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XINBOLE

Product Specification

XBLW AO4409

P-Channel Enhancement Mode MOSFET

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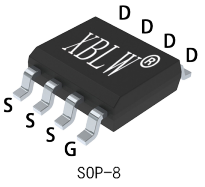
Description

The AO4409 uses advanced trench technology to provide excellent RDS(ON) , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

Feature:

- V_{DS} =-30V I_D = -15A
- $R_{DS(ON)}$ < 8.7mΩ @ V_{GS}= 10V



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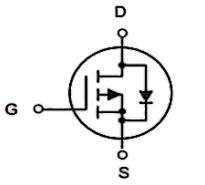

P-Channel MOSFET

Applications

- Battery protection Load switch
- Uninterruptible power supply

Ordering Information

Product Model	Package Type	Marking	Packing	Packing Qty
XBLW AO4409	SOP-8	AO4409	Tape	3000Pcs/Reel

Absolute Maximum Ratings (TC=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25°C	Continuous Drain Current, V_{GS} @ -10V[1]	-15	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ -10V[1]	-11	A
I_{DM}	Pulsed Drain Current[2]	-56	A
EAS	Single Pulse Avalanche Energy[3]	151	mJ
I_{AS}	Avalanche Current	-55	A
P_D@T_A=25°C	Total Power Dissipation[4]	1.5	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1](t≤10s)	40	°C/W
	Thermal Resistance Junction-Ambient [1]	75	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	24	°C/W

Electrical Characteristics (TJ=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.018	---	V/℃
$R_{DS(ON)}$	Static Drain-Source On-Resistance[2]	V_{GS}=-10V , I_D=-12A	---	5.8	8.7	mΩ
		V_{GS}=-4.5V , I_D=-10A	---	8.5	13.5	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1.2	---	-2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	5.04	---	mV/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=-24V , V_{GS}=0V , T_J=25℃	---	---	-1	uA
		V_{DS}=-24V , V_{GS}=0V , T_J=55℃	---	---	-5	
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-12A	---	25	---	S
Q_g	Total Gate Charge (-4.5V)	VDS=-15V VGS=-4.5V ID=-12A	---	30	---	nC
Q_{gs}	Gate-Source Charge		---	10	---	
Q_{gd}	Gate-Drain Charge		---	10.4	---	
$T_{d(on)}$	Turn-On Delay Time	VDD=-15V VGS=-10V RG=3.3 ID=-1A	---	9.4	---	ns
T_r	Rise Time		---	10.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	117	---	
T_f	Fall Time		---	24	---	
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	3448	---	pF
C_{oss}	Output Capacitance		---	508	---	
C_{rss}	Reverse Transfer Capacitance		---	421	---	
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	-14	A
I_{SM}	Pulsed Source Current[2,5]		---	---	-56	A
V_{SD}	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1.2	V
t_{rr}	Reverse Recovery Time	I_F=-10A , dI/dt=100A/μs , T_J=25℃	---	19.4	---	nS
Q_{rr}	Reverse Recovery Charge		---	9.1	---	nC

Note :
1.The data tested by surface mounted on a 1 inch^2 FR-4 board with 2OZ copper.
2.The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
3.The EAS data shows Max. rating . The test condition is V_{DD}=-25V,V_{GS}=-10V,L=0.1mH,I_{AS}=-
55A 4.The power dissipation is limited by 150℃ junction temperature
5.The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

