



**General Description**

The AO4474 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge. This device is suitable for use as a high side switch in SMPS and general purpose applications.

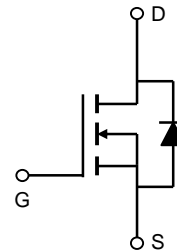
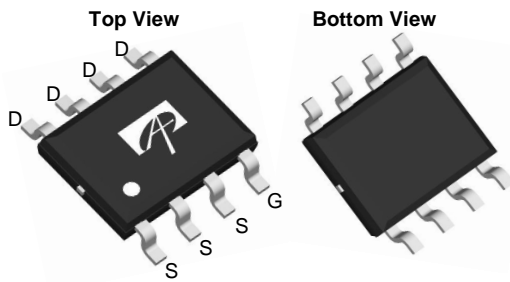
**Product Summary**

$V_{DS}$  (V) = 30V  
 $I_D$  = 13.4A ( $V_{GS}$  = 10V)  
 $R_{DS(ON)}$  < 11.5m $\Omega$  ( $V_{GS}$  = 10V)  
 $R_{DS(ON)}$  < 13.5m $\Omega$  ( $V_{GS}$  = 4.5V)

100% UIS Tested  
 100% Rg Tested



SOIC-8



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

Parameter	Symbol	Maximum	Units
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 12$	V
Continuous Drain Current <sup>A, F</sup>	$I_{DSM}$	$T_A=25^\circ\text{C}$	13.4
		$T_A=70^\circ\text{C}$	10.7
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	60	A
Power Dissipation	$P_D$	$T_A=25^\circ\text{C}$	3.7
		$T_A=70^\circ\text{C}$	2.4
Avalanche Current <sup>B, G</sup>	$I_{AR}$	42	A
Repetitive avalanche energy 0.1mH <sup>B, G</sup>	$E_{AR}$	88	mJ
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>	$R_{\theta JA}$	28	34	$^\circ\text{C/W}$
$t \leq 10\text{s}$				
Maximum Junction-to-Ambient <sup>A</sup>	$R_{\theta JL}$	16	23	$^\circ\text{C/W}$
Steady-State				
Maximum Junction-to-Lead <sup>C</sup>				

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	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	30			V
$I_{DSS}$	Zero Gate Voltage Drain Current	$V_{DS}=30\text{V}$ , $V_{GS}=0\text{V}$ $T_J=55^\circ\text{C}$			1 5	$\mu\text{A}$
$I_{GSS}$	Gate-Body leakage current	$V_{DS}=0\text{V}$ , $V_{GS}=\pm 12\text{V}$			0.1	$\mu\text{A}$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$ , $I_D=250\mu\text{A}$	1	1.55	2.5	V
$I_{D(ON)}$	On state drain current	$V_{GS}=10\text{V}$ , $V_{DS}=5\text{V}$	60			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$ , $I_D=13.4\text{A}$ $T_J=125^\circ\text{C}$		9.5	11.5	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$ , $I_D=10\text{A}$		11	13.5	$\text{m}\Omega$
$g_{FS}$	Forward Transconductance	$V_{DS}=5\text{V}$ , $I_D=13.4\text{A}$		40		S
$V_{SD}$	Diode Forward Voltage	$I_S=1\text{A}$ , $V_{GS}=0\text{V}$		0.74	1.0	V
$I_S$	Maximum Body-Diode Continuous Current				5	A
<b>DYNAMIC PARAMETERS</b>						
$C_{iss}$	Input Capacitance	$V_{GS}=0\text{V}$ , $V_{DS}=15\text{V}$ , $f=1\text{MHz}$		1210	1452	pF
$C_{oss}$	Output Capacitance			330	396	pF
$C_{rss}$	Reverse Transfer Capacitance			85	119	pF
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $f=1\text{MHz}$	0.8	1.2	1.6	$\Omega$
<b>SWITCHING PARAMETERS</b>						
$Q_g(10\text{V})$	Total Gate Charge	$V_{GS}=10\text{V}$ , $V_{DS}=15\text{V}$ , $I_D=13.4\text{A}$		22	28	nC
$Q_g(4.5\text{V})$	Total Gate Charge			10	13	nC
$Q_{gs}$	Gate Source Charge			3.7		nC
$Q_{gd}$	Gate Drain Charge			2.7		nC
$t_{D(on)}$	Turn-On Delay Time	$V_{GS}=10\text{V}$ , $V_{DS}=15\text{V}$ , $R_L=1.1\Omega$ , $R_{GEN}=3\Omega$		10		ns
$t_r$	Turn-On Rise Time			6.3		ns
$t_{D(off)}$	Turn-Off Delay Time			21		ns
$t_f$	Turn-Off Fall Time			2.8		ns
$t_{rr}$	Body Diode Reverse Recovery Time		$I_F=13.4\text{A}$ , $di/dt=100\text{A}/\mu\text{s}$		36	45
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=13.4\text{A}$ , $di/dt=100\text{A}/\mu\text{s}$		47		nC
$t_{rr}$	Body Diode Reverse Recovery Time	$I_F=13.4\text{A}$ , $di/dt=500\text{A}/\mu\text{s}$		20	27	ns
$Q_{rr}$	Body Diode Reverse Recovery Charge	$I_F=13.4\text{A}$ , $di/dt=500\text{A}/\mu\text{s}$		55		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 <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  $t \leq 10\text{s}$  junction to ambient thermal resistance rating.

