

# 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



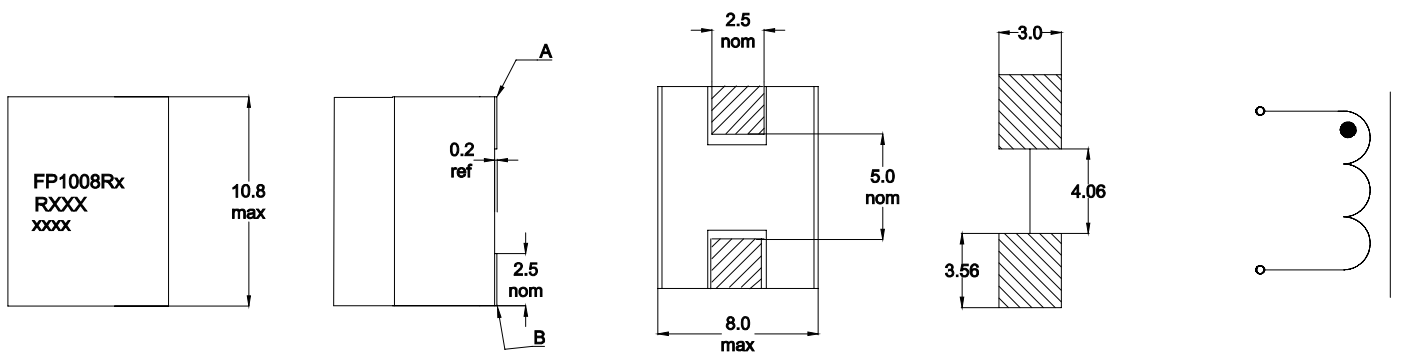
Product specifications

Part Number <sup>5</sup>	OCL <sup>1</sup> (nH) ±10%	FLL <sup>2</sup> (nH) minimum	I <sub>rms</sub> <sup>3</sup> (A)	I <sub>sat</sub> 1 <sup>4</sup> (A)	I <sub>sat</sub> 2 <sup>5</sup> (A)	I <sub>sat</sub> 3 <sup>6</sup> (A)	DCR (mΩ) ±5% @ 20 °C	K-factor <sup>7</sup>
<b>R5 version</b>								
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
<b>R6 version</b>								
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

- Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.1 Vrms, 0.0 Adc, +25 °C
- Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.1 V<sub>rms</sub>, I<sub>sat</sub>1, +25 °C
- I<sub>rms</sub>: 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</sub>1: Peak current for approximately 20% rolloff @ +25 °C
- I<sub>sat</sub>2: Peak current for approximately 20% rolloff @ +100 °C

- I<sub>sat</sub>3: 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: FP1008Rx-Rxxx-R  
FP1008R= Product code and size  
x= Version indicator  
-Rxxx= Inductance value in uH, R= decimal point  
-R suffix = RoHS compliant

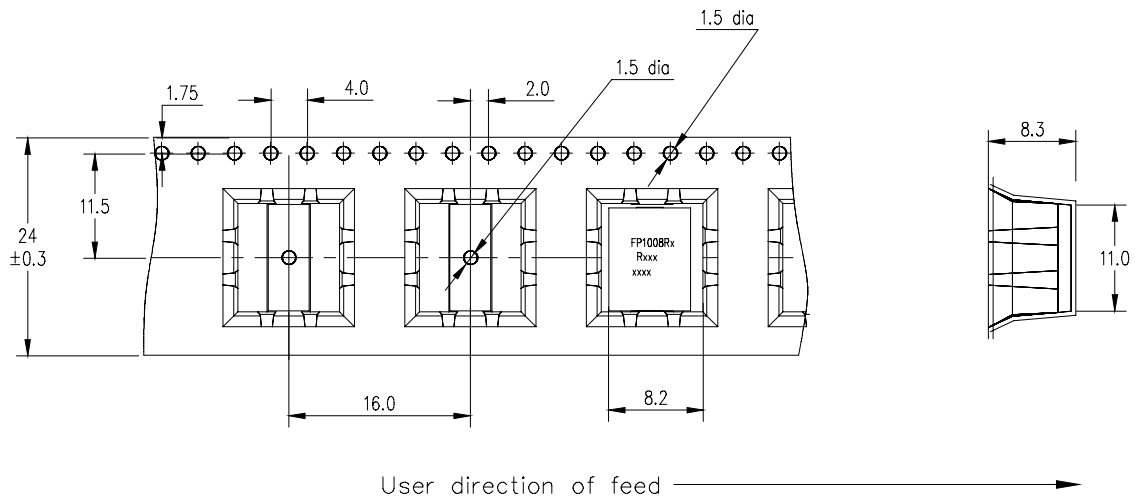
Dimensions (mm)



