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General Description

The AO4498 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.

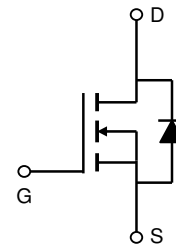
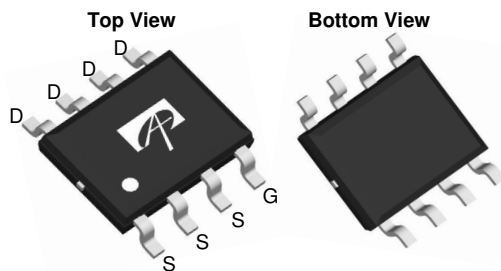
Product Summary

$V_{DS} (V) = 30V$
 $I_D = 18A$ ($V_{GS} = 10V$)
 $R_{DS(ON)} < 5.5m\Omega$ ($V_{GS} = 10V$)
 $R_{DS(ON)} < 7.5m\Omega$ ($V_{GS} = 4.5V$)

100% UIS Tested
100% Rg Tested



SOIC-8



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 | $T_C=25^\circ C$ | 18 |
| | | $T_C=70^\circ C$ | 14 |
| Pulsed Drain Current ^C | I_{DM} | 140 | A |
| Avalanche Current ^C | I_{AR} | 42 | A |
| Repetitive avalanche energy $L=0.1mH$ ^C | E_{AR} | 88 | mJ |
| Power Dissipation ^B | P_D | $T_C=25^\circ C$ | 3.1 |
| | | $T_C=70^\circ C$ | 2 |
| 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 | $R_{\theta JA}$ | 31 | 40 | $^\circ C/W$ |
| Maximum Junction-to-Ambient ^{A,D} | | Steady-State | 59 | 75 |
| Maximum Junction-to-Lead | $R_{\theta JL}$ | 16 | 24 | $^\circ C/W$ |

Electrical Characteristics ($T_J=25^\circ\text{C}$ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|-----------------------------|---------------------------------------|---|-----|------|--------|------------------|
| STATIC PARAMETERS | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$ | 30 | 36.5 | | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=30\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$ | | | 1 5 | μA |
| I_{GSS} | Gate-Body leakage current | $V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$ | | | 100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$ | 1.3 | 1.8 | 2.5 | V |
| $I_{D(ON)}$ | On state drain current | $V_{GS}=10\text{V}$, $V_{DS}=5\text{V}$ | 140 | | | A |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}=10\text{V}$, $I_D=18\text{A}$ $T_J=125^\circ\text{C}$ | | 4.6 | 5.5 | $\text{m}\Omega$ |
| | | $V_{GS}=4.5\text{V}$, $I_D=16\text{A}$ | | 6 | 7.5 | |
| g_{FS} | Forward Transconductance | $V_{DS}=5\text{V}$, $I_D=18\text{A}$ | | 53 | | S |
| V_{SD} | Diode Forward Voltage | $I_S=1\text{A}$, $V_{GS}=0\text{V}$ | | 0.7 | 1 | V |
| I_S | Maximum Body-Diode Continuous Current | | | | 4 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C_{iss} | Input Capacitance | $V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, $f=1\text{MHz}$ | | 1910 | 2300 | pF |
| C_{oss} | Output Capacitance | | | 316 | | pF |
| C_{rss} | Reverse Transfer Capacitance | | | 227 | | pF |
| R_g | Gate resistance | $V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$ | 0.7 | 1.4 | 2.1 | Ω |
| SWITCHING PARAMETERS | | | | | | |
| $Q_g(10\text{V})$ | Total Gate Charge | $V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $I_D=18\text{A}$ | | 37 | 44.5 | nC |
| $Q_g(4.5\text{V})$ | Total Gate Charge | | | 18 | | nC |
| Q_{gs} | Gate Source Charge | | | 4.8 | | nC |
| Q_{gd} | Gate Drain Charge | | | 11 | | nC |
| $t_{D(on)}$ | Turn-On Delay Time | $V_{GS}=10\text{V}$, $V_{DS}=15\text{V}$, $R_L=0.83\Omega$, $R_{GEN}=3\Omega$ | | 8.1 | | ns |
| t_r | Turn-On Rise Time | | | 8.6 | | ns |
| $t_{D(off)}$ | Turn-Off Delay Time | | | 29 | | ns |
| t_f | Turn-Off Fall Time | | | 8 | | ns |
| t_{rr} | Body Diode Reverse Recovery Time | $I_F=18\text{A}$, $dI/dt=500\text{A}/\mu\text{s}$ | | 14 | 17 | ns |
| Q_{rr} | Body Diode Reverse Recovery Charge | $I_F=18\text{A}$, $dI/dt=500\text{A}/\mu\text{s}$ | | 40 | | nC |

