



## PRODUCT DATA SHEET



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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](http://www.jg-semi.cn). Please email any questions regarding the system integration to [JINGAO\\_questions@jgsemi.com](mailto:JINGAO_questions@jgsemi.com).

## General Description

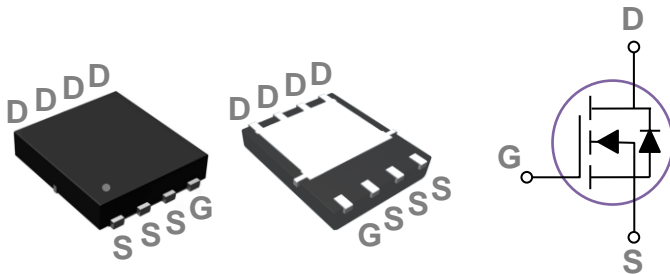
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BVDSS	RDSON	ID
100V	5.5mΩ	70A

## Features

- 100V,70A,  $R_{DS(ON)} = 5.5m\Omega @ V_{GS} = 10V$
- Improved  $dv/dt$  capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

## PPAK5X6 Pin Configuration



## Applications

- Networking
- Load Switch
- LED applications
- Quick Charger

## Absolute Maximum Ratings $T_c=25^\circ\text{C}$ unless otherwise noted

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	100	V
$V_{GS}$	Gate-Source Voltage	+20/-12	V
$I_D$	Drain Current – Continuous ( $T_c=25^\circ\text{C}$ )	70	A
	Drain Current – Continuous ( $T_c=100^\circ\text{C}$ )	44	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	280	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	320	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	80	A
$P_D$	Power Dissipation ( $T_c=25^\circ\text{C}$ )	142	W
	Power Dissipation – Derate above $25^\circ\text{C}$	1.14	W/ $^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-55 to 125	$^\circ\text{C}$

## Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	0.88	$^\circ\text{C}/\text{W}$

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**
**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	100	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =100V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =80V, V <sub>GS</sub> =0V, T <sub>J</sub> =85°C	---	---	10	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =20V, V <sub>DS</sub> =0V	---	---	100	nA

**On Characteristics**

R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> =10V, I <sub>D</sub> =20A	---	4.6	5.5	mΩ
		V <sub>GS</sub> =10V, I <sub>D</sub> =20A (T <sub>J</sub> =125°C)	---	8.1	---	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =10A	---	6.2	7.8	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1	1.6	2.5	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =5A	---	18	---	S

