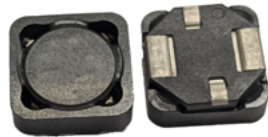


# DRAP124

## Automotive grade high power density, shielded drum core power inductors



### Product features

- AEC-Q200 qualified
- Secure four terminal mounting ideal for severe vibration environments up to 30 g.
- Rugged construction for high shock conditions
- Magnetically shielded-reduces EMI
- Inductance range from 0.42  $\mu$ H to 1001  $\mu$ H
- Current range from 0.38 A to 30.8 A
- 12.5 mm x 12.5 mm x 4.6 mm surface mount package
- Ferrite core material
- Weight: 2.32 grams typical
- Moisture Sensitivity Level: 1

### Applications

- Body electronics
  - LED lighting (interior and exterior)
  - Central body control module
  - Vehicle access control module
  - Headlamps, tail lamps and interior lighting
  - Heating ventilation and air conditioning controllers (HVAC)
  - Doors, window lift and seat control
- Advanced driver assistance systems
  - Adaptive cruise control (ACC)
  - Automatic parking control
  - Collision avoidance system/ Car black box system
- Infotainment and cluster electronics
  - Audio subsystem: head unit and trunk amp
  - Digital instrument cluster
  - In-vehicle infotainment (IVI) and navigation
- Chassis and safety electronics
  - Electronic stability control system (ESC)
  - Electric parking brake
  - Electronic power steering (EPS) / Anti-locking braking system (ABS)
- Engine and powertrain systems
  - Electric pumps, motor control and auxiliaries
  - Powertrain control module (PCU)/ Engine control unit (ECU)
  - Transmission control unit (TCU)

### Environmental compliance and general specifications

- Storage temperature range (Component): -40 °C to +165 °C
- Operating temperature range: -40 °C to +165 °C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020 (latest revision) compliant



Powering Business Worldwide

Product specifications

Part number <sup>6</sup>	OCL <sup>1</sup> (μH) ±20%	I <sub>rms</sub> <sup>2</sup> (A)	I <sub>sat</sub> 1 <sup>3</sup> (A)	I <sub>sat</sub> 2 <sup>4</sup> (A)	DCR (Ω) typical @ +25 °C	DCR (Ω) maximum @ +25 °C	K Factor <sup>5</sup>
DRAP124-R47-R	0.42	13.5	30.8	24.6	0.0024	0.0028	196.9
DRAP124-1R0-R	0.82	11.65	22.0	17.6	0.0031	0.0038	140.7
DRAP124-1R5-R	1.36	9.36	17.1	13.7	0.0049	0.0058	109.4
DRAP124-2R2-R	2.04	7.64	14.0	11.2	0.0070	0.0090	89.5
DRAP124-3R3-R	2.79	6.94	11.9	9.48	0.0090	0.011	75.7
DRAP124-4R7-R	4.74	5.47	9.06	7.25	0.014	0.017	57.9
DRAP124-6R8-R	7.28	4.46	7.33	5.87	0.021	0.026	46.9
DRAP124-8R2-R	8.88	3.87	6.70	5.36	0.028	0.034	42.8
DRAP124-100-R	10.4	3.67	6.16	4.93	0.031	0.038	39.4
DRAP124-150-R	14.1	3.10	5.31	4.25	0.044	0.053	34.0
DRAP124-220-R	23.0	2.44	4.16	3.33	0.071	0.086	26.6
DRAP124-330-R	34.1	1.98	3.42	2.74	0.108	0.130	21.9
DRAP124-470-R	46.3	1.78	2.91	2.33	0.134	0.160	18.6
DRAP124-680-R	69.8	1.45	2.37	1.90	0.201	0.241	15.1
DRAP124-820-R	80.6	1.29	2.23	1.79	0.257	0.309	14.3
DRAP124-101-R	98.8	1.20	2.00	1.60	0.296	0.355	12.8
DRAP124-151-R	152	0.967	1.62	1.30	0.454	0.550	10.4
DRAP124-221-R	209	0.865	1.36	1.09	0.568	0.680	8.7
DRAP124-331-R	326	0.690	1.09	0.874	0.892	1.070	7.0
DRAP124-471-R	473	0.568	0.911	0.729	1.32	1.58	5.8
DRAP124-681-R	682	0.466	0.759	0.607	1.96	2.35	4.9
DRAP124-821-R	826	0.406	0.697	0.557	2.57	3.09	4.5
DRAP124-102-R	1001	0.380	0.629	0.503	2.94	3.52	4.0

1. Open circuit inductance (OCL) test parameters: 100 kHz, 0.25 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 +165 °C under worst case operating conditions verified in the end application.

3. I<sub>sat</sub>1: Peak current for approximately 30% rolloff @ +25 °C

4. I<sub>sat</sub>2: Peak current for approximately 40% rolloff @ +125 °C

5. K-factor: Used to determine Bp-p for core loss (see graph). Bp-p = K \* L \* ΔI. Bp-p:(Gauss), K: (K-factor from table), L: (Inductance in μH), ΔI (Peak-to-peak ripple current in Amps).

