



**ALPHA & OMEGA**  
SEMICONDUCTOR



## AON7408 30V N-Channel MOSFET

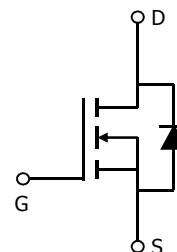
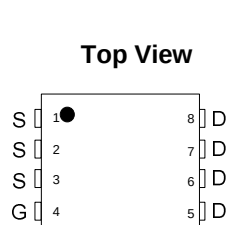
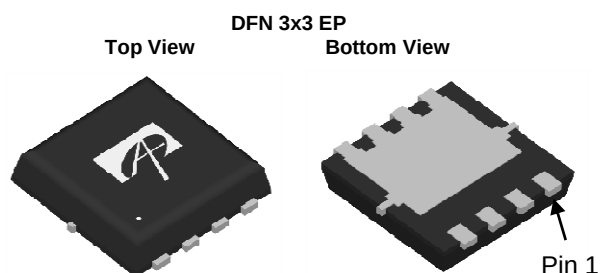
### General Description

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)  
 $R_{DS(ON)} < 20m\Omega$  ( $V_{GS}$  = 10V)  
 $R_{DS(ON)} < 32m\Omega$  ( $V_{GS}$  = 4.5V)

100% UIS Tested!



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

| Parameter                              | Symbol         | Maximum    | Units            |
|----------------------------------------|----------------|------------|------------------|
| Drain-Source Voltage                   | $V_{DS}$       | 30         | V                |
| Gate-Source Voltage                    | $V_{GS}$       | $\pm 20$   | V                |
| Continuous Drain Current <sup>B</sup>  | $I_D$          | 23         | A                |
| $T_C=25^\circ\text{C}$                 |                | 15         |                  |
| $T_C=100^\circ\text{C}$                | $I_{DM}$       | 64         |                  |
| Pulsed Drain Current <sup>C</sup>      |                | 10         |                  |
| Continuous Drain Current <sup>A</sup>  | $I_{DSM}$      | 8          | W                |
| $T_A=25^\circ\text{C}$                 |                | 16.7       |                  |
| $T_A=70^\circ\text{C}$                 | $P_D$          | 7          |                  |
| Power Dissipation <sup>B</sup>         |                | 3.1        |                  |
| $T_C=25^\circ\text{C}$                 | $P_{DSM}$      | 2          |                  |
| $T_C=100^\circ\text{C}$                |                |            |                  |
| Power Dissipation <sup>A</sup>         |                |            |                  |
| 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 <sup>A</sup> | $R_{\theta JA}$ | 25  | 40  | $^\circ\text{C/W}$ |
| $t \leq 10s$                             |                 | 62  | 75  | $^\circ\text{C/W}$ |
| Maximum Junction-to-Ambient <sup>A</sup> | $R_{\theta JC}$ | 6.2 | 7.5 | $^\circ\text{C/W}$ |
| Steady-State                             |                 |     |     |                    |
| Maximum Junction-to-Case <sup>B</sup>    |                 |     |     |                    |

Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise noted)

