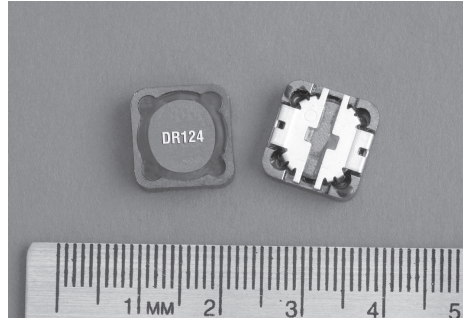


# DR124

High power density, high efficiency, low profile shielded drum core power inductors



## Product features

- Low profile surface mount inductor
- 12.5 mm x 12.5 mm x 4.5 mm shielded drum core
- Inductance range from 0.47  $\mu$ H to 1000  $\mu$ H
- Current range from 0.44 A to 24.4 A
- Frequency range up to 1 MHz
- Ferrite core material

## Applications

- Notebook power
- LCD panels
- Desktop and servers
- DVD players and portable power devices
- DC-DC Converters
- Buck, boost, forward, and resonant converters
- Noise filtering and filter chokes

## 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**

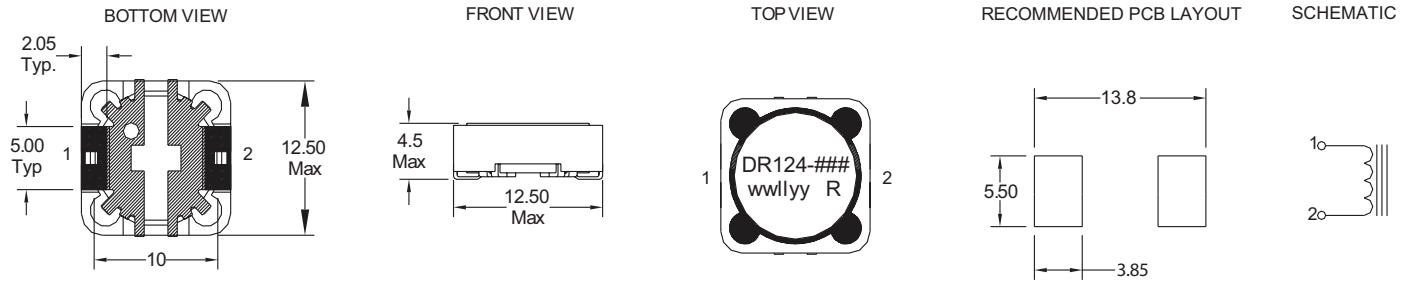
| Part Number | Rated Inductance (μH) | OCL <sup>1</sup> μH±20% | I <sub>rms</sub> <sup>2</sup> (A) | I <sub>sat</sub> <sup>3</sup> (A) | DCR mΩ @20°C Typ | DCR mΩ @ +20°C Max | K-factor <sup>4</sup> |
|-------------|-----------------------|-------------------------|-----------------------------------|-----------------------------------|------------------|--------------------|-----------------------|
| DR124-R47-R | 0.47                  | 0.42                    | 16.0                              | 24.40                             | 2.2              | 2.7                | 17.51                 |
| DR124-1R0-R | 1.0                   | 0.83                    | 13.9                              | 18.00                             | 3.00             | 3.6                | 12.50                 |
| DR124-1R5-R | 1.5                   | 1.37                    | 11.1                              | 14.00                             | 4.75             | 5.7                | 9.73                  |
| DR124-2R2-R | 2.2                   | 2.04                    | 9.1                               | 11.45                             | 5.92             | 7.1                | 7.96                  |
| DR124-3R9-R | 3.9                   | 3.80                    | 7.0                               | 8.40                              | 12.50            | 15.0               | 5.84                  |
| DR124-4R7-R | 4.7                   | 4.88                    | 6.5                               | 7.65                              | 13.50            | 16.2               | 5.15                  |
| DR124-6R8-R | 6.8                   | 6.10                    | 5.6                               | 6.47                              | 18.06            | 21.7               | 4.61                  |
| DR124-8R2-R | 8.2                   | 7.45                    | 5.2                               | 6.22                              | 21.67            | 26.0               | 4.17                  |
| DR124-100-R | 10                    | 8.94                    | 4.5                               | 5.80                              | 23.33            | 28.0               | 3.81                  |
| DR124-120-R | 12                    | 11.5                    | 4.1                               | 4.96                              | 31.67            | 38.0               | 3.50                  |
| DR124-150-R | 15                    | 14.2                    | 3.6                               | 4.62                              | 37.30            | 44.8               | 3.02                  |
| DR124-180-R | 18                    | 16.2                    | 3.4                               | 4.32                              | 46.97            | 56.4               | 2.82                  |
| DR124-220-R | 22                    | 20.7                    | 3.2                               | 3.83                              | 53.99            | 64.8               | 2.50                  |
