FP1008R5 and FP1008R6

High frequency, high current power inductors

Applications

- Multi-phase and Vcore regulators
- Voltage Regulator Modules (VRMs) and high power density VRMs
  - Server and desktop
  - Central processing unit (CPU)
  - Graphics processing unit (GPU)
  - Application specific integrated circuit (ASIC)
- Data networking and storage systems
- Graphics cards and battery power systems
- Point-of-Loadmodules (POL)
- DCR sensing circuits

Product features

- High current carrying capacity
- Low core loss
- Magnetically shielded
- Tight tolerance DCR for sensing circuits
- Inductance Range from 100 nH to 300 nH
- Current range from 36 A to 103 A
- 10.8 mm x 8.0 mm footprint surface mount package in an 8.0 mm height
- Moisture Sensitivity Level: 1
- Ferrite core material

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
- Halogen free, lead free, RoHS compliant

Pb HALOGEN HF FREE RoHS

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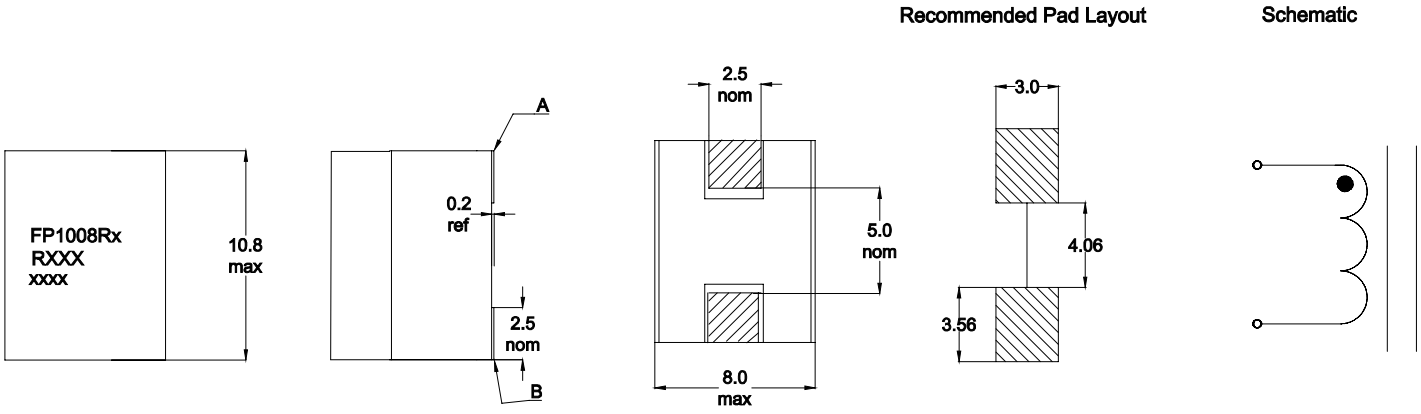
Product specifications

Part Number[8]	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)	DCR (mΩ) ±5% @ 20 °C	K-factor[7]
R5 version								
FP1008R5-R120-R	120	86	79	103	90	84	0.170	342
FP1008R5-R150-R	150	108	79	85	68	64	0.170	342
FP1008R5-R180-R	180	130	79	70	56	53	0.170	342
FP1008R5-R220-R	220	158	79	58	44	42	0.170	342
FP1008R5-R270-R	270	194	79	44	34	32	0.170	342
FP1008R5-R300-R	300	216	79	36	28	26	0.170	342
R6 version								
FP1008R6-R100-R	100	72	74	103	86	81	0.180	342
FP1008R6-R120-R	120	86	74	103	90	84	0.180	342
FP1008R6-R150-R	150	108	74	85	68	64	0.180	342
FP1008R6-R180-R	180	130	74	70	56	53	0.180	342
FP1008R6-R220-R	220	158	74	58	44	42	0.180	342
FP1008R6-R270-R	270	194	74	44	34	32	0.180	342
FP1008R6-R300-R	300	216	74	36	28	26	0.180	342

