FP1008R1 and FP1008R2

High frequency, high current power inductors

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 description

- High current carrying capacity
- Low core loss
- Controlled DCR for sensing circuits
- Inductance range from 120nH to 300nH
- Current range from 38 to 112 amps
- 10.8 x 8.0 mm footprint surface mount package in an 8.0 mm height
- Ferrite core material
- Halogen free, lead free, RoHS compliant

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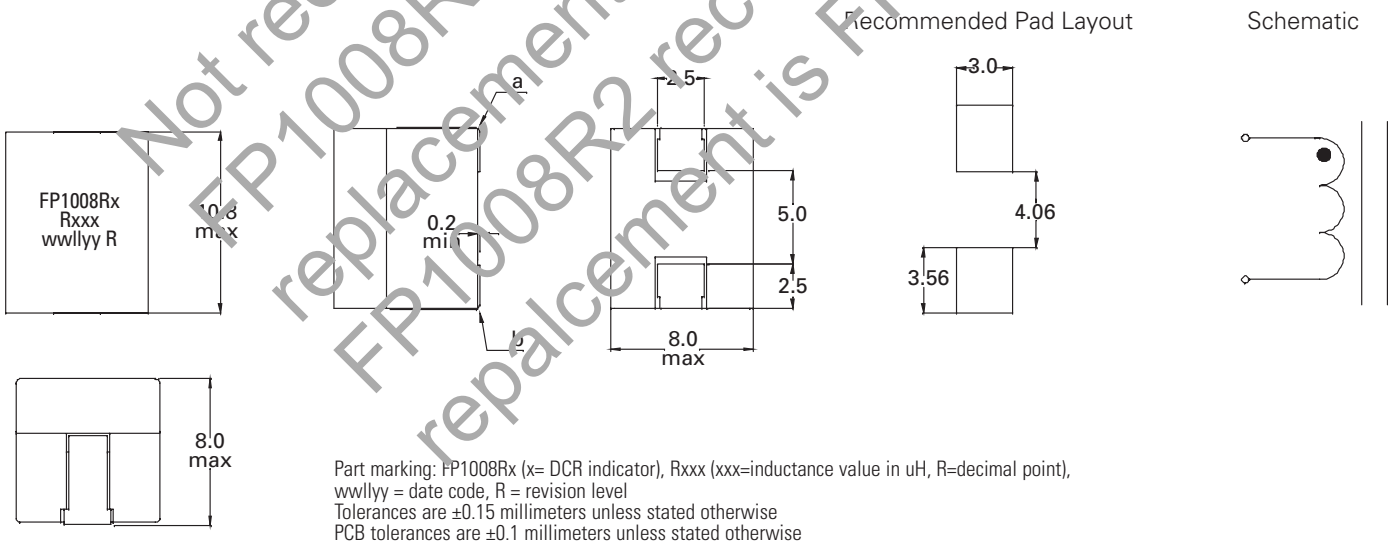
Product specifications

Part Number[9]	OCL[1] (nH)±10%	FLL[2] (nH) minimum	I_{rms}[3] (amps)	$I_{sat}1$[4] (amps)	$I_{sat}2$[5] (amps)	$I_{sat}3$[6] (amps)	DCR (mΩ) ±5% @ 20°C	K-factor[7]
R1 version								
FP1008R1-R120-R	120	86	79	112	92	84	0.17	342
FP1008R1-R150-R	150	108	79	90	72	67	0.17	342
FP1008R1-R180-R	180	130	79	74	60	54	0.17	342
FP1008R1-R220-R	220	158	79	56	44	42	0.17	342
FP1008R1-R270-R	270	194	79	44	34	32	0.17	342
FP1008R1-R300-R	300	216	79	38	30	28	0.17	342
R2 version								
FP1008R2-R120-R	120	86	74	112	92	84	0.18	342
FP1008R2-R150-R	150	108	74	90	72	67	0.18	342
FP1008R2-R180-R	180	130	74	74	60	54	0.18	342
FP1008R2-R220-R	220	158	74	56	44	42	0.18	342
FP1008R2-R270-R	270	194	74	44	34	32	0.18	342
FP1008R2-R300-R	300	216	74	38	30	28	0.18	342