G:  $L=100\mu\text{H}$ ,  $V_{DD}=0\text{V}$ ,  $R_G=0\Omega$ , rated  $V_{DS}=30\text{V}$  and  $V_{GS}=10\text{V}$

Rev4: Nov. 2010

THIS PRODUCT HAS BEEN DESIGNED AND QUALIFIED FOR THE CONSUMER MARKET. APPLICATIONS OR USES AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS ARE NOT AUTHORIZED. AOS DOES NOT ASSUME ANY LIABILITY ARISING OUT OF SUCH APPLICATIONS OR USES OF ITS PRODUCTS. AOS RESERVES THE RIGHT TO IMPROVE PRODUCT DESIGN, FUNCTIONS AND RELIABILITY WITHOUT NOTICE.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

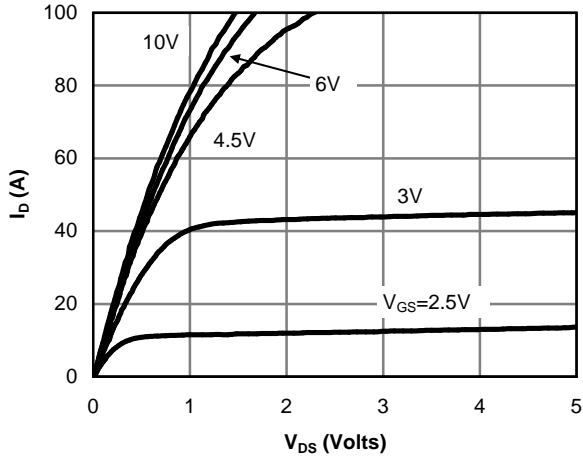


Fig 1: On-Region Characteristics

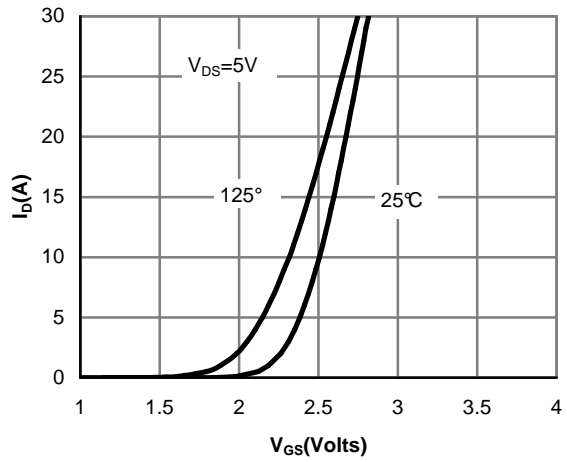


Figure 2: Transfer Characteristics

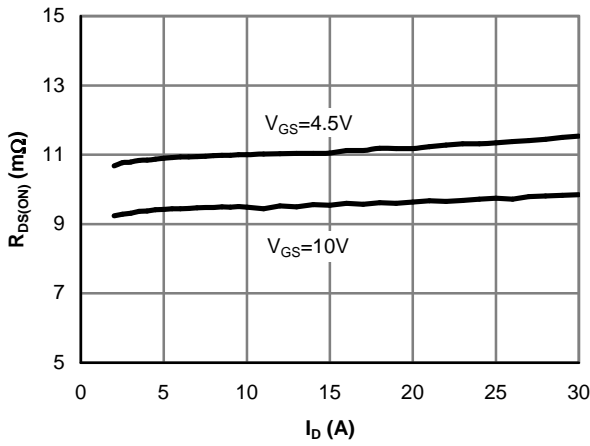


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

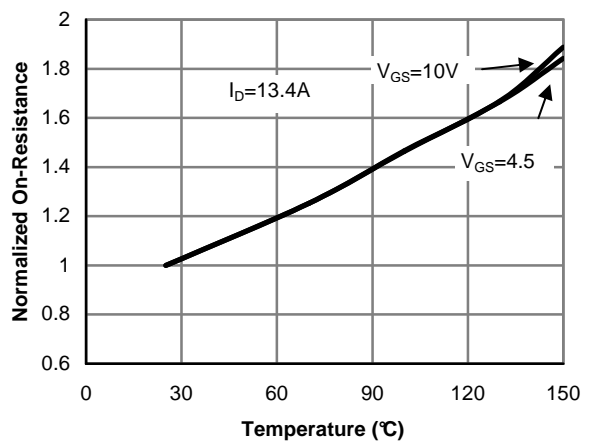


Figure 4: On-Resistance vs. Junction Temperature

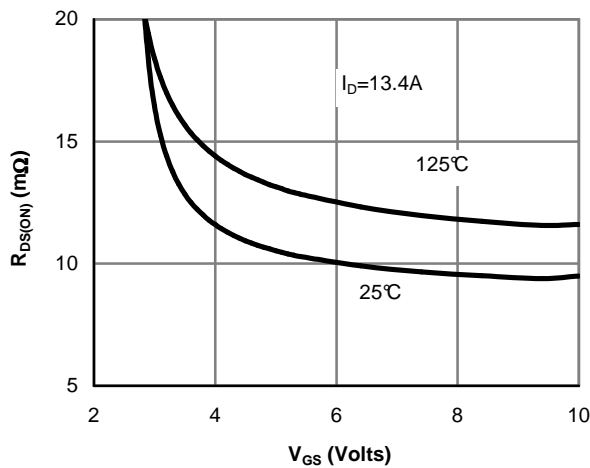


Figure 5: On-Resistance vs. Gate-Source Voltage

