

General Description

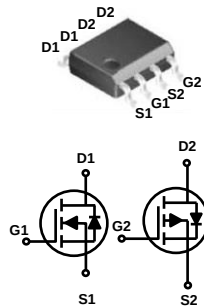
These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

Features

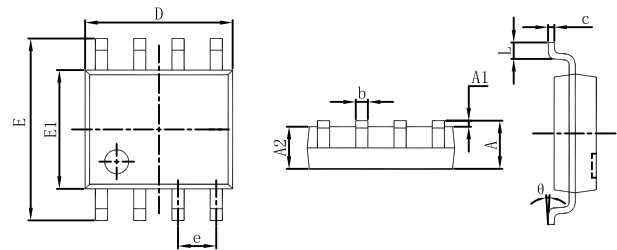
Fast switching
Green Device Available
Suit for 4.5V Gate Drive Applications

Applications

DC Fan
Motor Drive Applications
Networking
Half / Full Bridge Topology



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	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

BVDSS	RDSON	ID
30V	15mΩ	7.0A
-30V	45mΩ	-6.0A

Absolute Maximum Ratings Tc=25°C unless otherwise noted

Symbol	Parameter	Rating		Units
V _{DS}	Drain-Source Voltage	30	-30	V
V _{GS}	Gate-Source Voltage	±20	±20	V
I _D	Drain Current – Continuous (T _C =25°C)	7.0	-6.0	A
	Drain Current – Continuous (T _C =100°C)	4.5	-3.5	A
I _{DM}	Drain Current – Pulsed ¹	21	-18	A
P _D	Power Dissipation (T _C =25°C)	2.5		W
	Power Dissipation – Derate above 25°C	0.02		W/°C
T _{STG}	Storage Temperature Range	-55 to 150		°C
T _J	Operating Junction Temperature Range	-55 to 125		°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R _{θJA}	Thermal Resistance Junction to ambient	---	62.5	°C/W
R _{θJC}	Thermal Resistance Junction to Case	---	50	°C/W

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N-CH Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V , I _D =250uA	30	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =30V , V _{GS} =0V , T _J =25°C	---	---	1	uA
		V _{DS} =24V , V _{GS} =0V , T _J =125°C	---	---	10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =± 20V , V _{DS} =0V	---	---	± 100	nA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =10V , I _D =6A	---	15	22	mΩ
		V _{GS} =4.5V , I _D =5A	---	21	35	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	1.5	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-4	---	mV/°C
g _{fs}	Forward Transconductance	V _{DS} =10V , I _D =3A	---	3	---	S

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{3, 4}	V _{DS} =15V , V _{GS} =4.5V , I _D =8A	---	4.1	---	nC
Q _{gs}	Gate-Source Charge ^{3, 4}		---	1	---	
Q _{gd}	Gate-Drain Charge ^{3, 4}		---	2.1	---	
T _{d(on)}	Turn-On Delay Time ^{3, 4}	V _{DD} =15V , V _{GS} =10V , R _G =6Ω I _D =1A	---	2.8	---	ns
T _r	Rise Time ^{3, 4}		---	7.2	---	
T _{d(off)}	Turn-Off Delay Time ^{3, 4}		---	15.8	---	
T _f	Fall Time ^{3, 4}		---	4.6	---	
C _{iss}	Input Capacitance	V _{DS} =25V , V _{GS} =0V , F=1MHz	---	345	---	pF
C _{oss}	Output Capacitance		---	55	---	
C _{rss}	Reverse Transfer Capacitance		---	32	---	
R _g	Gate resistance	V _{GS} =0V , V _{DS} =0V , F=1MHz	---	3.2	---	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V , Force Current	---	---	7.0	A
I _{SM}	Pulsed Source Current		---	---	14	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V , I _S =1A , T _J =25°C	---	---	1.2	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=17A., R_G=25Ω, Starting T_J=25°C.
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

RATING AND CHARACTERISTIC CURVES (AO4606)

