



## General Description

The AO8820 is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent RDSON and gate charge for most of the small power switching and load switch applications. The meet the RoHS and Product requirement with full function reliability approved.

## General Features

$V_{DS} = 20V$   $I_D = 7A$

$R_{DS(ON)} < 14m\Omega$  @  $V_{GS}=4.5V$

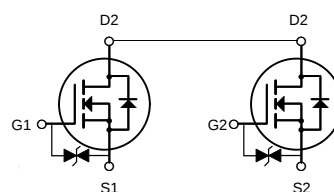
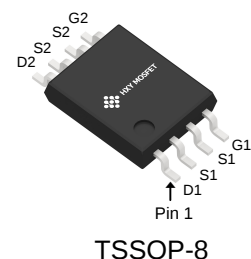
$R_{DS(ON)} < 17m\Omega$  @  $V_{GS}=2.5V$

## Application

Battery protection

Load switch

Uninterruptible power supply



Dual N-Channel MOSFET

## Package Marking and Ordering Information

| Product ID | Pack    | Brand      | Qty(PCS) |
|------------|---------|------------|----------|
| AO8820     | TSSOP-8 | HXY MOSFET | 5000     |

## Absolute Maximum Ratings (TA=25°C unless otherwise noted)

| Symbol          | Parameter                                        | Limit      | Unit |
|-----------------|--------------------------------------------------|------------|------|
| $V_{DS}$        | Drain-Source Voltage                             | 20         | V    |
| $V_{GS}$        | Gate-Source Voltage                              | $\pm 10$   | V    |
| $I_D$           | Drain Current-Continuous                         | 7          | A    |
| $I_{DM}$        | Drain Current-Pulsed (Note 1)                    | 23         | A    |
| $P_D$           | Maximum Power Dissipation                        | 1.25       | W    |
| $T_J, T_{STG}$  | Operating Junction and Storage Temperature Range | -55 To 150 | °C   |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient (Note 2) | 111        | °C/W |



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

| Parameter                                 | Symbol       | Condition                                                | Min | Typ  | Max       | Unit       |
|-------------------------------------------|--------------|----------------------------------------------------------|-----|------|-----------|------------|
| Drain-Source Breakdown Voltage            | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                                | 20  | -    | -         | V          |
| Zero Gate Voltage Drain Current           | $I_{DSS}$    | $V_{DS}=16V, V_{GS}=0V$                                  | -   | -    | 1         | $\mu A$    |
| Gate-Body Leakage Current                 | $I_{GSS}$    | $V_{GS}=\pm 8V, V_{DS}=0V$                               | -   | -    | $\pm 100$ | nA         |
| Gate Threshold Voltage                    | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$                            | 0.5 | 0.7  | 1.2       | V          |
| Drain-Source On-State Resistance          | $R_{DS(ON)}$ | $V_{GS}=4.5V, I_D=4.5A$                                  | -   | 12   | 14        | m $\Omega$ |
|                                           |              | $V_{GS}=2.5V, I_D=3.5A$                                  | -   | 15   | 17        | m $\Omega$ |
| Forward Transconductance                  | $g_{FS}$     | $V_{DS}=5V, I_D=3.5A$                                    | -   | 20   | -         | S          |
| Input Capacitance                         | $C_{iss}$    | $V_{DS}=8V, V_{GS}=0V,$<br>$F=1.0\text{MHz}$             | -   | 955  | -         | PF         |
| Output Capacitance                        | $C_{oss}$    |                                                          | -   | 200  | -         | PF         |
| Reverse Transfer Capacitance              | $C_{rss}$    |                                                          | -   | 150  | -         | PF         |
| Turn-on Delay Time                        | $t_{d(on)}$  | $V_{DD}=10V, I_D=3.5A$<br>$V_{GS}=4.5V, R_{GEN}=6\Omega$ | -   | 8    | -         | nS         |
| Turn-on Rise Time                         | $t_r$        |                                                          | -   | 17   | -         | nS         |
| Turn-Off Delay Time                       | $t_{d(off)}$ |                                                          | -   | 27   | -         | nS         |
| Turn-Off Fall Time                        | $t_f$        |                                                          | -   | 8.8  | -         | nS         |
| Total Gate Charge                         | $Q_g$        | $V_{DS}=10V, I_D=7A,$<br>$V_{GS}=4.5V$                   | -   | 11.3 | -         | nC         |
| Gate-Source Charge                        | $Q_{gs}$     |                                                          | -   | 1.89 | -         | nC         |
| Gate-Drain Charge                         | $Q_{gd}$     |                                                          | -   | 3.56 | -         | nC         |
| Diode Forward Voltage <sup>(Note 3)</sup> | $V_{SD}$     | $V_{GS}=0V, I_S=1.7A$                                    | -   | 0.75 | 1.2       | V          |
| Diode Forward Current <sup>(Note 2)</sup> | $I_S$        |                                                          | -   | -    | 7         | A          |

