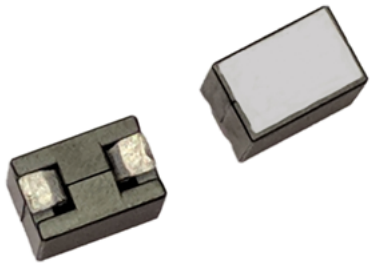
FP1010V

High frequency, high current power inductors



Product features

- Vertical design utilizes less board space
- Tight tolerance DCR for sensing circuits
- High current carrying capacity
- Low core loss
- Magnetically shielded
- Inductance range from 100 nH to 470 nH
- Current range from 30 A to 117 A
- 9.6 mm x 6.4 mm and 10 mm x 7.0 mm footprint surface mount package in a 10 mm height
- Ferrite core material
- Moisture sensitivity level (MSL): 1
- Weight: FP1010V1: 2.5 g typical, FP1010V4, V6: 2.98 g typical, FP1010V5: 3.0 g typical,

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-oflLoad modules (POL)
- DCR sensing circuits

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

Pb HALOGEN HF FREE RoHS

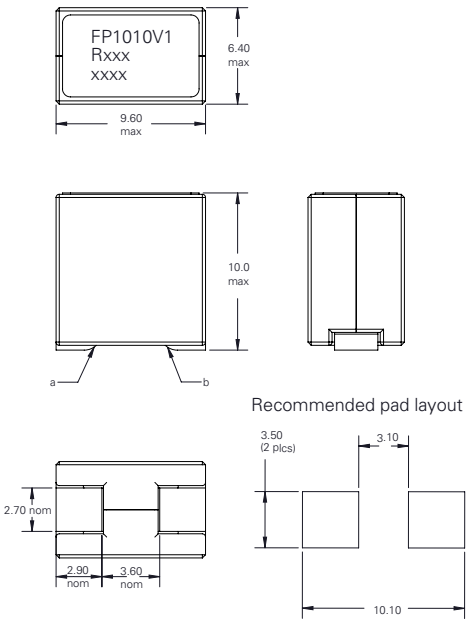
Powering Business Worldwide

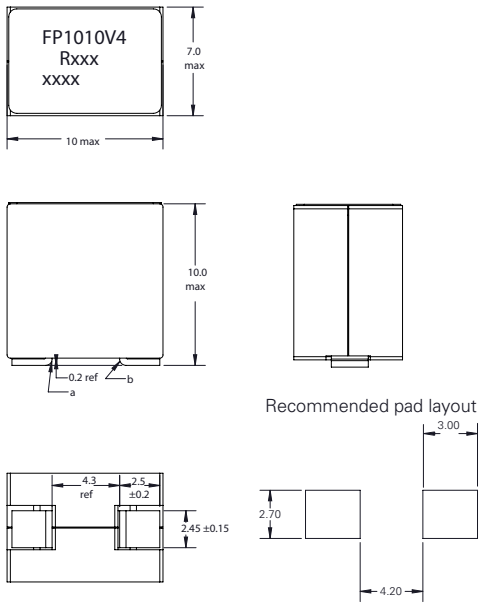
Product specifications

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) @ +20 °C	K-factor[7]
V1 Version								
FP1010V1-R100-R	100	72	68	97	88	85	0.145 ±5%	352
FP1010V1-R120-R	120	86	68	80	73	71	0.145 ±5%	352
FP1010V1-R150-R	150	108	68	65	59	57	0.145 ±5%	352
FP1010V1-R180-R	180	130	68	53	48	46	0.145 ±5%	352
V4 Version								
FP1010V4-R330-R	330	230	34	35	33	30	0.40 ±5%	216
V5 Version								
FP1010V5-R100-R	100	72	68	117	97	94	0.185 ±10%	308
FP1010V5-R120-R	120	86	68	98	82	79	0.185 ±10%	308
FP1010V5-R150-R	150	108	68	85	75	73	0.185 ±10%	308
FP1010V5-R330-R	330	237	68	35	29	27	0.185 ±10%	308
V6 Version								
FP1010V6-R330-R	330	231	54	40	32	30	0.40 ±5%	216
FP1010V6-R470-R	470	329	54	30	22	21	0.40 ±5%	216

