General Description

• Trench Power AlphaSGT™ technology
• Dual N-Ch MOSFET
• Layout optimized
• RoHS and Halogen-Free Compliant

Product Summary

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Maximum</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_DS</td>
<td>100V</td>
<td></td>
</tr>
<tr>
<td>I_D (at V_GS=10V)</td>
<td>7A</td>
<td></td>
</tr>
<tr>
<td>R_DS(ON) (at V_GS=10V)</td>
<td>&lt; 68mΩ</td>
<td></td>
</tr>
<tr>
<td>R_DS(ON) (at V_GS=4.5V)</td>
<td>&lt; 94mΩ</td>
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</table>

Applications

• Dimming MOSFETs

100% UIS Tested
100% Rg Tested

Orderable Part Number | Package Type | Form | Minimum Order Quantity |
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>AOND62930</td>
<td>DFN 5x6 EP2</td>
<td>Tape &amp; Reel</td>
<td>3000</td>
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Absolute Maximum Ratings  T_A=25°C unless otherwise noted

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
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<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drain-Source Voltage</td>
<td>V_DS</td>
<td>100</td>
<td>V</td>
</tr>
<tr>
<td>Gate-Source Voltage</td>
<td>V_GS</td>
<td>±20</td>
<td>V</td>
</tr>
<tr>
<td>Continuous Drain Current</td>
<td>T_C=25°C</td>
<td>I_D</td>
<td>7</td>
</tr>
<tr>
<td>Continuous Drain Current</td>
<td>T_C=100°C</td>
<td>I_D</td>
<td>4.5</td>
</tr>
<tr>
<td>Pulsed Drain Current</td>
<td>I_DM</td>
<td>25</td>
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<tr>
<td>Continuous Drain Current</td>
<td>T_A=25°C</td>
<td>I_DSM</td>
<td>4.5</td>
</tr>
<tr>
<td>Continuous Drain Current</td>
<td>T_A=70°C</td>
<td>I_DSM</td>
<td>3.5</td>
</tr>
<tr>
<td>Avalanche Current</td>
<td>I_A</td>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>Avalanche energy</td>
<td>E_A</td>
<td>0.8</td>
<td>mJ</td>
</tr>
<tr>
<td>Power Dissipation</td>
<td>P_D</td>
<td>7.3</td>
<td>W</td>
</tr>
<tr>
<td>Power Dissipation</td>
<td>P_DSM</td>
<td>3.5</td>
<td>W</td>
</tr>
<tr>
<td>Junction and Storage Temperature Range</td>
<td>T_J, T_STG</td>
<td>-55 to 150</td>
<td>°C</td>
</tr>
</tbody>
</table>