| Symbol                      | Parameter                             | Conditions                                                                                | Min | Typ          | Max      | Units |
|-----------------------------|---------------------------------------|-------------------------------------------------------------------------------------------|-----|--------------|----------|-------|
| <b>STATIC PARAMETERS</b>    |                                       |                                                                                           |     |              |          |       |
| BV <sub>DSS</sub>           | Drain-Source Breakdown Voltage        | I <sub>D</sub> =250μA, V <sub>GS</sub> =0V                                                | 30  |              |          | V     |
| I <sub>DSS</sub>            | Zero Gate Voltage Drain Current       | V <sub>DS</sub> =30V, V <sub>GS</sub> =0V<br>T <sub>J</sub> =55°C                         |     |              | 1<br>5   | μA    |
| I <sub>GSS</sub>            | Gate-Body leakage current             | V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V                                               |     |              | ±100     | nA    |
| V <sub>GS(th)</sub>         | Gate Threshold Voltage                | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                  | 1.5 | 2.1          | 2.6      | V     |
| I <sub>D(ON)</sub>          | On state drain current                | V <sub>GS</sub> =10V, V <sub>DS</sub> =5V                                                 | 64  |              |          | A     |
| R <sub>DS(ON)</sub>         | Static Drain-Source On-Resistance     | V <sub>GS</sub> =10V, I <sub>D</sub> =10A<br>T <sub>J</sub> =125°C                        |     | 15.3<br>23.3 | 20<br>30 | mΩ    |
|                             |                                       | V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A                                                 |     | 22.7         | 32       |       |
| g <sub>FS</sub>             | Forward Transconductance              | V <sub>DS</sub> =5V, I <sub>D</sub> =10A                                                  |     | 17           |          | S     |
| V <sub>SD</sub>             | Diode Forward Voltage                 | I <sub>S</sub> =1A, V <sub>GS</sub> =0V                                                   |     | 0.75         | 1        | V     |
| I <sub>S</sub>              | Maximum Body-Diode Continuous Current |                                                                                           |     |              | 3.8      | A     |
| <b>DYNAMIC PARAMETERS</b>   |                                       |                                                                                           |     |              |          |       |
| C <sub>iss</sub>            | Input Capacitance                     | V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, f=1MHz                                         |     | 373          | 448      | pF    |
| C <sub>oss</sub>            | Output Capacitance                    |                                                                                           |     | 67           |          | pF    |
| C <sub>rss</sub>            | Reverse Transfer Capacitance          |                                                                                           |     | 41           |          | pF    |
| R <sub>g</sub>              | Gate resistance                       | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                          |     | 1.8          | 2.8      | Ω     |
| <b>SWITCHING PARAMETERS</b> |                                       |                                                                                           |     |              |          |       |
| Q <sub>g</sub>              | Total Gate Charge                     | V <sub>GS</sub> =4.5V, V <sub>DS</sub> =15V, I <sub>D</sub> =10A                          |     | 7.1          | 8.6      | nC    |
| Q <sub>gs</sub>             | Gate Source Charge                    |                                                                                           |     | 1.2          |          | nC    |
| Q <sub>gd</sub>             | Gate Drain Charge                     |                                                                                           |     | 1.6          |          | nC    |
| t <sub>D(on)</sub>          | Turn-On DelayTime                     | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, R <sub>L</sub> =1.5Ω,<br>R <sub>GEN</sub> =3Ω |     | 4.3          |          | ns    |
| t <sub>r</sub>              | Turn-On Rise Time                     |                                                                                           |     | 2.8          |          | ns    |
| t <sub>D(off)</sub>         | Turn-Off DelayTime                    |                                                                                           |     | 15.8         |          | ns    |
| t <sub>f</sub>              | Turn-Off Fall Time                    |                                                                                           |     | 3            |          | ns    |
| t <sub>rr</sub>             | Body Diode Reverse Recovery Time      | I <sub>F</sub> =10A, dI/dt=100A/μs                                                        |     | 10.5         | 12.6     | ns    |
| Q <sub>rr</sub>             | Body Diode Reverse Recovery Charge    | I <sub>F</sub> =10A, dI/dt=100A/μs                                                        |     | 4.5          |          | nC    |

A: The value of R<sub>θJA</sub> is measured with the device in a still air environment with T<sub>A</sub>=25° C. The power dissipation P<sub>DSM</sub> and current rating I<sub>DSM</sub> are based on T<sub>J(MAX)</sub>=150° C, using t ≤ 10s junction-to-ambient thermal resistance.

B: The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=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<sub>J(MAX)</sub>=150° C.

D: The R<sub>θJA</sub> is the sum of the thermal impedance from junction to case R<sub>θJC</sub> 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 impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T<sub>J(MAX)</sub>=150° C. The SOA curve provides a single pulse rating.

G: These tests are performed with the device mounted on 1 in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25° C.

H: The maximum current rating is limited by bond-wires.

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## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

