

General Description

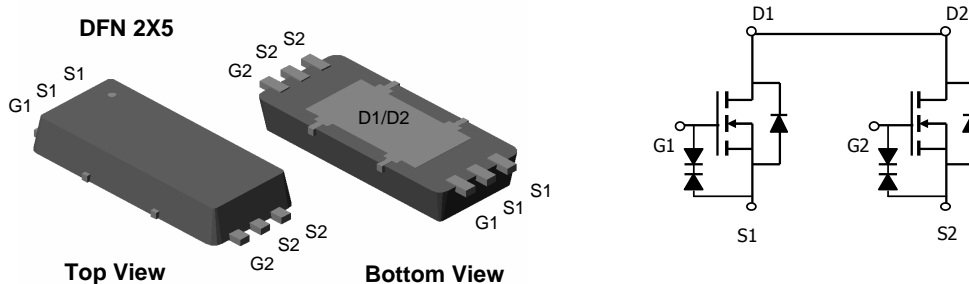
The AON5810 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.8V while retaining a 12V $V_{GS(MAX)}$ rating. It is ESD protected. This device is suitable for use as a uni-directional or bi-directional load switch, facilitated by its common-drain configuration. *Standard Product AON5810 is Pb-free (meets ROHS & Sony 259 specifications). AON5810L is a Green Product ordering option. AON5810 and AON5810L are electrically identical.*



Features

$V_{DS} (V) = 20V$
 $I_D = 7.7 A (V_{GS} = 4.5V)$

$R_{DS(ON)} < 18 m\Omega (V_{GS} = 4.5V)$
 $R_{DS(ON)} < 19 m\Omega (V_{GS} = 4.0V)$
 $R_{DS(ON)} < 21 m\Omega (V_{GS} = 3.1V)$
 $R_{DS(ON)} < 25 m\Omega (V_{GS} = 2.5V)$
 $R_{DS(ON)} < 40 m\Omega (V_{GS} = 1.8V)$
ESD Rating: 2000V HBM



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

| Parameter | Symbol | Maximum | Units |
|---|----------------|------------------|------------|
| Drain-Source Voltage | V_{DS} | 20 | V |
| Gate-Source Voltage | V_{GS} | ± 12 | |
| Continuous Drain Current $R_{\theta JA}=75^\circ C/W$ | I_D | $T_A=25^\circ C$ | A |
| Current $T_A=70^\circ C$ | | 6.1 | |
| Pulsed Drain Current ^B | I_{DM} | 30 | |
| Power Dissipation ^A | P_{DSM} | $T_A=25^\circ C$ | W |
| $R_{\theta JA}=75^\circ C/W$ | | $T_A=70^\circ C$ | |
| 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 | $R_{\theta JA}$ | $t \leq 10s$ | 30 | $^\circ C/W$ |
| Maximum Junction-to-Ambient ^A | | Steady-State | 61 | |
| Maximum Junction-to-Case ^B | $R_{\theta JC}$ | 4.5 | 6 | $^\circ C/W$ |



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

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|-----------------------------|---|--|------|------|--------|-------|
| STATIC PARAMETERS | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | I _D =250μA, V _{GS} =0V | 20 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =16V, V _{GS} =0V T _J =55°C | | | 1 5 | μA |
| I _{GSS} | Gate-Body leakage current | V _{DS} =0V, V _{GS} =±10V | | | 10 | μA |
| BV _{GSO} | Gate-Source Breakdown Voltage | V _{DS} =0V, I _G =±250μA | ±12 | | | V |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 0.5 | 0.73 | 1 | V |
| I _{D(ON)} | On state drain current | V _{GS} =4.5V, V _{DS} =5V | 30 | | | A |
| R _{DS(ON)} | Static Drain-Source On-Resistance | V _{GS} =4.5V, I _D =7.7A T _J =125°C | 11 | 14 | 18 | mΩ |
| | | | 16 | 21 | 26 | |
| | | V _{GS} =4.0V, I _D =6A | 11 | 14.5 | 19 | mΩ |
| | | V _{GS} =3.1V, I _D =6A | 13 | 16.7 | 21 | mΩ |
| | | V _{GS} =2.5V, I _D =5A | 15 | 20 | 25 | mΩ |
| | V _{GS} =1.8V, I _D =4A | 25 | 32 | 40 | mΩ | |
| g _{FS} | Forward Transconductance | V _{DS} =5V, I _D =7.7A | | 28 | | S |
| V _{SD} | Diode Forward Voltage | I _S =1A, V _{GS} =0V | 0.5 | 0.74 | 1 | V |
| I _S | Maximum Body-Diode Continuous Current | | | | 2.5 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =10V, f=1MHz | | 1360 | | pF |
| C _{oss} | Output Capacitance | | 200 | pF | | |
| C _{rss} | Reverse Transfer Capacitance | | 178 | pF | | |
| R _g | Gate resistance | V _{GS} =0V, V _{DS} =0V, f=1MHz | | 1.5 | | Ω |
| SWITCHING PARAMETERS | | | | | | |
| Q _{g(4.5V)} | Total Gate Charge | V _{GS} =4.5V, V _{DS} =10V, I _D =7.7A | | 13.1 | | nC |
| Q _{gs} | Gate Source Charge | | 2 | nC | | |
| Q _{gd} | Gate Drain Charge | | 3.9 | nC | | |
| t _{D(on)} | Turn-On DelayTime | V _{GS} =5V, V _{DS} =10V, R _L =1.4Ω, R _{GEN} =3Ω | | 6.2 | | ns |
| t _r | Turn-On Rise Time | | 11 | ns | | |
| t _{D(off)} | Turn-Off DelayTime | | 40.5 | ns | | |
| t _f | Turn-Off Fall Time | | 10 | ns | | |
| t _{rr} | Body Diode Reverse Recovery Time | I _F =7.7A, dI/dt=100A/μs | | 18.8 | | ns |
| Q _{rr} | Body Diode Reverse Recovery Charge | I _F =7.7A, dI/dt=100A/μs | | 8.1 | | 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. The current rating is based on the t_{10s} thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using 80 μs pulses, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

