

General Description

The AO4425 uses advanced trench technology to provide excellent $R_{DS(ON)}$, and ultra-low low gate charge with a 25V gate rating. This device is suitable for use as a load switch or in PWM applications. It is ESD protected.

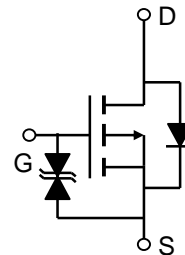
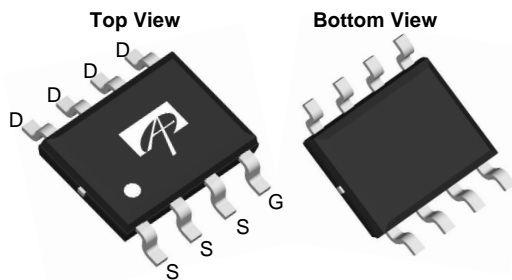
Product Summary

V_{DS} (V) = -38V
 I_D = -14A (V_{GS} = -20V)
 $R_{DS(ON)}$ < 10m Ω (V_{GS} = -20V)
 $R_{DS(ON)}$ < 11m Ω (V_{GS} = -10V)
 ESD Rating: 4000V HBM

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}	-38	V
Gate-Source Voltage	V_{GS}	± 25	V
Continuous Drain Current ^A	$T_A=25^\circ\text{C}$	-14	A
	$T_A=70^\circ\text{C}$	-11	
Pulsed Drain Current ^B	I_{DM}	-50	
Power Dissipation ^A	$T_A=25^\circ\text{C}$	3.1	W
	$T_A=70^\circ\text{C}$	2	
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 ^A	$R_{\theta JA}$	26	40	$^\circ\text{C/W}$
Maximum Junction-to-Ambient ^A		Steady-State	50	75
Maximum Junction-to-Lead ^C	$R_{\theta JL}$	14	24	$^\circ\text{C/W}$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV_{DSS}	Drain-Source Breakdown Voltage	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-38			V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=-30\text{V}$, $V_{GS}=0\text{V}$			-100	nA
		$T_J=55^\circ\text{C}$			-500	
I_{GSS}	Gate-Body leakage current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$			± 1	μA
		$V_{DS}=0\text{V}$, $V_{GS}=\pm 25\text{V}$			± 10	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-2	-2.5	-3.5	V
$I_{D(ON)}$	On state drain current	$V_{GS}=-10\text{V}$, $V_{DS}=-5\text{V}$	-50			A
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-20\text{V}$, $I_D=-14\text{A}$		7.7	10	m Ω
		$T_J=125^\circ\text{C}$		11	13.5	
		$V_{GS}=-10\text{V}$, $I_D=-14\text{A}$		8.8	11	m Ω
g_{FS}	Forward Transconductance	$V_{DS}=-5\text{V}$, $I_D=-14\text{A}$		43		S
V_{SD}	Diode Forward Voltage	$I_S=-1\text{A}$, $V_{GS}=0\text{V}$		0.71	1	V
I_S	Maximum Body-Diode Continuous Current				4.2	A
DYNAMIC PARAMETERS						
C_{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=-20\text{V}$, $f=1\text{MHz}$		3800		pF
C_{oss}	Output Capacitance			560		pF
C_{rss}	Reverse Transfer Capacitance			350		pF
R_g	Gate resistance	$V_{GS}=0\text{V}$, $V_{DS}=0\text{V}$, $f=1\text{MHz}$		7.5		Ω
SWITCHING PARAMETERS						
Q_g	Total Gate Charge	$V_{GS}=-10\text{V}$, $V_{DS}=-20\text{V}$, $I_D=-14\text{A}$		63		nC
Q_{gs}	Gate Source Charge			14.1		nC
Q_{gd}	Gate Drain Charge			16.1		nC
$t_{D(on)}$	Turn-On DelayTime	$V_{GS}=-10\text{V}$, $V_{DS}=-20\text{V}$, $R_L=1.35\Omega$, $R_{GEN}=3\Omega$		12.4		ns
t_r	Turn-On Rise Time			9.2		ns
$t_{D(off)}$	Turn-Off DelayTime			97.5		ns
t_f	Turn-Off Fall Time			45.5		ns
t_{rr}	Body Diode Reverse Recovery Time	$I_F=-14\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		35		ns
Q_{rr}	Body Diode Reverse Recovery Charge	$I_F=-14\text{A}$, $dI/dt=100\text{A}/\mu\text{s}$		33		nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in² 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. The current rating is based on the $t \leq 10\text{s}$ thermal resistance rating.