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 Vrms, $I_{sat}1$, +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 @ +75 °C (FP1010V1), @ +100 °C (FP1010V4, V5, V6)
6. $I_{sat}3$: Peak current for approximately 20% rolloff @ +100 °C (FP1010V1), @ +125 °C (FP1010V4, V5, V6)
7. K-factor: Used to determine B_{p-p} for core loss (see graph).
   Bp-p = K * L * ΔI * 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: FP1010Vx-Rxxx-R
   FP1010V= Product code and size
   x= Version indicator
   Rxxx= Inductance value in µH, R= decimal point
   -R suffix = RoHS compliant

Dimensions (mm)





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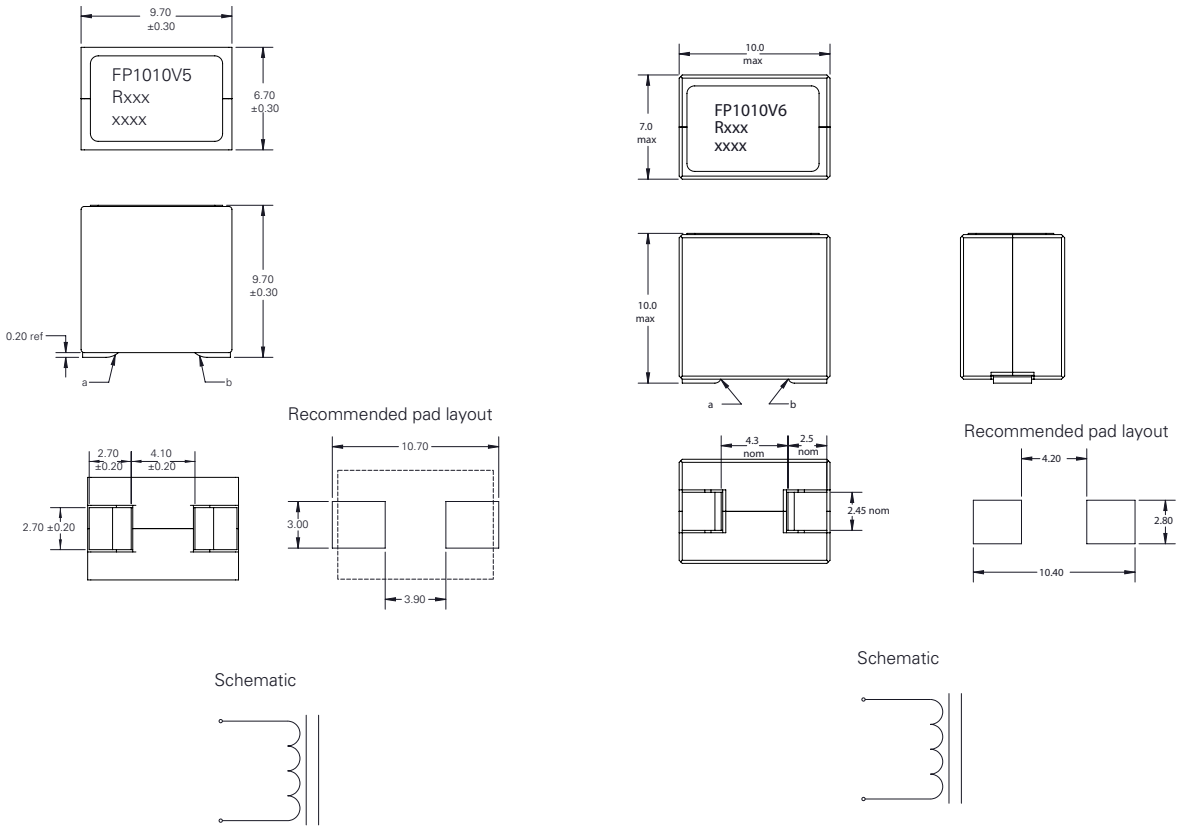
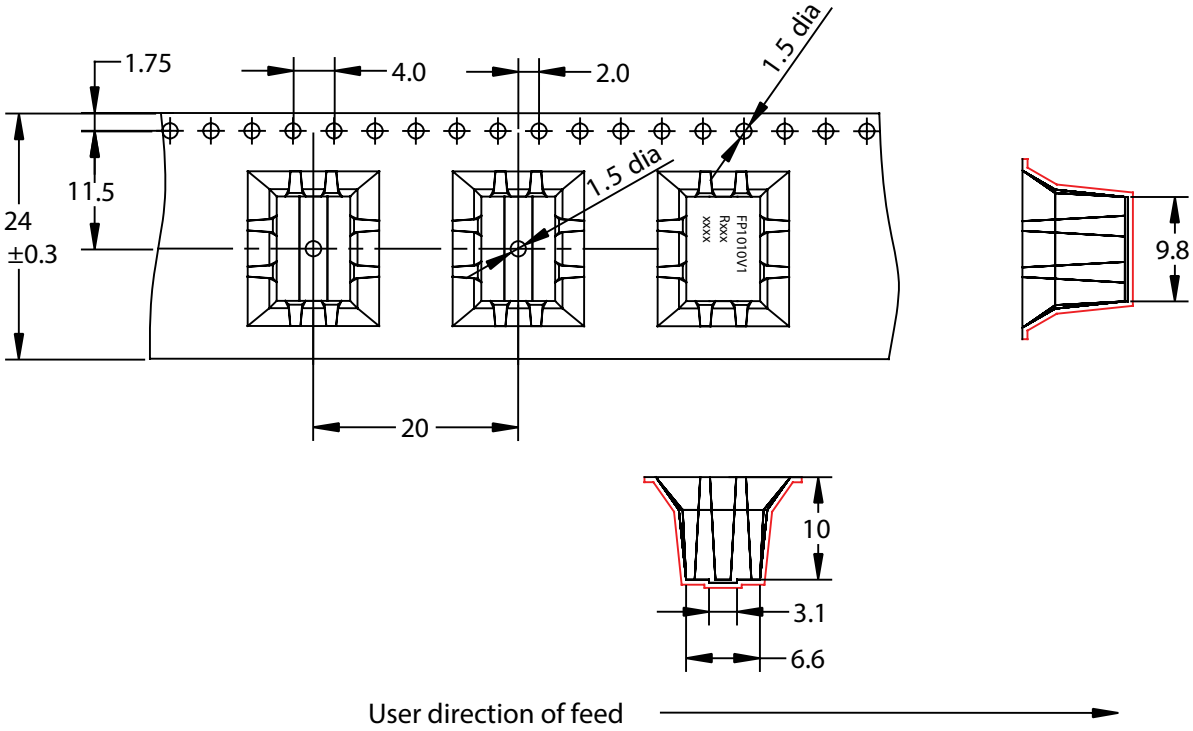


