

**AO4836**
**Dual N-Channel Enhancement Mode Field Effect Transistor**

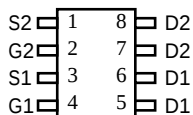
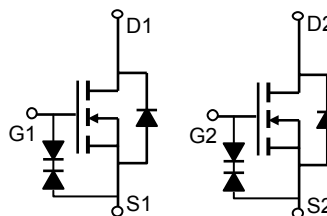

### General Description

The AO4836 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge. The two MOSFETs make a compact and efficient switch and synchronous rectifier combination for use in buck converters. It is ESD protected. *AO4836 is Pb-free (meets ROHS & Sony 259 specifications). AO4836L is a Green Product ordering option. AO4836 and AO4836L are electrically identical.*

### Features

 $V_{DS} (V) = 30V$ 
 $I_D = 7.2A$ 
 $R_{DS(ON)} < 24m\Omega (V_{GS} = 10V)$ 
 $R_{DS(ON)} < 40m\Omega (V_{GS} = 4.5V)$ 

ESD rating: 1500V (HBM)


**SOIC-8**


### Absolute Maximum Ratings $T_A=25^\circ C$ 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>A</sup>  | $I_D$            | 7.2        | A          |
| $T_A=25^\circ C$                       |                  | 6.1        |            |
| Pulsed Drain Current <sup>B</sup>      | $I_{DM}$         | 30         |            |
| Power Dissipation                      | $P_D$            | 2          | W          |
|                                        | $T_A=25^\circ C$ | 1.44       |            |
| 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 <sup>A</sup> | $R_{\theta JA}$ | 55  | 62.5 | $^\circ C/W$ |
| $t \leq 10s$                             |                 |     |      |              |
| Maximum Junction-to-Ambient <sup>A</sup> | $R_{\theta JA}$ | 92  | 110  | $^\circ C/W$ |
| Steady-State                             |                 |     |      |              |
| Maximum Junction-to-Lead <sup>C</sup>    | $R_{\theta JL}$ | 37  | 50   | $^\circ C/W$ |
| Steady-State                             |                 |     |      |              |

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> =24V, 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                                                |     |          | 10       | μA    |
| V <sub>GS(th)</sub>         | Gate Threshold Voltage                | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA                                  | 1   | 2        | 3        | V     |
| I <sub>D(ON)</sub>          | On state drain current                | V <sub>GS</sub> =10V, V <sub>DS</sub> =5V                                                 | 20  |          |          | A     |
| R <sub>DS(ON)</sub>         | Static Drain-Source On-Resistance     | V <sub>GS</sub> =10V, I <sub>D</sub> =7.2A<br>T <sub>J</sub> =125°C                       |     | 20<br>29 | 24<br>35 | mΩ    |
|                             |                                       | V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A                                                 |     | 30       | 40       | mΩ    |
| g <sub>FS</sub>             | Forward Transconductance              | V <sub>DS</sub> =5V, I <sub>D</sub> =7.2A                                                 | 10  | 18       |          | S     |
| V <sub>SD</sub>             | Diode Forward Voltage                 | I <sub>S</sub> =1A                                                                        |     | 0.77     | 1        | V     |
| I <sub>S</sub>              | Maximum Body-Diode Continuous Current |                                                                                           |     |          | 3        | A     |
| <b>DYNAMIC PARAMETERS</b>   |                                       |                                                                                           |     |          |          |       |
| C <sub>iss</sub>            | Input Capacitance                     | V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, f=1MHz                                         |     | 522      | 630      | pF    |
| C <sub>oss</sub>            | Output Capacitance                    |                                                                                           |     | 110      |          | pF    |
| C <sub>rss</sub>            | Reverse Transfer Capacitance          |                                                                                           |     | 75       |          | pF    |
| R <sub>g</sub>              | Gate resistance                       | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                          |     | 2.1      | 3        | Ω     |
| <b>SWITCHING PARAMETERS</b> |                                       |                                                                                           |     |          |          |       |
| Q <sub>g</sub> (10V)        | Total Gate Charge                     | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, I <sub>D</sub> =7.2A                          |     | 11       | 15       | nC    |
| Q <sub>g</sub> (4.5V)       | Total Gate Charge                     |                                                                                           |     | 5.3      | 7        | nC    |
| Q <sub>gs</sub>             | Gate Source Charge                    |                                                                                           |     | 1.9      |          | nC    |
| Q <sub>gd</sub>             | Gate Drain Charge                     |                                                                                           |     | 4        |          | nC    |
| t <sub>D(on)</sub>          | Turn-On DelayTime                     | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, R <sub>L</sub> =2.1Ω,<br>R <sub>GEN</sub> =3Ω |     | 4.7      | 7        | ns    |
| t <sub>r</sub>              | Turn-On Rise Time                     |                                                                                           |     | 4.9      | 10       | ns    |
| t <sub>D(off)</sub>         | Turn-Off DelayTime                    |                                                                                           |     | 16.2     | 22       | ns    |
| t <sub>f</sub>              | Turn-Off Fall Time                    |                                                                                           |     | 3.5      | 7        | ns    |
| t <sub>rr</sub>             | Body Diode Reverse Recovery Time      | I <sub>F</sub> =7.2A, dI/dt=100A/μs                                                       |     | 15.7     | 20       | ns    |
| Q <sub>rr</sub>             | Body Diode Reverse Recovery Charge    | I <sub>F</sub> =7.2A, dI/dt=100A/μs                                                       |     | 7.9      | 10       | nC    |

