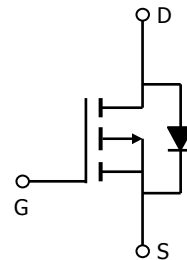
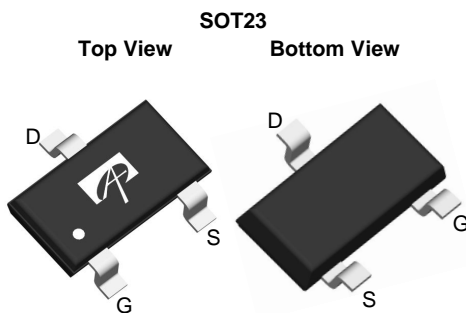


General Description

The AO3435 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 1.5V. This device is suitable for use in buck convertor applications.

Product Summary

| | |
|---------------------------|--------------------|
| $V_{DS} = -20V$ | |
| $I_D = -3.5A$ | $(V_{GS} = -4.5V)$ |
| $R_{DS(ON)} < 70m\Omega$ | $(V_{GS} = -4.5V)$ |
| $R_{DS(ON)} < 90m\Omega$ | $(V_{GS} = -2.5V)$ |
| $R_{DS(ON)} < 110m\Omega$ | $(V_{GS} = -1.8V)$ |
| $R_{DS(ON)} < 130m\Omega$ | $(V_{GS} = -1.5V)$ |



Absolute Maximum Ratings $T_A=25^\circ C$ unless otherwise noted

| Parameter | Symbol | 10 Sec | Steady State | Units |
|--|----------------|------------------|--------------|------------|
| Drain-Source Voltage | V_{DS} | -20 | | V |
| Gate-Source Voltage | V_{GS} | ± 8 | | V |
| Continuous Drain Current ^A | I_D | -3.5 | -2.9 | A |
| $T_A=25^\circ C$ | | | | |
| $T_A=70^\circ C$ | | -2.7 | -2.3 | |
| Pulsed Drain Current ^B | I_{DM} | -25 | | |
| Power Dissipation ^A | P_D | 1.4 | 1 | W |
| | | $T_A=25^\circ C$ | | |
| $T_A=70^\circ C$ | | 0.9 | 0.6 | |
| 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 ^A | $R_{\theta JA}$ | 70 | 90 | $^\circ C/W$ |
| $t \leq 10s$ | | | | |
| Maximum Junction-to-Ambient ^A | $R_{\theta JA}$ | 100 | 125 | $^\circ C/W$ |
| Steady-State | | | | |
| Maximum Junction-to-Lead ^C | $R_{\theta JL}$ | 63 | 80 | $^\circ C/W$ |

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|-----------------------------|---------------------------------------|---|------|-------|-----------|---------------|
| STATIC PARAMETERS | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$ | -20 | | | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=-20\text{V}$, $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$ | | | -1 -5 | μA |
| I_{GSS} | Gate-Body leakage current | $V_{DS}=0\text{V}$, $V_{GS}=\pm 8\text{V}$ | | | ± 100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$ | -0.5 | -0.65 | -1 | V |
| $I_{D(ON)}$ | On state drain current | $V_{GS}=-4.5\text{V}$, $V_{DS}=-5\text{V}$ | -25 | | | A |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS}=-4.5\text{V}$, $I_D=-3.5\text{A}$ $T_J=125^\circ\text{C}$ | | 56 | 70 | m Ω |
| | | $V_{GS}=-2.5\text{V}$, $I_D=-3.0\text{A}$ | | 70 | 90 | |
| | | $V_{GS}=-1.8\text{V}$, $I_D=-2.0\text{A}$ | | 85 | 110 | m Ω |
| | | $V_{GS}=-1.5\text{V}$, $I_D=-0.5\text{A}$ | | 100 | 130 | m Ω |
| g_{FS} | Forward Transconductance | $V_{DS}=-5\text{V}$, $I_D=-3.5\text{A}$ | | 15 | | S |
| V_{SD} | Diode Forward Voltage | $I_S=-1\text{A}$, $V_{GS}=0\text{V}$ | | -0.7 | -1 | V |
| I_S | Maximum Body-Diode Continuous Current | | | | -1.4 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C_{ISS} | Input Capacitance | $V_{GS}=0\text{V}$, $V_{DS}=-10\text{V}$, $f=1\text{MHz}$ | | 560 | 745 | pF |
| C_{OSS} | Output Capacitance | | | 80 | | pF |
| C_{RSS} | Reverse Transfer Capacitance | | | 70 | | pF |
| R_g | Gate resistance | $V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$ | | 15 | 23 | Ω |
| SWITCHING PARAMETERS | | | | | | |
| Q_g | Total Gate Charge | $V_{GS}=-4.5\text{V}$, $V_{DS}=-10\text{V}$, $I_D=-3.5\text{A}$ | | 8.5 | 11 | nC |
| Q_{gs} | Gate Source Charge | | | 1.2 | | nC |
| Q_{gd} | Gate Drain Charge | | | 2.1 | | nC |
| $t_{D(on)}$ | Turn-On DelayTime | $V_{GS}=-4.5\text{V}$, $V_{DS}=-10\text{V}$, $R_L=3\Omega$, $R_{GEN}=6\Omega$ | | 7.2 | | ns |
| t_r | Turn-On Rise Time | | | 36 | | ns |
| $t_{D(off)}$ | Turn-Off DelayTime | | | 53 | | ns |
| t_f | Turn-Off Fall Time | | | 56 | | ns |
| t_{rr} | Body Diode Reverse Recovery Time | $I_F=-3.5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$ | | 37 | 49 | ns |
| Q_{rr} | Body Diode Reverse Recovery Charge | $I_F=-3.5\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$ | | 27 | | nC |

