

# DR1050

## Shielded power inductors



### Description

- Shielded drum core
- Inductance range from 0.7  $\mu$ H to 1000  $\mu$ H
- Current range from 0.43 A to 13.5 A
- 10.5 mm x 10.3 mm footprint surface mount package in a 5.0 mm height
- Ferrite core material
- Halogen free, lead free, RoHS compliant

### Applications

- LED/LCD backlighting
- High definition televisions (HDTV)
- Server and desktop power supplies
- Graphics cards and battery powered systems
- Point-of-load (POL) modules
- Printers and peripherals
- Portable electronics

### 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

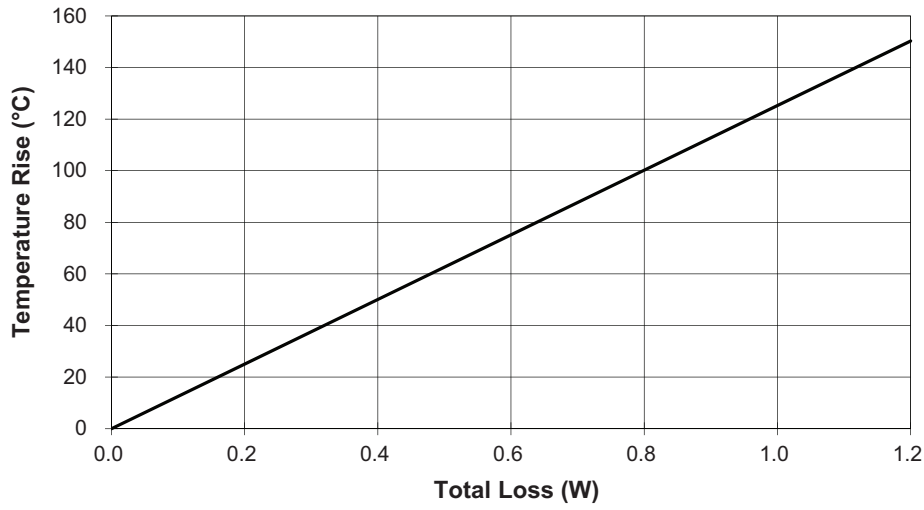
| Part Number <sup>5</sup> | OCL <sup>1</sup><br>( $\mu$ H) $\pm$ 30% | I <sub>rms</sub> <sup>2</sup><br>(A) | I <sub>sat</sub> <sup>3</sup><br>(A) | DCR (m $\Omega$ )<br>typical<br>@ 20°C | DCR (m $\Omega$ )<br>maximum<br>@ 20°C | K-factor <sup>4</sup> |
|--------------------------|--|--------------------------------------|--------------------------------------|--|--|-----------------------|
| DR1050-R80-R             | 0.70                                     | 9.70                                 | 13.5                                 | 3.2                                    | 4.0                                    | 20.47                 |
| DR1050-1R5-R             | 1.37                                     | 8.60                                 | 10.5                                 | 4.0                                    | 5.0                                    | 14.62                 |
| DR1050-2R2-R             | 2.27                                     | 7.52                                 | 9.3                                  | 5.6                                    | 6.8                                    | 11.37                 |
| DR1050-3R3-R             | 3.21                                     | 6.50                                 | 8.2                                  | 8.0                                    | 10                                     | 9.30                  |
| DR1050-4R7-R             | 4.43                                     | 6.13                                 | 6.7                                  | 10                                     | 12                                     | 7.87                  |
| DR1050-6R8-R             | 6.30                                     | 5.45                                 | 5.8                                  | 13                                     | 17                                     | 6.82                  |
| DR1050-8R2-R             | 8.09                                     | 5.24                                 | 5.0                                  | 15                                     | 19                                     | 6.02                  |
| DR1050-100-R             | 10.1                                     | 4.80                                 | 4.6                                  | 18                                     | 23                                     | 5.39                  |
| DR1050-120-R             | 11.6                                     | 3.94                                 | 4.1                                  | 24                                     | 30                                     | 4.87                  |
| DR1050-150-R             | 14.8                                     | 3.80                                 | 3.7                                  | 26                                     | 33                                     | 4.45                  |
| DR1050-180-R             | 17.5                                     | 3.39                                 | 3.3                                  | 33                                     | 41                                     | 4.09                  |
| DR1050-220-R             | 23.5                                     | 3.12                                 | 3.0                                  | 39                                     | 48                                     | 3.53                  |
| DR1050-270-R             | 26.9                                     | 2.82                                 | 2.8                                  | 43                                     | 53                                     | 3.30                  |
| DR1050-330-R             | 34.3                                     | 2.56                                 | 2.5                                  | 58                                     | 72                                     | 2.92                  |
| DR1050-390-R             | 38.3                                     | 2.35                                 | 2.35                                 | 61                                     | 76                                     | 2.77                  |
| DR1050-470-R             | 47.1                                     | 2.06                                 | 2.10                                 | 89                                     | 111                                    | 2.50                  |
| DR1050-560-R             | 56.7                                     | 1.96                                 | 1.94                                 | 98                                     | 123                                    | 2.27                  |
| DR1050-680-R             | 67.2                                     | 1.84                                 | 1.70                                 | 111                                    | 139                                    | 2.09                  |
| DR1050-820-R             | 84.4                                     | 1.60                                 | 1.58                                 | 147                                    | 184                                    | 1.86                  |
| DR1050-101-R             | 97.5                                     | 1.52                                 | 1.45                                 | 164                                    | 205                                    | 1.73                  |
| DR1050-121-R             | 118                                      | 1.30                                 | 1.30                                 | 223                                    | 279                                    | 1.57                  |
| DR1050-151-R             | 149                                      | 1.26                                 | 1.15                                 | 238                                    | 298                                    | 1.40                  |
| DR1050-181-R             | 184                                      | 1.18                                 | 1.08                                 | 273                                    | 341                                    | 1.26                  |
| DR1050-221-R             | 222                                      | 1.00                                 | 0.98                                 | 377                                    | 472                                    | 1.15                  |
| DR1050-271-R             | 264                                      | 0.96                                 | 0.90                                 | 410                                    | 513                                    | 1.06                  |
| DR1050-331-R             | 321                                      | 0.83                                 | 0.80                                 | 554                                    | 693                                    | 0.96                  |
| DR1050-391-R             | 397                                      | 0.76                                 | 0.72                                 | 648                                    | 810                                    | 0.86                  |
| DR1050-471-R             | 481                                      | 0.64                                 | 0.62                                 | 855                                    | 1069                                   | 0.78                  |
| DR1050-561-R             | 573                                      | 0.62                                 | 0.60                                 | 970                                    | 1213                                   | 0.72                  |
| DR1050-681-R             | 708                                      | 0.56                                 | 0.55                                 | 1095                                   | 1369                                   | 0.64                  |
| DR1050-821-R             | 819                                      | 0.54                                 | 0.50                                 | 1185                                   | 1481                                   | 0.60                  |
| DR1050-102-R             | 1000                                     | 0.43                                 | 0.48                                 | 1528                                   | 1950                                   | 0.54                  |