**Dynamic and switching Characteristics**

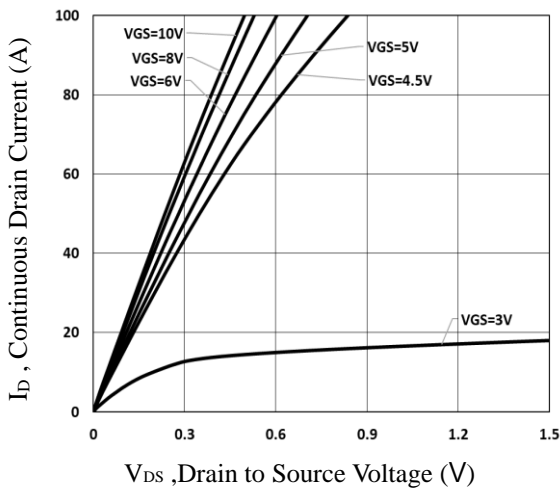
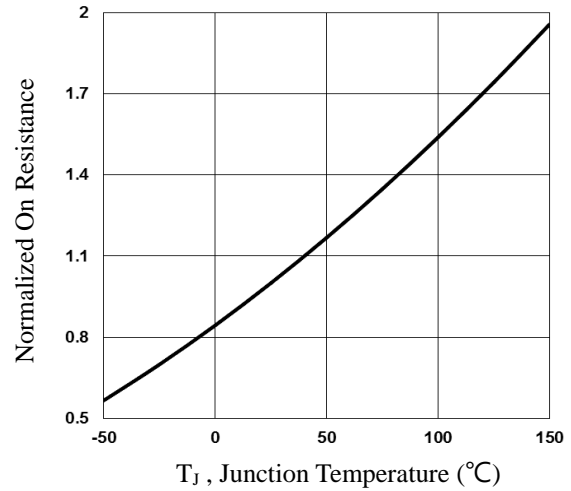
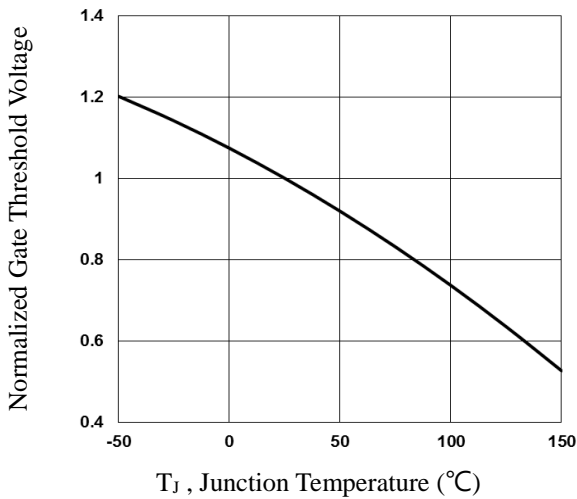
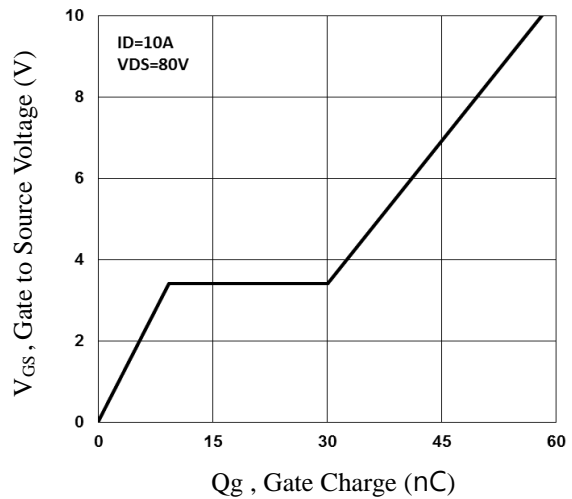
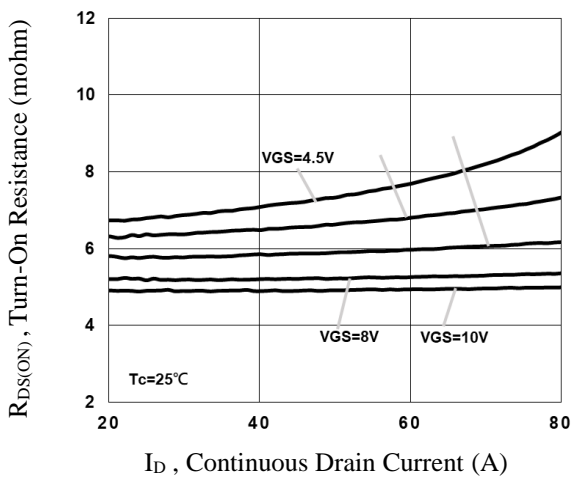
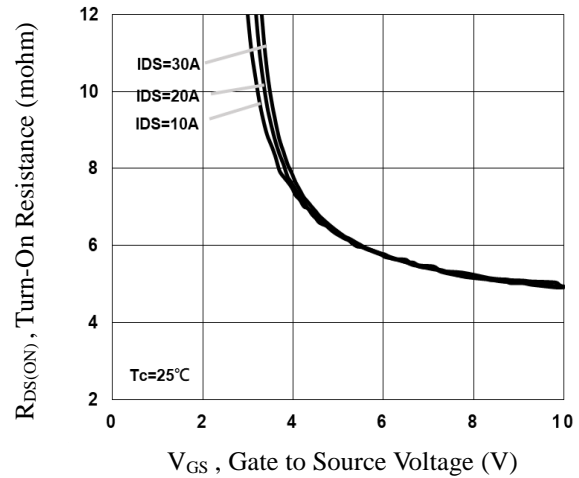
Q <sub>g</sub>	Total Gate Charge <sup>3, 4</sup>	V <sub>DS</sub> =80V, V <sub>GS</sub> =10V, I <sub>D</sub> =10A	---	58.2	100	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>3, 4</sup>		---	9.2	18	
Q <sub>gd</sub>	Gate-Drain Charge <sup>3, 4</sup>		---	20.8	30	
T <sub>d(on)</sub>	Turn-On Delay Time <sup>3, 4</sup>	V <sub>DD</sub> =50V, V <sub>GS</sub> =10V, R <sub>G</sub> =6Ω I <sub>D</sub> =1A	---	24	48	ns
T <sub>r</sub>	Rise Time <sup>3, 4</sup>		---	19.8	39	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>3, 4</sup>		---	46	92	
T <sub>f</sub>	Fall Time <sup>3, 4</sup>		---	26	52	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V, V <sub>GS</sub> =0V, F=1MHz	---	4570	9100	pF
C <sub>oss</sub>	Output Capacitance		---	1180	2300	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	49	98	
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	---	2	4	Ω

