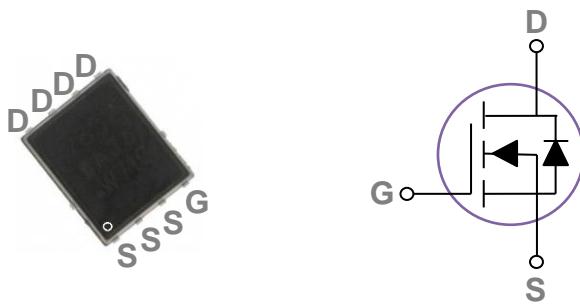


### General Description

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.

### PPAK5x6 Pin Configuration



BVDSS	RDSON	ID
30V	7.2mΩ	65A

### Features

- 30V, 65A,  $RDS(ON) = 7.2m\Omega @ VGS = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

### Applications

- MB / VGA / Vcore
- POL Applications
- SMPS 2<sup>nd</sup> SR

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

Symbol	Parameter	Rating	Units
V <sub>Ds</sub>	Drain-Source Voltage	30	V
V <sub>Gs</sub>	Gate-Source Voltage	$\pm 20$	V
I <sub>D</sub>	Drain Current – Continuous ( $T_c=25^\circ C$ )	65	A
	Drain Current – Continuous ( $T_c=100^\circ C$ )	41	A
I <sub>DM</sub>	Drain Current – Pulsed <sup>1</sup>	260	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	45	mJ
I <sub>AS</sub>	Single Pulse Avalanche Current <sup>2</sup>	30	A
P <sub>D</sub>	Power Dissipation ( $T_c=25^\circ C$ )	54	W
	Power Dissipation – Derate above $25^\circ C$	0.43	W/ $^\circ C$
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	$^\circ C$
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	$^\circ C$

### Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction to ambient	---	62	$^\circ C/W$
R <sub>θJC</sub>	Thermal Resistance Junction to Case	---	2.3	$^\circ C/W$

**Electrical Characteristics (T<sub>J</sub>=25 °C, unless otherwise noted)**
**Static State 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	30	---	---	V
△BV <sub>DSS</sub> /△T <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C , I <sub>D</sub> =1mA	---	0.04	---	V/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =30V , V <sub>GS</sub> =0V , T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =24V , V <sub>GS</sub> =0V , T <sub>J</sub> =125°C	---	---	10	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V , V <sub>DS</sub> =0V	---	---	±100	nA
R <sub>Ds(ON)</sub>	Static Drain-Source On-Resistance <sup>3</sup>	V <sub>GS</sub> =10V , I <sub>D</sub> =16A	---	6.2	7.2	mΩ
		V <sub>GS</sub> =4.5V , I <sub>D</sub> =8A	---	8.9	11.5	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.2	1.6	2.5	V
△V <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	-4	---	mV/°C
g <sub>fS</sub>	Forward Transconductance	V <sub>DS</sub> =10V , I <sub>D</sub> =8A	---	9.5	---	S

**Dynamic Characteristics**

Q <sub>g</sub>	Total Gate Charge <sup>3, 4</sup>	V <sub>DS</sub> =15V , V <sub>GS</sub> =4.5V , I <sub>D</sub> =20A	---	7.5	12	nC
Q <sub>gs</sub>	Gate-Source Charge <sup>3, 4</sup>		---	4.5	8	
Q <sub>gd</sub>	Gate-Drain Charge <sup>3, 4</sup>		---	1.3	2.6	
T <sub>d(on)</sub>	Turn-On Delay Time <sup>3, 4</sup>	V <sub>DD</sub> =15V , V <sub>GS</sub> =10V , R <sub>G</sub> =3.3Ω I <sub>D</sub> =15A	---	4.8	9	ns
T <sub>r</sub>	Rise Time <sup>3, 4</sup>		---	12.5	24	
T <sub>d(off)</sub>	Turn-Off Delay Time <sup>3, 4</sup>		---	27.6	52	
T <sub>f</sub>	Fall Time <sup>3, 4</sup>		---	8.2	16	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =25V , V <sub>GS</sub> =0V , F=1MHz	---	680	1000	pF
C <sub>oss</sub>	Output Capacitance		---	150	220	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	70	105	
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	---	2.7	5.4	Ω