1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.1V_{rms}, 0.0Adc, +25°C
2. Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1V_{rms}, $I_{sat}1$, +25°C
3. I_{rms}: DC current for an approximate temperature rise of 40ºC 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 @ +25ºC
5. $I_{sat}2$: Peak current for approximately 20% rolloff @ +100ºC
6. $I_{sat}3$: Peak current for approximately 20% rolloff @ +125ºC
7. K-factor used to determine B_{p-p} for core loss (see graph).
   $B_{p-p} = K * L * \Delta I * 10^{-3} / A_e$ (Gauss), K: (K factor from table), L: (Inductance in nH), ΔI (Peak-to-peak ripple current in Amps).
8. Part Number Definition: FP1008Rx-Rxxx-R
   FP1008R = Product code and size
   x = DCR indicator
   Rxxx = Inductance value in uH, R = decimal point
   -R suffix = RoHS compliant

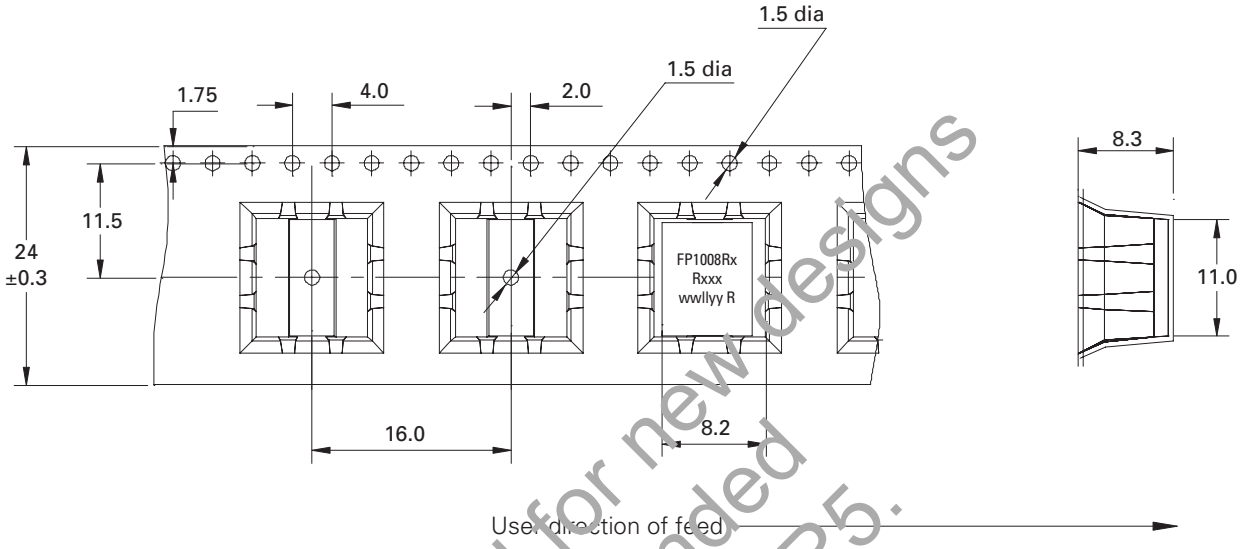
Dimensions (mm)



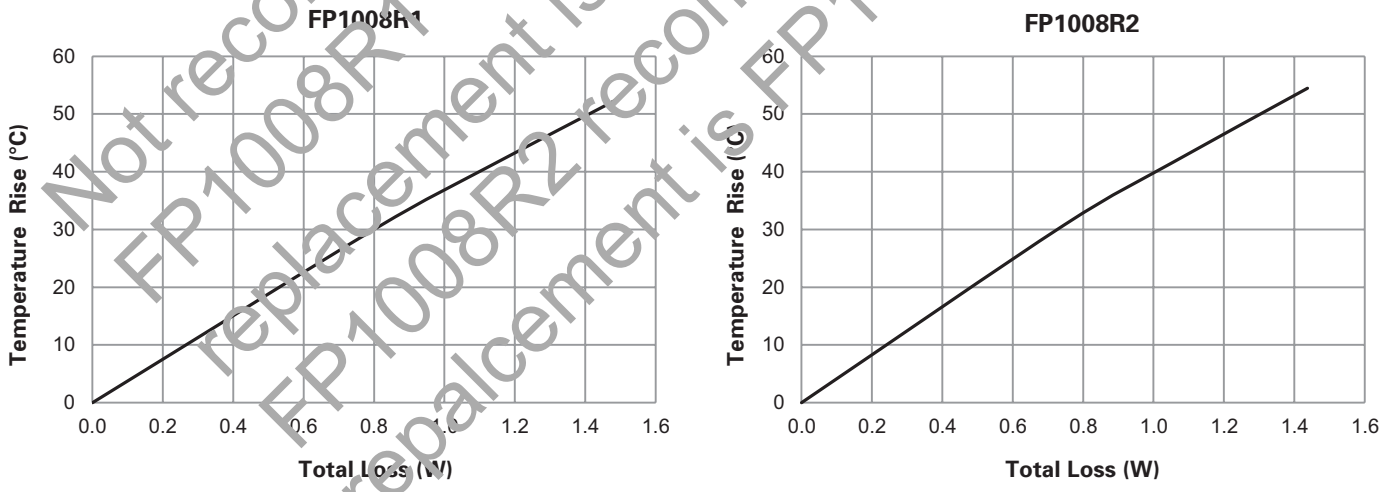
Part marking: FP1008Rx (x= DCR indicator), Rxxx (xxx=inductance value in uH, R=decimal point), wwllyy = date code, R = revision level
Tolerances are ±0.15 millimeters unless stated otherwise
PCB tolerances are ±0.1 millimeters unless stated otherwise
All soldering surfaces to be coplanar within 0.1 millimeter
DCR measured from point "a" to point "b"
Do not route traces or vias underneath the inductor

