

## Product Specifications

| Part Number <sup>5</sup> | OCL <sup>1</sup><br>( $\mu$ H) $\pm 30\%$ | $I_{rms}^2$<br>(A) | $I_{avg}^2$<br>(A) | DCR (m $\Omega$ )<br>typical<br>@ 20°C | DCR (m $\Omega$ )<br>maximum<br>@ 20°C | K-factor <sup>4</sup> |
|--------------------------|-------------------------------------------|--------------------|--------------------|----------------------------------------|----------------------------------------|-----------------------|
| DR1040-1R5-R             | 1.35                                      | 6.5                | 10                 | 6.0                                    | 8.1                                    | 15.5                  |
| DR1040-2R5-R             | 2.4                                       | 6.1                | 7.8                | 7.0                                    | 9.0                                    | 12.0                  |
| DR1040-3R8-R             | 3.6                                       | 5.5                | 6.4                | 9.6                                    | 13                                     | 9.9                   |
| DR1040-5R2-R             | 5.2                                       | 5.4                | 5.5                | 14                                     | 17                                     | 8.3                   |
| DR1040-7R0-R             | 6.8                                       | 4.5                | 4.8                | 17                                     | 20                                     | 7.2                   |
| DR1040-8R2-R             | 8.1                                       | 3.98               | 4.6                | 24                                     | 29                                     | 6.4                   |
| DR1040-100-R             | 9.6                                       | 3.8                | 4.4                | 26                                     | 35                                     | 5.7                   |
| DR1040-150-R             | 14.9                                      | 3.1                | 3.6                | 37                                     | 50                                     | 4.7                   |
| DR1040-220-R             | 21.1 $\pm 20\%$                           | 2.5                | 2.9                | 54                                     | 73                                     | 4.0                   |
| DR1040-330-R             | 32.6                                      | 2.2                | 2.45               | 69                                     | 93                                     | 3.3                   |
| DR1040-470-R             | 45.8                                      | 1.9                | 2.1                | 95                                     | 128                                    | 2.8                   |
| DR1040-680-R             | 65.3                                      | 1.42               | 1.65               | 152                                    | 183                                    | 2.3                   |
| DR1040-820-R             | 87                                        | 1.29               | 1.47               | 214                                    | 260                                    | 2.0                   |
| DR1040-101-R             | 101                                       | 1.25               | 1.35               | 225                                    | 304                                    | 1.9                   |
| DR1040-151-R             | 148                                       | 0.85               | 1.15               | 356                                    | 430                                    | 1.6                   |
| DR1040-221-R             | 216                                       | 0.70               | 0.92               | 530                                    | 640                                    | 1.3                   |
| DR1040-331-R             | 323                                       | 0.52               | 0.70               | 810                                    | 1090                                   | 1.0                   |

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 Vrms, 0.0 Adc, +25 °C

2.  $I_{avg}$ : DC current for an approximate temperature rise of 30 °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.

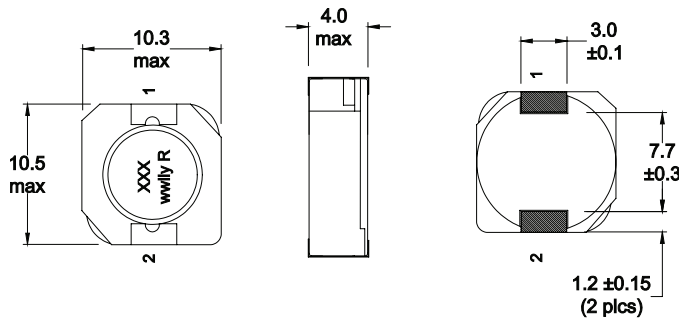
3.  $I_{avg}$ : Peak current for approximately 35% rolloff @ +25 °C

4. K-factor: K-factor: Used to determine Bp-p for core loss (see graph).  $Bp-p = K * L * \Delta I$ . Bp-p: (mT), K: (K-factor from table), L: (Inductance in  $\mu$ H),  $\Delta I$  (Peak to peak ripple current in Amps).

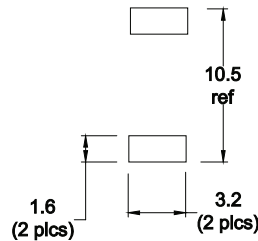
5. Part Number Definition: DR1040-xxx-R

DR1040 = Product code and size  
-xxx= inductance value in  $\mu$ H, R= decimal point,  
If no R is present then last character equals number of zeros  
-R suffix = RoHS compliant

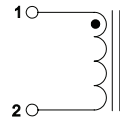
## Dimensions (mm)



