

# FDS6815

## Dual P-Channel 2.5V Specified PowerTrench™ MOSFET

### General Description

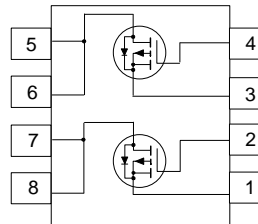
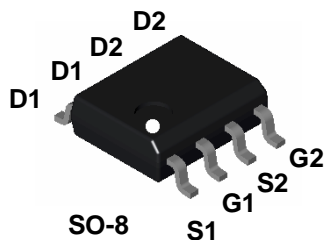
These P-Channel 2.5V specified MOSFETs are produced using a rugged gate version of Fairchild's advanced PowerTrench™ process. It has been optimized for power management applications which require a wide range of gate drive voltages.

### Applications

- Load switch
- Battery protection
- Power management

### Features

- -5.5 A, 20 V.  $R_{DS(ON)} = 0.040 \Omega @ V_{GS} = -4.5 \text{ V}$   
 $R_{DS(ON)} = 0.050 \Omega @ V_{GS} = -2.5 \text{ V}$
- Extended  $V_{GSS}$  range ( $\pm 12\text{V}$ ) for battery applications.
- Low gate charge.
- Fast switching speed.
- High performance trench technology for extremely low  $R_{DS(ON)}$ .
- High power and current handling capability.



### Absolute Maximum Ratings T<sub>A</sub>=25°C unless otherwise noted

| Symbol                            | Parameter  | Ratings     | Units |
|-----------------------------------|--|-------------|-------|
| V <sub>DSS</sub>                  | Drain-Source Voltage                             | 20          | V     |
| V <sub>GSS</sub>                  | Gate-Source Voltage                              | ±12         | V     |
| I <sub>D</sub>                    | Drain Current - Continuous (Note 1a)             | 5.5         | A     |
|                                   | - Pulsed   | 50          |       |
| P <sub>D</sub>                    | Power Dissipation for Dual Operation             | 2.0         | W     |
|                                   | Power Dissipation for Single Operation (Note 1a) | 1.6         |       |
|                                   | (Note 1b)  | 1.0         |       |
|                                   | (Note 1c)  | 0.9         |       |
| T <sub>J</sub> , T <sub>stg</sub> | Operating and Storage Junction Temperature Range | -55 to +150 | °C    |

### Thermal Characteristics

|                  |   |    |      |
|------------------|---|----|------|
| R <sub>θJA</sub> | Thermal Resistance, Junction-to-Ambient (Note 1a) | 78 | °C/W |
| R <sub>θJC</sub> | Thermal Resistance, Junction-to-Case (Note 1)     | 40 | °C/W |

### Package Marking and Ordering Information

| Device Marking | Device  | Reel Size | Tape Width | Quantity   |
|----------------|---------|-----------|------------|------------|
| FDS6815        | FDS6815 | 13"       | 12mm       | 2500 units |

**Electrical Characteristics** T<sub>A</sub>=25°C unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Units |
|--------|-----------|-----------------|-----|-----|-----|-------|
|--------|-----------|-----------------|-----|-----|-----|-------|

**OFF CHARACTERISTICS**

|                   |                                 |   |     |  |      |    |
|-------------------|---------------------------------|---|-----|--|------|----|
| BV <sub>DSS</sub> | Drain-Source Breakdown Voltage  | V <sub>GS</sub> = 0 V, I <sub>D</sub> = -250 μA | -20 |  |      | V  |
| I <sub>DSS</sub>  | Zero Gate Voltage Drain Current | V <sub>DS</sub> = -16 V, V <sub>GS</sub> = 0 V  |     |  | 1    | μA |
| I <sub>GSSF</sub> | Gate-Body Leakage, Forward      | V <sub>GS</sub> = 12 V, V <sub>DS</sub> = 0 V   |     |  | 100  | nA |
| I <sub>GSSR</sub> | Gate-Body Leakage, Reverse      | V <sub>GS</sub> = -12 V, V <sub>DS</sub> = 0 V  |     |  | -100 | nA |

