

## General Description

The AO3460 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge, and operation with gate voltages as low as 4.5V, in the small SOT-23 footprint. It can be used for a wide variety of applications, including load switching, low current inverters and low current DC-DC converters. It is ESD protected.

## Features

$V_{DS}$  (V) = 60V

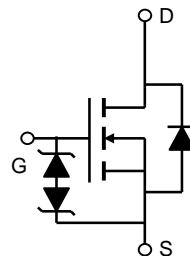
$I_D$  = 0.65A ( $V_{GS}$  = 10V)

$R_{DS(ON)} < 1.7\Omega$  ( $V_{GS}$  = 10V)



$R_{DS(ON)} < 2\Omega$  ( $V_{GS}$  = 4.5V)

ESD protected



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Continuous Drain Current <sup>A, F</sup>	$I_D$	0.65	A
$T_A=70^\circ C$		0.5	
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	1.6	
Power Dissipation <sup>A</sup>	$P_D$	1.4	W
$T_A=70^\circ C$		0.9	
Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to 150	°C

### Thermal Characteristics

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient <sup>A</sup>	$R_{\theta JA}$	70	90	°C/W
Steady-State		100	125	°C/W
Maximum Junction-to-Lead <sup>C</sup>	$R_{\theta JL}$	63	80	°C/W

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$\text{BV}_{\text{DSS}}$	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	60			V
$I_{\text{DSS}}$	Zero Gate Voltage Drain Current	$V_{DS}=60\text{V}, V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$		1 5		$\mu\text{A}$
$I_{\text{GSS}}$	Gate-Body leakage current	$V_{DS}=0\text{V}, V_{GS}=\pm 20\text{V}$			$\pm 10$	$\mu\text{A}$
$V_{\text{GS(th)}}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu\text{A}$	1	2.2	2.5	V
$I_{\text{D(ON)}}$	On state drain current	$V_{GS}=10\text{V}, V_{DS}=5\text{V}$	1.6			A
$R_{\text{DS(ON)}}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}, I_D=0.65\text{A}$ $T_J=125^\circ\text{C}$		1.4 2.5	1.7 3	$\Omega$
		$V_{GS}=4.5\text{V}, I_D=0.5\text{A}$		1.6	2	$\Omega$
$g_{\text{FS}}$	Forward Transconductance	$V_{DS}=5\text{V}, I_D=0.65\text{A}$		0.8		S
$V_{\text{SD}}$	Diode Forward Voltage	$I_S=0.1\text{A}, V_{GS}=0\text{V}$		0.8	1	V
$I_S$	Maximum Body-Diode Continuous Current				1.2	A
<b>DYNAMIC PARAMETERS</b>						
$C_{\text{iss}}$	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=30\text{V}, f=1\text{MHz}$		22	27	pF
$C_{\text{oss}}$	Output Capacitance			6		pF
$C_{\text{rss}}$	Reverse Transfer Capacitance			2		pF
<b>SWITCHING PARAMETERS</b>						
$t_{\text{D(on)}}$	Turn-On DelayTime	$V_{GS}=10\text{V}, V_{DS}=30\text{V}, R_L=75\Omega, R_{\text{GEN}}=3\Omega$		5.3		ns
$t_r$	Turn-On Rise Time			2.8		ns
$t_{\text{D(off)}}$	Turn-Off DelayTime			19.7		ns
$t_f$	Turn-Off Fall Time			5.5		ns
$t_{\text{rr}}$	Body Diode Reverse Recovery Time	$I_F=0.65\text{A}, dI/dt=100\text{A}/\mu\text{s}, V_{GS}=-9\text{V}$		11.3	14	ns
$Q_{\text{rr}}$	Body Diode Reverse Recovery Charge	$I_F=0.65\text{A}, dI/dt=100\text{A}/\mu\text{s}, V_{GS}=-9\text{V}$		7.5		nC

A: The value of  $R_{\theta JA}$  is measured with the device mounted on  $1\text{in}^2$  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.

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  $<300\ \mu\text{s}$  pulses, duty cycle 0.5% max.

E. These tests are performed with the device mounted on  $1\text{in}^2$  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.

F. The current rating is based on the  $t \leq 10\text{s}$  thermal resistance rating.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

