DRAP127

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 0.41 µH to 999 µH
- Current range from 0.6 A to 56 A
- 12.5 mm x 12.5 mm x 8.1 mm surface mount package
- Ferrite core material
- Weight: 4.46 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

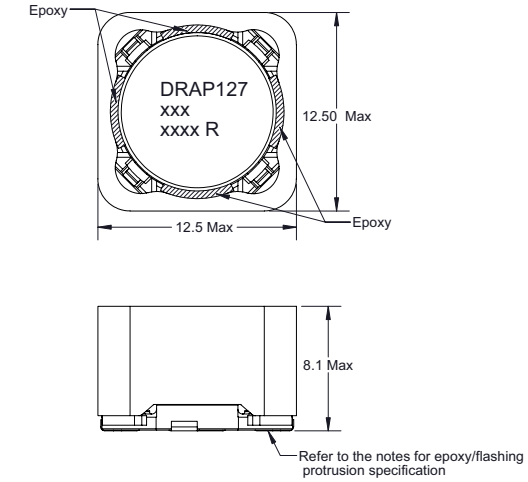
Powering Business Worldwide

Product specifications

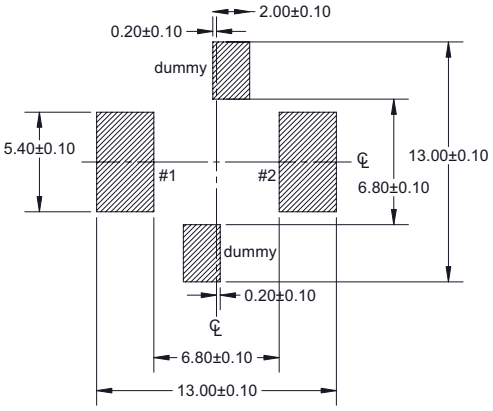
Part number[6]	OCL[1] (µH) ±20%	I_{rms}[2] (A)	$I_{sat}1$[3] (A)	$I_{sat}2$[4] (A)	DCR (Ω) typical @ +25 °C	DCR (Ω) maximum @ +25 °C	K Factor[5]
DRAP127-R47-R	0.41	15.9	56	44.8	0.0024	0.0030	120
DRAP127-1R0-R	0.77	13.6	40	32	0.0034	0.0040	85.7
DRAP127-1R5-R	1.27	12.2	31	24.9	0.0043	0.0051	66.7
DRAP127-2R2-R	1.92	12.5	25.5	20.4	0.0040	0.0048	54.6
DRAP127-3R3-R	3.51	8.54	18.7	14.9	0.0086	0.0104	40
DRAP127-4R7-R	4.58	8.14	16.5	13.2	0.0094	0.011	35.3
DRAP127-6R8-R	6.72	6.52	13.3	10.7	0.015	0.018	28.6
DRAP127-8R2-R	8.33	6.33	12.2	9.74	0.016	0.019	26.1
DRAP127-100-R	9.63	6.02	11.2	8.96	0.017	0.021	24.0
DRAP127-150-R	14.90	4.83	9.03	7.23	0.027	0.032	19.4
DRAP127-220-R	21.5	3.98	7.57	6.05	0.040	0.047	16.2
DRAP127-330-R	32.0	3.22	6.22	4.98	0.060	0.072	13.3
DRAP127-470-R	47.9	2.62	5.09	4.07	0.091	0.110	10.9
DRAP127-680-R	68.2	2.33	4.18	3.34	0.115	0.138	9.0
DRAP127-820-R	83.9	2.01	3.84	3.07	0.155	0.186	8.2
DRAP127-101-R	101	1.89	3.46	2.77	0.175	0.210	7.4
DRAP127-151-R	151	1.52	2.83	2.26	0.269	0.320	6.1
DRAP127-221-R	220	1.25	2.35	1.88	0.398	0.480	5.0
DRAP127-331-R	328	1.01	1.93	1.54	0.612	0.730	4.1
DRAP127-471-R	475	0.827	1.62	1.29	0.910	1.10	3.5
DRAP127-681-R	677	0.736	1.33	1.06	1.15	1.39	2.8
DRAP127-821-R	825	0.637	1.22	0.978	1.54	1.85	2.6
DRAP127-102-R	999	0.598	1.10	0.878	1.75	2.10	2.4