A: The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=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<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>θJL</sub> and lead to ambient.

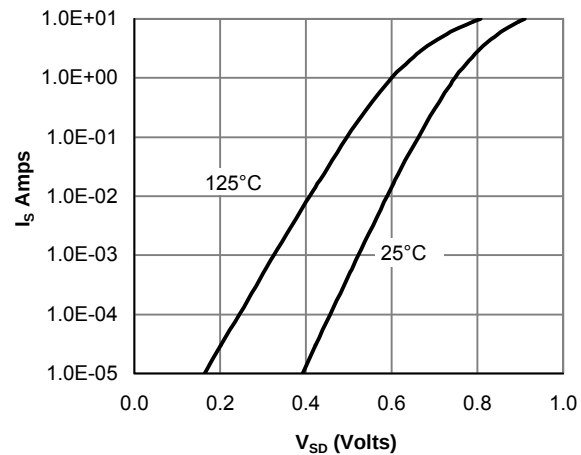
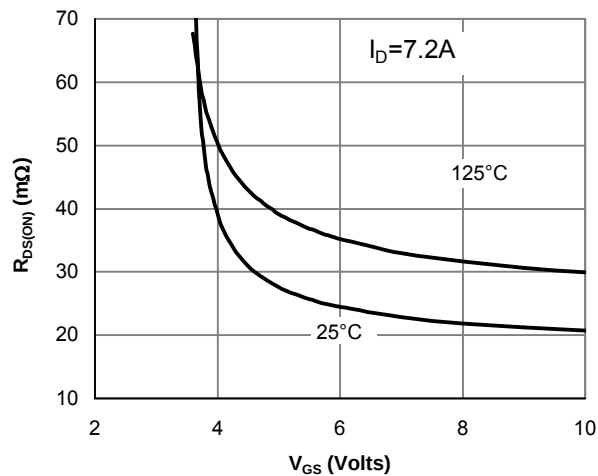
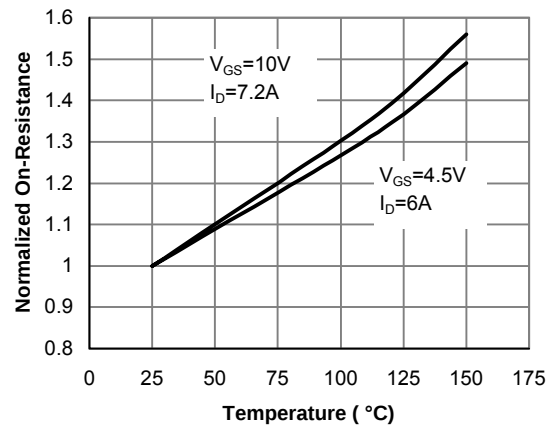
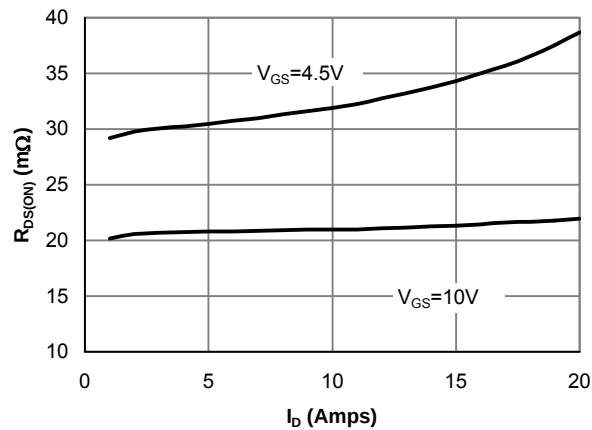
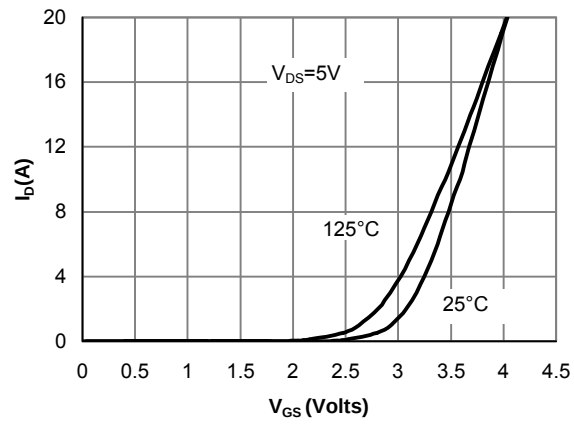
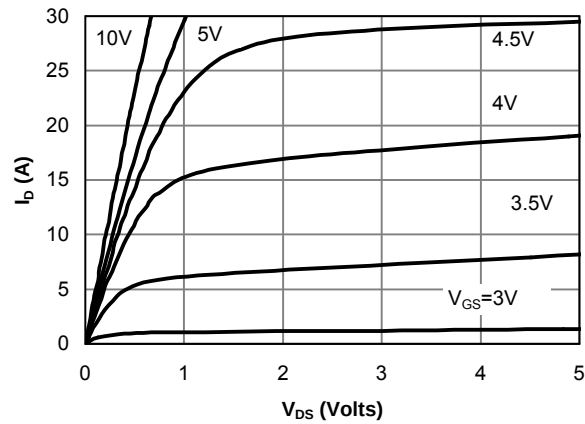
D: The static characteristics in Figures 1 to 6 are obtained using 80μs pulses, duty cycle 0.5% max.