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 V_{rms}, $I_{sat}1$, +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 @ +100 °C
6. $I_{sat}3$: Peak current for approximately 20% rolloff @ +125 °C
7. K-factor: Used to determine B_{p-p} for core loss (see graph).
   $B_{p-p} = K * L * \Delta I * 10^{-3}$. B_{p-p}:(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= Version indicator
   -Rxxx= Inductance value in uH, R= decimal point
   -R suffix = RoHS compliant

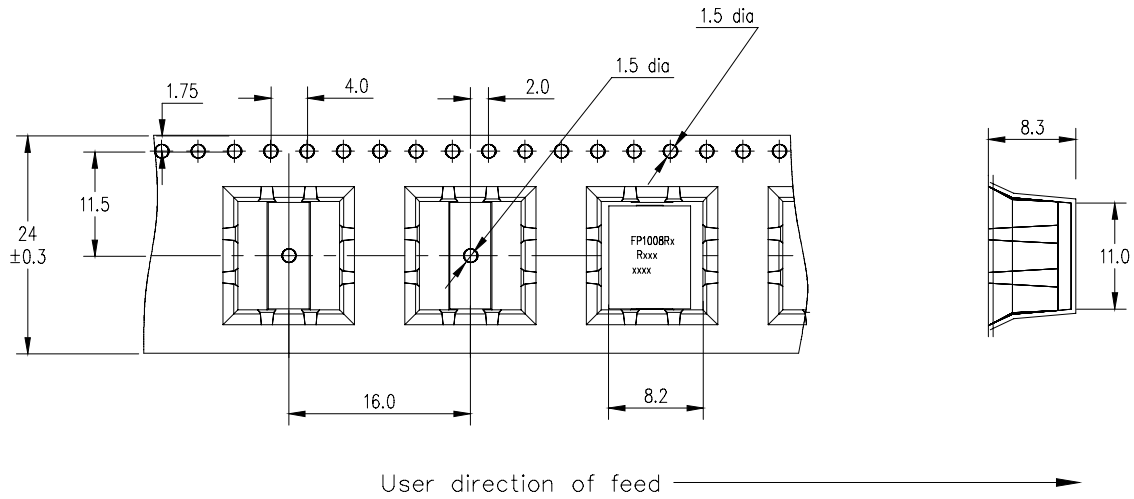
Dimensions (mm)



Part marking: FP1008Rx (x = Version), Rxxx= Inductance value in uH (R= decimal point) xxxx = Lot code
Tolerances are ±0.15 millimeters unless stated otherwise
Pad layout 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

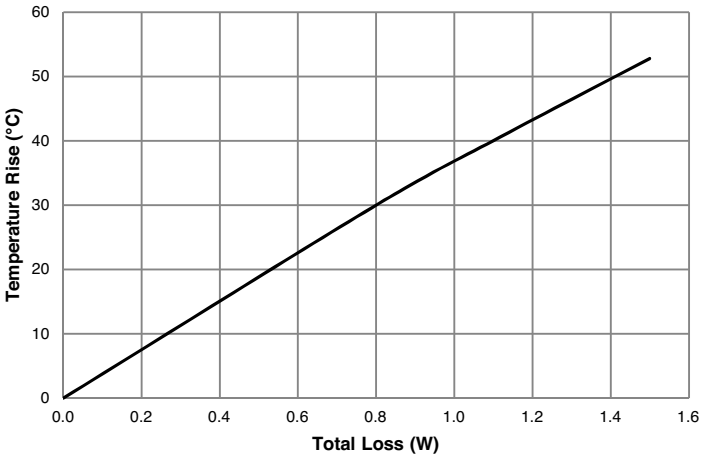
Packaging information (mm)

Supplied in tape-and-reel packaging, 500 parts on a 13" diameter reel.

