**ALPHA & OMEGA SEMICONDUCTOR**

# AON7408
# 30V N-Channel MOSFET

## General Description

The AON7408 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in general purpose applications.

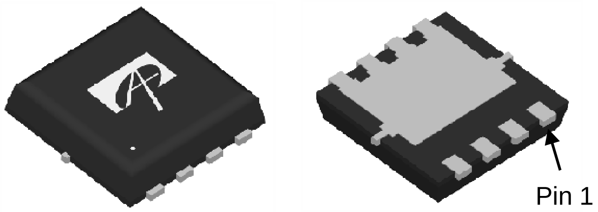
## Features

$V_{DS}$ (V) = 30V
$I_D$ = 23A (V$_{GS}$ = 10V)
$R_{DS(ON)}$ < 20mΩ ($V_{GS}$ = 10V)
$R_{DS(ON)}$ < 32mΩ ($V_{GS}$ = 4.5V)

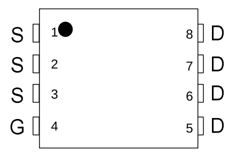
100% UIS Tested!

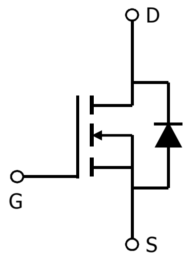
DFN 3x3 EP

Top View Bottom View




Top View




**Absolute Maximum Ratings $T_A$=25℃ unless otherwise noted**

| Parameter | | Symbol | Maximum | Units |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | V |
| Continuous Drain Current [B] | $T_C$=25℃ | $I_D$ | 23 | A |
| | $T_C$=100℃ | | 15 | |
| Pulsed Drain Current [C] | | $I_{DM}$ | 64 | |
| Continuous Drain Current [A] | $T_A$=25℃ | $I_{DSM}$ | 10 | |
| | $T_A$=70℃ | | 8 | |
| Power Dissipation [B] | $T_C$=25℃ | $P_D$ | 16.7 | W |
| | $T_C$=100℃ | | 7 | |
| Power Dissipation [A] | $T_A$=25℃ | $P_{DSM}$ | 3.1 | |
| | $T_A$=70℃ | | 2 | |
| Junction and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to 150 | ℃ |

**Thermal Characteristics**

| Parameter | | Symbol | Typ | Max | Units |
|---|---|---|---|---|---|
| Maximum Junction-to-Ambient [A] | t ≤ 10s | $R_{\theta JA}$ | 25 | 40 | ℃/W |
| Maximum Junction-to-Ambient [A] | Steady-State | | 62 | 75 | ℃/W |
| Maximum Junction-to-Case [B] | Steady-State | $R_{\theta JC}$ | 6.2 | 7.5 | ℃/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 | | 30 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=30V, $V_{GS}$=0V | | | | 1 | µA |
| | | | $T_J$=55°C | | | 5 | |
| $I_{GSS}$ | Gate-Body leakage current | $V_{DS}$=0V, $V_{GS}$= ±20V | | | | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250µA | | 1.5 | 2.1 | 2.6 | V |
| $I_{D(ON)}$ | On state drain current | $V_{GS}$=10V, $V_{DS}$=5V | | 64 | | | A |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}$=10V, $I_D$=10A | | | 15.3 | 20 | mΩ |
| | | | $T_J$=125°C | | 23.3 | 30 | |
| | | $V_{GS}$=4.5V, $I_D$=5A | | | 22.7 | 32 | |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=5V, $I_D$=10A | | | 17 | | S |
| $V_{SD}$ | Diode Forward Voltage | $I_S$=1A,$V_{GS}$=0V | | | 0.75 | 1 | V |
| $I_S$ | Maximum Body-Diode Continuous Current | | | | | 3.8 | A |
| **DYNAMIC PARAMETERS** | | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$=0V, $V_{DS}$=15V, f=1MHz | | | 373 | 448 | pF |
| $C_{oss}$ | Output Capacitance | | | | 67 | | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | | 41 | | pF |
| $R_g$ | Gate resistance | $V_{GS}$=0V, $V_{DS}$=0V, f=1MHz | | | 1.8 | 2.8 | Ω |
| **SWITCHING PARAMETERS** | | | | | | | |
| $Q_g$ | Total Gate Charge | $V_{GS}$=4.5V, $V_{DS}$=15V, $I_D$=10A | | | 7.1 | 8.6 | nC |
| $Q_{gs}$ | Gate Source Charge | | | | 1.2 | | nC |
| $Q_{gd}$ | Gate Drain Charge | | | | 1.6 | | nC |
| $t_{D(on)}$ | Turn-On DelayTime | $V_{GS}$=10V, $V_{DS}$=15V, $R_L$=1.5Ω, $R_{GEN}$=3Ω | | | 4.3 | | ns |
| $t_r$ | Turn-On Rise Time | | | | 2.8 | | ns |
| $t_{D(off)}$ | Turn-Off DelayTime | | | | 15.8 | | ns |
| $t_f$ | Turn-Off Fall Time | | | | 3 | | ns |
| $t_{rr}$ | Body Diode Reverse Recovery Time | $I_F$=10A, dI/dt=100A/µs | | | 10.5 | 12.6 | ns |
| $Q_{rr}$ | Body Diode Reverse Recovery Charge | $I_F$=10A, dI/dt=100A/µs | | | 4.5 | | nC |