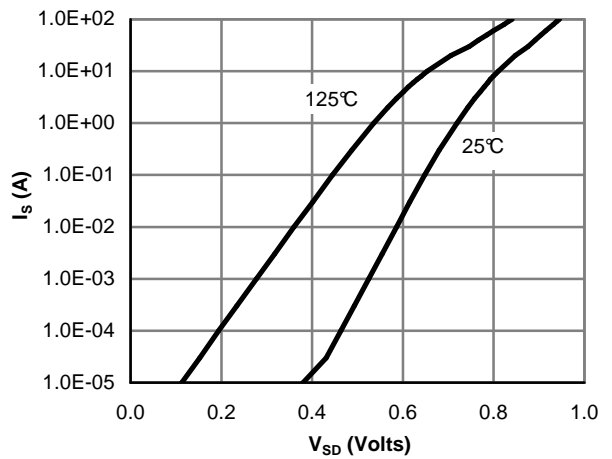


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

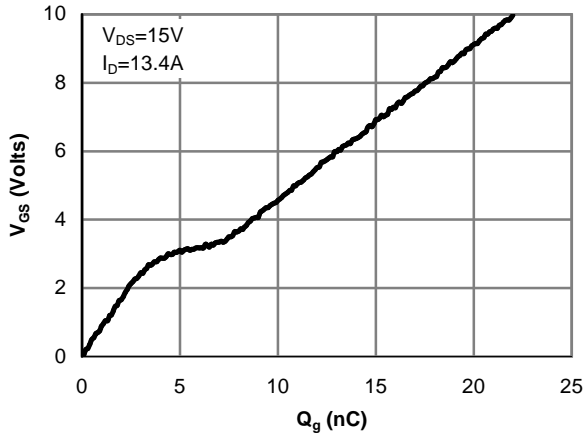


Figure 7: Gate-Charge Characteristics

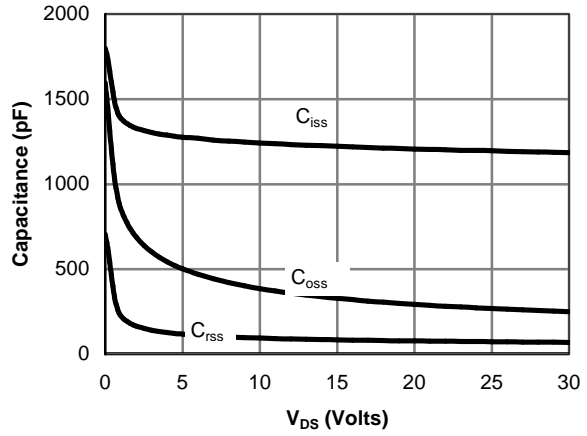


Figure 8: Capacitance Characteristics

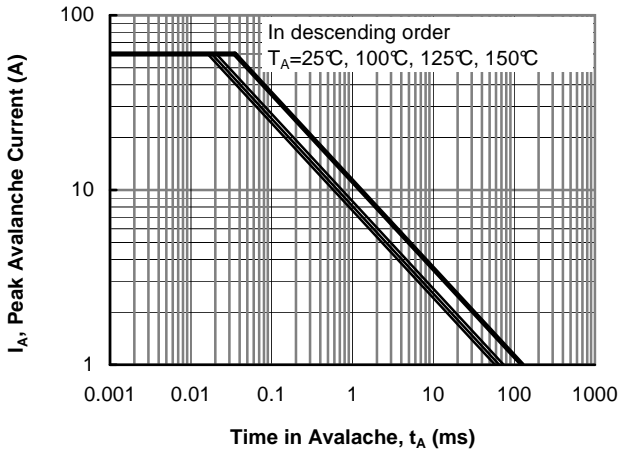


Figure 9: Single Pulse Avalanche Capability

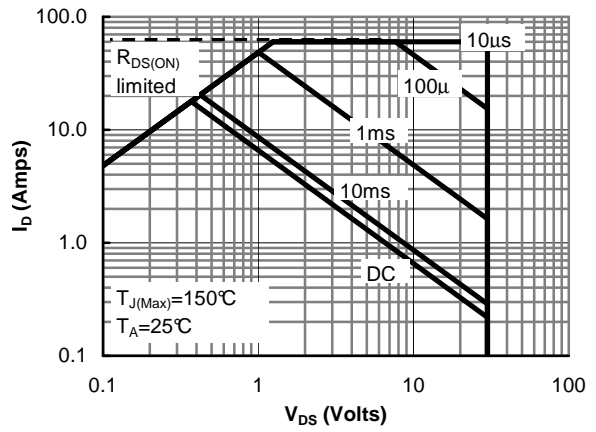


Figure 10: Maximum Forward Biased Safe Operating Area (Note F)

