

# 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



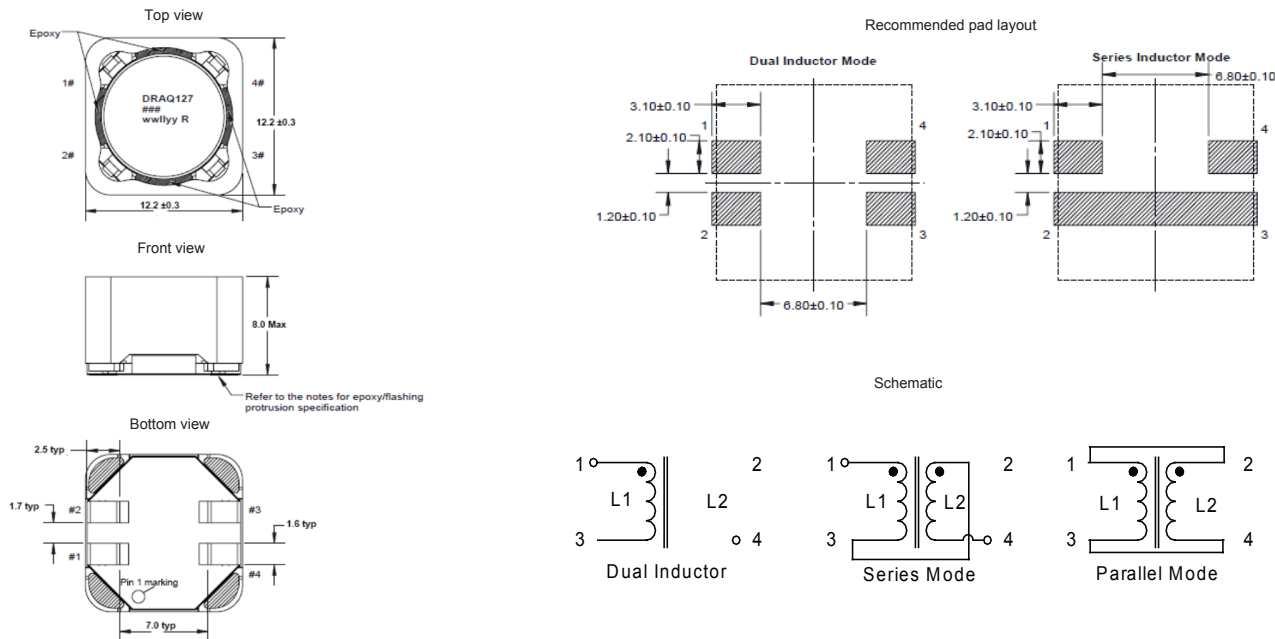
Dual winding, high power density shielded drum core power inductors

Product specifications

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

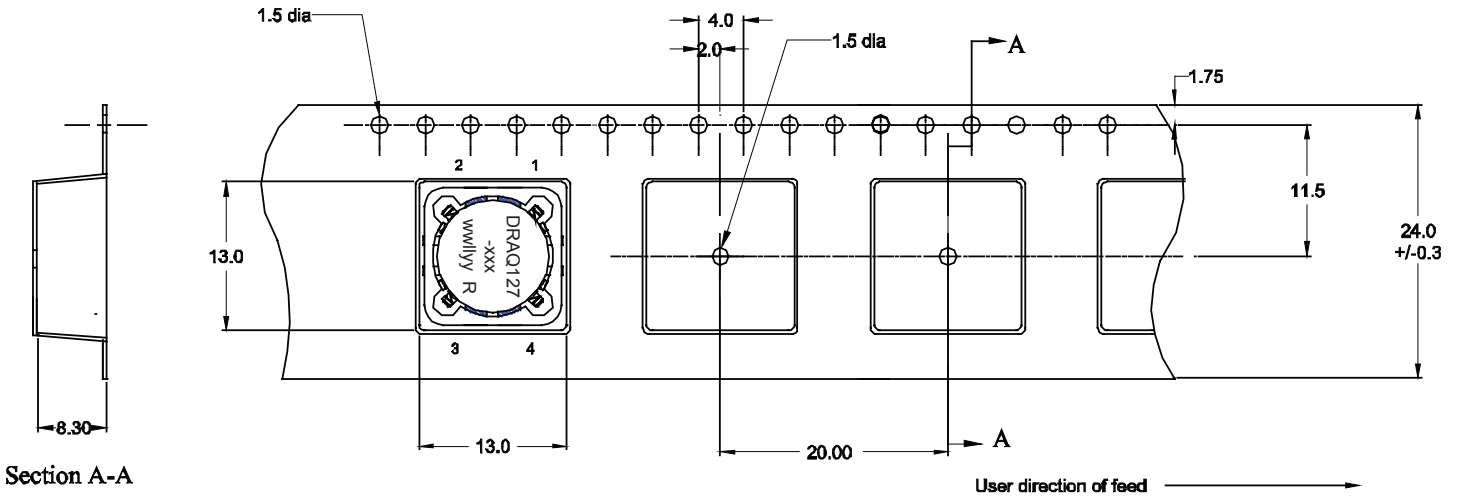
All soldering surfaces to be coplanar within 0.10 millimeters

Tolerances are ± 0.2 millimeters unless stated otherwise.

