


**General Description**

The AO4485/L uses advanced trench technology to provide excellent  $R_{DS(ON)}$  with low gate charge. This device is suitable for use as a DC-DC converter application.

*AO4485 and AO4485L are electrically identical.*

*-RoHS Compliant*

*-AO4485L is Halogen Free*

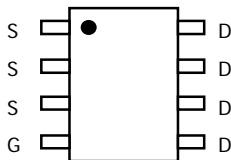
**Features**

$V_{DS}$  (V) = -40V

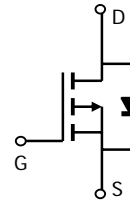
$I_D$  = -10A ( $V_{GS}$  = -10V)

$R_{DS(ON)} < 15m\Omega$  ( $V_{GS}$  = -10V)

$R_{DS(ON)} < 20m\Omega$  ( $V_{GS}$  = -4.5V)



**SOIC-8**


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

Parameter	Symbol	10 Sec	Steady State	Units	
Drain-Source Voltage	$V_{DS}$	-40		V	
Gate-Source Voltage	$V_{GS}$	$\pm 20$		V	
Continuous Drain Current <sup>A</sup>	$I_D$	$T_A=25^\circ\text{C}$	-12	-10	A
		$T_A=70^\circ\text{C}$	-9	-8	
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	-120			
Avalanche Current <sup>G</sup>	$I_{AR}$	-28			
Repetitive avalanche energy $L=0.3\text{mH}$ <sup>G</sup>	$E_{AR}$	118		mJ	
Power Dissipation <sup>A</sup>	$P_D$	$T_A=25^\circ\text{C}$	3.1	1.7	W
		$T_A=70^\circ\text{C}$	2.0	1.1	
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> $t \leq 10\text{s}$	$R_{\theta JA}$	31	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient <sup>A</sup> Steady State		59	75	$^\circ\text{C/W}$
Maximum Junction-to-Lead <sup>C</sup> Steady State	$R_{\theta JL}$	16	24	$^\circ\text{C/W}$

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	$I_D = -250\mu\text{A}, V_{GS} = 0\text{V}$	-40			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS} = -40\text{V}, V_{GS} = 0\text{V}$ $T_J = 55^\circ\text{C}$			-1 -5	$\mu\text{A}$
$I_{GSS}$	Gate-Body leakage current	$V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$			$\pm 100$	nA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$	-1.7	-1.9	-2.5	V
$I_{D(ON)}$	On state drain current	$V_{GS} = -10\text{V}, V_{DS} = -5\text{V}$	-120			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS} = -10\text{V}, I_D = -10\text{A}$ $T_J = 125^\circ\text{C}$		12.5 19	15 23	m $\Omega$
		$V_{GS} = -4.5\text{V}, I_D = -8\text{A}$		16	20	
$g_{FS}$	Forward Transconductance	$V_{DS} = -5\text{V}, I_D = -10\text{A}$		25		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				-3	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}, V_{DS}=-20\text{V}, f=1\text{MHz}$		2500	3000	pF
$C_{oss}$	Output Capacitance			260		pF
$C_{rss}$	Reverse Transfer Capacitance			180		pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}, V_{DS}=0\text{V}, f=1\text{MHz}$	2.5	4	6	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=-10\text{V}, V_{DS}=-20\text{V}, I_D=-10\text{A}$		42	55	nC
$Q_g(4.5\text{V})$	Total Gate Charge			18.6		nC
$Q_{gs}$	Gate Source Charge			7		nC
$Q_{gd}$	Gate Drain Charge			8.6		nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=-10\text{V}, V_{DS}=-20\text{V},$ $R_L = 2\Omega, R_{GEN}=3\Omega$		9.4		ns
$t_r$	Turn-On Rise Time			20		ns
$t_{D(off)}$	Turn-Off Delay Time			55		ns
$t_f$	Turn-Off Fall Time			30		ns
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=-10\text{A}, di/dt=100\text{A}/\mu\text{s}$		38	49	ns
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=-10\text{A}, di/dt=100\text{A}/\mu\text{s}$		47		nC

A: The value of  $R_{\theta JA}$  is measured with the device mounted on 1in<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  $t \leq 300\mu\text{s}$  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.

