**General Description**

- Latest Trench Power AlphaMOS (αMOS MV) technology
- Very Low $R_{DS(ON)}$
- Low Gate Charge
- Optimized for fast-switching applications
- RoHS and Halogen-Free Compliant

**Product Summary**

- $V_{DS}$: 100V
- $I_D$ (at $V_{DS}=10V$): 23A
- $R_{DS(ON)}$ (at $V_{DS}=10V$): < 24mΩ
- $R_{DS(ON)}$ (at $V_{DS}=4.5V$): < 32mΩ

**Application**

- Synchronous rectification in DC/DC and AC/DC converters
- Isolated DC/DC Converters in Telecom and Industrial

**Orderable Part Number**

<table>
<thead>
<tr>
<th>Orderable Part Number</th>
<th>Package Type</th>
<th>Form</th>
<th>Minimum Order Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>AON7292</td>
<td>DFN 3.3x3.3</td>
<td>Tape &amp; Reel</td>
<td>3000</td>
</tr>
</tbody>
</table>

**Absolute Maximum Ratings $T_J=25$°C unless otherwise noted**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Maximum</th>
<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 $T_J=25$°C</td>
<td>$I_D$</td>
<td>23</td>
<td>A</td>
</tr>
<tr>
<td>Current $T_J=100$°C</td>
<td>$I_D$</td>
<td>15</td>
<td>A</td>
</tr>
<tr>
<td>Pulsed Drain Current</td>
<td>$R_{SM}$</td>
<td>45</td>
<td>A</td>
</tr>
<tr>
<td>Continuous Drain Current $T_J=25$°C</td>
<td>$I_{DSM}$</td>
<td>9</td>
<td>A</td>
</tr>
<tr>
<td>Current $T_J=70$°C</td>
<td>$I_{DSM}$</td>
<td>7</td>
<td>A</td>
</tr>
<tr>
<td>Avalanche Current $T_J=70$°C</td>
<td>$I_{AS}$</td>
<td>14</td>
<td>A</td>
</tr>
<tr>
<td>Avalanche energy $L=0.1mH$</td>
<td>$E_{AS}$</td>
<td>10</td>
<td>nJ</td>
</tr>
<tr>
<td>$V_{DS}$ Spike 10µs</td>
<td>$V_{SPIKE}$</td>
<td>120</td>
<td>V</td>
</tr>
<tr>
<td>Power Dissipation $T_J=25$°C</td>
<td>$P_D$</td>
<td>28</td>
<td>W</td>
</tr>
<tr>
<td>Current $T_J=100$°C</td>
<td>$P_D$</td>
<td>11</td>
<td>W</td>
</tr>
<tr>
<td>Power Dissipation $T_J=25$°C</td>
<td>$P_{Diss}$</td>
<td>4.1</td>
<td>W</td>
</tr>
<tr>
<td>Current $T_J=70$°C</td>
<td>$P_{Diss}$</td>
<td>2.6</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 $S$ ≤10s</td>
<td>$R_{JA}$</td>
<td>25</td>
<td>30</td>
<td>°C/W</td>
</tr>
<tr>
<td>Maximum Junction-to-Ambient $AS$</td>
<td>$R_{JC}$</td>
<td>50</td>
<td>60</td>
<td>°C/W</td>
</tr>
<tr>
<td>Maximum Junction-to-Case Steady-State</td>
<td>$R_{JC}$</td>
<td>3.7</td>
<td>4.5</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

