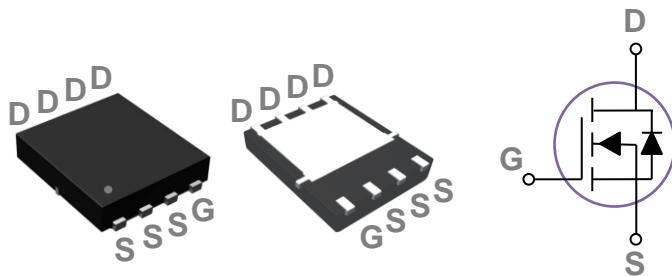


### General Description

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
65V	4.2mΩ	90A

### Features

- 65V,90A,  $RDS(ON) = 4.2m\Omega @ VGS = 10V$
- Improved dv/dt capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

### Applications

- Networking
- Load Switch
- LED applications
- Quick Charger

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	65	V
$V_{GS}$	Gate-Source Voltage	+20/-12	V
$I_D$	Drain Current – Continuous ( $T_c=25^\circ C$ )	90	A
	Drain Current – Continuous ( $T_c=100^\circ C$ )	57	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	360	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	174	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	59	A
$P_D$	Power Dissipation ( $T_c=25^\circ C$ )	125	W
	Power Dissipation – Derate above 25°C	1	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	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	1	°C/W

**Electrical Characteristics ( $T_J=25\text{ }^{\circ}\text{C}$ , unless otherwise noted)**
**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0\text{V}$ , $I_D=250\mu\text{A}$	65	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25\text{ }^{\circ}\text{C}$ , $I_D=1\text{mA}$	---	0.02	---	$\text{V}/\text{ }^{\circ}\text{C}$
$I_{DS}$	Drain-Source Leakage Current	$V_{DS}=60\text{V}$ , $V_{GS}=0\text{V}$ , $T_J=25\text{ }^{\circ}\text{C}$	---	---	1	$\mu\text{A}$
		$V_{DS}=48\text{V}$ , $V_{GS}=0\text{V}$ , $T_J=85\text{ }^{\circ}\text{C}$	---	---	10	$\mu\text{A}$
$I_{GS}$	Gate-Source Leakage Current	$V_{GS}=20\text{V}$ , $V_{DS}=0\text{V}$	---	---	100	nA

**On Characteristics**

$R_{DS(\text{ON})}$	Static Drain-Source On-Resistance	$V_{GS}=10\text{V}$ , $I_D=15\text{A}$	---	3.4	4.2	$\text{m}\Omega$
		$V_{GS}=4.5\text{V}$ , $I_D=8\text{A}$	---	5.4	7.2	$\text{m}\Omega$
$V_{GS(\text{th})}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$ , $I_D=250\mu\text{A}$	1	1.5	2.5	V
			---	-5.1	---	$\text{mV}/\text{ }^{\circ}\text{C}$
$g_{fs}$	Forward Transconductance	$V_{DS}=10\text{V}$ , $I_D=3\text{A}$	---	12	---	S

