

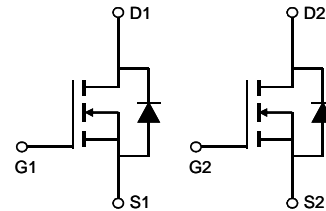
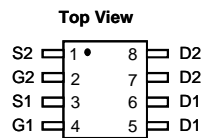
## General Description

The AO4832 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  with low gate charge.

This device is suitable for high side switch in SMPS and general purpose applications.

## Features

|                                  |                  |
|----------------------------------|------------------|
| $V_{DS}$                         | 30V              |
| $I_D$ (at $V_{GS}=10V$ )         | 10A              |
| $R_{DS(ON)}$ (at $V_{GS}=10V$ )  | < 13m $\Omega$   |
| $R_{DS(ON)}$ (at $V_{GS}=4.5V$ ) | < 17.5m $\Omega$ |



### 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                       | $I_D$            | $T_A=25^\circ\text{C}$ | 10               |
|  |                  | $T_A=70^\circ\text{C}$ | 8                |
| Pulsed Drain Current <sup>C</sup>              | $I_{DM}$         | 55                     | A                |
| Avalanche Current <sup>C</sup>                 | $I_{AS}, I_{AR}$ | 22                     | A                |
| Avalanche energy $L=0.1\text{mH}$ <sup>C</sup> | $E_{AS}, E_{AR}$ | 24                     | mJ               |
| Power Dissipation <sup>B</sup>                 | $P_D$            | $T_A=25^\circ\text{C}$ | 2                |
|  |                  | $T_A=70^\circ\text{C}$ | 1.3              |
| 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>   | $R_{\theta JA}$ | 48           | 62.5 | $^\circ\text{C}/\text{W}$ |
| Maximum Junction-to-Ambient <sup>A,D</sup> |                 | Steady-State | 74   | 90                        |
| Maximum Junction-to-Lead                   | $R_{\theta JL}$ | 32           | 40   | $^\circ\text{C}/\text{W}$ |

**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 | 1.9  | 2.5    | V     |
| I <sub>D(ON)</sub>          | On state drain current                | V <sub>GS</sub> =10V, V <sub>DS</sub> =5V   | 55  |      |        | 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                        |     | 10.8 | 13     | mΩ    |
|                             |                                       | V <sub>GS</sub> =4.5V, I <sub>D</sub> =8A   |     | 14   | 17.5   |       |
| g <sub>FS</sub>             | Forward Transconductance              | V <sub>DS</sub> =5V, I <sub>D</sub> =10A  |     | 43   |        | 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 |   |     |      | 2.5    | A     |
| <b>DYNAMIC PARAMETERS</b>   |                                       |   |     |      |        |       |
| C <sub>iss</sub>            | Input Capacitance                     | V <sub>GS</sub> =0V, V <sub>DS</sub> =15V, f=1MHz   | 610 | 760  | 910    | pF    |
| C <sub>oss</sub>            | Output Capacitance                    |   | 88  | 125  | 160    | pF    |
| C <sub>riss</sub>           | Reverse Transfer Capacitance          |   | 40  | 70   | 100    | pF    |
| R <sub>g</sub>              | Gate resistance                       | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz  | 0.8 | 1.6  | 2.4    | Ω     |
| <b>SWITCHING PARAMETERS</b> |                                       |   |     |      |        |       |
| Q <sub>g(10V)</sub>         | Total Gate Charge                     | V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, I <sub>D</sub> =10A                           | 11  | 14   | 17     | nC    |
| Q <sub>g(4.5V)</sub>        | Total Gate Charge                     |   | 5   | 6.6  | 8      | nC    |
| Q <sub>gs</sub>             | Gate Source Charge                    |   |     | 2.4  |        | nC    |
| Q <sub>gd</sub>             | Gate Drain Charge                     |   |     | 3    |        | 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 |     | 4.4  |        | ns    |
| t <sub>r</sub>              | Turn-On Rise Time                     |   |     | 9    |        | ns    |
| t <sub>D(off)</sub>         | Turn-Off DelayTime                    |   |     | 17   |        | ns    |
| t <sub>f</sub>              | Turn-Off Fall Time                    |   |     | 6    |        | ns    |
| t <sub>rr</sub>             | Body Diode Reverse Recovery Time      | I <sub>F</sub> =10A, dI/dt=500A/μs  | 5.6 | 7    | 8      | ns    |
| Q <sub>rr</sub>             | Body Diode Reverse Recovery Charge    | I <sub>F</sub> =10A, dI/dt=500A/μs  | 6.4 | 8    | 9.6    | 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.