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 6,12,14 are obtained using $<300\mu\text{s}$ pulses, duty cycle 0.5% max.

E. These tests are performed with the device mounted on 1 in² 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.

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TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

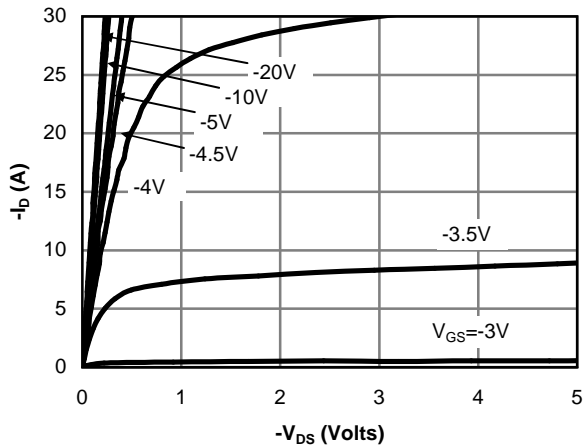


Fig 1: On-Region Characteristics

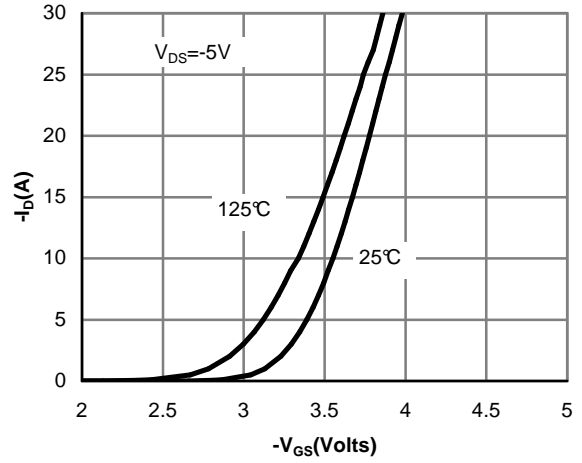


