
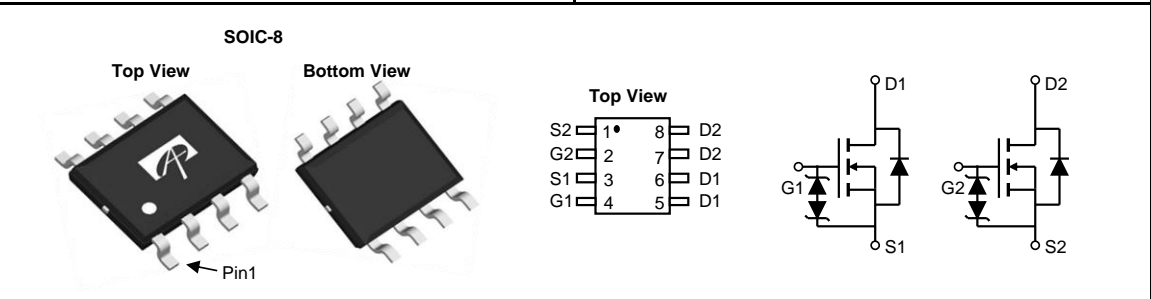


| | | | | | | | | | |
|--|--|----------|-----|--------------------------|------|---------------------------------|--------|----------------------------------|--------|
| <p>General Description</p> <ul style="list-style-type: none"> Trench Power AlphaMOS (αMOS LV) technology Low $R_{DS(ON)}$ Low Gate Charge High Current Capability RoHS and Halogen-Free Compliant <p>Applications</p> <ul style="list-style-type: none"> System switch Inverter Motor drive PPC MFP | <p>Product Summary</p> <table style="width: 100%; border: none;"> <tr> <td style="padding: 2px;">V_{DS}</td> <td style="padding: 2px;">30V</td> </tr> <tr> <td style="padding: 2px;">I_D (at $V_{GS}=10V$)</td> <td style="padding: 2px;">4.5A</td> </tr> <tr> <td style="padding: 2px;">$R_{DS(ON)}$ (at $V_{GS}=10V$)</td> <td style="padding: 2px;">< 46mΩ</td> </tr> <tr> <td style="padding: 2px;">$R_{DS(ON)}$ (at $V_{GS}=4.5V$)</td> <td style="padding: 2px;">< 65mΩ</td> </tr> </table> <p>Typical ESD protection HBM Class 2</p> <p>100% UIS Tested 100% Rg Tested</p> <div style="text-align: right;">  </div> | V_{DS} | 30V | I_D (at $V_{GS}=10V$) | 4.5A | $R_{DS(ON)}$ (at $V_{GS}=10V$) | < 46mΩ | $R_{DS(ON)}$ (at $V_{GS}=4.5V$) | < 65mΩ |
| V_{DS} | 30V | | | | | | | | |
| I_D (at $V_{GS}=10V$) | 4.5A | | | | | | | | |
| $R_{DS(ON)}$ (at $V_{GS}=10V$) | < 46mΩ | | | | | | | | |
| $R_{DS(ON)}$ (at $V_{GS}=4.5V$) | < 65mΩ | | | | | | | | |



| Orderable Part Number | Package Type | Form | Minimum Order Quantity |
|-----------------------|--------------|-------------|------------------------|
| AO4862E | SO-8 | Tape & Reel | 3000 |

| Absolute Maximum Ratings $T_A=25^{\circ}C$ unless otherwise noted | | | |
|---|----------------|-------------------|-------------|
| Parameter | Symbol | Maximum | Units |
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current | I_D | $T_A=25^{\circ}C$ | 4.5 |
| | | $T_A=70^{\circ}C$ | 3.5 |
| Pulsed Drain Current ^C | I_{DM} | 18 | A |
| Avalanche Current ^C | I_{AS} | 8 | A |
| Avalanche energy $L=0.1mH$ ^C | E_{AS} | 3 | mJ |
| V_{DS} Spike | V_{SPIKE} | 36 | V |
| Power Dissipation ^B | P_D | $T_A=25^{\circ}C$ | 1.7 |
| | | $T_A=70^{\circ}C$ | 1.1 |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | $^{\circ}C$ |