| DR124-270-R | 27                    | 25.7                    | 2.8                               | 3.44                              | 66.67            | 80.0               | 2.24                  |
| DR124-330-R | 33                    | 31.2                    | 2.6                               | 3.12                              | 80.83            | 97.0               | 2.04                  |
| DR124-390-R | 39                    | 37.3                    | 2.3                               | 2.85                              | 110.00           | 132.0              | 1.86                  |
| DR124-470-R | 47                    | 44.0                    | 2.2                               | 2.63                              | 124.66           | 149.6              | 1.72                  |
| DR124-560-R | 56                    | 54.9                    | 2.0                               | 2.35                              | 144.32           | 173.2              | 1.54                  |
| DR124-680-R | 68                    | 67.1                    | 1.8                               | 2.13                              | 183.33           | 220.0              | 1.39                  |
| DR124-820-R | 82                    | 80.5                    | 1.7                               | 1.94                              | 212.72           | 255.3              | 1.27                  |
| DR124-101-R | 100                   | 95.1                    | 1.5                               | 1.79                              | 256.67           | 308.0              | 1.17                  |
| DR124-121-R | 120                   | 111                     | 1.3                               | 1.65                              | 311.18           | 373.4              | 1.08                  |
| DR124-151-R | 150                   | 146                     | 1.3                               | 1.44                              | 371.02           | 445.2              | 0.94                  |
| DR124-181-R | 180                   | 179                     | 1.1                               | 1.30                              | 501.66           | 602.0              | 0.87                  |
| DR124-221-R | 220                   | 216                     | 1.0                               | 1.15                              | 558.00           | 669.6              | 0.77                  |
| DR124-271-R | 270                   | 256                     | 0.88                              | 1.09                              | 725.00           | 870.0              | 0.71                  |
| DR124-331-R | 330                   | 327                     | 0.83                              | 0.92                              | 825.00           | 990.0              | 0.63                  |
| DR124-471-R | 470                   | 460                     | 0.68                              | 0.74                              | 1242.50          | 1491.0             | 0.53                  |
| DR124-681-R | 680                   | 669                     | 0.56                              | 0.65                              | 1845.83          | 2215.0             | 0.45                  |
| DR124-821-R | 820                   | 825                     | 0.53                              | 0.62                              | 2109.17          | 2351.0             | 0.40                  |
| DR124-102-R | 1000                  | 998                     | 0.44                              | 0.53                              | 2898.00          | 3477.00            | 0.37                  |

