FDY1002PZ
Dual P-Channel (–1.5 V) Specified PowerTrench® MOSFET

–20 V, –0.83 A, 0.5 Ω

Features
- Max $r_{DS(on)} = 0.5$ Ω at $V_{GS} = –4.5$ V, $I_D = –0.83$ A
- Max $r_{DS(on)} = 0.7$ Ω at $V_{GS} = –2.5$ V, $I_D = –0.70$ A
- Max $r_{DS(on)} = 1.2$ Ω at $V_{GS} = –1.8$ V, $I_D = –0.43$ A
- Max $r_{DS(on)} = 1.8$ Ω at $V_{GS} = –1.5$ V, $I_D = –0.36$ A
- HBM ESD protection level = 1400 V (Note 3)
- RoHS Compliant

General Description
This Dual P-Channel MOSFET has been designed using ON Semiconductor’s advanced Power Trench process to optimize the $r_{DS(on)}@V_{GS} = –1.5$ V.

Application
- Li-Ion Battery Pack

MOSFET Maximum Ratings $T_A = 25$ °C unless otherwise noted

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Ratings</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{DS}$</td>
<td>Drain to Source Voltage</td>
<td>–20</td>
<td>V</td>
</tr>
<tr>
<td>$V_{GS}$</td>
<td>Gate to Source Voltage</td>
<td>±8</td>
<td>V</td>
</tr>
<tr>
<td>$I_D$</td>
<td>Drain Current -Continuous (Note 1a)</td>
<td>–0.83</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>-Pulsed (Note 1a)</td>
<td>–1.0</td>
<td></td>
</tr>
<tr>
<td>$P_D$</td>
<td>Power Dissipation (Note 1a)</td>
<td>0.625</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td>Power Dissipation (Note 1b)</td>
<td>0.446</td>
<td></td>
</tr>
<tr>
<td>$T_{J}, T_{STG}$</td>
<td>Operating and Storage Junction Temperature Range</td>
<td>–55 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

Thermal Characteristics

- $R_{JUA}$ Thermal Resistance, Junction to Ambient (Note 1a) 200 °C/W
- $R_{JUA}$ Thermal Resistance, Junction to Ambient (Note 1b) 280 °C/W

Package Marking and Ordering Information

<table>
<thead>
<tr>
<th>Device Marking</th>
<th>Device</th>
<th>Package</th>
<th>Reel Size</th>
<th>Tape Width</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>FDY1002PZ</td>
<td>SC89-6</td>
<td>7&quot;</td>
<td>8 mm</td>
<td>3000 units</td>
</tr>
</tbody>
</table>
### Electrical Characteristics T<sub>J</sub> = 25 °C unless otherwise noted

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>BV&lt;sub&gt;DSS&lt;/sub&gt;</td>
<td>Drain to Source Breakdown Voltage</td>
<td>I&lt;sub&gt;D&lt;/sub&gt; = –250 µA, V&lt;sub&gt;GS&lt;/sub&gt; = 0 V</td>
<td>–20</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>∆BV&lt;sub&gt;DSS&lt;/sub&gt;</td>
<td>Breakdown Voltage Temperature Coefficient</td>
<td>I&lt;sub&gt;D&lt;/sub&gt; = –250 µA, referenced to 25 °C</td>
<td>–11</td>
<td></td>
<td></td>
<td>mV/°C</td>
</tr>
<tr>
<td>IDSS</td>
<td>Zero Gate Voltage Drain Current</td>
<td>V&lt;sub&gt;DS&lt;/sub&gt; = –16 V, V&lt;sub&gt;GS&lt;/sub&gt; = 0 V</td>
<td>–1</td>
<td></td>
<td></td>
<td>µA</td>
</tr>
<tr>
<td>IGSS</td>
<td>Gate to Source Leakage Current</td>
<td>V&lt;sub&gt;GS&lt;/sub&gt; = ±8 V, V&lt;sub&gt;DS&lt;/sub&gt; = 0 V</td>
<td>±10</td>
<td></td>
<td></td>
<td>µA</td>
</tr>
</tbody>
</table>

### Related Symbols
- R<sub>θJA</sub>: Thermal Resistance
- R<sub>θJC</sub>: Junction-to-Case Thermal Resistance
- R<sub>θJC</sub>: Junction-to-Case Thermal Resistance

### Notes:
1. R<sub>θJA</sub> is determined with the device mounted on a 1 in<sup>2</sup> pad of 2 oz copper.
2. Pulse Test: Pulse Width < 300 us, Duty Cycle < 2.0%
3. The diode connected between the gate and source serves only as protection against ESD. No gate overvoltage rating is implied.
Typical Characteristics $T_J = 25 \, ^\circ\text{C}$ unless otherwise noted

Figure 1. On Region Characteristics

$V_{GS} = -1.8 \, \text{V}$

$PULSE \ DURATION = 80 \, \mu\text{s}$

$DUTY \ CYCLE = 0.5\% \text{ MAX}$

$V_{GS} = -2.0 \, \text{V}$

$V_{GS} = -1.8 \, \text{V}$

$V_{GS} = -2.5 \, \text{V}$

$V_{GS} = -4.5 \, \text{V}$

Figure 2. Normalized On-Resistance vs Drain Current and Gate Voltage

$PULSE \ DURATION = 80 \, \mu\text{s}$

$DUTY \ CYCLE = 0.5\% \text{ MAX}$

$V_{GS} = -2.0 \, \text{V}$

$V_{GS} = -2.5 \, \text{V}$

$V_{GS} = -1.5 \, \text{V}$

$V_{GS} = -4.5 \, \text{V}$

Figure 3. Normalized On Resistance vs Junction Temperature

$T_J = 125 \, ^\circ\text{C}$

$T_J = 25 \, ^\circ\text{C}$

Figure 4. On-Resistance vs Gate to Source Voltage

$PULSE \ DURATION = 80 \, \mu\text{s}$

$DUTY \ CYCLE = 0.5\% \text{ MAX}$

$T_J = 125 \, ^\circ\text{C}$

$T_J = 25 \, ^\circ\text{C}$

$T_J = -55 \, ^\circ\text{C}$

Figure 5. Transfer Characteristics

$T_J = 125 \, ^\circ\text{C}$

$T_J = 25 \, ^\circ\text{C}$

$T_J = -55 \, ^\circ\text{C}$

Figure 6. Source to Drain Diode Forward Voltage vs Source Current

$V_{GS} = 0 \, \text{V}$

$V_{DS} = -5 \, \text{V}$

$V_{GS} = -5 \, \text{V}$

$V_{GS} = -5 \, \text{V}$

$V_{GS} = 0 \, \text{V}$
Typical Characteristics $T_J = 25 \, ^\circ C$ unless otherwise noted

Figure 7. Gate Charge Characteristics

Figure 8. Capacitance vs Drain to Source Voltage

Figure 9. Gate Leakage Current vs Gate to Source Voltage

Figure 10. Forward Bias Safe Operating Area

Figure 11. Single Pulse Maximum Power Dissipation
Typical Characteristics  $T_J = 25 \, ^\circ C$ unless otherwise noted

Figure 12. Junction-to-Ambient Transient Thermal Response Curve