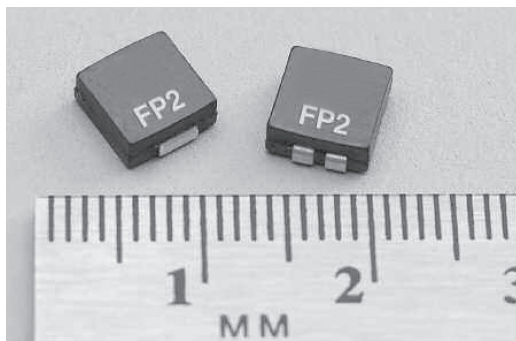


FP2

Low profile, high current power inductors



Product description

- High current carrying capacity
- Dual conductors allow for low inductance and high current or high inductance and lower current
- Inductance range from 0.047uH to 0.480uH
- Current range 9.0 to 42 Amps
- 7.2 x 6.7mm footprint surface mount package in a 3.0 or 5.0mm heights
- Ferrite core material
- Halogen free, lead free, RoHS compliant

Applications

- Servers
- Multi-phase and Vcore regulators
- Voltage Regulator Modules (VRMs)
 - Server and desktop
 - Central processing unit (CPU)
 - Graphics processing unit (GPU)
 - Application specific integrated circuit (ASIC)
 - High power density
- Notebook regulators
- Battery power systems
- Graphics cards

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-020D compliant



Product specifications

Part number ⁵	OCL ¹ (μH) ±15%	I _{rms} ² (amps)	I _{sat} ³ (amps)	DCR (Ω) typical @ 20°C	Height maximum	Volt-μsec ⁴ (V-μs)
Single conductor						
FP2-S047-R	0.047	39	42	0.00024	3	0.75
FP2-S068-R	0.068	39	32	0.00024	3	0.75
FP2-S082-R	0.082	39	26	0.00024	3	0.75
FP2-S100-R	0.100	39	22	0.00024	3	0.75
FP2-S120-R	0.120	39	18	0.00024	3	0.75
FP2-S200-R	0.200	37	19	0.00028	5	0.99
FP2-V050-R	0.050	37	70	0.00028	5	0.99
FP2-V100-R	0.100	37	40	0.00028	5	0.99
FP2-V120-R	0.120	37	33	0.00028	5	0.99
FP2-V150-R	0.150	37	25.5	0.00028	5	0.99
Double conductor						
FP2-D047-R	0.047	37	42	0.00026	3	0.75
FP2-D068-R	0.068	37	32	0.00026	3	0.75
FP2-D082-R	0.082	37	26	0.00026	3	0.75
FP2-D100-R	0.100	37	22	0.00026	3	0.75
FP2-D120-R	0.120	37	18	0.00026	3	0.75

Series mode

Part number ⁵	OCL ¹ (μH) ±15%	I _{rms} ² (amps)	I _{sat} ³ (amps)	DCR (Ω) typical @ 20°C	Height maximum	Volt-μsec ⁴ (V-μs)
Double conductor						
FP2-D047-R	0.188	16	21	0.0013	3	1.5
FP2-D068-R	0.272	16	16	0.0013	3	1.5
FP2-D082-R	0.328	16	13	0.0013	3	1.5
FP2-D100-R	0.400	16	11	0.0013	3	1.5
FP2-D120-R	0.480	16	9	0.0013	3	1.5

1. Open Circuit Inductance (OCL) Test parameters: 1.0MHz, 0.25Vrms, 1.0Aac, +25°C

2. Irms: 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, airflow, 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.

3. Isat : Peak current for approximately 30% rolloff @ +20°C.

4. Applied Volt-Time product (V-μs) across the inductor. This value represents the applied V-μs at 500kHz necessary to generate a core loss equal to 10% of the total losses for 40°C temperature rise.

5. Part Number Definition: FP2-xyyy-R

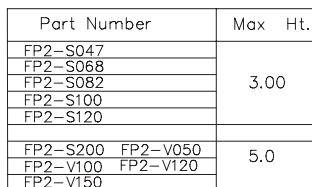
FP2 = Product code and size

x = Version indicator, S = single conductor, V = single conductor, D = dual conductor