6. Part Number Definition: DRAP124-xxx-R

DRAP124= Product code and size

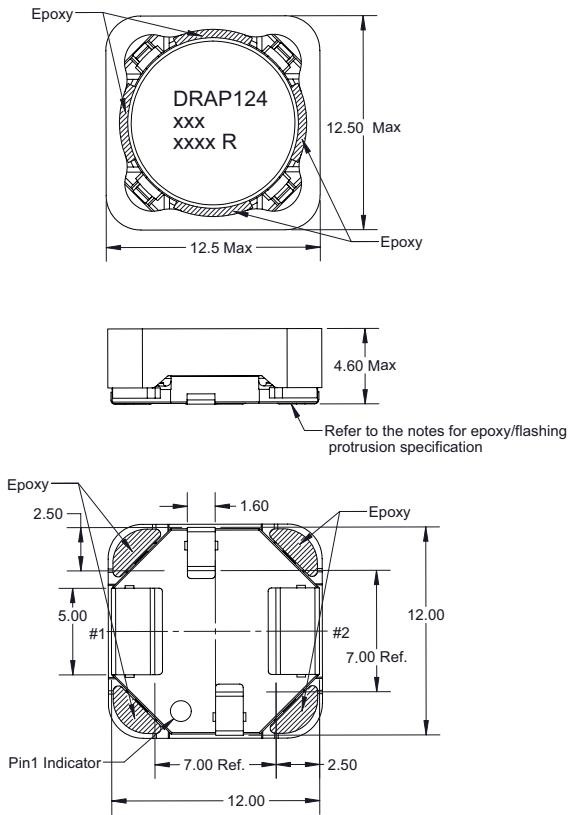
xxx= Inductance value in μH, R= decimal point, If no R is present last character equals number of zeros

-R suffix = RoHS compliant

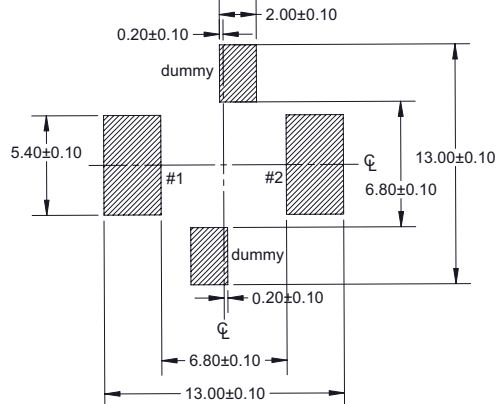
**DRAP124**  
Automotive grade high power density,  
shielded drum core power inductors