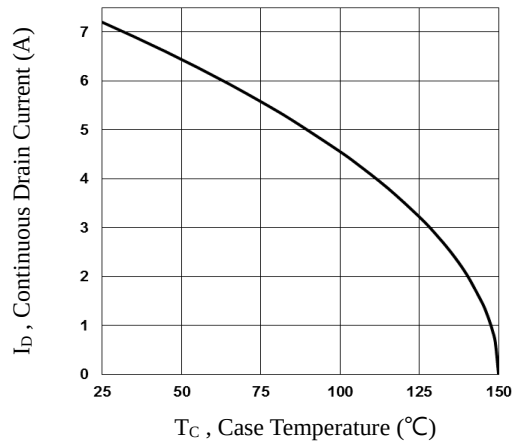


Fig.1 Continuous Drain Current vs. T_C

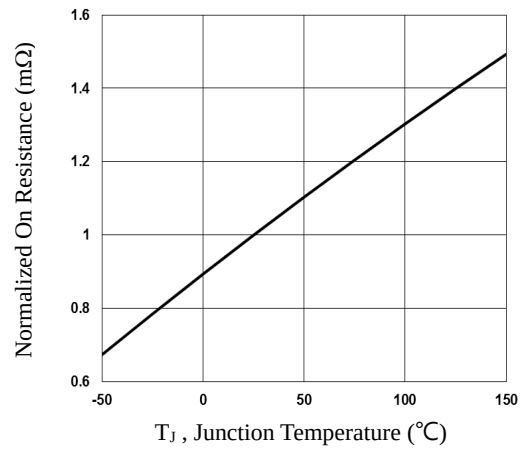


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

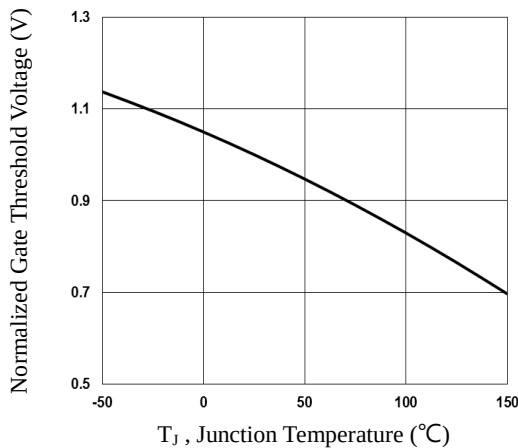


Fig.3 Normalized V_{th} vs. T_J

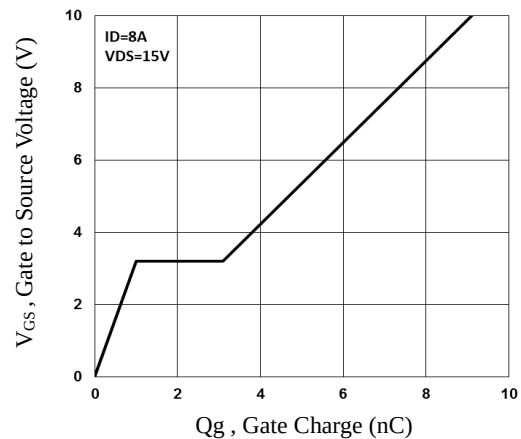


Fig.4 Gate Charge Waveform

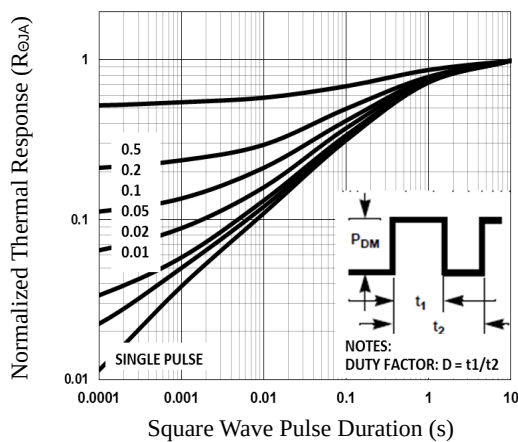


Fig.5 Normalized Transient Response

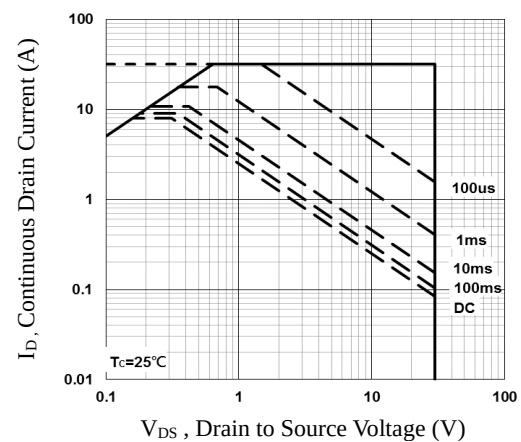


Fig.6 Maximum Safe Operation Area

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P-CH Electrical Characteristics (T_J=25 °C, unless otherwise

noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-30	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.03	---	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-30V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-24V, V _{GS} =0V, T _J =125°C	---	---	-10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-5A	---	45	60	mΩ
		V _{GS} =-4.5V, I _D =-3A	---	65	80	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-1.0	-1.5	-2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	4	---	mV/°C
g _{fs}	Forward Transconductance	V _{DS} =-10V, I _D =-3A	---	3.5	---	S

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{7,8}	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-3A	---	5.1	---	nC
Q _{gs}	Gate-Source Charge ^{7,8}		---	2	---	
Q _{gd}	Gate-Drain Charge ^{7,8}		---	2.2	---	
T _{d(on)}	Turn-On Delay Time ^{7,8}	V _{DD} =-15V, V _{GS} =-10V, R _G =6Ω I _D =-1A	---	3.4	---	ns
T _r	Rise Time ^{7,8}		---	10.8	---	
T _{d(off)}	Turn-Off Delay Time ^{7,8}		---	26.9	---	
T _f	Fall Time ^{7,8}		---	6.9	---	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, F=1MHz	---	560	---	pF
C _{oss}	Output Capacitance		---	55	---	
C _{rss}	Reverse Transfer Capacitance		---	40	---	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	-6.0	A
I _{SM}	Pulsed Source Current		---	---	-12	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.3	V

Note :

- Repetitive Rating : Pulsed width limited by maximum junction temperature.
- V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-10A, R_G=25Ω, Starting T_J=25°C
- The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
- Essentially independent of operating temperature.

