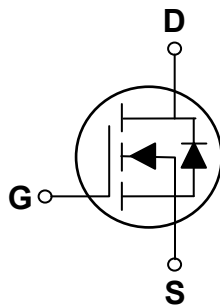


### General Description

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
100V	18mΩ	45A

### Features

- 100V,45A,  $R_{DS(ON)} = 18m\Omega @ V_{GS} = 10V$
- Improved  $dv/dt$  capability
- Fast switching
- 100% EAS Guaranteed
- Green Device Available

### Applications

- Networking
- Load Switch
- LED applications



### 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	$\pm 20$	V
$I_D$	Drain Current – Continuous ( $T_c=25^\circ\text{C}$ )	45	A
	Drain Current – Continuous ( $T_c=100^\circ\text{C}$ )	28	A
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	180	A
EAS	Single Pulse Avalanche Energy <sup>2</sup>	45	mJ
IAS	Single Pulse Avalanche Current <sup>2</sup>	30	A
$P_D$	Power Dissipation ( $T_c=25^\circ\text{C}$ )	135	W
	Power Dissipation – Derate above $25^\circ\text{C}$	1.08	W/ $^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-50 to 150	$^\circ\text{C}$
$T_J$	Operating Junction Temperature Range	-50 to 150	$^\circ\text{C}$

### 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	---	0.92	$^\circ\text{C}/\text{W}$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	100	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$	---	0.05	---	$V/^\circ\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=100V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=80V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA

**On Characteristics**

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=16A$	---	15	18	m $\Omega$
		$V_{GS}=6V, I_D=8A$	---	17	22	m $\Omega$
		$V_{GS}=4.5V, I_D=8A$	---	25	38	m $\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1	2	3	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-5	---	$\text{mV}/^\circ\text{C}$
gfs	Forward Transconductance	$V_{DS}=10V, I_D=3A$	---	10	---	S

**Dynamic and switching Characteristics**

$Q_g$	Total Gate Charge <sup>3,4</sup>	$V_{DS}=50V, V_{GS}=10V, I_D=5A$	---	36.8	68	nC
$Q_{gs}$	Gate-Source Charge <sup>3,4</sup>		---	9.3	18	
$Q_{gd}$	Gate-Drain Charge <sup>3,4</sup>		---	9.8	19	
$T_{d(on)}$	Turn-On Delay Time <sup>3,4</sup>	$V_{DD}=50V, V_{GS}=10V, R_G=6\Omega$ $I_D=1A$	---	20	40	ns
$T_r$	Rise Time <sup>3,4</sup>		---	15	30	
$T_{d(off)}$	Turn-Off Delay Time <sup>3,4</sup>		---	45	80	
$T_f$	Fall Time <sup>3,4</sup>		---	21	40	
$C_{iss}$	Input Capacitance	$V_{DS}=50V, V_{GS}=0V, F=1\text{MHz}$	---	1820	3300	pF
$C_{oss}$	Output Capacitance		---	170	340	
$C_{rss}$	Reverse Transfer Capacitance		---	90	180	
$R_g$	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	1.35	2.6	$\Omega$

**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	---	---	45	A
$I_{SM}$	Pulsed Source Current		---	---	90	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V
$t_{rr}$	Reverse Recovery Time <sup>3</sup>	$I_S=1A, dI/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	---	---	ns
$Q_{rr}$	Reverse Recovery Charge <sup>3</sup>		---	---	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=50V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=30A, R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$ .
3. The data tested by pulsed , pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.

