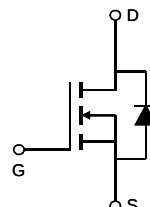
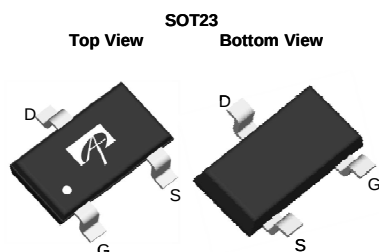


### General Description

The AO3442 combines advanced trench MOSFET technology with a low resistance package to provide extremely low  $R_{DS(ON)}$ . This device is ideal for boost converters and synchronous rectifiers for consumer, telecom, industrial power supplies and LED backlighting.

### Product Summary

|                                  |                 |
|----------------------------------|-----------------|
| $V_{DS}$                         | 100V            |
| $I_D$ (at $V_{GS}=10V$ )         | 1A              |
| $R_{DS(ON)}$ (at $V_{GS}=10V$ )  | < 630m $\Omega$ |
| $R_{DS(ON)}$ (at $V_{GS}=4.5V$ ) | < 720m $\Omega$ |



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

| Parameter                              | Symbol         | Maximum    | Units            |
|----------------------------------------|----------------|------------|------------------|
| Drain-Source Voltage                   | $V_{DS}$       | 100        | V                |
| Gate-Source Voltage                    | $V_{GS}$       | $\pm 20$   | V                |
| Continuous Drain Current               | $I_D$          | 1          | A                |
| Current                                |                | 0.8        |                  |
| Pulsed Drain Current <sup>C</sup>      | $I_{DM}$       | 4          |                  |
| Power Dissipation <sup>B</sup>         | $P_D$          | 1.4        | W                |
|                                        |                | 0.9        |                  |
| 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>    | $R_{\theta JA}$ | 70  | 90  | $^\circ\text{C/W}$ |
| Maximum Junction-to-Ambient <sup>A, D</sup> |                 | 100 | 125 | $^\circ\text{C/W}$ |
| Maximum Junction-to-Lead                    | $R_{\theta JL}$ | 63  | 80  | $^\circ\text{C/W}$ |

**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                                               | 100 |            |             | V     |
| I <sub>DSS</sub>            | Zero Gate Voltage Drain Current                    | V <sub>DS</sub> =100V, 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                                 | 1.7 | 2.3        | 2.9         | V     |
| I <sub>D(ON)</sub>          | On state drain current                             | V <sub>GS</sub> =10V, V <sub>DS</sub> =5V                                                | 4   |            |             | A     |
| R <sub>DS(ON)</sub>         | Static Drain-Source On-Resistance                  | V <sub>GS</sub> =10V, I <sub>D</sub> =1A<br>T <sub>j</sub> =125°C                        |     | 514<br>983 | 630<br>1200 | mΩ    |
|                             |                                                    | V <sub>GS</sub> =4.5V, I <sub>D</sub> =0.8A                                              |     | 554        | 720         | mΩ    |
|                             |                                                    |                                                                                          |     |            |             |       |
| g <sub>FS</sub>             | Forward Transconductance                           | V <sub>DS</sub> =5V, I <sub>D</sub> =1A                                                  |     | 2.8        |             | S     |
| V <sub>SD</sub>             | Diode Forward Voltage                              | I <sub>S</sub> =1A, V <sub>GS</sub> =0V                                                  |     | 0.9        | 1.2         | V     |
| I <sub>S</sub>              | Maximum Body-Diode Continuous Current <sup>6</sup> |                                                                                          |     |            | 1           | A     |
| <b>DYNAMIC PARAMETERS</b>   |                                                    |                                                                                          |     |            |             |       |
| C <sub>iss</sub>            | Input Capacitance                                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =50V, f=1MHz                                        |     | 100        |             | pF    |
| C <sub>oss</sub>            | Output Capacitance                                 |                                                                                          |     | 13         |             | pF    |
| C <sub>rss</sub>            | Reverse Transfer Capacitance                       |                                                                                          |     | 5          |             | pF    |
| R <sub>g</sub>              | Gate resistance                                    | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                         | 2.5 | 5          | 7.5         | Ω     |
| <b>SWITCHING PARAMETERS</b> |                                                    |                                                                                          |     |            |             |       |
| Q <sub>g(10V)</sub>         | Total Gate Charge                                  | V <sub>GS</sub> =10V, V <sub>DS</sub> =50V, I <sub>D</sub> =1A                           |     | 2.8        | 6           | nC    |
| Q <sub>g(4.5V)</sub>        | Total Gate Charge                                  |                                                                                          |     | 1.5        | 3           | nC    |
| Q <sub>gs</sub>             | Gate Source Charge                                 |                                                                                          |     | 0.4        |             | nC    |
| Q <sub>gd</sub>             | Gate Drain Charge                                  |                                                                                          |     | 0.8        |             | nC    |
| t <sub>D(on)</sub>          | Turn-On DelayTime                                  | V <sub>GS</sub> =10V, V <sub>DS</sub> =50V, R <sub>L</sub> =50Ω,<br>R <sub>GEN</sub> =3Ω |     | 5          |             | ns    |
| t <sub>r</sub>              | Turn-On Rise Time                                  |                                                                                          |     | 4          |             | ns    |
| t <sub>D(off)</sub>         | Turn-Off DelayTime                                 |                                                                                          |     | 12         |             | ns    |
| t <sub>f</sub>              | Turn-Off Fall Time                                 |                                                                                          |     | 5          |             | ns    |
| t <sub>rr</sub>             | Body Diode Reverse Recovery Time                   | I <sub>F</sub> =5.6A, dI/dt=100A/μs                                                      |     | 52         |             | ns    |
| Q <sub>rr</sub>             | Body Diode Reverse Recovery Charge                 | I <sub>F</sub> =5.6A, dI/dt=100A/μs                                                      |     | 60         |             | 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.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