Do not route traces or vias underneath the inductor

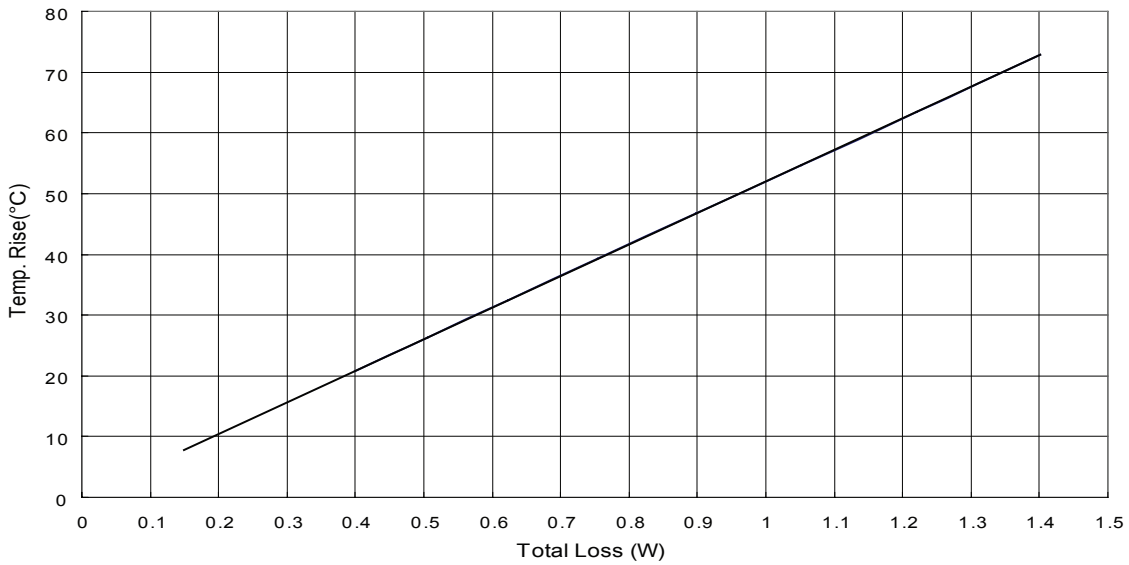
\*Special Characteristic epoxy protrusion or any flashing from the plastic on the header/base can be below the terminal surface and must not exceed 0.08 mm beyond the bottom surface of the terminal.

Packaging information - mm



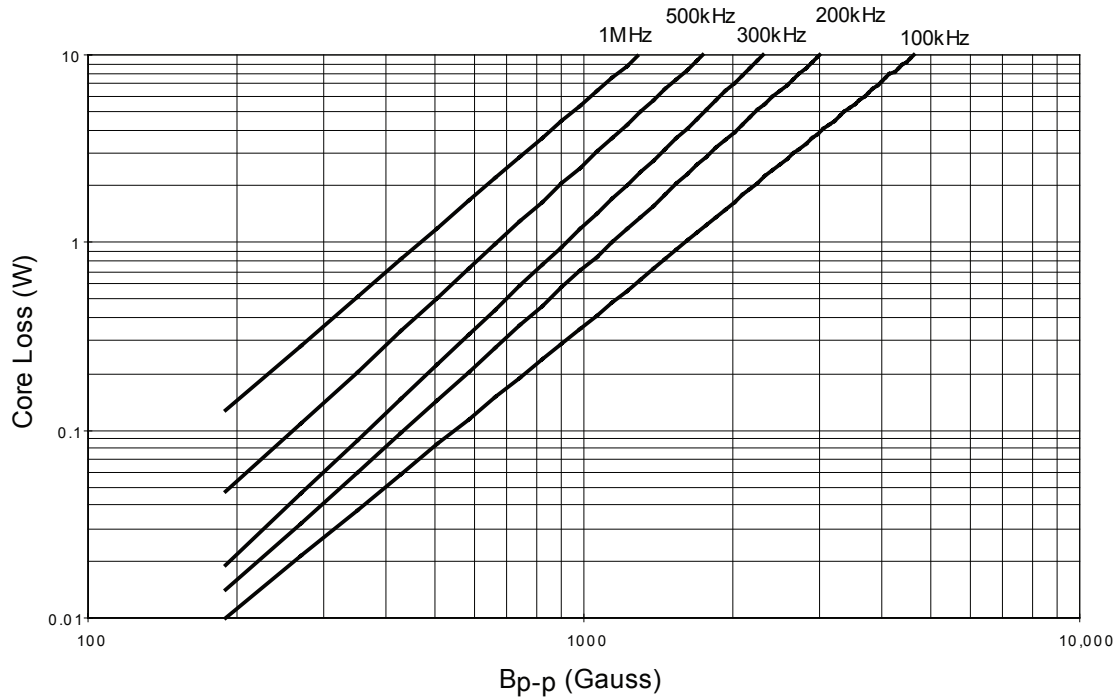
Supplied in tape and reel packaging, 350 parts per 13" diameter reel.

