



PRODUCT DATA SHEET



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Datasheet



Resources



Samples

Please note: Please check the JINGAO Semiconductor website to verify the updated device numbers. The most current and up-to-date ordering information can be found at www.jg-semi.cn. Please email any questions regarding the system integration to JINGAO_questions@jgsemi.com.

General Description

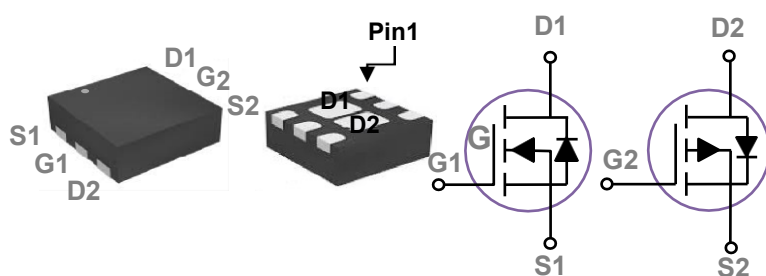
These N+P dual Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode.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

BVDSS	RDSON	ID
20V	20mΩ	5A
-20V	56mΩ	-3.5A

Features

- Fast switching
- Green Device Available

DFN2X2 Dual 2EP Pin Configuration



Applications

- Notebook
- Load Switch
- Networking
- Hand-held Instruments

Absolute Maximum Ratings Tc=25°C unless otherwise noted

Symbol	Parameter	Rating		Units
V_{DS}	Drain-Source Voltage	20	-20	V
V_{GS}	Gate-Source Voltage	±12	±12	V
I_D	Drain Current – Continuous ($T_A=25^\circ\text{C}$)	5	-3.5	A
	Drain Current – Continuous ($T_A=70^\circ\text{C}$)	3.5	-2.5	A
I_{DM}	Drain Current – Pulsed ¹	20	-14	A
P_D	Power Dissipation ($T_A=25^\circ\text{C}$)	1.25		W
	Power Dissipation – Derate above 25°C	0.01		W/°C
T_{STG}	Storage Temperature Range	-55 to 150		°C
T_J	Operating Junction Temperature Range	-55 to 150		°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	100	°C/W

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	20	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =20V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =16V, V _{GS} =0V, T _J =125°C	---	---	10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±12V, V _{DS} =0V	---	---	±100	nA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =4A	---	20	30	mΩ
		V _{GS} =2.5V, I _D =3A	---	24	40	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	0.4	0.7	1	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =1A	---	4	---	S

