

DRAQ127

Automotive grade Dual winding, high power density shielded drum core power inductors



Product features

- AEC-Q200 qualified
- Dual winding inductors that can be used as a single inductor, SEPIC, Flyback, or other coupled inductor/transformer applications (1:1 turns ratio)
- Windings can be connected in series or parallel, offering a wide range of inductance and current ratings
- 200 Vac isolation between windings
- 12.5 mm x 12.5 mm x 8.0 mm surface mount package
- Mechanical secure mounting for high shock and vibration environments
- Ferrite core material
- Moisture Sensitivity Level (MSL): 1

Applications

- Body electronics
 - 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)
 - 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)
- Engine and powertrain systems
 - Diesel/gasoline engine management
 - Powertrain Control Module (PCM)/ Engine Control Unit (ECU)
 - Transmission Control Unit (TCU)

Environmental Data

- 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



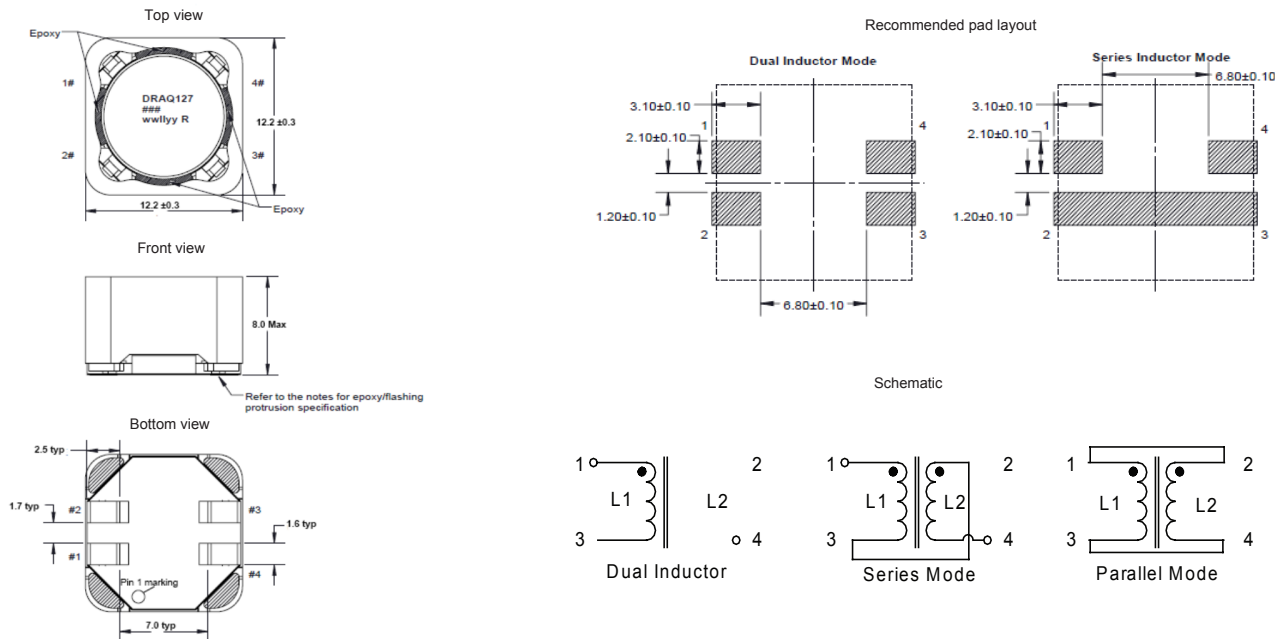
Dual winding, high power density shielded drum core power inductors

Product specifications

| Part Number ⁶ | Parallel Ratings | | | | | | | Series Ratings | | | | | | |
|--------------------------|----------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|-------------------------------|-------------------------------|-----------------------|----------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|-------------------------------|-------------------------------|-----------------------|
| | OCL ¹ ±25% (μH) | I _{rms} ² (A) | I _{sat} ¹³ (A) | I _{sat} ²⁴ (A) | DCR (Ω) @ +20 °C (Typ.) | DCR (Ω) @ +20 °C (Max.) | K-Factor ⁵ | OCL ¹ ±25% (μH) | I _{rms} ² (A) | I _{sat} ¹³ (A) | I _{sat} ²⁴ (A) | DCR (Ω) @ +20 °C (Typ.) | DCR (Ω) @ +20 °C (Max.) | K-Factor ⁵ |
| DRAQ127-100-R | 9.63 | 6.02 | 11.2 | 8.96 | 0.018 | 0.022 | 24.0 | 38.5 | 3.01 | 5.60 | 4.48 | 0.072 | 0.089 | 12.0 |
| DRAQ127-150-R | 14.9 | 4.83 | 9.03 | 7.23 | 0.027 | 0.032 | 19.4 | 59.6 | 2.41 | 4.52 | 3.61 | 0.108 | 0.128 | 9.70 |
| DRAQ127-220-R | 22.0 | 3.98 | 7.57 | 6.05 | 0.040 | 0.047 | 16.2 | 88.0 | 1.99 | 3.79 | 3.03 | 0.162 | 0.192 | 8.10 |
| DRAQ127-330-R | 32.0 | 3.22 | 6.22 | 4.98 | 0.060 | 0.072 | 13.3 | 128.0 | 1.61 | 3.11 | 2.49 | 0.240 | 0.288 | 6.65 |
| DRAQ127-470-R | 47.9 | 2.62 | 5.09 | 4.07 | 0.091 | 0.110 | 10.9 | 192.0 | 1.31 | 2.54 | 2.03 | 0.364 | 0.440 | 5.45 |

- Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V_{rms}, 0.0 Adc
- 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.
- I_{sat}1: Peak current for approximately 30% rolloff at +25 °C.
- I_{sat}2: Peak current for approximately 40% rolloff at +125 °C.
- K-factor: Used to determine B_{p-p} for core loss (see graph). B_{p-p} = K * L * ΔI. B_{p-p}:(Gauss), K: (K-factor from table), L: (Inductance in μH), ΔI (Peak-to-peak ripple current in Amps).
- Part Number Definition: DRAQxxx-xxx-R
- DRAQxxx = Product code and size
- xxx= Inductance value in uH, R = decimal point, If no R is present then 3rd digit equals number of zeros.
- "-R" suffix = RoHS compliant

Dimensions - mm



Part Marking: DRAQ127, ### = inductance value in μH, R = decimal point; if no R is present, then 3rd digit equals number of zeros wwlly = Date code, R = revision level

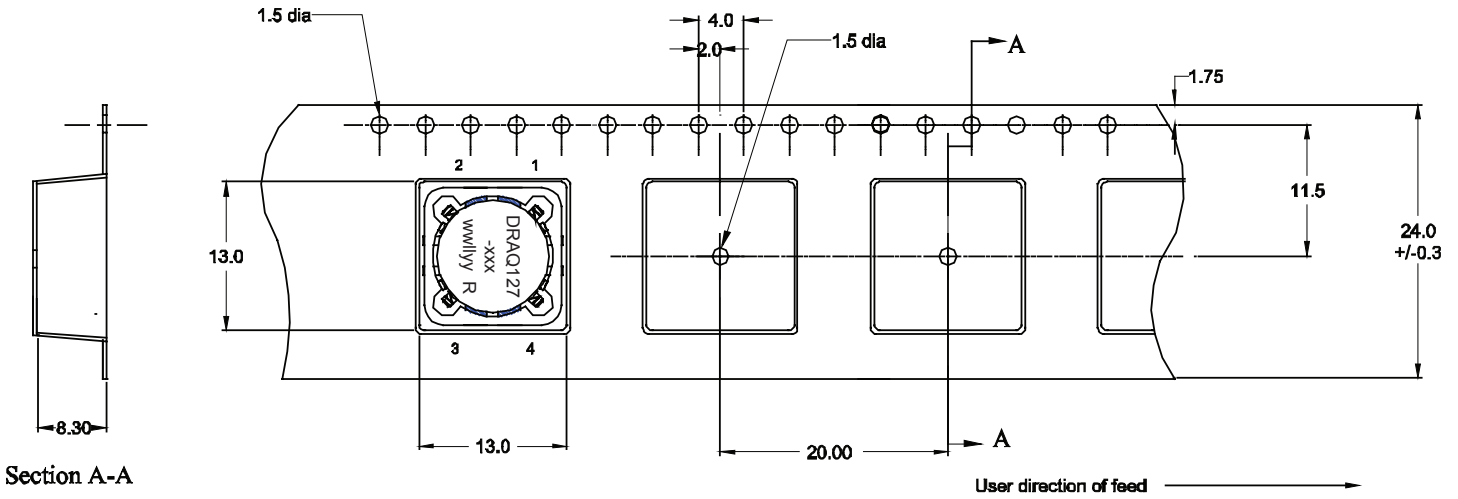
All soldering surfaces to be coplanar within 0.10 millimeters

Tolerances are ± 0.2 millimeters unless stated otherwise.