## Recommended Pad Layout



## Schematic



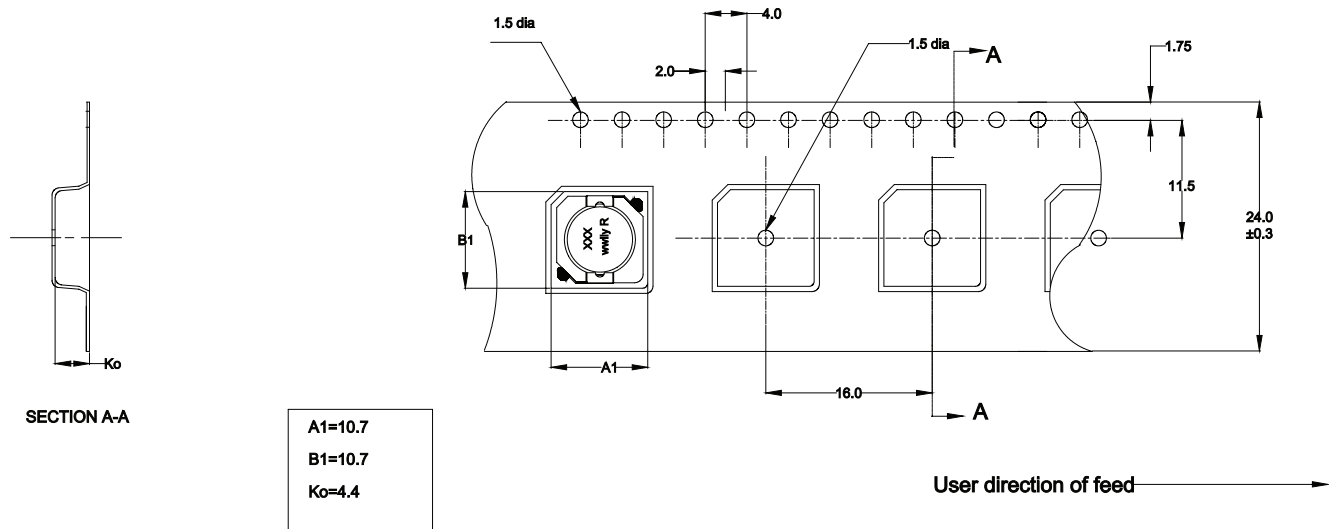
Part marking: inductance value in  $\mu$ H. R = decimal point. If no R is present then last character equals number of zeroes.

wwvly = date code, R = revision level

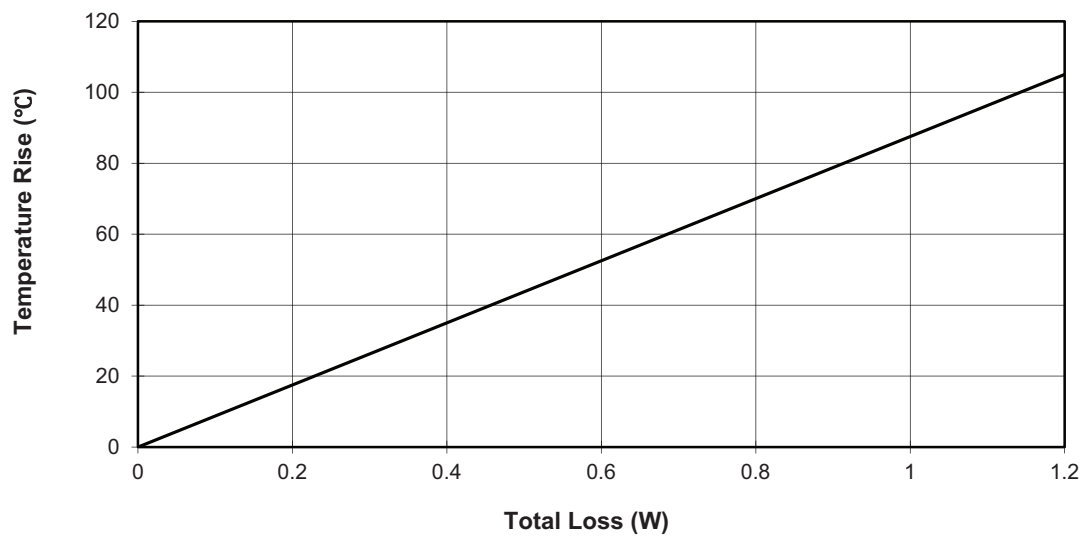
Do not route traces or vias underneath the inductor