Dynamic and switching Characteristics

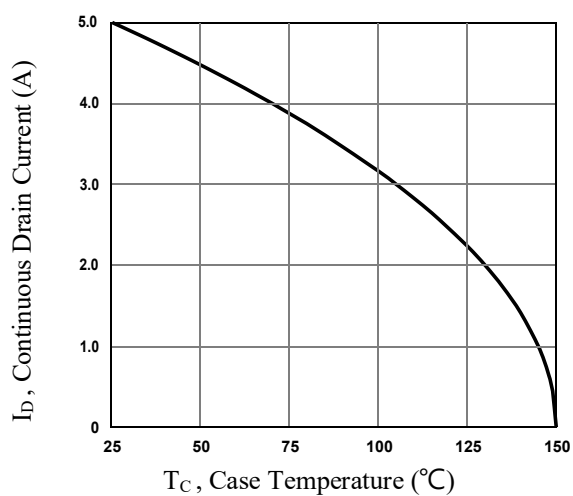
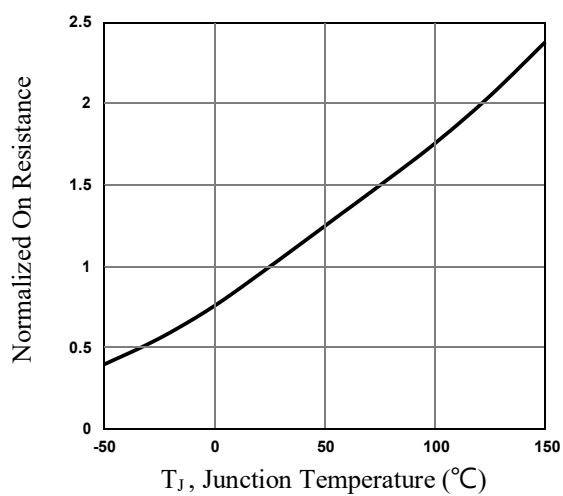
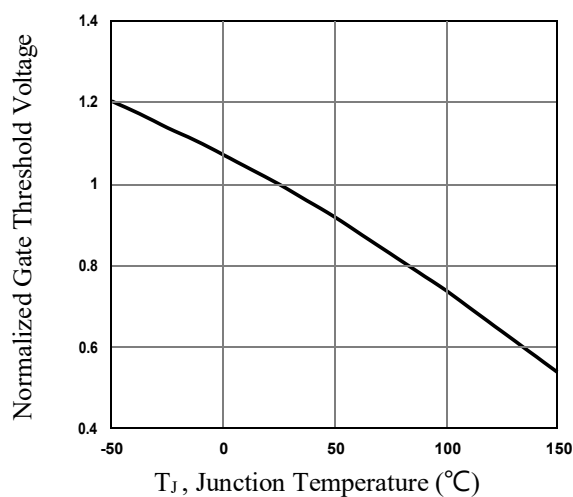
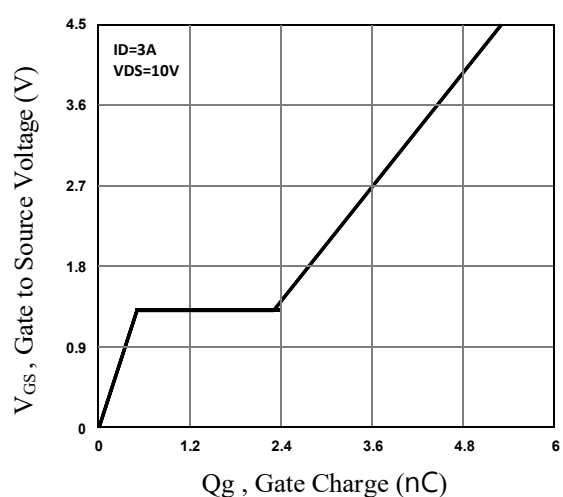
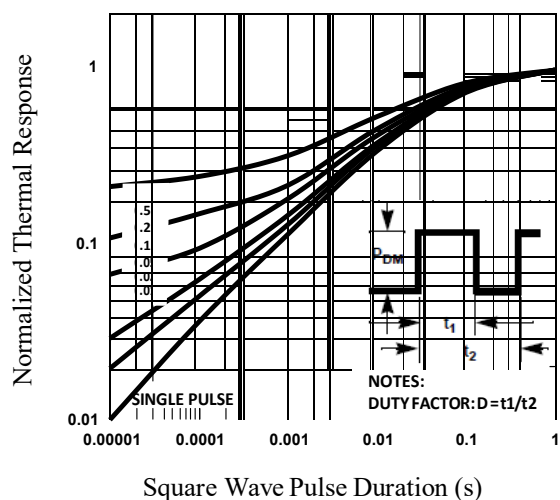
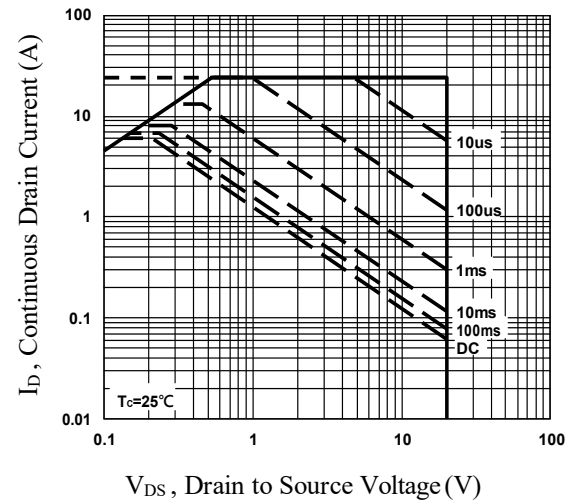
Q _g	Total Gate Charge ^{2, 3}	V _{DS} =10V, V _{GS} =4.5V, I _D =3A	---	5.3	---	nC
Q _{gs}	Gate-Source Charge ^{2, 3}		---	0.5	---	
Q _{gd}	Gate-Drain Charge ^{2, 3}		---	1.8	---	
T _{d(on)}	Turn-On Delay Time ^{2, 3}	V _{DD} =10V, V _{GS} =4.5V, R _G =6Ω I _D =3A	---	4.1	---	ns
T _r	Rise Time ^{2, 3}		---	11.6	---	
T _{d(off)}	Turn-Off Delay Time ^{2, 3}		---	23.9	---	
T _f	Fall Time ^{2, 3}		---	7.6	---	
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, F=1MHz	---	490	---	pF
C _{oss}	Output Capacitance		---	90	---	
C _{rss}	Reverse Transfer Capacitance		---	70	---	

