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

Eaton
Powering Business Worldwide
Dual winding, high power density shielded drum core power inductors

**Product specifications**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Parallel Ratings</th>
<th>Series Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OCL(^{1}) ±25% (µH)</td>
<td>DCR (Ω) @ +20 °C (Typ.)</td>
</tr>
<tr>
<td>DRAQ127-100-R</td>
<td>9.63</td>
<td>0.018</td>
</tr>
<tr>
<td>DRAQ127-150-R</td>
<td>14.9</td>
<td>0.027</td>
</tr>
<tr>
<td>DRAQ127-220-R</td>
<td>22.0</td>
<td>0.040</td>
</tr>
<tr>
<td>DRAQ127-330-R</td>
<td>32.0</td>
<td>0.060</td>
</tr>
<tr>
<td>DRAQ127-470-R</td>
<td>47.9</td>
<td>0.091</td>
</tr>
</tbody>
</table>

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.25 V\(_{rms}\), 0.0 A\(_{dc}\).
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. \(I_{sat1}\): Peak current for approximately 30% rolloff at +25 °C.
4. \(I_{sat2}\): Peak current for approximately 40% rolloff at +125 °C.
5. K-factor: Used to determine \(B_{p-p}\) for core loss (see graph). \(B_{p-p} = K \times L \times I_\Delta\). \(K\): (K-factor from table), \(L\): (Inductance in µH), \(I_\Delta\): (Peak-to-peak ripple current in Amps).
6. Part Number Definition: DRAQxxxx-xxx-R
   - DRAQxxx = Product code and size
   - xxx = Inductance value in µH, R = decimal point, If no R is present then 3rd digit equals number of zeros.
   - “-R” suffix = RoHS compliant

**Dimensions - mm**

- Top view
- Front view
- Bottom view

Part Marking: DRAQ127, ### = inductance value in µH, R = decimal point; if no R is present, then 3rd digit equals number of zeros. wwy = 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.*
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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

![Graph showing core loss vs. Bp-p for different frequencies.](image)

Inductance characteristics

![Graph showing % of OCL vs. % of Isat1 for different temperatures.](image)
Solder reflow profile

Reference JDEC J-STD-020

<table>
<thead>
<tr>
<th>Profile Feature</th>
<th>Standard SnPb Solder</th>
<th>Lead (Pb) Free Solder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preheat and Soak</td>
<td>• Temperature min. (Tsmin) 100°C</td>
<td>• Temperature max. (Tsmax) 150°C</td>
</tr>
<tr>
<td></td>
<td>• Temperature max. (Tsmax) 150°C</td>
<td>• Temperature max. (Tsmax) 200°C</td>
</tr>
<tr>
<td></td>
<td>• Time (Tsmin to Tsmax) 60-120 Seconds</td>
<td>• Time at liquidous (tL) 60-150 Seconds</td>
</tr>
<tr>
<td></td>
<td>Average ramp up rate Tsmax to Tp 3°C/Second Max.</td>
<td>Average ramp up rate Tsmax to Tp 3°C/Second Max.</td>
</tr>
<tr>
<td>Liquidus temperature (Tli)</td>
<td>183°C</td>
<td>217°C</td>
</tr>
<tr>
<td>Time at liquidous (tL)</td>
<td>60-150 Seconds</td>
<td>60-150 Seconds</td>
</tr>
<tr>
<td>Peak package body temperature (Tp)*</td>
<td>Table 1</td>
<td>Table 2</td>
</tr>
<tr>
<td>Time (t3)** within 5°C of the specified classification temperature (Tc)</td>
<td>20 Seconds**</td>
<td>30 Seconds**</td>
</tr>
<tr>
<td>Average ramp-down rate (Tpf to Tsmax)</td>
<td>6°C/Second Max.</td>
<td>6°C/Second Max.</td>
</tr>
<tr>
<td>Time 25°C to Peak Temperature</td>
<td>6 Minutes Max.</td>
<td>8 Minutes Max.</td>
</tr>
</tbody>
</table>

* Tolerance for peak profile temperature (Tp) is defined as a supplier minimum and a user maximum.
** Tolerance for time at peak profile temperature (tp) is defined as a supplier minimum and a user maximum.

Table 1 - Standard SnPb Solder (Tc)

<table>
<thead>
<tr>
<th>Package Thickness</th>
<th>Volume mm³</th>
<th>Volume mm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;2.5mm</td>
<td>235°C</td>
<td>220°C</td>
</tr>
<tr>
<td>≥2.5mm</td>
<td>220°C</td>
<td>220°C</td>
</tr>
</tbody>
</table>

Table 2 - Lead (Pb) Free Solder (Tc)

<table>
<thead>
<tr>
<th>Package Thickness</th>
<th>Volume mm³</th>
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<th>Volume mm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1.6mm</td>
<td>260°C</td>
<td>260°C</td>
<td>260°C</td>
</tr>
<tr>
<td>1.6 – 2.5mm</td>
<td>260°C</td>
<td>250°C</td>
<td>250°C</td>
</tr>
<tr>
<td>&gt;2.5mm</td>
<td>250°C</td>
<td>245°C</td>
<td>245°C</td>
</tr>
</tbody>
</table>

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