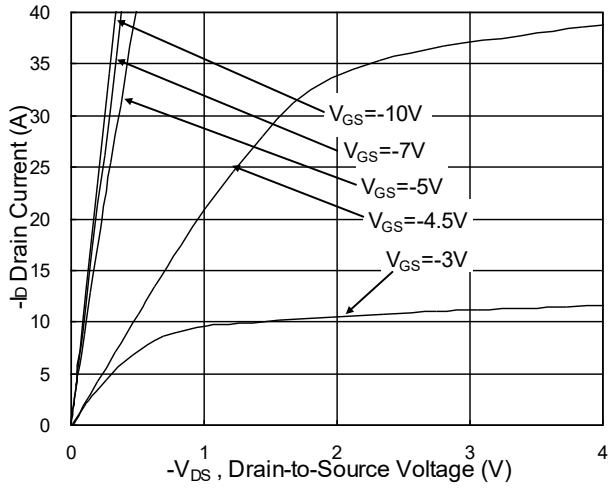

Fig.1 Typical Output Characteristics

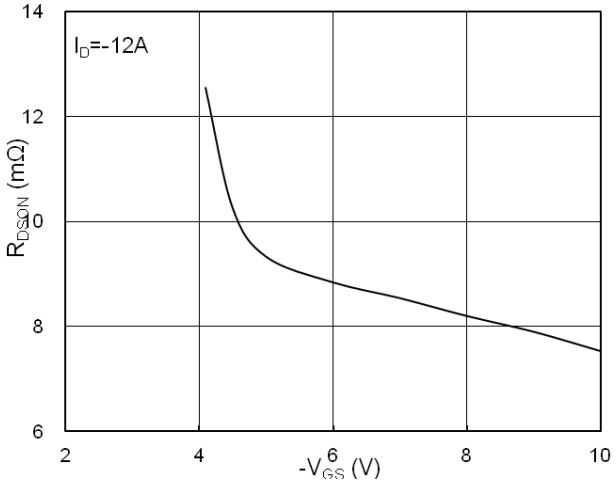

Fig.2 On-Resistance v.s Gate-Source

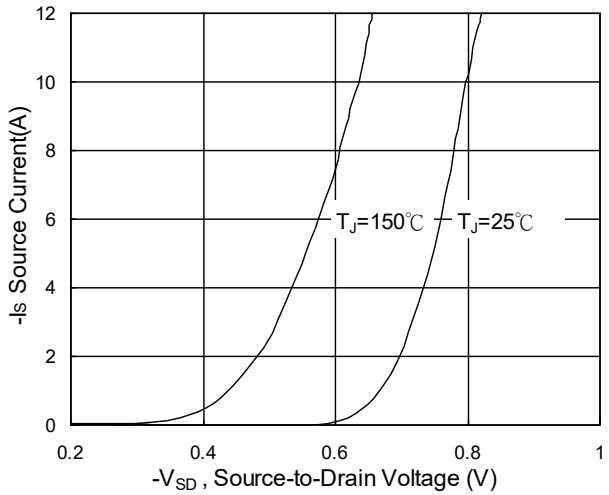

Fig.3 Forward Characteristics Of Reverse

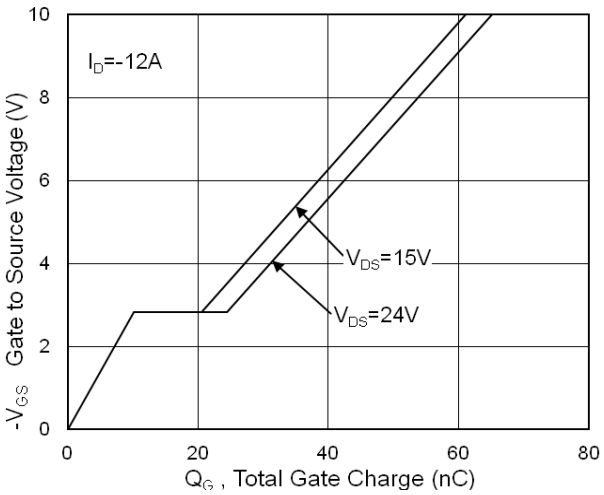

Fig.4 Gate-Charge Characteristics

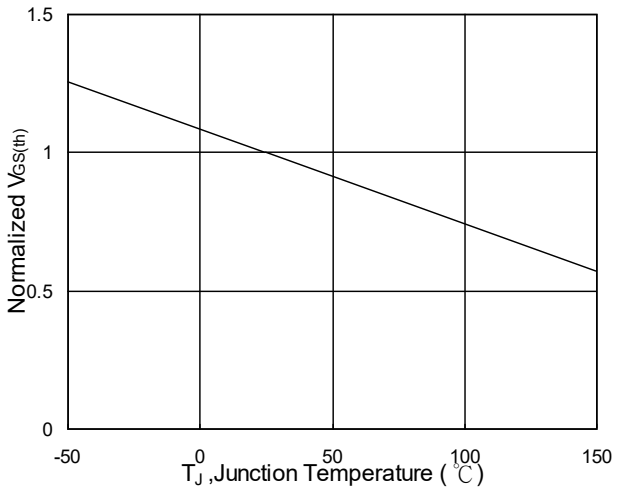

Fig.5 Normalized $V_{GS(th)}$ vs. T_J

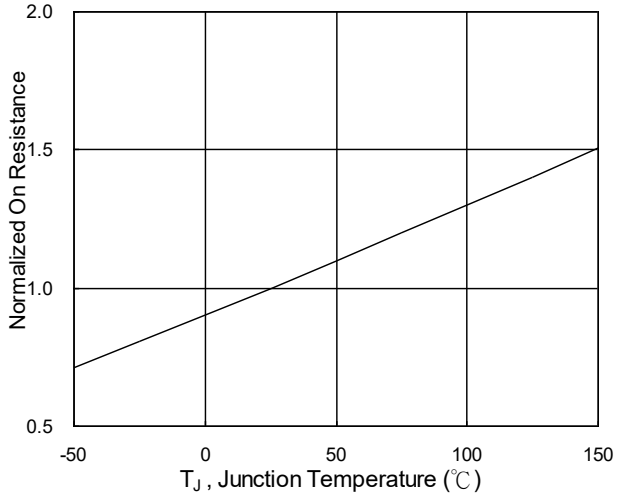