| Thermal Characteristics | | | | | |
|--|-----------------|--------------|-----|-------|---------------|
| Parameter | Symbol | Typ | Max | Units | |
| Maximum Junction-to-Ambient ^A | $R_{\theta JA}$ | $t \leq 10s$ | 52 | 70 | $^{\circ}C/W$ |
| Maximum Junction-to-Ambient ^{A,D} | | Steady-State | 80 | 100 | $^{\circ}C/W$ |
| Maximum Junction-to-Lead | $R_{\theta JL}$ | Steady-State | 35 | 45 | $^{\circ}C/W$ |

Electrical Characteristics (T_J=25°C unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|-----------------------------|---------------------------------------|--|-----|------|-----|-------|
| STATIC PARAMETERS | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | ID=250μA, VGS=0V | 30 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =30V, V _{GS} =0V T _J =55°C | | | 1 | μA |
| | | | | | 5 | |
| I _{GSS} | Gate-Body leakage current | V _{DS} =0V, V _{GS} =±20V | | | ±10 | μA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 1.5 | 1.9 | 2.5 | V |
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =10V, I _D =4.5A T _J =125°C | | 38 | 46 | mΩ |
| | | | | 60 | 72 | |
| | | | | | 50 | 65 |
| g _{FS} | Forward Transconductance | V _{DS} =5V, I _D =4.5A | | 11 | | S |
| V _{SD} | Diode Forward Voltage | I _S =1A, V _{GS} =0V | | 0.8 | 1 | V |
| I _S | Maximum Body-Diode Continuous Current | | | | 2 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =15V, f=1MHz | | 215 | | pF |
| C _{oss} | Output Capacitance | | | 35 | | pF |
| C _{riss} | Reverse Transfer Capacitance | | | 20 | | pF |
| R _g | Gate resistance | f=1MHz | 1 | 2 | 3 | Ω |
| SWITCHING PARAMETERS | | | | | | |
| Q _{g(10V)} | Total Gate Charge | V _{GS} =10V, V _{DS} =15V, I _D =4.5A | | 4.2 | 10 | nC |
| Q _{g(4.5V)} | Total Gate Charge | | | 2 | 6 | nC |
| Q _{gs} | Gate Source Charge | | | 0.55 | | nC |
| Q _{gd} | Gate Drain Charge | | | 1 | | nC |
| t _{D(on)} | Turn-On DelayTime | V _{GS} =10V, V _{DS} =15V, R _L =3.33Ω, R _{GEN} =3Ω | | 3 | | ns |
| t _r | Turn-On Rise Time | | | 3 | | ns |
| t _{D(off)} | Turn-Off DelayTime | | | 16 | | ns |
| t _f | Turn-Off Fall Time | | | 2.5 | | ns |
| t _{rr} | Body Diode Reverse Recovery Time | I _F =4.5A, di/dt=500A/μs | | 5.5 | | ns |
| Q _{rr} | Body Diode Reverse Recovery Charge | I _F =4.5A, di/dt=500A/μs | | 7 | | nC |

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 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 ≤ 10s junction-to-ambient thermal resistance.

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 lead R_{θJL} and lead 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-ambient thermal impedance which is measured with the device mounted on 1in² FR-4 board with 2oz. Copper, assuming a maximum junction temperature of T_{J(MAX)}=150° C. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

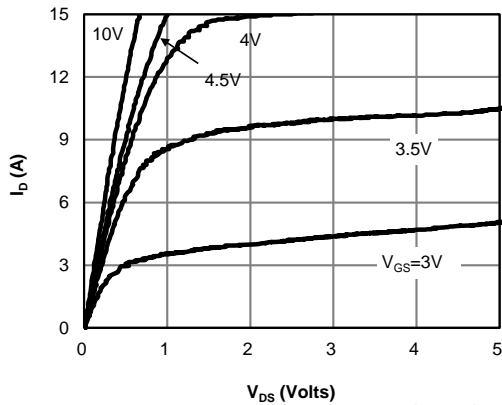


Figure 1: On-Region Characteristics (Note E)