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on $T_{J(MAX)}=150^\circ\text{C}$, using $\leq 10\text{s}$ junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ\text{C}$. Ratings are based on low frequency and duty cycles to keep initial $T_J=25^\circ\text{C}$.

D. The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using $<300\mu\text{s}$ 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 1in^2 FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}=150^\circ\text{C}$. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

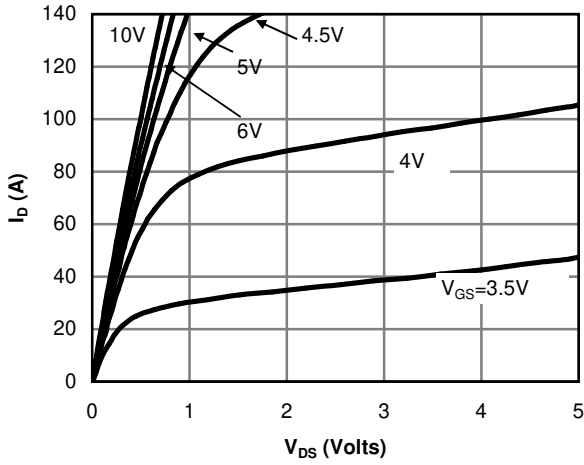


Fig 1: On-Region Characteristics (Note E)

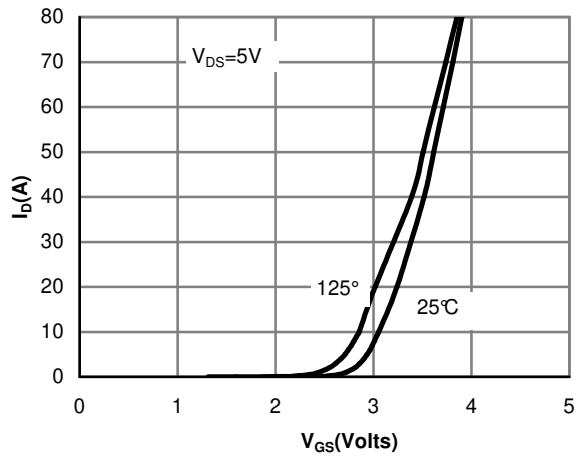


Figure 2: Transfer Characteristics (Note E)

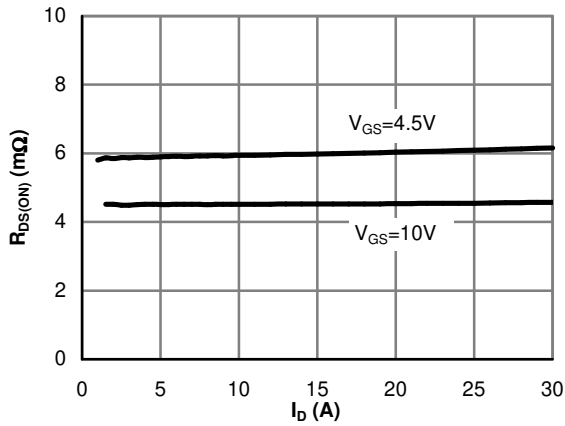


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

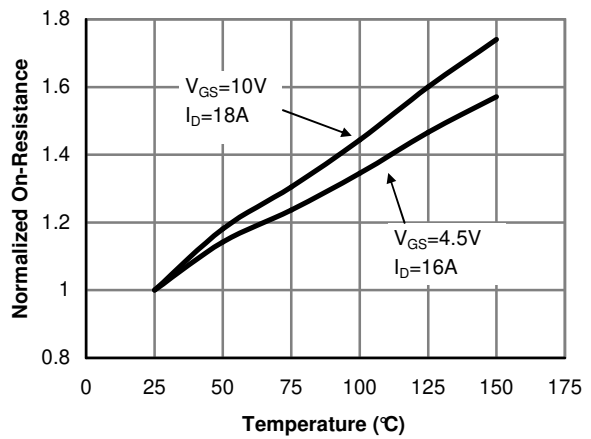


Figure 4: On-Resistance vs. Junction Temperature (Note E)

