



**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.

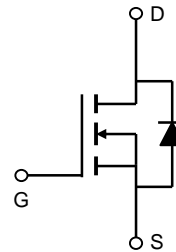
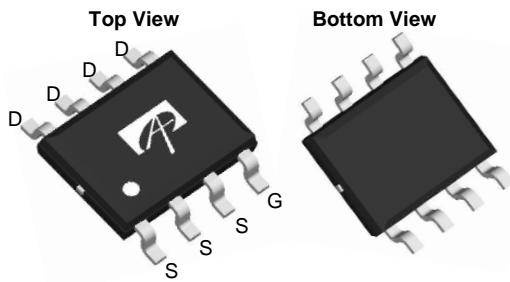
**Product Summary**

$V_{DS}$  (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>	$I_{DSM}$	$T_A=25^\circ\text{C}$	A
		$T_A=70^\circ\text{C}$	
Pulsed Drain Current <sup>B</sup>	$I_{DM}$	60	A
Power Dissipation	$P_D$	$T_A=25^\circ\text{C}$	W
		$T_A=70^\circ\text{C}$	
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	$^\circ\text{C/W}$
Maximum Junction-to-Ambient <sup>A</sup>		Steady-State	57	71
Maximum Junction-to-Lead <sup>C</sup>	$R_{\theta JL}$	16	23	$^\circ\text{C/W}$

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	$I_D=250\mu\text{A}$ , $V_{GS}=0\text{V}$	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	ns
$Q_{rr}$	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  $V_{GS}=10\text{V}$

