AON6884
40V Dual N-Channel MOSFET

General Description

The AON6884 uses advanced trench technology to provide excellent $R_{DS(ON)}$ with low gate charge. This is an all purpose device that is suitable for use in a wide range of power conversion applications.

<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>40</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>$I_D$</td>
<td>34</td>
<td>A</td>
</tr>
<tr>
<td>Current $T_C=25^\circ C$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current $T_C=100^\circ C$</td>
<td></td>
<td>21</td>
<td>A</td>
</tr>
<tr>
<td>Pulsed Drain Current</td>
<td>$I_{DM}$</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Continuous Drain Current</td>
<td>$I_{DSM}$</td>
<td>9</td>
<td>A</td>
</tr>
<tr>
<td>Current $T_A=25^\circ C$</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Current $T_A=70^\circ C$</td>
<td></td>
<td>7</td>
<td>A</td>
</tr>
<tr>
<td>Avalanche Current</td>
<td>$I_{AS}, I_{AR}$</td>
<td>35</td>
<td>A</td>
</tr>
<tr>
<td>avalanche energy $L=0.1mH$</td>
<td>$E_{AS}, E_{AR}$</td>
<td>61</td>
<td>mJ</td>
</tr>
<tr>
<td>Power Dissipation $B$</td>
<td>$P_D$</td>
<td>21</td>
<td>W</td>
</tr>
<tr>
<td>Current $T_C=25^\circ C$</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Current $T_C=100^\circ C$</td>
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<td>8</td>
<td>W</td>
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<tr>
<td>Power Dissipation $A$</td>
<td>$P_{DSM}$</td>
<td>1.6</td>
<td>W</td>
</tr>
<tr>
<td>Current $T_A=25^\circ C$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current $T_A=70^\circ C$</td>
<td></td>
<td>1</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>

Product Summary

- $V_{DS}$: 40V
- $I_D$ (at $V_{GS}=10V$): 34A
- $R_{DS(ON)}$ (at $V_{GS}=10V$): < 11.3mΩ
- $R_{DS(ON)}$ (at $V_{GS} = 4.5V$): < 13.8mΩ