Do not route traces or vias underneath the inductor

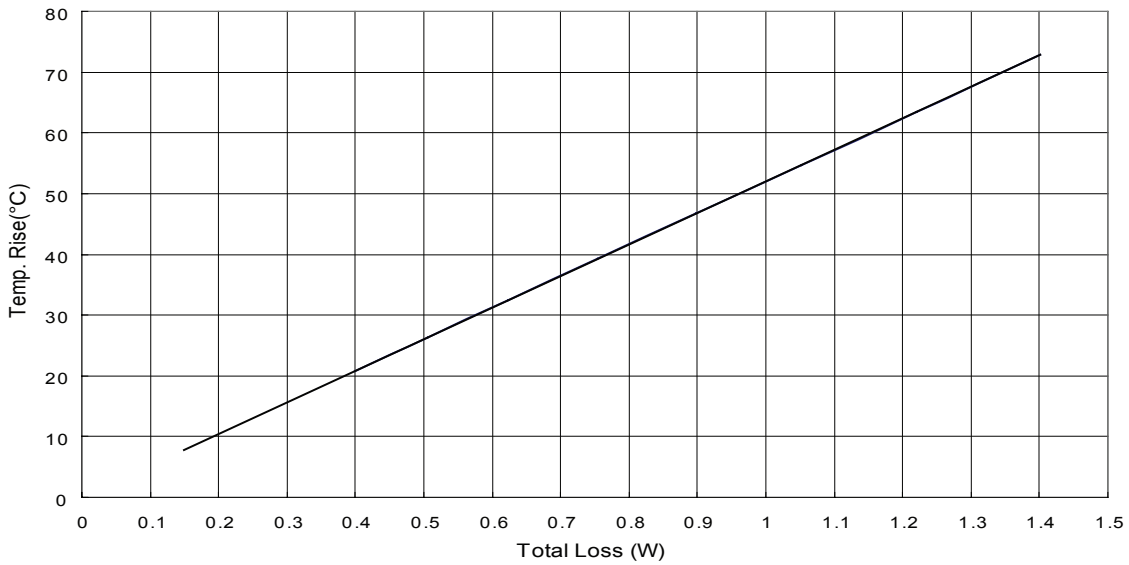
*Special Characteristic epoxy protrusion or any flashing from the plastic on the header/base can be below the terminal surface and must not exceed 0.08 mm beyond the bottom surface of the terminal.

Packaging information - mm



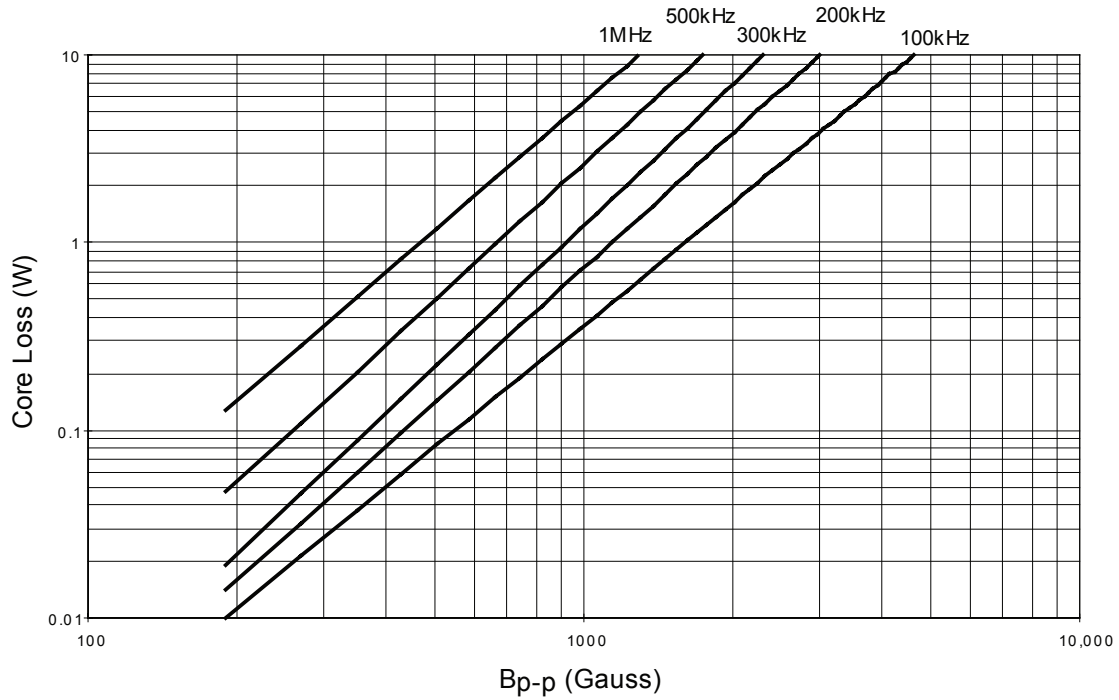
Supplied in tape and reel packaging, 350 parts per 13" diameter reel.