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: DRAP127-xxx-R
   DRAP127= 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

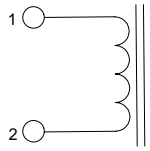
Dimensions (mm)

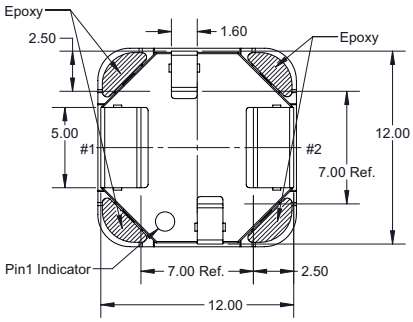


Recommended pad layout



Schematic

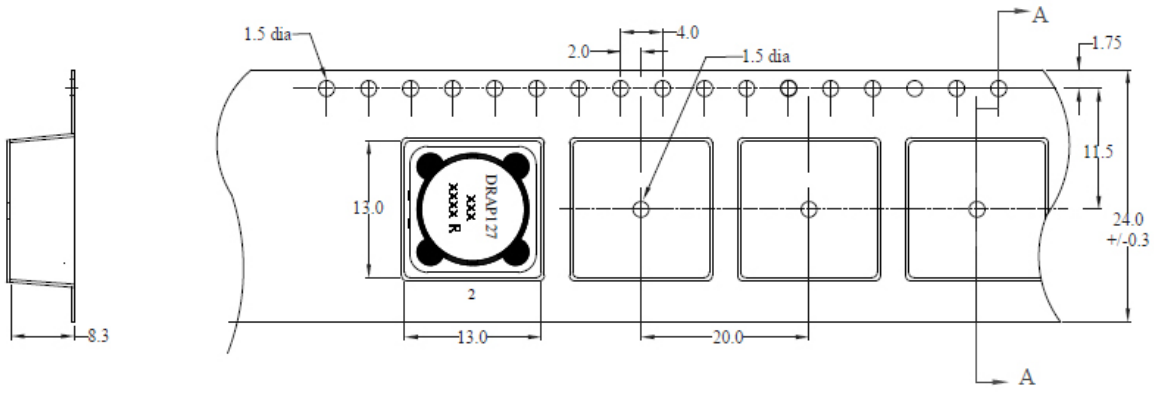




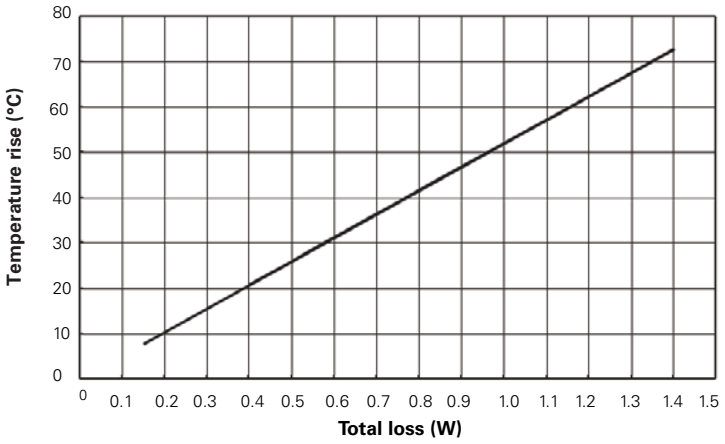
Part marking: DRAP127, xxx= inductance value in uH, R= decimal point,
if no R is present last character equals number of zeros
xxxx=lot code, R= Revision level
All soldering surface to be coplanar within 0.1 millimeters
Tolerances are ±0.2 millimeters unless stated otherwise
Special Characteristic epoxy 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)

