

# UP5

## High power, drum inductors



### Description

- 18.54 x 15.24 x 7.11mm maximum surface mount package
- Ferrite core material
- Inductance range from 1.0 $\mu$ H to 1000 $\mu$ H
- Current range from 0.56 to 20 Amps
- Frequency range up to 1MHz
- RoHS compliant

### Applications

- Buck or boost inductor
- Desktop computer
- Workstations/servers
- DVD Players
- Portable power devices
- Base stations
- Industrial power supplies
- Output filter chokes
- Test equipment instrumentation

### Environmental Data

- Storage temperature range: -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 <sup>5</sup>	OCL <sup>1</sup> $\mu\text{H} \pm 20\%$	I <sub>rms</sub> <sup>2</sup> (amps)	sat <sup>3</sup> (amps) @25°C	SRF MHz typical	DCR m $\Omega$ @ 20°C Maximum	K-factor <sup>4</sup>
UP5-1R0-R	1.0	8.6	20.0	140	9.0	73.61
UP5-1R5-R	1.5	7.5	18.0	110	12.0	60.22
UP5-2R2-R	2.2	7.1	16.0	75.0	14.0	50.96
UP5-3R3-R	3.3	6.2	14.0	70.0	18.0	44.16
UP5-5R6-R	5.6	5.3	12.0	45.0	20.0	31.55
UP5-100-R	10.0	4.3	10.0	21.0	31.0	24.54
UP5-150-R	15.0	4.0	8.0	16.0	36.0	20.07
UP5-220-R	22.0	3.5	7.0	13.0	47.0	16.99
UP5-330-R	33.0	3.0	5.5	11.0	66.0	14.09
UP5-470-R	47.0	2.6	4.5	9.0	86.0	11.62
UP5-680-R	68.0	2.3	3.5	6.5	130	9.60
UP5-101-R	100	1.8	3.0	5.7	190	7.98
UP5-151-R	150	1.5	2.6	4.5	250	6.56
UP5-221-R	220	1.2	2.4	3.7	380	5.39
UP5-331-R	330	1.0	1.9	3.0	560	4.39
UP5-471-R	470	0.82	1.4	2.7	850	3.70
UP5-681-R	680	0.72	1.2	2.2	1100	3.08
UP5-102-R	1000	0.56	1.0	2.0	1800	2.54

1. OpenCircuitInductance(OCL)TestParameters:100kHz,0.25Vrms,0.0Adc

2. I<sub>rms</sub>: DC current for an approximate  $\Delta T$  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 the part temperature not exceed 125°C under worst case operating conditions verified in the end application.

3. Isat: Peak current for approximately 10% rolloff at 25°C.

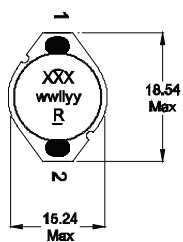
4. K-factor:UsedtodetermineBp-pforcoreloss(see graph).  $B_p-p = K \cdot L \cdot \Delta I$ , Bp-p:(Gauss), K: (K-factor from table), L: (inductance in  $\mu\text{H}$ ),  $\Delta I$  (peak-to-peak ripple current in amps).

5. Part Number Definition: UP5-xxx-R

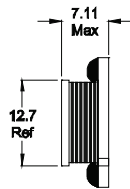
- UP5 = Product code and size
- xxx= Inductance value in  $\mu\text{H}$ , R = decimal point. If no R is present, then third digit equals the number of zeros.
- "-R" suffix = RoHS compliant

