



# THE DATASHEET OF AO3460L



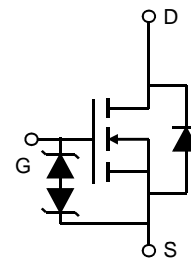
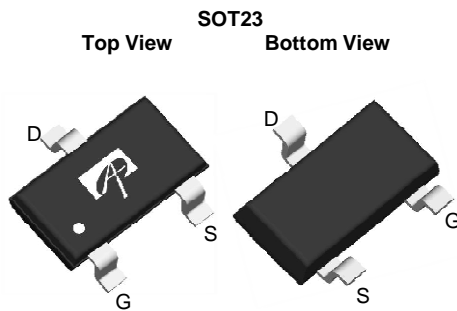
### General Description

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.

### Product Summary

$V_{DS} (V) = 60V$   
 $I_D = 0.65A (V_{GS} = 10V)$   
 $R_{DS(ON)} < 1.7\Omega (V_{GS} = 10V)$   
 $R_{DS(ON)} < 2\Omega (V_{GS} = 4.5V)$

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>	$I_D$	$T_A=25^\circ C$	A
		$T_A=70^\circ C$	
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	1.6	
Power Dissipation <sup>A</sup>	$P_D$	$T_A=25^\circ C$	W
		$T_A=70^\circ C$	
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>	$R_{\theta JA}$	70	90	$^\circ C/W$
Maximum Junction-to-Ambient <sup>A</sup>		Steady-State	100	125
Maximum Junction-to-Lead <sup>C</sup>	$R_{\theta JL}$	63	80	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>STATIC PARAMETERS</b>						
$BV_{DSS}$	Drain-Source Breakdown Voltage	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	60			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=60\text{V}$ , $V_{GS}=0\text{V}$			1	$\mu\text{A}$
			$T_J=55^\circ\text{C}$		5	
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 20\text{V}$			$\pm 10$	$\mu\text{A}$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	1	2.2	2.5	V
$I_{D(ON)}$	On state drain current	$V_{GS}=10\text{V}$ , $V_{DS}=5\text{V}$	1.6			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$ , $I_D=0.65\text{A}$		1.4	1.7	$\Omega$
			$T_J=125^\circ\text{C}$	2.5	3	
		$V_{GS}=4.5\text{V}$ , $I_D=0.5\text{A}$		1.6	2	$\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS}=5\text{V}$ , $I_D=0.65\text{A}$		0.8		S
$V_{SD}$	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>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}$ , $V_{DS}=30\text{V}$ , $f=1\text{MHz}$		22	27	pF
$C_{oss}$	Output Capacitance			6	10	pF
$C_{riss}$	Reverse Transfer Capacitance			2	6	pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$		250	400	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$ , $V_{DS}=30\text{V}$ , $I_D=0.65\text{A}$		0.8	2	nC
$Q_g(4.5\text{V})$	Total Gate Charge			0.4	1.5	nC
$Q_{gs}$	Gate Source Charge			0.17	1	nC
$Q_{gd}$	Gate Drain Charge			0.2	1	nC
$t_{D(on)}$	Turn-On DelayTime			5.3	12	ns
$t_r$	Turn-On Rise Time	$V_{GS}=10\text{V}$ , $V_{DS}=30\text{V}$ , $R_L=75\Omega$ , $R_{GEN}=3\Omega$		2.8	6	ns
$t_{D(off)}$	Turn-Off DelayTime			19.7	30	ns
$t_f$	Turn-Off Fall Time			5.5	11	ns
$t_{rr}$	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
$Q_{rr}$	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 in<sup>2</sup> 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 in<sup>2</sup> 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

