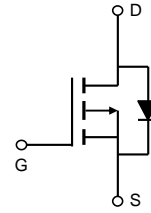


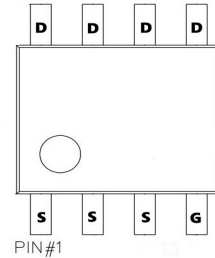
General Description

The AO4421 combines advanced trench MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is ideal for load switch and battery protection applications.



Product Summary

V_{DS}	-60V
I_D (at $V_{GS}=-10V$)	-6.2A
$R_{DS(ON)}$ (at $V_{GS}=-10V$)	< 40m Ω
$R_{DS(ON)}$ (at $V_{GS} = -4.5V$)	< 50m Ω



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}	± 20	V		
Continuous Drain Current ^A	I_D	$T_A=25^\circ C$	-6.2		
		$T_A=70^\circ C$	-5		
Pulsed Drain Current ^B	I_{DM}	-40	A		
Power Dissipation ^A	P_D	$T_A=25^\circ C$	3.1		
		$T_A=70^\circ C$	2		
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 ^A	$t \leq 10s$	$R_{\theta JA}$	24	40	$^\circ C/W$
Maximum Junction-to-Ambient ^A	Steady-State		54	75	$^\circ C/W$
Maximum Junction-to-Lead ^C	Steady-State	$R_{\theta JL}$	21	30	$^\circ C/W$

Electrical Characteristics (T_J=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
BV _{DSS}	Drain-Source Breakdown Voltage	I _D =-250μA, V _{GS} =0V	-60			V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =-48V, V _{GS} =0V T _J =55°C			-1 -5	μA
I _{GSS}	Gate-Body leakage current	V _{DS} =0V, V _{GS} =±20V			±100	nA
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} I _D =-250μA	-1	-2	-3	V
I _{D(ON)}	On state drain current	V _{GS} =-10V, V _{DS} =-5V	-40			A
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-6.2A		32	40	mΩ
		V _{GS} =-4.5V, I _D =-5A		40	50	mΩ
g _{FS}	Forward Transconductance	V _{DS} =-5V, I _D =-6.2A		18		S
V _{SD}	Diode Forward Voltage	I _S =-1A, V _{GS} =0V		-0.74	-1	V
I _S	Maximum Body-Diode Continuous Current				-4.2	A
DYNAMIC PARAMETERS						
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-30V, f=1MHz		2417	2900	pF
C _{oss}	Output Capacitance			179		pF
C _{rss}	Reverse Transfer Capacitance			120		pF
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz		1.9	2.3	Ω
SWITCHING PARAMETERS						
Q _{g(10V)}	Total Gate Charge (10V)	V _{GS} =-10V, V _{DS} =-30V, I _D =-6.2A		46.5	55	nC
Q _{g(4.5V)}	Total Gate Charge (4.5V)			22.7		nC
Q _{gs}	Gate Source Charge			9.1		nC
Q _{gd}	Gate Drain Charge			9.2		nC
t _{D(on)}	Turn-On DelayTime	V _{GS} =-10V, V _{DS} =-30V, R _L =4.7Ω, R _{GEN} =3Ω		9.8		ns
t _r	Turn-On Rise Time			6.1		ns
t _{D(off)}	Turn-Off DelayTime			44		ns
t _f	Turn-Off Fall Time			12.7		ns
t _{rr}	Body Diode Reverse Recovery Time	I _F =-6.2A, dI/dt=100A/μs		34	42	ns
Q _{rr}	Body Diode Reverse Recovery Charge	I _F =-6.2A, dI/dt=100A/μs		47		nC

A: The value of R_{θJA} is measured with the device mounted on 1 in² FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any a given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C: The R_{θJA} is the sum of the thermal impedance from junction to lead R_{θJL} and lead to ambient.