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

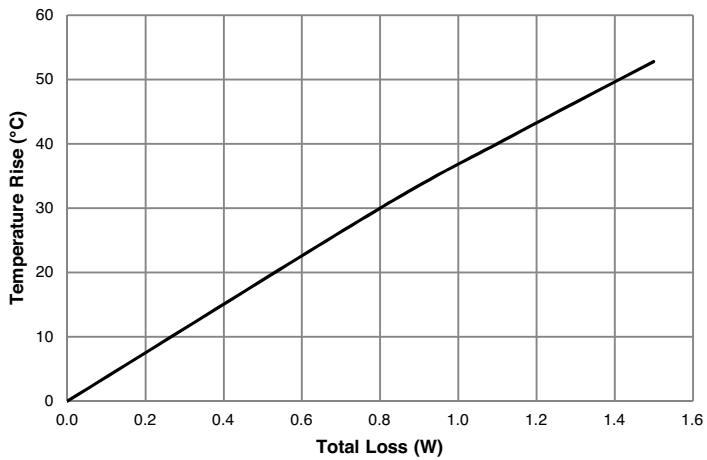
**Packaging information (mm)**

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

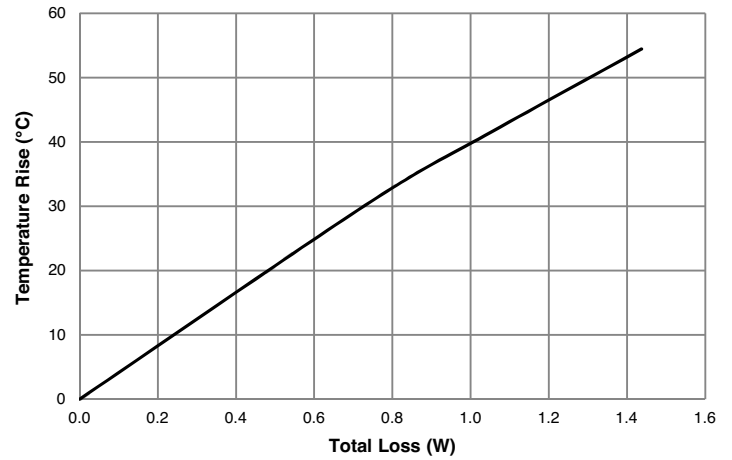