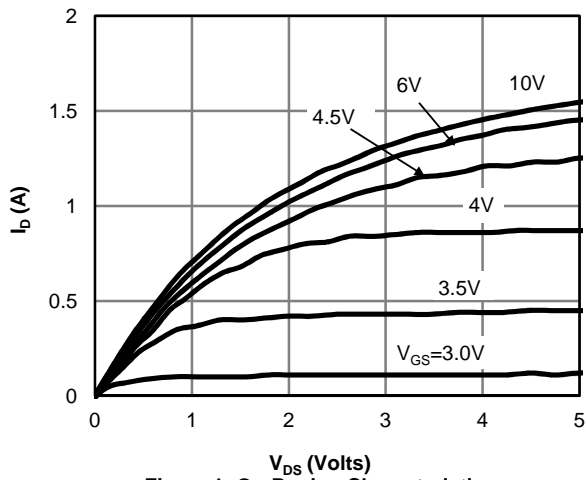


Figure 1: On-Region Characteristics

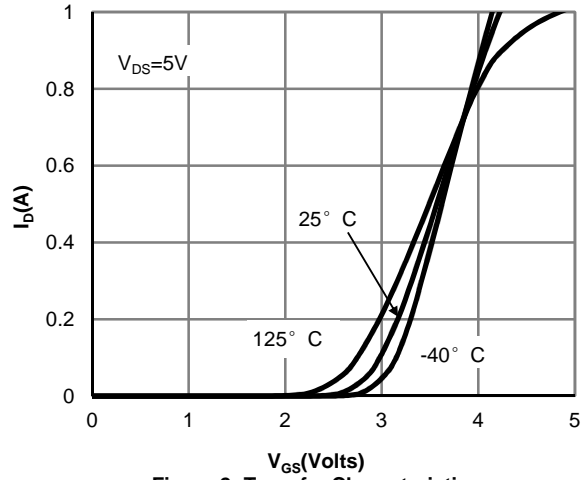


Figure 2: Transfer Characteristics

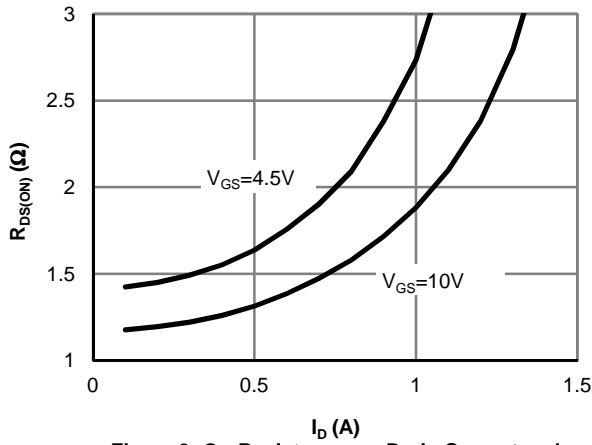


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

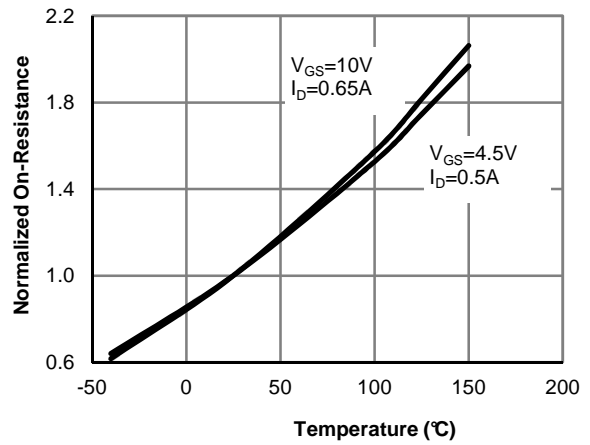


Figure 4: On-Resistance vs. Junction Temperature

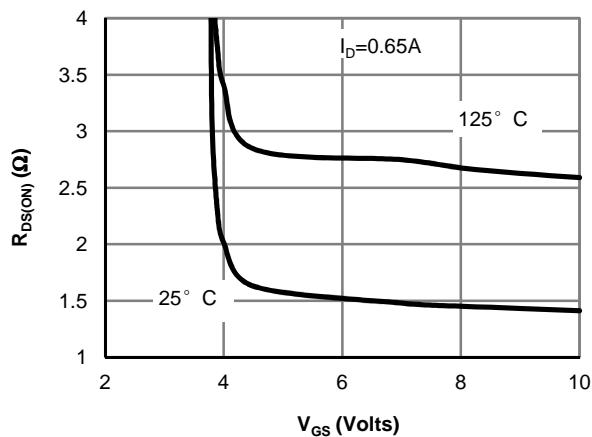


Figure 5: On-Resistance vs. Gate-Source Voltage

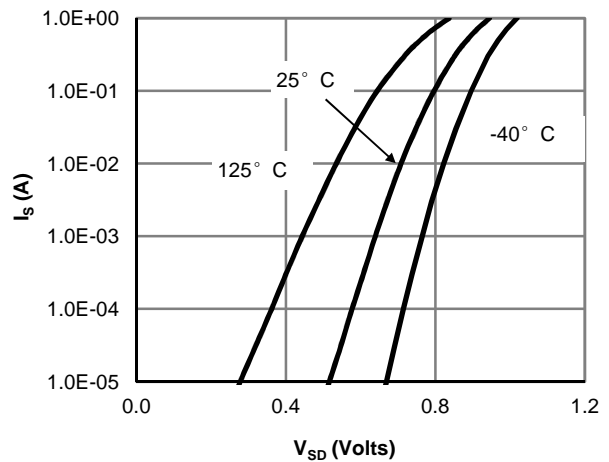


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