[Image]
### 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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</thead>
<tbody>
<tr>
<td><strong>STATIC PARAMETERS</strong></td>
<td></td>
<td></td>
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<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>
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<tr>
<td>IDSS</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>
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<tr>
<td>IDSS</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>VGS(h)</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>1.6</td>
<td>2.1</td>
<td>2.6</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;G&lt;/sub&gt;=9A</td>
<td>20</td>
<td>24</td>
<td></td>
<td>mΩ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>V&lt;sub&gt;DS&lt;/sub&gt;=4.5V, I&lt;sub&gt;G&lt;/sub&gt;=7A</td>
<td>25.5</td>
<td>32</td>
<td></td>
<td>mΩ</td>
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<tr>
<td>GS</td>
<td>Forward Transconductance</td>
<td>V&lt;sub&gt;DS&lt;/sub&gt;=5V, I&lt;sub&gt;D&lt;/sub&gt;=9A</td>
<td>32</td>
<td></td>
<td></td>
<td>S</td>
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<tr>
<td>VGSD</td>
<td>Diode Forward Voltage</td>
<td>I&lt;sub&gt;F&lt;/sub&gt;=1A, V&lt;sub&gt;GS&lt;/sub&gt;=0V</td>
<td>0.72</td>
<td>1</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>fs</td>
<td>Maximum Body-Diode Continuous Current</td>
<td></td>
<td></td>
<td></td>
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<td>A</td>
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<tr>
<td><strong>DYNAMIC PARAMETERS</strong></td>
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<tr>
<td>CGS</td>
<td>Input 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>1170</td>
<td></td>
<td></td>
<td>pF</td>
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<tr>
<td>Coss</td>
<td>Output Capacitance</td>
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<td>90</td>
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<td>pF</td>
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<td>Coss</td>
<td>Reverse Transfer Capacitance</td>
<td></td>
<td>8</td>
<td></td>
<td></td>
<td>pF</td>
</tr>
<tr>
<td>R&lt;sub&gt;d&lt;/sub&gt;</td>
<td>Gate resistance</td>
<td>f=1MHz</td>
<td>0.3</td>
<td>0.65</td>
<td>1.0</td>
<td>Ω</td>
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<tr>
<td><strong>SWITCHING PARAMETERS</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>QG(10V)</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;G&lt;/sub&gt;=9A</td>
<td>17</td>
<td>25</td>
<td></td>
<td>nC</td>
</tr>
<tr>
<td>QG(4.5V)</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;G&lt;/sub&gt;=9A</td>
<td>8</td>
<td>15</td>
<td></td>
<td>nC</td>
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<tr>
<td>Qg</td>
<td>Gate Source Charge</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td>nC</td>
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<tr>
<td>Qgd</td>
<td>Gate Drain Charge</td>
<td></td>
<td>3.5</td>
<td></td>
<td></td>
<td>nC</td>
</tr>
<tr>
<td>t&lt;sub&gt;on&lt;/sub&gt;</td>
<td>Turn-On DelayTime</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;=5.55Ω,</td>
<td>5</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>t&lt;sub&gt;rr&lt;/sub&gt;</td>
<td>Turn-On Rise Time</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>t&lt;sub&gt;off&lt;/sub&gt;</td>
<td>Turn-Off DelayTime</td>
<td>R&lt;sub&gt;GEN&lt;/sub&gt;=3Ω</td>
<td>21</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>t&lt;sub&gt;f&lt;/sub&gt;</td>
<td>Turn-Off Fall Time</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>t&lt;sub&gt;d&lt;/sub&gt;</td>
<td>Body Diode Reverse Recovery Time</td>
<td>I&lt;sub&gt;D&lt;/sub&gt;=9A, dI/dt=500A/µs</td>
<td>24</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>t&lt;sub&gt;Q&lt;/sub&gt;</td>
<td>Body Diode Reverse Recovery Charge</td>
<td>I&lt;sub&gt;D&lt;/sub&gt;=9A, dI/dt=500A/µs</td>
<td>110</td>
<td></td>
<td></td>
<td>nC</td>
</tr>
</tbody>
</table>

A. The value of R<sub>θJA</sub> is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C. The Power dissipation P<sub>DSM</sub> is based on R<sub>θJA</sub><sub>≤</sub>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>θJA</sub> is the sum of the thermal impedance from junction to case R<sub>θJC</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 in² FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C.
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)

Figure 13: Current De-rating (Note F)

Figure 14: Single Pulse Power Rating Junction-to-Ambient (Note H)

Figure 15: Normalized Maximum Transient Thermal Impedance (Note H)
Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

Diode Recovery Test Circuit & Waveforms

E_{AR} = \frac{1}{2} L \frac{dI}{dt}

Q_{on} = \int I_{on} dt

AR

V_{dd}