A: The value of $R_{\theta JA}$ is measured with the device in a still air environment with $T_A$ =25° C. The power dissipation $P_{DSM}$ and current rating $I_{DSM}$ are based on $T_{J(MAX)}$=150° C, using t ≤ 10s junction-to-ambient thermal resistance.
B. The power dissipation $P_D$ is based on $T_{J(MAX)}$=150° C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.
C: Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150° C.
D. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to case $R_{\theta JC}$ and case 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-case thermal impedence which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)}$=150° C. The SOA curve provides a single pulse rating.
G. These tests are performed with the device mounted on 1 $in^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$=25° C.
H. The maximum current rating is limited by bond-wires.
Rev5: May-2012

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

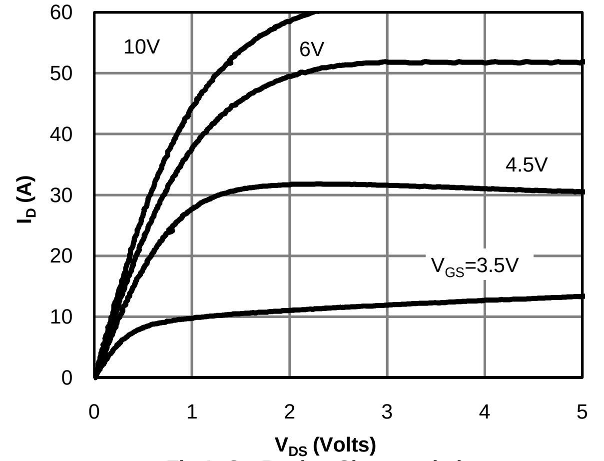



**Fig 1: On-Region Characteristics**

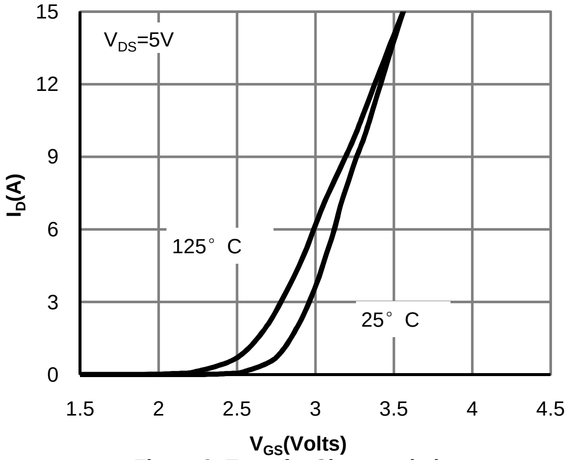



**Figure 2: Transfer Characteristics**

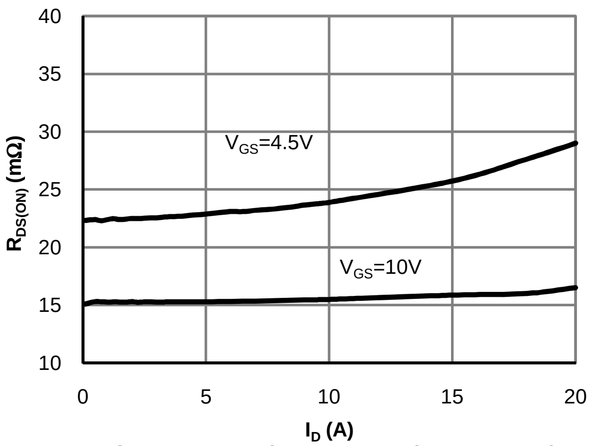



**Figure 3: On-Resistance vs. Drain Current and Gate Voltage**

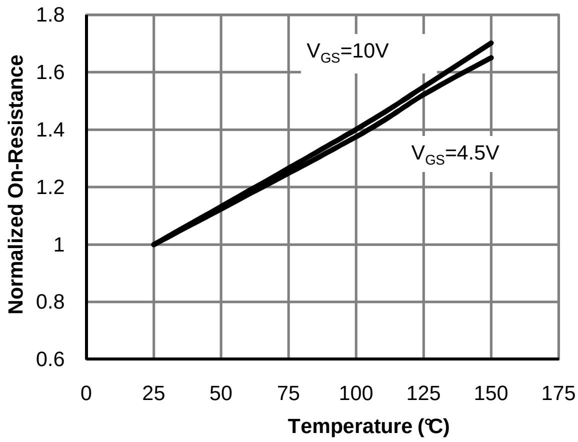



**Figure 4: On-Resistance vs. Junction Temperature**

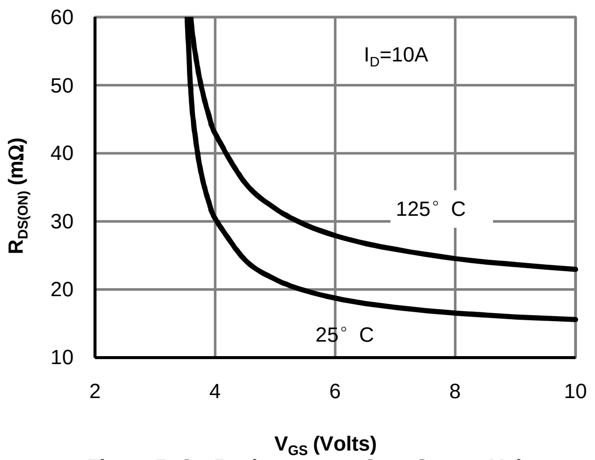