Part marking: FP1010Vx (x = Version indicator), Rxxx = Inductance value in uH, R= decimal point), xxxx=Lot code
Tolerances are ±0.15 unless stated otherwise
Pad layout tolerances are ±0.1 unless stated otherwise
Soldering surfaces to be coplanar within 0.1 millimeters
DCR measured from point "a" to point "b"
Traces or vias underneath the inductor is not recommended

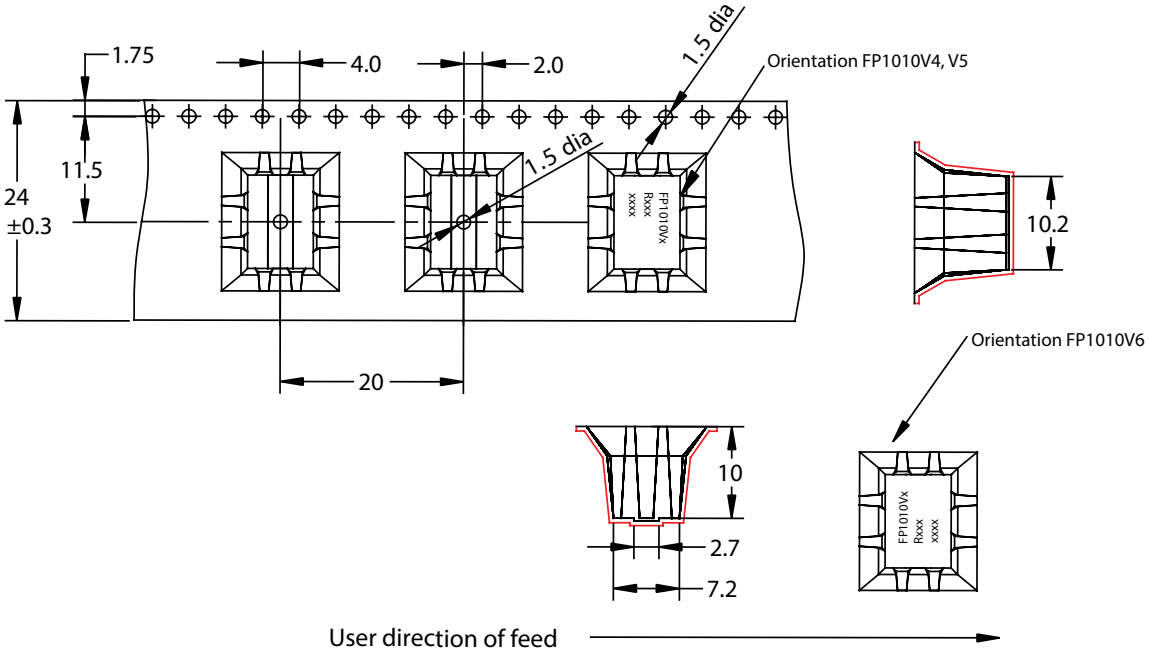
Packaging information (mm)