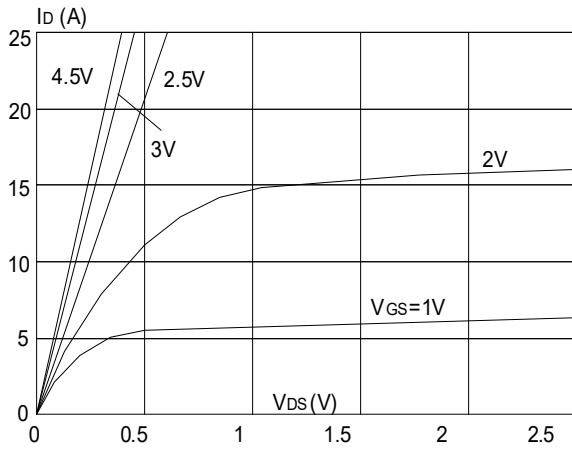
**Notes:**

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production

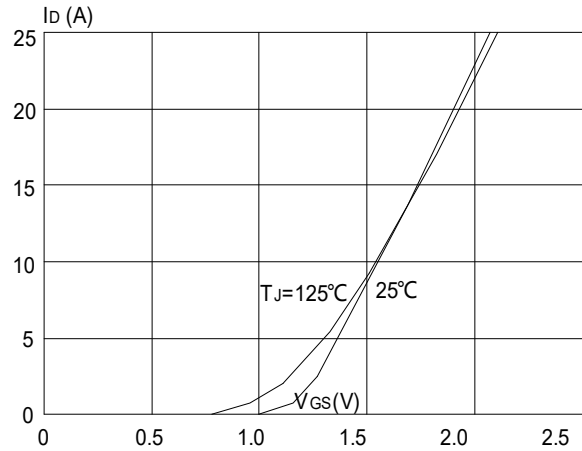


## Typical Characteristics

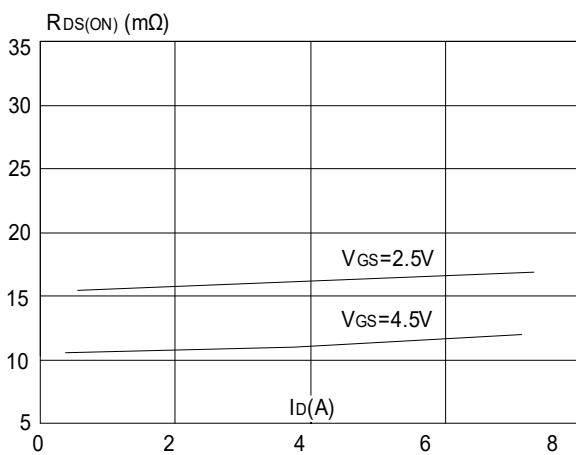
**Figure1:** Output Characteristics



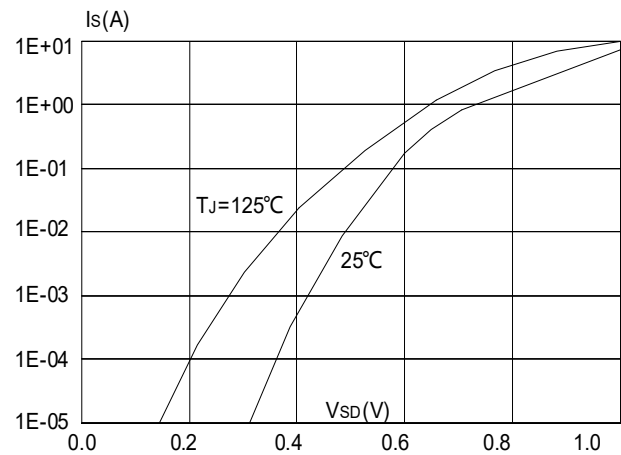
**Figure 2:** Typical Transfer Characteristics