1. Open Circuit Inductance Test Parameters: 100 kHz, 0.25 V, 0.0 Adc.
2. I<sub>rms</sub><sup>2</sup>: DC current for an approximate ΔT 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><sup>3</sup>: Amps peak for approximately 25% rolloff (@ +25 °C).

4. K-factor: Used to determine B<sub>pp</sub> for core loss (see graph).  
B<sub>pp</sub> = K\*L\*ΔI, B<sub>pp</sub> (mT), K: (K factor from table), L: (Inductance in μH), ΔI (Peak to peak ripple current in Amps).
5. Part Number Definition: DR124-xxx-R  
- DR124 = Product code and size; -xxx = Inductance value in uH;  
- R = decimal point; If no R is present, third character = # of zeros.  
- "-R" suffix = RoHS compliant

**DR124**  
 High power density, high efficiency, low profile shielded drum  
 core power inductors

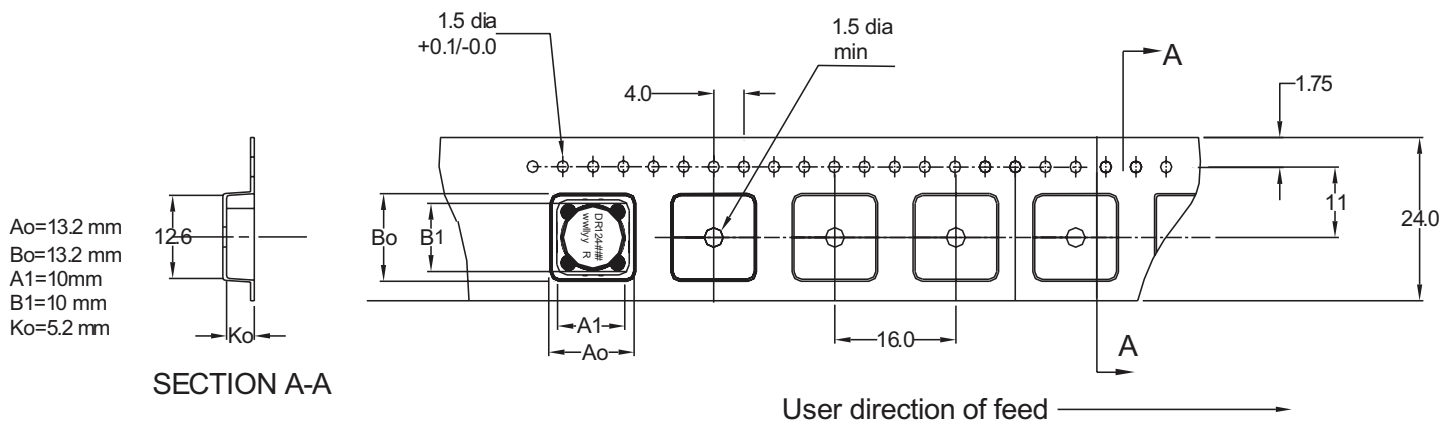
**Dimensions- mm**



Dimensions are in millimeters.  
 Do not route traces or vias underneath the inductor.

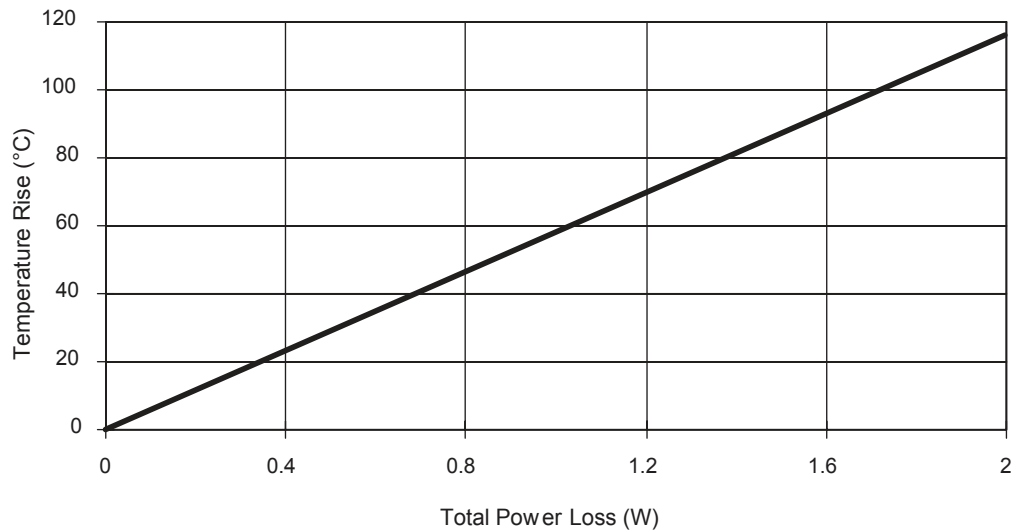
wwllly = Date code, R = Revision level.

