

# 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



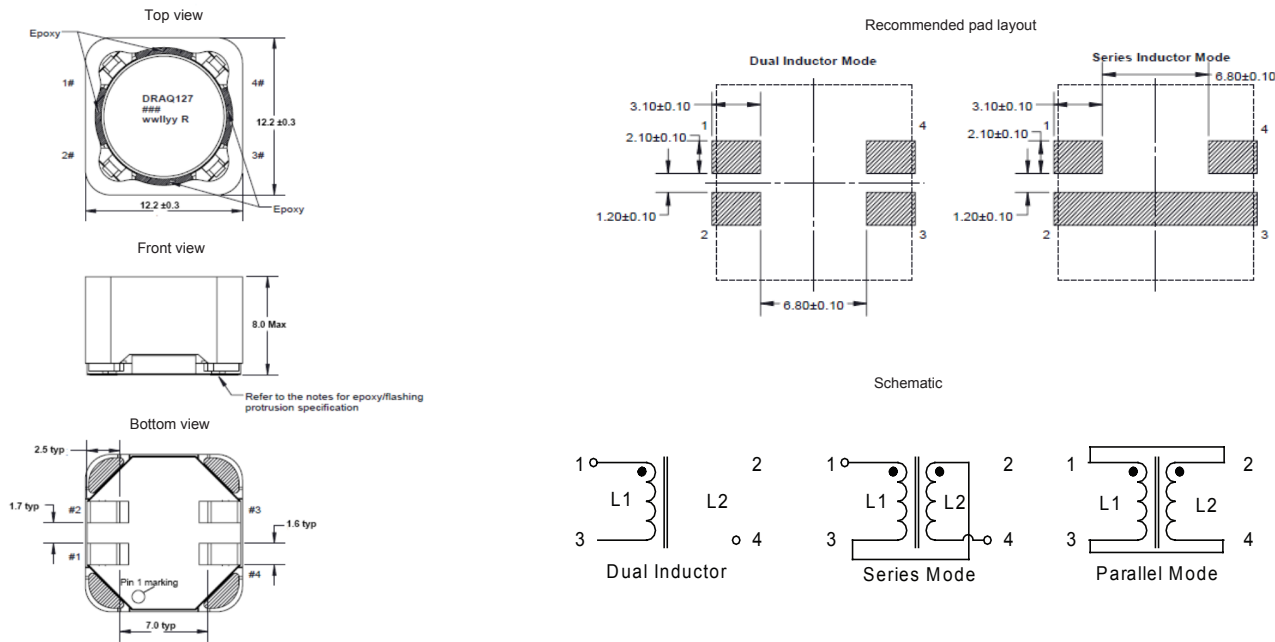
Dual winding, high power density shielded drum core power inductors

Product specifications

| Part Number <sup>6</sup> | Parallel Ratings                 |                                      |                                       |                                       |                               |                               |                       | Series Ratings                   |                                      |                                       |                                       |                               |                               |                       |
|--------------------------|----------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|-------------------------------|-------------------------------|-----------------------|----------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|-------------------------------|-------------------------------|-----------------------|
|                          | OCL <sup>1</sup><br>±25%<br>(μH) | I <sub>rms</sub> <sup>2</sup><br>(A) | I <sub>sat</sub> <sup>13</sup><br>(A) | I <sub>sat</sub> <sup>24</sup><br>(A) | DCR (Ω)<br>@ +20 °C<br>(Typ.) | DCR (Ω)<br>@ +20 °C<br>(Max.) | K-Factor <sup>5</sup> | OCL <sup>1</sup><br>±25%<br>(μH) | I <sub>rms</sub> <sup>2</sup><br>(A) | I <sub>sat</sub> <sup>13</sup><br>(A) | I <sub>sat</sub> <sup>24</sup><br>(A) | DCR (Ω)<br>@ +20 °C<br>(Typ.) | DCR (Ω)<br>@ +20 °C<br>(Max.) | K-Factor <sup>5</sup> |
| 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                  |

