

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 μ H to 1000 μ 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 ¹ μH±20% | I _{rms} ² (A) | I _{sat} ³ (A) | DCR mΩ @20°C Typ | DCR mΩ @ +20°C Max | K-factor ⁴ |
|-------------|-----------------------|-------------------------|-----------------------------------|-----------------------------------|------------------|--------------------|-----------------------|
| 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_{rms}²: 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_{sat}³: Amps peak for approximately 25% rolloff (@ +25 °C).

4. K-factor: Used to determine B_{pp} for core loss (see graph).
B_{pp} = K*L*ΔI, B_{pp} (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

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 core power inductors

Dimensions- mm



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

wwlly = 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_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 JEDEC 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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