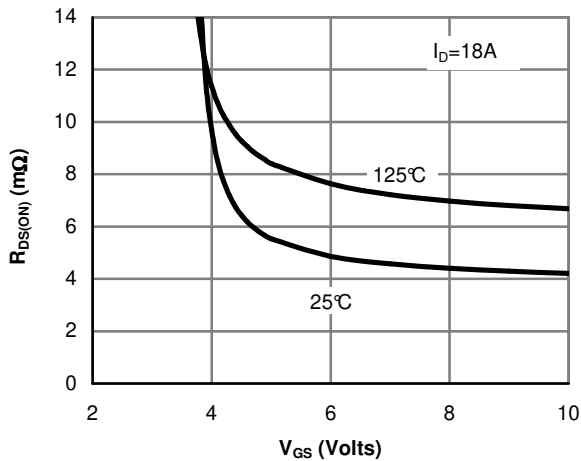


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

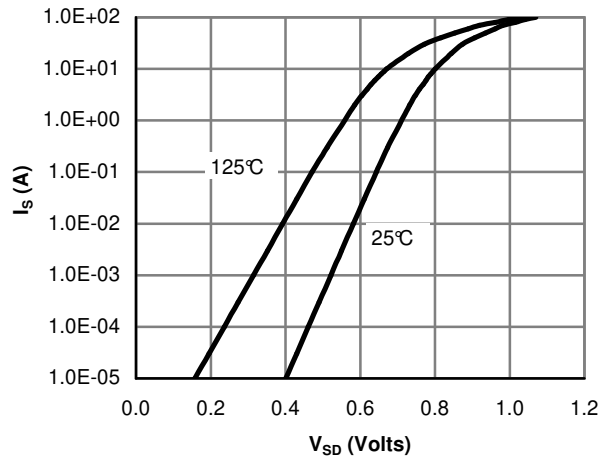


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

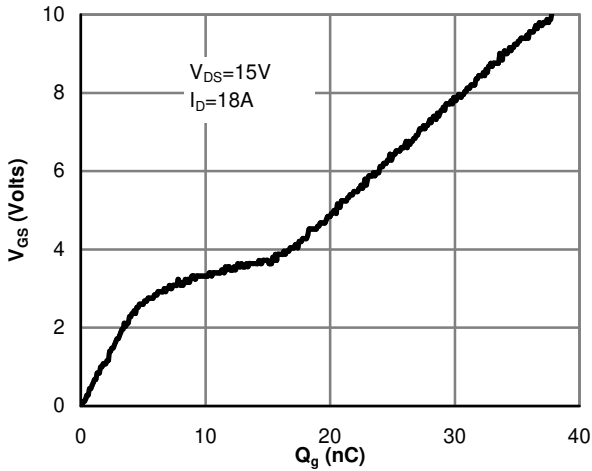


Figure 7: Gate-Charge Characteristics

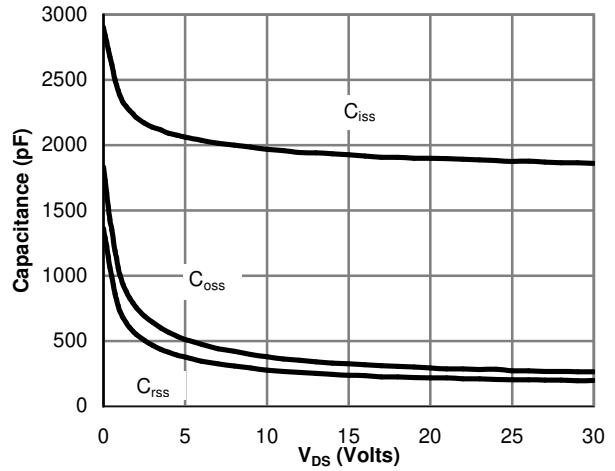


Figure 8: Capacitance Characteristics