Figure 2: Transfer Characteristics

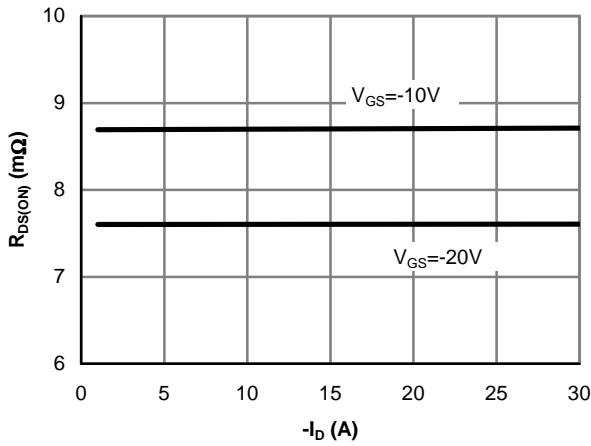


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

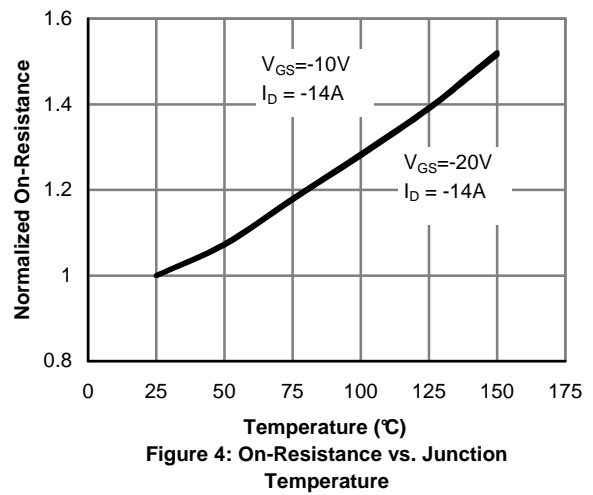


Figure 4: On-Resistance vs. Junction Temperature

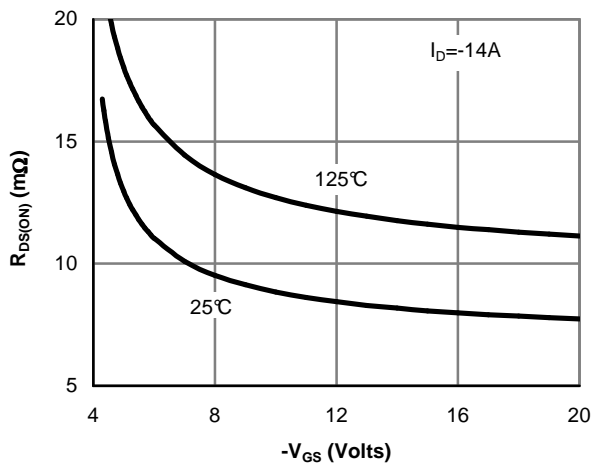


Figure 5: On-Resistance vs. Gate-Source Voltage

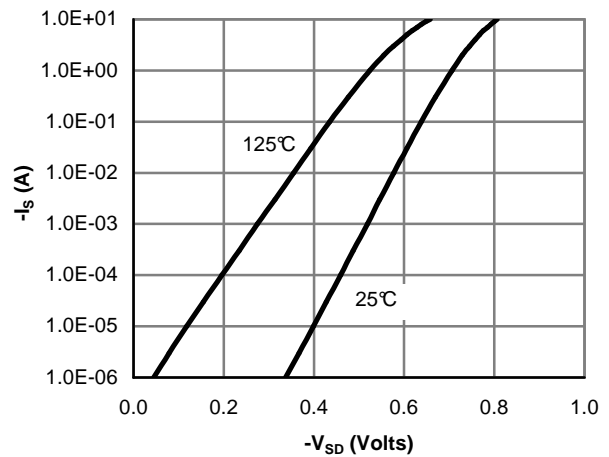


Figure 6: Body-Diode Characteristics

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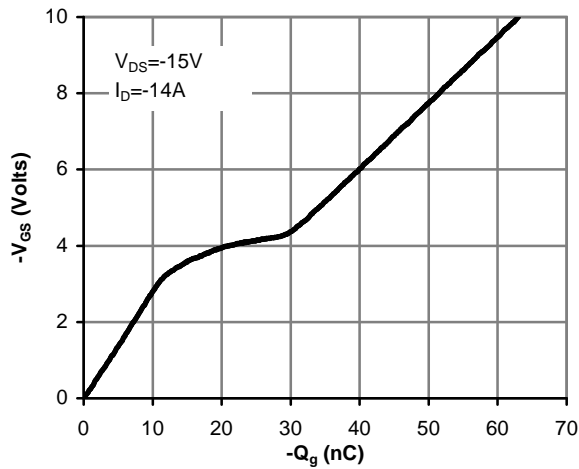