Packaging information (mm)

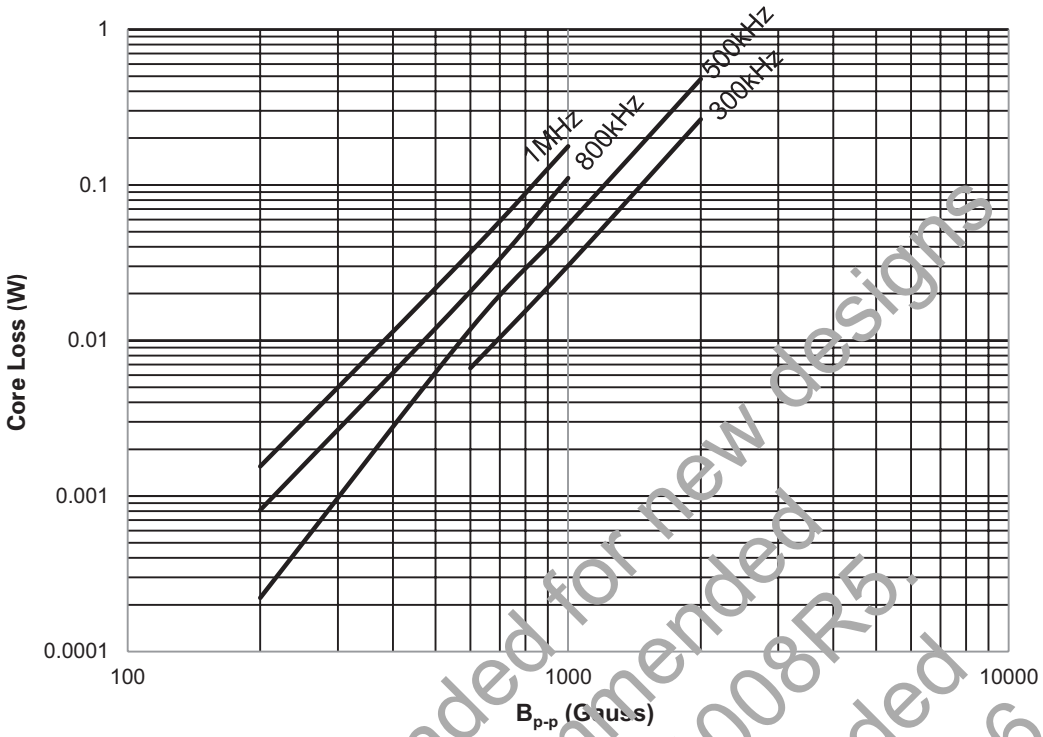
Supplied in tape and reel packaging, 500 parts per 13″ diameter reel.