G:  $E_{AR}$  and  $I_{AR}$  ratings are based on low frequency and duty cycles to keep  $T_J=25^\circ\text{C}$ .

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

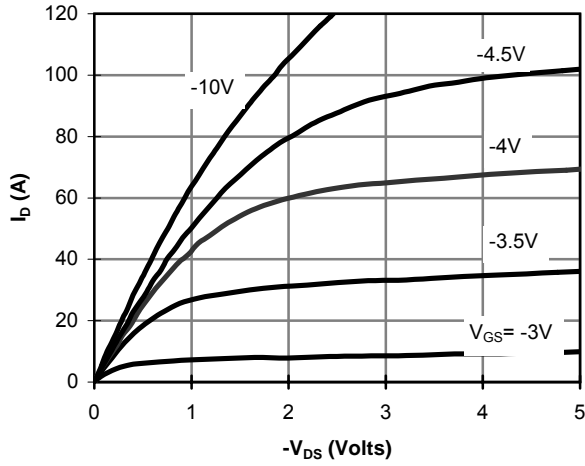


Figure 1: On-Region Characteristics

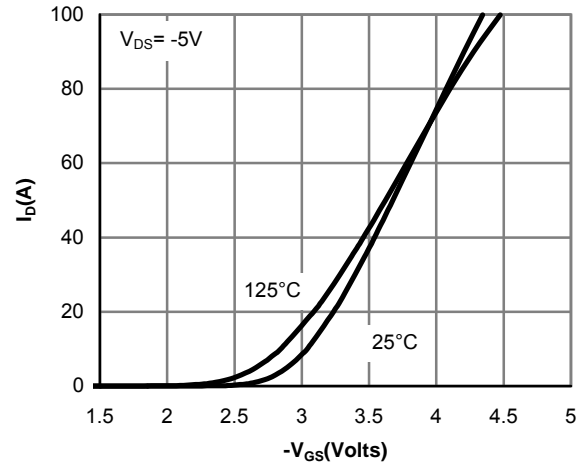


Figure 2: Transfer Characteristics

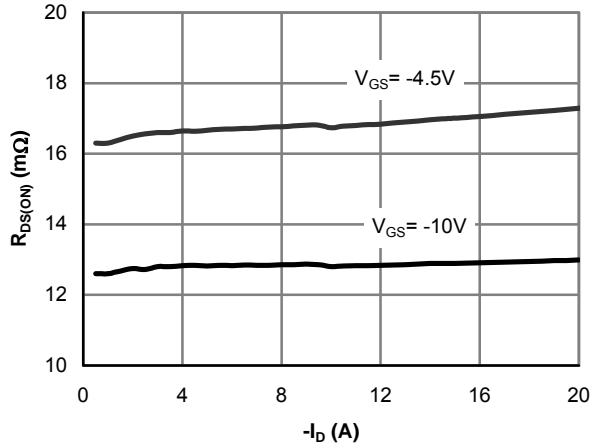


