## General Description
- Trench Power MOSFET technology
- Ultra low $R_{SS(ON)}$
- With ESD protection to improve battery performance and safety
- Common drain configuration for design simplicity
- RoHS 2.0 and Halogen-Free Compliant

### Applications
- Battery protection switch
- Mobile device battery charging and discharging

## Product Summary

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Typical</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source-Source Voltage</td>
<td>$V_{SS}$</td>
<td>12</td>
<td>V</td>
</tr>
<tr>
<td>Gate-Source Voltage</td>
<td>$V_{GS}$</td>
<td>$\pm 8$</td>
<td>V</td>
</tr>
<tr>
<td>Source Current(DC)</td>
<td>$I_s$</td>
<td>30</td>
<td>A</td>
</tr>
<tr>
<td>Source Current(Pulse)</td>
<td>$I_{SM}$</td>
<td>100</td>
<td>A</td>
</tr>
<tr>
<td>Power Dissipation</td>
<td>$P_{D}$</td>
<td>3.1</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>

## Orderable Part Number

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package Type</th>
<th>Form</th>
<th>Minimum Order Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOCCR33105E</td>
<td>MRigidCSP™ 2.08x1.45_10</td>
<td>Tape &amp; Reel</td>
<td>8000</td>
</tr>
</tbody>
</table>

## Absolute Maximum Ratings

- $T_A=25^\circ C$ unless otherwise noted

## Thermal Characteristics

- Maximum Junction-to-Ambient Steady-State $P_{JA}$
- Maximum Junction-to-Ambient $T_J$ ≤ 10s

### Notes
1. $I_s$ rated value is based on bare silicon. Mounted on 70mmx70mm FR-4 board.
2. PW <10 μs pulses, duty cycle 1% max.
### 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>
</tr>
</thead>
<tbody>
<tr>
<td>BV&lt;sub&gt;SS&lt;/sub&gt;</td>
<td>Source-Source Breakdown Voltage</td>
<td>I&lt;sub&gt;SS&lt;/sub&gt;=250μA, V&lt;sub&gt;GS&lt;/sub&gt;=0V, Test Circuit 6</td>
<td>12</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>I&lt;sub&gt;SS&lt;/sub&gt;</td>
<td>Zero Gate Voltage Source Current</td>
<td>V&lt;sub&gt;SS&lt;/sub&gt;=12V, V&lt;sub&gt;GS&lt;/sub&gt;=0V, Test Circuit 1</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 leakage current</td>
<td>V&lt;sub&gt;SS&lt;/sub&gt;=0V, V&lt;sub&gt;GS&lt;/sub&gt;=±8V, Test Circuit 2</td>
<td>±10</td>
<td></td>
<td></td>
<td>µA</td>
</tr>
<tr>
<td>V&lt;sub&gt;GS(th)&lt;/sub&gt;</td>
<td>Gate Threshold Voltage</td>
<td>V&lt;sub&gt;GS&lt;/sub&gt;=V&lt;sub&gt;GS&lt;/sub&gt;, I&lt;sub&gt;SS&lt;/sub&gt;=250µA, Test Circuit 3</td>
<td>0.5</td>
<td>0.9</td>
<td>1.3</td>
<td>V</td>
</tr>
<tr>
<td>R&lt;sub&gt;GS(ON)&lt;/sub&gt;</td>
<td>Static Source to Source On-Resistance</td>
<td>V&lt;sub&gt;GS&lt;/sub&gt;=4.5V, I&lt;sub&gt;G&lt;/sub&gt;=5A, Test Circuit 4</td>
<td>1.6</td>
<td>2.3</td>
<td>3</td>
<td>mΩ</td>
</tr>
<tr>
<td>G&lt;sub&gt;FS&lt;/sub&gt;</td>
<td>Forward Transconductance</td>
<td>V&lt;sub&gt;GS&lt;/sub&gt;=5V, I&lt;sub&gt;G&lt;/sub&gt;=5A, Test Circuit 3</td>
<td>50</td>
<td></td>
<td></td>
<td>S</td>
</tr>
<tr>
<td>V&lt;sub&gt;SS&lt;/sub&gt;</td>
<td>Forward Source to Source Voltage</td>
<td>I&lt;sub&gt;G&lt;/sub&gt;=1A, V&lt;sub&gt;GS&lt;/sub&gt;=0V, Test Circuit 5</td>
<td>0.65</td>
<td></td>
<td>1</td>
<td>V</td>
</tr>
</tbody>
</table>