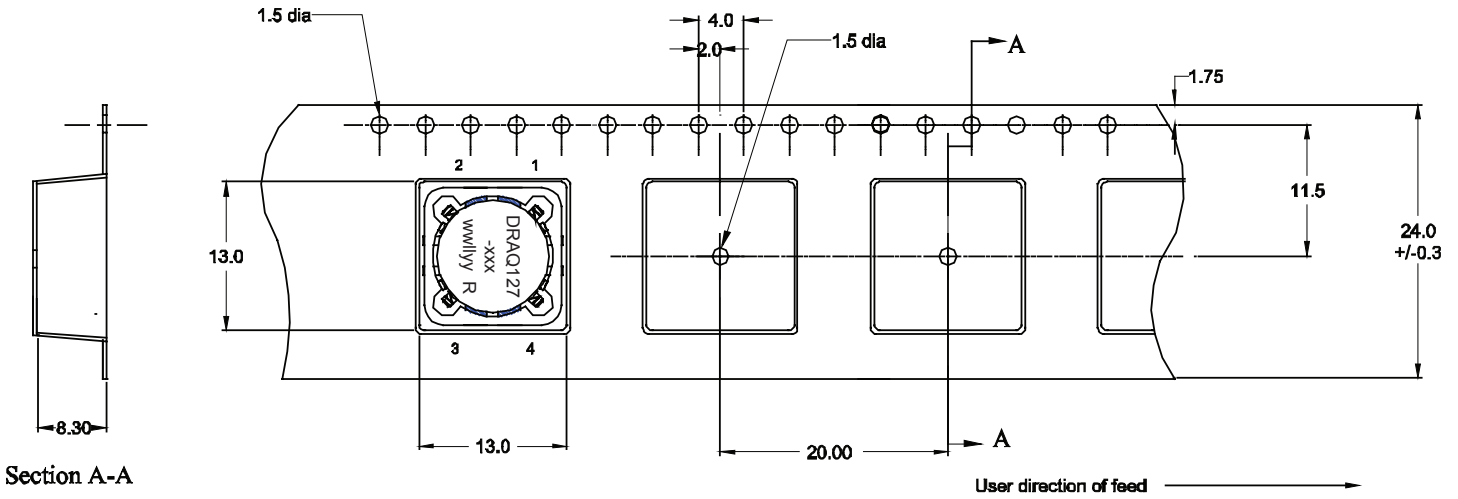
- Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V<sub>rms</sub>, 0.0 Adc
- I<sub>rms</sub>: DC current for an approximate temperature rise of 40 °C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow and proximity of other heat generating 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.
- I<sub>sat</sub>1: Peak current for approximately 30% rolloff at +25 °C.
- I<sub>sat</sub>2: Peak current for approximately 40% rolloff at +125 °C.
- K-factor: Used to determine B<sub>p-p</sub> for core loss (see graph). B<sub>p-p</sub> = K \* L \* ΔI. B<sub>p-p</sub>:(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



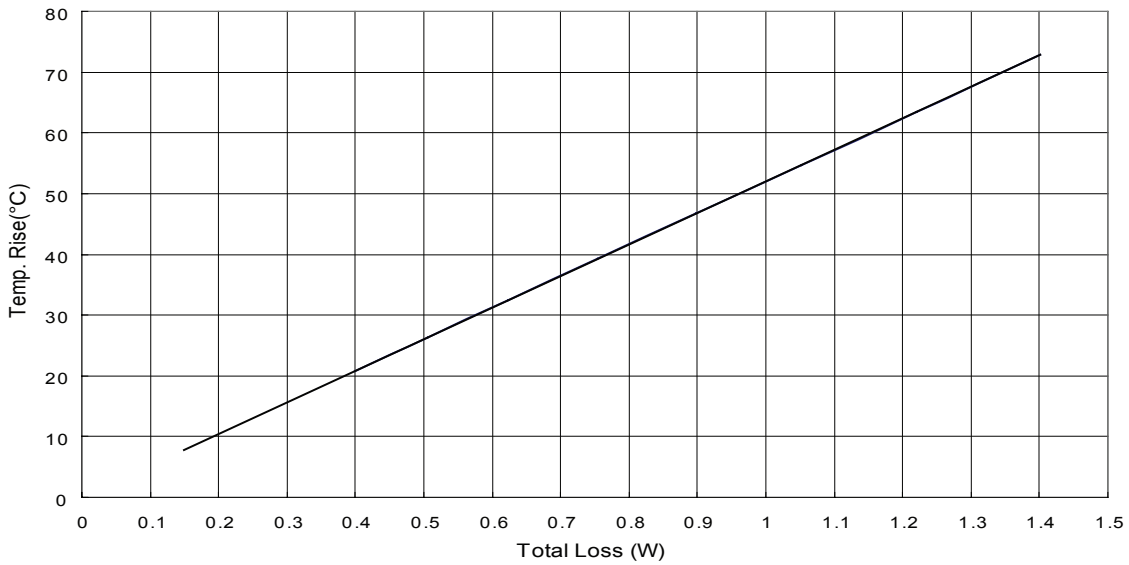
Part Marking: DRAQ127, ### = inductance value in μH, R = decimal point; if no R is present, then 3rd digit equals number of zeros wwlly = Date code, R = revision level  
 All soldering surfaces to be coplanar within 0.10 millimeters  
 Tolerances are ± 0.2 millimeters unless stated otherwise.  
 Do not 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