## Dimensions (mm)

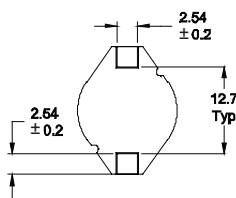
Top View



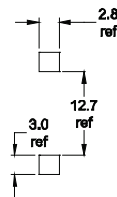
Side View



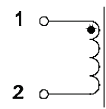
Bottom View



Recommended Pad Layout



Schematic



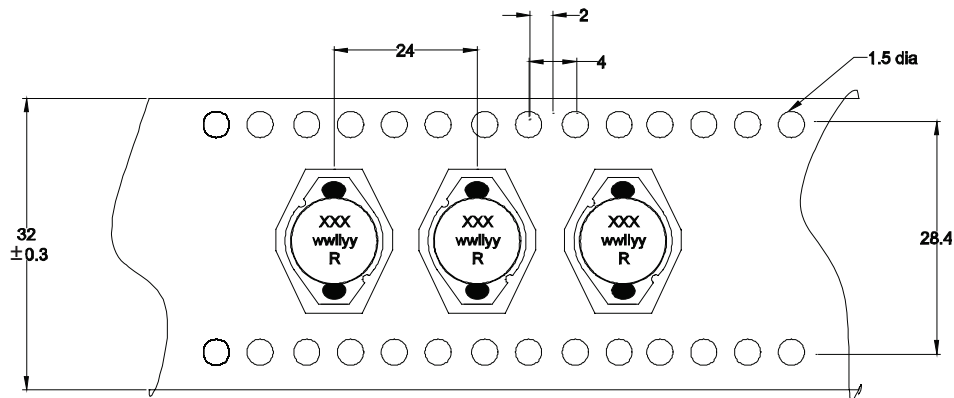
xxx = Inductance value in  $\mu\text{H}$  (R = Decimal point).

If no "R" is present, then the third digit equals the number of zeros.

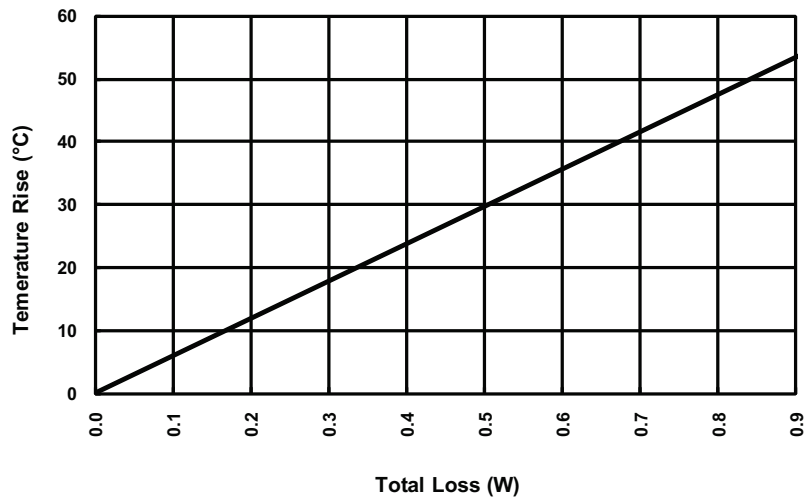
wwlllyy = Date code R = Revision level

Packaging information

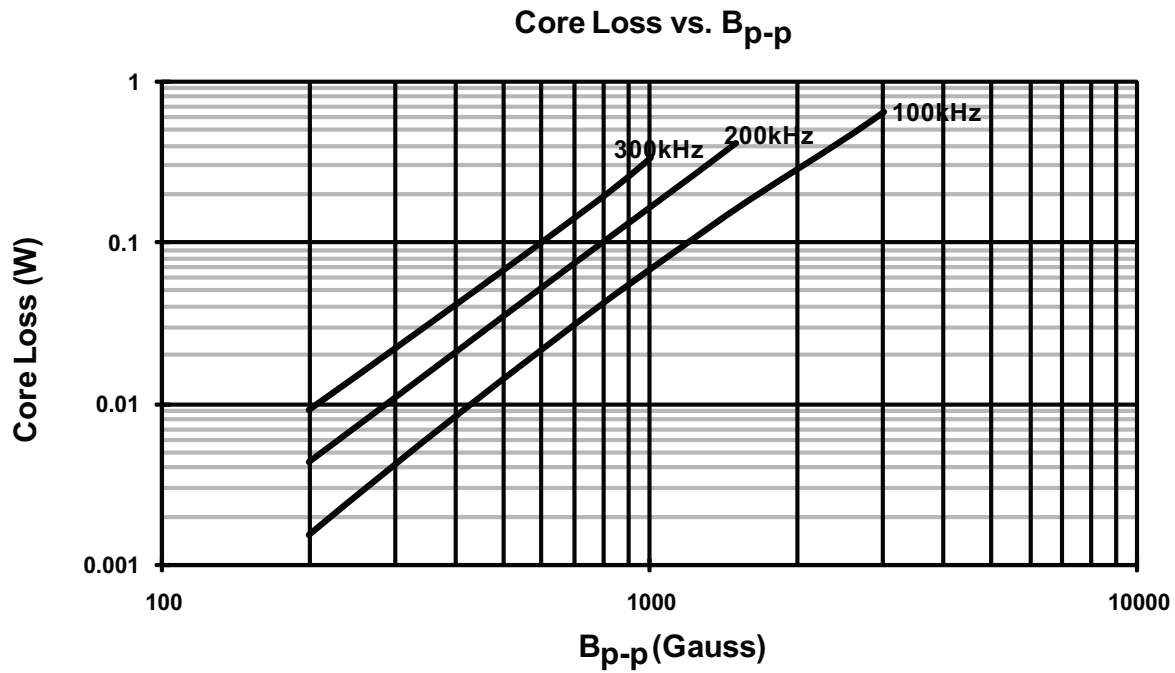
Supplied in tape-and-reel packaging, 250 parts per reel, 13" diameter reel.