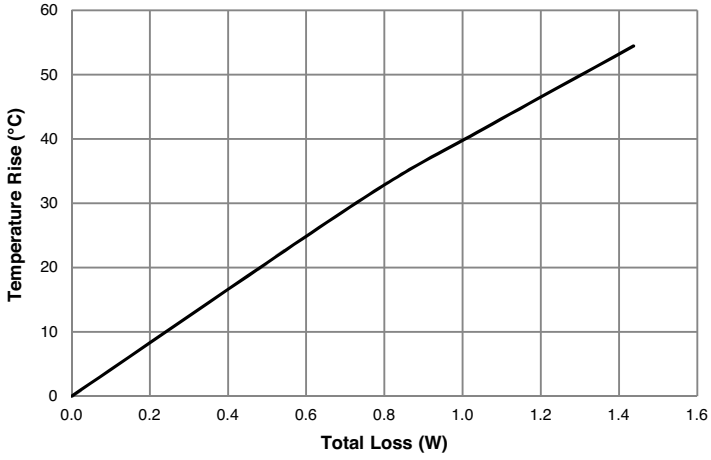


Temperature rise vs total loss

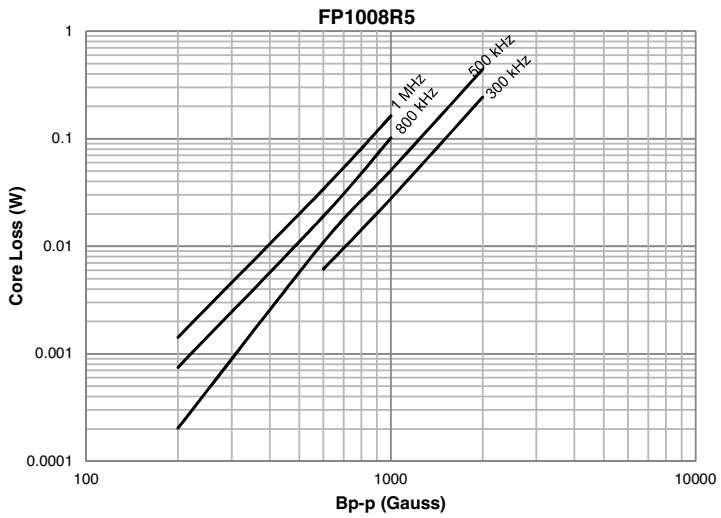
FP1008R5

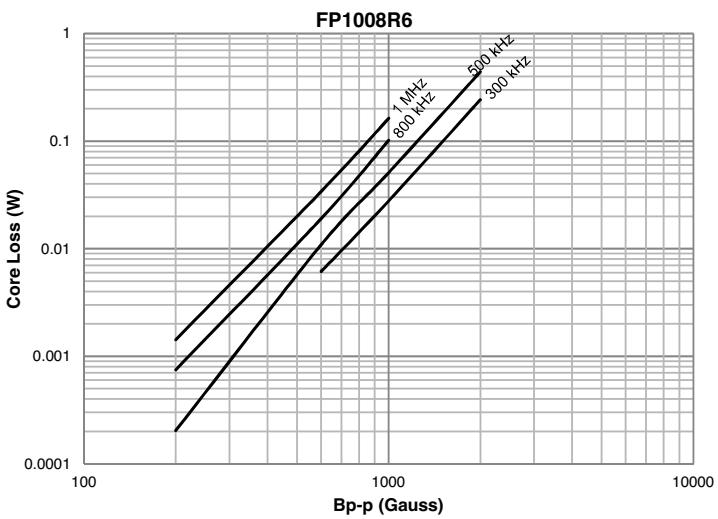


FP1008R6

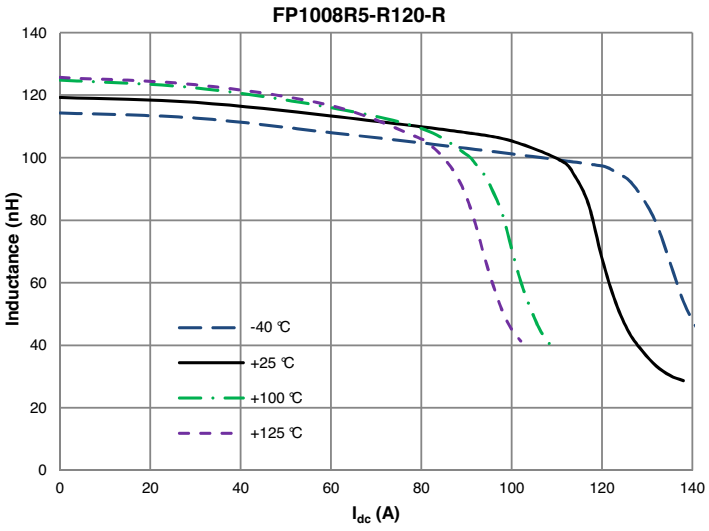


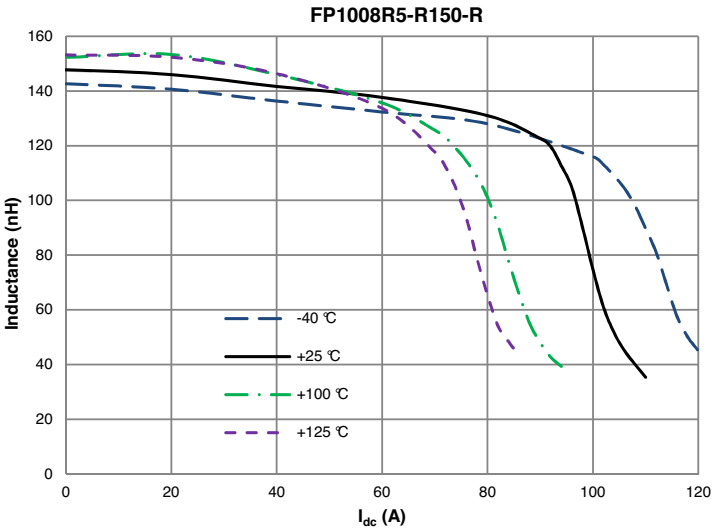