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

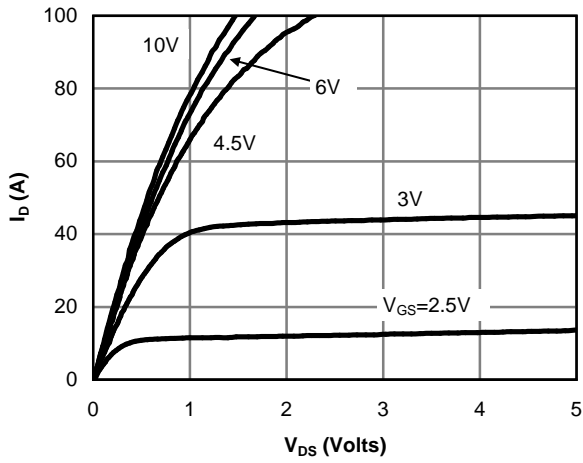


Fig 1: On-Region Characteristics

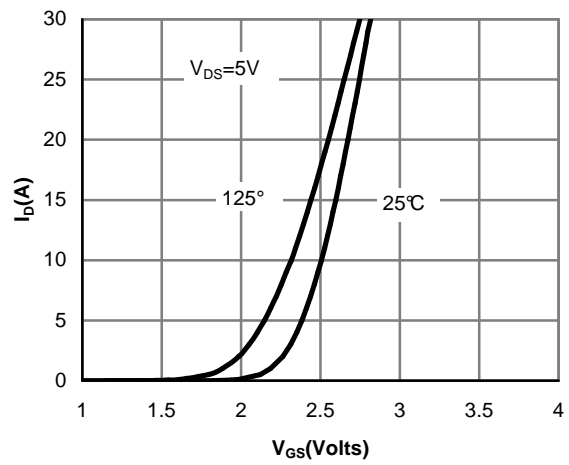


Figure 2: Transfer Characteristics

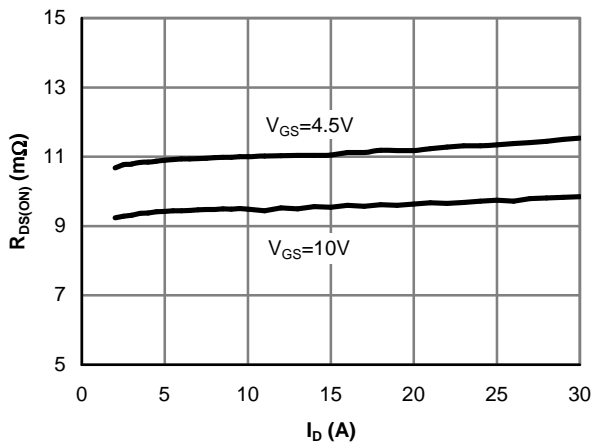


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

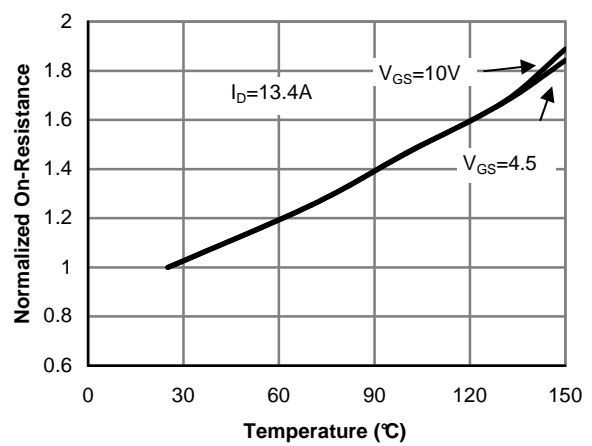


Figure 4: On-Resistance vs. Junction Temperature

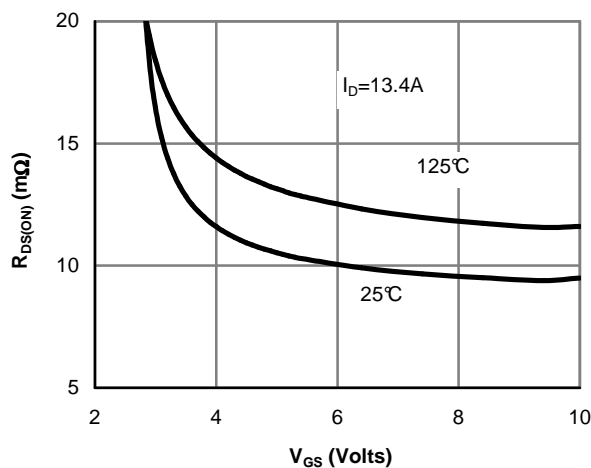


Figure 5: On-Resistance vs. Gate-Source Voltage

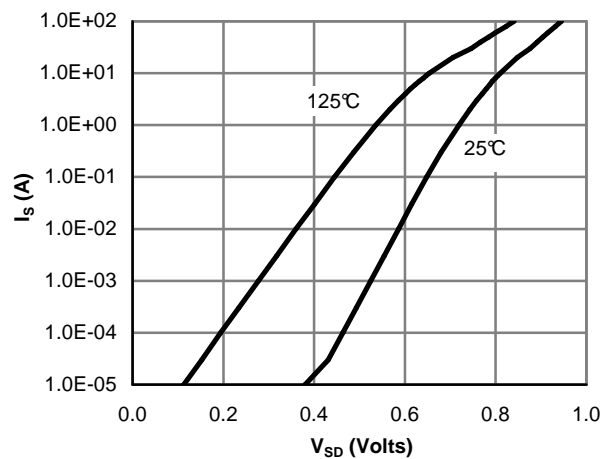


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