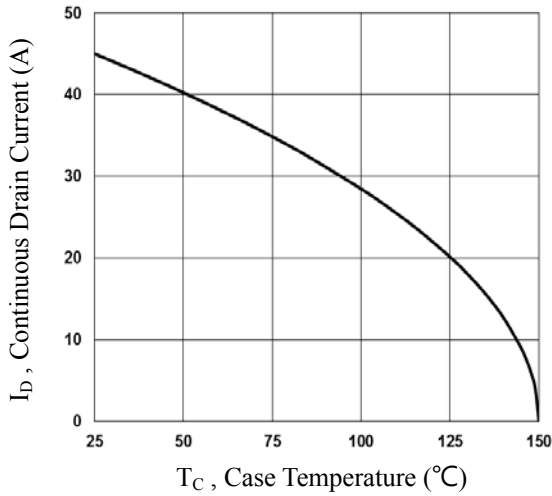


Fig.1 Continuous Drain Current vs.  $T_C$

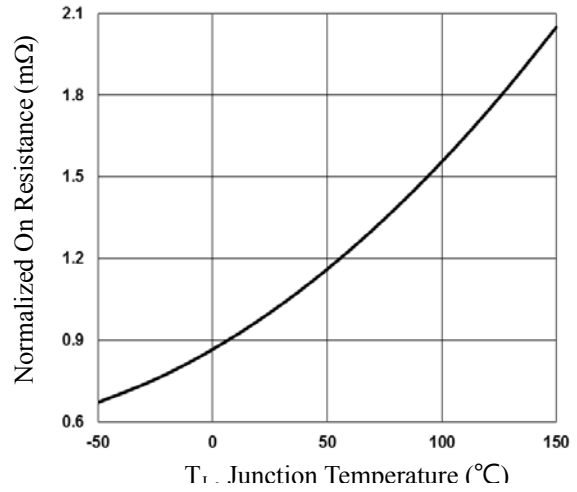


Fig.2 Normalized RDSON vs.  $T_J$

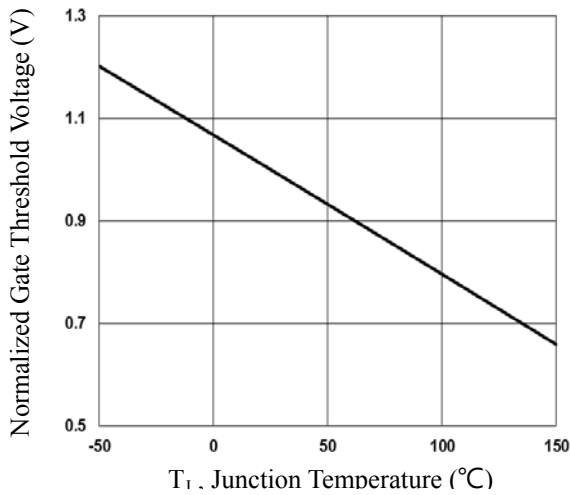


Fig.3 Normalized  $V_{th}$  vs.  $T_J$

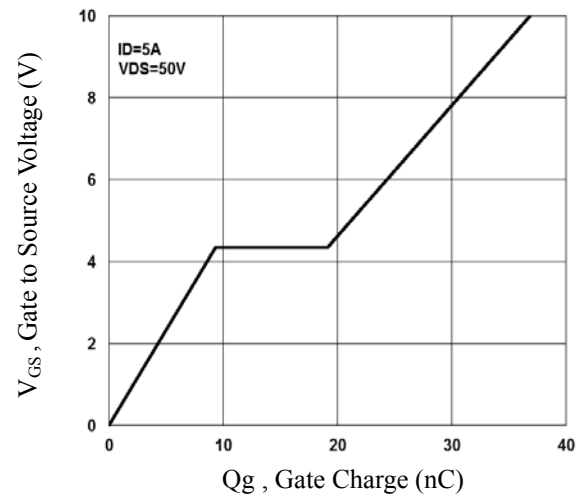


Fig.4 Gate Charge Characteristics

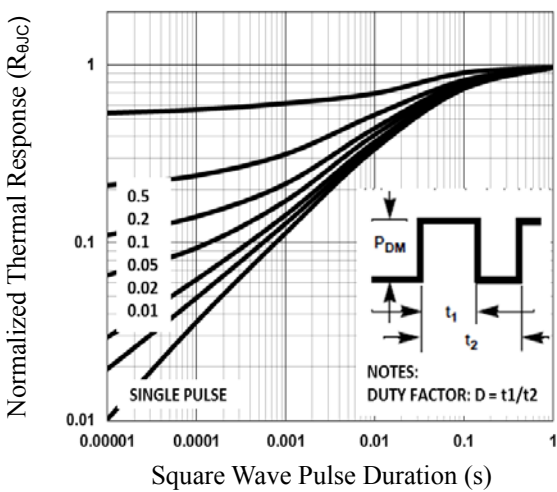


Fig.5 Normalized Transient Impedance

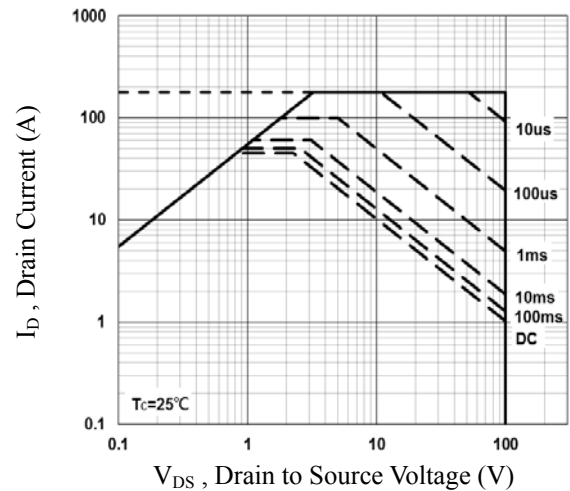


Fig.6 Maximum Safe Operation Area

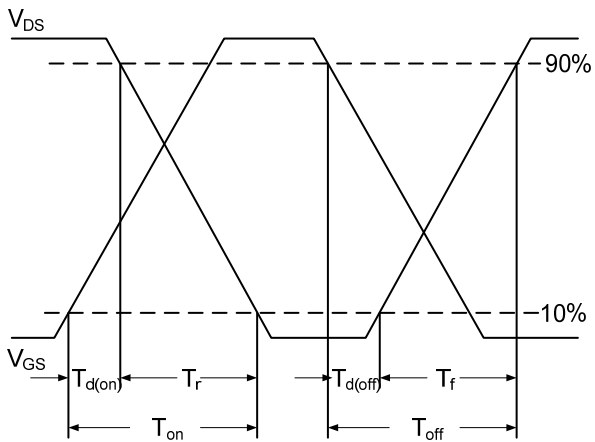


Fig.7 Switching Time Waveform