Figure 7: Gate-Charge Characteristics

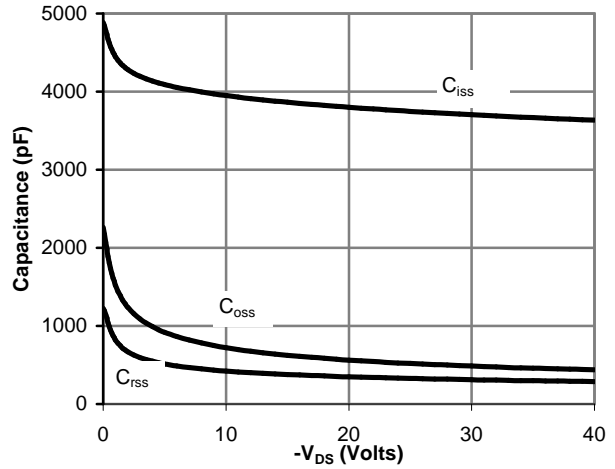


Figure 8: Capacitance Characteristics

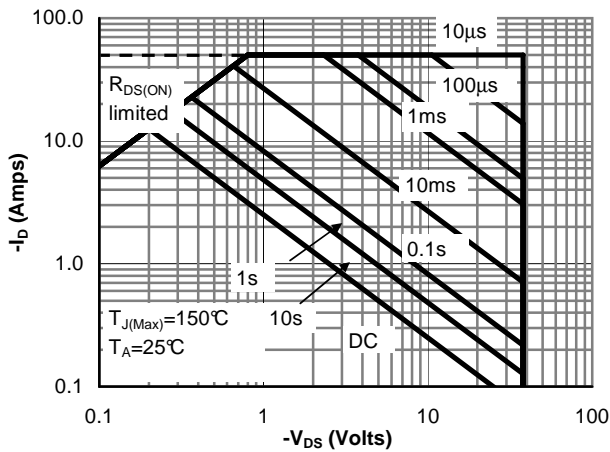


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

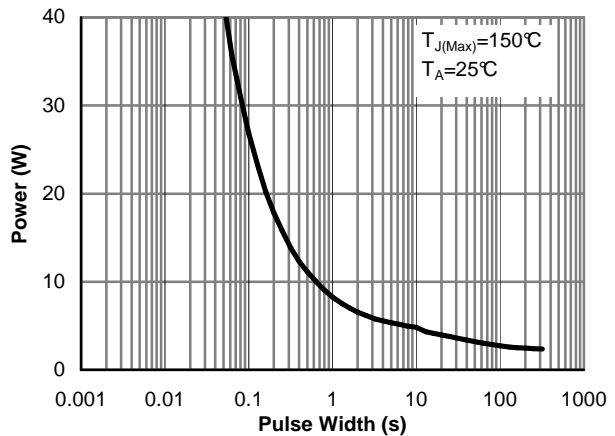


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

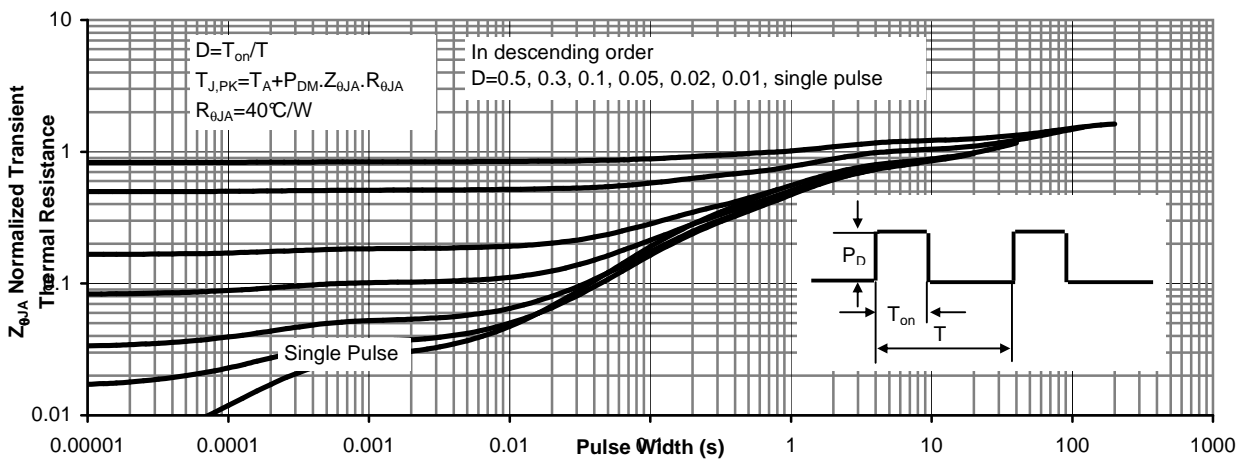


Figure 11: Normalized Maximum Transient Thermal Impedance