

# SMT POWER INDUCTORS

## Shielded Toroid Series - Ros1/Ros2 Series



### TWO PACKAGE SIZES:

-  **Height:** 3.2mm and 5.3mm Max
-  **Footprint:** 8.1mm x 5.3mm and 14.0mm x 10.2mm
-  **Current Rating:** up to 5A
-  **Inductance Range:** .51μH to 357μH

### Electrical Specifications @ 25°C — Operating Temperature -40°C to +130°C

| Pulse Part Number | Inductance @ Irated (μH Min) | Irated (A) | DCR (mΩ) |      | Inductance @ 0Adc (μH +/- 15%) | Reference ET (V*μsec) | Trise Factor (K0) | Coreloss Factor (K1) | ET Factor (K2) |
|-------------------|------------------------------|------------|----------|------|--------------------------------|-----------------------|-------------------|----------------------|----------------|
|                   |                              |            | TYP      | MAX  |                                |                       |                   |                      |                |
| Ros 1 Series      |                              |            |          |      |                                |                       |                   |                      |                |
| P0430             | 0.51                         | 2.00       | 14       | 16.1 | .7                             | .8                    | 1.45              | 1.27E-11             | 476.2          |
| P0431             | 0.76                         | 1.90       | 18       | 20.7 | 1.1                            | .8                    | 1.45              | 1.27E-11             | 370.4          |
| P0432             | 0.85                         | 1.50       | 18       | 20.7 | 1.1                            | 1.2                   | 1.45              | 1.27E-11             | 370.4          |
| P0433             | 1.44                         | 1.20       | 28       | 32.2 | 1.9                            | 1.8                   | 1.45              | 1.27E-11             | 277.8          |
| P0434             | 1.87                         | 1.20       | 34       | 39.1 | 2.6                            | 1.8                   | 1.45              | 1.27E-11             | 238.1          |
| P0435             | 2.72                         | 1.00       | 40       | 46   | 3.9                            | 2.3                   | 1.45              | 1.27E-11             | 196.1          |
| P0436             | 4.33                         | 0.70       | 73       | 84   | 6.0                            | 3.1                   | 1.45              | 1.27E-11             | 158.7          |
| P0437             | 5.35                         | 0.60       | 100      | 115  | 7.1                            | 3.3                   | 1.45              | 1.27E-11             | 144.9          |
| P0438             | 8.84                         | 0.50       | 140      | 161  | 12.2                           | 4.4                   | 1.45              | 1.27E-11             | 111.1          |
| P0439             | 10.79                        | 0.45       | 155      | 178  | 14.7                           | 5.0                   | 1.45              | 1.27E-11             | 101.0          |
| P0440             | 17.59                        | 0.34       | 250      | 288  | 23.8                           | 6.5                   | 1.45              | 1.27E-11             | 79.4           |
| P0441             | 25.50                        | 0.29       | 280      | 322  | 33.8                           | 8.4                   | 1.45              | 1.27E-11             | 66.7           |
| P0442             | 35.80                        | 0.24       | 440      | 506  | 49                             | 9.8                   | 1.45              | 1.27E-11             | 55.6           |
| P0443             | 52.70                        | 0.20       | 650      | 747  | 72                             | 12                    | 1.45              | 1.27E-11             | 45.7           |
| P0444             | 79                           | 0.17       | 1050     | 1208 | 110                            | 14                    | 1.45              | 1.27E-11             | 37.0           |
| P0445             | 88                           | 0.16       | 1065     | 1225 | 122                            | 15                    | 1.45              | 1.27E-11             | 35.1           |
| P0446             | 127                          | 0.14       | 1600     | 1840 | 179                            | 18                    | 1.45              | 1.27E-11             | 29.0           |
| Ros 2 Series      |                              |            |          |      |                                |                       |                   |                      |                |
| P0450             | 0.51                         | 5.00       | 8.1      | 9.3  | .65                            | 3                     | .508              | 8.87E-11             | 181.8          |
| P0451             | 0.67                         | 5.00       | 8.7      | 10   | .86                            | 3.1                   | .508              | 8.87E-11             | 151.5          |
| P0452             | 1.09                         | 5.00       | 11.4     | 13.1 | 1.5                            | .5                    | .508              | 8.87E-11             | 113.6          |
| P0453             | 1.53                         | 5.00       | 13.0     | 15   | 2.3                            | 1.0                   | .508              | 8.87E-11             | 90.9           |
| P0454             | 1.78                         | 3.00       | 15.0     | 17.3 | 2.3                            | 7.5                   | .508              | 8.87E-11             | 90.9           |
| P0455             | 3.74                         | 2.50       | 23.0     | 26.5 | 5.1                            | 10.5                  | .508              | 8.87E-11             | 60.6           |
| P0456             | 4.76                         | 2.00       | 26.1     | 30   | 6.3                            | 13                    | .508              | 8.87E-11             | 56.8           |
| P0457             | 5.61                         | 1.80       | 33.0     | 38   | 7.5                            | 14                    | .508              | 8.87E-11             | 50.5           |
| P0458             | 9.09                         | 1.50       | 70.4     | 81   | 13.2                           | 15                    | .508              | 8.87E-11             | 39.5           |
| P0459             | 11.47                        | 1.30       | 60.0     | 69   | 15.5                           | 21                    | .508              | 8.87E-11             | 35.0           |
| P0460             | 22.95                        | 1.00       | 90.4     | 104  | 34                             | 31                    | .508              | 8.87E-11             | 24.6           |
| P0461             | 39.10                        | 0.90       | 123.5    | 142  | 57.2                           | 39                    | .508              | 8.87E-11             | 18.9           |
| P0462             | 40.80                        | 0.80       | 240.0    | 276  | 62.5                           | 35                    | .508              | 8.87E-11             | 18.2           |
| P0463             | 69.70                        | 0.60       | 245.2    | 282  | 100                            | 55                    | .508              | 8.87E-11             | 14.0           |
| P0464             | 76.50                        | 0.50       | 305.2    | 351  | 103                            | 54                    | .508              | 8.87E-11             | 14.2           |
| P0465             | 137                          | 0.40       | 480.9    | 553  | 180                            | 78                    | .508              | 8.87E-11             | 10.0           |
| P0466             | 182                          | 0.35       | 681.7    | 784  | 254                            | 87                    | .508              | 8.87E-11             | 8.7            |
| P0467             | 272                          | 0.30       | 1030.4   | 1185 | 422.5                          | 105                   | .508              | 8.87E-11             | 7.0            |
| P0468             | 357                          | 0.25       | 1200.0   | 1380 | 500                            | 130                   | .508              | 8.87E-11             | 6.1            |