**Figure 5: On-Resistance vs. Gate-Source Voltage**

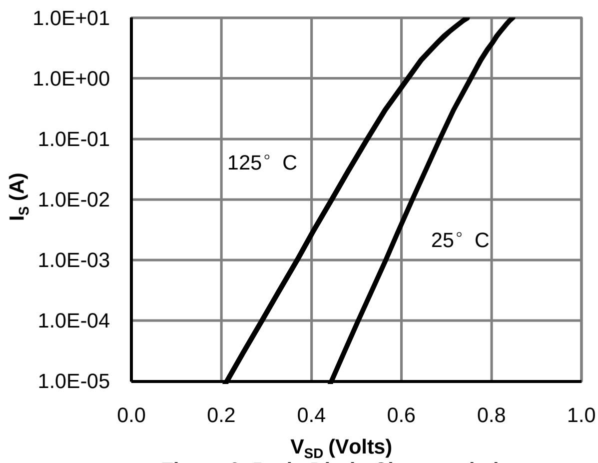



**Figure 6: Body-Diode Characteristics**

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

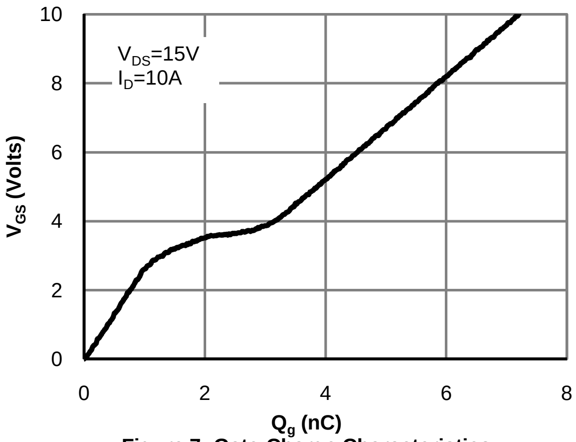



Figure 7: Gate-Charge Characteristics

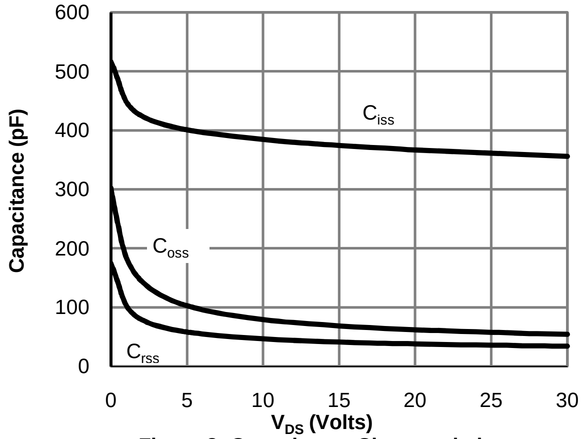



Figure 8: Capacitance Characteristics

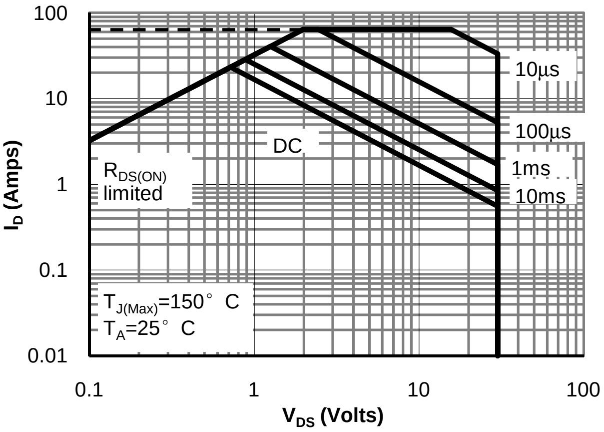



Figure 9: Maximum Forward Biased Safe Operating Area (Note H)

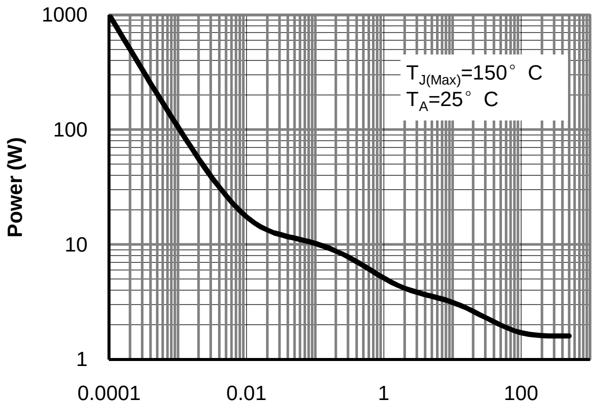



Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note H)

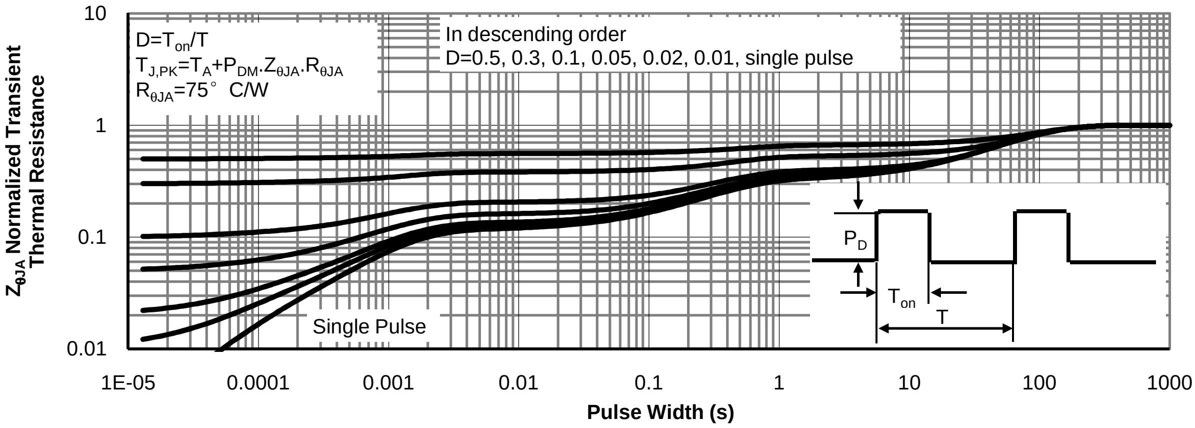



Figure 11: Normalized Maximum Transient Thermal Impedance (Note H)