100% UIS Tested
100% $R_g$ Tested
### Electrical Characteristics (T_{j}=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>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BV_{DSS}</td>
<td>Drain-Source Breakdown Voltage</td>
<td>I_D=250µA, V_GS=0V</td>
<td>40</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>I_{RSS}</td>
<td>Zero Gate Voltage Drain Current</td>
<td>V_DS=40V, V_GS=0V</td>
<td></td>
<td>1</td>
<td></td>
<td>µA</td>
</tr>
<tr>
<td>I_{GSS}</td>
<td>Gate-Body leakage current</td>
<td>V_DS=0V, V_GS=±20V</td>
<td></td>
<td>±100</td>
<td></td>
<td>nA</td>
</tr>
<tr>
<td>V_{GS(th)}</td>
<td>Gate Threshold Voltage</td>
<td>V_DS=V_GS, I_D=250µA</td>
<td>1.55</td>
<td>2.1</td>
<td>2.7</td>
<td>V</td>
</tr>
<tr>
<td>I_{D(ON)}</td>
<td>On state drain current</td>
<td>V_DS=10V, V_GS=5V</td>
<td>120</td>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>R_{DS(ON)}</td>
<td>Static Drain-Source On-Resistance</td>
<td>V_GS=10V, I_D=10A</td>
<td>9.4</td>
<td>11.3</td>
<td></td>
<td>mΩ</td>
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<tr>
<td></td>
<td></td>
<td>V_GS=4.5V, I_D=10A</td>
<td></td>
<td>14</td>
<td>17</td>
<td>mΩ</td>
</tr>
<tr>
<td>g_{FS}</td>
<td>Forward Transconductance</td>
<td>V_DS=5V, I_D=10A</td>
<td>50</td>
<td></td>
<td></td>
<td>S</td>
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<tr>
<td>V_{SD}</td>
<td>Diode Forward Voltage</td>
<td>I_S=1A, V_GS=0V</td>
<td>0.7</td>
<td>1</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>I_{s}</td>
<td>Maximum Body-Diode Continuous Current</td>
<td></td>
<td>25</td>
<td></td>
<td></td>
<td>A</td>
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<td><strong>DYNAMIC PARAMETERS</strong></td>
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</tr>
<tr>
<td>C_{gs}</td>
<td>Input Capacitance</td>
<td>V_GS=0V, V_DS=20V, f=1MHz</td>
<td>1200</td>
<td>1500</td>
<td>1950</td>
<td>pF</td>
</tr>
<tr>
<td>C_{oss}</td>
<td>Output Capacitance</td>
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<td>150</td>
<td>215</td>
<td>280</td>
<td>pF</td>
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<td>C_{rss}</td>
<td>Reverse Transfer Capacitance</td>
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<td>80</td>
<td>135</td>
<td>190</td>
<td>pF</td>
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<tr>
<td>R_{g}</td>
<td>Gate resistance</td>
<td>V_GS=0V, V_DS=0V, f=1MHz</td>
<td>1.7</td>
<td>3.5</td>
<td>5.3</td>
<td>Ω</td>
</tr>
<tr>
<td><strong>SWITCHING PARAMETERS</strong></td>
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</tr>
<tr>
<td>Q_{g}(10V)</td>
<td>Total Gate Charge</td>
<td>V_GS=10V, V_DS=20V, I_D=10A</td>
<td>22</td>
<td>27.2</td>
<td>33</td>
<td>nC</td>
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<tr>
<td>Q_{g}(4.5V)</td>
<td>Total Gate Charge</td>
<td></td>
<td>10</td>
<td>13.6</td>
<td>16</td>
<td>nC</td>
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<tr>
<td>Q_{gs}</td>
<td>Gate Source Charge</td>
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<td>3.6</td>
<td>4.5</td>
<td>5.4</td>
<td>nC</td>
</tr>
<tr>
<td>Q_{gd}</td>
<td>Gate Drain Charge</td>
<td></td>
<td>3.8</td>
<td>6.4</td>
<td>9</td>
<td>nC</td>
</tr>
<tr>
<td>t_{(ON)}</td>
<td>Turn-On Delay Time</td>
<td>V_GS=10V, V_DS=20V</td>
<td>6.4</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>t_{(off)}</td>
<td>Turn-Off Delay Time</td>
<td></td>
<td>17.2</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>t_{r}</td>
<td>Turn-Off Fall Time</td>
<td>R_{GEN}=3Ω</td>
<td>29.6</td>
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<td></td>
<td>ns</td>
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<tr>
<td>t_{rr}</td>
<td>Body Diode Reverse Recovery Time</td>
<td>I_F=10A, dl/dt=500µA/µs</td>
<td>16.8</td>
<td></td>
<td></td>
<td>ns</td>
</tr>
<tr>
<td>Q_{tr}</td>
<td>Body Diode Reverse Recovery Charge</td>
<td>I_F=10A, dl/dt=500µA/µs</td>
<td>25</td>
<td>35</td>
<td>45</td>
<td>nC</td>
</tr>
</tbody>
</table>

A. The value of R_{θJA} is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, in a still air environment with T_{A}=25°C. The Power dissipation P_{DSM} is based on R_{θJA} 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_{D} is based on T_{J(MAX)}=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. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C. Ratings are based on low frequency and duty cycles to keep initial T_{J}=25°C.

D. The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} 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_{J(MAX)}=150°C. The SOA curve provides a single pulse rating.

G. The maximum current rating is limited by bond-wires.

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_{A}=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: Single Pulse Avalanche capability (Note C)

Figure 13: Power De-rating (Note F)

Figure 14: Current De-rating (Note F)

Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note H)

Figure 16: Normalized Maximum Transient Thermal Impedance (Note H)