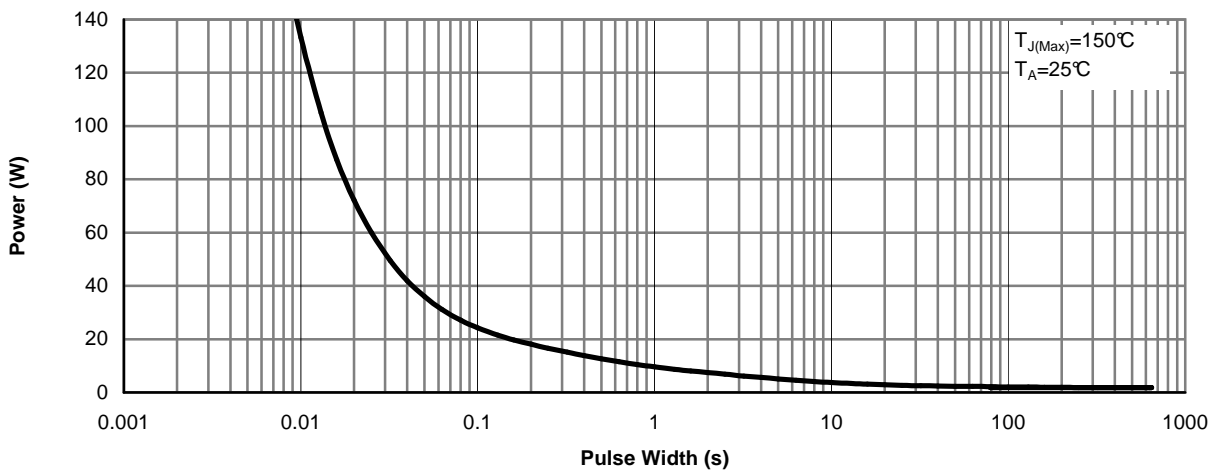


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note G)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

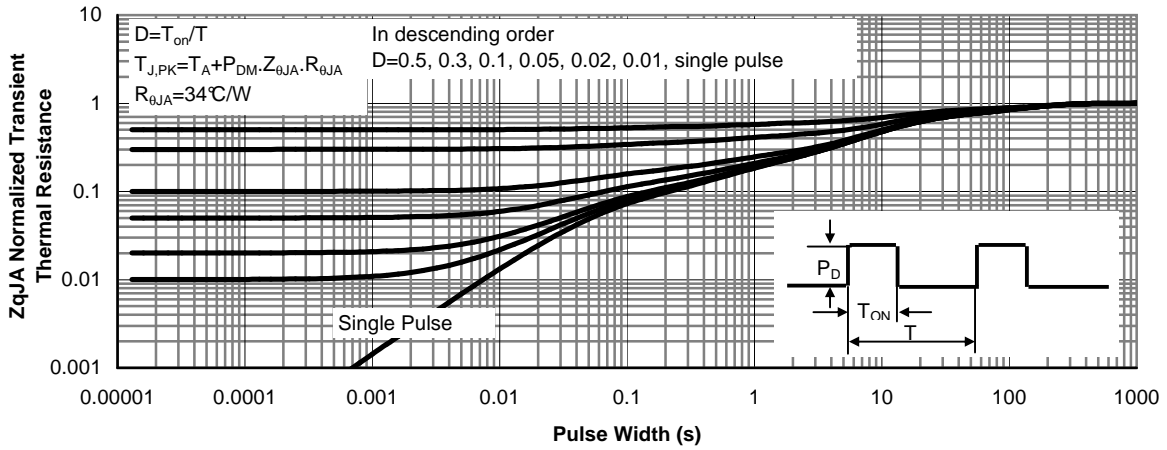


Figure 12: Normalized Maximum Transient Thermal Impedance (Note G)