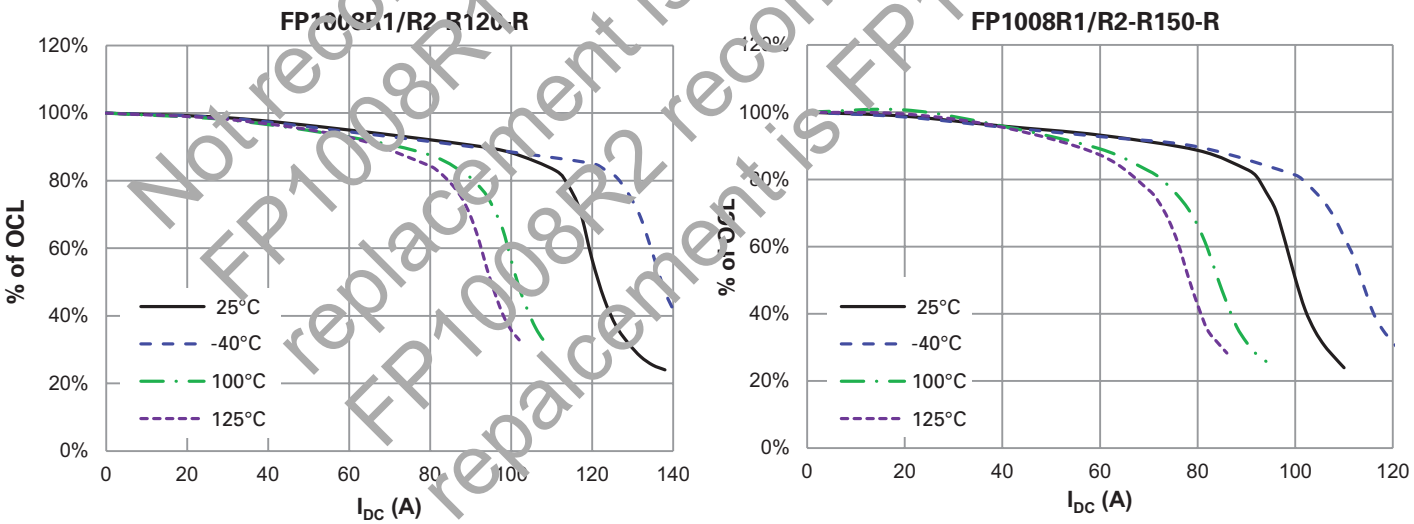
Temperature rise vs. total loss



Core loss vs. Bp-p

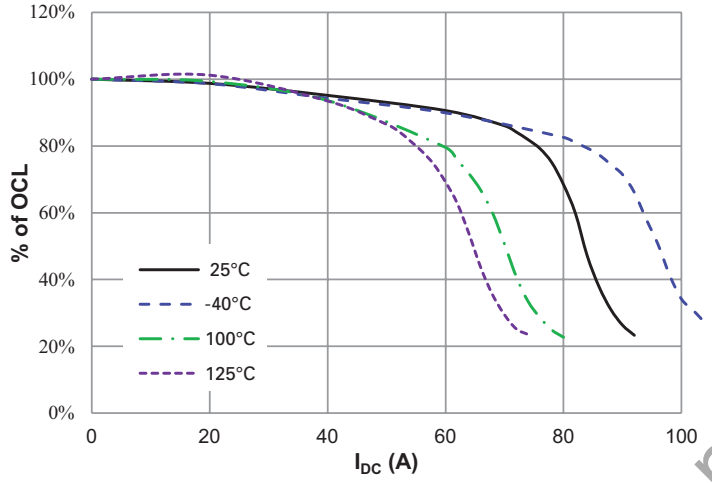


Inductance characteristics

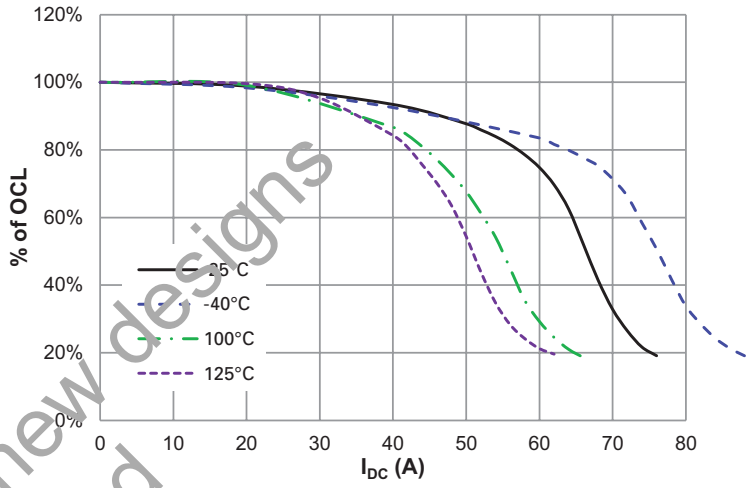


Inductance characteristics

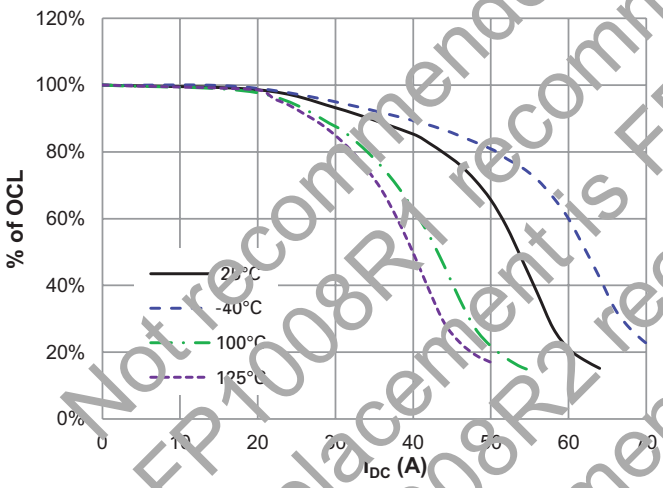
FP1008R1/R2-R180-R



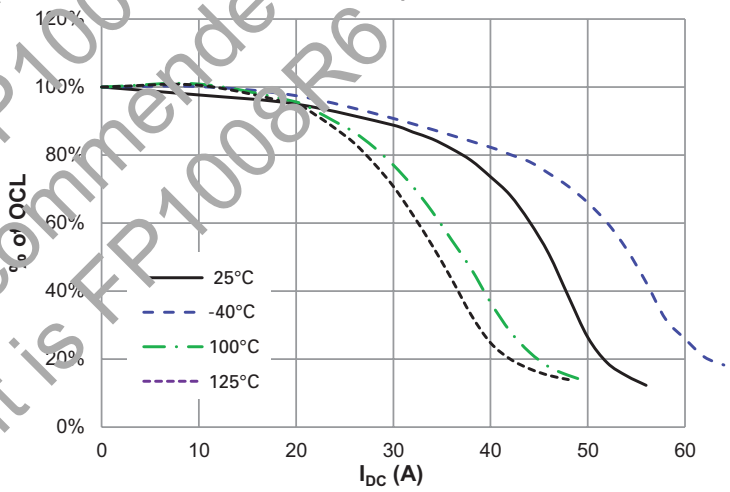
FP1008R1/R2-R220-R



FP1008R1/R2-R270-R



FP1008R1/R2-300-R



Solder reflow profile

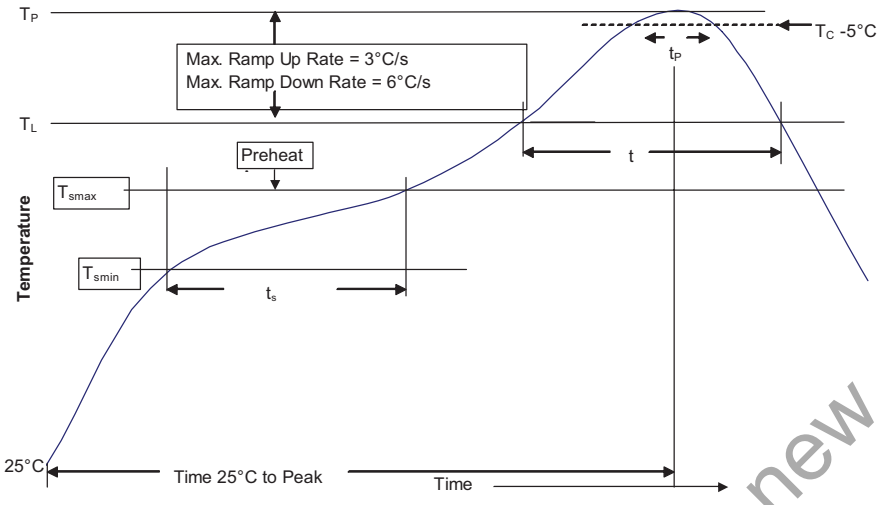


Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume mm3 <350	Volume mm3 ≥350
<2.5mm)	235°C	220°C
≥2.5mm	220°C	220°C

Table 2 - Lead (Pb) Free Solder (T_C)

Package Thickness	Volume mm³ <350	Volume mm³ 350 - 2000	Volume mm³ >2000
<1.6mm	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) Time at liquidous (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**
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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