**Temperature rise vs total loss**

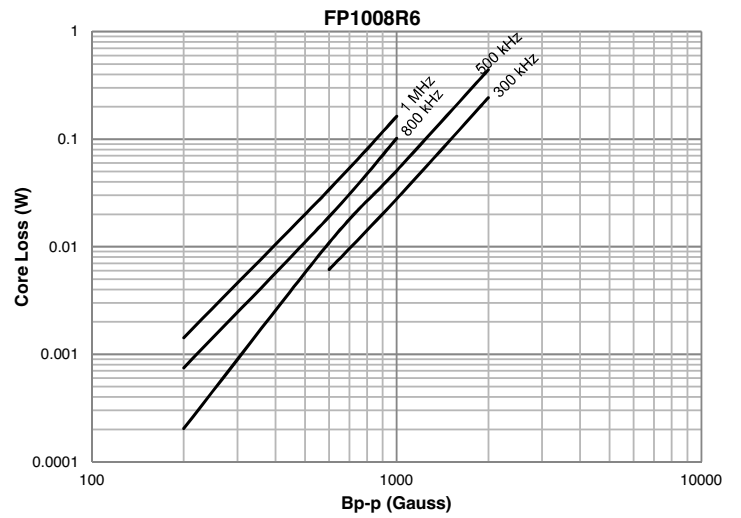
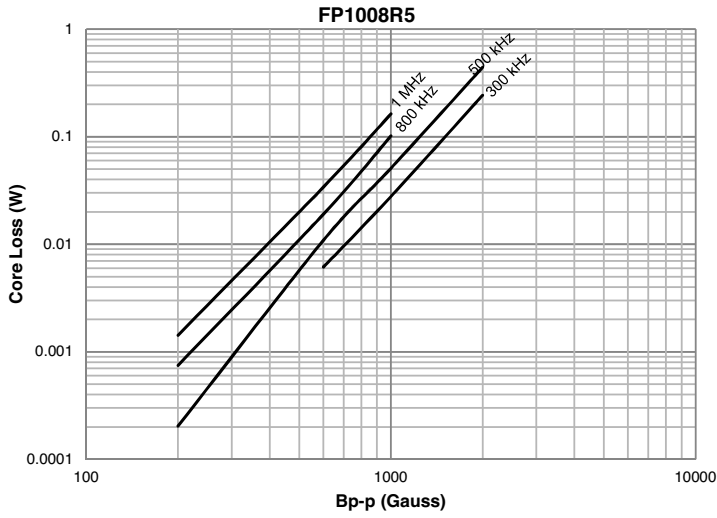
**FP1008R5**



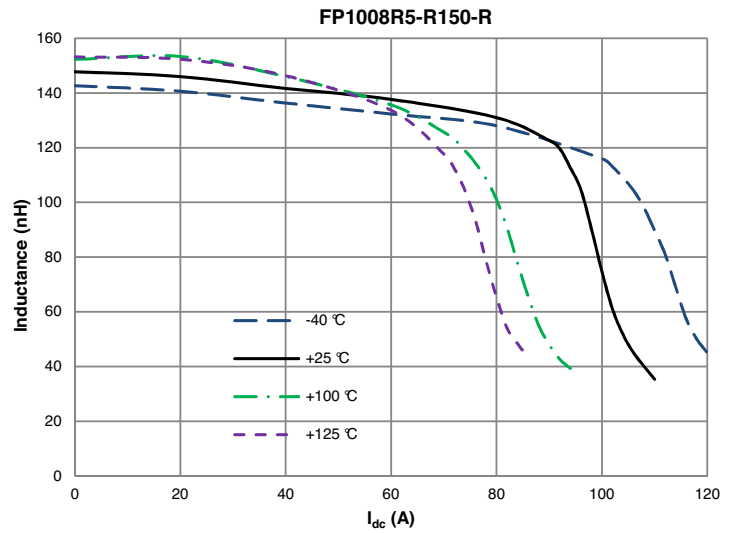
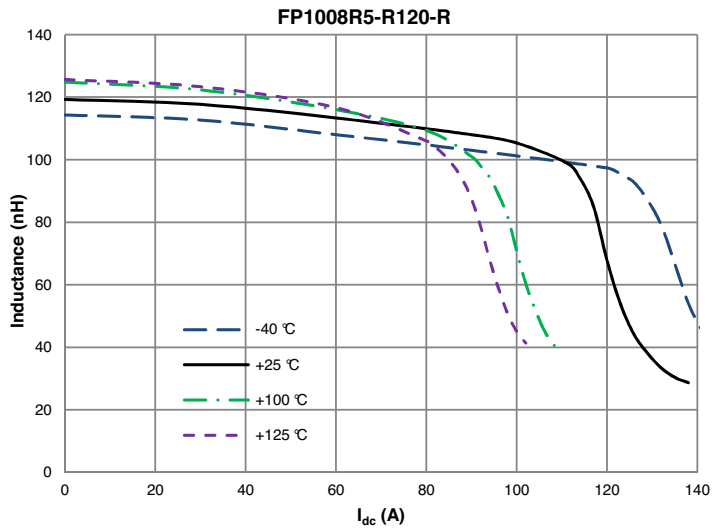
**FP1008R6**