Fig.6 Normalized R_{DSON} vs. T_J

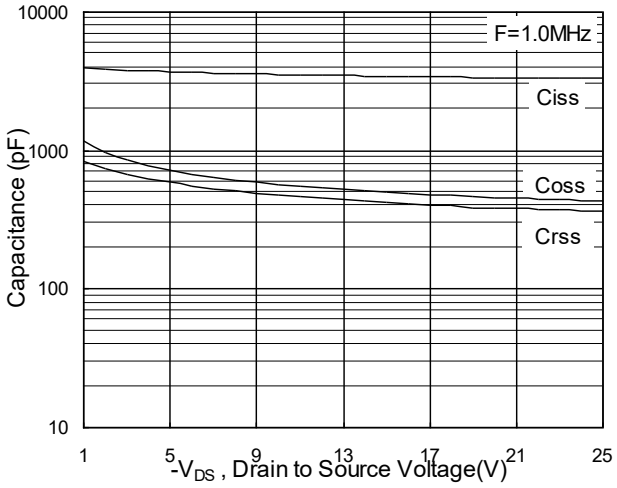

Fig.7 Capacitance

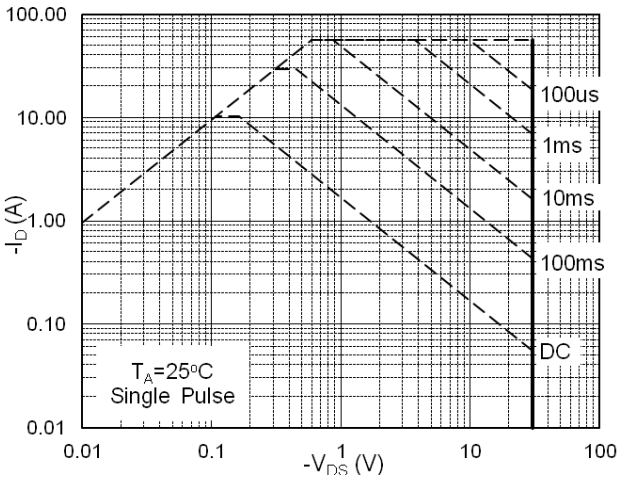

Fig.8 Safe Operating Area

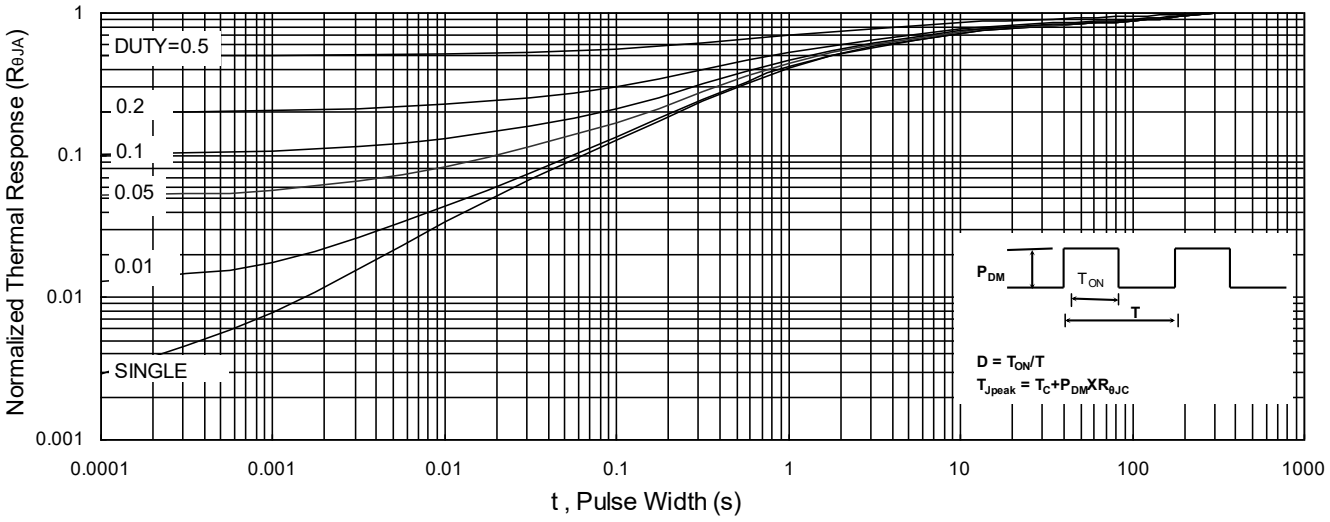

Fig.9 Normalized Maximum Transient Thermal Impedance

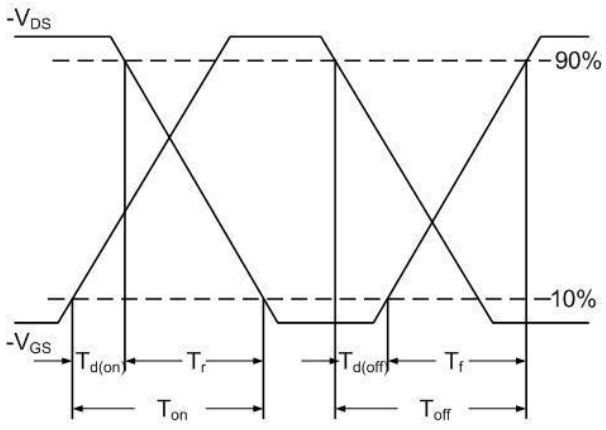

Fig.10 Switching Time Waveform

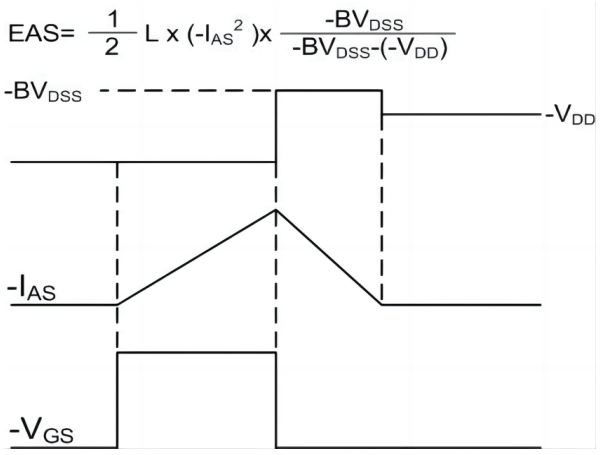

Fig.11 Unclamped Inductive Switching Waveform

Package Information