Core loss vs. B_{p-p}





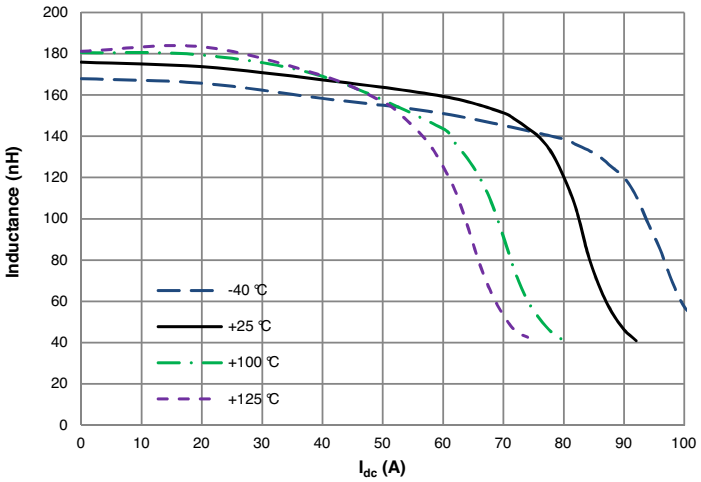
Inductance characteristics



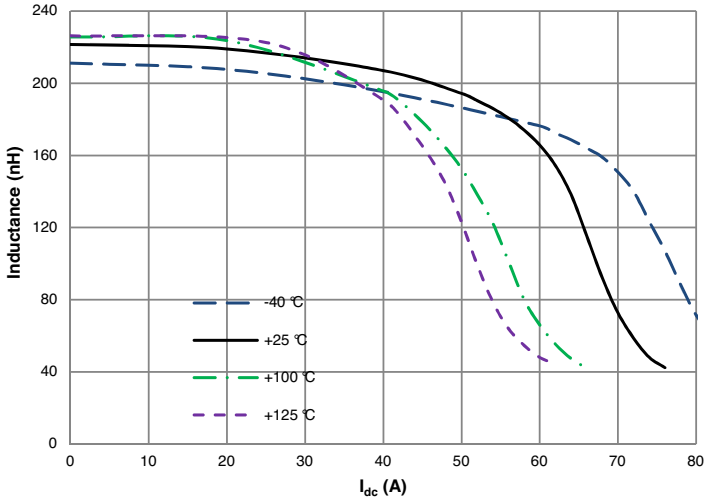


Inductance characteristics

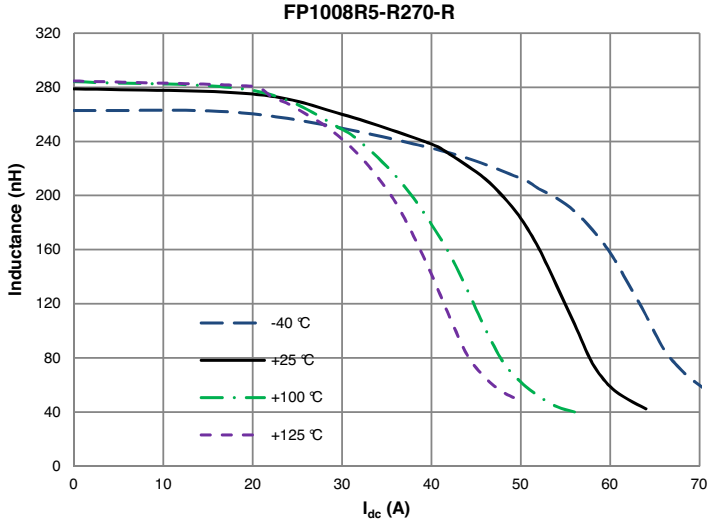
FP1008R5-R180-R