**Guaranteed Avalanche Energy**

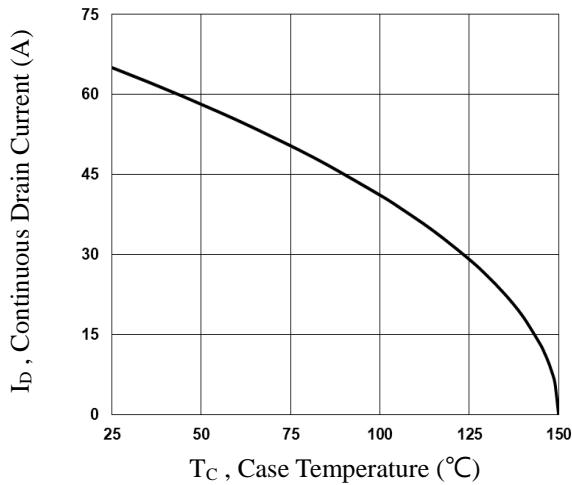
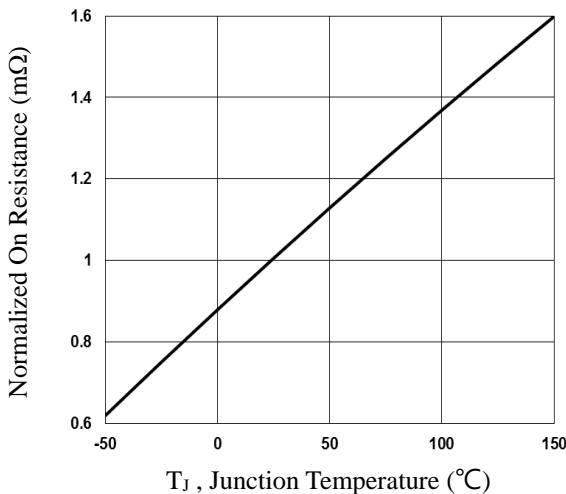
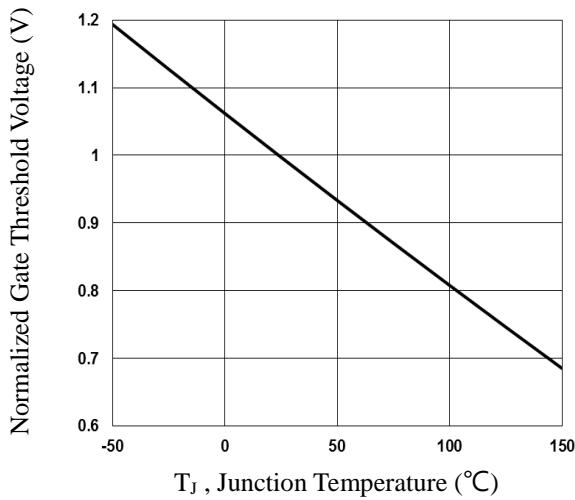
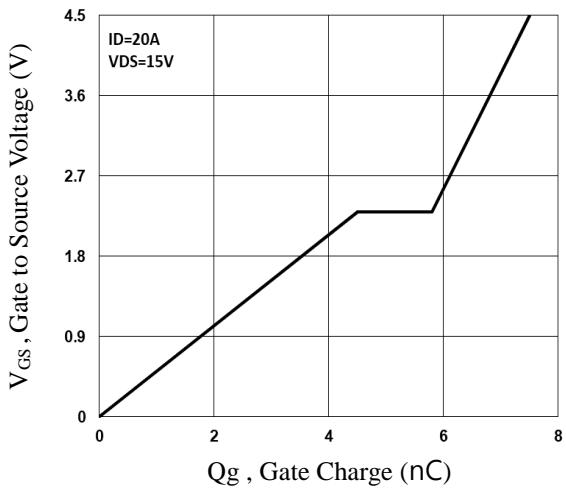
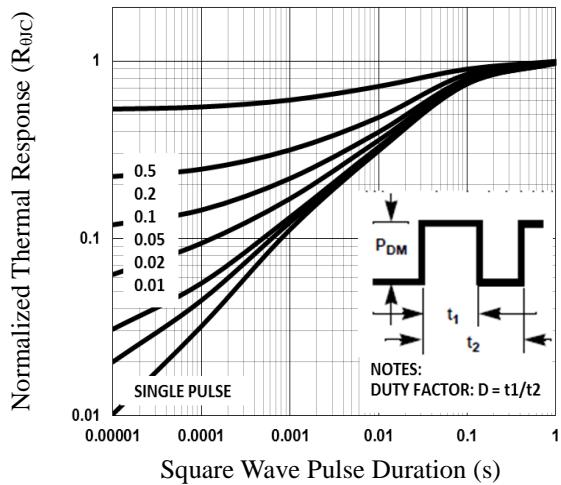
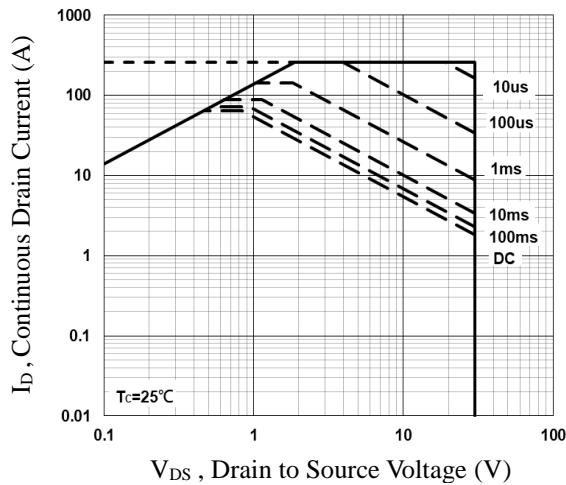
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy	V <sub>DD</sub> =25V, L=0.1mH, I <sub>AS</sub> =15A	12	---	---	mJ