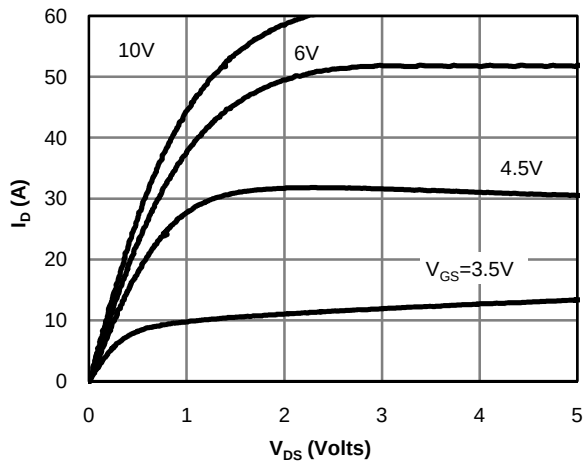


Fig 1: On-Region Characteristics

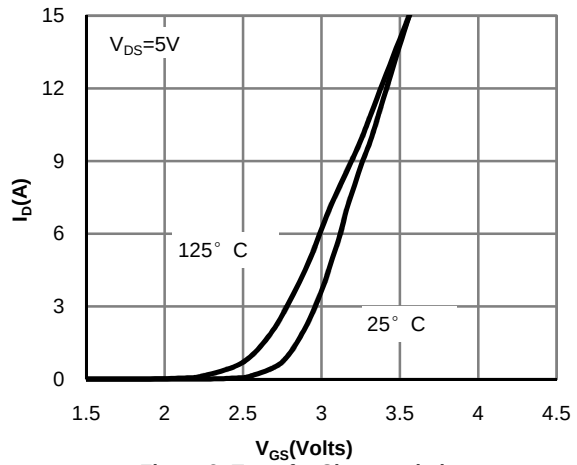


Figure 2: Transfer Characteristics

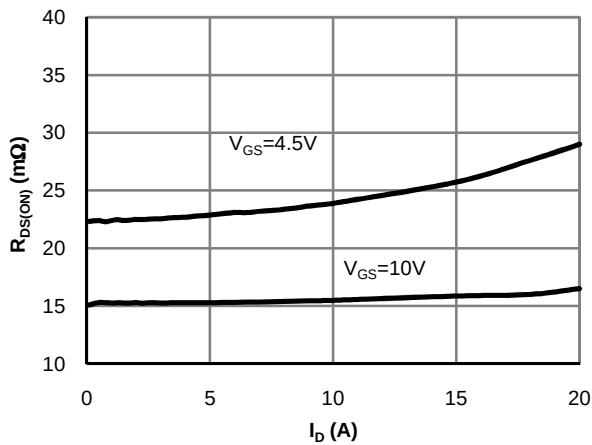


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

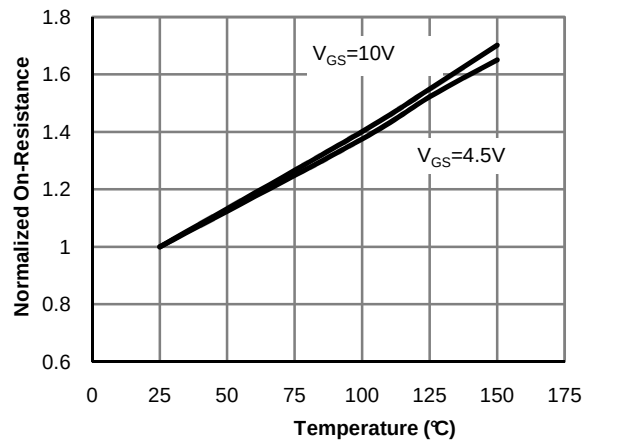


Figure 4: On-Resistance vs. Junction Temperature

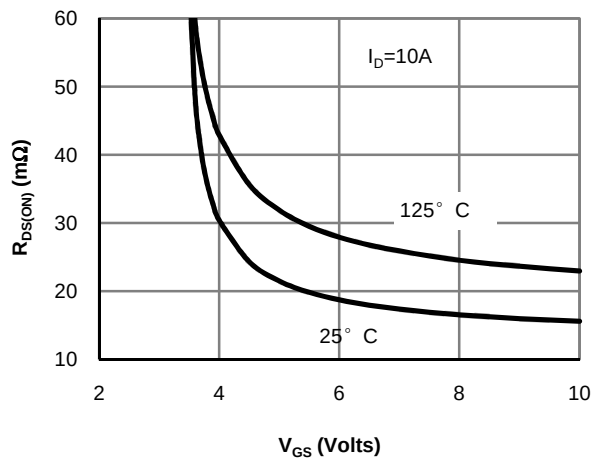


Figure 5: On-Resistance vs. Gate-Source Voltage

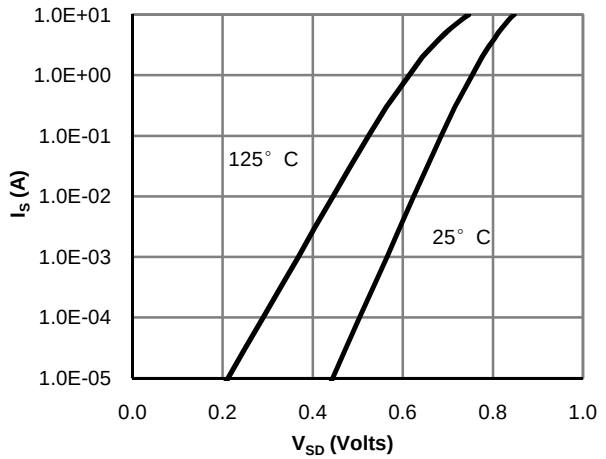


Figure 6: Body-Diode Characteristics

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