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.1 Vrms, 0.0 Adc, +25 °C  
 2. I<sub>rms</sub>: 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, 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<sub>sat</sub>: Peak current for approximately 35% rolloff @ +25 °C

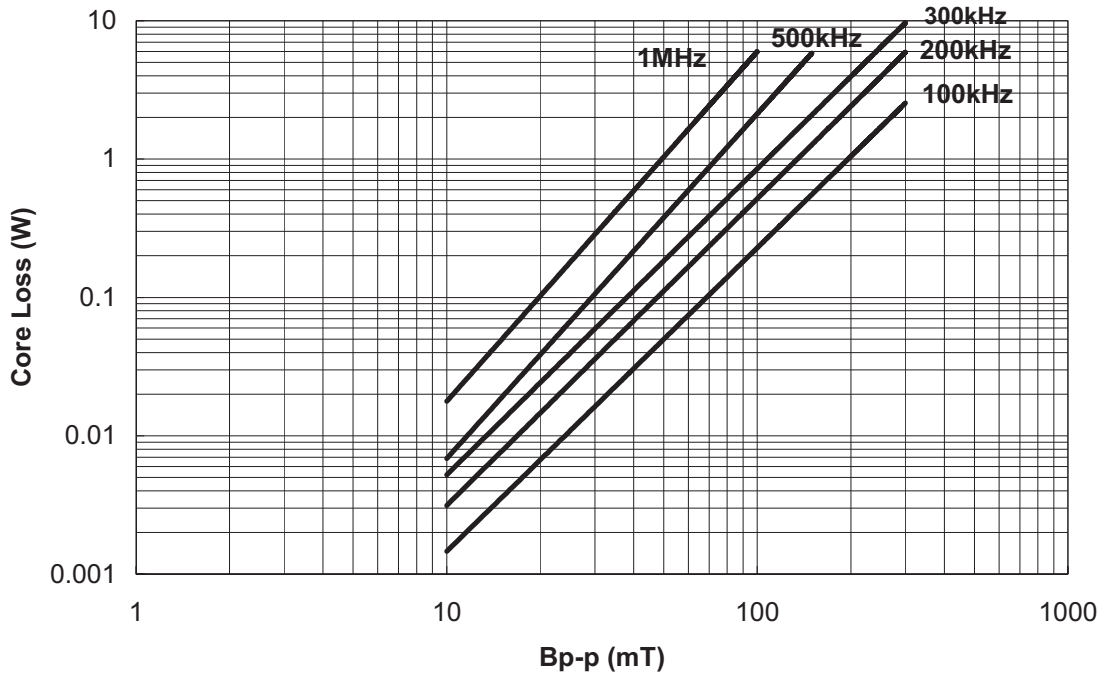
4. K-factor: K-factor: Used to determine Bp-p for core loss (see graph). Bp-p = K \* L \*  $\Delta$ I. Bp-p: (mT), K: (K-factor from table), L: (Inductance in  $\mu$ H),  $\Delta$ I (Peak to peak ripple current in Amps).  
 5. Part Number Definition: DR1050-xxx-R  
 DR1050 = Product code and size  
 -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