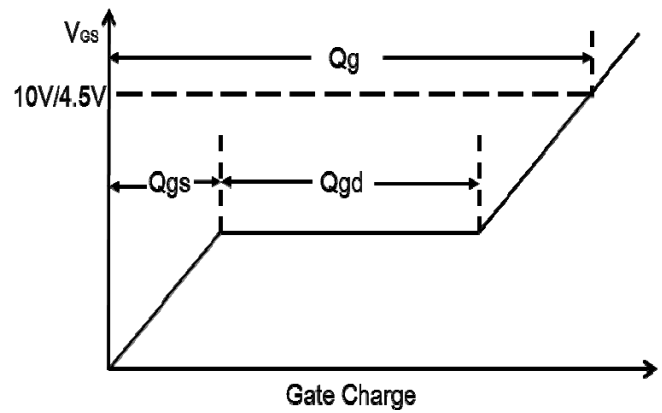
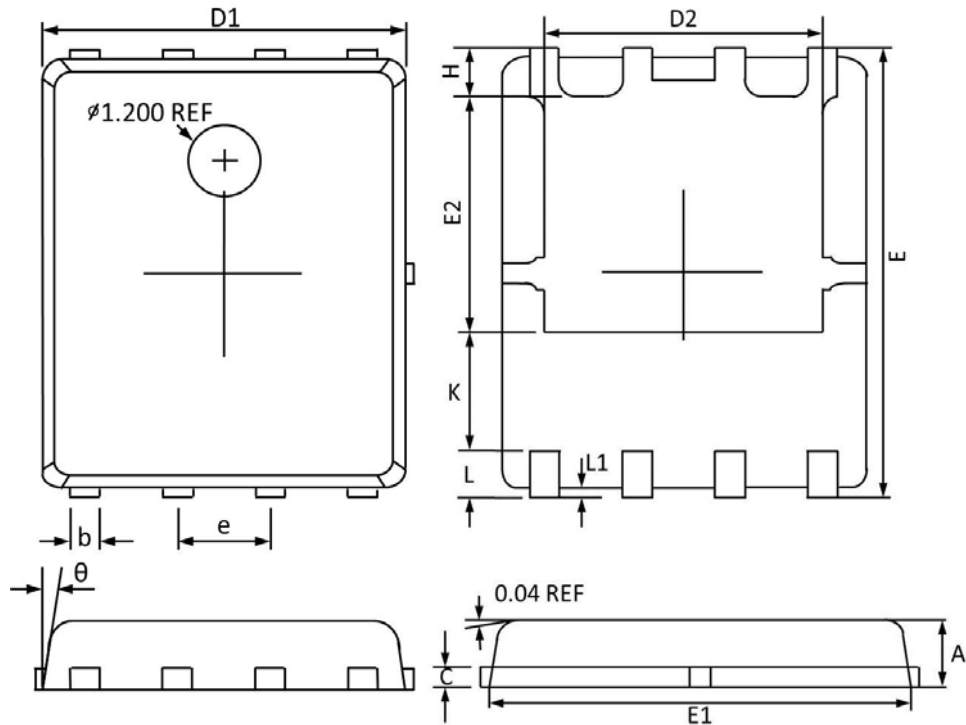


Fig.8 Gate Charge Waveform

## PPAK5x6 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.100	0.800	0.043	0.031
b	0.510	0.330	0.020	0.013
C	0.300	0.200	0.012	0.008
D1	5.100	4.800	0.201	0.189
D2	4.100	3.610	0.161	0.142
E	6.200	5.900	0.244	0.232
E1	5.900	5.700	0.232	0.224
E2	3.780	3.350	0.149	0.132
e	1.27BSC		0.05BSC	
H	0.700	0.410	0.028	0.016
K	1.500	1.100	0.059	0.043
L	0.710	0.510	0.028	0.020
L1	0.200	0.060	0.008	0.002
$\theta$	12°	0°	12°	0°