Supplied in tape and reel packaging , 300 parts per 13″ diameter reel

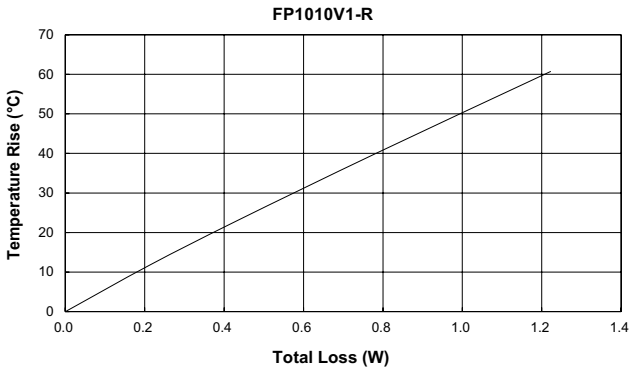
FP1010V1

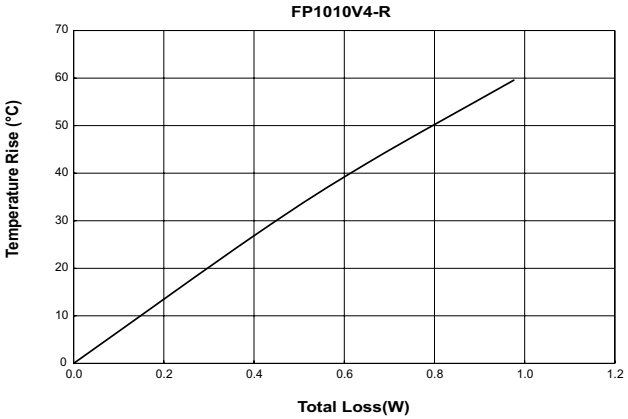


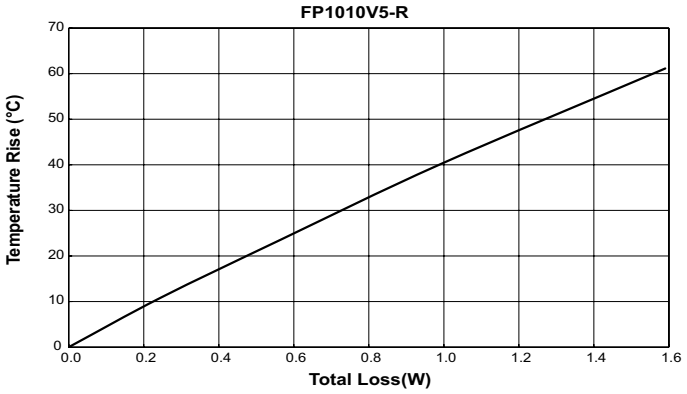
FP1010V4, V5, V6

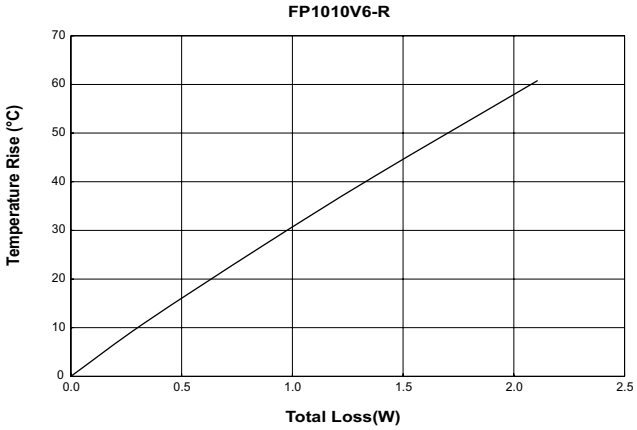


Temperature rise vs. total loss

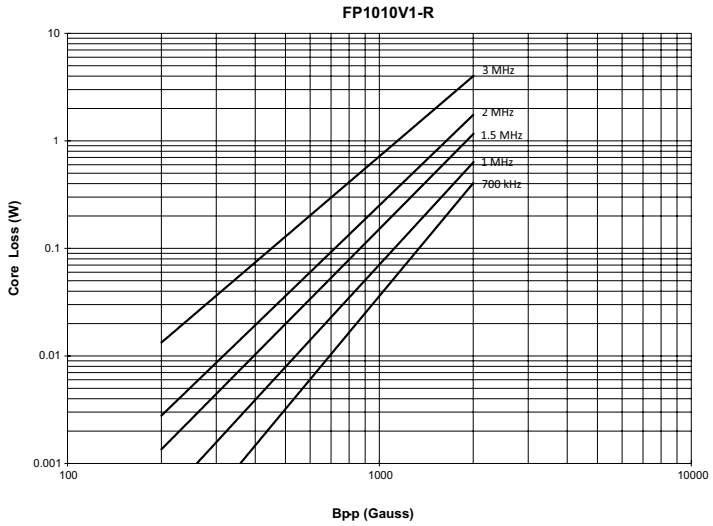


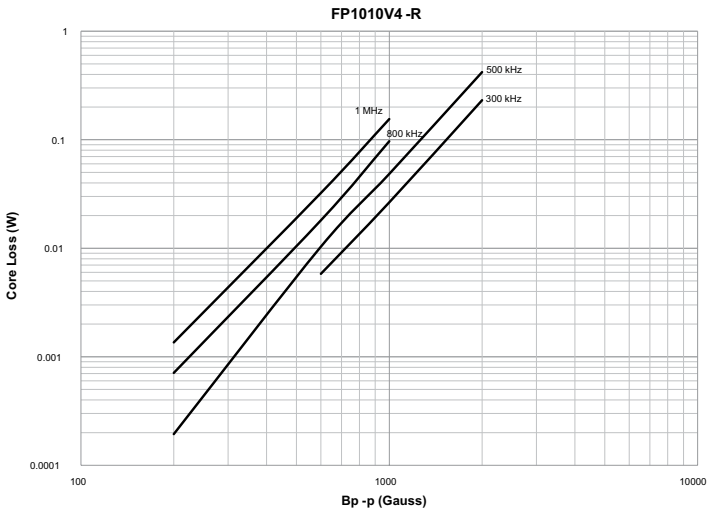




