

#### Description

The AO4435 is the new generation trench P-channel MOSFET has been designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) yet maintain superior switching performance, making it ideal for high efficiency power management applications

#### Features

- High - speed switching
- Excellent gate charge x  $R_{DS(ON)}$  product (FOM) for extremely low  $R_{DS(ON)}$
- Lead-Free, Halogen-Free; RoHS Compliant

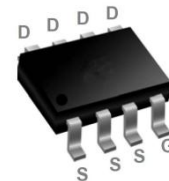
#### Applications

- POL Applications
- Load Switch
- Power Management

|              |                           |
|--------------|---------------------------|
| $V_{DS}$     | -30V                      |
| $I_D$        | -10A                      |
| $R_{DS(ON)}$ | 12.5mΩ @ $V_{GS} = -10V$  |
| $R_{DS(ON)}$ | 19.5mΩ @ $V_{GS} = -4.5V$ |

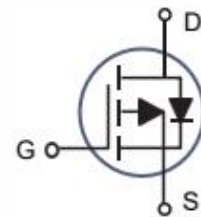
#### Outline

SOP-8 Pin Configuration



#### Equivalent

(4)Gate  
(1\2\3)Source  
(5\6\7\8)Drain



#### Packaging specifications

| Part No. | Package | Marking | Basic ordering unit.(pcs) |
|----------|---------|---------|---------------------------|
| AO4435   | SOP-8   |         | 3000                      |

#### Absolute Maximum Ratings

| Parameter                                        |                    | Symbol          | Limit      | Units |
|--------------------------------------------------|--------------------|-----------------|------------|-------|
| Drain-Source Voltage                             |                    | $V_{DS}$        | -30        | V     |
| Gate-Source Voltage                              |                    | $V_{GS}$        | ±20        | V     |
| Drain Current-Continuous <sup>(Note2)</sup>      | $T_C = 25^\circ C$ | $I_D$           | -10        | A     |
|                                                  | $T_C = 70^\circ C$ |                 | -7.9       | A     |
| -Pulsed <sup>(Note 1- Note 2)</sup>              |                    | $I_{DM}$        | -40        | A     |
| Maximum Power Dissipation                        | $T_C = 25^\circ C$ | $P_D$           | 2.8        | W     |
|                                                  | $T_C = 70^\circ C$ |                 | 2.2        | W     |
| Operating Junction and Storage Temperature Range |                    | $T_J, T_{STG}$  | -55 to 150 | °C    |
| Thermal Resistance Junction-Ambient              |                    | $R_{\theta JA}$ | 50         | °C /W |