B. The power dissipation P<sub>D</sub> is based on T<sub>J(MAX)</sub>=150° C, using ≤ 10s junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature T<sub>J(MAX)</sub>=150° C. Ratings are based on low frequency and duty cycles to keep initial T<sub>J</sub>=25° C.

D. The R<sub>θJA</sub> is the sum of the thermal impedance from junction to lead R<sub>θJL</sub> and lead to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-ambient thermal impedance which is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, assuming a maximum junction temperature of T<sub>J(MAX)</sub>=150° C. The SOA curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

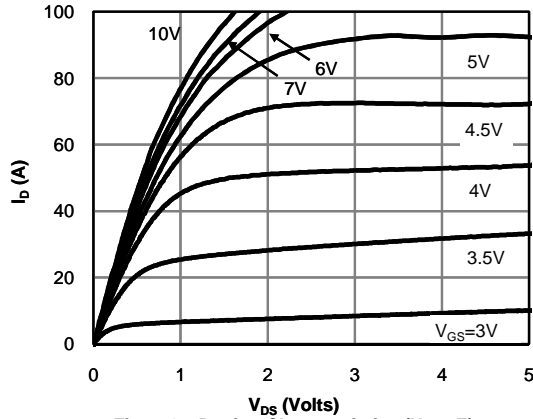


Fig 1: On-Region Characteristics (Note E)

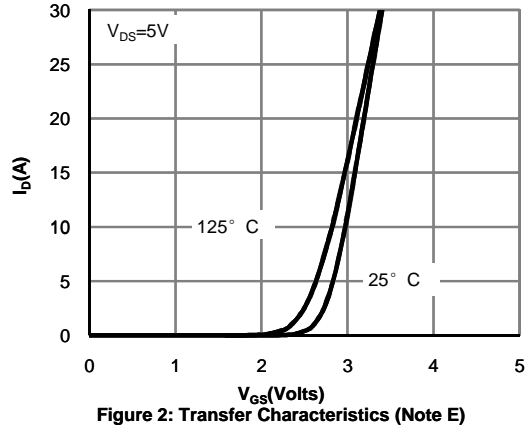


Figure 2: Transfer Characteristics (Note E)

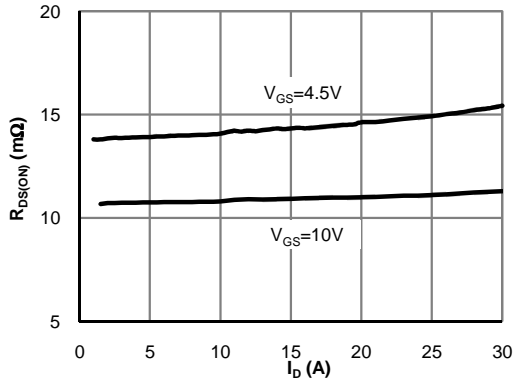


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

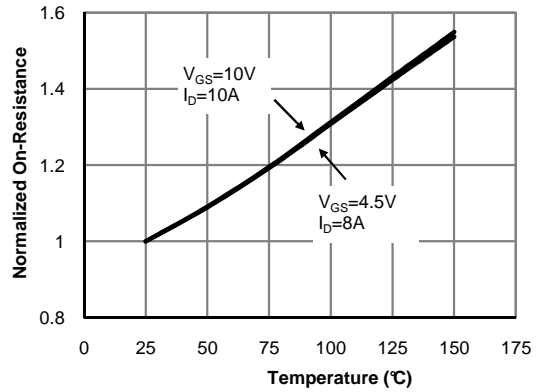


Figure 4: On-Resistance vs. Junction Temperature (Note E)