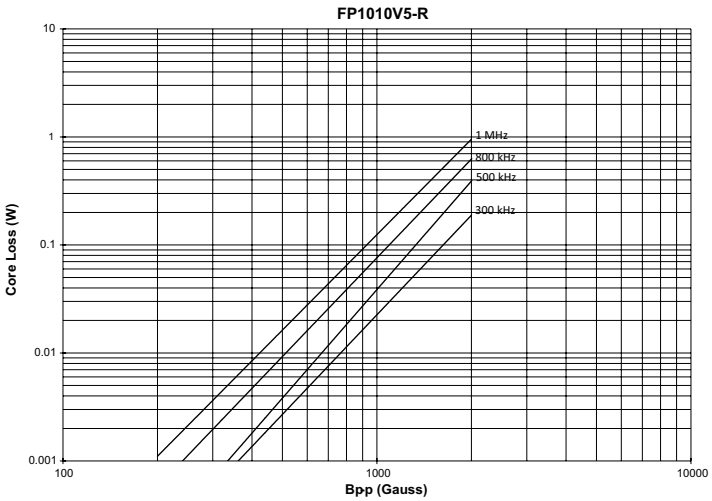


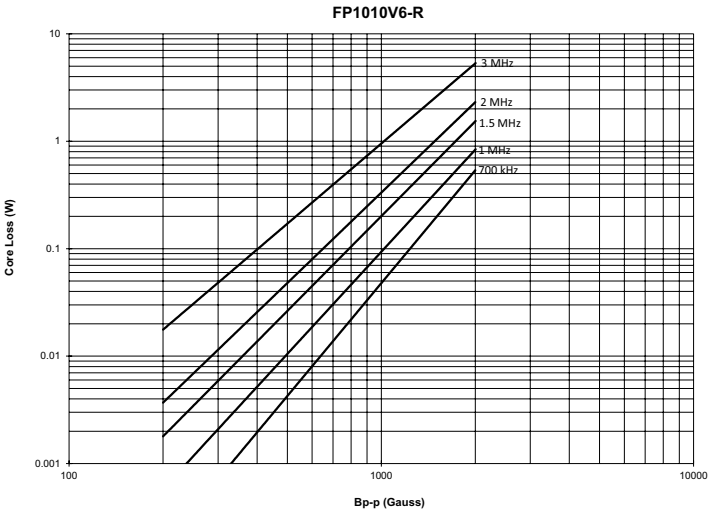
Core loss vs. B_{p-p}



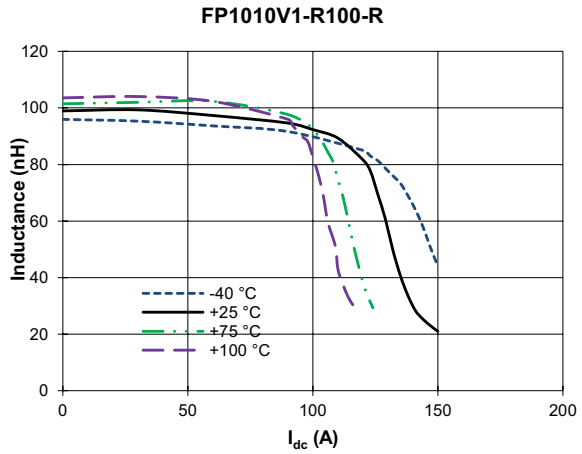


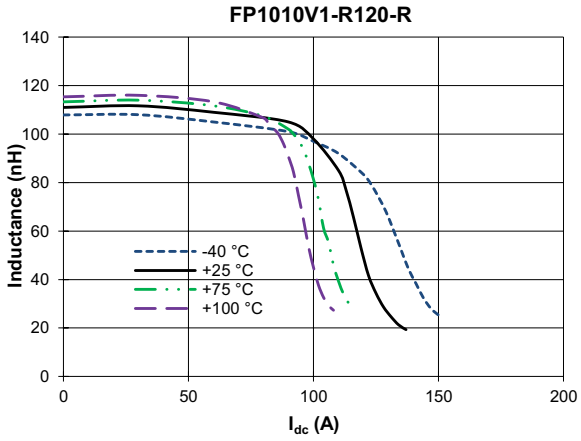
Core loss vs. B_{p-p}

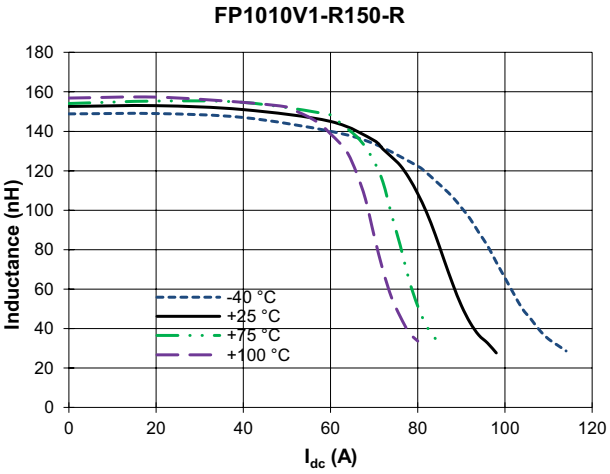


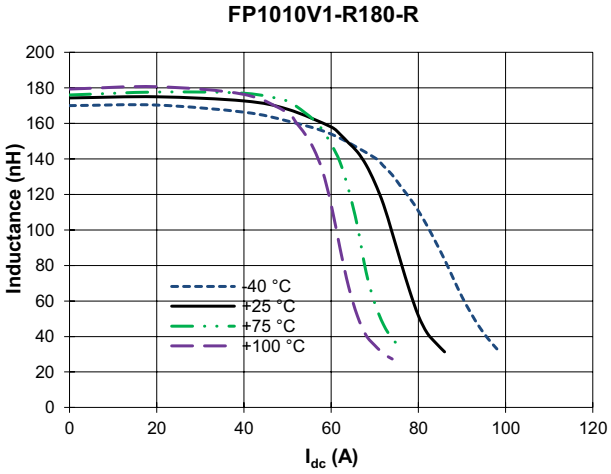


Inductance characteristics



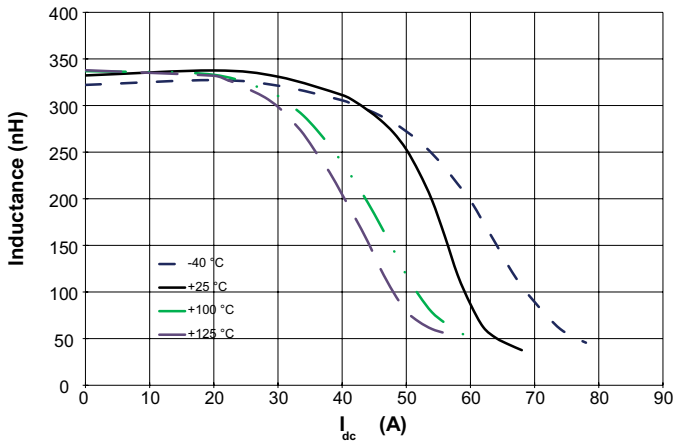