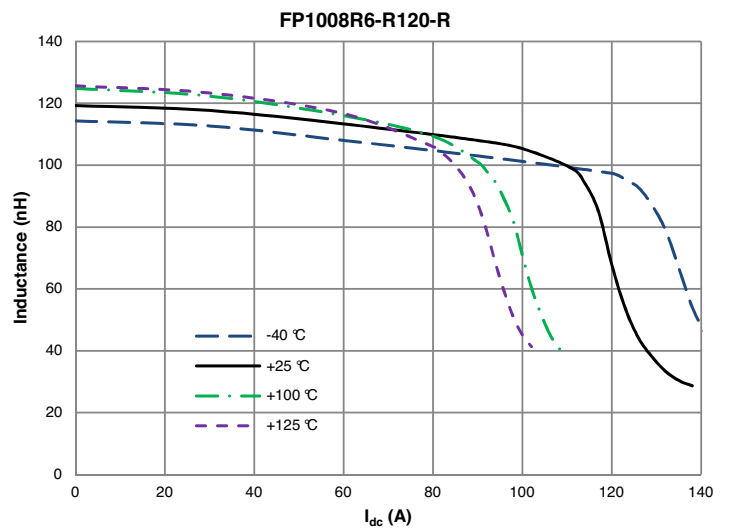
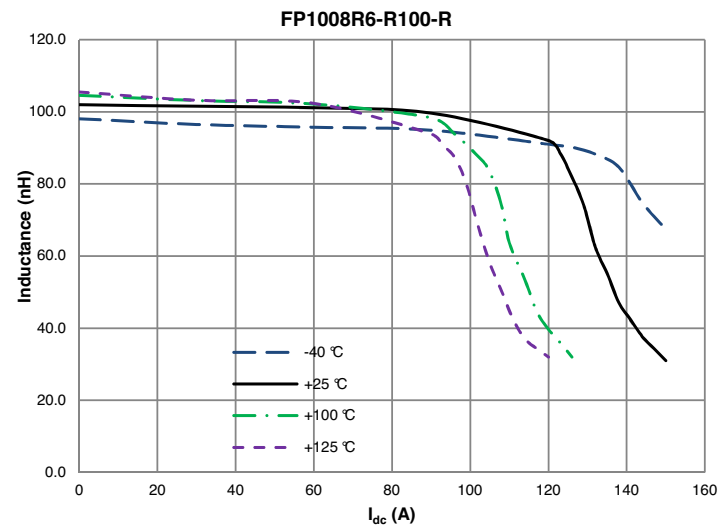
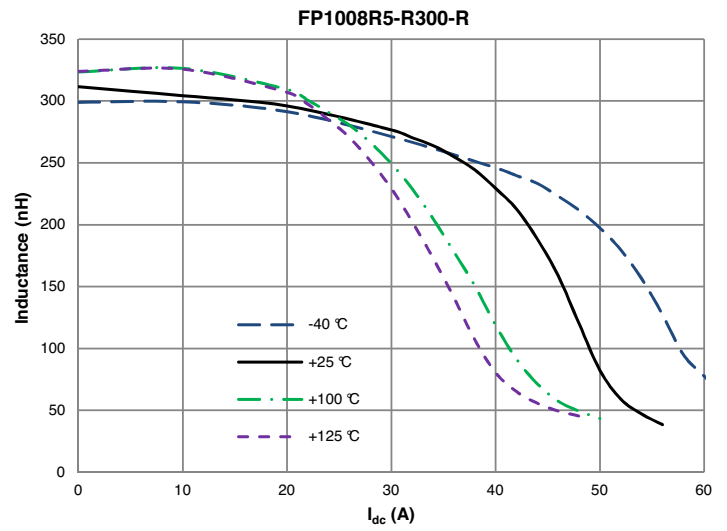