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

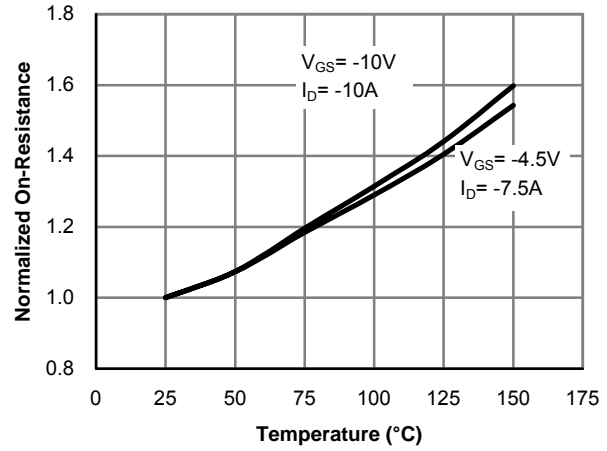


Figure 4: On-Resistance vs. Junction Temperature

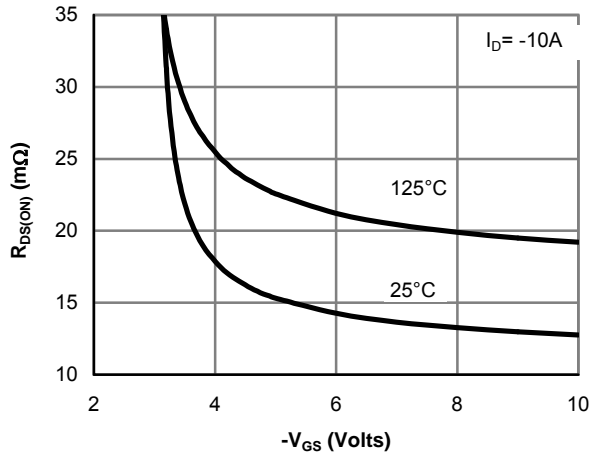


Figure 5: On-Resistance vs. Gate-Source Voltage

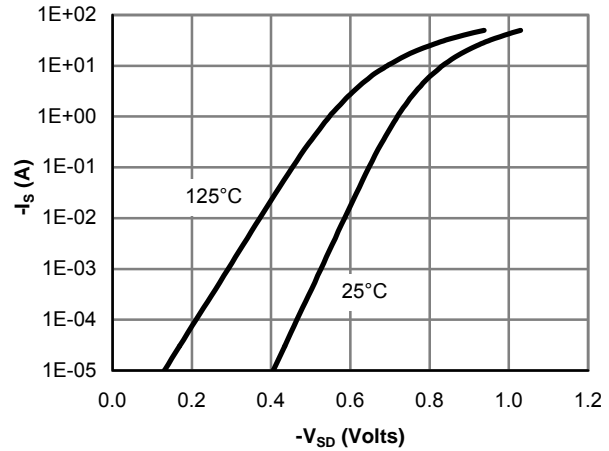


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

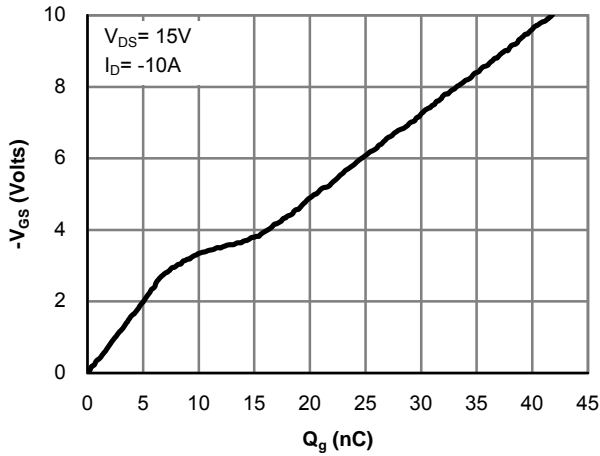


Figure 7: Gate-Charge Characteristics