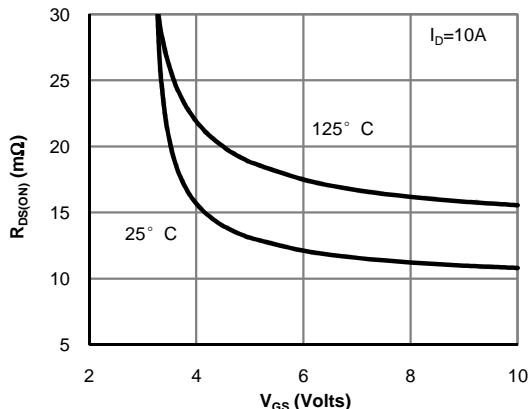


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

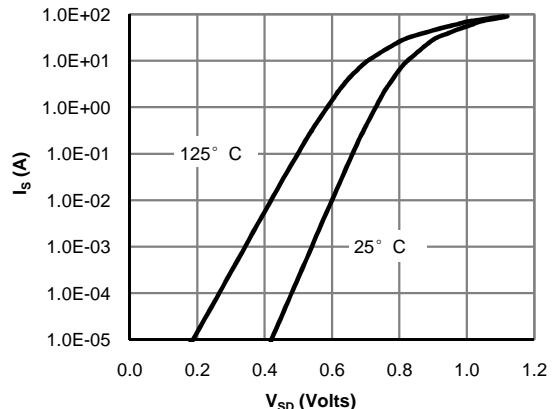


Figure 6: Body-Diode Characteristics (Note E)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