yyy = Inductance value in uH, R = decimal point

-R suffix = RoHS compliant

Single conductor

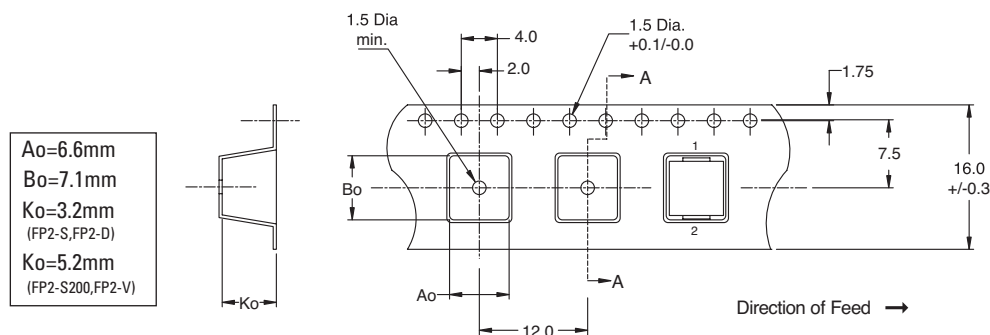


The mechanical drawings include:

- Top View:** Shows a rectangular component with dimensions 6.70 (width) and 7.20 Mpx (height). It features four mounting pads labeled 1, 2, 3, and 4. The text "DXXX" and "yww" are printed on the top surface.
- Side View:** Shows the profile of the component with a height dimension of 1.0 min. (4x).
- Front View:** Shows the component from the front with a width of 3.00 Max. It includes reference dimensions: 1.00 ref., 1.25 (2x) ref., and 1.30 ref. (2x).
- Recommended Pad Layout:**
 - Series Mode:** Shows a layout with four pads (1, 2, 3, 4) and dimensions: 0.50 (typ) between pads 1 and 4, 1.80 between pads 2 and 3, 4.80 (2x) for pad 2, 1.75 (4x) for pad 3, and 7.8 for the total width.
 - 2 Winding Mode:** Shows a layout with four pads (1, 2, 3, 4) and dimensions: 0.50 between pads 1 and 4, 1.75 (4x) for pad 2, 2.00 (2x) for pad 3, and 7.80 for the total width.
- Schematic:** Shows a transformer with two windings. Winding 1 has terminals 1 and 2. Winding 2 has terminals 4 and 3. The windings are coupled inductively.

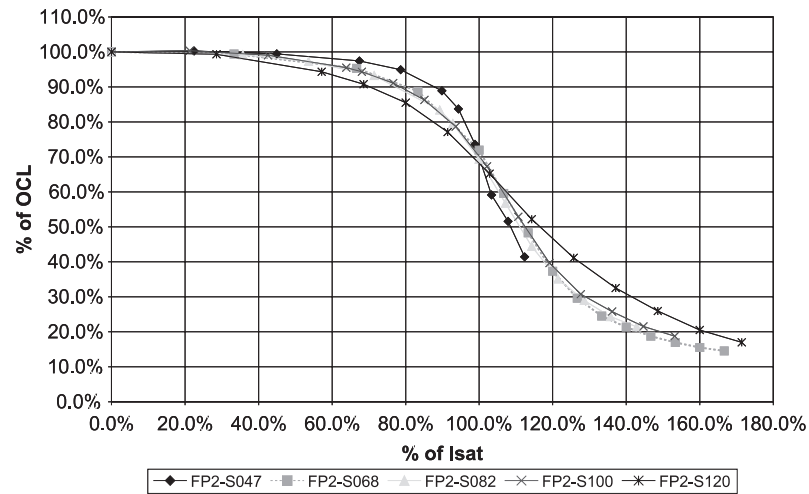
Part marking: FPS, V or D (S= single conductor,
V= single conductor, D= dual conductor),
xxx (xxx= inductance value in uH, R= decimal point)
yyy= date code
Tolerances are ± 0.2 millimeters unless stated otherwise
All soldering surfaces to be coplanar within 0.15 millimeters
Do not route traces or vias underneath the inductor

Supplied in tape and reel packaging.
 FP2-S,FP2-D: 1,700 parts per 13" diameter reel.
 FP2-S200, FP2-V: 950 parts per 13" diameter reel.