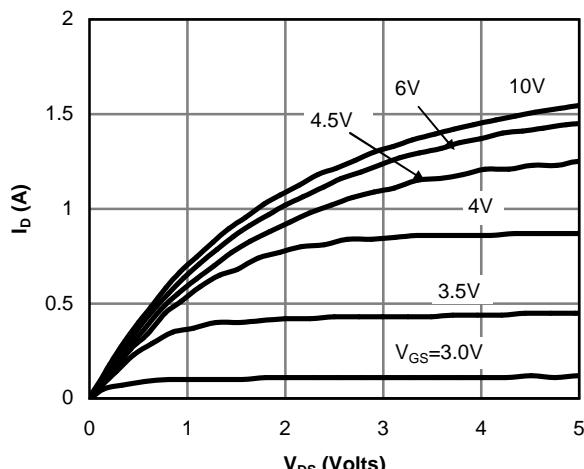


Figure 1: On-Region Characteristics

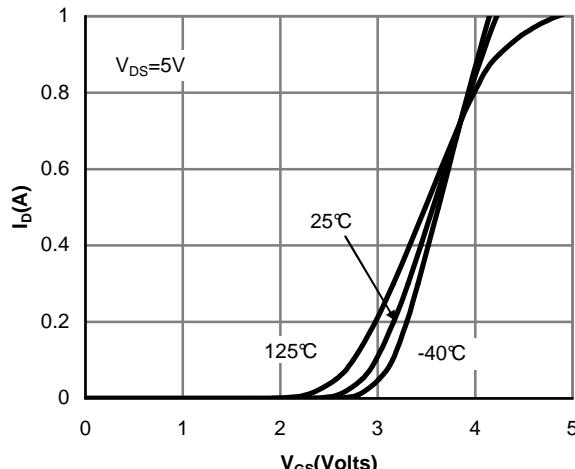


Figure 2: Transfer Characteristics

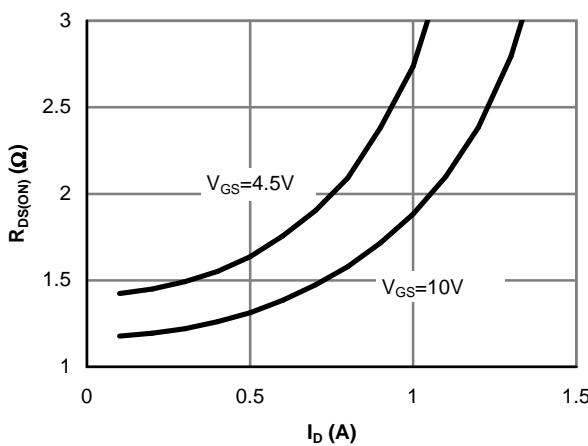


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

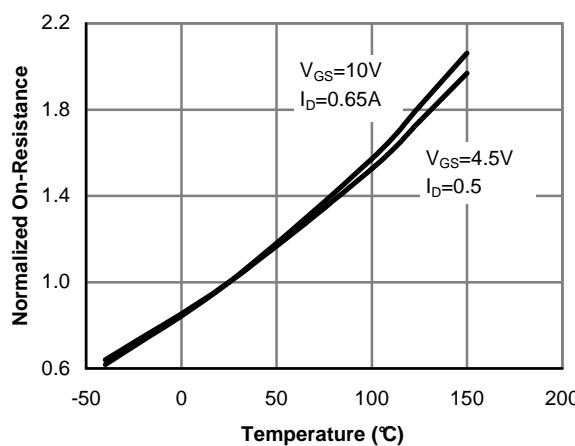


Figure 4: On-Resistance vs. Junction Temperature

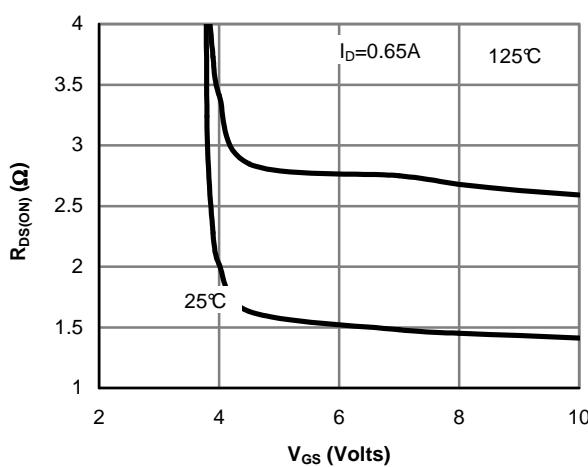


Figure 5: On-Resistance vs. Gate-Source Voltage

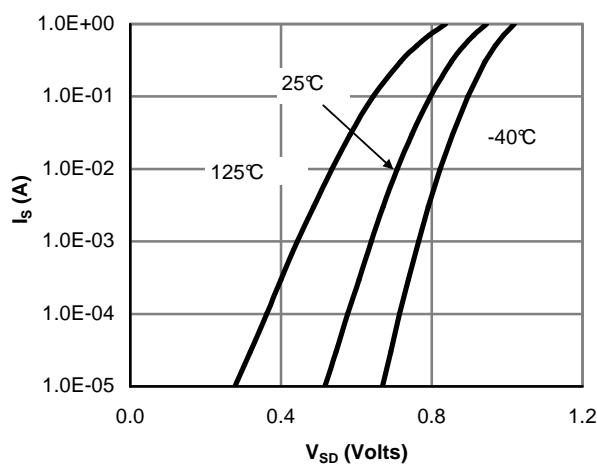


Figure 6: Body-Diode Characteristics

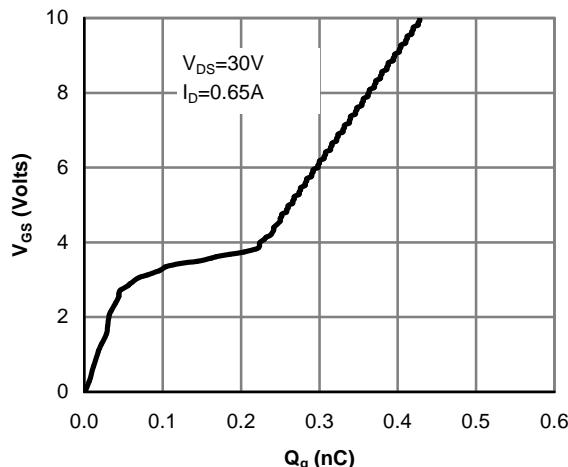
**TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS**