### Electrical Characteristics ( $T_C=25\text{ }^{\circ}\text{C}$ , unless otherwise noted)

| Parameter                                                     | Symbol       | Test Conditions                              | Min | Typ  | Max       | Units      |
|---------------------------------------------------------------|--------------|----------------------------------------------|-----|------|-----------|------------|
| <b>OFF CHARACTERISTICS</b>                                    |              |                                              |     |      |           |            |
| Drain-Source Breakdown Voltage                                | $BV_{DSS}$   | $V_{GS}=0V$ , $I_D=-250\mu A$                | -30 |      |           | V          |
| Zero Gate Voltage Drain Current                               | $I_{DSS}$    | $V_{DS}=-30V$ , $V_{GS}=0V$                  |     |      | -1        | $\mu A$    |
| Gate-Body Leakage Current                                     | $I_{GSS}$    | $V_{GS}=\pm 20V$ , $V_{DS}=0V$               |     |      | $\pm 100$ | nA         |
| <b>ON CHARACTERISTICS</b>                                     |              |                                              |     |      |           |            |
| Gate Threshold Voltage                                        | $V_{GS(th)}$ | $V_{DS}=V_{GS}$ , $I_D=-250\mu A$            | -1  | -1.8 | -2.5      | V          |
| Drain-Source On-State Resistance                              | $R_{DS(ON)}$ | $V_{GS}=-10V$ , $I_D=-8A$                    |     | 12.5 | 16        | m $\Omega$ |
|                                                               |              | $V_{GS}=-4.5V$ , $I_D=-4A$                   |     | 19.5 | 26        | m $\Omega$ |
| Forward Transconductance                                      | $g_{FS}$     | $V_{GS}=-10V$ , $I_D=-8A$                    |     | 10.5 |           | S          |
| <b>DYNAMIC CHARACTERISTICS</b> <small>Note4</small>           |              |                                              |     |      |           |            |
| Input Capacitance                                             | $C_{ISS}$    | $V_{DS}=-15V$ ,                              |     | 1350 |           | pF         |
| Output Capacitance                                            | $C_{OSS}$    | $V_{GS}=0V$ ,                                |     | 180  |           | pF         |
| Reverse Transfer Capacitance                                  | $C_{RSS}$    | $f=1.0MHz$                                   |     | 120  |           | pF         |
| Total Gate Charge                                             | $Q_g$        | $V_{DS}=-15V$ ,<br>$I_D=-8A$ , $V_{GS}=-10V$ |     | 15   |           | nC         |
| Gate-Source Charge                                            | $Q_{gs}$     | $V_{DS}=-15V$ , $I_D=-8A$ ,                  |     | 4.5  |           | nC         |
| Gate-Drain Charge                                             | $Q_{gd}$     | $V_{GS}=-10V$                                |     | 6    |           | nC         |
| <b>SWITCHING CHARACTERISTICS</b> <small>Note4</small>         |              |                                              |     |      |           |            |
| Turn-On Delay Time                                            | $t_{D(ON)}$  | $V_{DD}=-15V$ ,                              |     | 10.5 |           | ns         |
| Rise Time                                                     | $t_r$        | $I_D=-1A$ ,                                  |     | 22   |           | ns         |
| Turn-Off Delay Time                                           | $t_{D(OFF)}$ | $V_{GS}=-10V$ ,                              |     | 60   |           | ns         |
| Fall Time                                                     | $t_f$        | $R_{GEN}=5\Omega$                            |     | 15.5 |           | ns         |
| <b>DRAIN-SOURCE DIODE CHARACTERISTICS AND MAXIMUM RATINGS</b> |              |                                              |     |      |           |            |
| Diode Forward Voltage                                         | $V_{SD}$     | $V_{GS}=0V$ , $I_S=-8A$                      |     |      | -1.2      | V          |

#### Notes:

- 1、Pulse Test Width < 300us,Duty Cycle< 2%
- 2、Drain current limited by maximum junction temperature.
- 3、Starting  $T_j=25^{\circ}\text{C}$ ,  $L=0.1mH$ ,  $V_{DD}=-15V$ ,  $V_{GS}=-10V$ ,  $R_G=25\Omega$
- 4、Guaranteed by design,not subject to production testing.