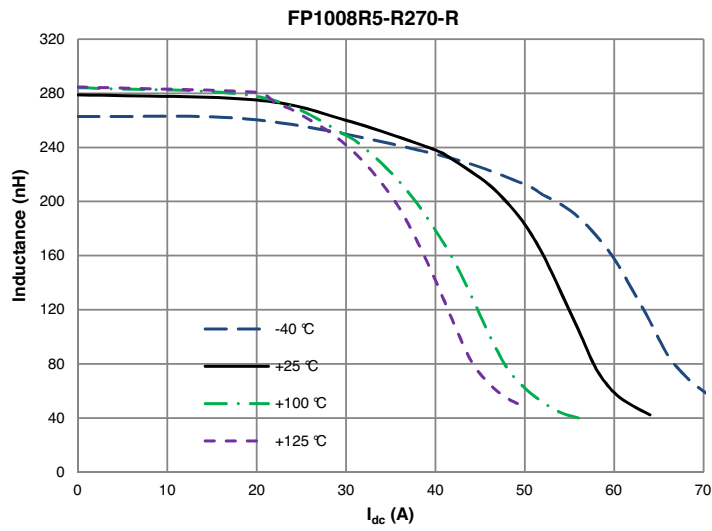
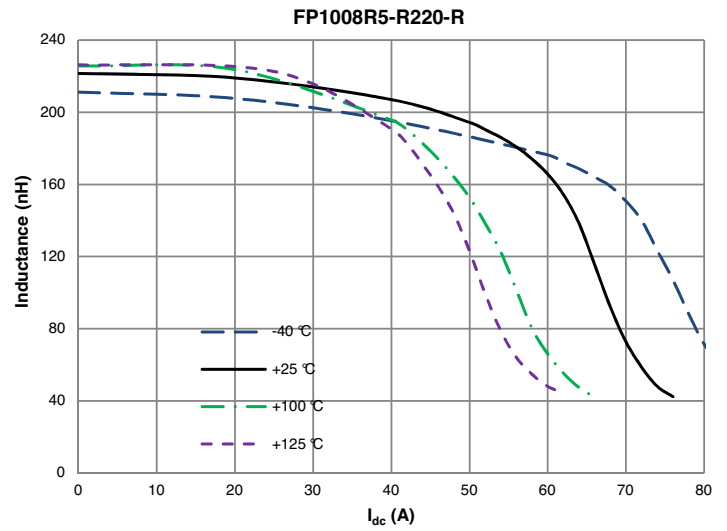
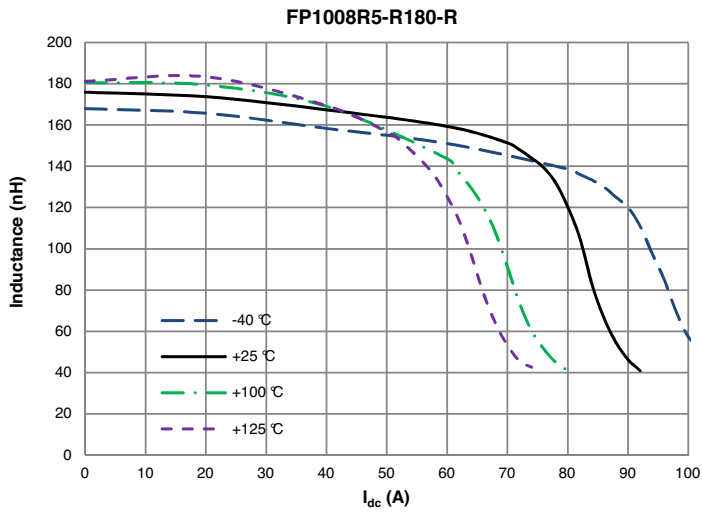
Core loss vs.  $B_{p-p}$