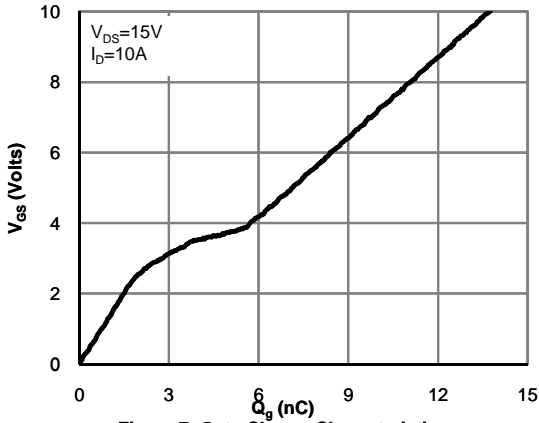


Figure 7: Gate-Charge Characteristics

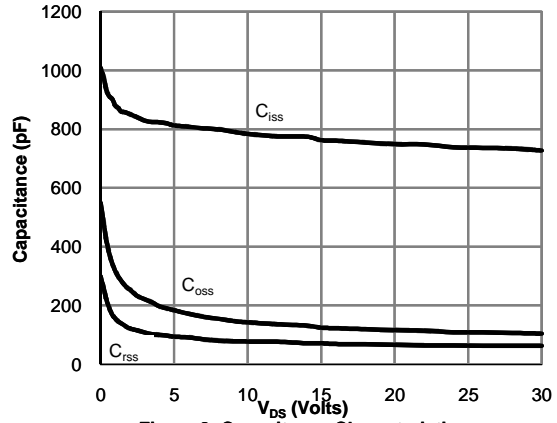


Figure 8: Capacitance Characteristics

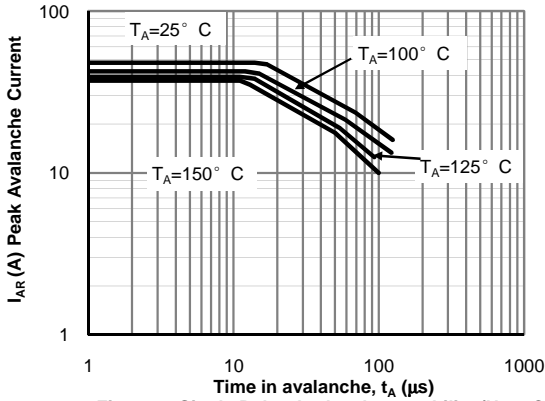


Figure 9: Single Pulse Avalanche capability (Note C)

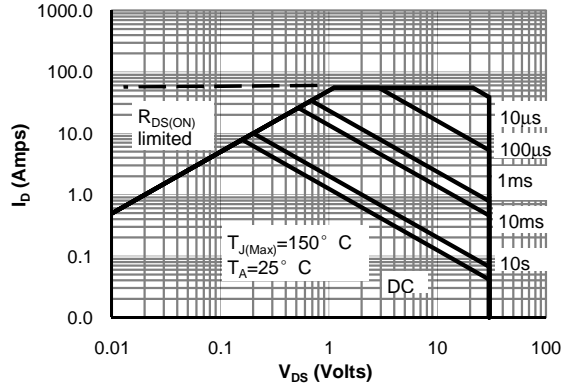


Figure 10: Maximum Forward Biased Safe Operating Area (Note F)

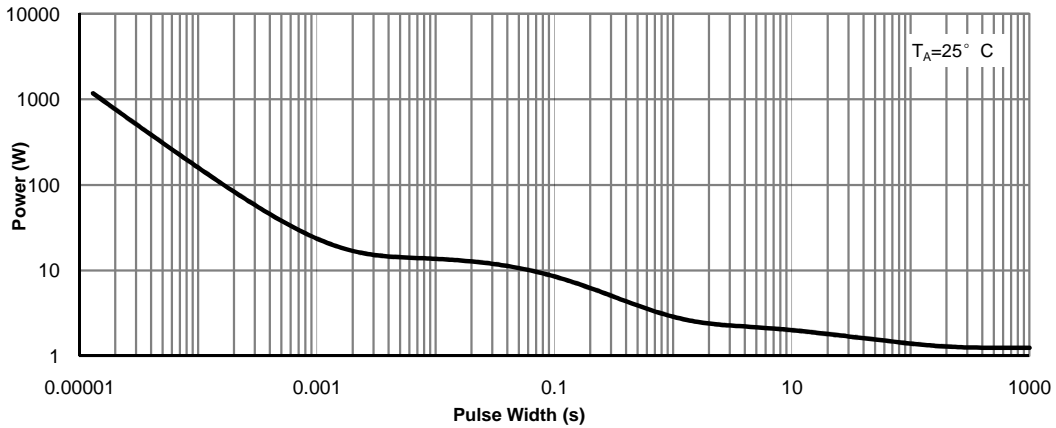
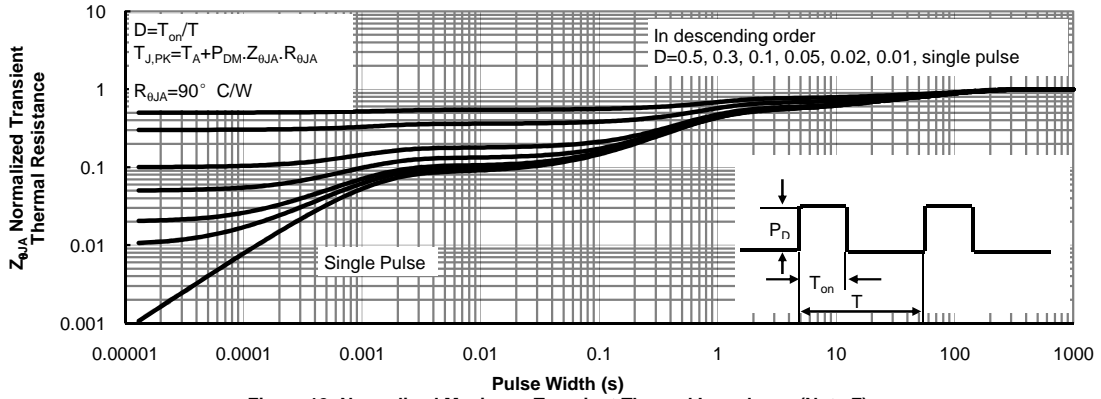
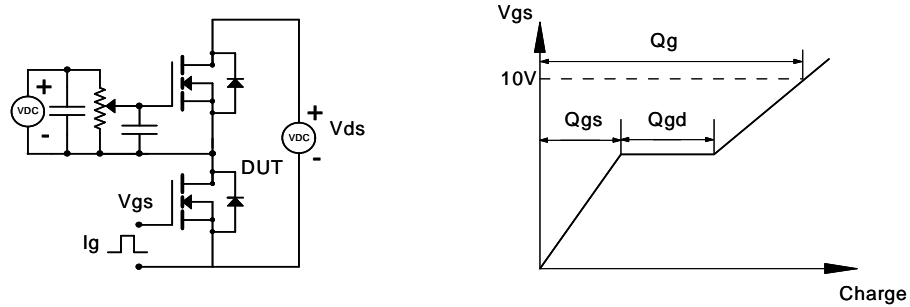