Thermal Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Junction-to-Ambient</td>
<td>R_{JA}</td>
<td>30</td>
<td>35</td>
<td>°C/W</td>
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<tr>
<td>Maximum Junction-to-Ambient Steady-State</td>
<td>R_{JA}</td>
<td>55</td>
<td>66</td>
<td>°C/W</td>
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<tr>
<td>Maximum Junction-to-Case</td>
<td>R_{JC}</td>
<td>14</td>
<td>17</td>
<td>°C/W</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>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
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<tbody>
<tr>
<td><strong>STATIC PARAMETERS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>BV&lt;sub&gt;DS&lt;/sub&gt;</td>
<td>Drain-Source Breakdown Voltage</td>
<td>I&lt;sub&gt;d&lt;/sub&gt;=250μA, V&lt;sub&gt;GS&lt;/sub&gt;=0V</td>
<td>100</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>I&lt;sub&gt;DS&lt;/sub&gt;</td>
<td>Zero Gate Voltage Drain Current</td>
<td>V&lt;sub&gt;DS&lt;/sub&gt;=100V, V&lt;sub&gt;GS&lt;/sub&gt;=0V</td>
<td>1</td>
<td></td>
<td></td>
<td>μA</td>
</tr>
<tr>
<td>I&lt;sub&gt;GS&lt;/sub&gt;</td>
<td>Gate-Body leakage current</td>
<td>V&lt;sub&gt;DS&lt;/sub&gt;=0V, V&lt;sub&gt;GS&lt;/sub&gt;=±20V</td>
<td>±100</td>
<td></td>
<td></td>
<td>nA</td>
</tr>
<tr>
<td>V&lt;sub&gt;GS(th)&lt;/sub&gt;</td>
<td>Gate Threshold Voltage</td>
<td>V&lt;sub&gt;DS&lt;/sub&gt;=V&lt;sub&gt;GS&lt;/sub&gt;, I&lt;sub&gt;d&lt;/sub&gt;=250μA</td>
<td>1.7</td>
<td>2.35</td>
<td>2.8</td>
<td>V</td>
</tr>
<tr>
<td>R&lt;sub&gt;DS(ON)&lt;/sub&gt;</td>
<td>Static Drain-Source On-Resistance</td>
<td>V&lt;sub&gt;GS&lt;/sub&gt;=10V, I&lt;sub&gt;d&lt;/sub&gt;=5A</td>
<td>56</td>
<td></td>
<td></td>
<td>mΩ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V&lt;sub&gt;GS&lt;/sub&gt;=4.5V, I&lt;sub&gt;d&lt;/sub&gt;=3A</td>
<td>104</td>
<td></td>
<td></td>
<td>mΩ</td>
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<tr>
<td>g&lt;sub&gt;fs&lt;/sub&gt;</td>
<td>Forward Transconductance</td>
<td>V&lt;sub&gt;DS&lt;/sub&gt;=5V, I&lt;sub&gt;d&lt;/sub&gt;=5A</td>
<td>13.5</td>
<td></td>
<td></td>
<td>S</td>
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<tr>
<td>V&lt;sub&gt;SD&lt;/sub&gt;</td>
<td>Diode Forward Voltage</td>
<td>I&lt;sub&gt;d&lt;/sub&gt;=1A, V&lt;sub&gt;GS&lt;/sub&gt;=0V</td>
<td>0.76</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>g&lt;sub&gt;s&lt;/sub&gt;</td>
<td>Maximum Body-Diode Continuous Current</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A</td>
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<tr>
<td><strong>DYNAMIC PARAMETERS</strong></td>
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<td></td>
<td></td>
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<tr>
<td>C&lt;sub&gt;iss&lt;/sub&gt;</td>
<td>Input Capacitance</td>
<td></td>
<td>415</td>
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<td>pF</td>
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<tr>
<td>C&lt;sub&gt;oss&lt;/sub&gt;</td>
<td>Output Capacitance</td>
<td>V&lt;sub&gt;GS&lt;/sub&gt;=0V, V&lt;sub&gt;DS&lt;/sub&gt;=50V, f=1MHz</td>
<td>32</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>C&lt;sub&gt;gd&lt;/sub&gt;</td>
<td>Reverse Transfer Capacitance</td>
<td></td>
<td>3</td>
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<td>pF</td>
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<tr>
<td>R&lt;sub&gt;g&lt;/sub&gt;</td>
<td>Gate resistance</td>
<td>f=1MHz</td>
<td>0.7</td>
<td>1.4</td>
<td>2.1</td>
<td>Ω</td>
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<td><strong>SWITCHING PARAMETERS</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Q&lt;sub&gt;g(10V)&lt;/sub&gt;</td>
<td>Total Gate Charge</td>
<td>V&lt;sub&gt;GS&lt;/sub&gt;=10V, V&lt;sub&gt;DS&lt;/sub&gt;=50V, I&lt;sub&gt;d&lt;/sub&gt;=5A</td>
<td>6.5</td>
<td>12</td>
<td></td>
<td>nC</td>
</tr>
<tr>
<td>Q&lt;sub&gt;g(4.5V)&lt;/sub&gt;</td>
<td>Total Gate Charge</td>
<td></td>
<td>3</td>
<td>6</td>
<td></td>
<td>nC</td>
</tr>
<tr>
<td>Q&lt;sub&gt;ss&lt;/sub&gt;</td>
<td>Gate Source Charge</td>
<td>V&lt;sub&gt;GS&lt;/sub&gt;=0V, V&lt;sub&gt;DS&lt;/sub&gt;=50V</td>
<td>1.5</td>
<td></td>
<td></td>
<td>nC</td>
</tr>
<tr>
<td>Q&lt;sub&gt;sd&lt;/sub&gt;</td>
<td>Gate Drain Charge</td>
<td>V&lt;sub&gt;GS&lt;/sub&gt;=0V, V&lt;sub&gt;DS&lt;/sub&gt;=50V</td>
<td>1.5</td>
<td></td>
<td></td>
<td>nC</td>
</tr>
<tr>
<td>Q&lt;sub&gt;oss&lt;/sub&gt;</td>
<td>Output Charge</td>
<td>V&lt;sub&gt;GS&lt;/sub&gt;=0V, V&lt;sub&gt;DS&lt;/sub&gt;=50V</td>
<td>5</td>
<td></td>
<td></td>
<td>nC</td>
</tr>
<tr>
<td>Q&lt;sub&gt;q&lt;/sub&gt;</td>
<td>Turn-On Delay Time</td>
<td>V&lt;sub&gt;GS&lt;/sub&gt;=10V, V&lt;sub&gt;DS&lt;/sub&gt;=50V, R&lt;sub&gt;L&lt;/sub&gt;=10Ω, R&lt;sub&gt;GEN&lt;/sub&gt;=3Ω</td>
<td>4</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>t&lt;sub&gt;r&lt;/sub&gt;</td>
<td>Turn-On Rise Time</td>
<td>V&lt;sub&gt;GS&lt;/sub&gt;=10V, V&lt;sub&gt;DS&lt;/sub&gt;=50V, R&lt;sub&gt;L&lt;/sub&gt;=10Ω, R&lt;sub&gt;GEN&lt;/sub&gt;=3Ω</td>
<td>2</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>t&lt;sub&gt;q&lt;/sub&gt;</td>
<td>Turn-Off Delay Time</td>
<td>V&lt;sub&gt;GS&lt;/sub&gt;=10V, V&lt;sub&gt;DS&lt;/sub&gt;=50V, R&lt;sub&gt;L&lt;/sub&gt;=10Ω, R&lt;sub&gt;GEN&lt;/sub&gt;=3Ω</td>
<td>15</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>t&lt;sub&gt;q&lt;/sub&gt;</td>
<td>Turn-Off Fall Time</td>
<td>V&lt;sub&gt;GS&lt;/sub&gt;=10V, V&lt;sub&gt;DS&lt;/sub&gt;=50V, R&lt;sub&gt;L&lt;/sub&gt;=10Ω, R&lt;sub&gt;GEN&lt;/sub&gt;=3Ω</td>
<td>2</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>Q&lt;sub&gt;V&lt;/sub&gt;</td>
<td>Body Diode Reverse Recovery Time</td>
<td>I&lt;sub&gt;d&lt;/sub&gt;=5A, di/dt=500A/μs</td>
<td>16</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>Q&lt;sub&gt;V&lt;/sub&gt;</td>
<td>Body Diode Reverse Recovery Charge</td>
<td>I&lt;sub&gt;d&lt;/sub&gt;=5A, di/dt=500A/μs</td>
<td>44</td>
<td></td>
<td></td>
<td>nC</td>
</tr>
</tbody>
</table>