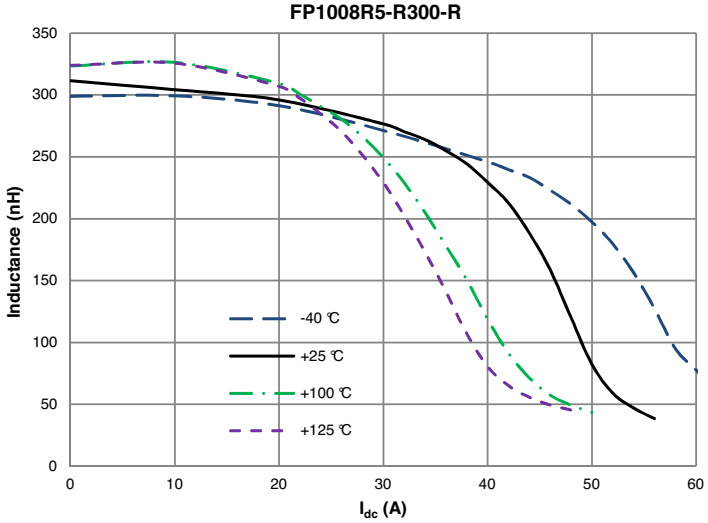
FP1008R5-R220-R



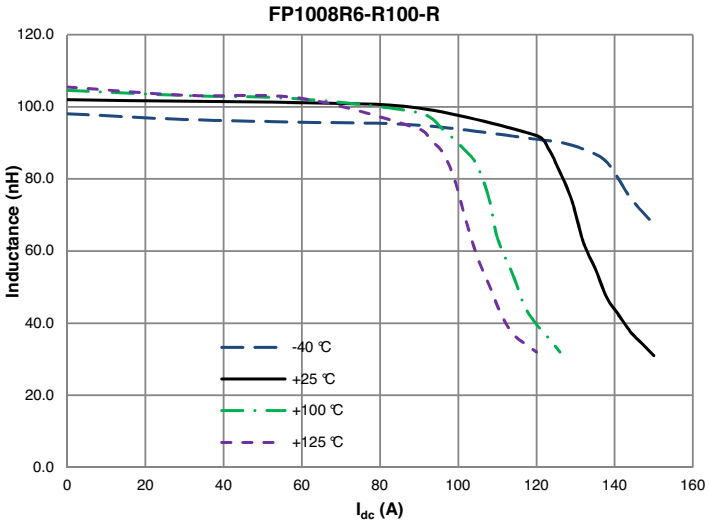
FP1008R5-R270-R



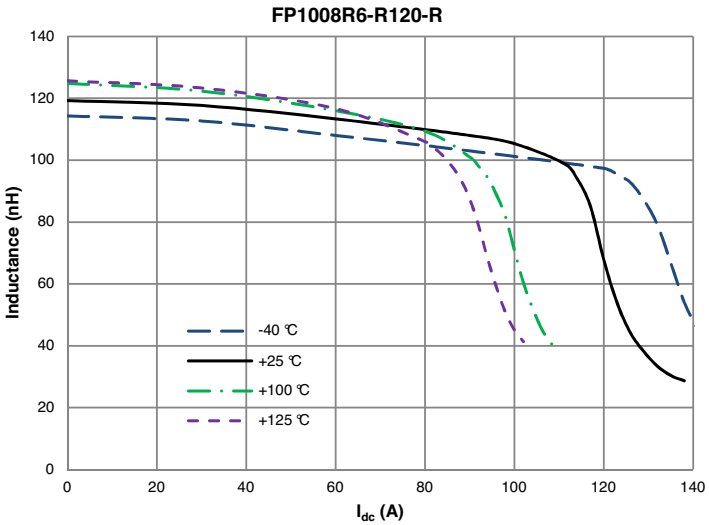
FP1008R5-R300-R



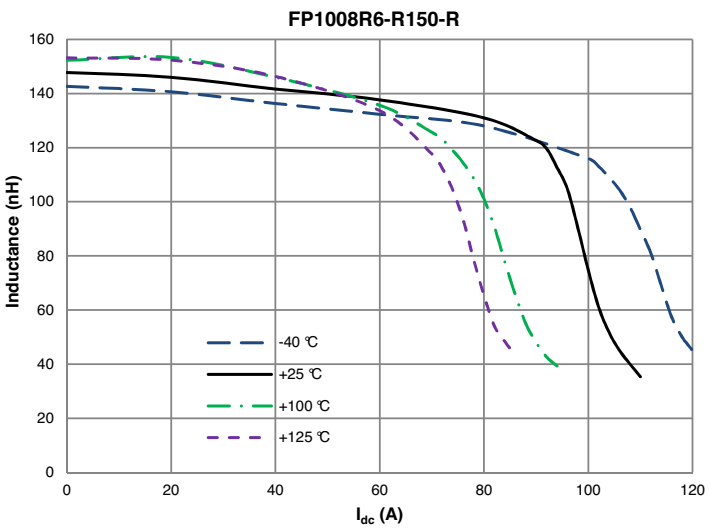
FP1008R6-R100-R

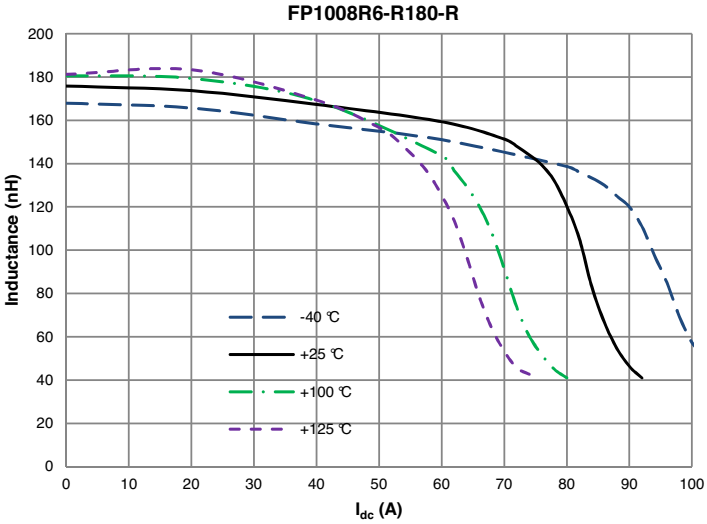