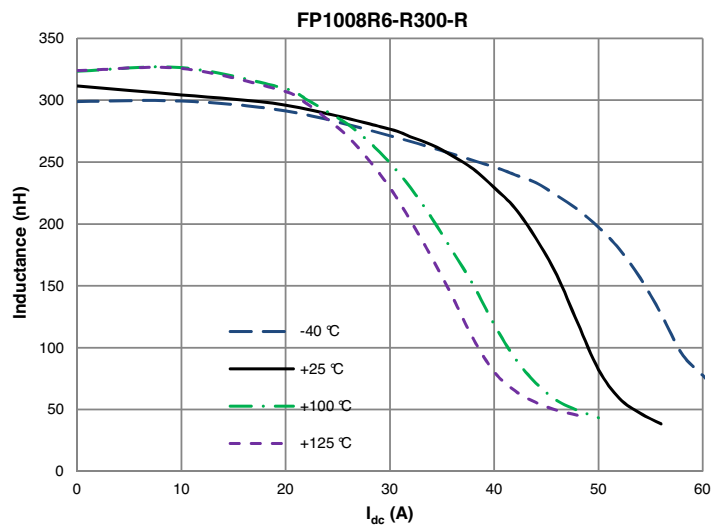
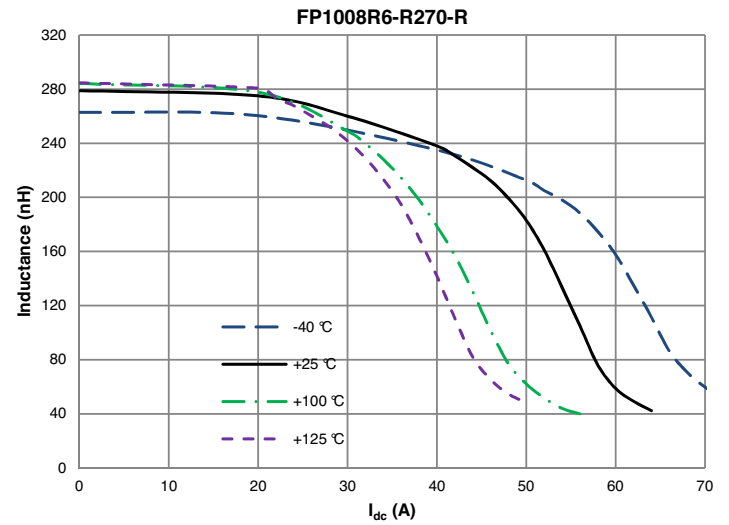
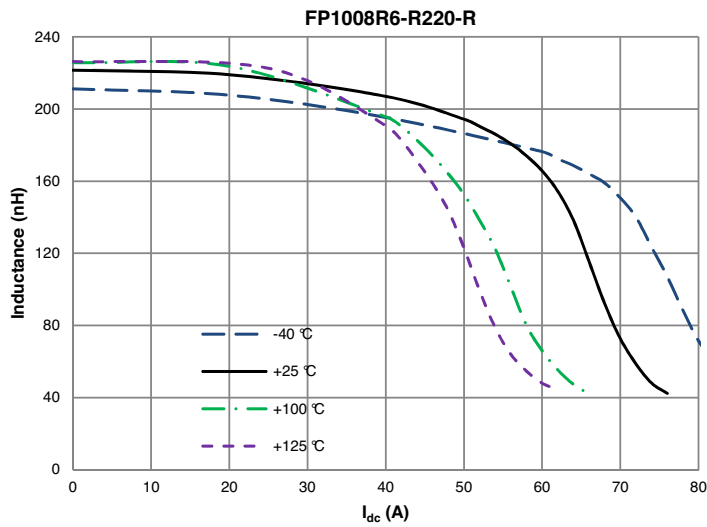
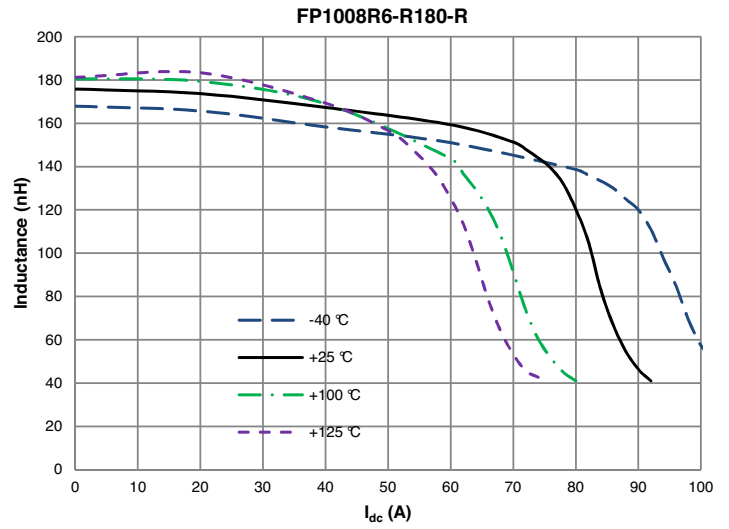
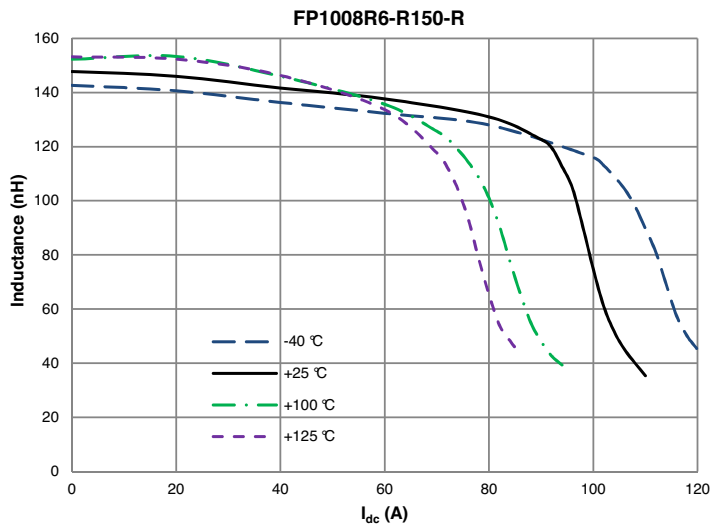
Inductance characteristics