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	---	---	5	A
I _{SM}	Pulsed Source Current		---	---	10	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. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. Essentially independent of operating temperature.


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

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	-20	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-20V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-16V, V _{GS} =0V, T _J =125°C	---	---	-10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±12V, V _{DS} =0V	---	---	±100	nA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-4.5V, I _D =-3A	---	56	75	mΩ
		V _{GS} =-2.5V, I _D =-2A	---	75	95	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-0.4	-0.7	-1.0	V
g _{fs}	Forward Transconductance	V _{DS} =-10V, I _D =-1A	---	4	---	S

Dynamic and switching Characteristics

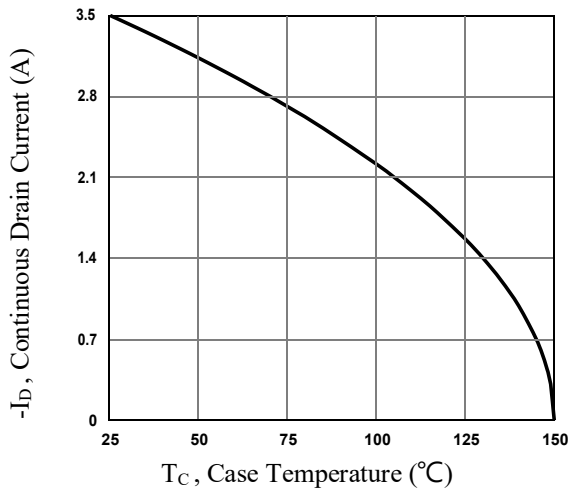
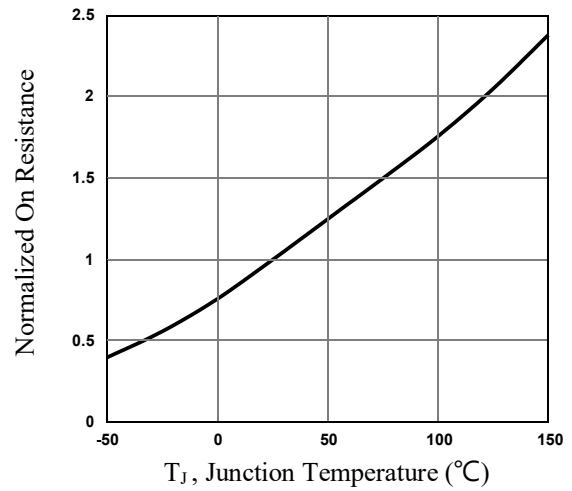
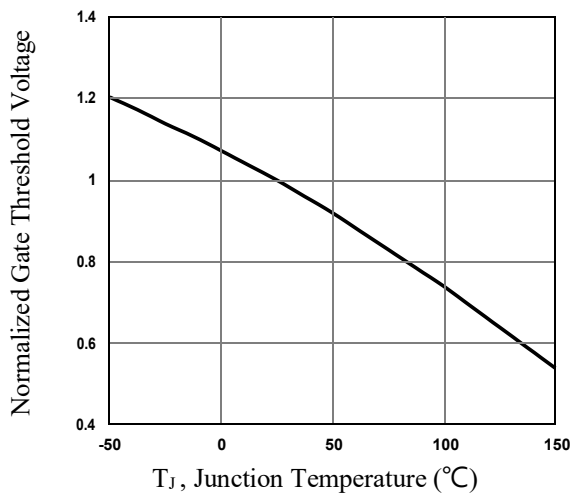
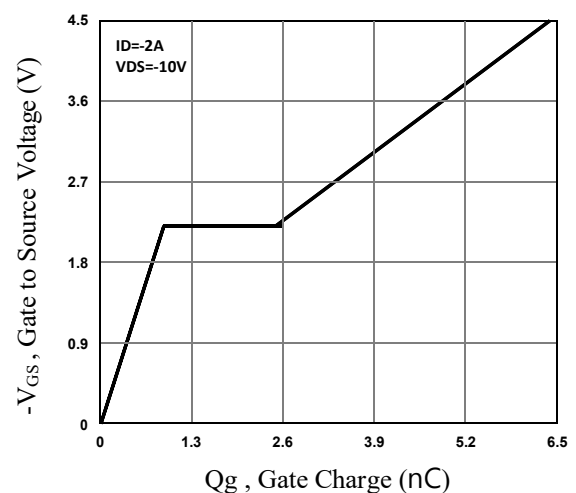
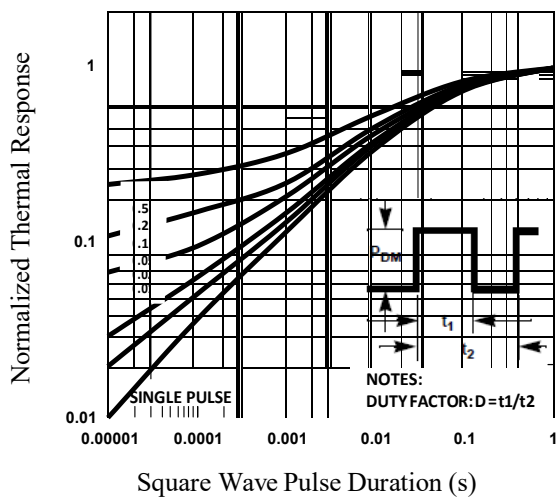
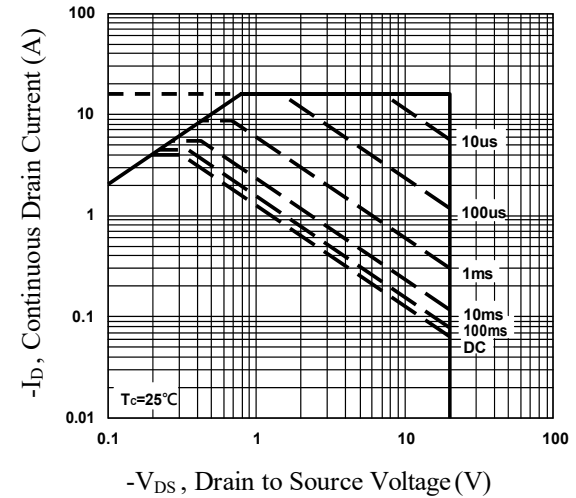
Q _g	Total Gate Charge ^{4, 5}	V _{DS} =-10V, V _{GS} =-4.5V, I _D =-2A	---	6.4	---	nC
Q _{gs}	Gate-Source Charge ^{4, 5}		---	0.9	---	
Q _{gd}	Gate-Drain Charge ^{4, 5}		---	1.6	---	
T _{d(on)}	Turn-On Delay Time ^{4, 5}	V _{DD} =-10V, V _{GS} =-4.5V, R _G =6Ω I _D =-2A	---	5	---	ns
T _r	Rise Time ^{4, 5}		---	17.4	---	
T _{d(off)}	Turn-Off Delay Time ^{4, 5}		---	40.7	---	
T _f	Fall Time ^{4, 5}		---	11.4	---	
C _{iss}	Input Capacitance	V _{DS} =-10V, V _{GS} =0V, F=1MHz	---	540	---	pF
C _{oss}	Output Capacitance		---	80	---	
C _{rss}	Reverse Transfer Capacitance		---	75	---	

