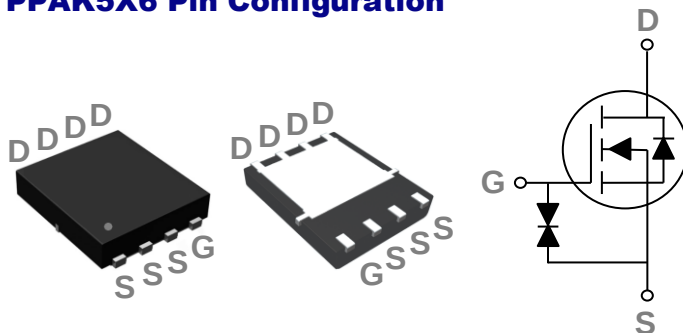


General Description

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	RDS(ON)	ID
30V	5.7mΩ	60A

Features

- 30V, 60A, $R_{DS(ON)} = 5.7\text{m}\Omega @ V_{GS} = 10\text{V}$
- Improved dv/dt capability
- Fast switching
- Green Device Available
- 1.5kV HBM ESD Capability

Applications

- MB / VGA / Vcore
- POL Applications
- SMPS 2nd SR

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_c=25^\circ\text{C}$)	60	A
	Drain Current – Continuous ($T_c=100^\circ\text{C}$)	38	A
I_{DM}	Drain Current – Pulsed ¹	240	A
EAS	Single Pulse Avalanche Energy ²	45	mJ
IAS	Single Pulse Avalanche Current ²	30	A
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	44	W
	Power Dissipation – Derate above 25°C	0.35	W/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	62	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	2.86	$^\circ\text{C/W}$

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	$V_{GS}=0V$, $I_D=250\mu A$	30	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=30V$, $V_{GS}=0V$, $T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=24V$, $V_{GS}=0V$, $T_J=85^\circ\text{C}$	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V$, $V_{DS}=0V$	---	---	± 20	μA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V$, $I_D=20A$	---	4.7	5.7	$m\Omega$
		$V_{GS}=4.5V$, $I_D=15A$	---	7.7	10	$m\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}$, $I_D=250\mu A$	1.2	1.6	2.5	V

Dynamic and switching Characteristics³

Q_g	Total Gate Charge	$V_{DS}=15V$, $V_{GS}=10V$, $I_D=30A$	---	13	25	nC
			---	6.3	12	
			---	1.1	3	
Q_{gs}	Gate-Source Charge	$V_{DS}=15V$, $V_{GS}=4.5V$, $I_D=30A$	---	2.2	5	ns
Q_{gd}	Gate-Drain Charge		---	3	6	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=15V$, $V_{GS}=10V$, $R_G=6\Omega$ $I_D=30A$	---	5	10	
T_r	Rise Time		---	8	16	
$T_{d(off)}$	Turn-Off Delay Time		---	680	1400	pF
T_f	Fall Time	$V_{DS}=15V$, $V_{GS}=0V$, $F=1\text{MHz}$	---	507	1000	
C_{iss}	Input Capacitance		---	27	60	
C_{oss}	Output Capacitance	$V_{GS}=0V$, $V_{DS}=0V$, $F=1\text{MHz}$	---	1.5	---	Ω
C_{rss}	Reverse Transfer Capacitance					
R_g	Gate resistance					

Guaranteed Avalanche Energy

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
EAS	Single Pulse Avalanche Energy	$V_{DD}=25V$, $L=0.1\text{mH}$, $I_{AS}=24A$	29	---	---	mJ

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	---	---	60	A
I_{SM}	Pulsed Source Current		---	---	120	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V$, $I_S=1A$, $T_J=25^\circ\text{C}$	---	---	1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V$, $V_{GS}=10V$, $L=0.1\text{mH}$, $I_{AS}=30A$, $R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$.
3. Essentially independent of operating temperature.

