

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 μ H to 1001 μ 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 ⁶	OCL ¹ (μH) ±20%	I _{rms} ² (A)	I _{sat} 1 ³ (A)	I _{sat} 2 ⁴ (A)	DCR (Ω) typical @ +25 °C	DCR (Ω) maximum @ +25 °C	K Factor ⁵
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_{rms}: 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_{sat}1: Peak current for approximately 30% rolloff @ +25 °C

4. I_{sat}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

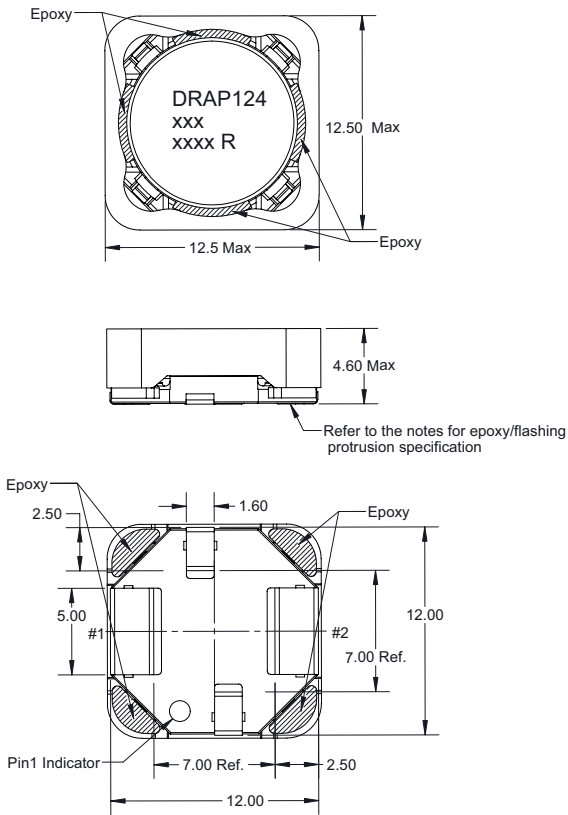
xxx= Inductance value in μH, R= decimal point, If no R is present last character equals number of zeros

-R suffix = RoHS compliant

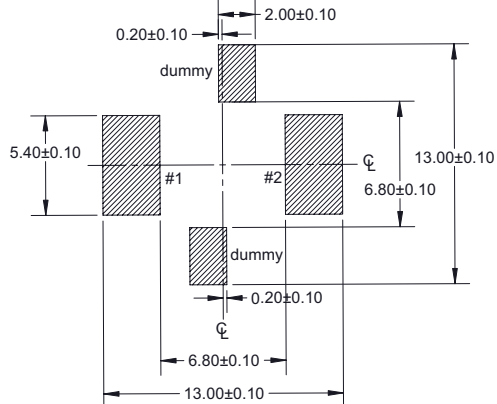
DRAP124
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Technical Data 11040
Effective March 2020

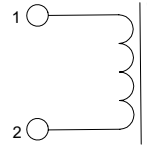
Dimensions (mm)



Recommended pad layout



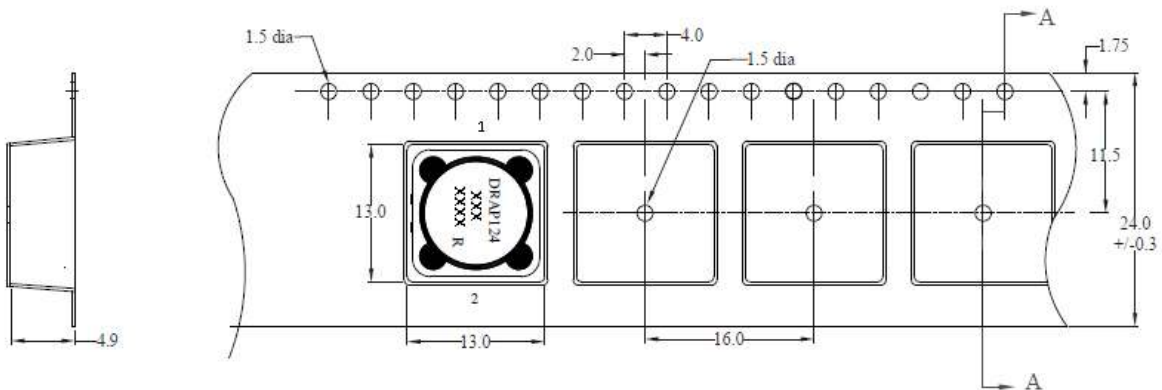
Schematic



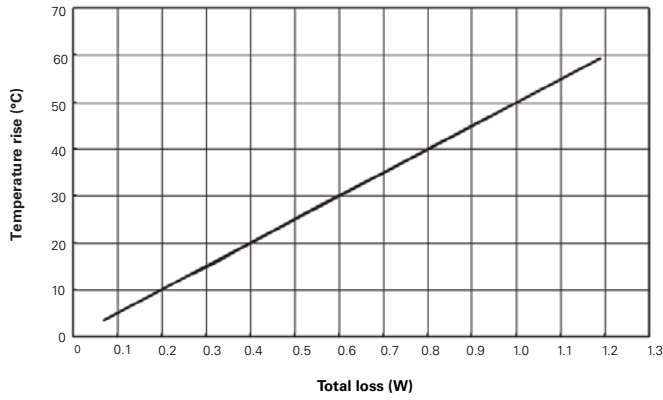
Part marking: DRAP124, xxx= inductance value in uH, R= decimal point, if no R is present last character equals number of zeros, xxxx=lot code, R= Revision level
All soldering surface to be coplanar within 0.1 millimeters
Tolerances are ± 0.2 millimeters unless stated otherwise
Special Characteristic 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)