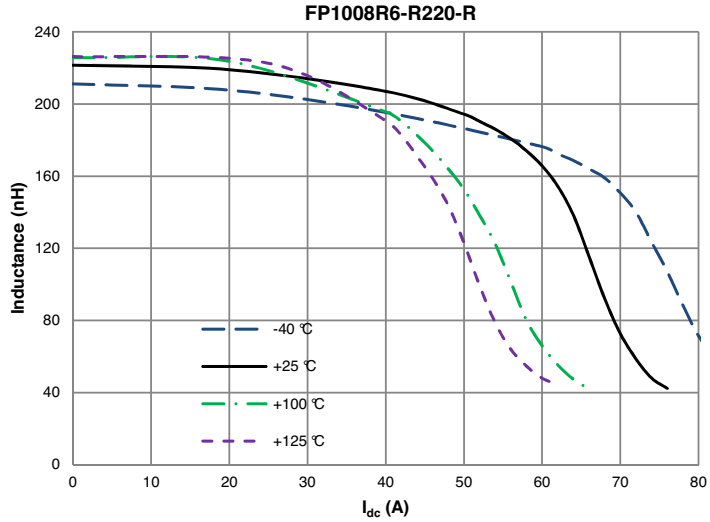
FP1008R6-R120-R

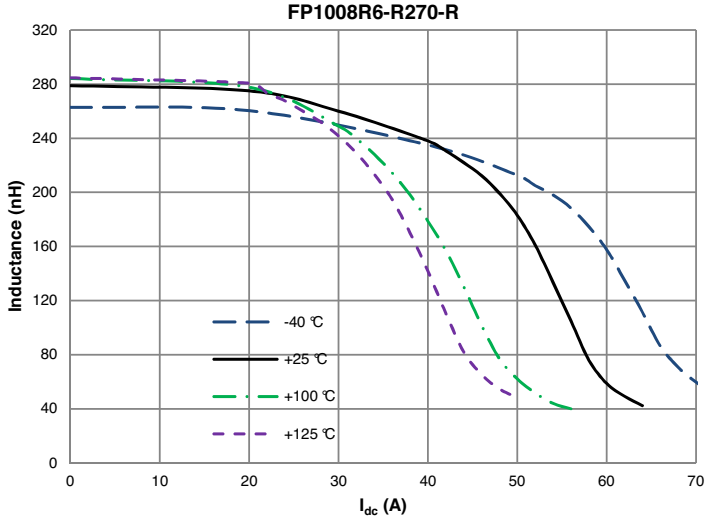


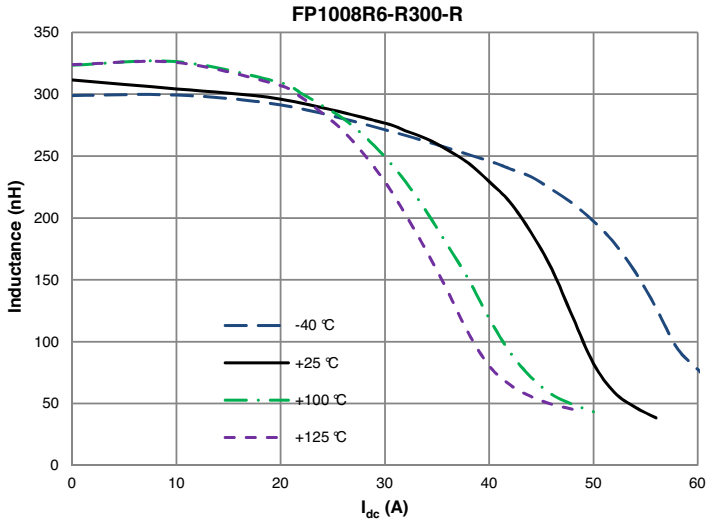
Inductance characteristics











Solder reflow profile

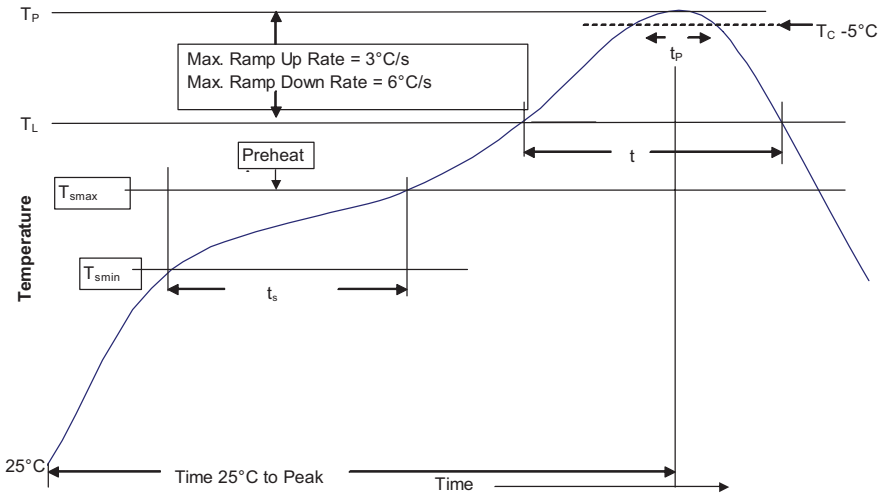


Table 1 - Standard SnPb Solder (T_C)

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-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
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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