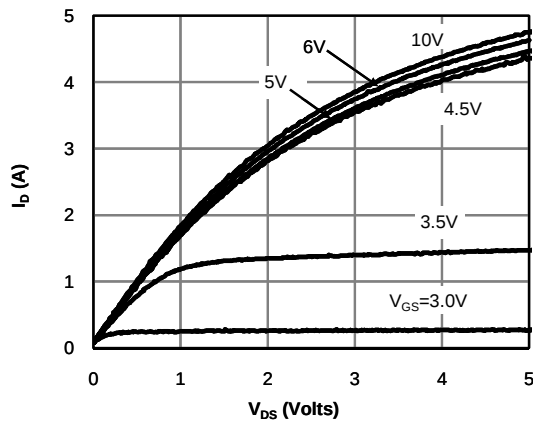


Fig 1: On-Region Characteristics (Note E)

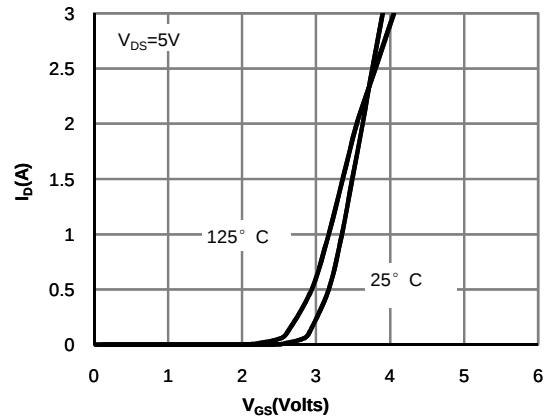


Figure 2: Transfer Characteristics (Note E)

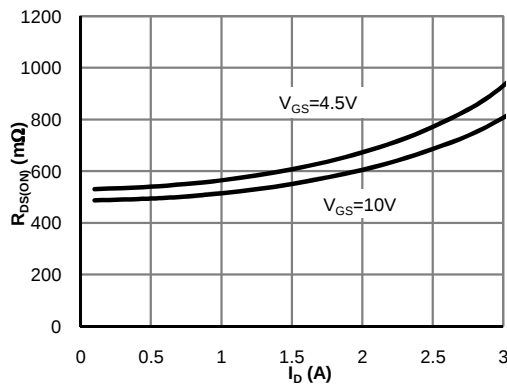


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

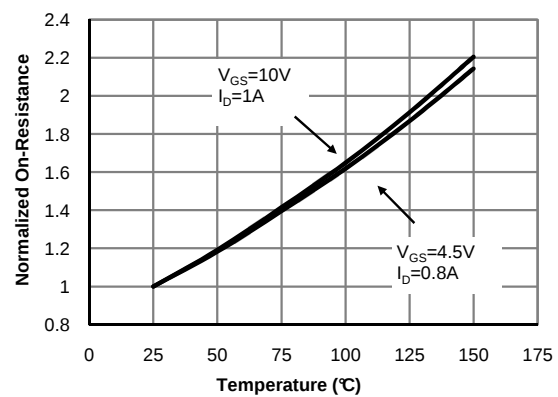


Figure 4: On-Resistance vs. Junction Temperature (Note E)

