



AO8807

Dual P-Channel Enhancement Mode Field Effect Transistor

General Description

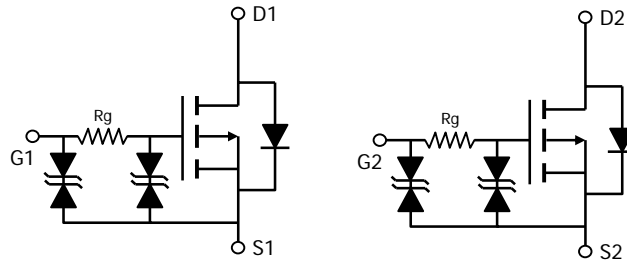
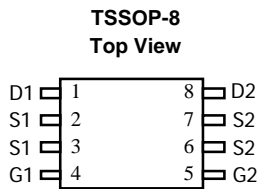
The AO8807 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V. This device is suitable for use as a load switch. AO8807 and AO8807L are electrically identical.

- RoHS Compliant
- Halogen Free

Features

- V_{DS} (V) = -12V
- I_D = -6.5 A (V_{GS} = -4.5V)
- $R_{DS(ON)} < 20m\Omega$ (V_{GS} = -4.5V)
- $R_{DS(ON)} < 24m\Omega$ (V_{GS} = -2.5V)
- $R_{DS(ON)} < 30m\Omega$ (V_{GS} = -1.8V)

ESD Protected!



Absolute Maximum Ratings $T_A=25^\circ\text{C}$ unless otherwise noted

| Parameter | Symbol | Maximum | Units |
|--|----------------|------------------------|------------------|
| Drain-Source Voltage | V_{DS} | -12 | V |
| Gate-Source Voltage | V_{GS} | ± 8 | V |
| Continuous Drain Current | I_D | $T_A=25^\circ\text{C}$ | -6.5 |
| | | $T_A=70^\circ\text{C}$ | -5 |
| Pulsed Drain Current ^C | I_{DM} | -60 | A |
| Power Dissipation ^B | P_D | $T_A=25^\circ\text{C}$ | 1.4 |
| | | $T_A=70^\circ\text{C}$ | 0.9 |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | $^\circ\text{C}$ |

Thermal Characteristics

| Parameter | Symbol | Typ | Max | Units |
|---|-----------------|-----|-----|--------------------|
| Maximum Junction-to-Ambient ^A | $R_{\theta JA}$ | 73 | 90 | $^\circ\text{C/W}$ |
| Maximum Junction-to-Ambient ^{AD} | | 96 | 125 | $^\circ\text{C/W}$ |
| Maximum Junction-to-Lead | $R_{\theta JL}$ | 63 | 75 | $^\circ\text{C/W}$ |

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|-----------------------------|---------------------------------------|---|--------------------------------------|----------|----------|-------|
| STATIC PARAMETERS | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | I _D =-250μA, V _{GS} =0V | -12 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =-12V, V _{GS} =0V T _J =55°C | | | -1 -5 | μA |
| I _{GSS} | Gate-Body leakage current | V _{DS} =0V, V _{GS} =±8V | | | ±10 | μA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} I _D =-250μA | -0.35 | -0.53 | -0.85 | |
| I _{D(ON)} | On state drain current | V _{GS} =-4.5V, V _{DS} =-5V | -60 | | | A |
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =-4.5V, I _D =-6.5A T _J =125°C | | 16 23 | 20 28 | mΩ |
| | | V _{GS} =-2.5V, I _D =-6A | | 19 | 24 | mΩ |
| | | V _{GS} =-1.8V, I _D =-5.5A | | 23 | 30 | mΩ |
| | | V _{GS} =-1.5V, I _D =-5A | | 28 | 36 | mΩ |
| | | | | | | |
| g _{FS} | Forward Transconductance | V _{DS} =-5V, I _D =-6.5A | | 45 | | S |
| V _{SD} | Diode Forward Voltage | I _S =-1A, V _{GS} =0V | | -0.56 | -1 | V |
| I _S | Maximum Body-Diode Continuous Current | | | | -1.4 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =-6V, f=1MHz | | 1740 | 2100 | pF |
| C _{oss} | Output Capacitance | | | 334 | | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 200 | | pF |
| R _g | Gate resistance | V _{GS} =0V, V _{DS} =0V, f=1MHz | | 1.3 | 1.7 | kΩ |
| SWITCHING PARAMETERS | | | | | | |
| Q _g | Total Gate Charge | V _{GS} =-4.5V, V _{DS} =-6V, I _D =-6.5A | | 19 | 23 | nC |
| Q _{gs} | Gate Source Charge | | | 4.5 | | nC |
| Q _{gd} | Gate Drain Charge | | | 5.3 | | nC |
| t _{D(on)} | Turn-On Delay Time | V _{GS} =-4.5V, V _{DS} =-6V, R _L =0.9Ω, R _{GEN} =3Ω | | 240 | | ns |
| t _r | Turn-On Rise Time | | | 580 | | ns |
| t _{D(off)} | Turn-Off Delay Time | | | 7 | | μs |
| t _f | Turn-Off Fall Time | | | 4.2 | | μs |
| t _{rr} | Body Diode Reverse Recovery Time | | I _F =-6.5A, di/dt=100A/μs | | 22 | 27 |
| Q _{rr} | Body Diode Reverse Recovery Charge | I _F =-6.5A, di/dt=100A/μs | | 17 | | 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 <300 μs 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