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note F)

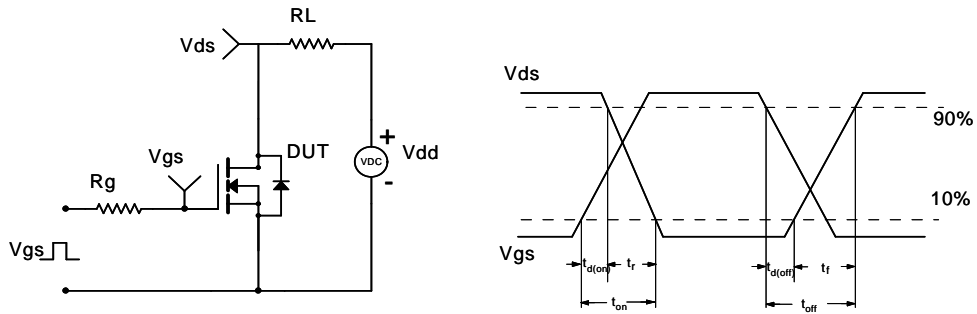
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**



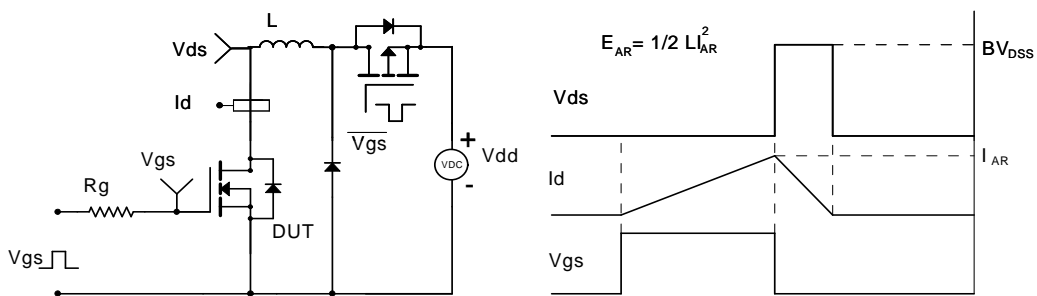
Gate Charge Test Circuit & Waveform



Resistive Switching Test Circuit & Waveforms



Unclamped Inductive Switching (UIS) Test Circuit & Waveforms



Diode Recovery Test Circuit & Waveforms