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1 in² FR-4 board with 2oz. copper, in a still air environment with $T_A=25^\circ\text{C}$. The value in any given application depends on the user's specific board design. The current rating is based on the $t \leq 10\text{s}$ thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C: The $R_{\theta JA}$ is the sum of the thermal impedance from junction to lead $R_{\theta JL}$ and lead to ambient.

D: The static characteristics in Figures 1 to 6 are obtained using 300 μs pulse width, duty cycle 0.5% max.

E: These tests are performed with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A=25^\circ\text{C}$. The SOA curve provides a single pulse rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

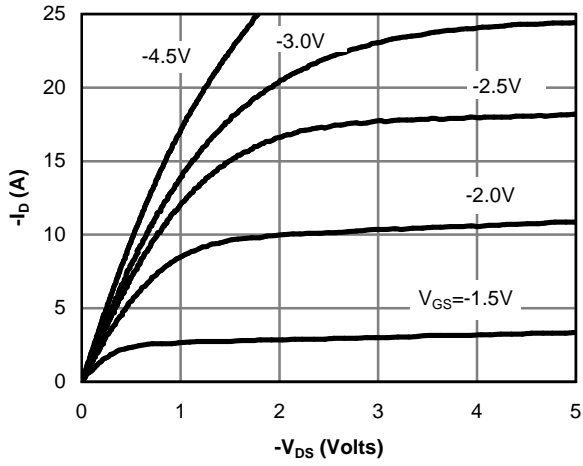


Figure 1: On-Region Characteristics

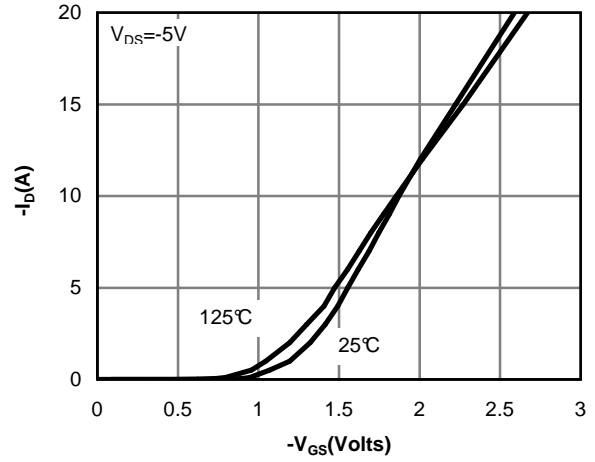


Figure 2: Transfer Characteristics

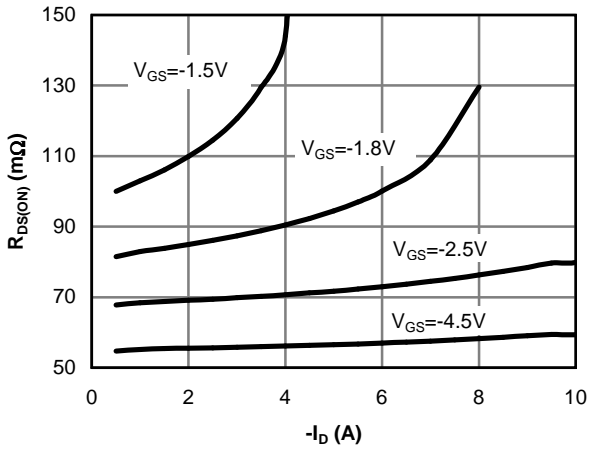


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

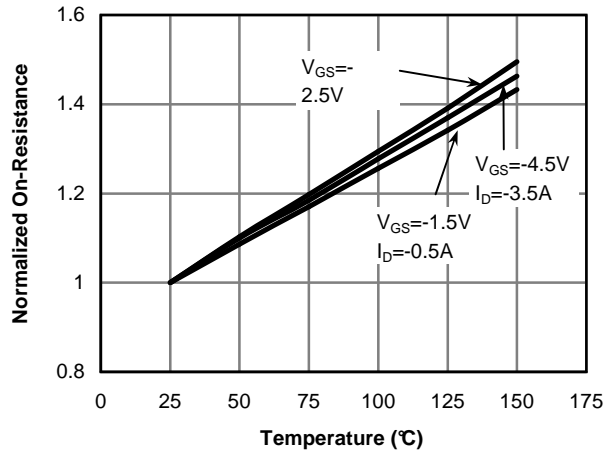


Figure 4: On-Resistance vs. Junction Temperature

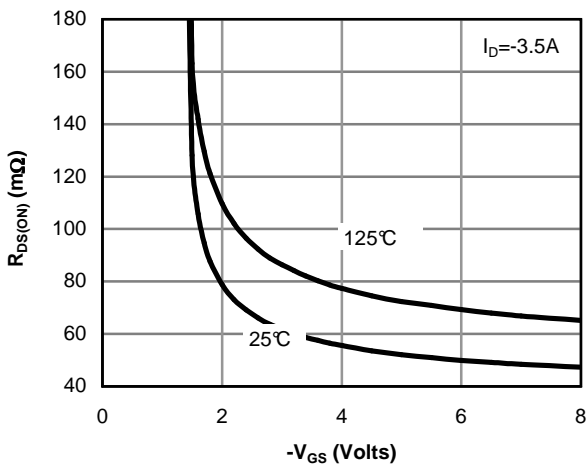