Temperature rise vs. total loss

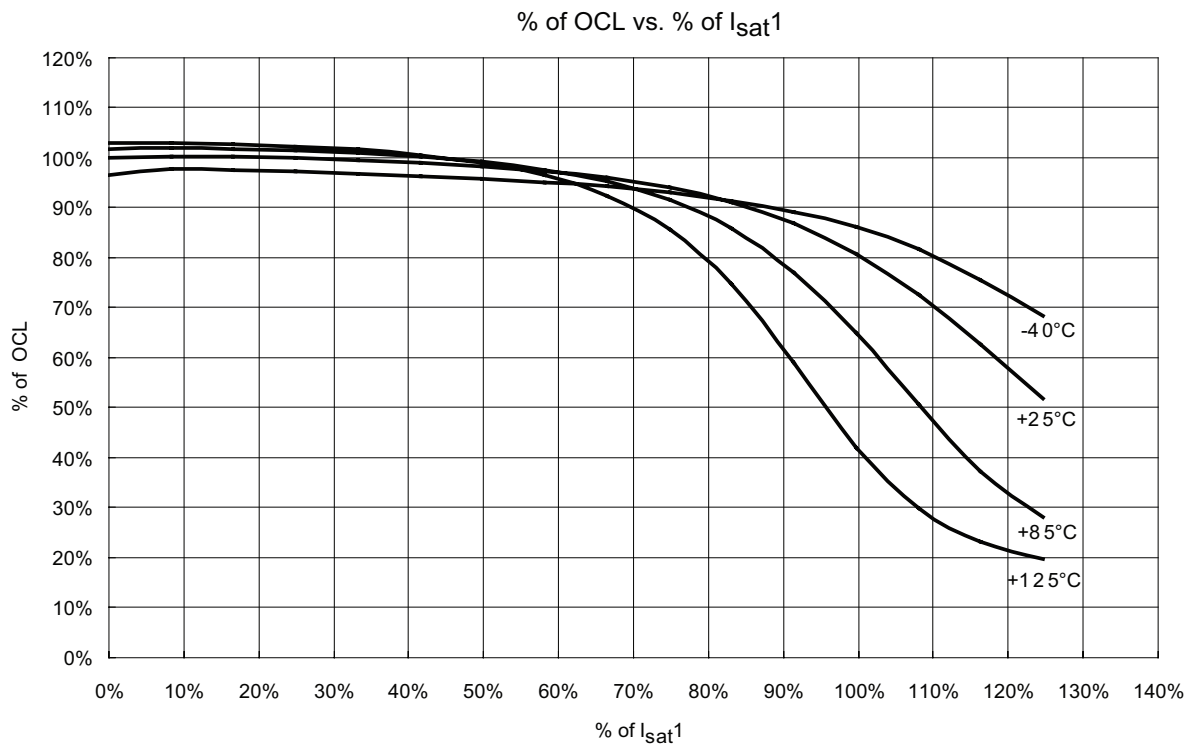


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Core loss vs. Bp-p



Inductance characteristics



Solder reflow profile

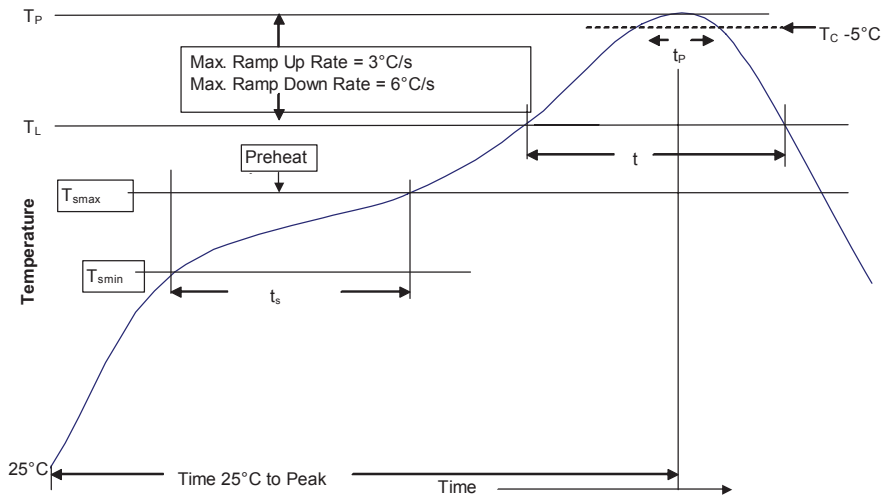


Table 1 - Standard SnPb Solder (T_C)

| 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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Eaton
Electronics Division
1000 Eaton Boulevard
Cleveland, OH 44122
United States
www.eaton.com/electronics

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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А