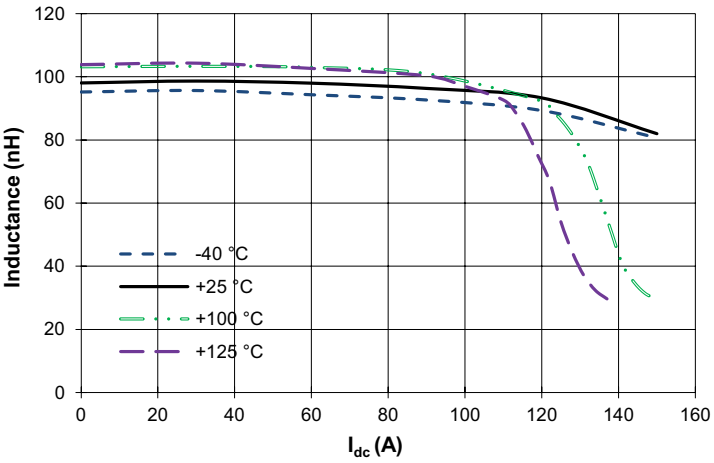


Inductance characteristics

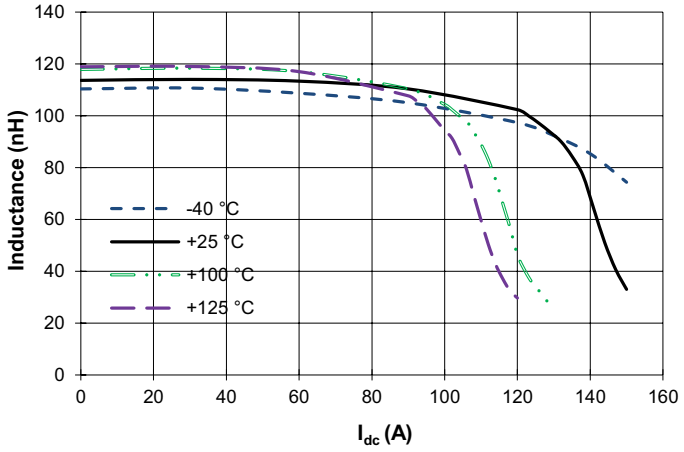
FP1010V4-R330-R



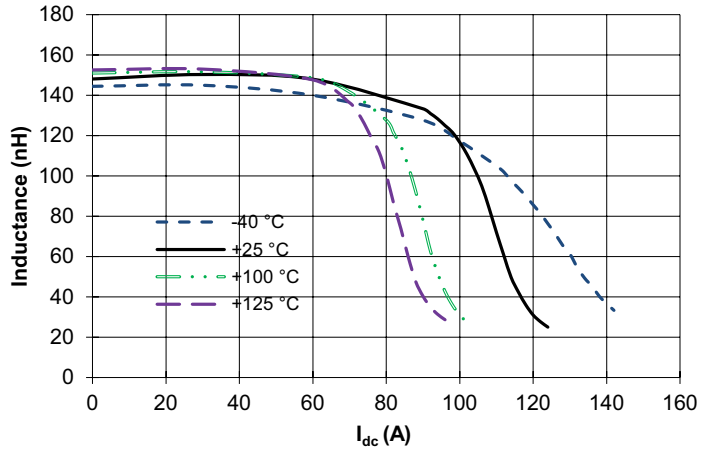
FP1010V5-R100-R



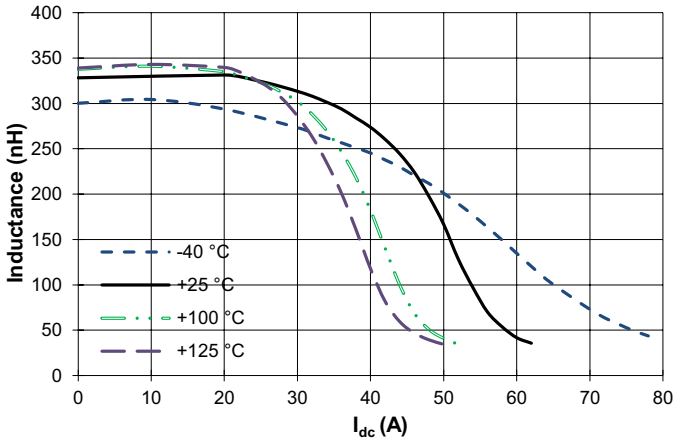
FP1010V5-R120-R



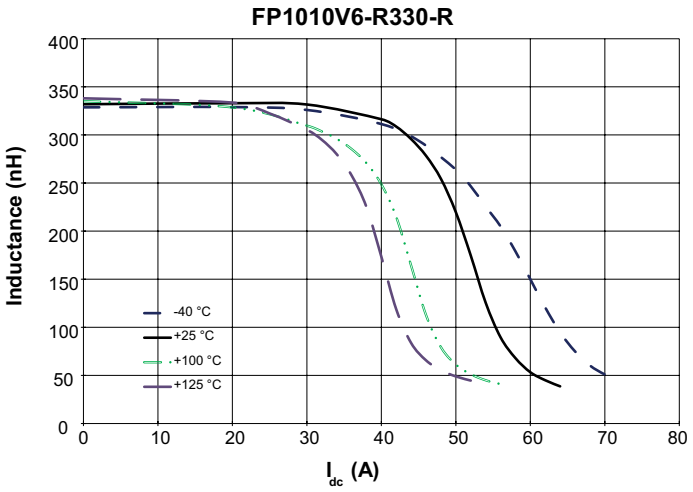
FP1010V5-R150-R

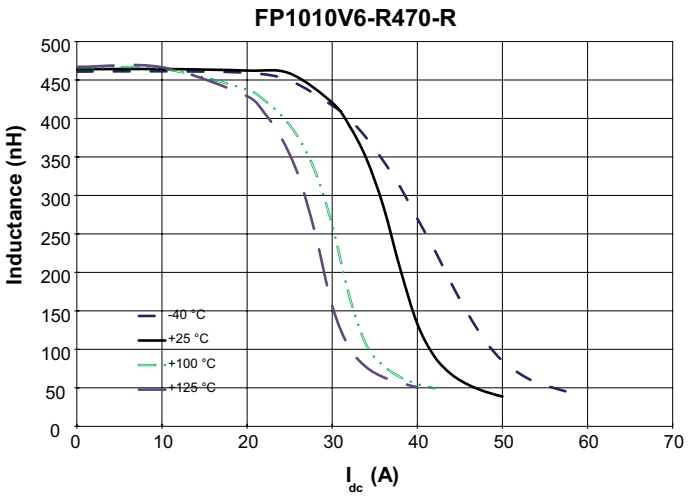


FP1010V5-R330-R



Inductance characteristics