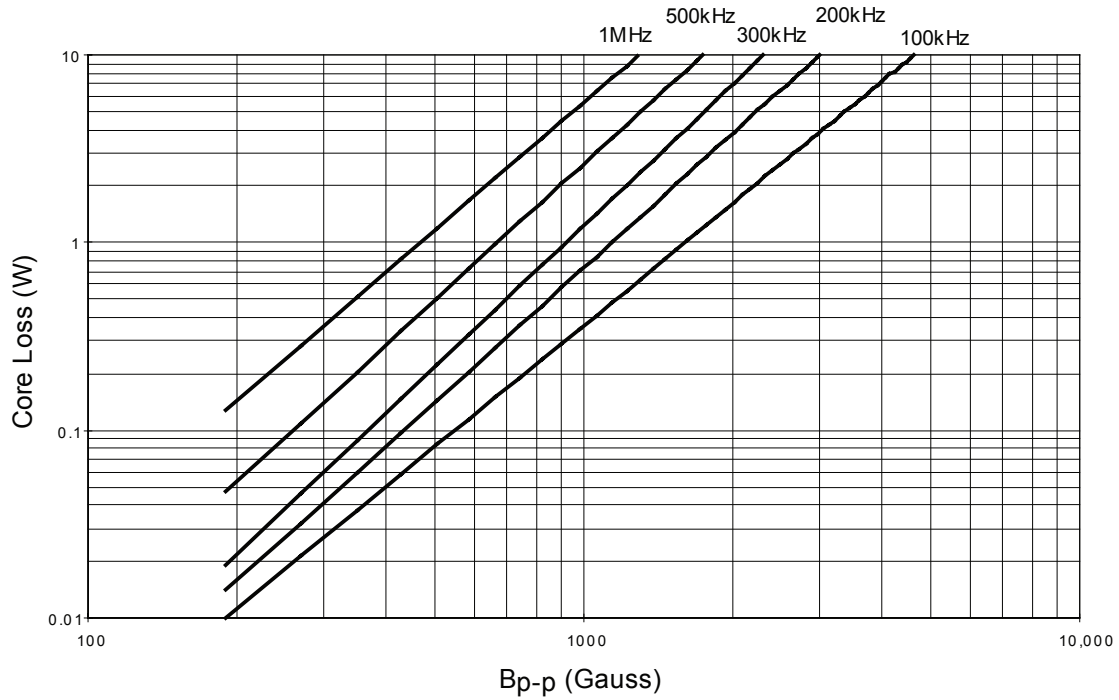
Supplied in tape and reel packaging, 350 parts per 13" diameter reel.