**Packaging- mm**

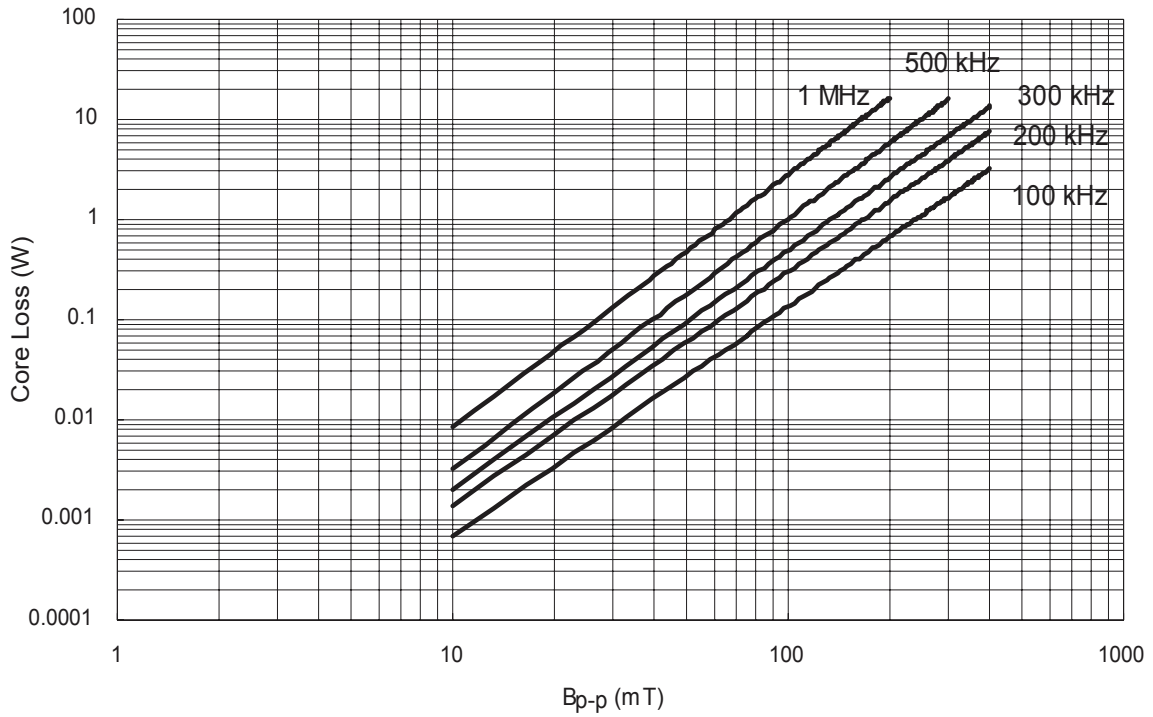


Parts packaged on 13" Diameter reel, 750 parts per reel.