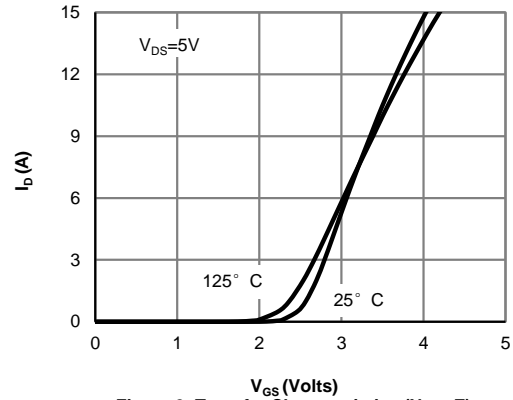


Figure 2: Transfer Characteristics (Note E)

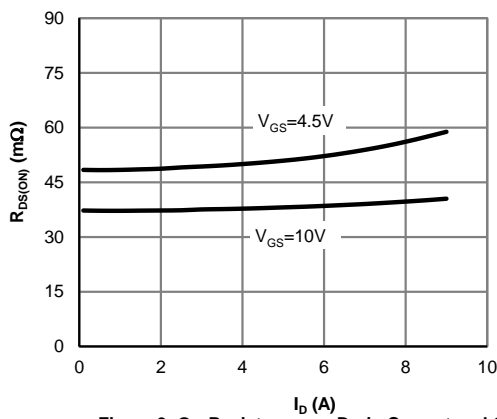


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

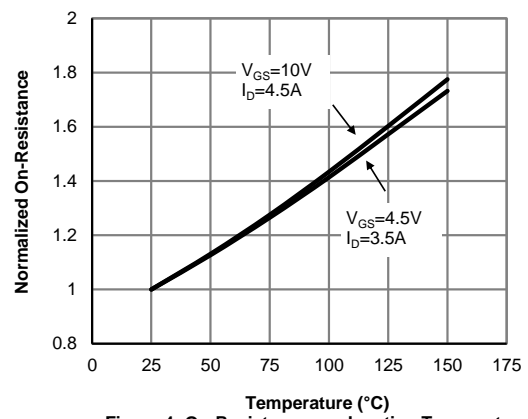


Figure 4: On-Resistance vs. Junction Temperature (Note E)