# SMT POWER INDUCTORS

## Shielded Toroid Series - Ros1/Ros2 Series



### Notes:

1. Temperature rise is 55°C in typical buck or boost circuits with the rated  $I_{DC}$  current and reference ET applied to the inductor.
2. Total loss in the inductor is 80 mW (ROS 1) and 280 mW (ROS 2) for 55°C temperature rise above ambient.
3. To estimate temperature rise in a given application, you must determine the total losses (copper losses + core losses) and apply the following formula:  

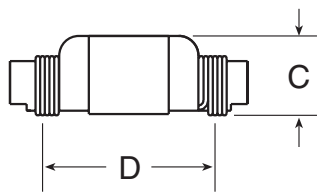
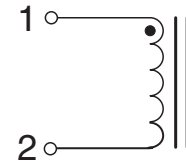
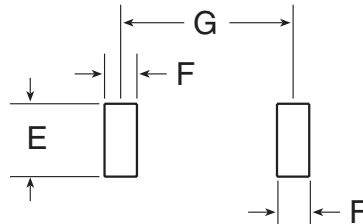
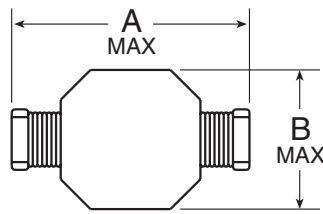
$$\text{Temp Rise (C)} = (\text{Total Losses (mW)})^{.833} * KO \text{ (from table)}$$
4. To determine copper losses, calculate:  

$$\text{Copper Loss (mW)} = I_{DC}^2 * DCR$$
5. For core loss in mWatts, using frequency  $f$  (in Hz) and operating flux density  $B$  (in Gauss), calculate:  

$$\text{Core Loss (mW)} = k_2 * f^{1.26} * B^{2.11}$$
6. For flux density ( $B$ ), calculate ET (V-μsec) for the application, and multiply by  $ET_{10}$  factor from the table.