## Typical Performance Characteristics

**Fig.1 Continuous Drain Current vs.  $T_C$**

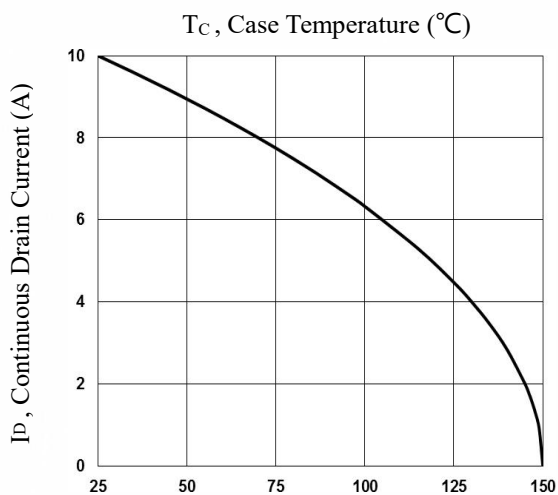


**Fig.2 Normalized  $R_{DS(on)}$  vs.  $T_J$**

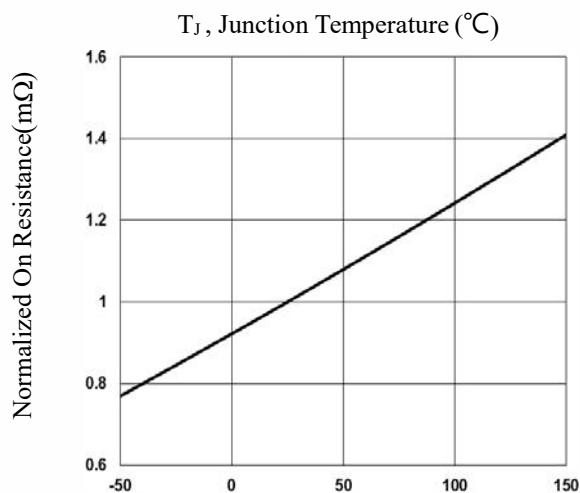


**Fig.3 Normalized  $V_{th}$  vs.  $T_J$**

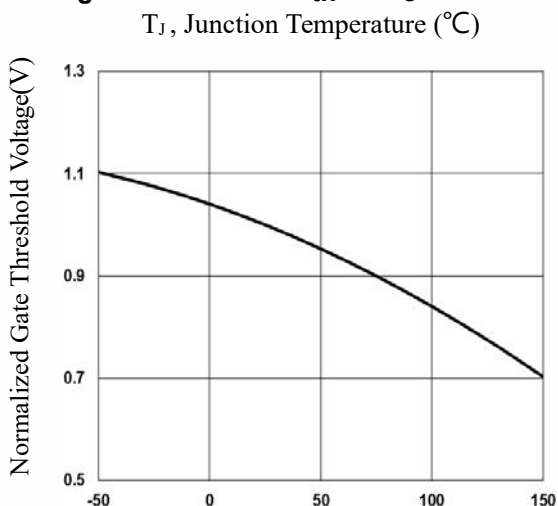


**Fig.4 Gate Charge Waveform**

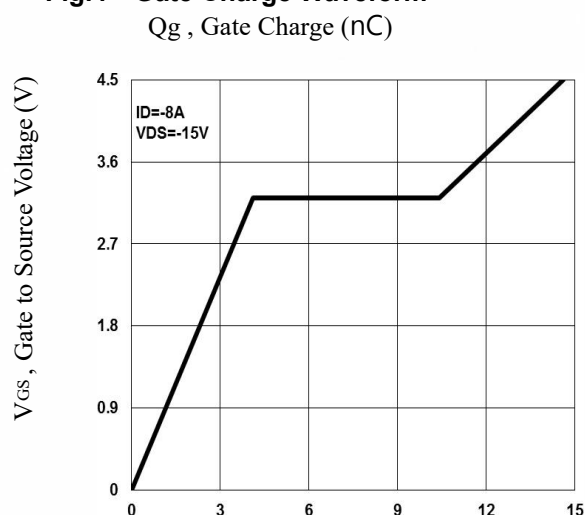