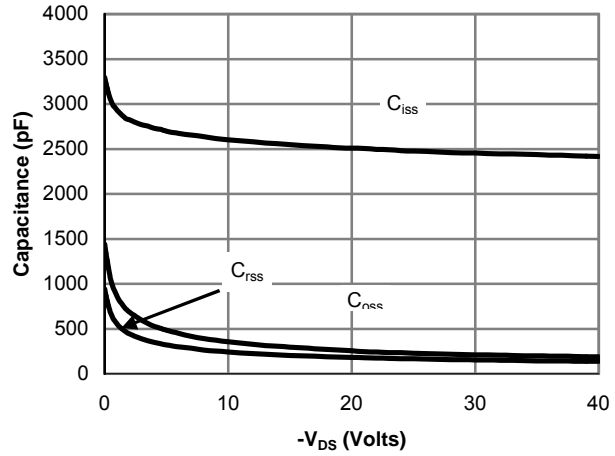


Figure 8: Capacitance Characteristics

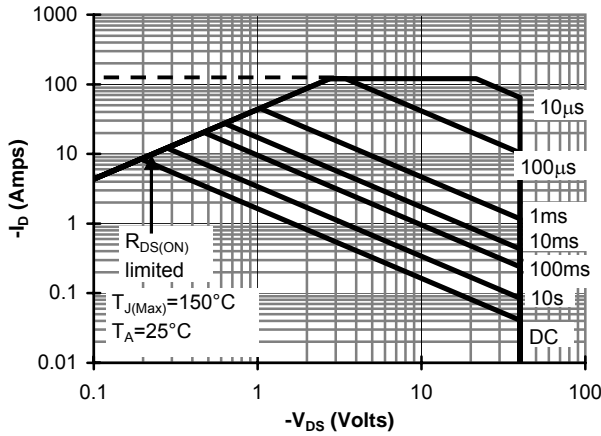


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

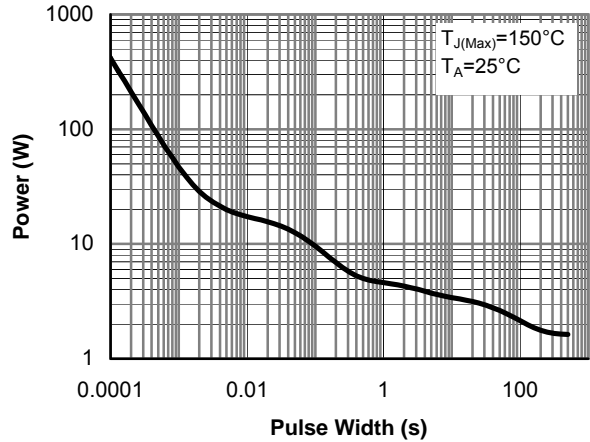


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

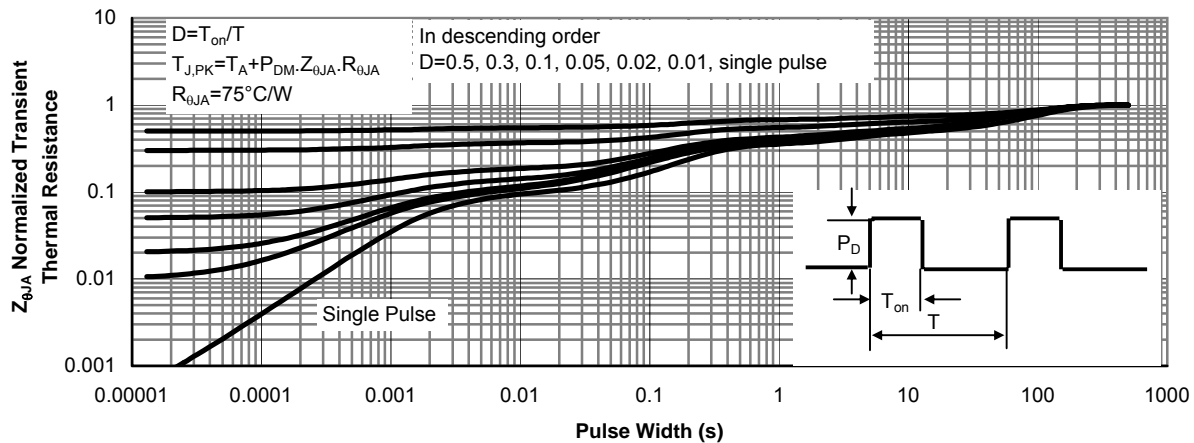


Figure 11: Normalized Maximum Transient Thermal Impedance (Note E)