Figure 5: On-Resistance vs. Gate-Source Voltage

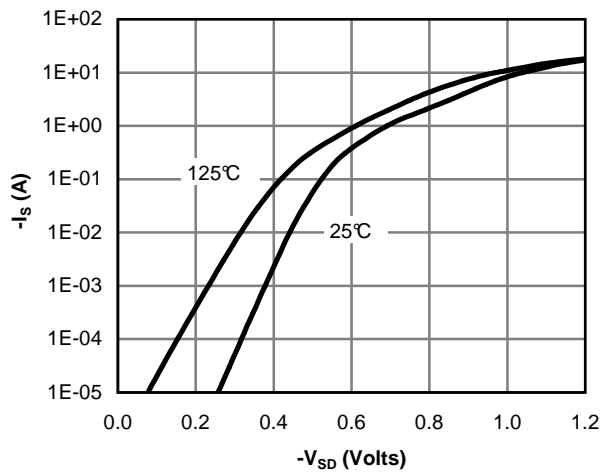


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

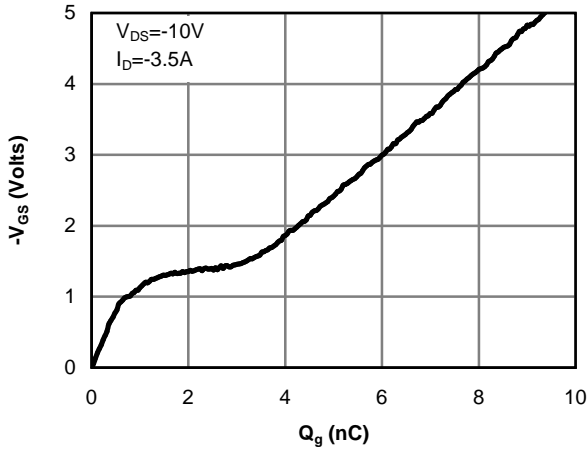


Figure 7: Gate-Charge Characteristics

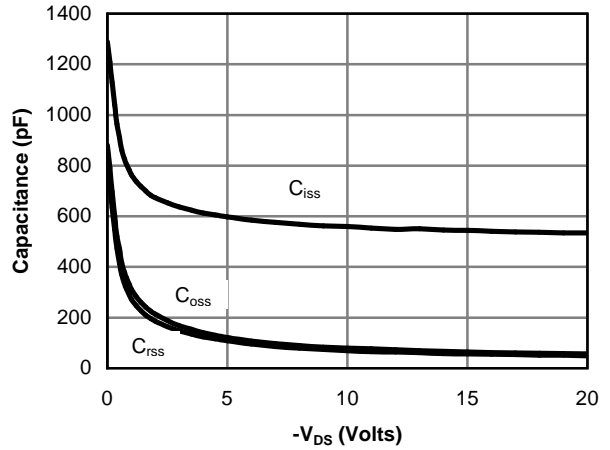


Figure 8: Capacitance Characteristics

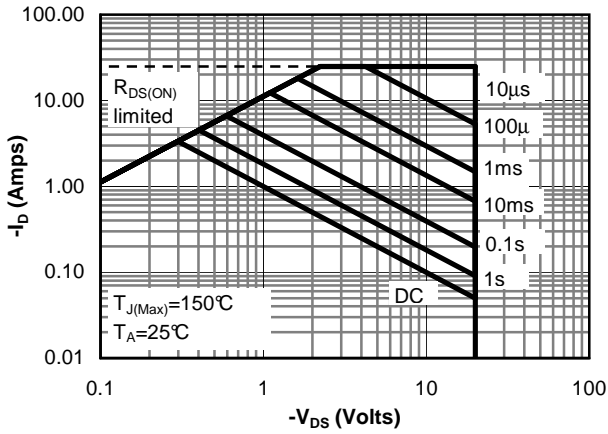


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

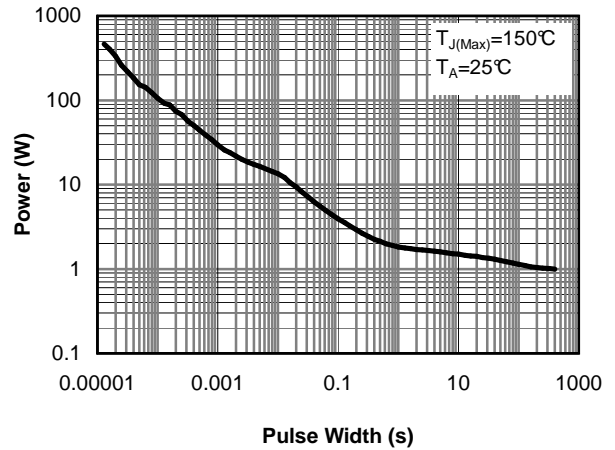


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

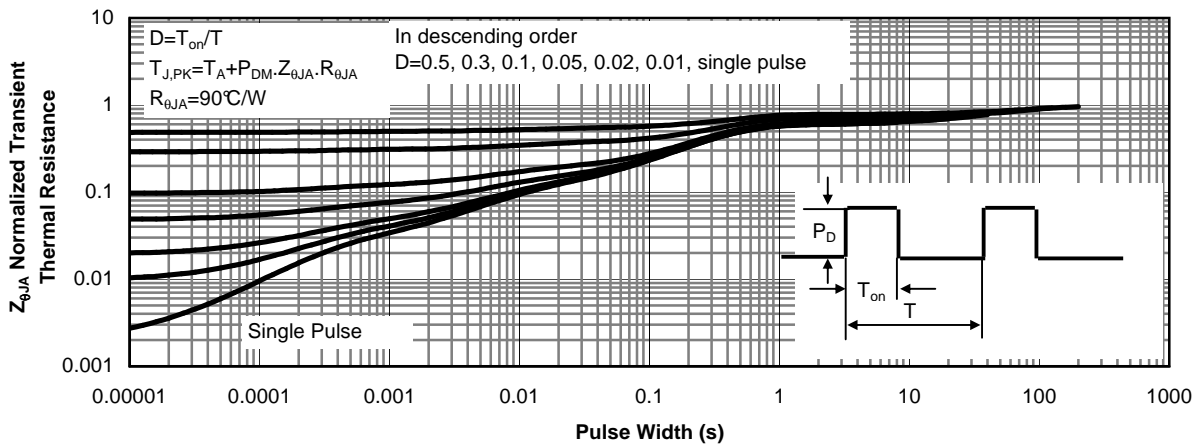


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)