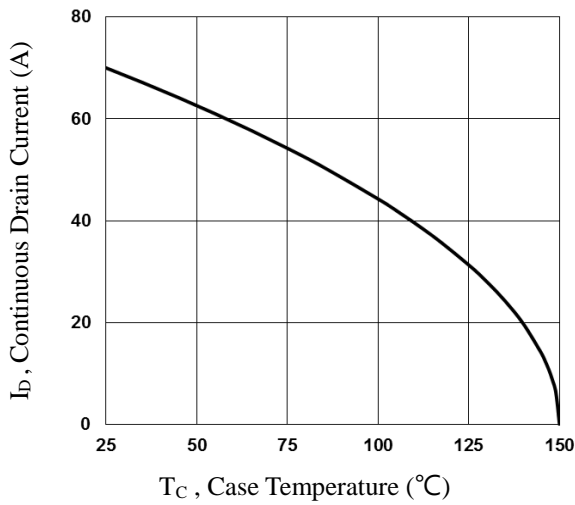
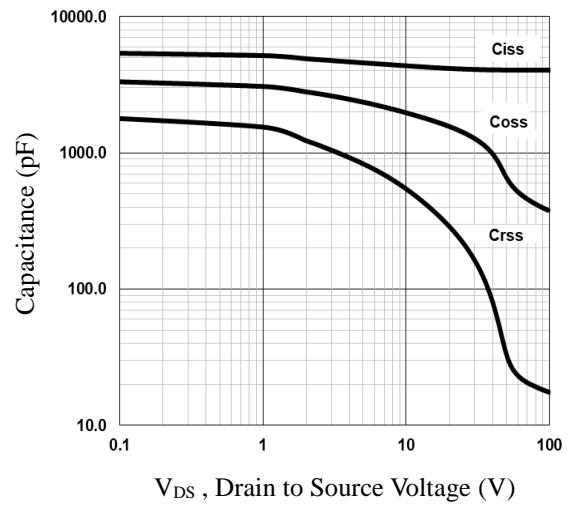
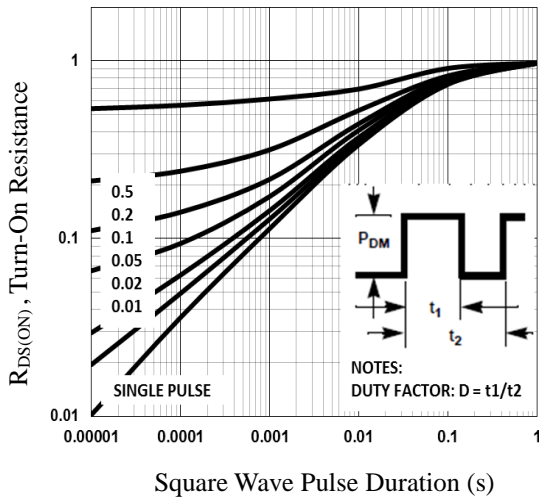
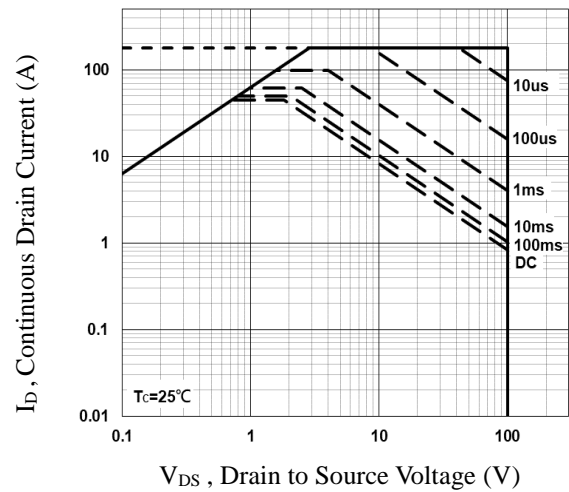
**Drain-Source Diode Characteristics and Maximum Ratings**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	70	A
I <sub>SM</sub>	Pulsed Source Current		---	---	140	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1	V
t <sub>rr</sub>	Reverse Recovery Time	V <sub>GS</sub> =0V, I <sub>S</sub> =10A, di/dt=100A/μs	---	61.6	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge	T <sub>J</sub> =25°C	---	120	---	nC