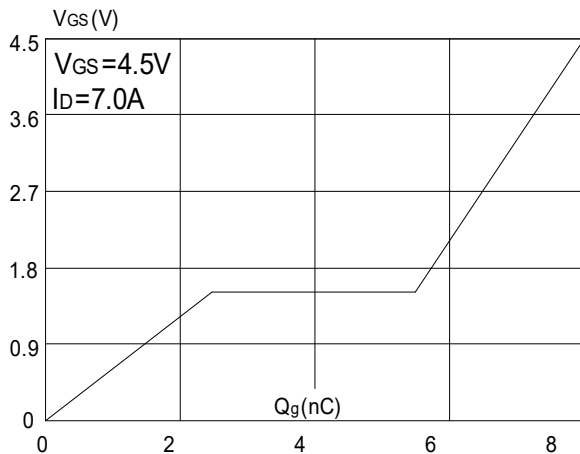
**Figure 3:** On-resistance vs. Drain Current



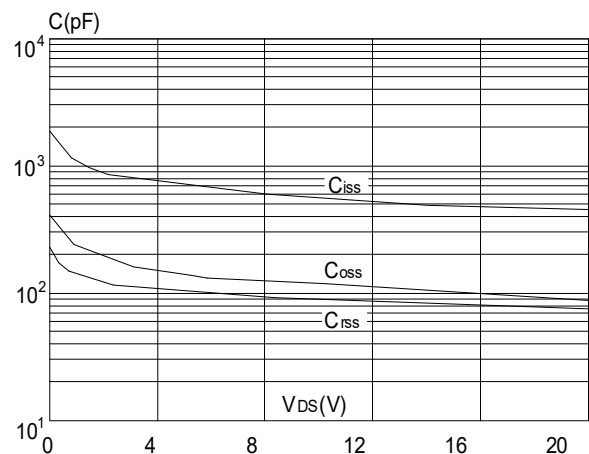
**Figure 4:** Body Diode Characteristics



**Figure 5:** Gate Charge Characteristics

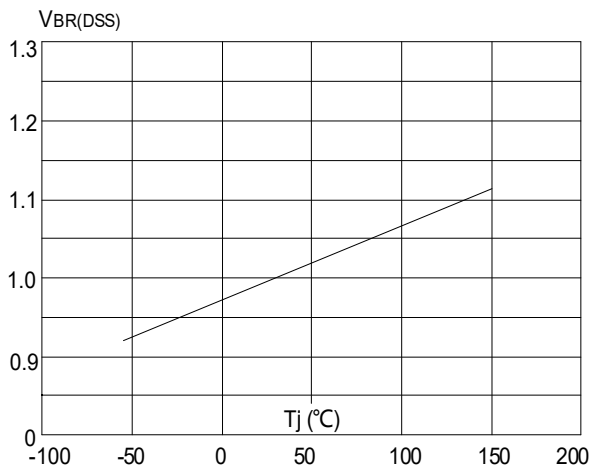


**Figure 6:** Capacitance Characteristics

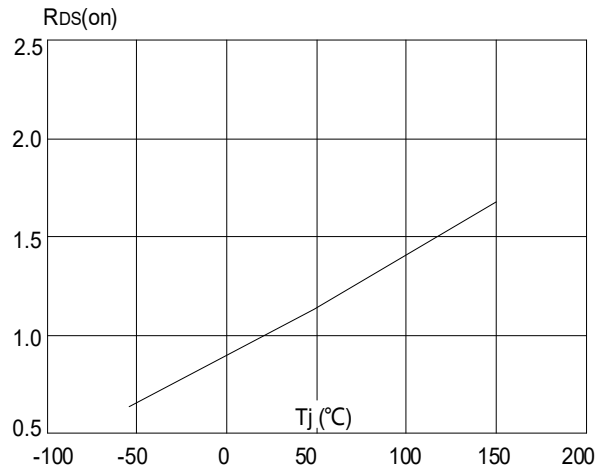




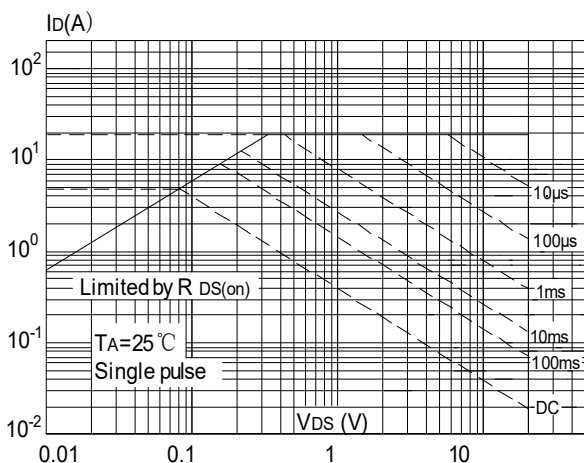
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