RATING AND CHARACTERISTIC CURVES (AO4606)

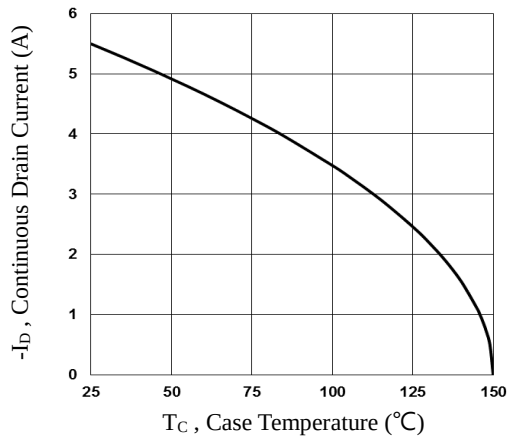


Fig.1 Continuous Drain Current vs. T_C

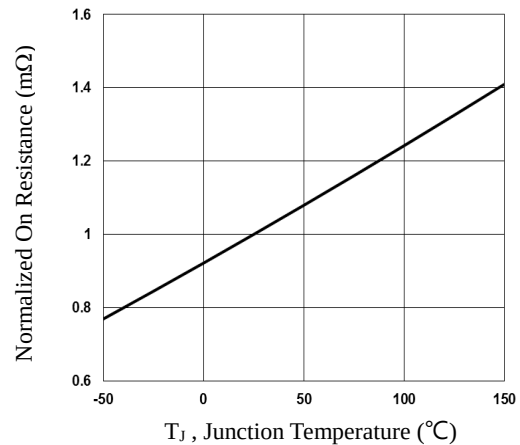


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

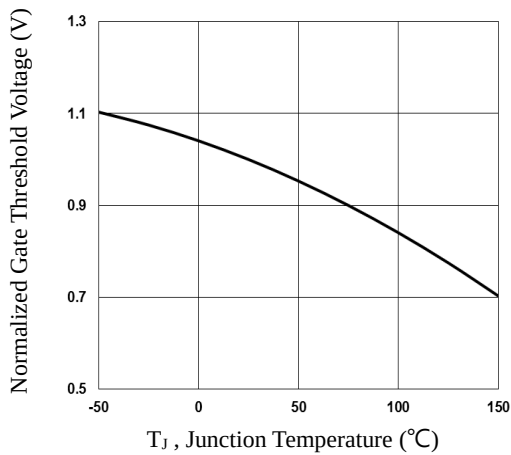


Fig.3 Normalized V_{th} vs. T_J

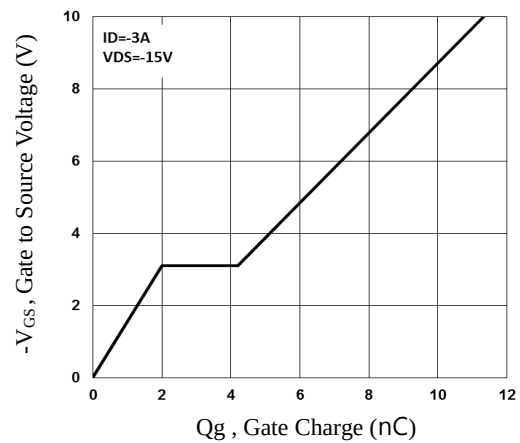


Fig.4 Gate Charge Waveform

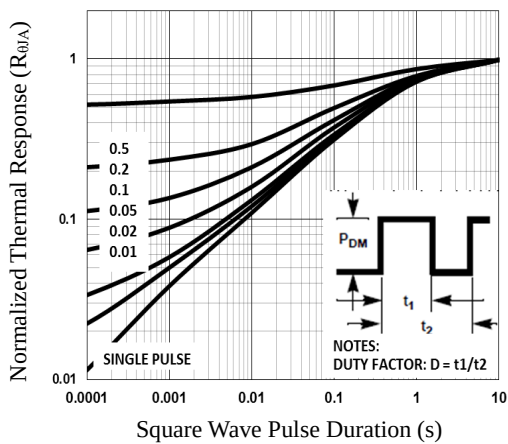


Fig.5 Normalized Transient Impedance

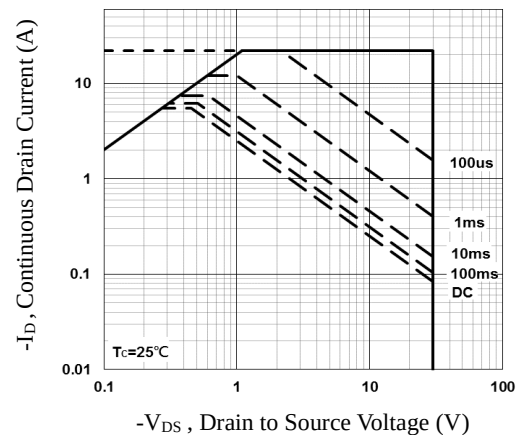


Fig.6 Maximum Safe Operation Area