		454
FP1006R2-R12-R	120	86		71	53		454
FP1006R2-R16-R	160	115		55	40		454
FP1006R2-R22-R	220	158		38	28		454

1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10V<sub>rms</sub>, 0.0A<sub>dc</sub>

2 Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1V<sub>rms</sub>, I<sub>sat</sub><sup>1</sup>

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 pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.

4 I<sub>sat</sub><sup>1</sup>: Peak current for approximately 20% rolloff at +25°C.

5 I<sub>sat</sub><sup>2</sup>: Peak current for approximately 20% rolloff at +125°C.

6 K-factor: Used to determine B<sub>p-p</sub> for core loss (see graph). B<sub>p-p</sub> = K \* L \* ΔI \* 10<sup>-3</sup>, B<sub>p-p</sub>: (Gauss), K: (K-factor from table), L: (inductance in nH), ΔI (peak-to-peak ripple current in amps).

7 Part Number Definition: FP1006Rx-Rxx-R

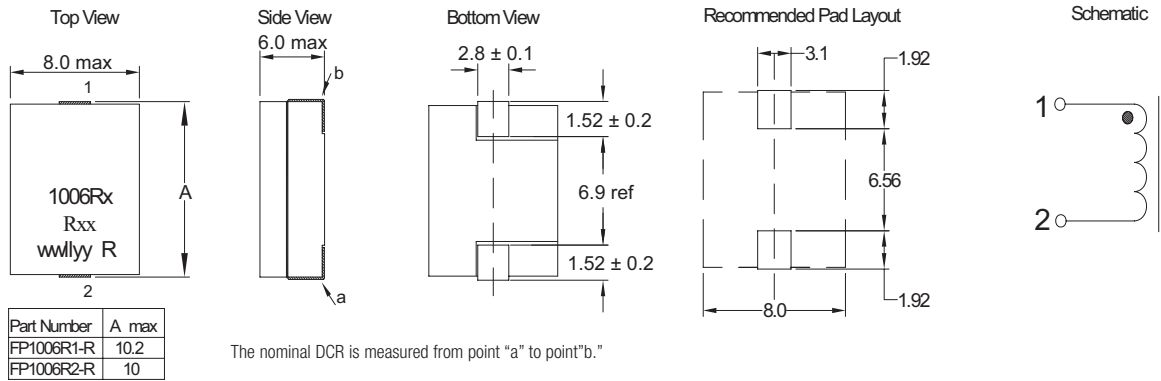
• FP1006 = Product code and size

• Rxx = Inductance value in μH, R = decimal point

• Rx is the DCR indicator

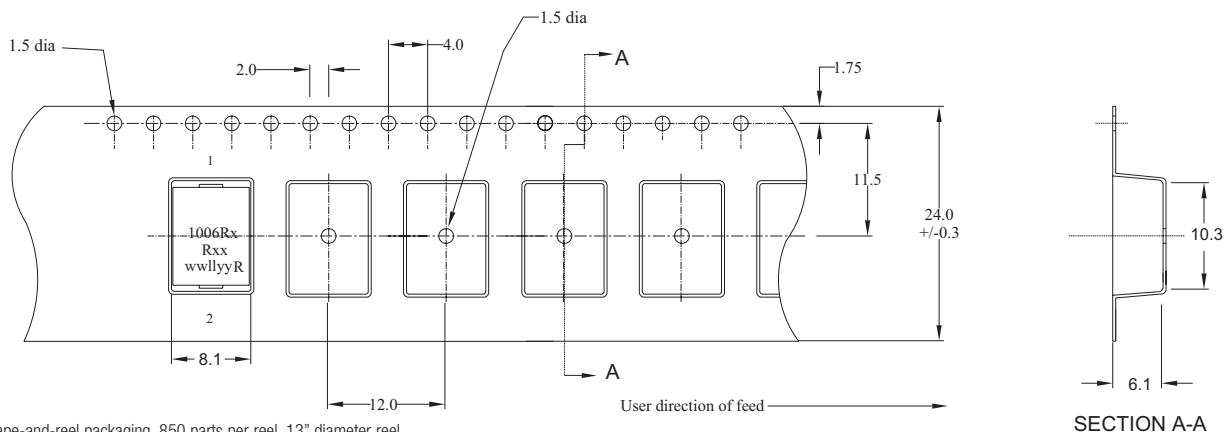
• "-R" suffix = RoHS compliant

### Dimensions- mm



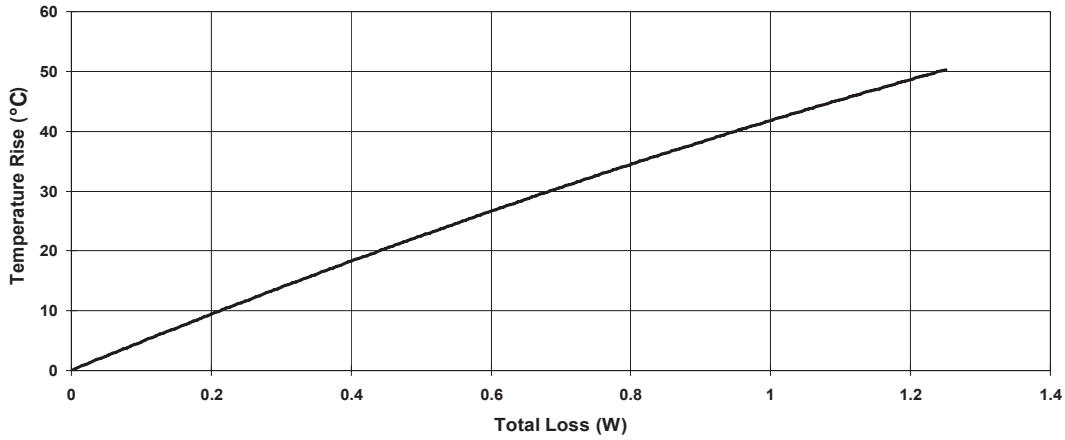
Part Marking: 1006Rx (Rx = DCR Indicator) Rxx = Inductance value in μH. (R = Decimal point) wwllly = Date code R = Revision level

### Packaging information - mm

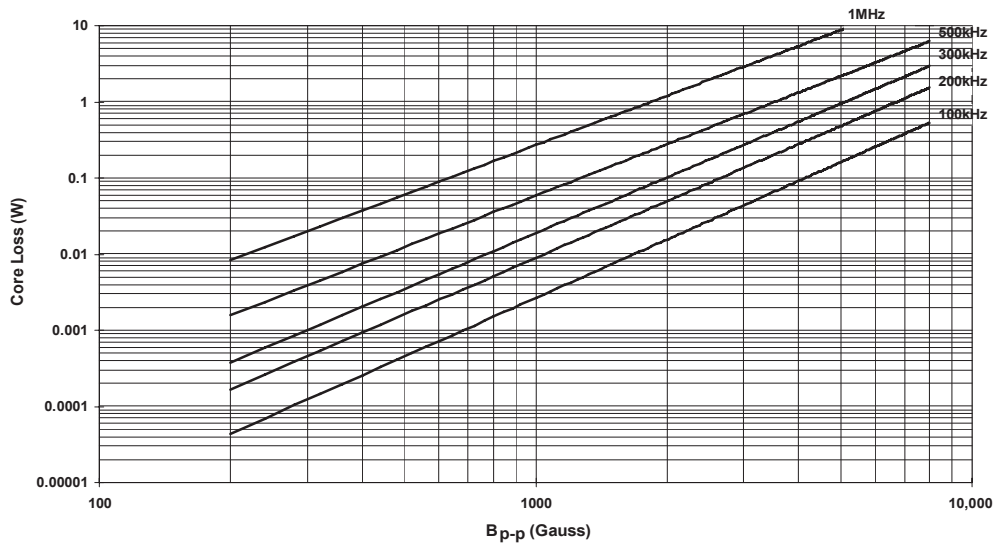


Supplied in tape-and-reel packaging, 850 parts per reel, 13" diameter reel.