**ON CHARACTERISTICS** (Note 2)

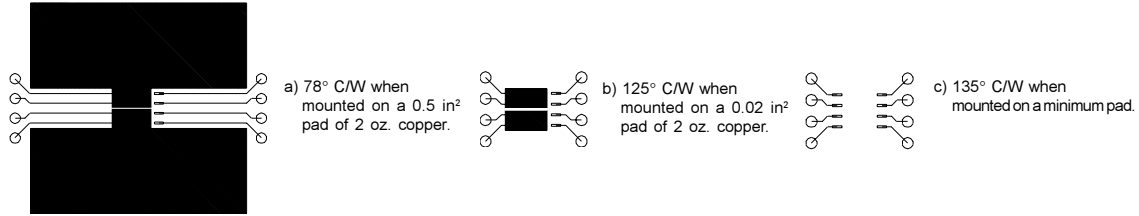
|                     |                                   |  |      |  |              |   |
|---------------------|-----------------------------------|--|------|--|--------------|---|
| V <sub>GS(TH)</sub> | Gate Threshold Voltage            | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250 μA   | -0.6 |  | -1.5         | V |
| R <sub>DS(ON)</sub> | Static Drain-Source On-Resistance | V <sub>GS</sub> = -4.5 V, I <sub>D</sub> = -5.5 A<br>V <sub>GS</sub> = -2.5 V, I <sub>D</sub> = -5 A |      |  | 0.04<br>0.05 | Ω |
| I <sub>D(ON)</sub>  | On-State Drain Current            | V <sub>GS</sub> = -4.5 V, V <sub>DS</sub> = -5.0 V   | 25   |  |              | A |

**DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS**

|                 |   |  |  |  |      |   |
|-----------------|---|--|--|--|------|---|
| I <sub>S</sub>  | Maximum Continuous Drain-Source Diode Forward Current |  |  |  | -1.3 | A |
| V <sub>SD</sub> | Drain-Source Diode Forward Voltage                    | V <sub>GS</sub> = 0 V, I <sub>S</sub> = -1.3 A <small>(Note 2)</small> |  |  | -1.2 | V |

**Notes:**

- R<sub>θJA</sub> is the sum of the junction-to-case and case-to-ambient thermal resistance where the case thermal reference is defined as the solder mounting surface of the drain pins. R<sub>θJC</sub> is guaranteed by design while R<sub>θJA</sub> is determined by the user's board design. Thermal rating based on independent single device operation.



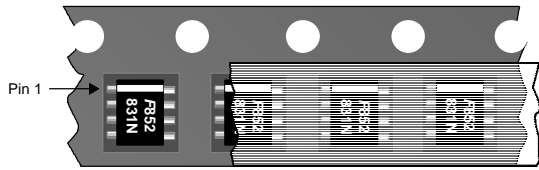
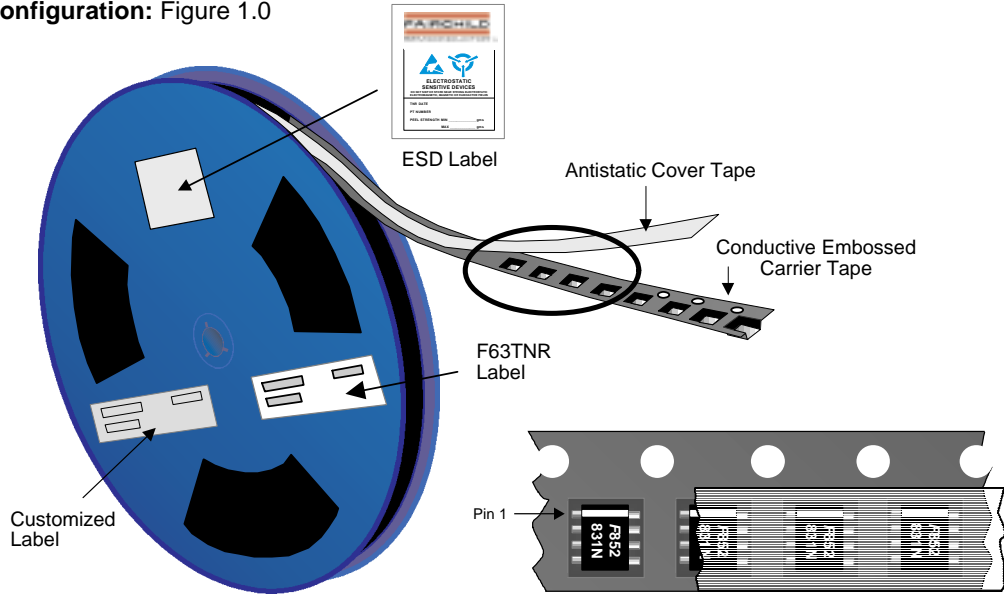
Scale 1 : 1 on letter size paper

- Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

# SO-8 Tape and Reel Data and Package Dimensions



## SOIC(8lds) Packaging Configuration: Figure 1.0

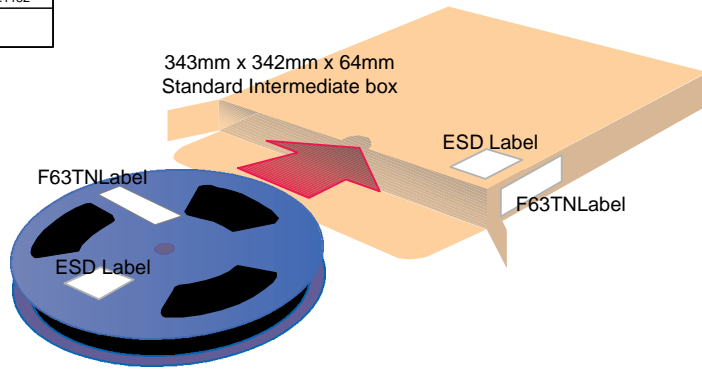


SOIC-8 Unit Orientation

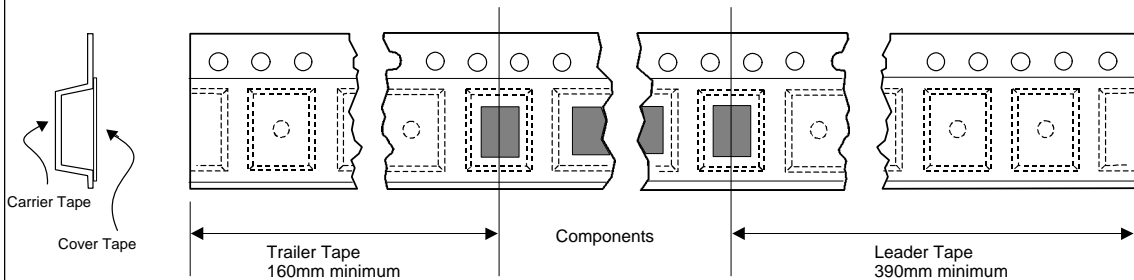
| SOIC (8lds) Packaging Information |                         |            |            |            |
|-----------------------------------|-------------------------|------------|------------|------------|
| Packaging Option                  | Standard (no flow code) | L86Z       | S62Z       | D84Z       |
| Packaging type                    | TNR                     | Rail/Tube  | Bag        | TNR        |
| Qty per Reel/Tube/Bag             | 2,500                   | 95         | 200        | 500        |
| Reel Size                         | 13" Dia                 | -          | -          | 7" Dia     |
| Box Dimension (mm)                | 343x64x343              | 530x130x83 | 76x102x127 | 184x187x47 |
| Max qty per Box                   | 5,000                   | 30,000     | 1,000      | 2,500      |
| Weight per unit (gm)              | 0.0774                  | 0.0774     | 0.0774     | 0.0774     |
| Weight per Reel (kg)              | 0.6060                  | -          | -          | 0.1182     |
| Note/Comments                     |                         |            | Bulk       |            |

## F63TNR Label sample

|                  |           |
|------------------|-----------|
| LOT: CBVK741B019 | QTY: 2500 |
| FSID: FDS9953A   | SPEC:     |
| DIC1: D9842      | QTY1:     |
| DIC2:            | QTY2:     |
| SPEC REV: CPN:   | QARV:     |
|                  | (F63TNR)2 |