**Dynamic and switching Characteristics**

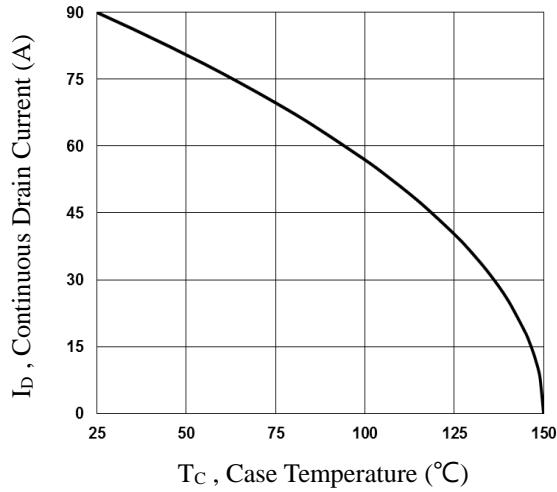
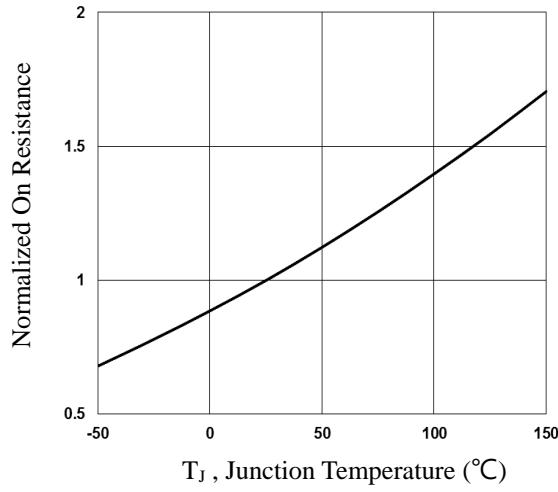
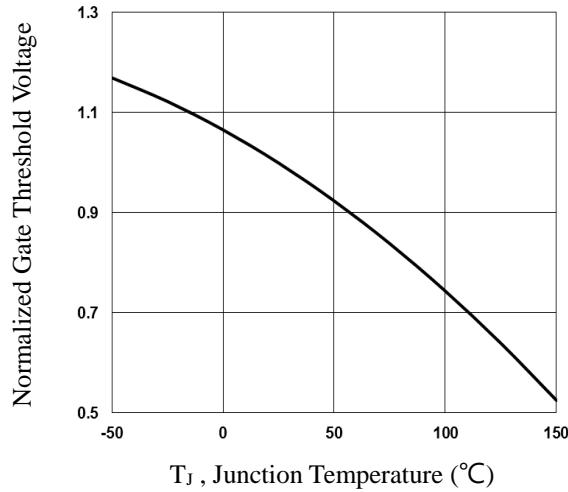
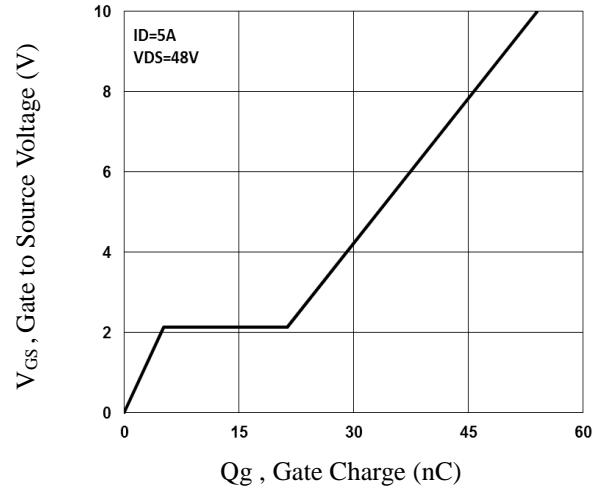
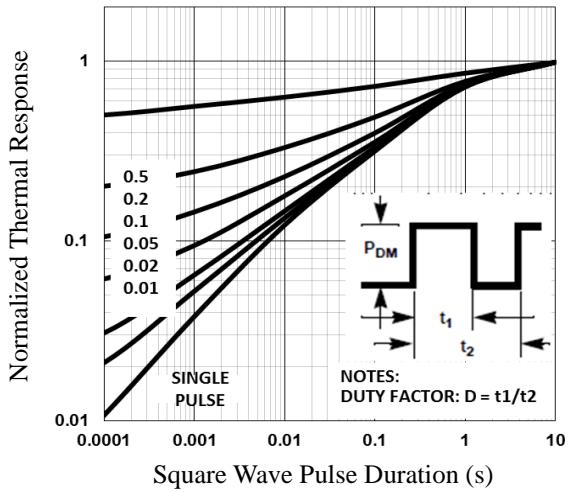
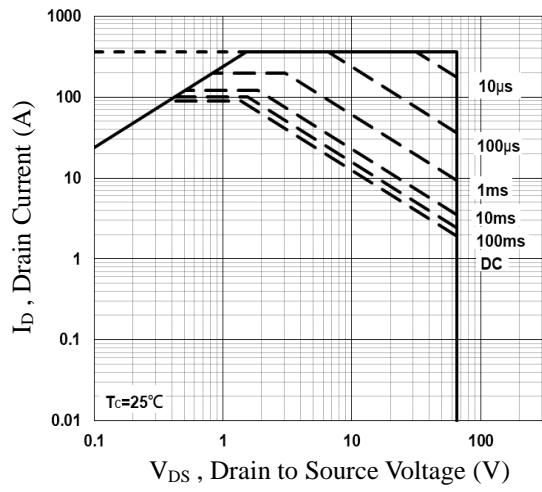
$Q_g$	Total Gate Charge <sup>3, 4</sup>	$V_{DS}=48\text{V}$ , $V_{GS}=10\text{V}$ , $I_D=5\text{A}$	---	54	108	nC
$Q_{gs}$	Gate-Source Charge <sup>3, 4</sup>		---	5.2	10.4	
$Q_{gd}$	Gate-Drain Charge <sup>3, 4</sup>		---	16.1	32.2	
$T_{d(on)}$	Turn-On Delay Time <sup>3, 4</sup>	$V_{DD}=30\text{V}$ , $V_{GS}=10\text{V}$ , $R_G=6\Omega$ $I_D=1\text{A}$	---	10.6	21	ns
$T_r$	Rise Time <sup>3, 4</sup>		---	16.5	33	
$T_{d(off)}$	Turn-Off Delay Time <sup>3, 4</sup>		---	48	96	
$T_f$	Fall Time <sup>3, 4</sup>		---	78	150	
$C_{iss}$	Input Capacitance	$V_{DS}=25\text{V}$ , $V_{GS}=0\text{V}$ , $F=1\text{MHz}$	---	2976	5800	pF
$C_{oss}$	Output Capacitance		---	950	1900	
$C_{rss}$	Reverse Transfer Capacitance		---	24	48	
$R_g$	Gate resistance	$V_{GS}=0\text{V}$ , $V_{DS}=0\text{V}$ , $F=1\text{MHz}$	---	1.24	---	$\Omega$