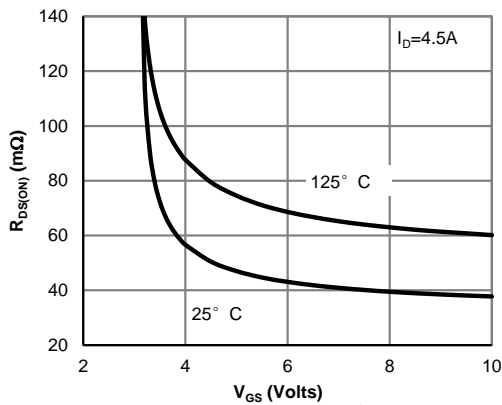


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

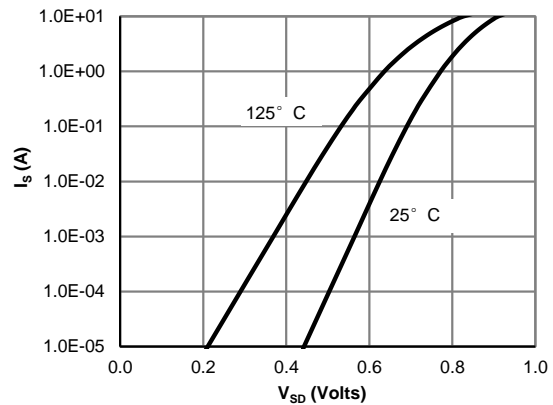


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

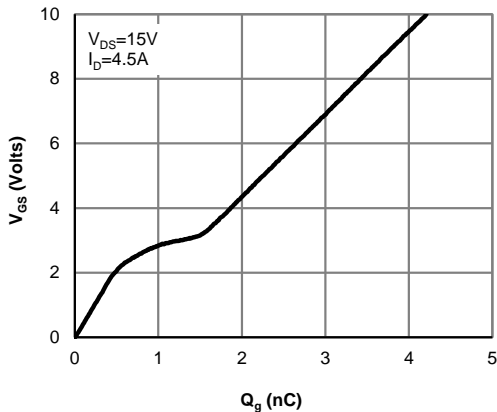


Figure 7: Gate-Charge Characteristics

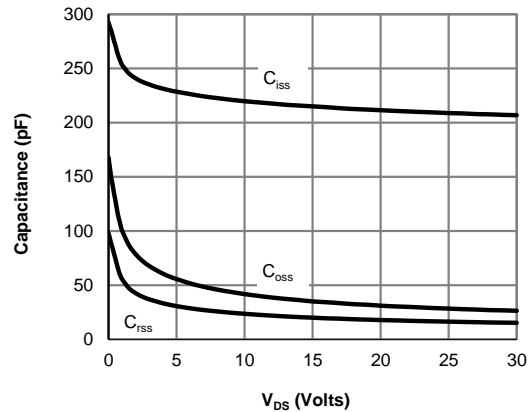


Figure 8: Capacitance Characteristics

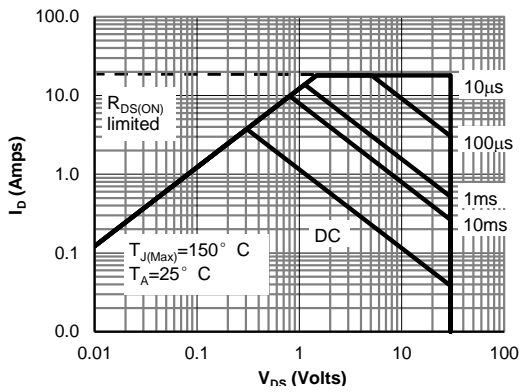


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

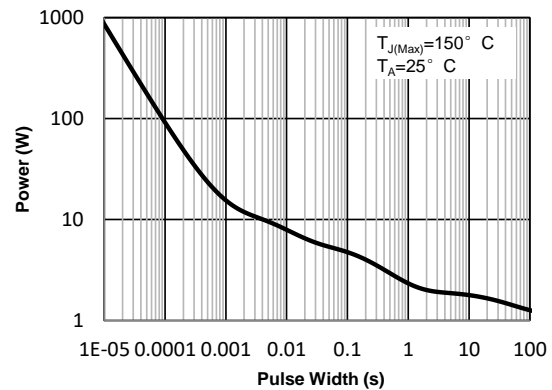


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

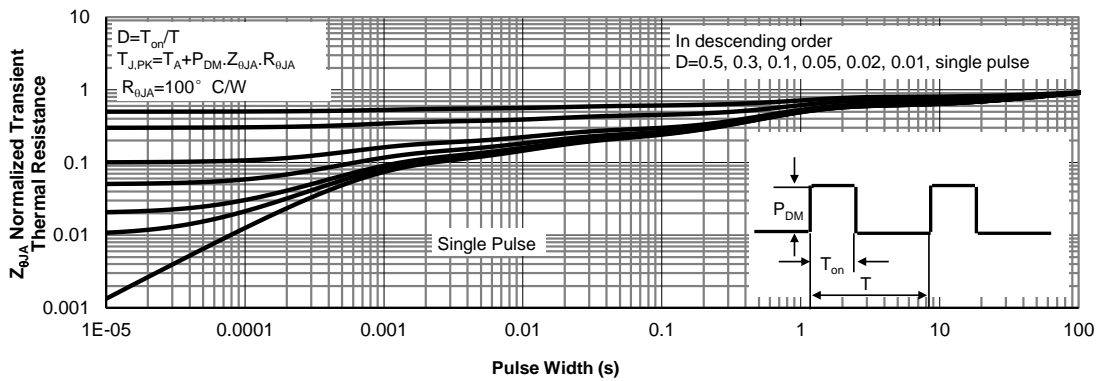


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Figure A: Gate Charge Test Circuit & Waveforms