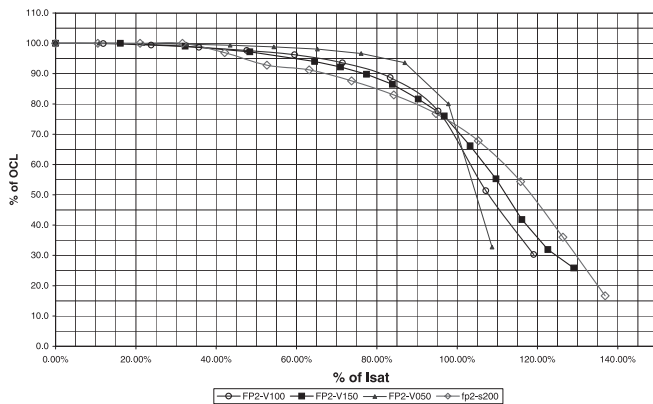


Inductance characteristics

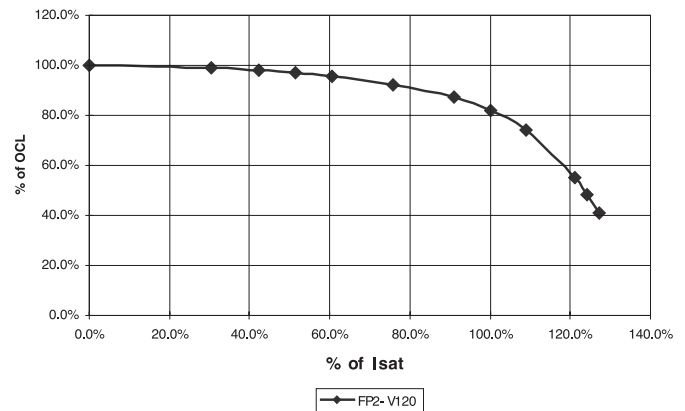
OCL vs. Isat



OCL vs. Isat

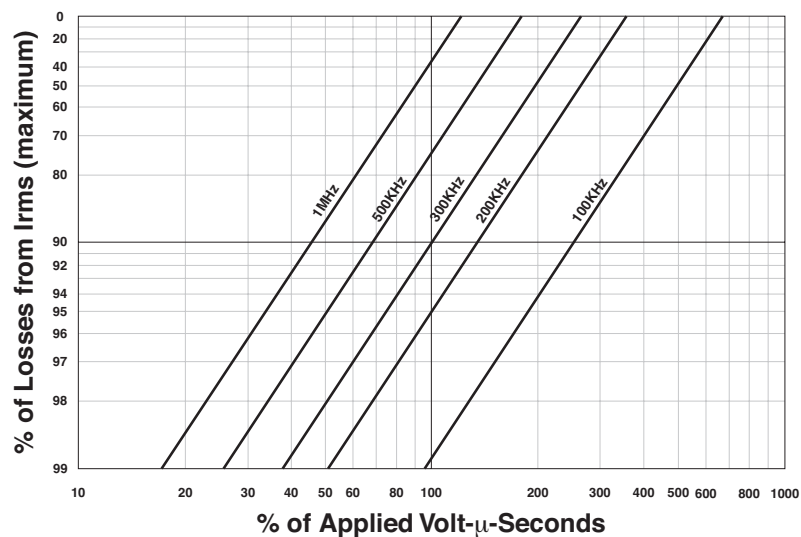


OCL Vs. Isat



Core loss

IRMS DERATING WITH CORE LOSS



Solder reflow profile

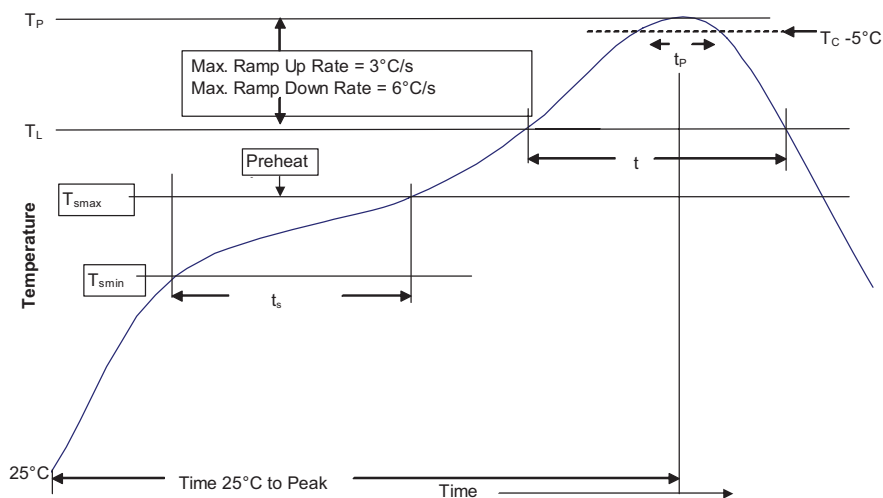


Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5mm)	235°C	220°C
≥2.5mm	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
<1.6mm	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 JEDEC 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)	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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Eaton
Electronics Division
1000 Eaton Boulevard
Cleveland, OH 44122
United States
www.eaton.com/elx

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