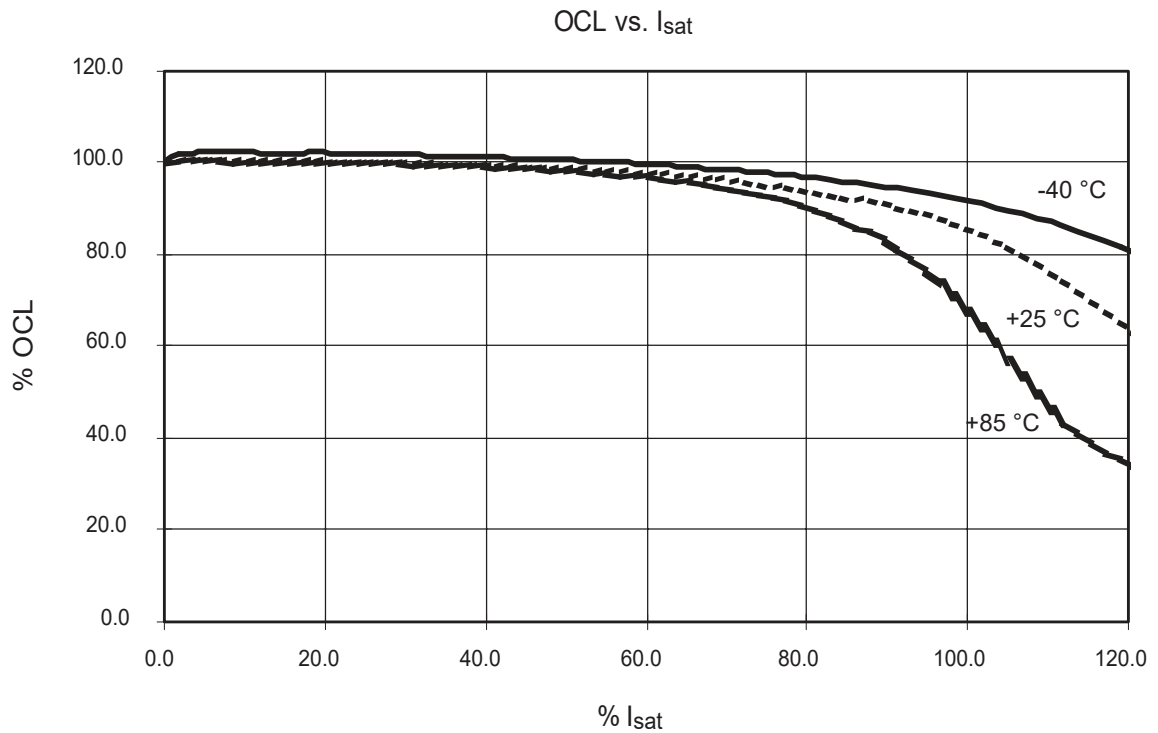
**Temperature rise vs. total loss**



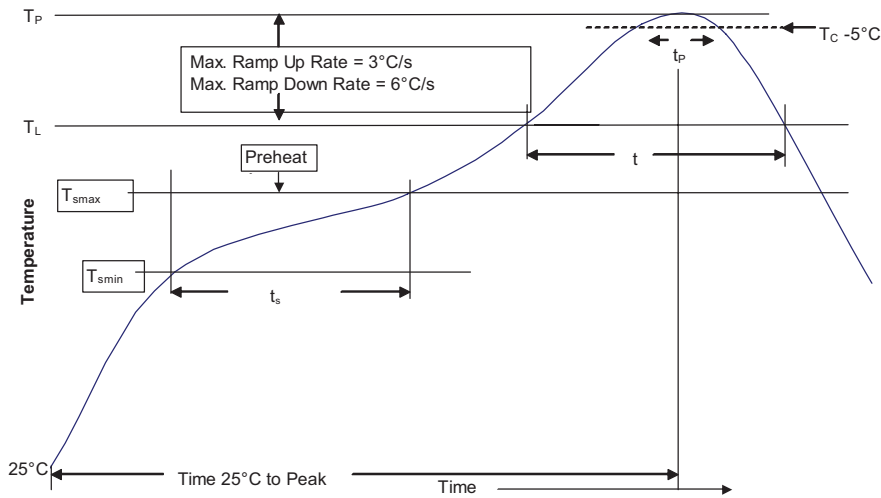
**Core loss vs. Bp-p**



**Inductance characteristics**



**Solder reflow profile**



**Table 1 - Standard SnPb Solder (T<sub>C</sub>)**

| 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<sub>C</sub>)**

| 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-020**

| Profile Feature  | Standard SnPb Solder | Lead (Pb) Free Solder |
|--|----------------------|-----------------------|
| Preheat and Soak   |                      |                       |
| • Temperature min. (T <sub>smin</sub> )  | 100°C                | 150°C                 |
| • Temperature max. (T <sub>smax</sub> )  | 150°C                | 200°C                 |
| • Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )                                 | 60-120 Seconds       | 60-120 Seconds        |
| Average ramp up rate T <sub>smax</sub> to T <sub>P</sub>   | 3°C/ Second Max.     | 3°C/ Second Max.      |
| Liquidous temperature (T <sub>L</sub> )  | 183°C                | 217°C                 |
| Time at liquidous (t <sub>L</sub> )  | 60-150 Seconds       | 60-150 Seconds        |
| Peak package body temperature (T <sub>P</sub> )*   | Table 1              | Table 2               |
| Time (t <sub>P</sub> )** within 5 °C of the specified classification temperature (T <sub>C</sub> ) | 20 Seconds**         | 30 Seconds**          |
| Average ramp-down rate (T <sub>P</sub> to T <sub>smax</sub> )                                      | 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<sub>P</sub>) is defined as a supplier minimum and a user maximum.

\*\* Tolerance for time at peak profile temperature (t<sub>P</sub>) is defined as a supplier minimum and a user maximum.

Life Support Policy: Eaton does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

Eaton reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Eaton also reserves the right to change or update, without notice, any technical information contained in this bulletin.

**Eaton**  
**Electronics Division**  
 1000 Eaton Boulevard  
 Cleveland, OH 44122  
 United States  
[www.eaton.com/electronics](http://www.eaton.com/electronics)

© 2019 Eaton  
 All Rights Reserved  
 Printed in USA  
 Publication No. 4141 BU-SB14114  
 March 2019

Eaton is a registered trademark.

All other trademarks are property of their respective owners.