D: The static characteristics in Figures 1 to 6,12,14 are obtained using 80 μs 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°C. The SOA curve provides a single pulse rating.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

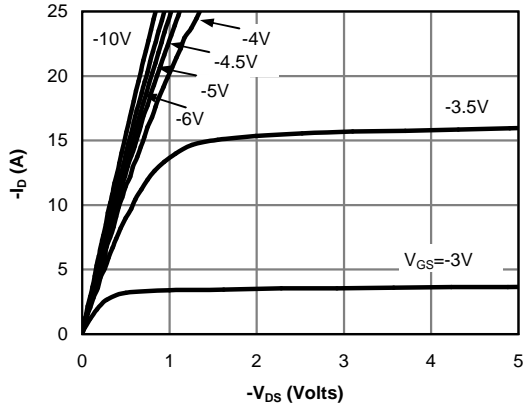


Fig 1: On-Region Characteristics

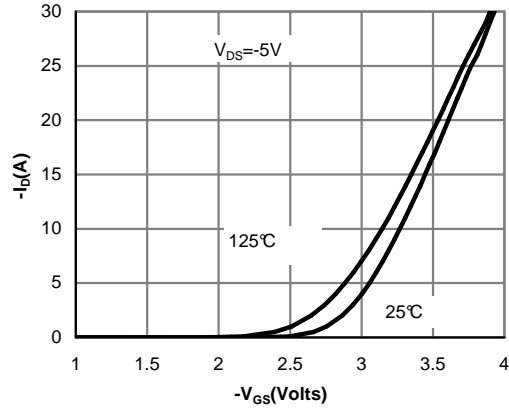


Figure 2: Transfer Characteristics

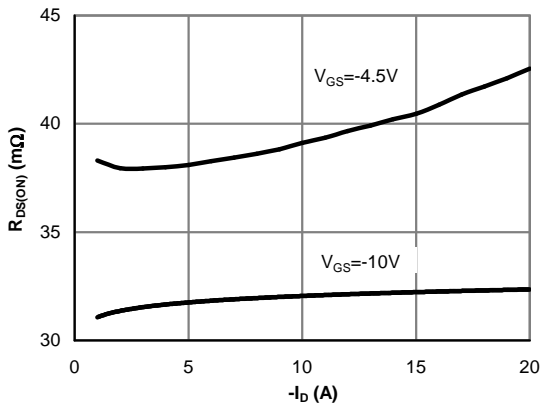


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

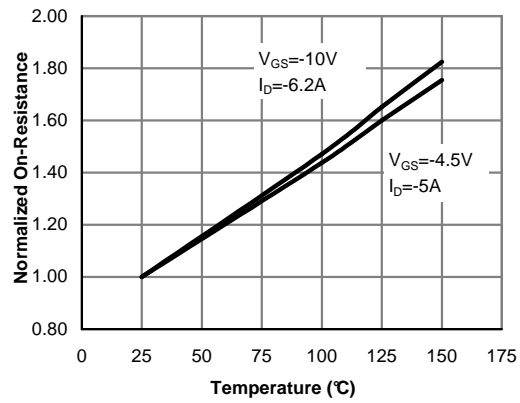


Figure 4: On-Resistance vs. Junction Temperature