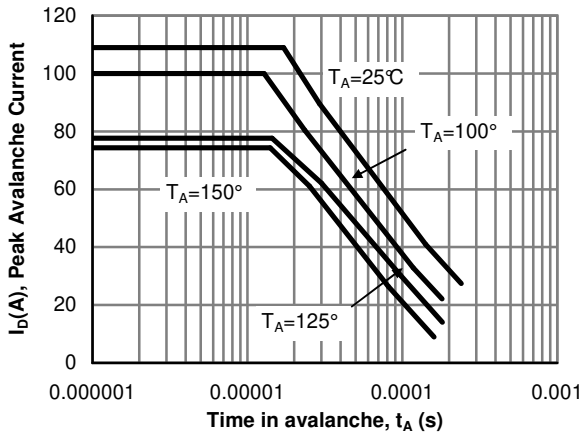


Figure 12: Single Pulse Avalanche capability (Note C)

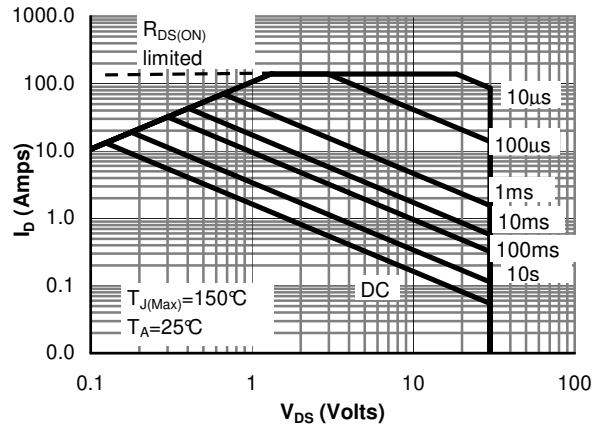


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

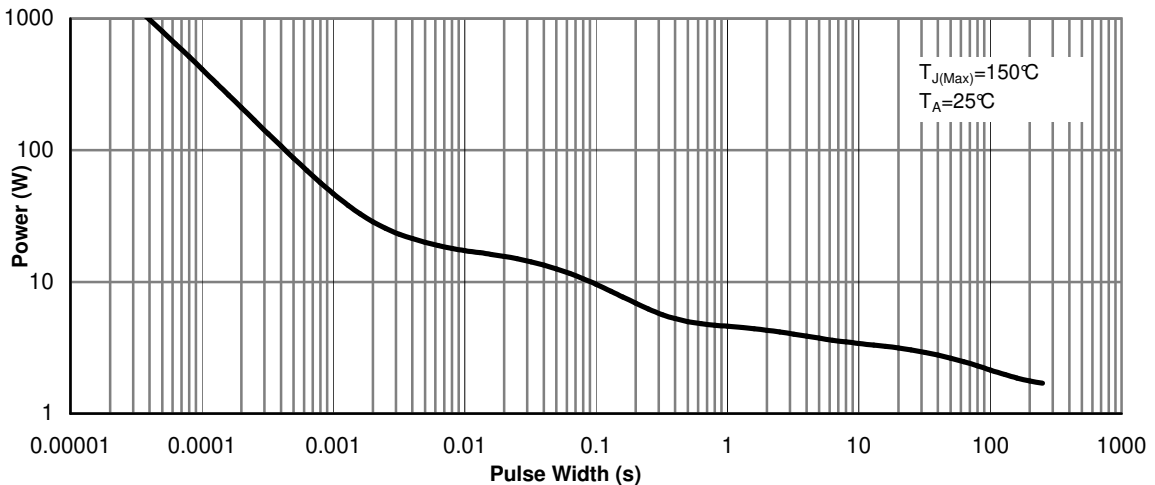


Figure 15: Single Pulse Power Rating Junction-to-Ambient (Note F)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