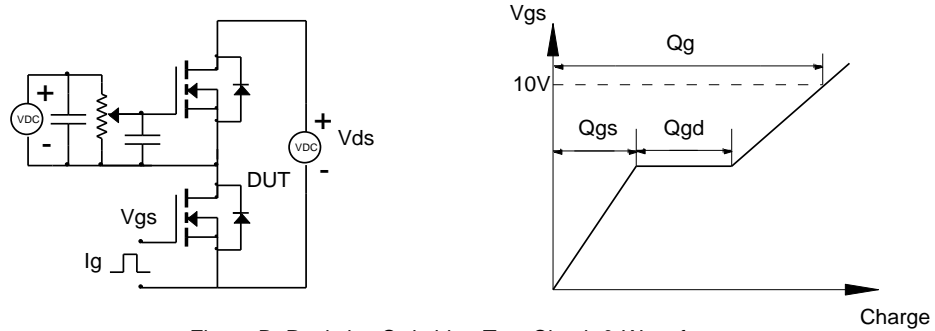


Figure B: Resistive Switching Test Circuit & Waveforms

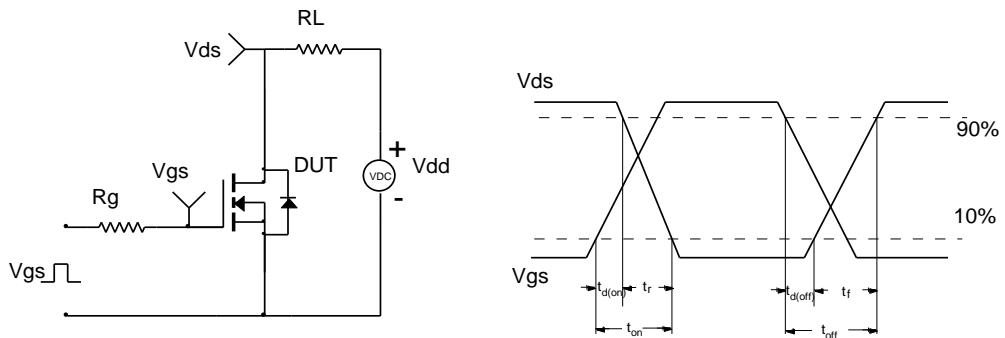


Figure C: Unclamped Inductive Switching (UIS) Test Circuit & Waveforms

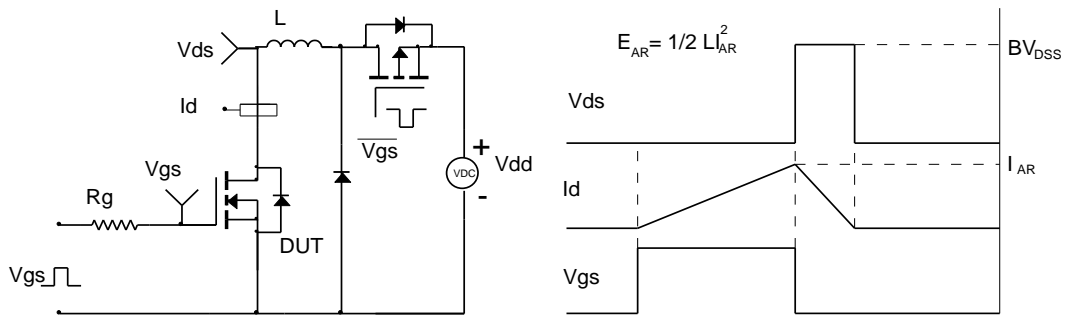


Figure D: Diode Recovery Test Circuit & Waveforms