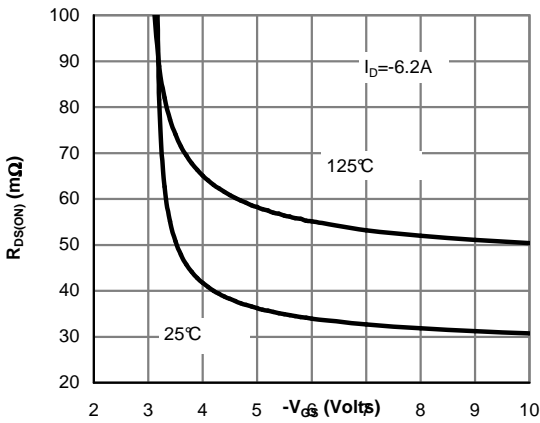


Figure 5: On-Resistance vs. Gate-Source Voltage

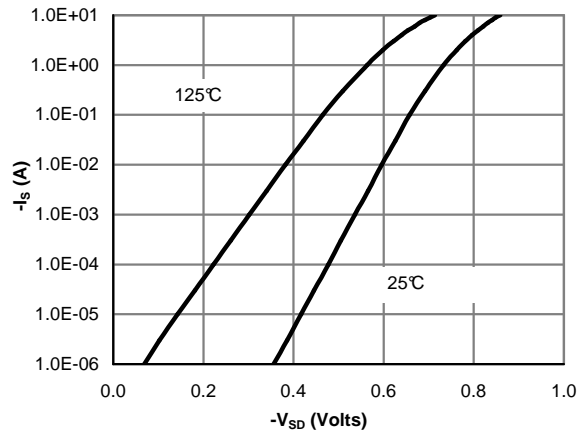


Figure 6: Body-Diode Characteristics

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

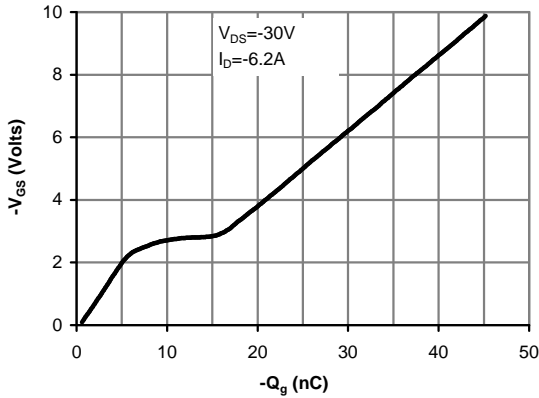


Figure 7: Gate-Charge Characteristics

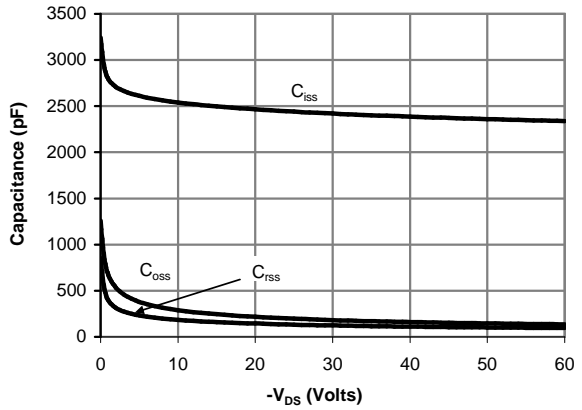


Figure 8: Capacitance Characteristics

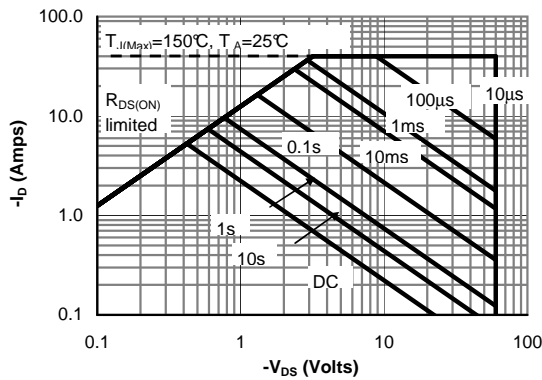


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

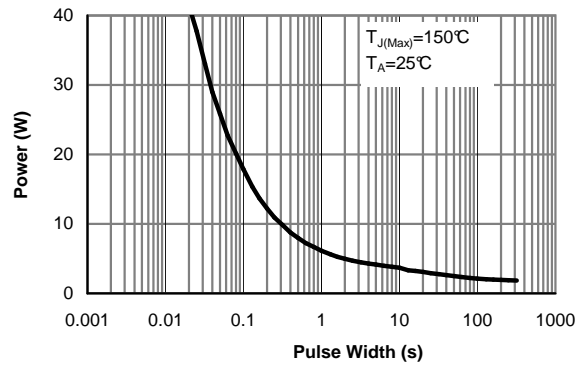


Figure 10: Single Pulse Power Rating Junction-to-Ambient (Note E)

