

# UP2UC

## UNI-PAC™ drum core power inductors



### Product features

- 12.7 mm x 9.5 mm x 5.21 mm drum core
- Inductance range from 1.0  $\mu$ H to 1000  $\mu$ H
- Current range from 0.30 A to 9.0 A
- Ferrite core material

### Applications

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

### 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



## Product specifications

| Part Number <sup>5</sup> | OCL <sup>1</sup><br>$\mu\text{H} \pm 20\%$ | $I_{\text{rms}}^2$<br>(A) | $I_{\text{sat}}^3$<br>(A) @ +25 °C | SRF MHz<br>Typical | DCR $\text{m}\Omega$ @ +20 °C<br>Typical | DCR $\text{m}\Omega$ @ +20 °C<br>Maximum | K-factor <sup>4</sup> |
|--------------------------|--------------------------------------------|---------------------------|------------------------------------|--------------------|------------------------------------------|------------------------------------------|-----------------------|
| UP2UC-1R0-R              | 1.0                                        | 6.8                       | 9.0                                | 100                | 4.0                                      | 9.0                                      | 216                   |
| UP2UC-1R5-R              | 1.5                                        | 6.4                       | 8.0                                | 90.0               | 4.4                                      | 10.0                                     | 177                   |
| UP2UC-2R2-R              | 2.2                                        | 6.1                       | 7.0                                | 80.0               | 5.8                                      | 12.0                                     | 130                   |
| UP2UC-3R3-R              | 3.3                                        | 5.4                       | 6.4                                | 65.0               | 9.9                                      | 15.0                                     | 114                   |
| UP2UC-4R7-R              | 4.7                                        | 4.8                       | 5.4                                | 45.0               | 12.0                                     | 18.0                                     | 92.52                 |
| UP2UC-6R8-R              | 6.8                                        | 4.4                       | 4.6                                | 38.0               | 25.8                                     | 27.0                                     | 77.72                 |
| UP2UC-100-R              | 10.0                                       | 3.9                       | 3.8                                | 30.0               | 25.9                                     | 38.0                                     | 62.68                 |
| UP2UC-150-R              | 15.0                                       | 3.1                       | 3.0                                | 27.0               | 35.4                                     | 46.0                                     | 49.82                 |
| UP2UC-220-R              | 22.0                                       | 2.7                       | 2.6                                | 19.0               | 55.9                                     | 85.0                                     | 41.34                 |
| UP2UC-330-R              | 33.0                                       | 2.1                       | 2.0                                | 15.0               | 81.6                                     | 100                                      | 34.09                 |
| UP2UC-470-R              | 47.0                                       | 1.8                       | 1.6                                | 12.0               | 120                                      | 140                                      | 29.00                 |
| UP2UC-680-R              | 68.0                                       | 1.5                       | 1.4                                | 10.0               | 145                                      | 200                                      | 24.59                 |
| UP2UC-101-R              | 100                                        | 1.3                       | 1.2                                | 9.0                | 211                                      | 280                                      | 20.89                 |
| UP2UC-151-R              | 150                                        | 1.0                       | 1.0                                | 6.0                | 347                                      | 400                                      | 15.80                 |
| UP2UC-221-R              | 220                                        | 0.80                      | 0.80                               | 5.0                | 491                                      | 610                                      | 13.04                 |
| UP2UC-331-R              | 330                                        | 0.60                      | 0.60                               | 4.5                | 750                                      | 1020                                     | 10.85                 |
| UP2UC-471-R              | 470                                        | 0.50                      | 0.50                               | 3.5                | 1188                                     | 1270                                     | 9.39                  |
| UP2UC-681-R              | 680                                        | 0.40                      | 0.40                               | 2.5                | 1811                                     | 2020                                     | 7.56                  |
| UP2UC-102-R              | 1000                                       | 0.30                      | 0.30                               | 2.0                | 2757                                     | 3000                                     | 6.13                  |

1 Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V<sub>rms</sub>, 0.0 Adc

2  $I_{\text{rms}}$ : 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  $I_{\text{sat}}$ : Peak current for approximately 7.5% rolloff at +25 °C.

4 K-factor: Used to determine  $B_{p-p}$  for core loss (see graph).  $B_{p-p} = K \cdot L \cdot \Delta I$ ,  $B_{p-p}$ : (Gauss),

K: (K-factor from table), L: (inductance in  $\mu\text{H}$ ),  $\Delta I$  (peak-to-peak ripple current in amps).