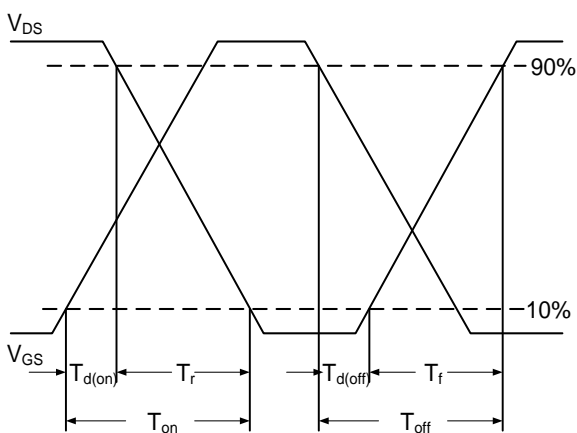
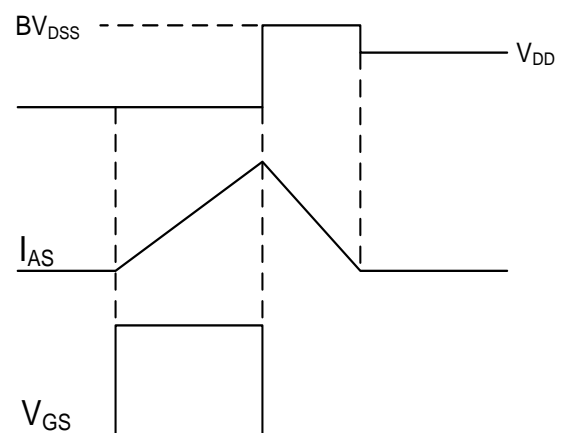
Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=80A., R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

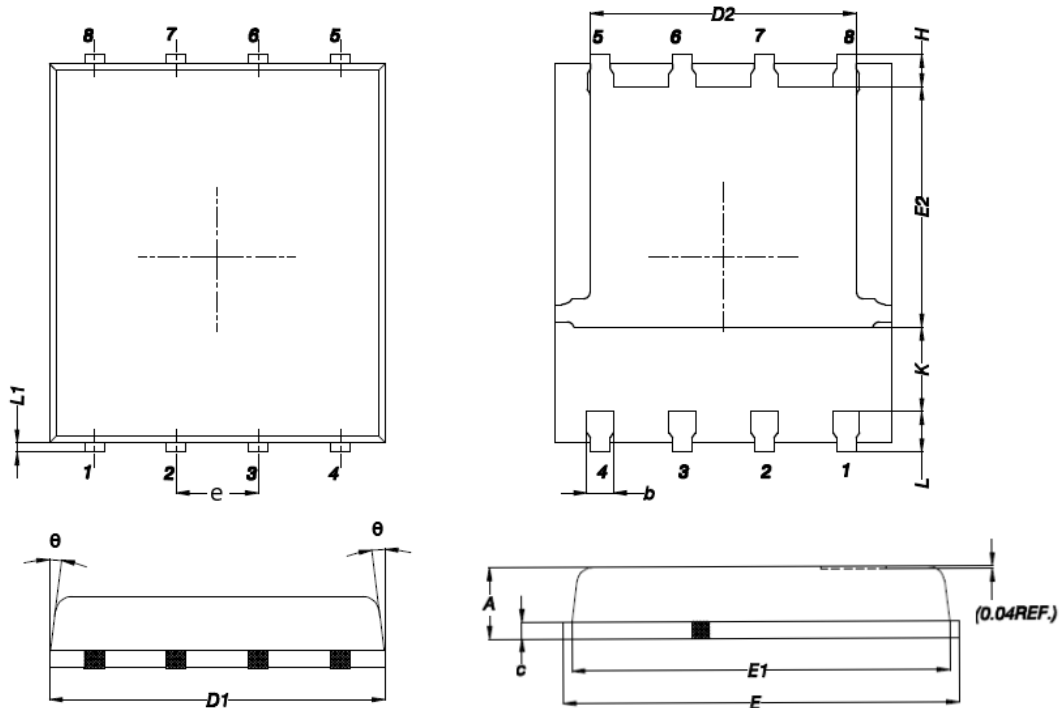

**Fig.1 Typical Output Characteristics**

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

**Fig.3 Normalized  $V_{th}$  vs.  $T_J$** 

**Fig.4 Gate Charge Waveform**

**Fig.5 Turn-On Resistance vs.  $I_D$** 

**Fig.6 Turn-On Resistance vs.  $V_{GS}$**


**Fig.7 Continuous Drain Current vs. T<sub>c</sub>**

**Fig.8 Capacitance Characteristics**

**Fig.9 Normalized Transient Impedance**

**Fig.10 Maximum Safe Operation Area**

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$


**Fig.11 Switching Time Waveform**

**Fig.12 EAS Waveform**

## PPAK5x6 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.200	0.850	0.047	0.031
b	0.510	0.300	0.020	0.012
C	0.300	0.200	0.012	0.008
D1	5.400	4.800	0.212	0.189
D2	4.310	3.610	0.170	0.142
E	6.300	5.850	0.248	0.230
E1	5.960	5.450	0.235	0.215
E2	3.920	3.300	0.154	0.130
e	1.27BSC		0.05BSC	
H	0.650	0.380	0.026	0.015
K	---	1.100	---	0.043
L	0.710	0.380	0.028	0.015
L1	0.250	0.050	0.009	0.002
$\theta$	12°	0°	12°	0°

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