**Fig.5 Normalized Transient Impedance**

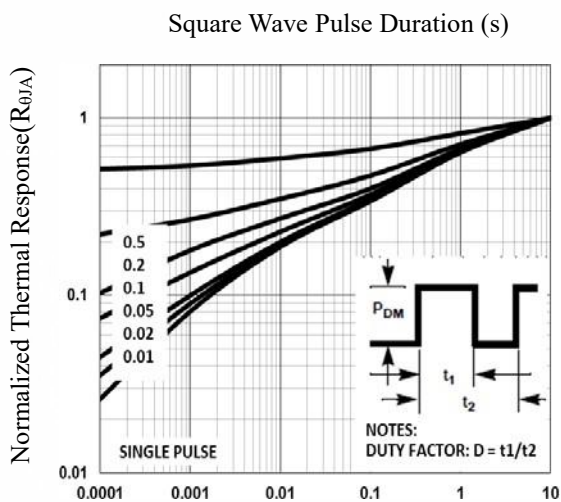


**Fig.6 Maximum Safe Operation Area**

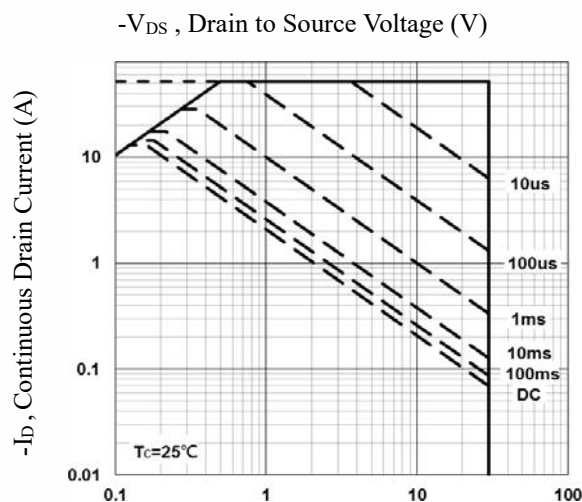


Figure 7a. Switching Test Circuit

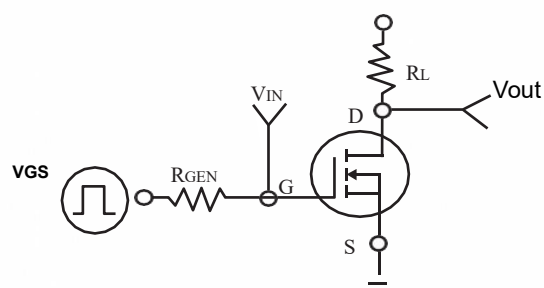


Figure 7b. Switching Waveforms

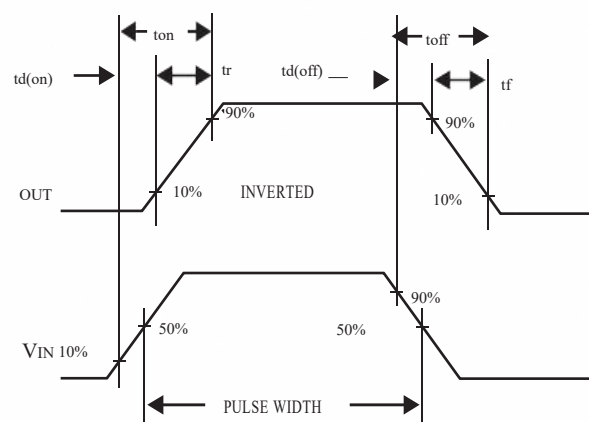


Figure 8a. Unclamped Inductive Test Circuit

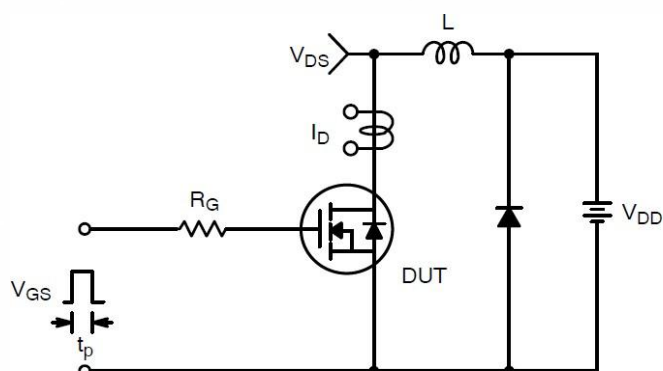
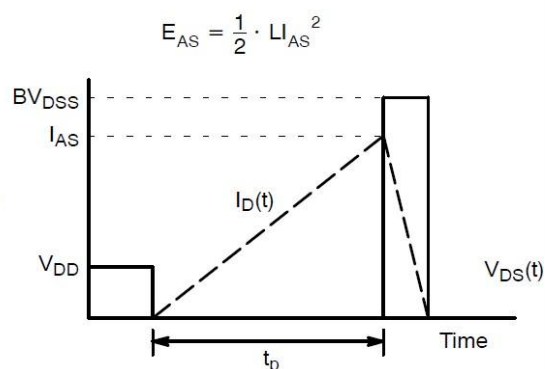