### Mechanical

### Schematic



### Suggested Pad Layout

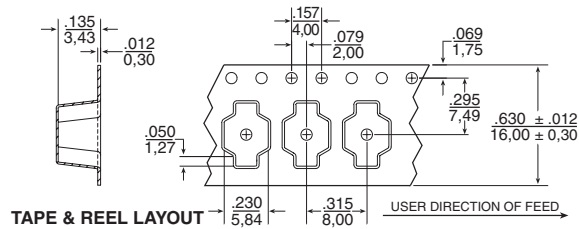
|                   | ROS 1      | ROS 2     |
|-------------------|------------|-----------|
| Weight .....      | .029 grams | 1.1 grams |
| Tape & Reel ..... | 2000/reel  | 600/reel  |

Dimensions:  $\frac{\text{Inches}}{\text{mm}}$

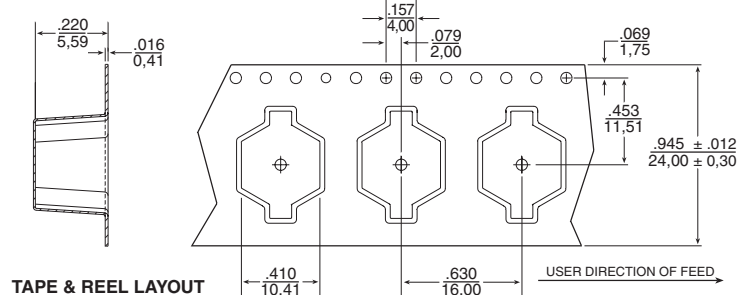
Unless otherwise specified, all tolerances are  $\pm \frac{.010}{0,25}$

| PKG   | A             | B            | C            | D             | E            | F            | G             |
|-------|---------------|--------------|--------------|---------------|--------------|--------------|---------------|
| ROS 1 | .335<br>8,51  | .225<br>5,72 | .125<br>3,18 | .250<br>6,35  | .100<br>2,54 | .050<br>1,27 | .250<br>6,35  |
| ROS 2 | .545<br>13,84 | .390<br>9,91 | .215<br>5,46 | .440<br>11,18 | .120<br>3,05 | .065<br>1,65 | .440<br>11,18 |

### ROS 1



### ROS 2



### For More Information:

**Pulse Worldwide Headquarters**  
 12220 World Trade Drive  
 San Diego, CA 92128  
 U.S.A.  
[www.pulseeng.com](http://www.pulseeng.com)  
 TEL: 858 674 8100  
 FAX: 858 674 8262

**Pulse Northern Europe**  
 3 Huxley Road  
 Surrey Research Park  
 Guildford, Surrey GU2 5RE  
 United Kingdom  
 TEL: 44 1483 401700  
 FAX: 44 1483 401701

**Pulse Southern Europe**  
 Zone Industrielle  
 F-39270  
 Orgelet  
 France  
 TEL: 33 3 84 35 04 04  
 FAX: 33 3 84 25 46 41

**Pulse China Headquarters**  
 No. 1  
 Industrial District  
 Changan, Dongguan  
 China  
 TEL: 86 769 85538070  
 FAX: 86 769 85538870

**Pulse North China**  
 Room 1503  
 XinYin Building  
 No. 888 YiShan Road  
 Shanghai 200233  
 China  
 TEL: 86 21 54643211/2  
 FAX: 86 21 54643210

**Pulse South Asia**  
 150 Kampong Ampat  
 #07-01/02  
 KA Centre  
 Singapore 368324  
 TEL: 65 6287 8998  
 FAX: 65 6280 0080

**Pulse North Asia**  
 No. 26  
 Kao Ching Road  
 Yang Mei Chen  
 Taoyuan Hsien  
 Taiwan, R. O. C.  
 TEL: 886 3 4641811  
 FAX: 886 3 4641911

Performance warranty of products offered on this data sheet is limited to the parameters specified. Data is subject to change without notice. Other brand and product names mentioned herein may be trademarks or registered trademarks of their respective owners.

© Copyright, 2006. Pulse Engineering, Inc. All rights reserved.

[www.pulseeng.com](http://www.pulseeng.com)

P617.A (3/06)