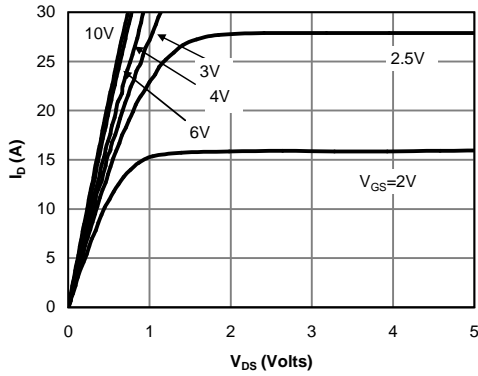


Fig 1: On-Region Characteristics

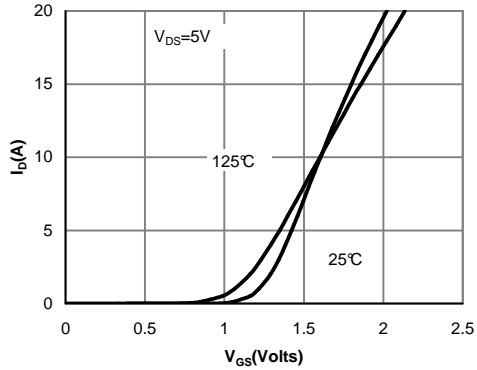


Figure 2: Transfer Characteristics

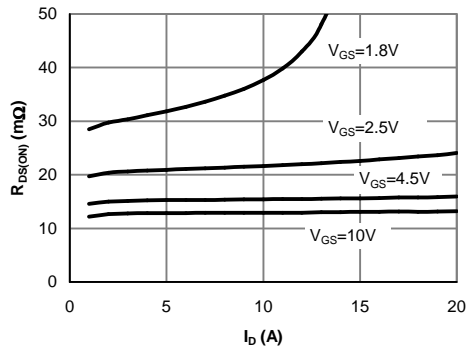


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

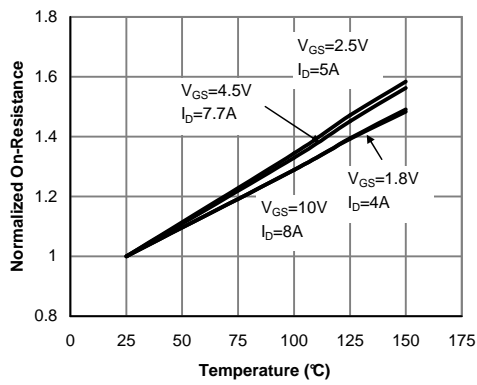


Figure 4: On-Resistance vs. Junction Temperature

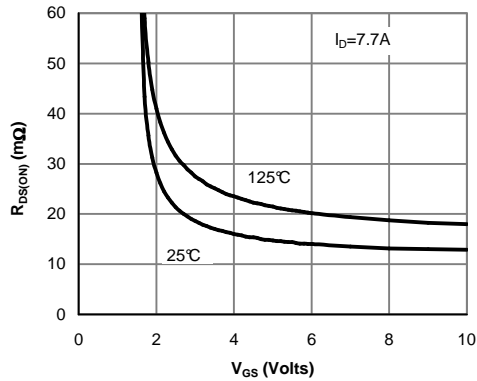


Figure 5: On-Resistance vs. Gate-Source Voltage

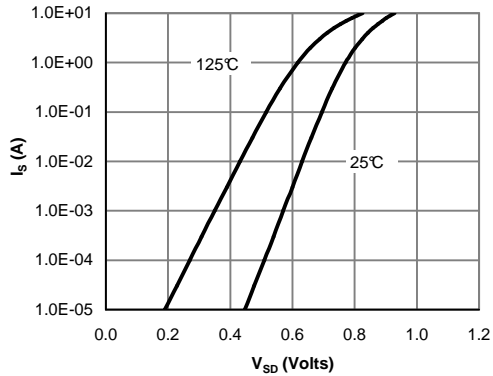