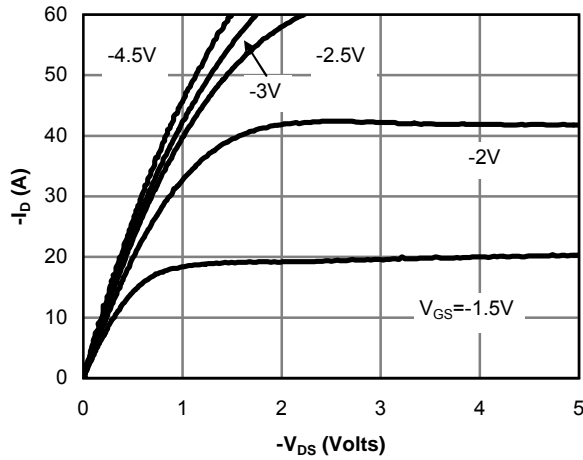


Figure 1: On-Region Characteristics(Note E)

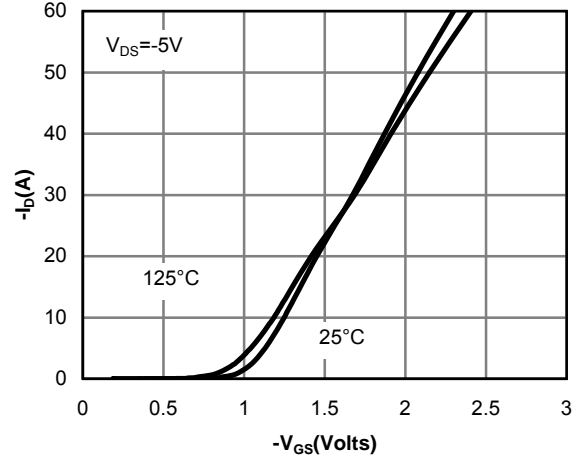


Figure 2: Transfer Characteristics(Note E)

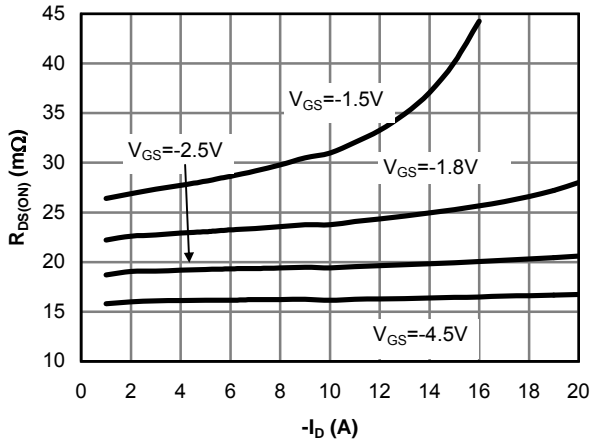


Figure 3: On-Resistance vs. Drain Current and Gate Voltage(Note E)

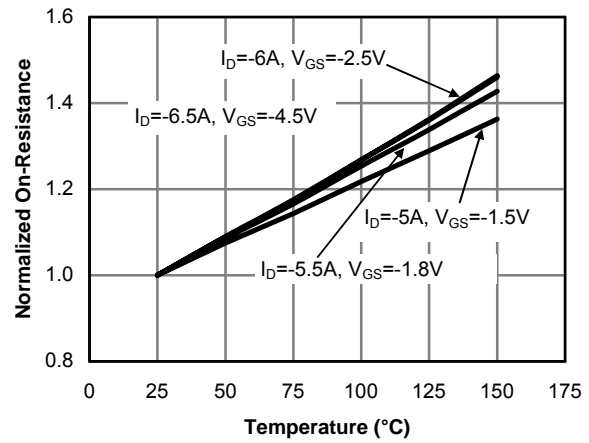


Figure 4: On-Resistance vs. Junction Temperature(Note E)