### Packaging information (mm)

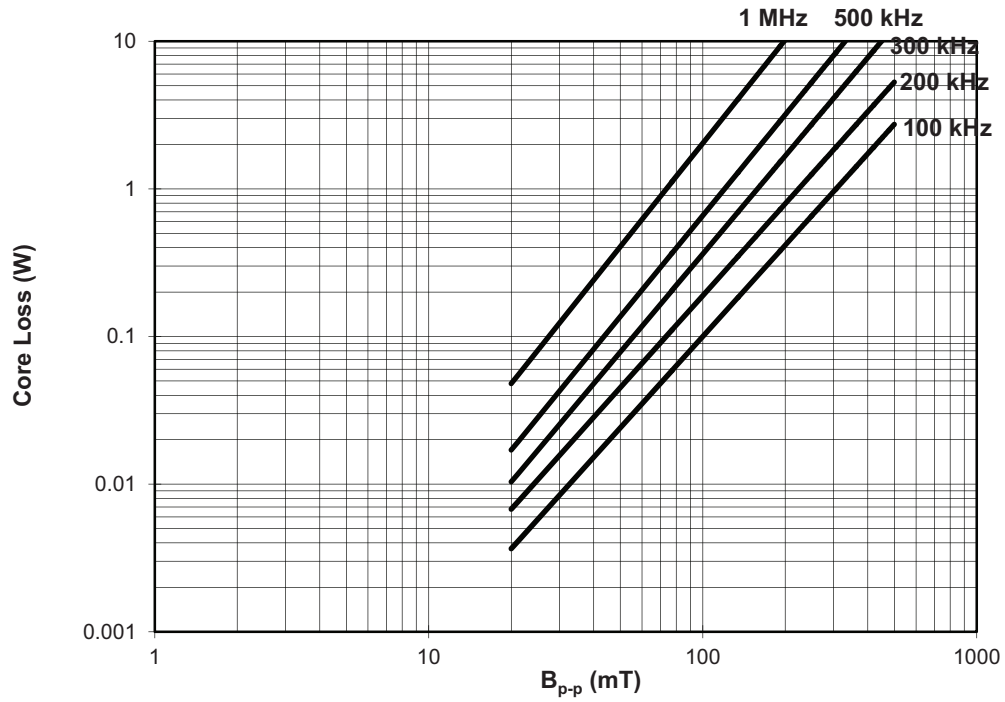
Supplied in tape and reel packaging , 850 parts per 13" diameter reel



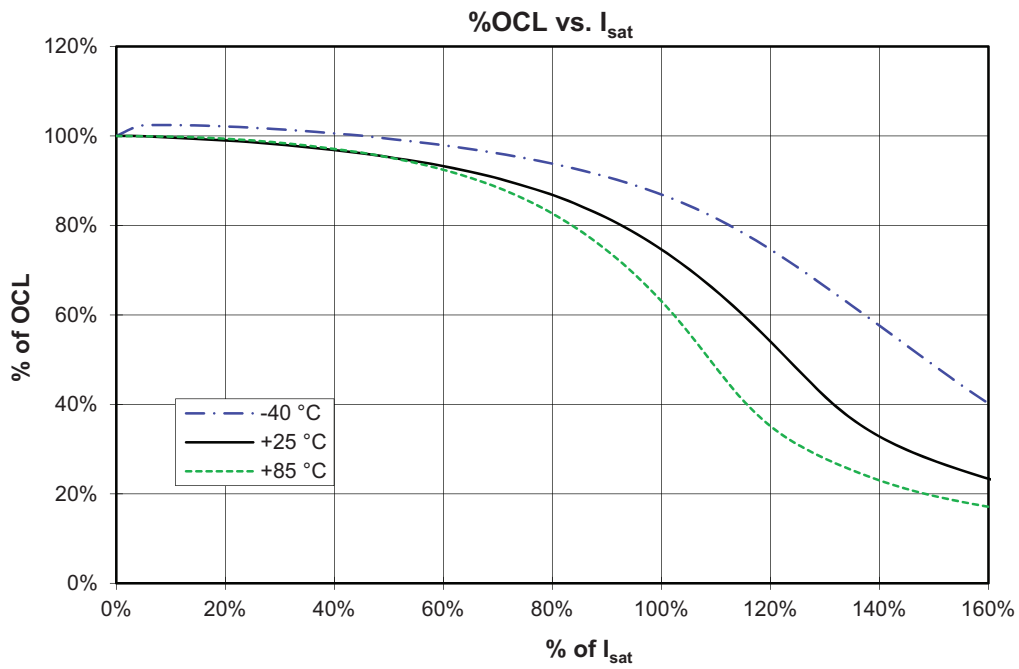
### Temperature rise vs. total loss



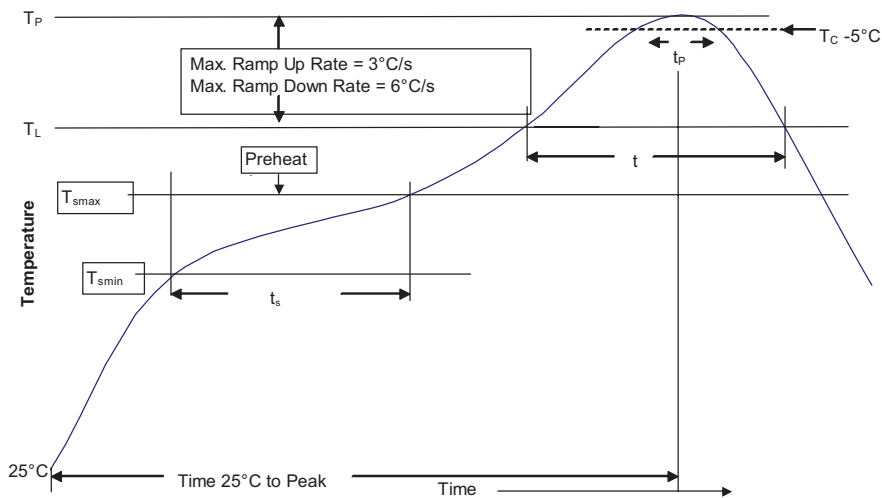
### Core loss vs. $B_{p-p}$



### 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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