Temperature rise vs total loss

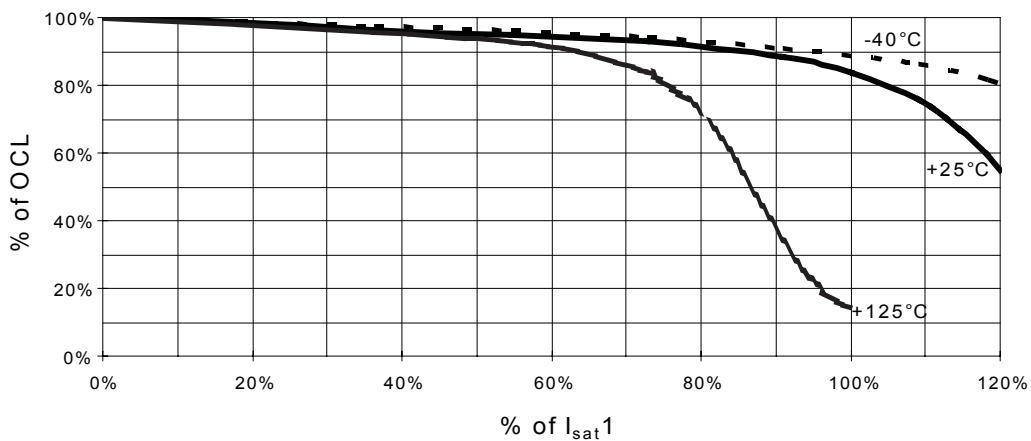


Core loss vs Bp-p



Inductance characteristics

% of OCL vs. % of  $I_{sat 1}$



### Solder Reflow Profile

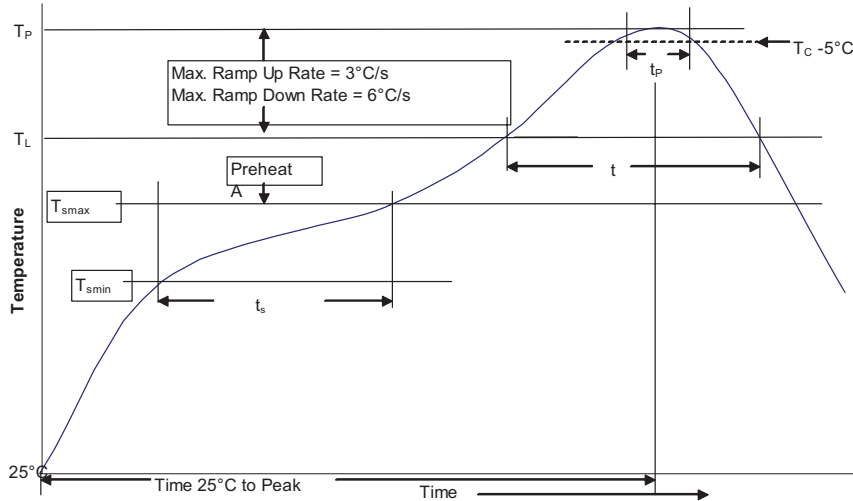


Table 1 - Standard SnPb Solder ( $T_C$ )

Package Thickness	Volume $\text{mm}^3$ <350	Volume $\text{mm}^3$ $\geq 350$
<2.5mm	235°C	220°C
$\geq 2.5\text{mm}$	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
<1.6mm	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-020

Profile Feature	Standard SnPb Solder	Lead (Pb) Free Solder
Preheat and Soak	• Temperature min. ( $T_{smin}$ )	100°C
	• Temperature max. ( $T_{smax}$ )	150°C
	• Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	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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