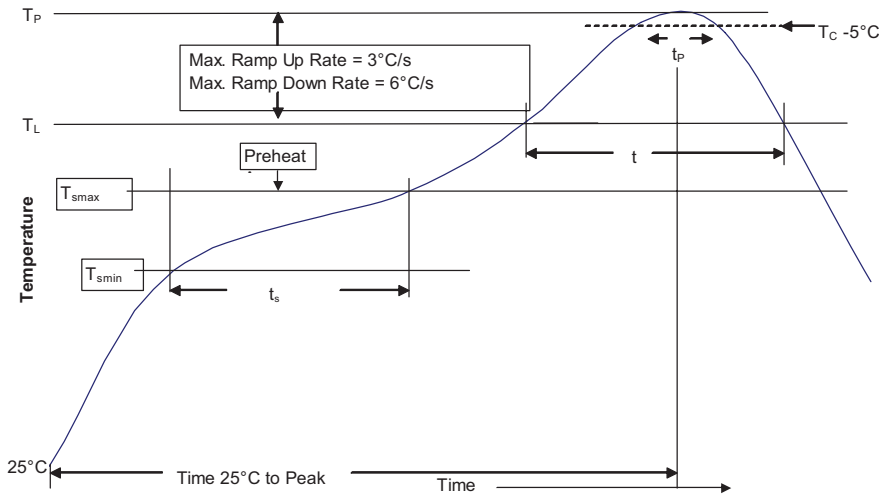
Inductance characteristics



Inductance characteristics



**Solder reflow profile**



**Table 1 - Standard SnPb Solder (T<sub>c</sub>)**

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> ≥350
<2.5mm)	235 °C	220 °C
≥2.5mm	220 °C	220 °C

**Table 2 - Lead (Pb) Free Solder (T<sub>c</sub>)**

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> 350 - 2000	Volume mm <sup>3</sup> >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 <sub>smin</sub> )	100 °C	150 °C
• Temperature max. (T <sub>smax</sub> )	150 °C	200 °C
• Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )	60-120 Seconds	60-120 Seconds
Average ramp up rate T <sub>smax</sub> to T <sub>p</sub>	3 °C/ Second Max.	3 °C/ Second Max.
Liquidous temperature (T <sub>L</sub> )	183 °C	217 °C
Time at liquidous (t <sub>L</sub> )	60-150 Seconds	60-150 Seconds
Peak package body temperature (T <sub>p</sub> )*	Table 1	Table 2
Time (t <sub>p</sub> )** within 5 °C of the specified classification temperature (T <sub>c</sub> )	20 Seconds**	30 Seconds**
Average ramp-down rate (T <sub>p</sub> to T <sub>smax</sub> )	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<sub>p</sub>) is defined as a supplier minimum and a user maximum.  
 \*\* Tolerance for time at peak profile temperature (t<sub>p</sub>) is defined as a supplier minimum and a user maximum.

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 Publication No. 10520 BU-MC17027  
 April 2017

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