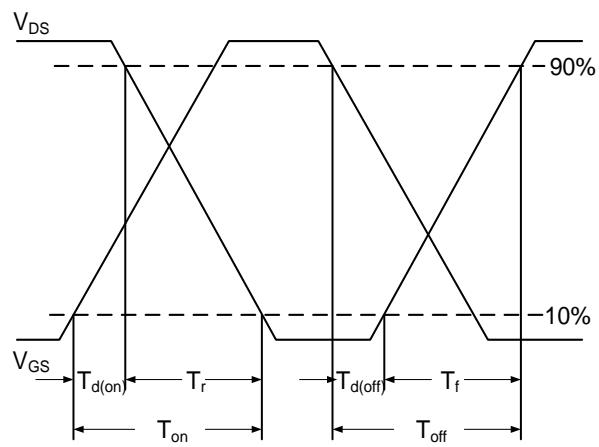
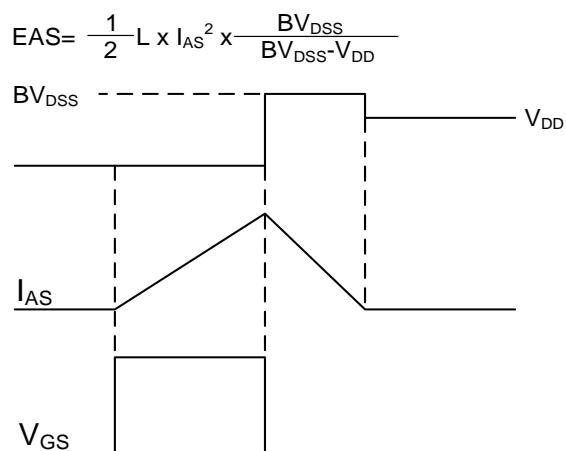
**Drain-Source Diode Characteristics**

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	---	---	65	A
I <sub>SM</sub>	Pulsed Source Current <sup>3</sup>		---	---	130	A
V <sub>SD</sub>	Diode Forward Voltage <sup>3</sup>	V <sub>GS</sub> =0V , I <sub>s</sub> =1A , T <sub>J</sub> =25°C V <sub>GS</sub> =0V,I <sub>s</sub> =10A , di/dt=100A/μs	---	---	1	V
t <sub>rr</sub>	Reverse Recovery Time		---	8.1	---	ns
Q <sub>rr</sub>	Reverse Recovery Charge	T <sub>J</sub> =25°C	---	1.6	---	nC