A. The value of R<sub>qJA</sub> is measured with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>j</sub> = 25°C. The Power dissipation P<sub>DSM</sub> is based on R<sub>qJA</sub> for 10s and the maximum allowed junction temperature of 150°C. The value in any given application depends on the user’s specific board design.

B. The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub> = 150°C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Single pulse width limited by junction temperature T<sub>J(MAX)</sub> = 150°C.

D. The R<sub>qJA</sub> is the sum of the thermal impedance from junction to case R<sub>qJC</sub> and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T<sub>J(MAX)</sub> = 150°C. The SOA curve provides a single pulse rating.

G. The maximum current rating is package limited.

H. These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>j</sub> = 25°C.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1: On-Region Characteristics (Note E)

Figure 2: Transfer Characteristics (Note E)

Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

Figure 4: On-Resistance vs. Junction Temperature (Note E)

Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

Figure 6: Body-Diode Characteristics (Note E)
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7: Gate-Charge Characteristics

Figure 8: Capacitance Characteristics

Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

Figure 10: Single Pulse Power Rating Junction-to-Case (Note F)

Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

- **Figure 12**: Power De-rating (Note F) - Graph showing power dissipation (W) against CASE temperature (°C) with a descending order of D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01.
- **Figure 13**: Current De-rating (Note F) - Graph showing current rating (A) against CASE temperature (°C) with a single pulse condition.
- **Figure 14**: Coss stored Energy - Graph showing stored energy (uJ) against VDS (Volts) with a descending order of D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01.
- **Figure 15**: Single Pulse Power Rating Junction-to-Ambient (Note H) - Graph showing power rating (W) against pulse width (s) with a 25°C ambient condition.
- **Figure 16**: Normalized Maximum Transient Thermal Impedance (Note H) - Graph showing normalized transient thermal resistance against pulse width (s) with a single pulse condition.

Equations:

- \( T_{\text{on}} \) = \( T_{\text{J,PK}} - T_{\text{A}} - P_{\text{DM}} \cdot Z_{\text{q JA}} \cdot R_{\text{q JA}} \)
Figure A: Gate Charge Test Circuit & Waveforms

Figure B: Resistive Switching Test Circuit & Waveforms

Figure C: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

Figure D: Diode Recovery Test Circuit & Waveforms