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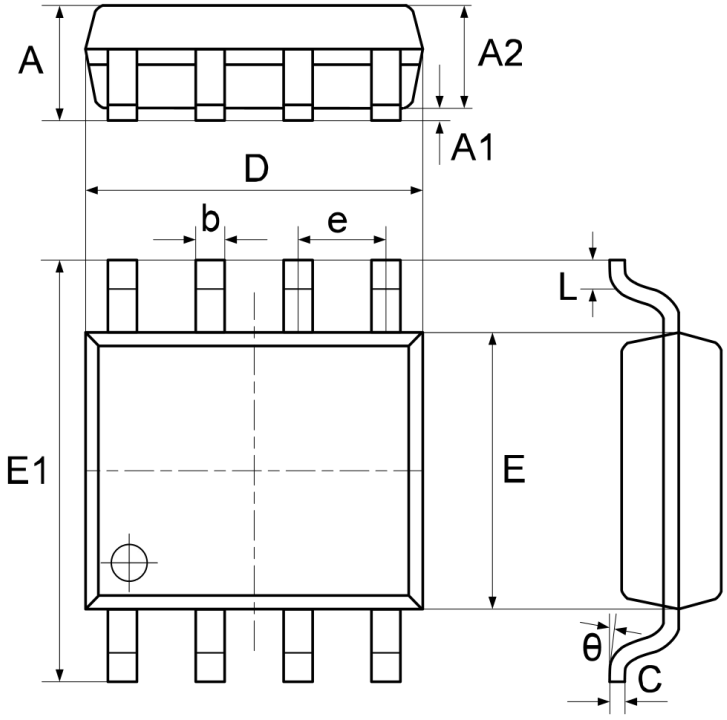

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.370	1.670	0.056	0.068
A1	0.070	0.170	0.003	0.007
A2	1.300	1.500	0.053	0.061
b	0.306	0.506	0.013	0.021
C	0.203 typ.		0.008 typ.	
D	4.700	5.100	0.192	0.208
E	3.820	4.020	0.156	0.164
E1	5.800	6.200	0.237	0.253
e	1.270 typ.		0.050 typ.	
L	0.450	0.750	0.018	0.306
θ	0°	8°	0°	8°

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