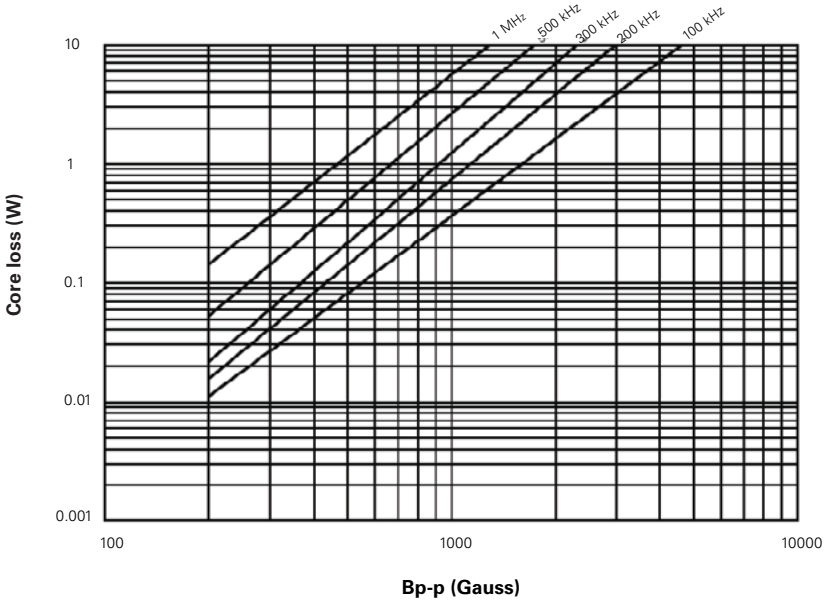
Supplied in tape and reel packaging , 350 parts per 13" diameter reel



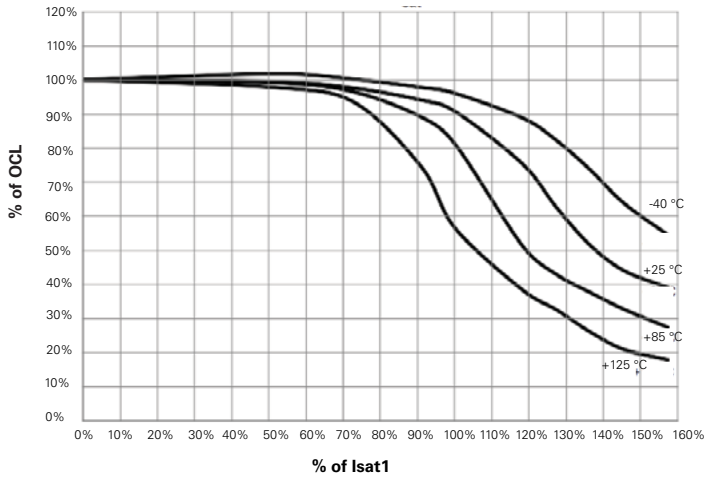
Temperature rise vs. total loss



Core loss vs. Bp-p



Inductance characteristics



Solder reflow profile

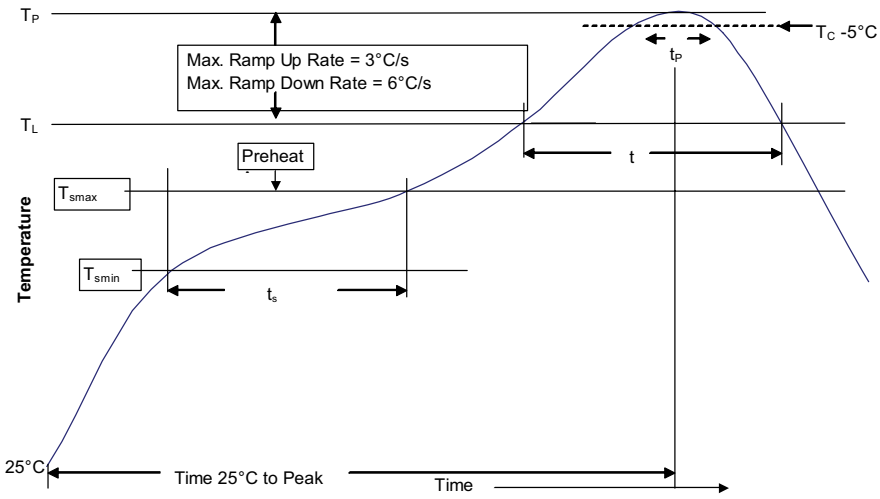


Table 1 - Standard SnPb solder (T_C)

Package thickness	Volume mm3 <350	Volume mm3 ≥350
<2.5 mm	235 °C	220 °C
≥2.5 mm	220 °C	220 °C

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

Package thickness	Volume mm³ <350	Volume mm³ 350 - 2000	Volume mm³ >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	• 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
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 (Tp)*		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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