E: 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. The SOA curve provides a single pulse rating.

F: Rev 0: July 2005

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS



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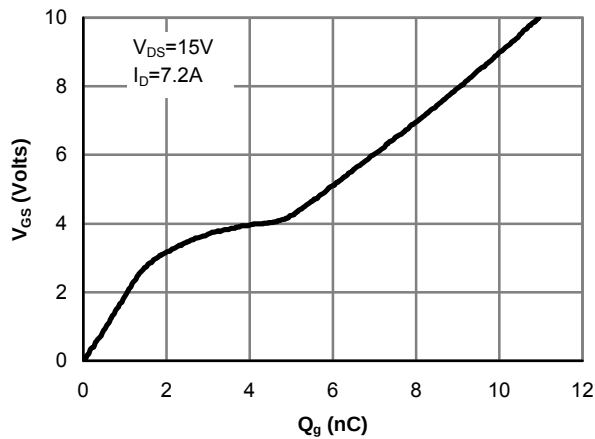


Figure 7: Gate-Charge characteristics

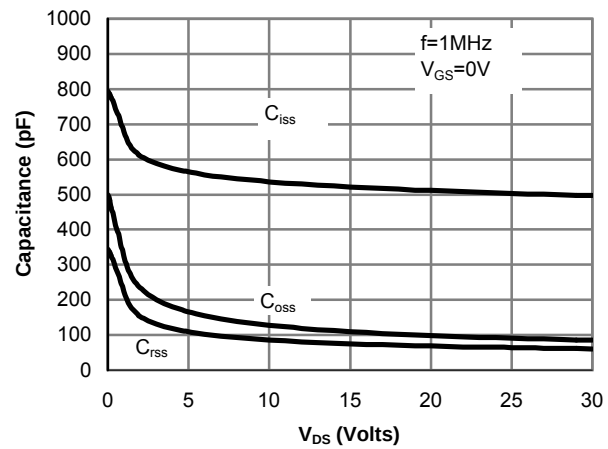