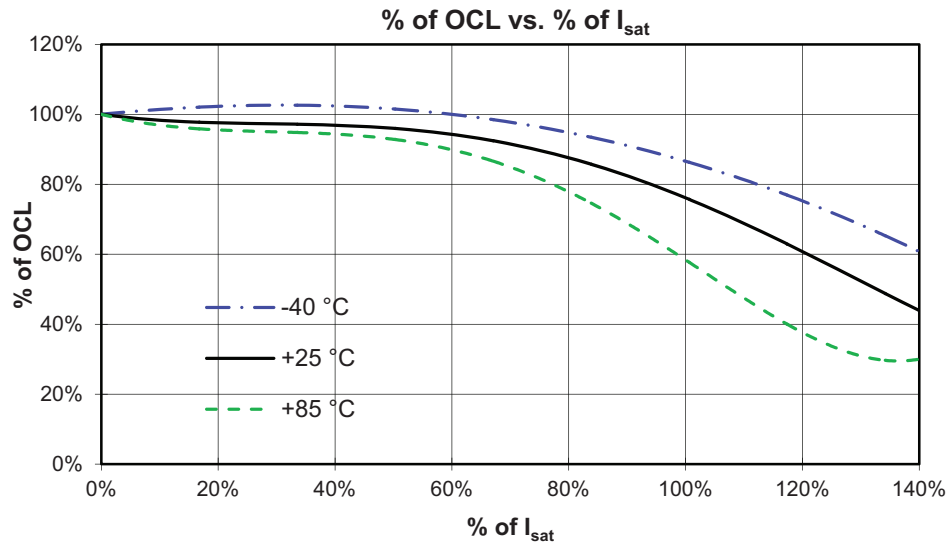
Temperature rise vs. total loss



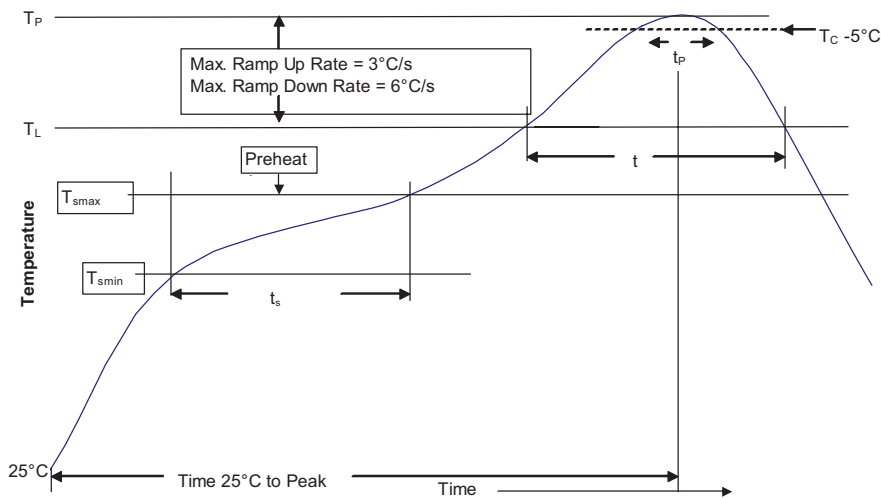
Core loss vs.  $B_{p-p}$



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 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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