Temperature rise vs. total loss

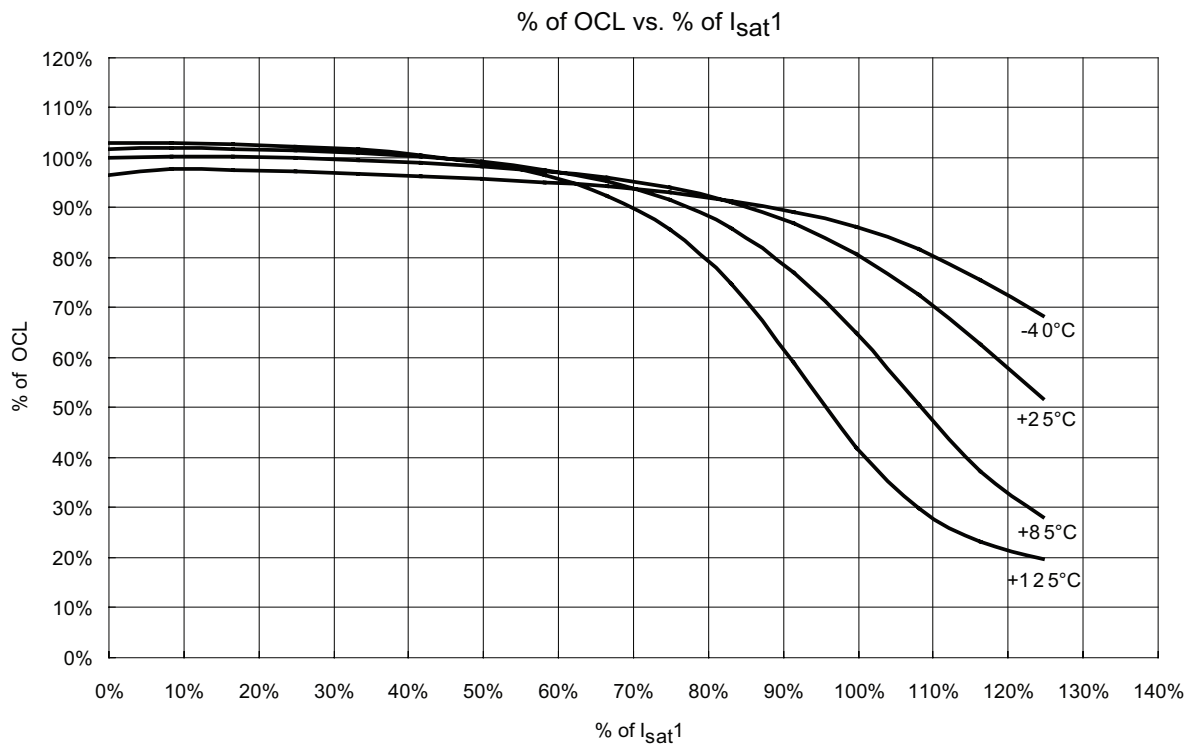


Dual winding, high power density shielded drum core power inductors

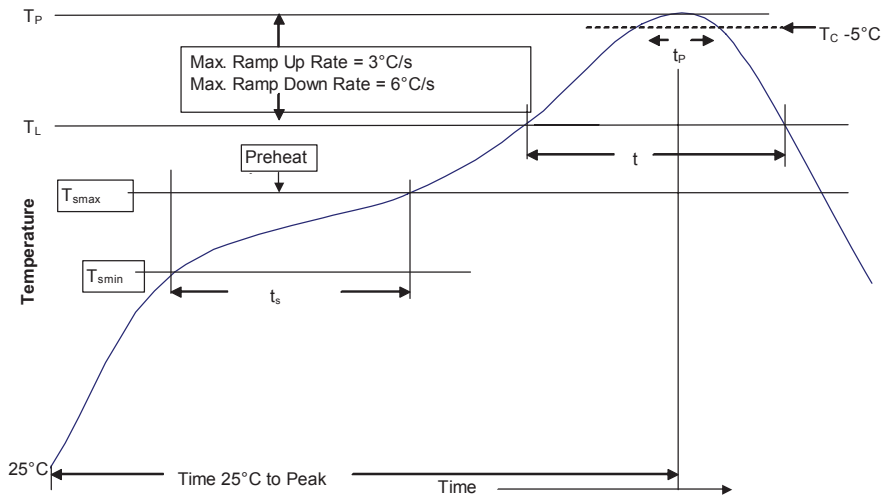
Core loss vs. Bp-p



Inductance characteristics



**Solder reflow profile**



**Table 1 - Standard SnPb Solder (T<sub>C</sub>)**

| Package Thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> ≥350 |
|-------------------|-----------------------------|-----------------------------|
| <2.5mm)           | 235°C                       | 220°C                       |
| ≥2.5mm            | 220°C                       | 220°C                       |

**Table 2 - Lead (Pb) Free Solder (T<sub>C</sub>)**

| Package Thickness | Volume mm <sup>3</sup> <350 | Volume mm <sup>3</sup> 350 - 2000 | Volume mm <sup>3</sup> >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 <sub>smin</sub> )  | 100°C                | 150°C                 |
| • Temperature max. (T <sub>smax</sub> )  | 150°C                | 200°C                 |
| • Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )                                 | 60-120 Seconds       | 60-120 Seconds        |
| Average ramp up rate T <sub>smax</sub> to T <sub>p</sub>   | 3°C/ Second Max.     | 3°C/ Second Max.      |
| Liquidous temperature (T <sub>L</sub> )  | 183°C                | 217°C                 |
| Time at liquidous (t <sub>L</sub> )  | 60-150 Seconds       | 60-150 Seconds        |
| Peak package body temperature (T <sub>p</sub> )*   | Table 1              | Table 2               |
| Time (t <sub>p</sub> )** within 5 °C of the specified classification temperature (T <sub>C</sub> ) | 20 Seconds**         | 30 Seconds**          |
| Average ramp-down rate (T <sub>p</sub> to T <sub>smax</sub> )                                      | 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<sub>p</sub>) is defined as a supplier minimum and a user maximum.

\*\* Tolerance for time at peak profile temperature (t<sub>p</sub>) is defined as a supplier minimum and a user maximum.

Life Support Policy: Eaton does not authorize the use of any of its products for use in life support devices or systems without the express written approval of an officer of the Company. Life support systems are devices which support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

Eaton reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Eaton also reserves the right to change or update, without notice, any technical information contained in this bulletin.

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

© 2018 Eaton  
All Rights Reserved  
Printed in USA  
Publication No. 4372 BU-MC17081  
January 2018

Eaton is a registered trademark.

All other trademarks are property of their respective owners.

Eaton:

[DRAQ127-100-R](#) [DRAQ127-220-R](#) [DRAQ127-330-R](#) [DRAQ127-150-R](#) [DRAQ127-470-R](#)