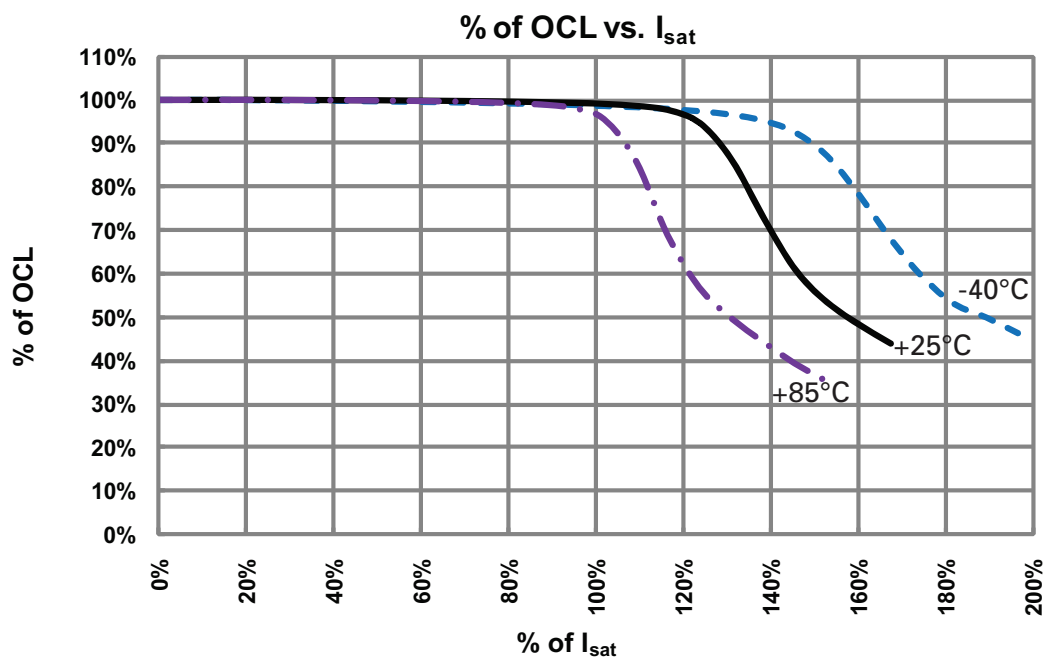
Temperature rise vs. total loss



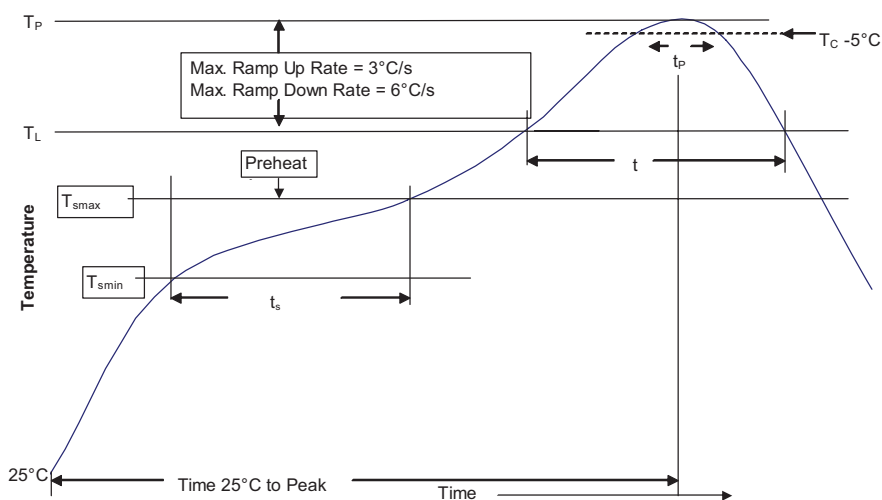
## Core loss



## Inductance characteristics



## Solder reflow profile



**Table 1 - Standard SnPb Solder ( $T_C$ )**

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 ( $T_C$ )**

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 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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