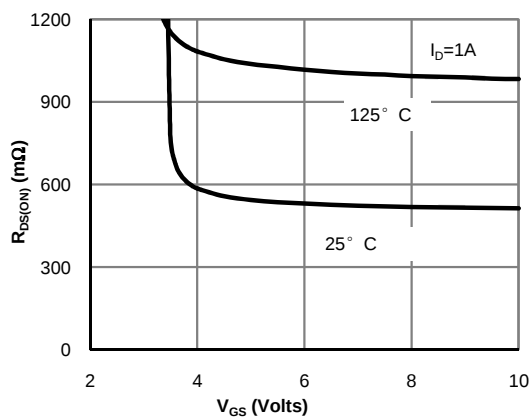


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

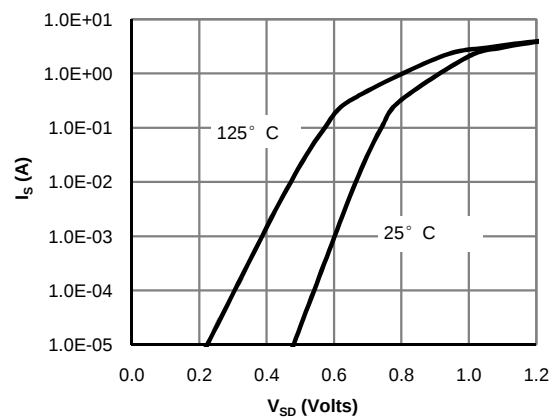


Figure 6: Body-Diode Characteristics (Note E)

# TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

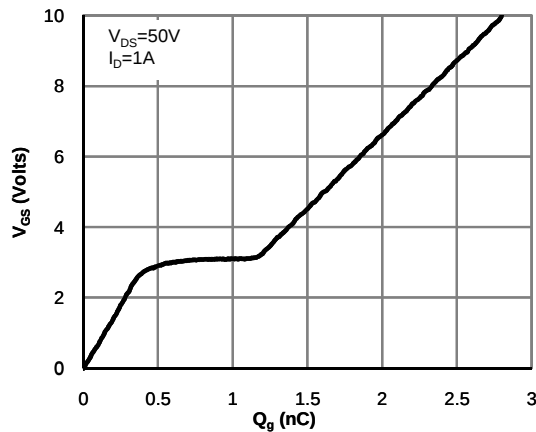


Figure 7: Gate-Charge Characteristics

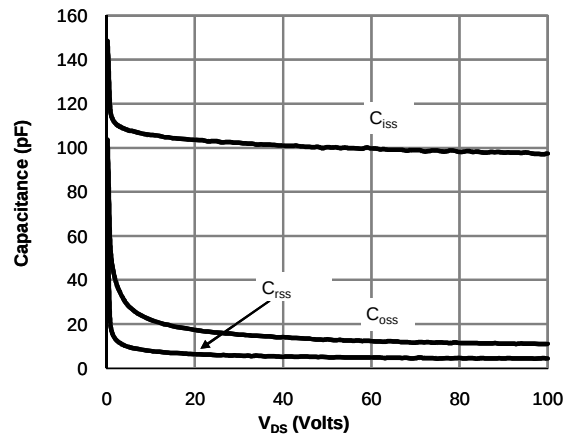


Figure 8: Capacitance Characteristics

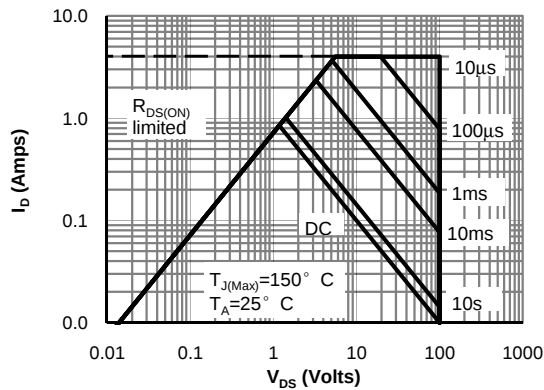


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

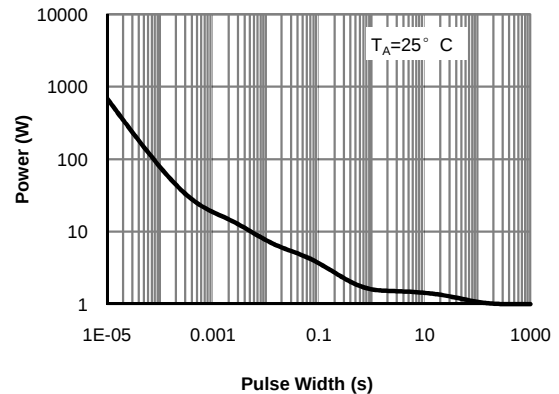


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note F)

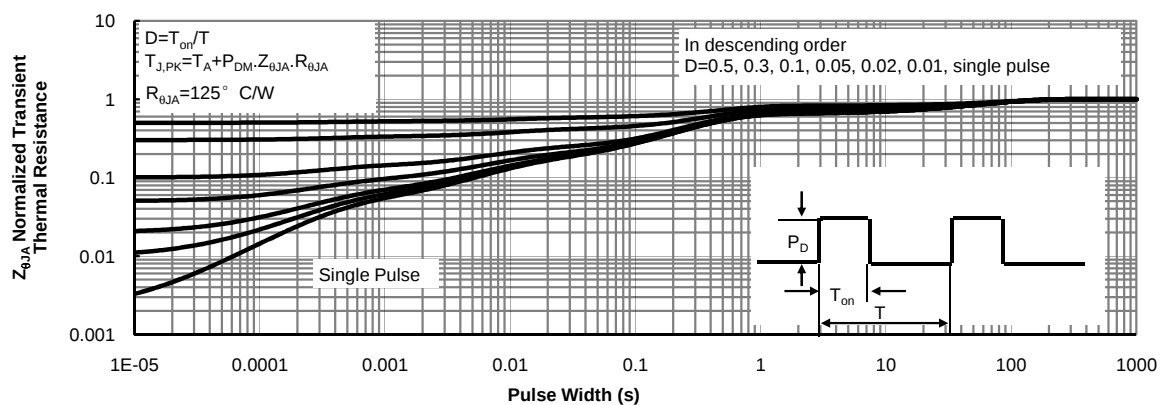
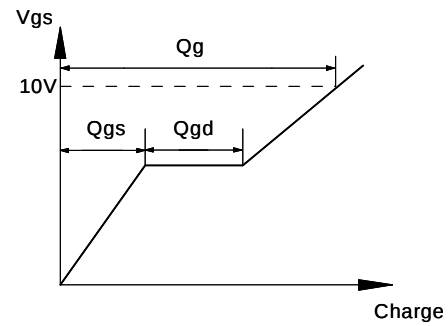
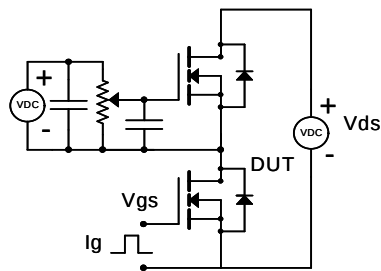
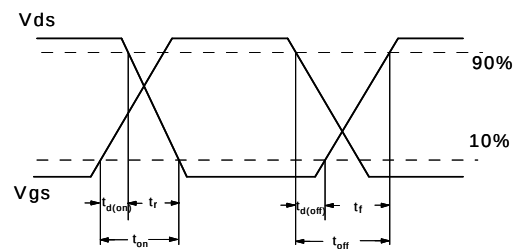
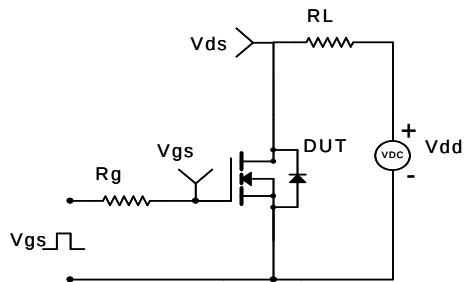


Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

### Gate Charge Test Circuit & Waveform



### Resistive Switching Test Circuit & Waveforms



### Diode Recovery Test Circuit & Waveforms