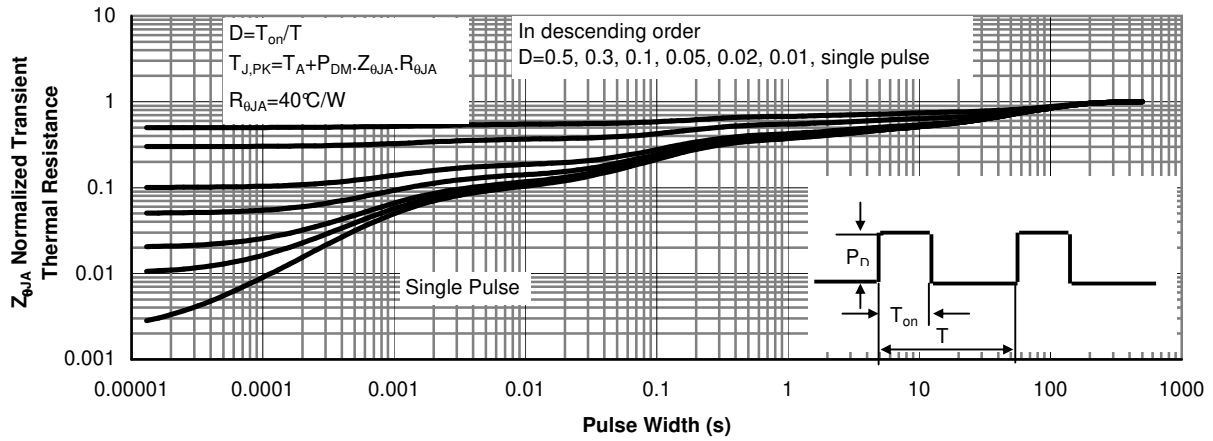
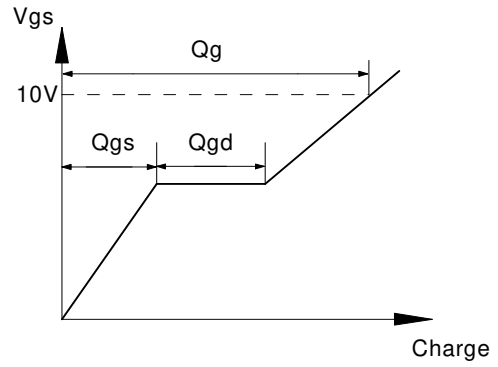
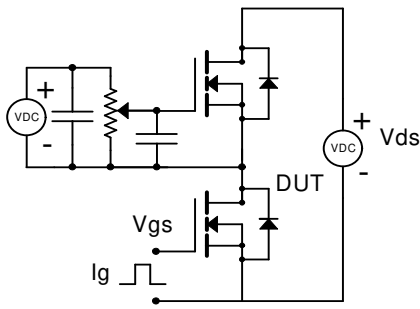


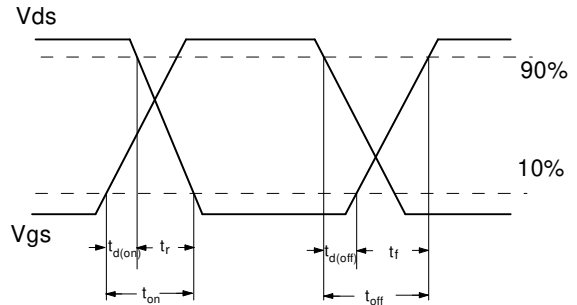
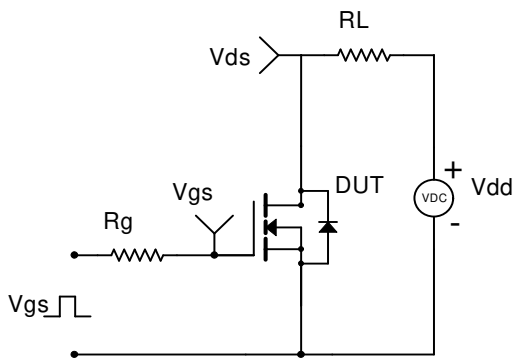
Figure 16: Normalized Maximum Transient Thermal Impedance (Note F)

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Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