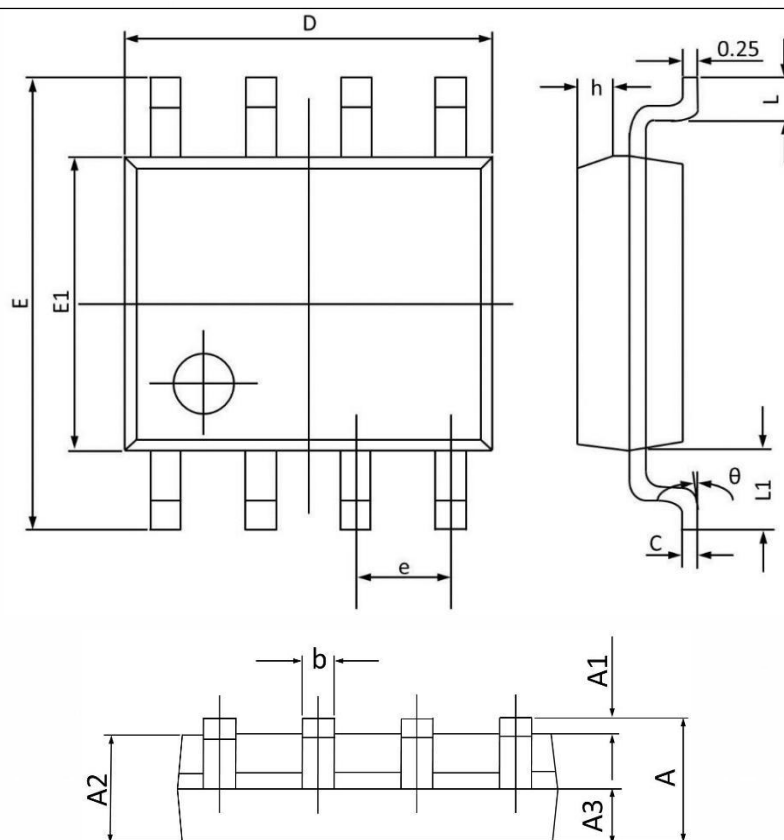
Figure 8b. Unclamped Inductive Waveforms



### NOTICE

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### SOP- 8 Package Information



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 1.350                     | 1.800 | 0.053                | 0.069 |
| A1     | 0.050                     | 0.250 | 0.002                | 0.010 |
| A2     | 1.250                     | 1.650 | 0.049                | 0.065 |
| A3     | 0.500                     | 0.700 | 0.020                | 0.028 |
| b      | 0.300                     | 0.510 | 0.012                | 0.020 |
| c      | 0.150                     | 0.260 | 0.006                | 0.010 |
| D      | 4.700                     | 5.100 | 0.185                | 0.201 |
| E      | 5.800                     | 6.200 | 0.228                | 0.244 |
| E1     | 3.700                     | 4.100 | 0.146                | 0.161 |
| e      | 1.270(BSC)                |       | 0.050(BSC)           |       |
| h      | 0.250                     | 0.500 | 0.010                | 0.020 |
| L      | 0.400                     | 1.000 | 0.016                | 0.039 |
| L1     | 1.050(BSC)                |       | 0.041(BSC)           |       |
| θ      | 0°                        | 8°    | 0°                   | 8°    |