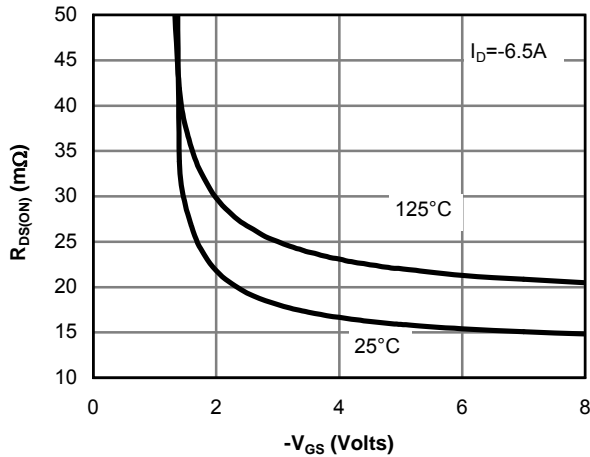


Figure 5: On-Resistance vs. Gate-Source Voltage(Note E)

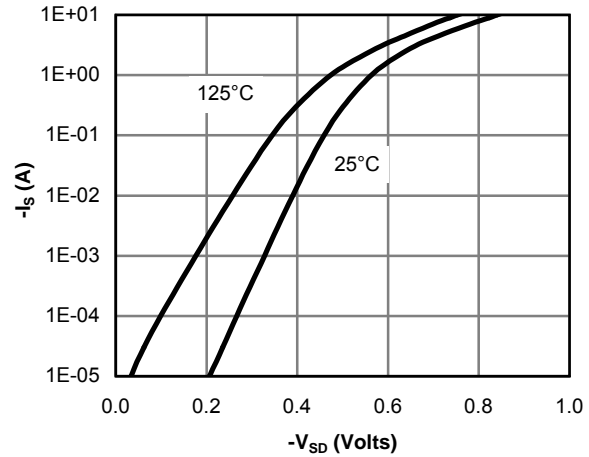


Figure 6: Body-Diode Characteristics(Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