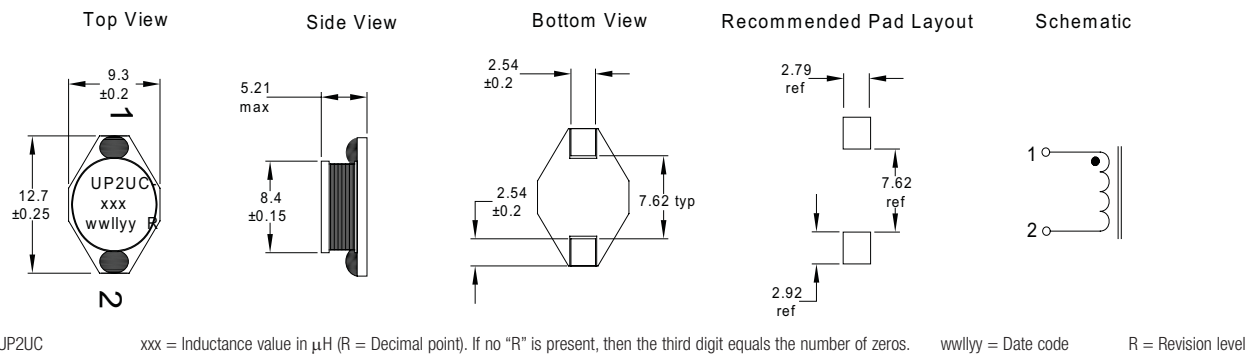
6 Part Number Definition: UP2CU-xxx-R

• UP2CU = 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

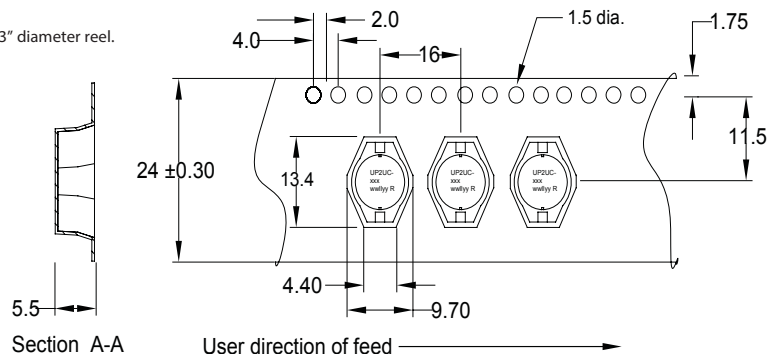
## Dimensions-mm



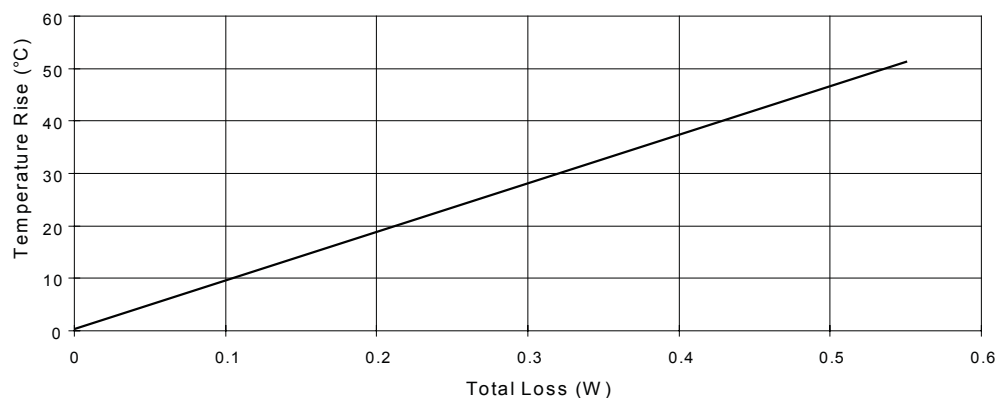
Tolerances are  $\pm 0.254$  mm unless otherwise specified.  
Do not route traces or vias underneath the inductor