Solder reflow profile

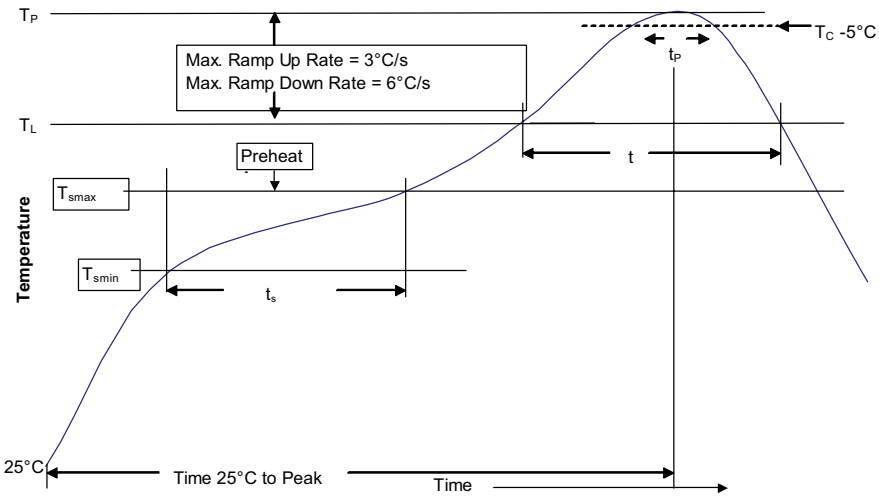


Table 1 - Standard SnPb solder (T_C)

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

Table 2 - Lead (Pb) free solder (T_C)

Package thickness	Volume mm^3 <350	Volume mm^3 350 - 2000	Volume mm^3 >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 – 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

Reference 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
Ramp up rate T_L to T_p		3 °C/ second max.	3 °C/ second max.
Liquidous temperature (T_L) Time (t_L) maintained above 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*
Ramp-down rate (T_p to T_L)		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.

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