Figure 8: Capacitance Characteristics

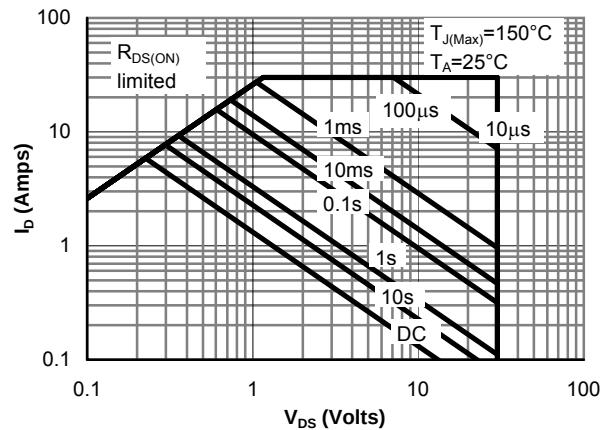


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

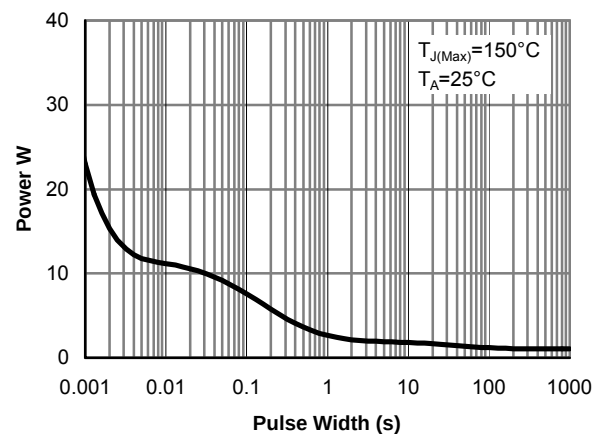


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

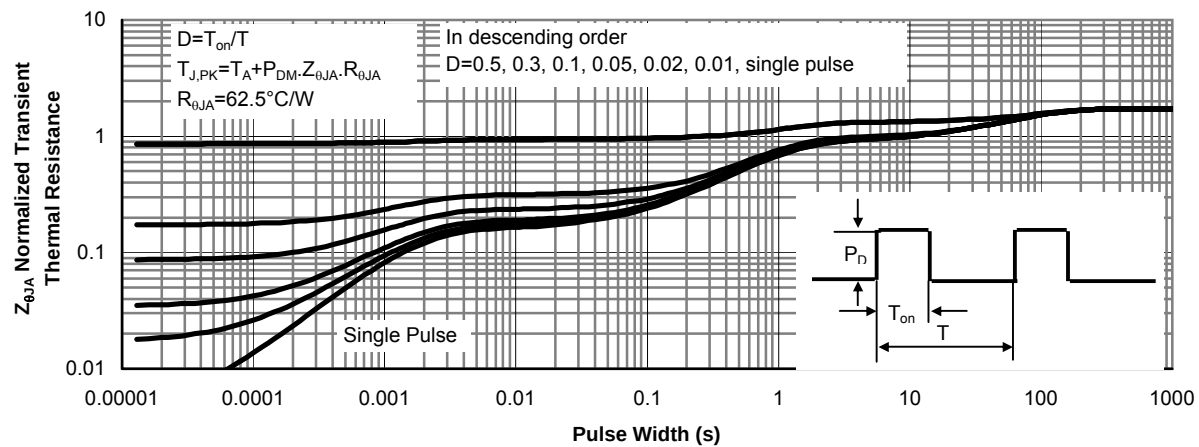


Figure 11: Normalized Maximum Transient Thermal Impedance