

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 μ H to 1000 μ 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 ⁵ | OCL ¹ $\mu\text{H} \pm 20\%$ | I _{rms} ² (amps) | sat ³ (amps) @25°C | SRF MHz typical | DCR m Ω @ 20°C Maximum | K-factor ⁴ |
|--------------------------|---|--------------------------------------|-------------------------------|-----------------|-------------------------------|-----------------------|
| 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 |

- OpenCircuitInductance(OCL)TestParameters:100kHz,0.25Vrms,0.0Aac
- I_{rms}: DC current for an approximate ΔT 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.
- I_{sat}: Peak current for approximately 10% rolloff at 25°C.
- K-factor: Used to determine Bp-p for core loss (see graph). $Bp-p = K \cdot L \cdot \Delta I$, Bp-p (Gauss), K: (K-factor from table), L: (inductance in μH), ΔI (peak-to-peak ripple current in amps).
- Part Number Definition: UP5-xxx-R
 - UP5 = Product code and size
 - xxx = Inductance value in μH , R = decimal point. If no R is present, then third digit equals the number of zeros.
 - “-R” suffix = RoHS compliant

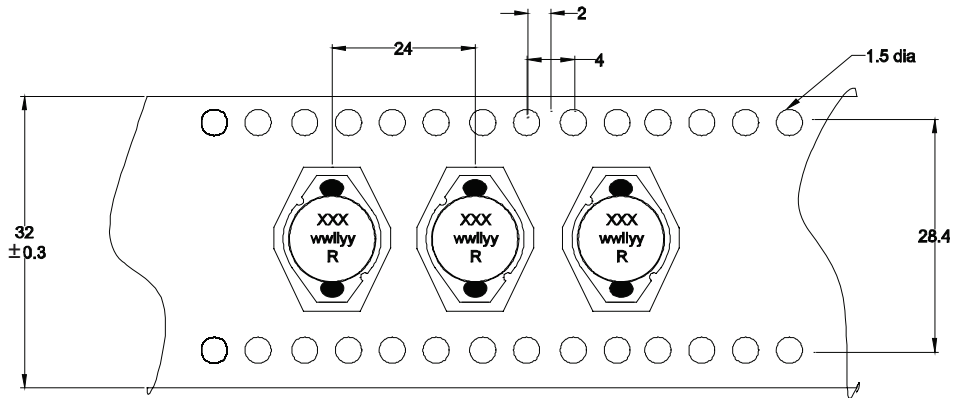
Dimensions (mm)



xxx = Inductance value in μH (R = Decimal point).
 If no "R" is present, then the third digit equals the number of zeros.
 wwllyy = Date code R = Revision level

Packaging information

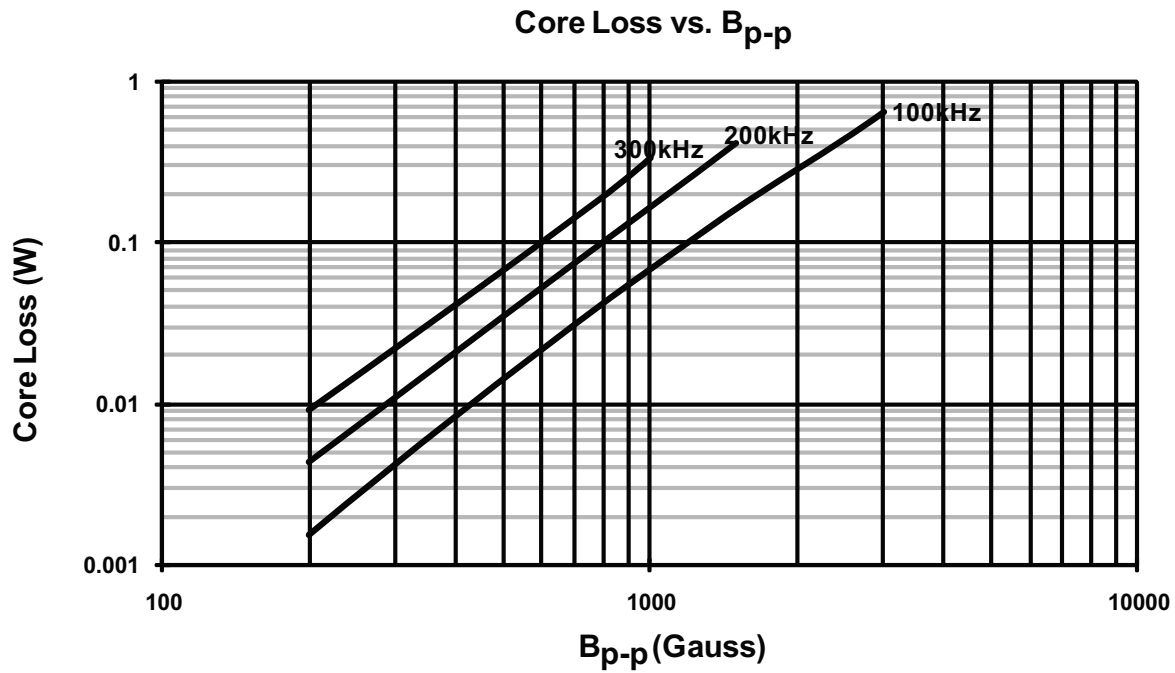
Supplied in tape-and-reel packaging, 250 parts per reel, 13" diameter reel.



Temperature rise vs. total loss



Core loss



Inductance characteristics



Solder reflow profile



Table 1 - Standard SnPb Solder (T_c)

| Package Thickness | Volume mm 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 JDEC 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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