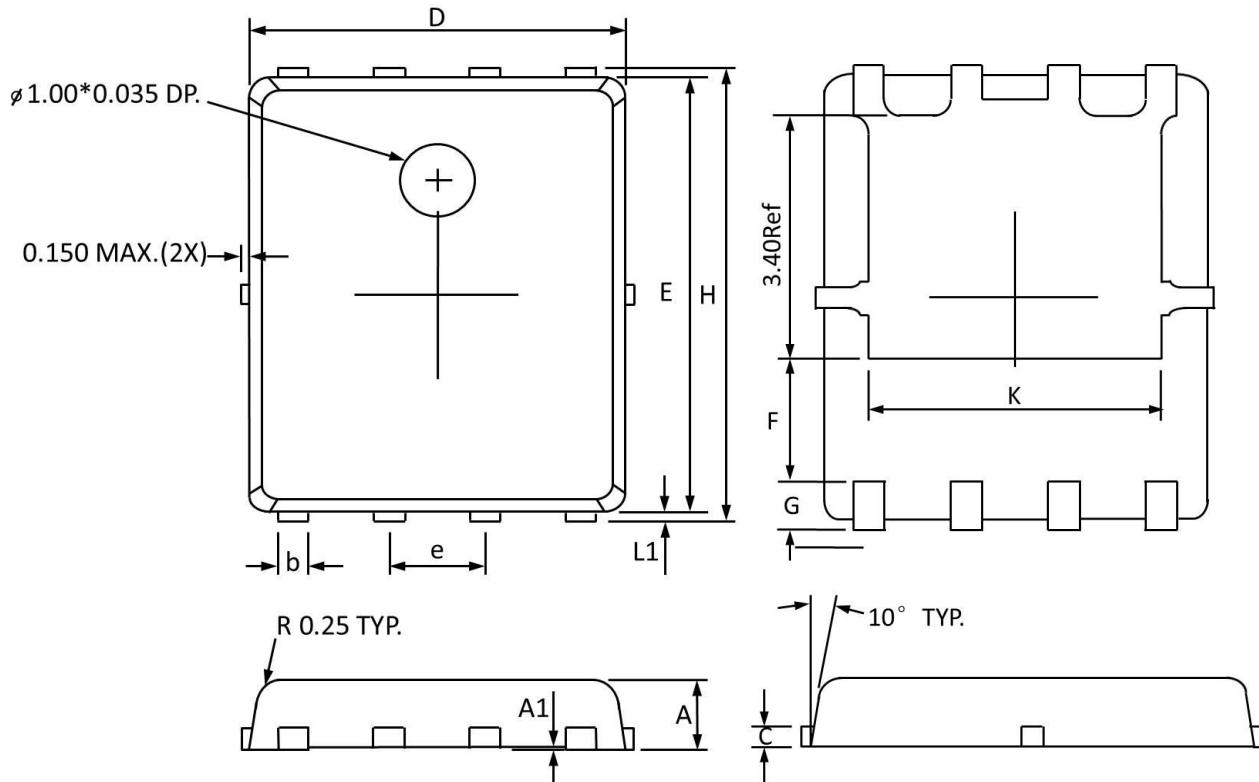
Note :

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>=30A.,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 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**


**Fig.7 Switching Time Waveform**

**Fig.8 EAS Waveform**

## PPAK5x6 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.000	0.032	0.039
A1	0.000	0.005	0.000	0.000
b	0.350	0.490	0.014	0.019
C	0.254 Ref		0.254 Ref	
D	4.900	5.100	0.193	0.200
E	5.700	5.900	0.225	0.232
e	1.27 BSC		1.27 BSC	
F	1.400 Ref		1.400 Ref	
G	0.600 Ref		0.600 Ref	
H	5.950	6.200	0.235	0.244
L1	0.100	0.180	0.004	0.007
K	4.000 Ref		4.000 Ref	