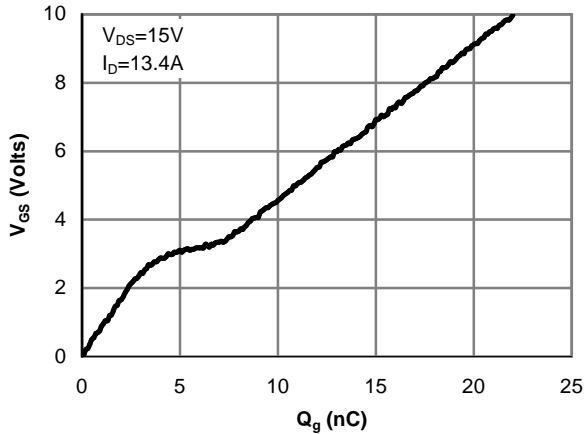


Figure 7: Gate-Charge Characteristics

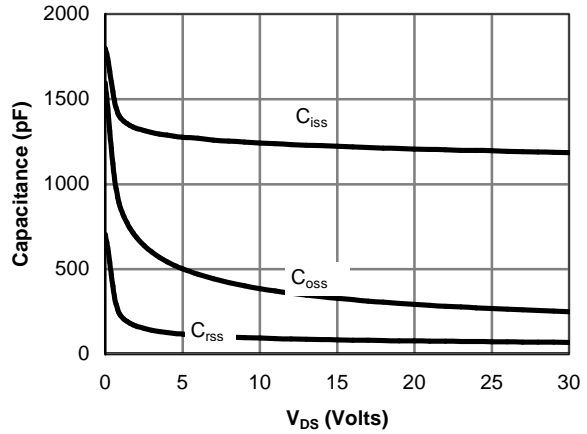


Figure 8: Capacitance Characteristics

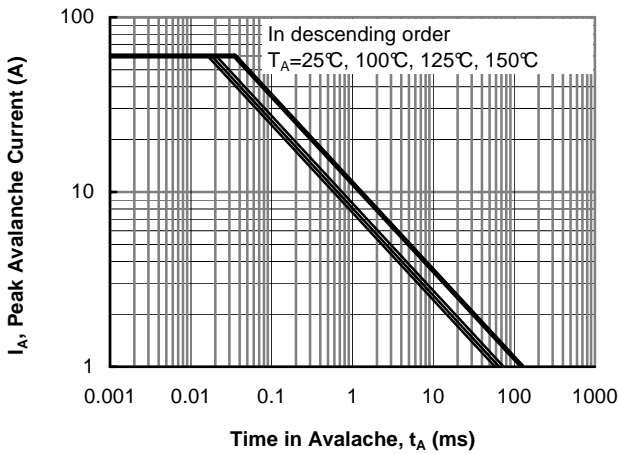


Figure 9: Single Pulse Avalanche Capability

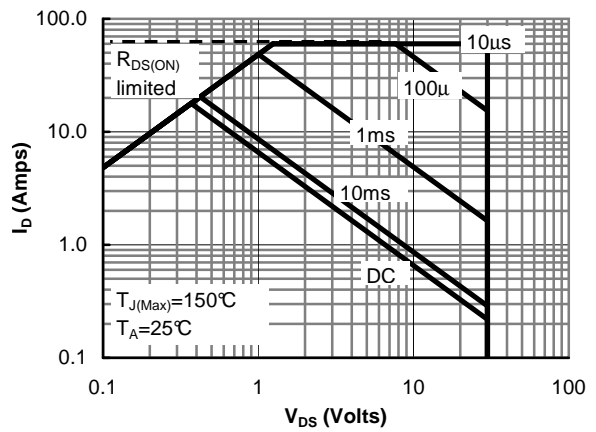


Figure 10: Maximum Forward Biased Safe Operating Area (Note F)

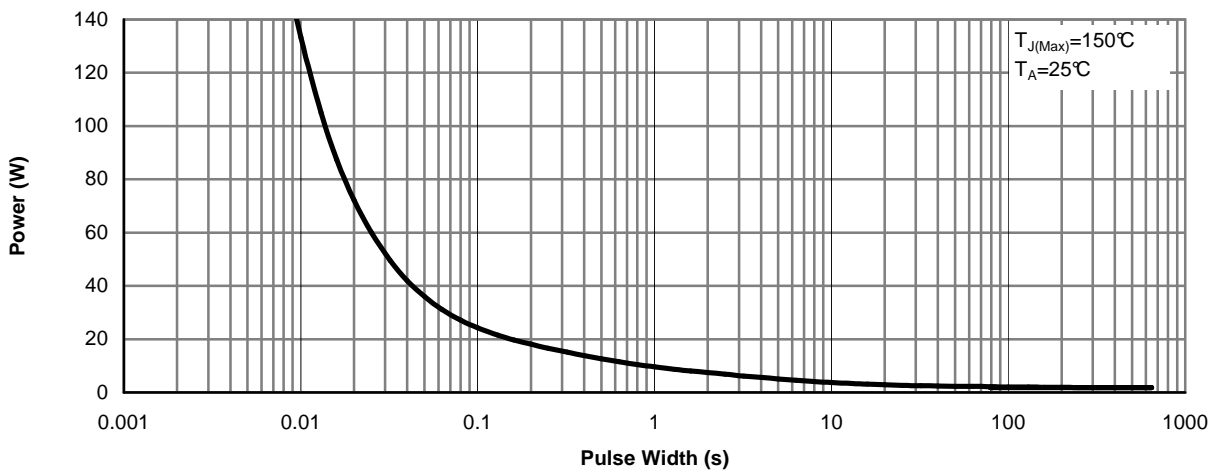


Figure 11: Single Pulse Power Rating Junction-to-Ambient (Note G)

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

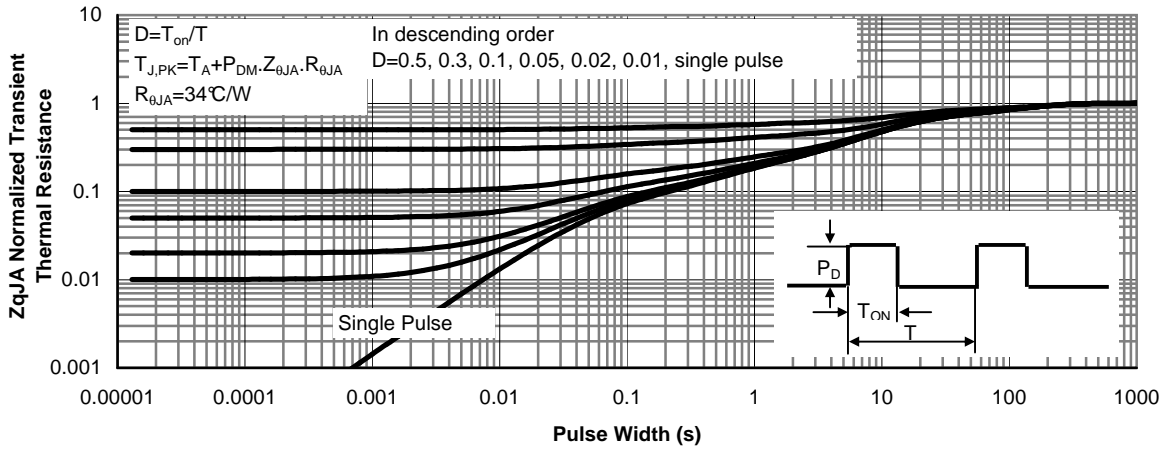


Figure 12: Normalized Maximum Transient Thermal Impedance (Note G)