## Packaging information-mm

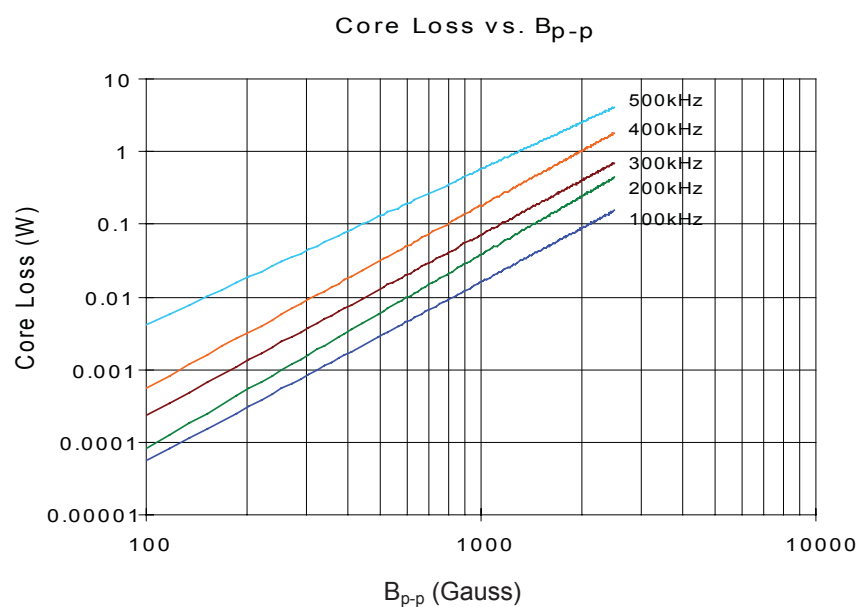
Supplied in tape-and-reel packaging, 600 parts per reel, 13" diameter reel.



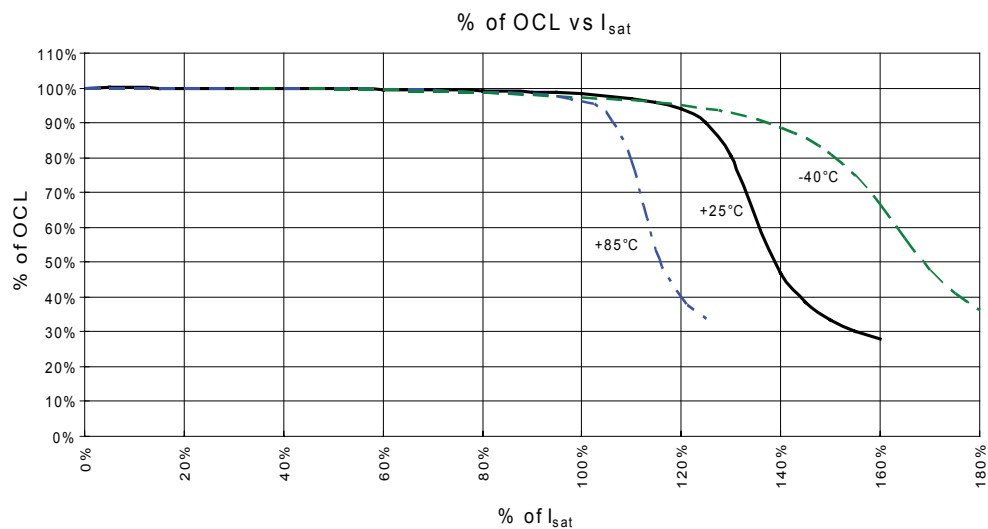
## Temperature rise vs total loss



## Core loss vs Bp-p



## Inductance characteristics



## Solder Reflow Profile

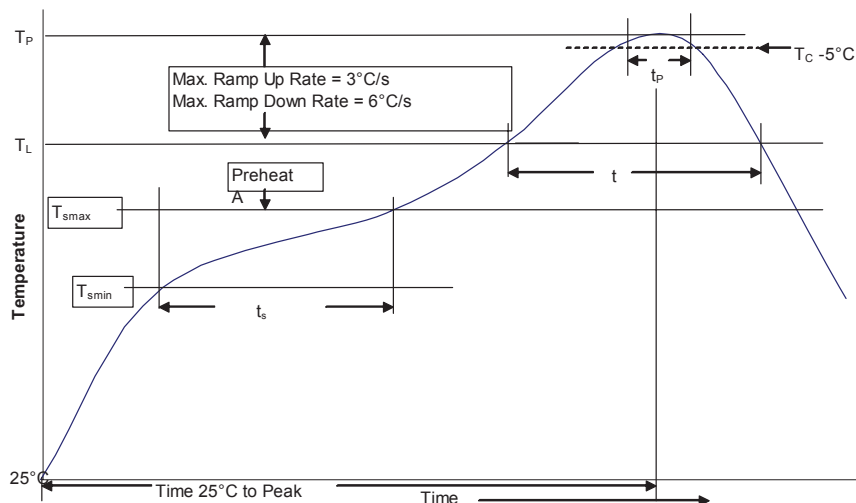


Table 1 - Standard SnPb Solder ( $T_p$ )

| Package Thickness | Volume $mm^3$ <350 | Volume $mm^3$ $\geq 350$ |
|-------------------|--------------------|--------------------------|
| <2.5mm            | 235°C              | 220°C                    |
| $\geq 2.5mm$      | 220°C              | 220°C                    |

Table 2 - Lead (Pb) Free Solder ( $T_p$ )

| 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-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        |
| 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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