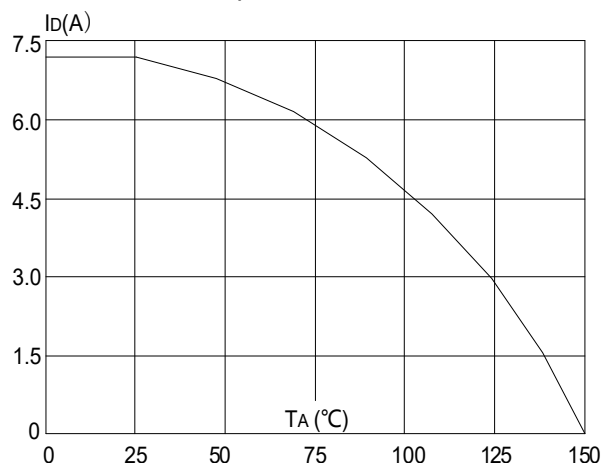
**Figure 8:** Normalized on Resistance vs. Junction Temperature



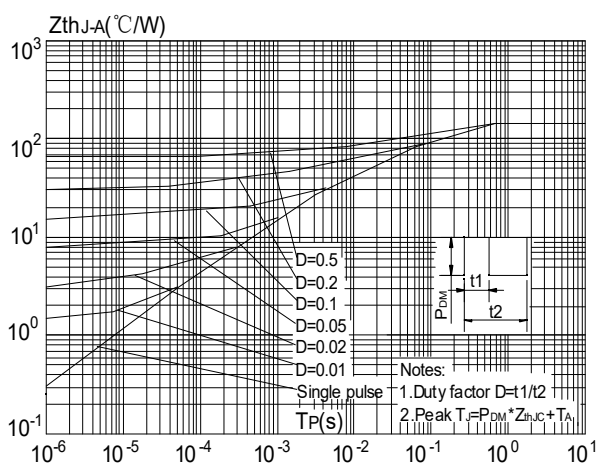
**Figure 9:** Maximum Safe Operating Area



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature

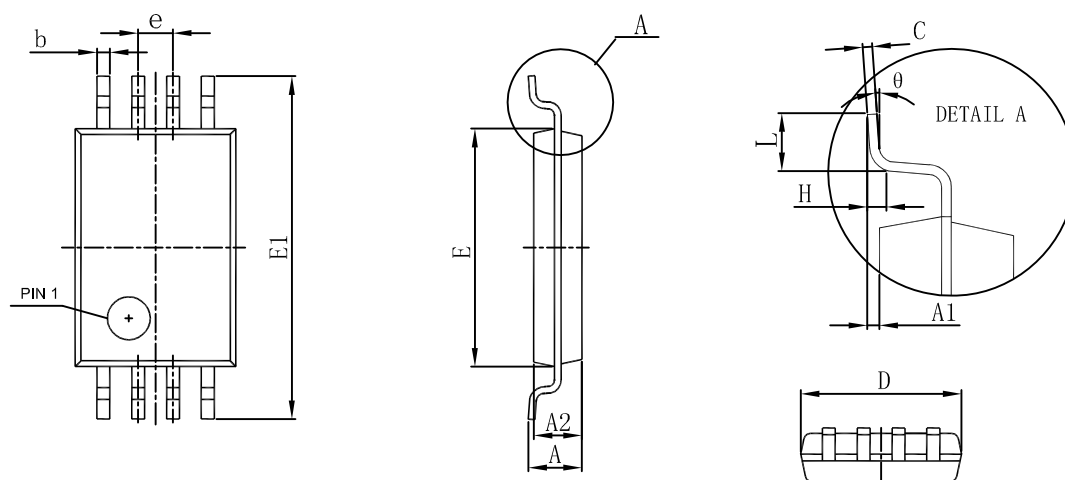


**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





## TSSOP-8 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| D      | 2.900                     | 3.100 | 0.114                | 0.122 |
| E      | 4.300                     | 4.500 | 0.169                | 0.177 |
| b      | 0.190                     | 0.300 | 0.007                | 0.012 |
| c      | 0.090                     | 0.200 | 0.004                | 0.008 |
| E1     | 6.250                     | 6.550 | 0.246                | 0.258 |
| A      |                           | 1.200 |                      | 0.047 |
| A2     | 0.800                     | 1.000 | 0.031                | 0.039 |
| A1     | 0.050                     | 0.150 | 0.002                | 0.006 |
| e      | 0.65 (BSC)                |       | 0.026 (BSC)          |       |
| L      | 0.500                     | 0.700 | 0.020                | 0.028 |
| H      | 0.25(TYP)                 |       | 0.01(TYP)            |       |
| θ      | 1°                        | 7°    | 1°                   | 7°    |



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