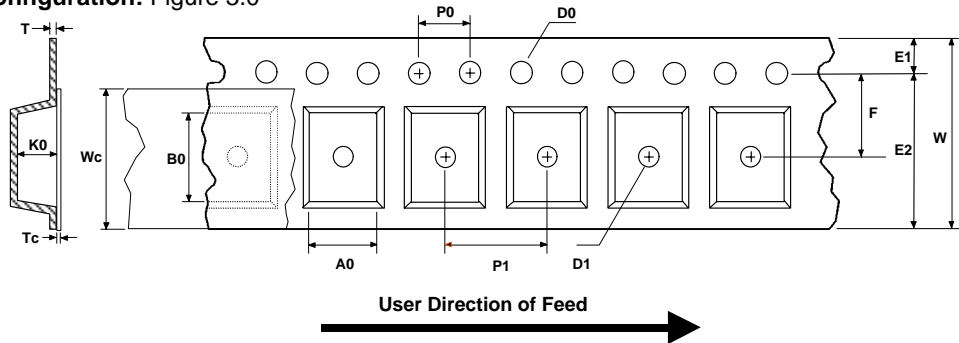


## SOIC(8lds) Tape Leader and Trailer Configuration: Figure 2.0



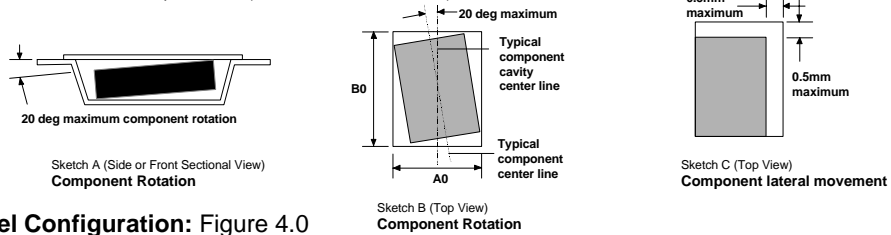
# SO-8 Tape and Reel Data and Package Dimensions, continued

## SOIC(8lds) Embossed Carrier Tape Configuration: Figure 3.0

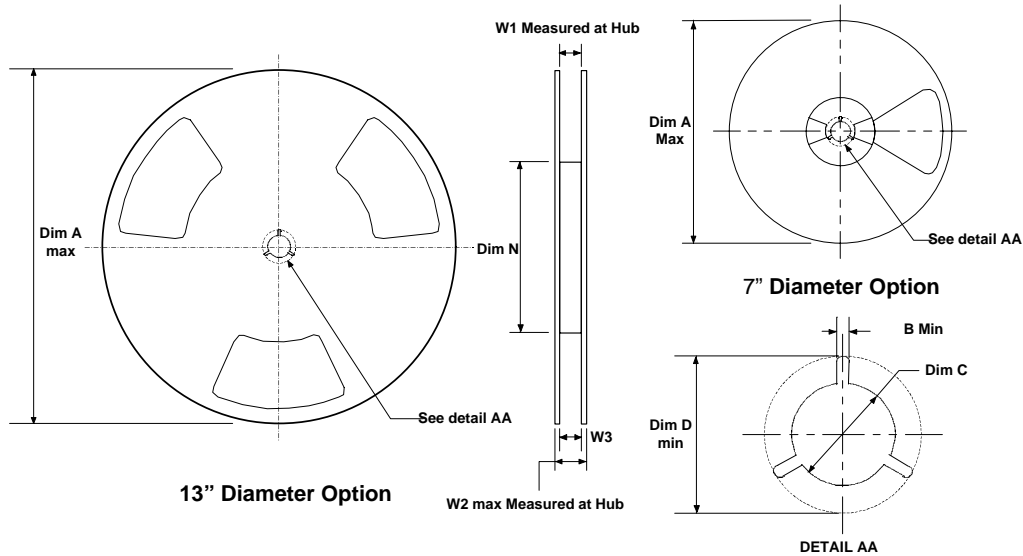


| Dimensions are in millimeter |                 |                 |                |                 |                 |                 |              |                 |               |               |                |                       |               |                 |
|------------------------------|-----------------|-----------------|----------------|-----------------|-----------------|-----------------|--------------|-----------------|---------------|---------------|----------------|-----------------------|---------------|-----------------|
| Pkg type                     | A0              | B0              | W              | D0              | D1              | E1              | E2           | F               | P1            | P0            | K0             | T                     | Wc            | Tc              |
| SOIC(8lds)<br>(12mm)         | 6.50<br>+/-0.10 | 5.30<br>+/-0.10 | 12.0<br>+/-0.3 | 1.55<br>+/-0.05 | 1.60<br>+/-0.10 | 1.75<br>+/-0.10 | 10.25<br>min | 5.50<br>+/-0.05 | 8.0<br>+/-0.1 | 4.0<br>+/-0.1 | 2.1<br>+/-0.10 | 0.450<br>+/-<br>0.150 | 9.2<br>+/-0.3 | 0.06<br>+/-0.02 |

Notes: A0, B0, and K0 dimensions are determined with respect to the EIA/Jedec RS-481 rotational and lateral movement requirements (see sketches A, B, and C).