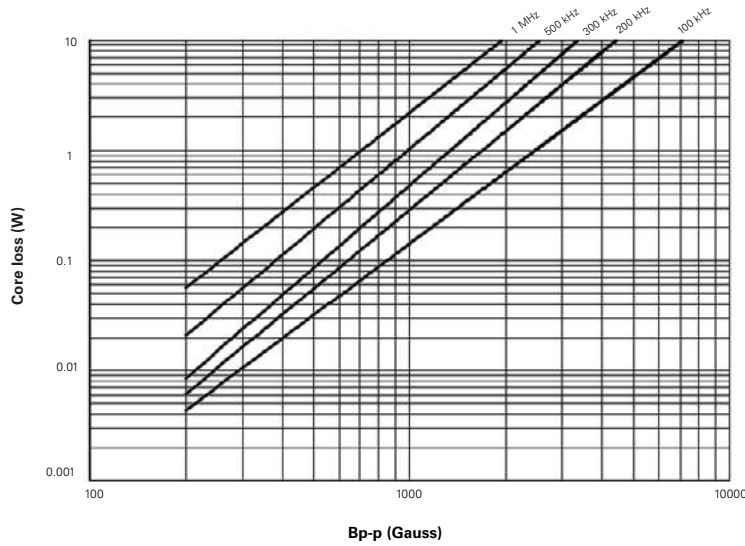
Supplied in tape and reel packaging , 750 parts per 13" diameter reel



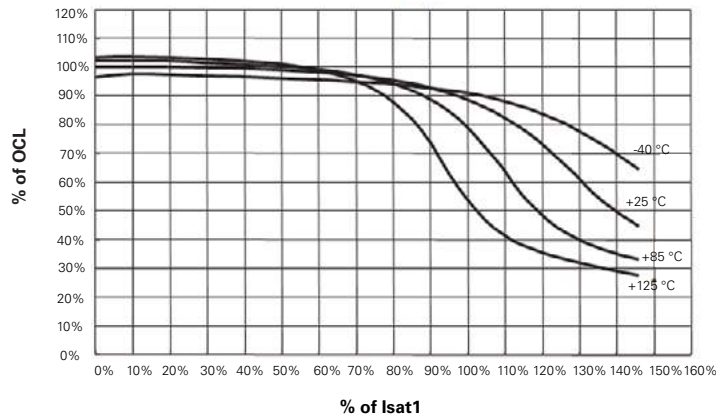
Temperature rise vs. total loss



Core loss vs. Bp-p



Inductance characteristics



Solder reflow profile

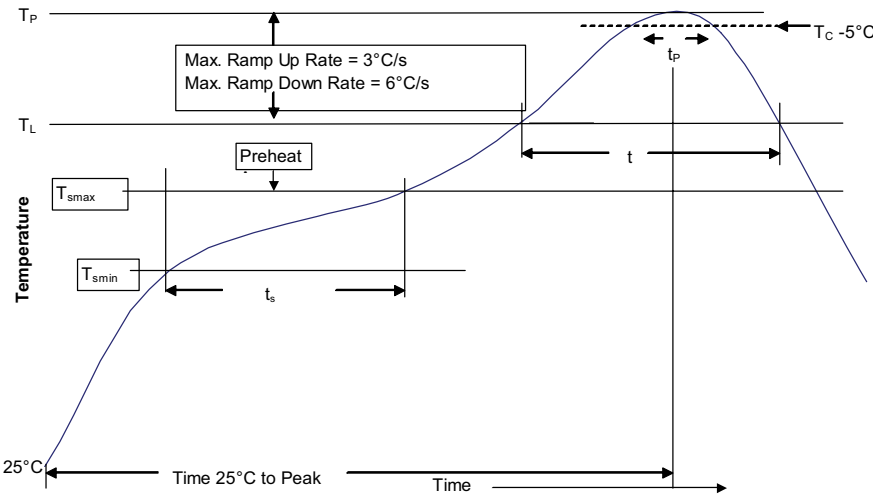


Table 1 - Standard SnPb solder (T_C)

Package thickness	Volume mm^3 <350	Volume 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 mm^3 <350	Volume mm^3 350 - 2000	Volume 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"> Temperature min. (T_{smin}) Temperature max. (T_{smax}) Time (T_{smin} to T_{smax}) (t_s) 	<ul style="list-style-type: none"> 100 °C 150 °C 60-120 seconds
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	<ul style="list-style-type: none"> 183 °C 60-150 seconds 	<ul style="list-style-type: none"> 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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