FDS4141 P-Channel PowerTrench® MOSFET
-40V, -10.8A, 13.0mΩ

Features
- Max \( r_{DS(on)} \) = 13.0mΩ at \( V_{GS} = -10V, I_D = -10.5A \)
- Max \( r_{DS(on)} \) = 19.0mΩ at \( V_{GS} = -4.5V, I_D = -8.4A \)
- High performance trench technology for extremely low \( r_{DS(on)} \)
- RoHS Compliant

General Description
This P-Channel MOSFET has been produced using Fairchild Semiconductor’s proprietary PowerTrench® technology to deliver low \( r_{DS(on)} \) and optimized \( BV_{DSS} \) capability to offer superior performance benefit in the applications and optimized switching performance capability reducing power dissipation losses in converter/inverter applications.

Applications
- Control switch in synchronous & non-synchronous buck
- Load switch
- Inverter

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>-40</td>
<td>V</td>
</tr>
<tr>
<td>( V_{GS} )</td>
<td>Gate to Source Voltage</td>
<td>±20</td>
<td>V</td>
</tr>
<tr>
<td>( I_D )</td>
<td>Drain Current</td>
<td>-10.8</td>
<td>A</td>
</tr>
<tr>
<td>( E_{AS} )</td>
<td>Single Pulse Avalanche Energy</td>
<td>(Note 3) 294</td>
<td>mJ</td>
</tr>
<tr>
<td>( P_D )</td>
<td>Power Dissipation ( T_A = 25°C )</td>
<td>5</td>
<td>W</td>
</tr>
<tr>
<td>( T_{J, STG} )</td>
<td>Operating and Storage Junction Temperature Range</td>
<td>-55 to +150</td>
<td>°C</td>
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</table>

Thermal Characteristics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Ratings</th>
<th>Units</th>
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<tbody>
<tr>
<td>( R_{JUC} )</td>
<td>Thermal Resistance, Junction to Case</td>
<td>(Note 1) 25</td>
<td>°C/W</td>
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<tr>
<td>( R_{JUA} )</td>
<td>Thermal Resistance, Junction to Ambient</td>
<td>(Note 1a) 50</td>
<td>°C/W</td>
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Package Marking and Ordering Information

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<tr>
<th>Device Marking</th>
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<tr>
<td>FDS4141</td>
<td>FDS4141</td>
<td>SO-8</td>
<td>13”</td>
<td>12mm</td>
<td>2500 units</td>
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### Electrical Characteristics \( T_J = 25^\circ C \) 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>
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<tbody>
<tr>
<td>( BV_{DSS} )</td>
<td>Drain to Source Breakdown Voltage</td>
<td>( I_D = -250\mu A, V_{GS} = 0V )</td>
<td>-40</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>( \Delta BV_{DSS} )</td>
<td>Breakdown Voltage Temperature Coefficient</td>
<td>( I_D = -250\mu A, ) referenced to ( 25^\circ C )</td>
<td></td>
<td>-33</td>
<td></td>
<td>mV/°C</td>
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<tr>
<td>( I_{DSS} )</td>
<td>Zero Gate Voltage Drain Current</td>
<td>( V_{DS} = -32V, )</td>
<td></td>
<td>-1</td>
<td></td>
<td>µA</td>
</tr>
<tr>
<td>( I_{GSS} )</td>
<td>Gate to Source Leakage Current</td>
<td>( V_{GS} = \pm 20V, V_{DS} = 0V )</td>
<td></td>
<td>±100</td>
<td></td>
<td>nA</td>
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### Off Characteristics

### On Characteristics

### Dynamic Characteristics

### Switching Characteristics

### Drain-Source Diode Characteristics

### NOTES:
1. \( R_{\theta JA} \) is determined with the device mounted on a \( 1\text{in}^2 \) pad of \( 2 \text{ oz} \) copper. \( R_{\theta JC} \) is guaranteed by design while \( R_{\theta CA} \) is determined by the user's board design.
2. Pulse Test: Pulse Width < 300µs, Duty cycle < 2.0%.
3. UIL condition: Starting \( T_J = 25^\circ C, L = 3mH, I_{AS} = -14A, V_{DD} = -40V, V_{GS} = -10V. \)

![Image](image_url)
Typical Characteristics $T_J = 25^\circ C$ unless otherwise noted

![Graph of On-Region Characteristics](image1)

**Figure 1.** On-Region Characteristics

![Graph of Normalized On-Resistance vs Drain Current and Gate Voltage](image2)

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

![Graph of Normalized On-Resistance vs Junction Temperature](image3)

**Figure 3.** Normalized On-Resistance vs Junction Temperature

![Graph of On-Resistance vs Gate to Source Voltage](image4)

**Figure 4.** On-Resistance vs Gate to Source Voltage

![Graph of Transfer Characteristics](image5)

**Figure 5.** Transfer Characteristics

![Graph of Source to Drain Diode Forward Voltage vs Source Current](image6)

**Figure 6.** Source to Drain Diode Forward Voltage vs Source Current
Typical Characteristics  \( T_J = 25^\circ C \) unless otherwise noted

![Figure 7. Gate Charge Characteristics](image)

![Figure 8. Capacitance vs Drain to Source Voltage](image)

![Figure 9. Unclamped Inductive Switching Capability](image)

![Figure 10. Maximum Continuous Drain Current vs Ambient Temperature](image)

![Figure 11. Forward Bias Safe Operating Area](image)

![Figure 12. Single Pulse Maximum Power Dissipation](image)
Typical Characteristics  $T_J = 25^\circ C$ unless otherwise noted

**Figure 13. Transient Thermal Response Curve**
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<th>Product Status</th>
<th>Definition</th>
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<td>First Production</td>
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