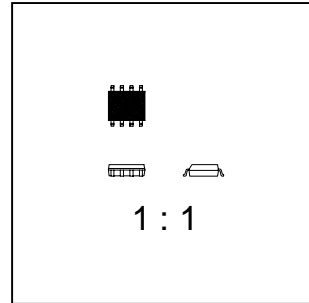
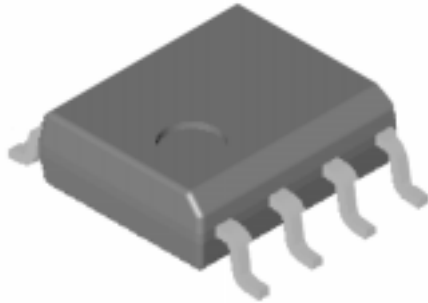
## SOIC(8lds) Reel Configuration: Figure 4.0



| Dimensions are in inches and millimeters |             |               |              |                                   |               |              |                                  |               |                              |
|--|-------------|---------------|--------------|-----------------------------------|---------------|--------------|----------------------------------|---------------|------------------------------|
| Tape Size                                | Reel Option | Dim A         | Dim B        | Dim C                             | Dim D         | Dim N        | Dim W1                           | Dim W2        | Dim W3 (LSL-USL)             |
| 12mm                                     | 7" Dia      | 7.00<br>177.8 | 0.059<br>1.5 | 512 +0.020/-0.008<br>13 +0.5/-0.2 | 0.795<br>20.2 | 5.906<br>150 | 0.488 +0.078/-0.000<br>12.4 +2/0 | 0.724<br>18.4 | 0.469 - 0.606<br>11.9 - 15.4 |
| 12mm                                     | 13" Dia     | 13.00<br>330  | 0.059<br>1.5 | 512 +0.020/-0.008<br>13 +0.5/-0.2 | 0.795<br>20.2 | 7.00<br>178  | 0.488 +0.078/-0.000<br>12.4 +2/0 | 0.724<br>18.4 | 0.469 - 0.606<br>11.9 - 15.4 |

SO-8 Tape and Reel Data and Package Dimensions, continued

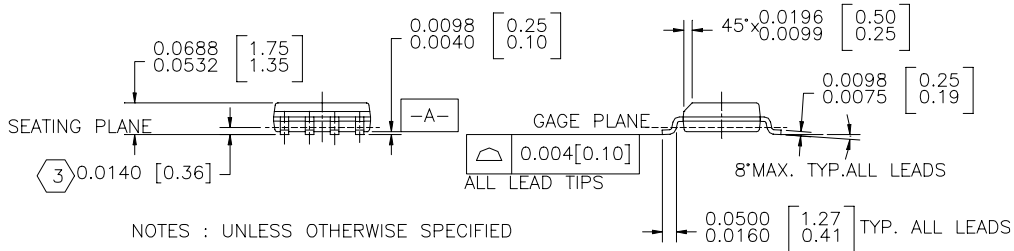
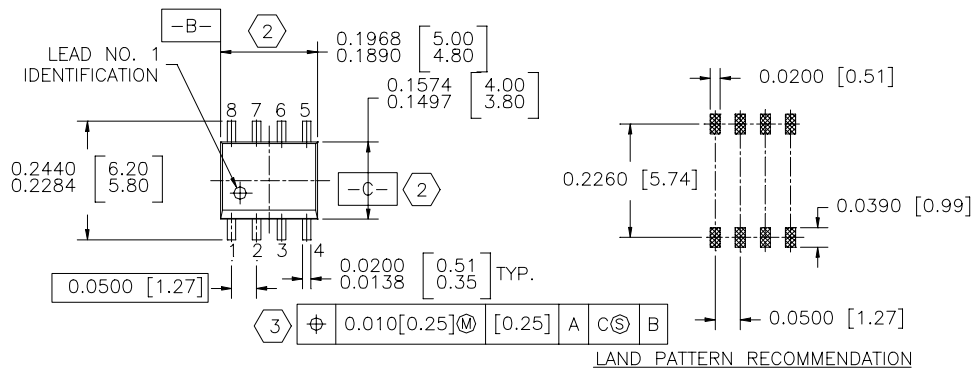
SOIC-8 (FS PKG Code S1)



Scale 1:1 on letter size paper

Dimensions shown below are in:  
inches [millimeters]

Part Weight per unit (gram): 0.0774



NOTES : UNLESS OTHERWISE SPECIFIED

1. STANDARD LEAD FINISH:  
200 MICROINCHES / 5.08 MICRONS MINIMUM  
LEAD / TIN (SOLDER) ON COPPER.

SO 0.150 WIDE 8 LEADS

2. THESE DIMENSIONS DO NOT INCLUDE MOLD FLASH

3. MAXIMUM LEAD 0.024 [0.609]

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| E <sup>2</sup> CMOS™ | PowerTrench®  | VCX™       |
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| FACT Quiet Series™   | QS™           |            |
| FAST®                | Quiet Series™ |            |
| FASTr™               | SuperSOT™-3   |            |
| GTO™                 | SuperSOT™-6   |            |
| HiSeC™               | SuperSOT™-8   |            |

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