The AON7423 combines advanced trench MOSFET technology with a low resistance package to provide extremely low *R*<sub>DS(ON)</sub>. This device is ideal for load switch and battery protection applications.

### Absolute Maximum Ratings

**Symbol**
- **V<sub>DS</sub>**
- **V<sub>GS</sub>**
- **I<sub>D</sub>**
- **I<sub>DM</sub>**
- **I<sub>BS</sub>**
- **I<sub>AS</sub>**
- **I<sub>AR</sub>**
- **E<sub>AS</sub>**
- **E<sub>AR</sub>**
- **P<sub>D</sub>**
- **P<sub>DSM</sub>**
- **T<sub>TJ</sub>**

**Parameter**
- Drain-Source Voltage
- Gate-Source Voltage
- Continuous Drain Current
- Pulsed Drain Current
- Continuous Drain Current
- Avalanche Current
- Avalanche Energy
- Power Dissipation
- Power Dissipation
- Junction and Storage Temperature Range

**Units**
- **V**
- **A**
- **A**
- **mJ**
- **W**
- **W**
- **°C**

**Maximum**
- **-20V**
- **±8 V**
- **-50 A**
- **-200 A**
- **-28 A**
- **60 A**
- **180 mJ**
- **83 W**
- **6.2 W**
- **-55 to 150 °C**

**Typ**
- **16**
- **45**
- **1.1**

**Max**
- **20**
- **55**
- **1.5**

**Units**
- **°C/W**

**Additional Notes**
- 100% UIS Tested
- 100% *R<sub>y</sub>* Tested

**Thermal Characteristics**

**Parameter**
- Maximum Junction-to-Ambient
- Maximum Junction-to-Ambient
- Maximum Junction-to-Case

**Symbol**
- **R<sub>MA</sub>**
- **R<sub>MS</sub>**
- **R<sub>MC</sub>**

**Typ**
- **16**
- **45**
- **1.1**

**Max**
- **20**
- **55**
- **1.5**

**Units**
- **°C/W**

**Notes**
- *R<sub>ON</sub>*
- *R<sub>DS(ON)</sub>*
- *V<sub>DS</sub>*
- *V<sub>GS</sub>*
- *I<sub>D</sub>*
- *I<sub>DM</sub>*
- *I<sub>BS</sub>*
- *I<sub>AS</sub>*
- *I<sub>AR</sub>*
- *E<sub>AS</sub>*
- *E<sub>AR</sub>*
- *P<sub>D</sub>*
- *P<sub>DSM</sub>*
- *T<sub>J</sub>*
- *R<sub>MA</sub>*
- *R<sub>MS</sub>*
- *R<sub>MC</sub>*
### 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>
</tr>
</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>-20</td>
<td>-1</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>$I_{DSS}$</td>
<td>Zero Gate Voltage Drain Current</td>
<td>$V_{DS}$=20V, $V_{GS}$=0V</td>
<td></td>
<td></td>
<td></td>
<td>µA</td>
</tr>
<tr>
<td>$I_{GS}$</td>
<td>Gate-Body leakage current</td>
<td>$V_{DS}$=0V, $V_{GS}$=±8V</td>
<td>±100</td>
<td></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>-0.2</td>
<td>-0.5</td>
<td>-0.9</td>
<td>V</td>
</tr>
<tr>
<td>$I_{D(on)}$</td>
<td>On state drain current</td>
<td>$V_{GS}$=4.5V, $V_{DS}$=5V</td>
<td>-200</td>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>$R_{DS(on)}$</td>
<td>Static Drain-Source On-Resistance</td>
<td>$V_{GS}$=4.5V, $I_D$=20A</td>
<td>3.95</td>
<td>5</td>
<td></td>
<td>mΩ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{GS}$=2.5V, $I_D$=20A</td>
<td>4.9</td>
<td>6.5</td>
<td></td>
<td>mΩ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{GS}$=1.8V, $I_D$=20A</td>
<td>6.1</td>
<td>8.5</td>
<td></td>
<td>mΩ</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_{GS}$=1.5V, $I_D$=20A</td>
<td>7.7</td>
<td>11</td>
<td></td>
<td>mΩ</td>
</tr>
<tr>
<td>$g_{FS}$</td>
<td>Forward Transconductance</td>
<td>$V_{DS}$=0V, $I_D$=20A</td>
<td>110</td>
<td></td>
<td></td>
<td>S</td>
</tr>
<tr>
<td>$V_{SD}$</td>
<td>Diode Forward Voltage</td>
<td>$I_S$=1A, $V_{GS}$=0V</td>
<td>-0.5</td>
<td>-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$I_{S}$</td>
<td>Maximum Body-Diode Continuous Current</td>
<td>$V_{GS}$=±4.5V, $V_{DS}$=10V</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### DYNAMIC PARAMETERS

- $C_{iss}$: Input Capacitance
- $C_{oss}$: Output Capacitance
- $C_{rss}$: Reverse Transfer Capacitance
- $R_g$: Gate resistance
- $G_{fs}$: Forward Transconductance
- $V_{SD}$: Diode Forward Voltage
- $I_S$: Maximum Body-Diode Continuous Current

**SWITCHING PARAMETERS**

- $Q_d$: Total Gate Charge
- $Q_{gs}$: Gate Source Charge
- $Q_{gd}$: Gate Drain Charge
- $I_{D(on)}$: Turn-On Delay Time
- $t_r$: Turn-On Rise Time
- $I_{D(soft)}$: Turn-Off Delay Time
- $I_{f}$: Turn-Off Fall Time
- $t_r$: Body Diode Reverse Recovery Time
- $Q_{r}$: Body Diode Reverse Recovery Charge

A. The value of $R_{th}$ is measured with the device mounted on 1in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_J$=25°C. The Power dissipation $P_F$ is based on $R_{th}$ at $T_J<100$°C 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 $P_F$ 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 $R_{th}$ is the sum of the thermal impedance from junction to case $R_{th}$ 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 package limited.
H. These tests are performed with the device mounted on 1 in$^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_J$=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)

In descending order:
D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01, single pulse

Note F: See page 6 for details.
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)

\[
D = \frac{T_{on}}{T} \\
T_{PK} = T + P_{DM} \cdot Z_{\theta JA} \cdot R_{\theta JA}
\]

In descending order, D=0.5, 0.3, 0.1, 0.05, 0.02, 0.01, single pulse

\[
R_{\theta JA} = 55°C/W
\]

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Gate Charge Test Circuit & Waveform

Resistive Switching Test Circuit & Waveforms

Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

Diode Recovery Test Circuit & Waveforms