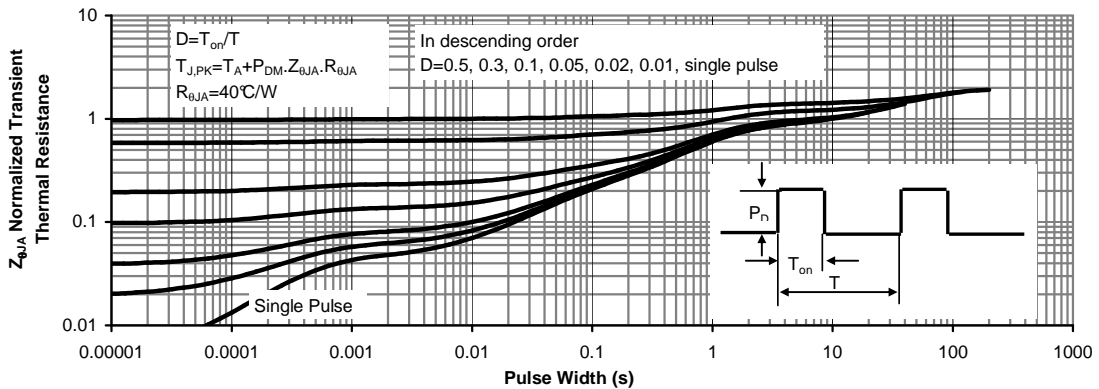
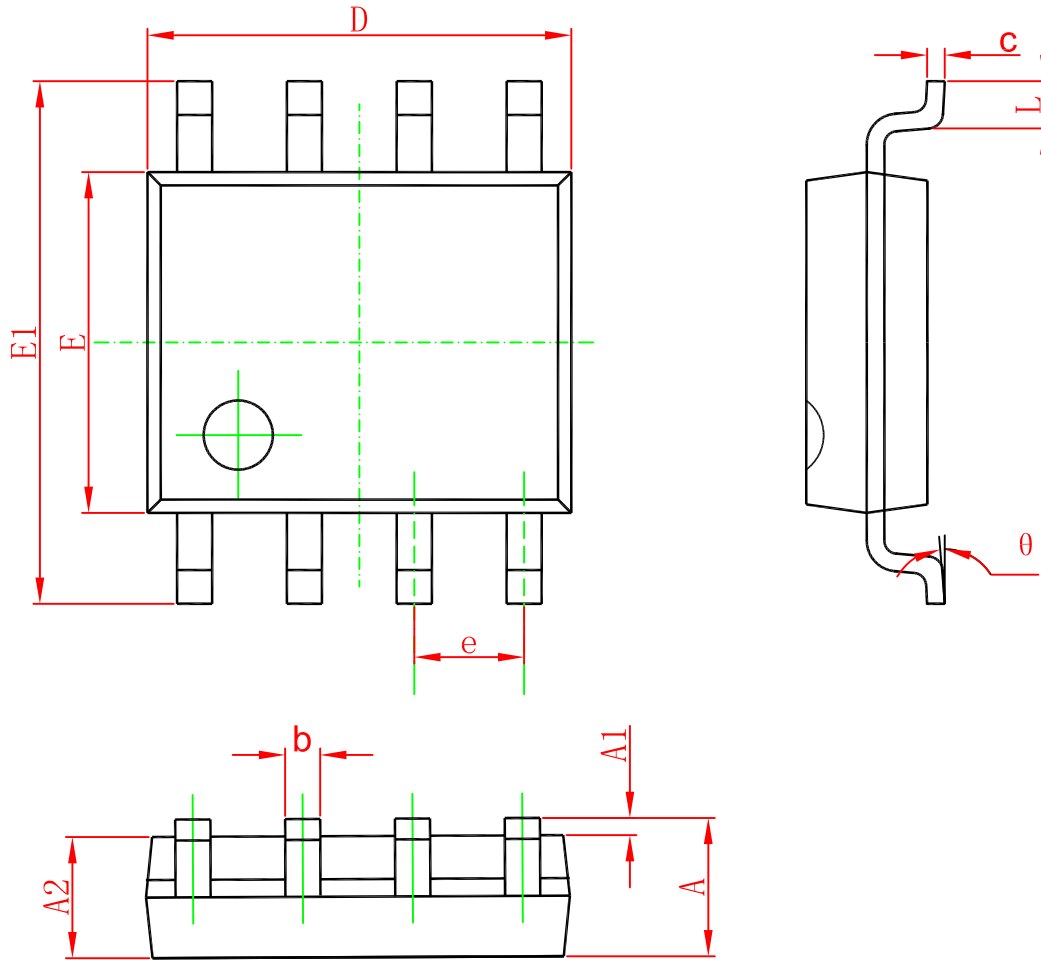


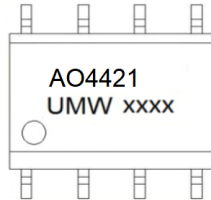
Figure 11: Normalized Maximum Transient Thermal Impedance

SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
UMW AO4421	SOP-8	3000	Tape and reel