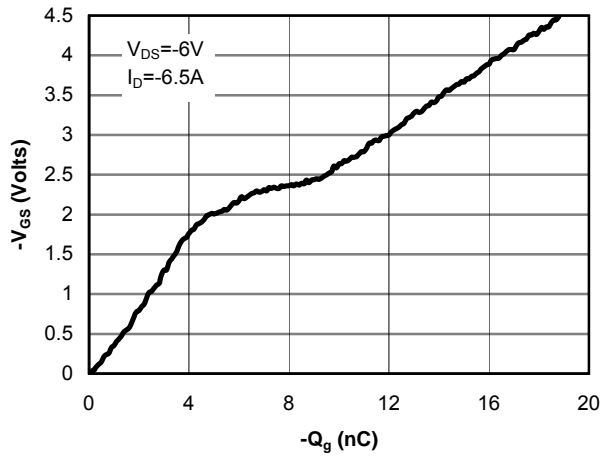


Figure 7: Gate-Charge Characteristics

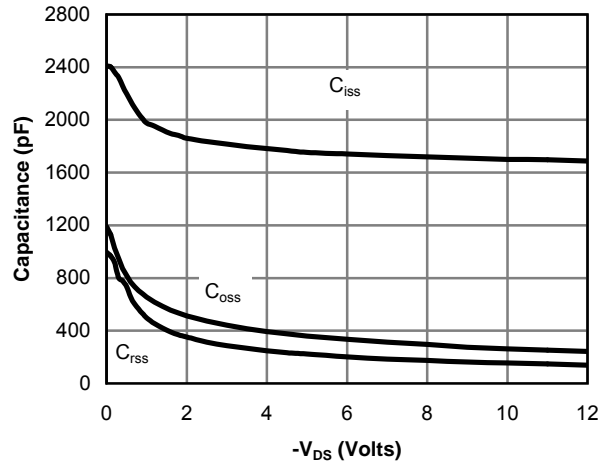


Figure 8: Capacitance Characteristics

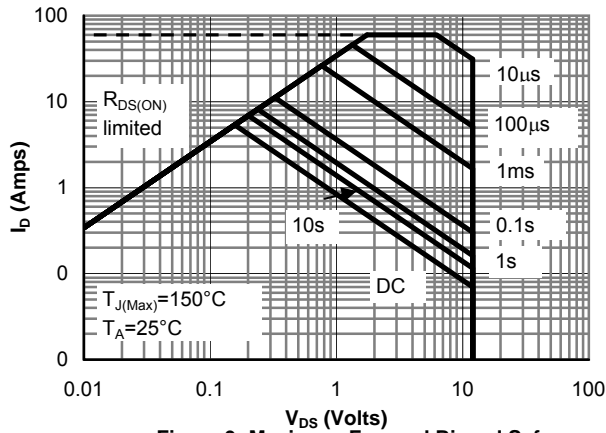


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

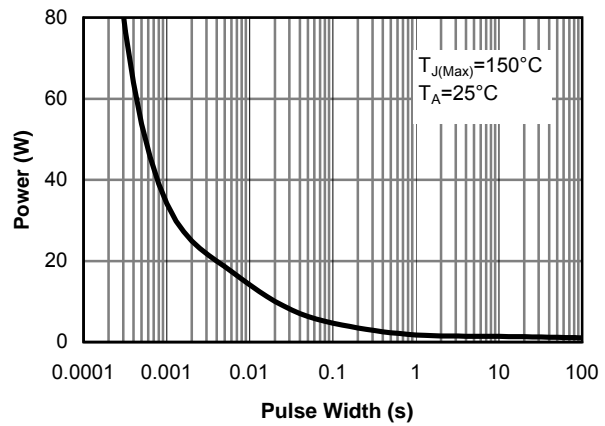


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

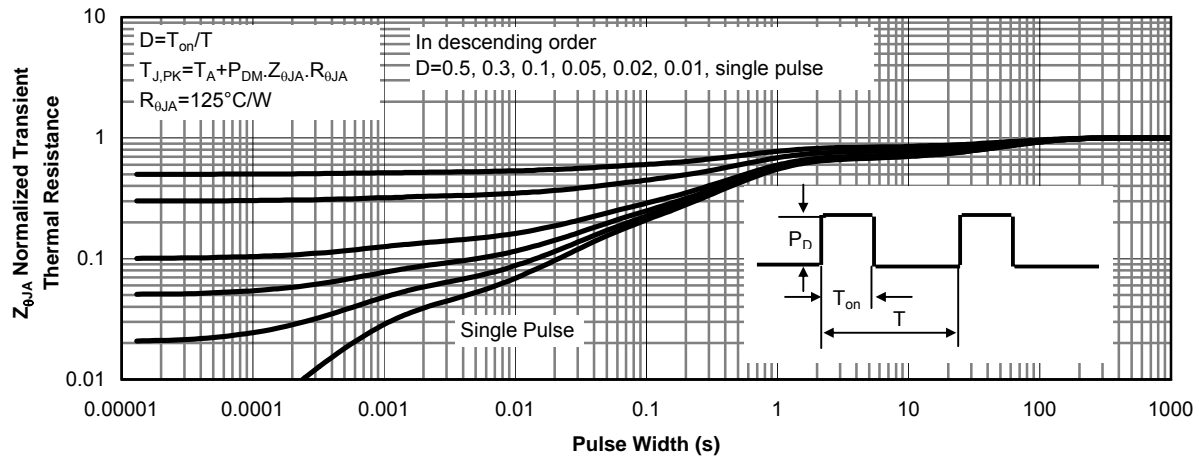
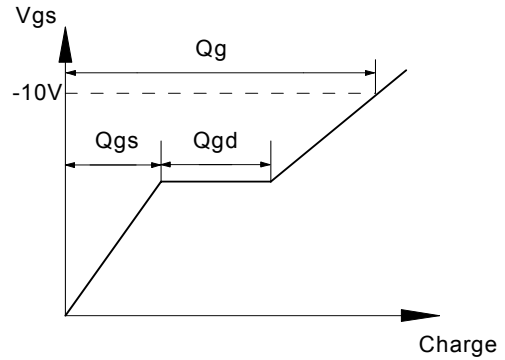
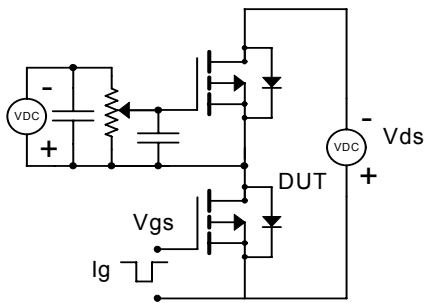
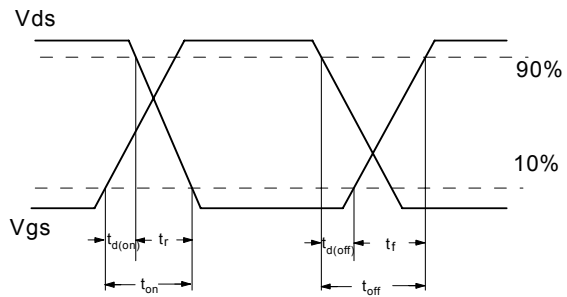
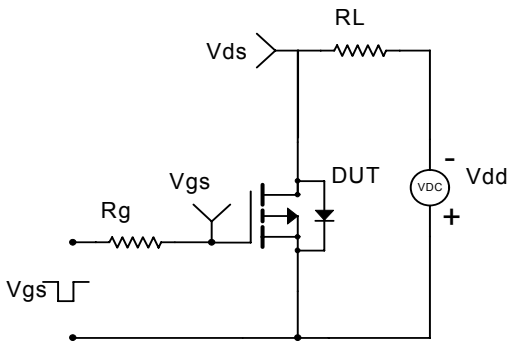


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