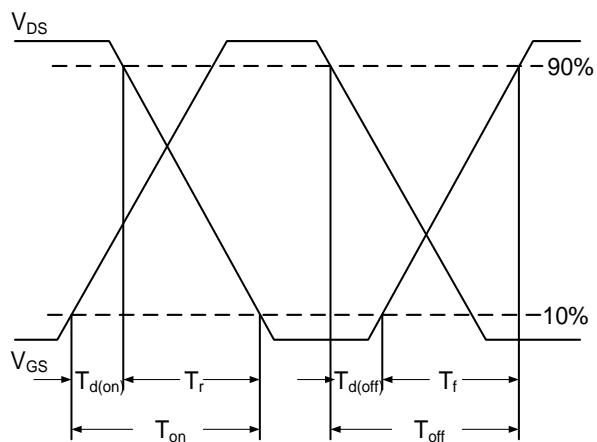
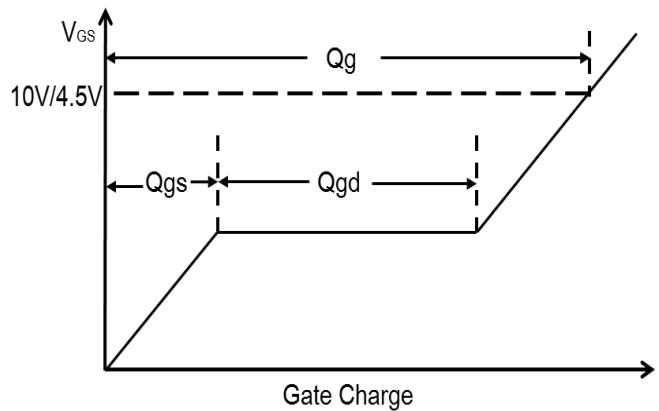
**Drain-Source Diode Characteristics and Maximum Ratings**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_s$	Continuous Source Current	$V_G=V_D=0\text{V}$ , Force Current	---	---	90	A
$I_{SM}$	Pulsed Source Current		---	---	180	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0\text{V}$ , $I_s=1\text{A}$ , $T_J=25\text{ }^{\circ}\text{C}$	---	---	1	V