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

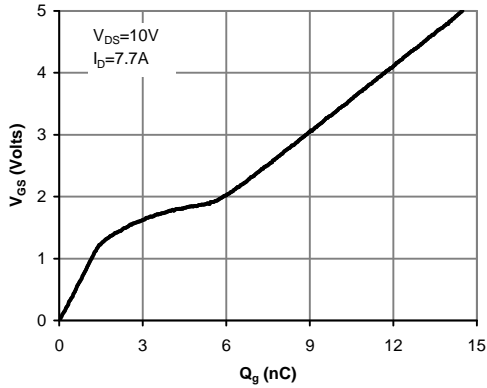


Figure 7: Gate-Charge Characteristics

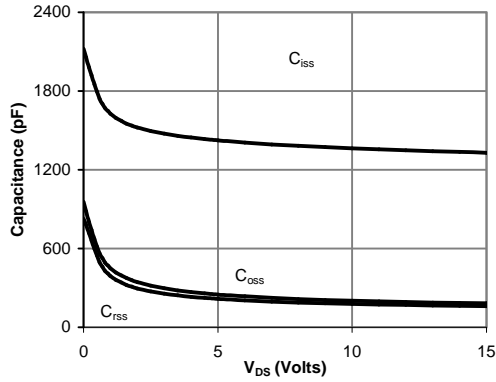


Figure 8: Capacitance Characteristics

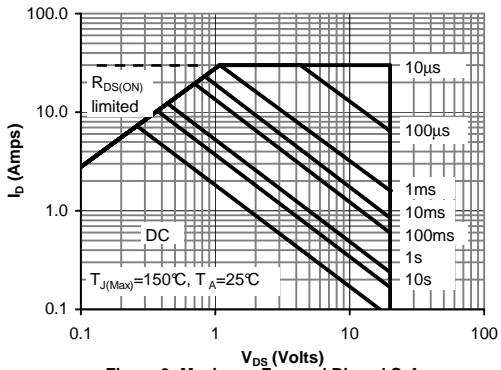


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

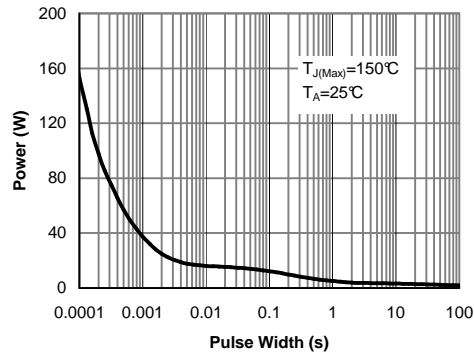


Figure 10: Single Pulse Power Rating Junction-to-Case (Note E)

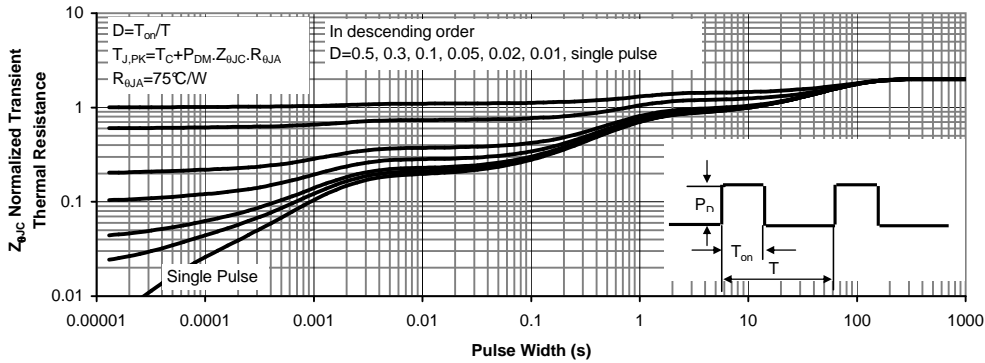


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)