Temperature rise vs. total loss

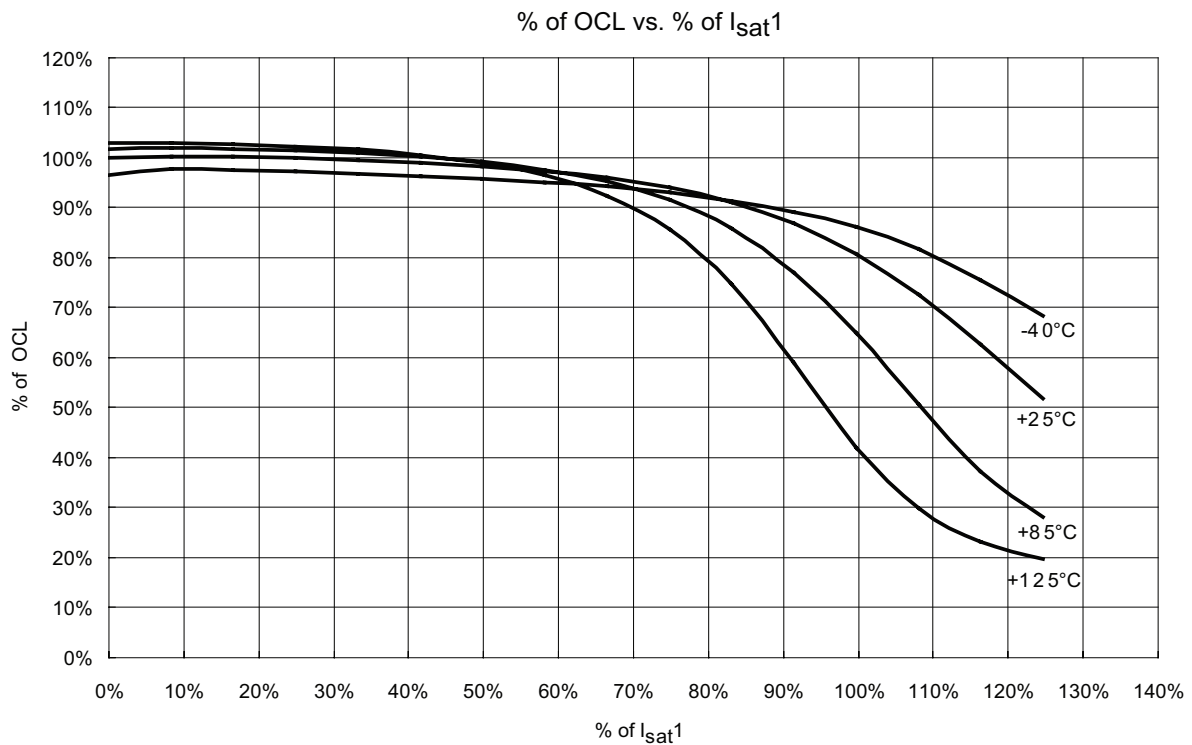


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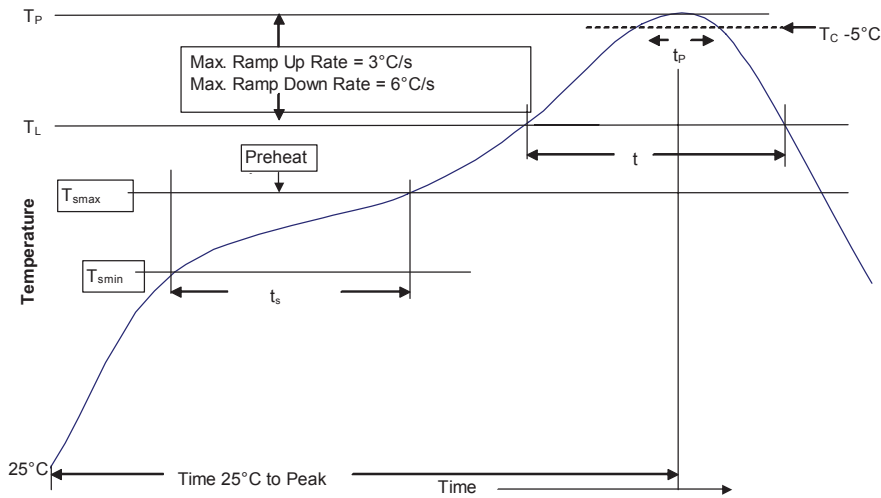
Core loss vs. Bp-p



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.

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