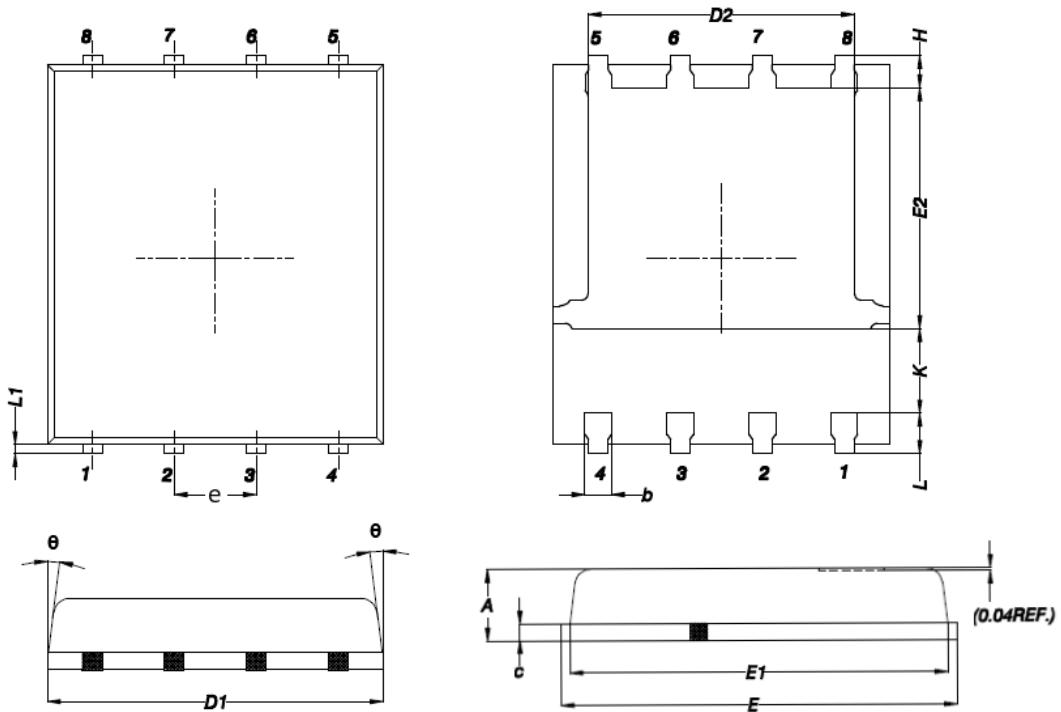
Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25\text{V}$ ,  $V_{GS}=10\text{V}$ ,  $L=0.1\text{mH}$ ,  $I_{AS}=59\text{A}$ ,  $R_G=25\Omega$ , Starting  $T_J=25\text{ }^{\circ}\text{C}$ .
3. The data tested by pulsed , pulse width  $\leq 300\mu\text{s}$  , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.

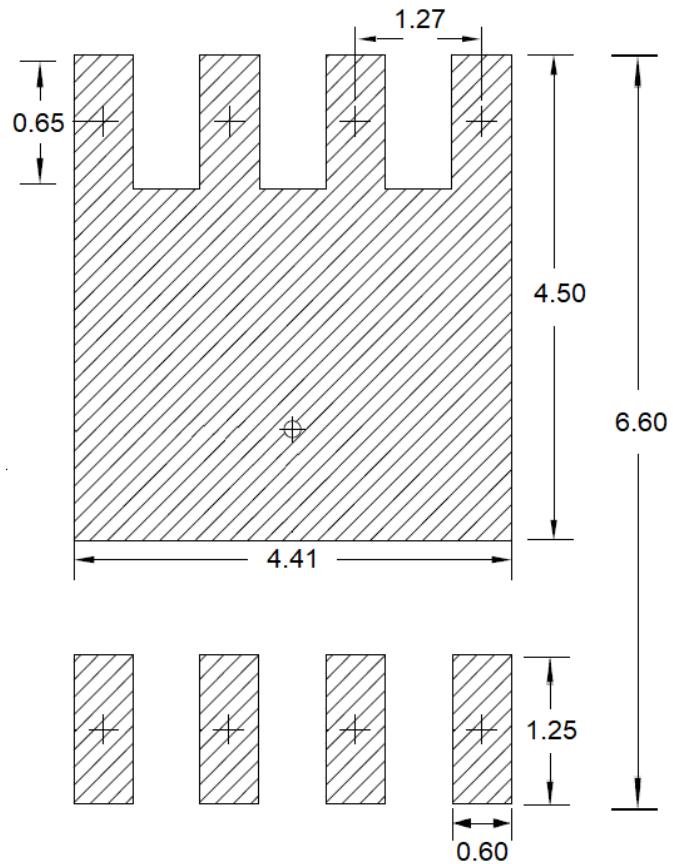

**Fig.1 Continuous Drain Current vs. Tc**

**Fig.2 Normalized RDSON vs. Tj**

**Fig.3 Normalized Vth vs. Tj**

**Fig.4 Gate Charge Characteristics**

**Fig.5 Normalized Transient Impedance**

**Fig.6 Maximum Safe Operation Area**


**Fig.7 Switching Time Waveform**

**Fig.8 Gate Charge 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°

**PPAK5X6 RECOMMENDED LAND PATTERN**

unit : mm