Figure 7: Gate-Charge Characteristics

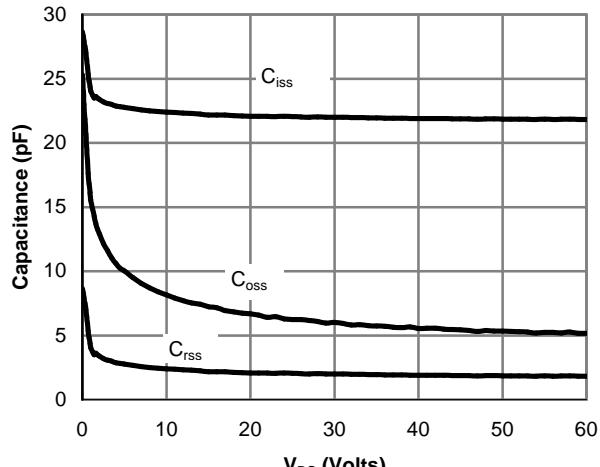


Figure 8: Capacitance Characteristics

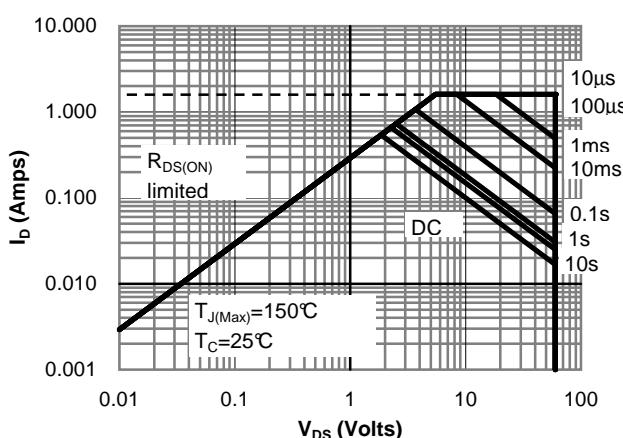


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

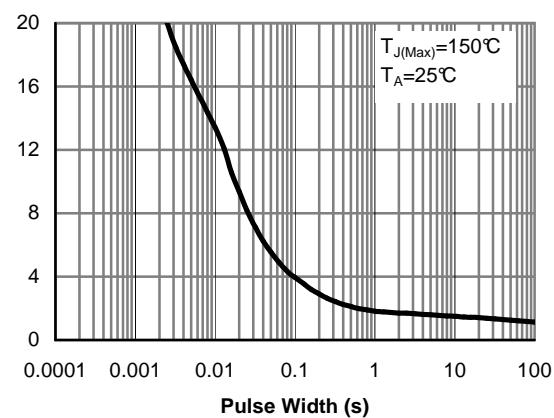


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

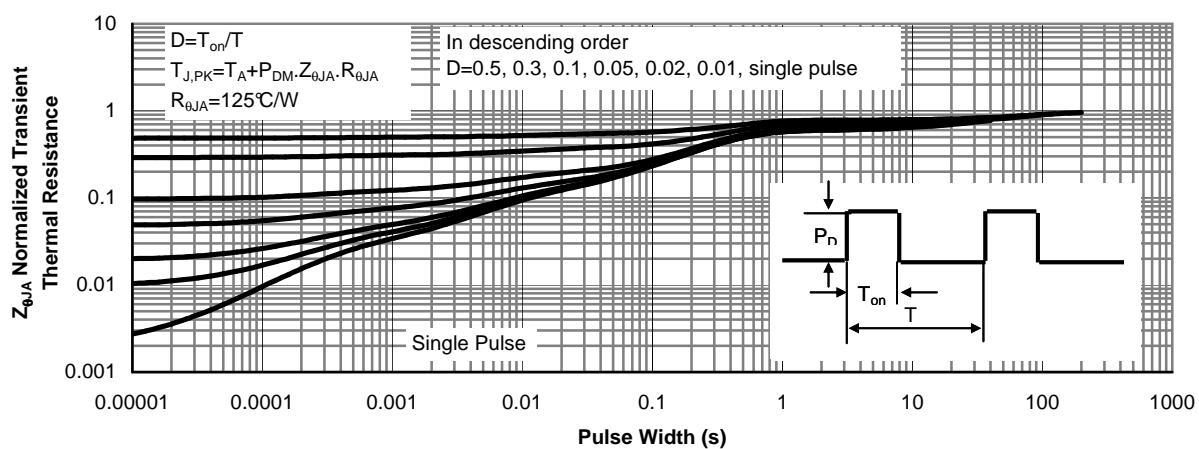


Figure 11: Normalized Maximum Transient Thermal Impedance