Drain-Source Diode Characteristics and Maximum Ratings

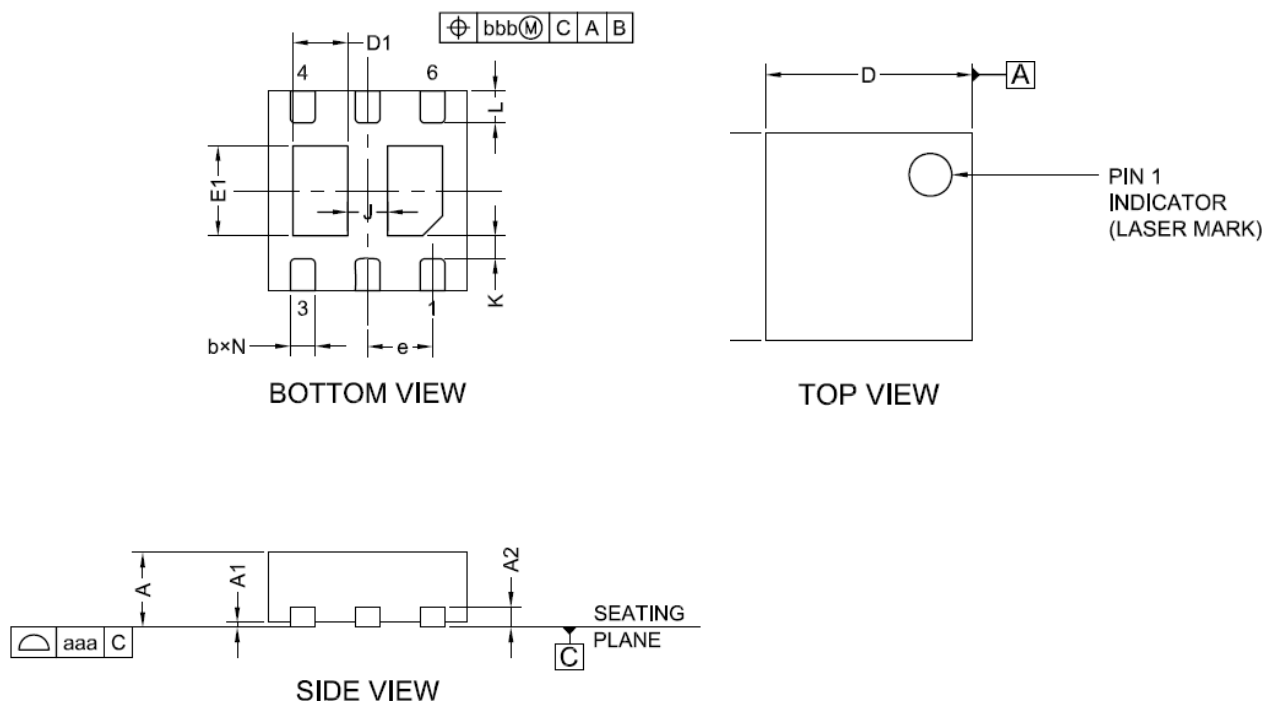
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	-3.5	A
I _{SM}	Pulsed Source Current		---	---	-7.0	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-1.2	V

Note :

4. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.


Fig.7 Continuous Drain Current vs. T_c

Fig.8 Normalized $R_{DS(on)}$ vs. T_j

Fig.9 Normalized V_{th} vs. T_j

Fig.10 Gate Charge Waveform

Fig.11 Normalized Transient Impedance

Fig.12 Maximum Safe Operation Area

DFN2X2 Dual 2EP PACKAGE INFORMATION



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	TYP	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A2		0.203	
b	0.20	0.25	0.30
D	1.95	2.00	2.05
D1	0.50	0.55	0.60
E	1.95	2.00	2.05
E1	0.85	0.90	0.95
e		0.65BSC	
L	0.27	0.32	0.37
J		0.40BSC	
K		0.20MIN	
N		6	
aaa		0.08	
bbb		0.10	

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