Technical Data 11040  
Effective March 2020

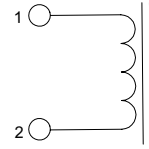
**Dimensions (mm)**



**Recommended pad layout**



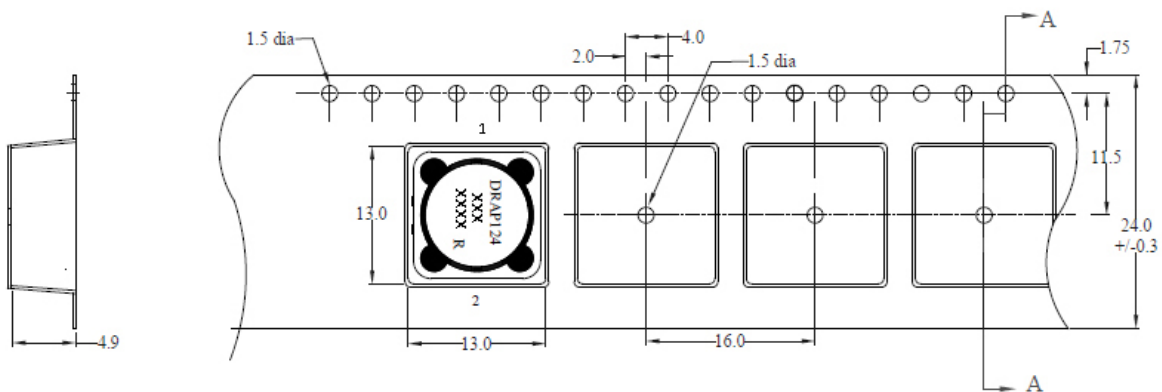
**Schematic**



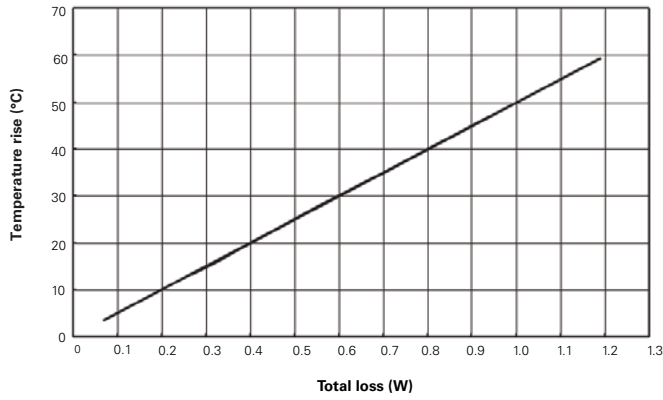
Part marking: DRAP124, xxx= inductance value in uH, R= decimal point, if no R is present last character equals number of zeros, xxxx=lot code, R= Revision level  
All soldering surface to be coplanar within 0.1 millimeters  
Tolerances are  $\pm 0.2$  millimeters unless stated otherwise  
Special Characteristic epoxy protrusion or any flashing from the plastic on the header/base can be below the terminal surface and must not exceed 0.08 mm beyond the bottom surface of the terminal.  
Terminal pads shall protrude the plastic base 0.00~0.08 mm  
Traces or vias underneath the inductor is not recommended

**Packaging information (mm)**

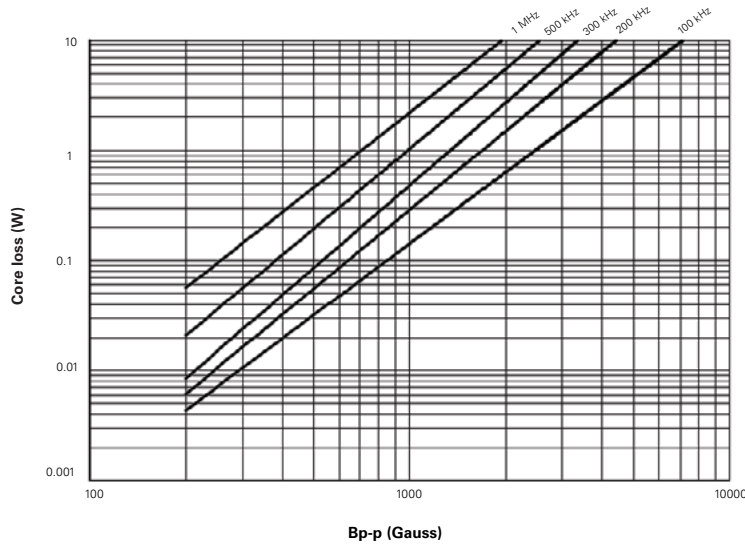
Supplied in tape and reel packaging , 750 parts per 13" diameter reel



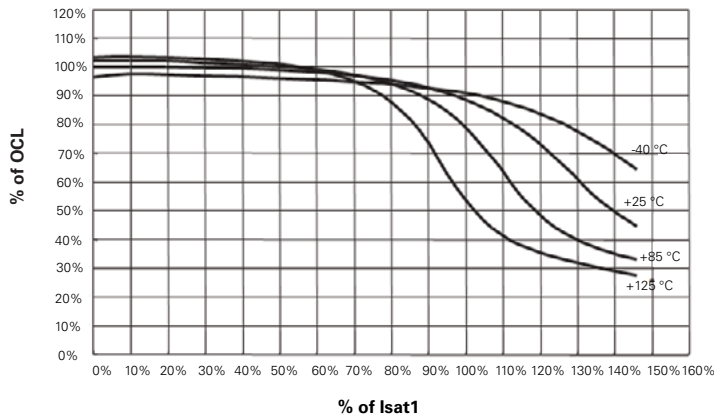
**Temperature rise vs. total loss**



**Core loss vs. Bp-p**



**Inductance characteristics**



**Solder reflow profile**



**Table 1 - Standard SnPb solder ( $T_C$ )**

Package thickness	Volume $\text{mm}^3$ <350	Volume $\text{mm}^3$ $\geq$ 350
<2.5 mm	235 °C	220 °C
$\geq$ 2.5 mm	220 °C	220 °C

**Table 2 - Lead (Pb) free solder ( $T_C$ )**

Package thickness	Volume $\text{mm}^3$ <350	Volume $\text{mm}^3$ 350 - 2000	Volume $\text{mm}^3$ >2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 – 2.5 mm	260 °C	250 °C	245 °C
>2.5 mm	250 °C	245 °C	245 °C

**Reference J-STD-020**

Profile feature	Standard SnPb solder	Lead (Pb) free solder
Preheat and soak	<ul style="list-style-type: none"> <li>Temperature min. (<math>T_{smin}</math>)</li> <li>Temperature max. (<math>T_{smax}</math>)</li> <li>Time (<math>T_{smin}</math> to <math>T_{smax}</math>) (<math>t_s</math>)</li> </ul>	<ul style="list-style-type: none"> <li>100 °C</li> <li>150 °C</li> <li>60-120 seconds</li> </ul>
Ramp up rate $T_L$ to $T_p$	3 °C/ second max.	3 °C/ second max.
Liquidous temperature ( $T_L$ ) Time ( $t_L$ ) maintained above $T_L$	183 °C 60-150 seconds	217 °C 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*
Ramp-down rate ( $T_p$ to $T_L$ )	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.

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