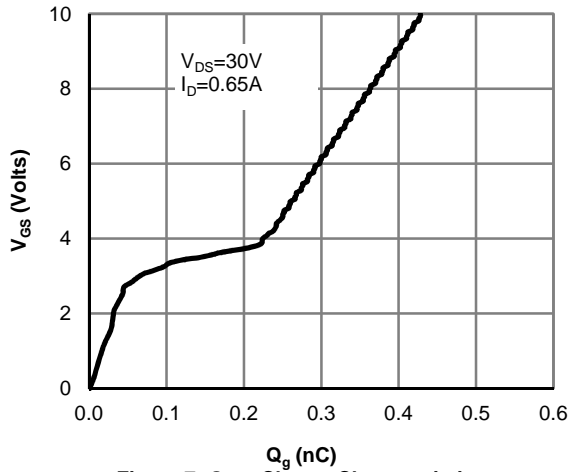


Figure 7: Gate-Charge Characteristics

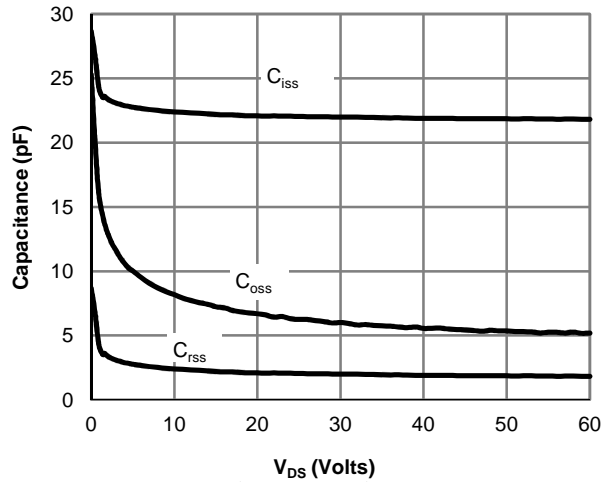


Figure 8: Capacitance Characteristics

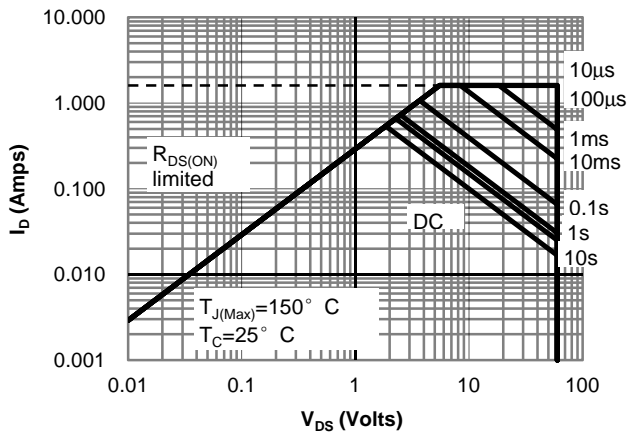


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

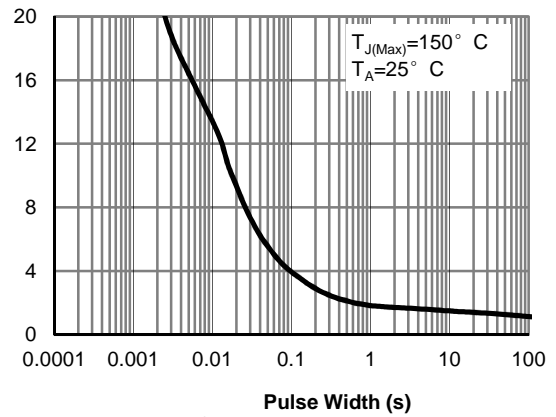


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

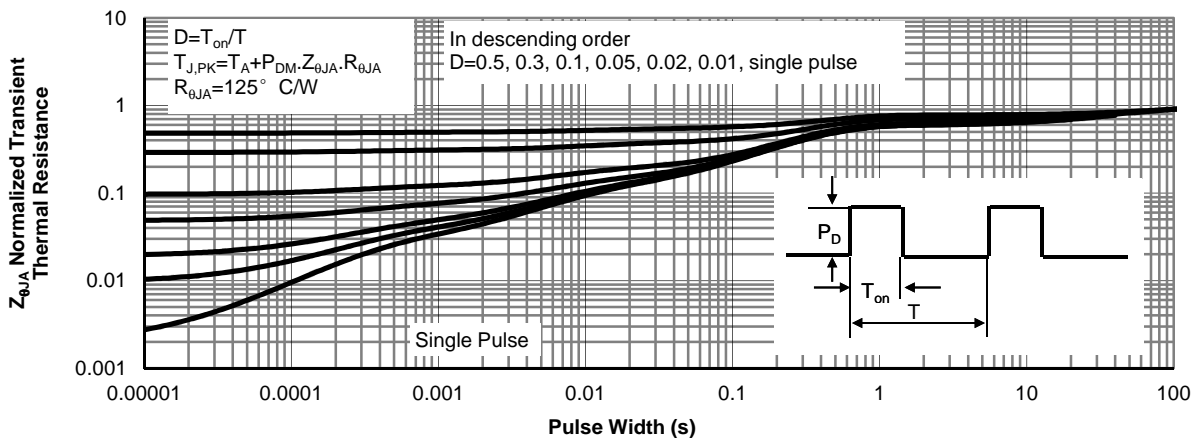




Figure 11: Normalized Maximum Transient Thermal Impedance

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