### Dynamic Parameters

<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>R&lt;sub&gt;g&lt;/sub&gt;</td>
<td>Gate resistance</td>
<td>f=1MHz</td>
<td>1.6</td>
<td></td>
<td></td>
<td>KΩ</td>
</tr>
</tbody>
</table>

### Switching Parameters

<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>Q&lt;sub&gt;g&lt;/sub&gt;</td>
<td>Total Gate Charge</td>
<td>V&lt;sub&gt;GS&lt;/sub&gt;=4.5V, V&lt;sub&gt;SS&lt;/sub&gt;=6V, I&lt;sub&gt;G&lt;/sub&gt;=5A</td>
<td>21</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></td>
<td>1.8</td>
<td></td>
<td></td>
<td>µs</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;=4.5V, V&lt;sub&gt;SS&lt;/sub&gt;=6V, R&lt;sub&gt;L&lt;/sub&gt;=1.2Ω, Test Circuit 8</td>
<td>3.6</td>
<td></td>
<td></td>
<td>µs</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>3.5</td>
<td></td>
<td></td>
<td>µs</td>
</tr>
<tr>
<td>t&lt;sub&gt;t&lt;/sub&gt;</td>
<td>Turn-Off Fall Time</td>
<td></td>
<td>6.6</td>
<td></td>
<td></td>
<td>µs</td>
</tr>
</tbody>
</table>

**Applications or Uses as Critical Components in Life Support Devices or Systems are Not Authorized.**

**AOS does not assume any liability arising out of such applications or uses of its products. AOS reserves the right to make changes to product specifications without notice. It is the responsibility of the customer to evaluate suitability of the product for their intended application. Customer shall comply with applicable legal requirements, including all applicable export control rules, regulations and limitations.**

AOS' products are provided subject to AOS' terms and conditions of sale which are set forth at:

http://www.aosmd.com/terms_and_conditions_of_sale
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1: On-Region Characteristics

Figure 2: Transfer Characteristics

Figure 3: On-Resistance vs. Source Current and Gate Voltage

Figure 4: On-Resistance vs. Junction Temperature

Figure 5: On-Resistance vs. Gate-Source Voltage

Figure 6: Forward Source to Source Characteristics
TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7: Gate-Charge Characteristics

Figure 8: Maximum Forward Biased Safe Operating Area (Note1)

Figure 9: Single Pulse Power Rating Junction-to-Ambient (Note1)

Figure 10: Normalized Maximum Transient Thermal Impedance (Note1)

V_{GS}=6V
I_{D}=5A

Q_g (nC)

V_{GS} (Volts)

Gates

Power (W)

Pulse Width (s)

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

T_J(Max)=150° C
T_A=25° C

R_{SSON} limited

V_{SS}=6V
I_{S}=5A

T_J(Max)=150° C
T_A=25° C

100ms
1ms
100μs
10μs

DC

Figure 8: Maximum Forward Biased Safe Operating Area (Note1)
**TEST CIRCUIT 1** Isss

Positive VSS for ISSS+
Negative VSS for ISSS-

When FET1 is measured between GATE and SOURCE of FET2 are shorted

**TEST CIRCUIT 2** Igss1,2

Positive VSS for IGSS1+
Negative VSS for IGSS1-

When FET1 is measured between GATE and SOURCE of FET2 are shorted

**TEST CIRCUIT 3** Vgs(off)

When FET1 is measured between GATE and SOURCE of FET2 are shorted

**TEST CIRCUIT 4** Rss(on)

**TEST CIRCUIT 5** Vf(oss)1,2

**TEST CIRCUIT 6** BVdss

Positive VSS for ISSS+
Negative VSS for ISSS-

When FET1 measured between GATE and SOURCE of FET2 are shorted

**TEST CIRCUIT 7** BVgs1,2

Positive VSS for ISSS+
Negative VSS for ISSS-

When FET1 measured between GATE and SOURCE of FET2 are shorted

**TEST CIRCUIT 8** Switching time

Positive VSS for ISSS+
Negative VSS for ISSS-

When FET1 measured between GATE and SOURCE of FET2 are shorted