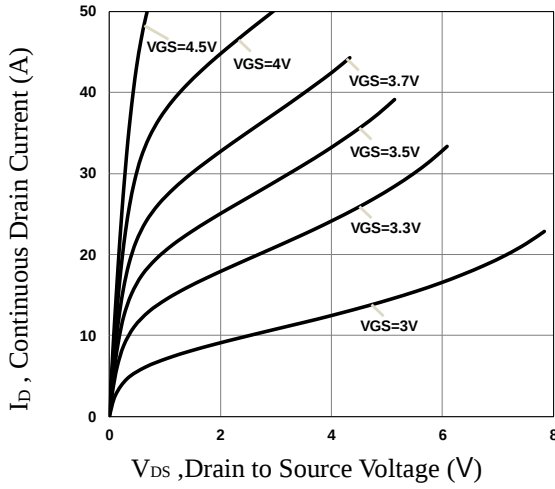


Fig.1 Typical Output Characteristics

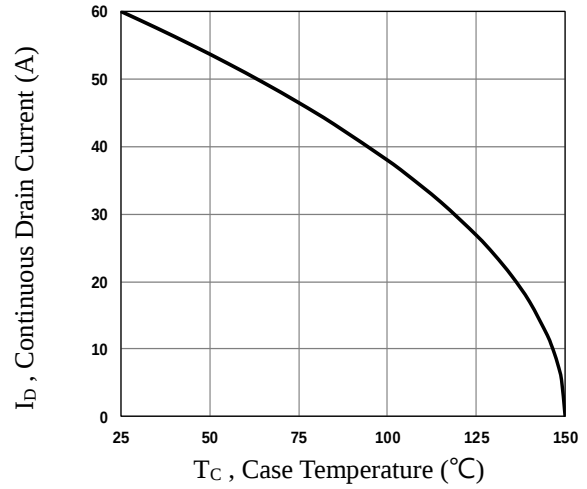


Fig.2 Continuous Drain Current vs. T_C

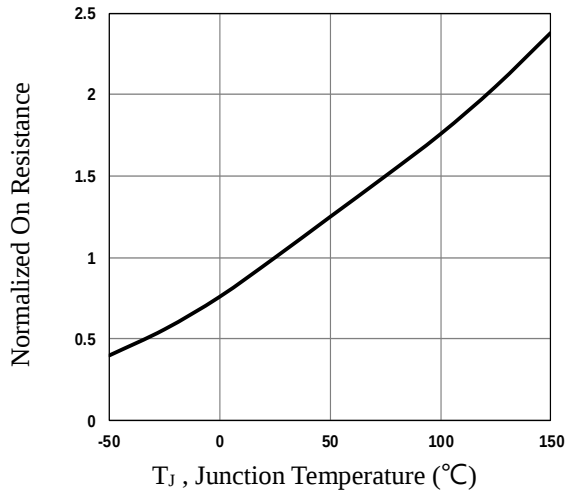


Fig.3 Normalized $R_{DS(on)}$ vs. T_J

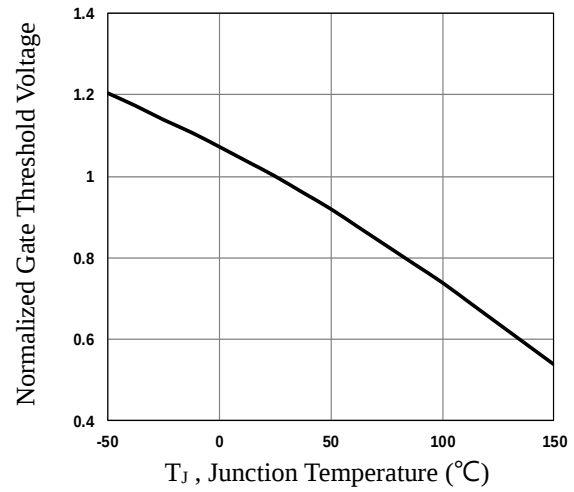


Fig.4 Normalized V_{th} vs. T_J

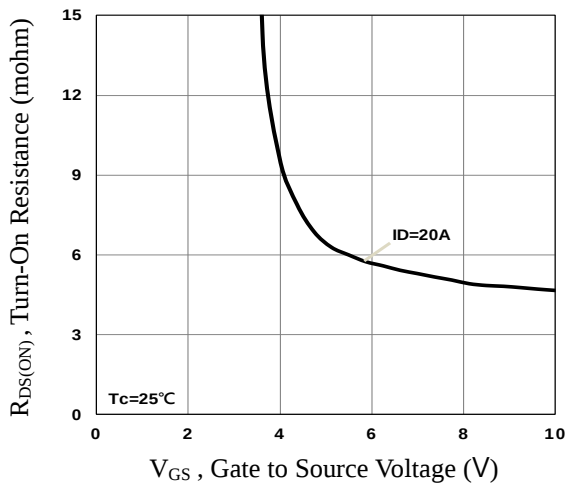


Fig.5 Turn-On Resistance vs. V_{GS}

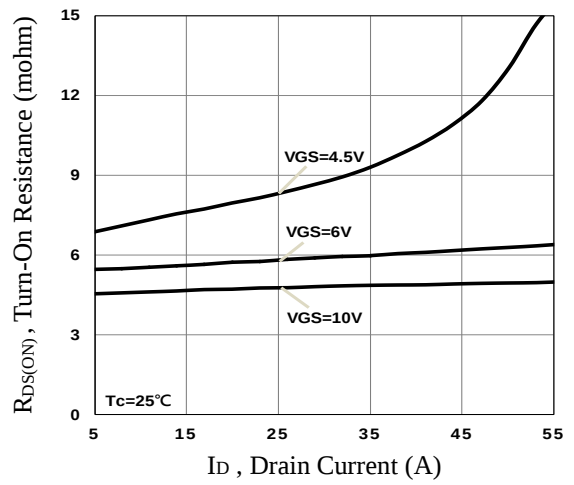


Fig.6 Turn-On Resistance vs. I_D

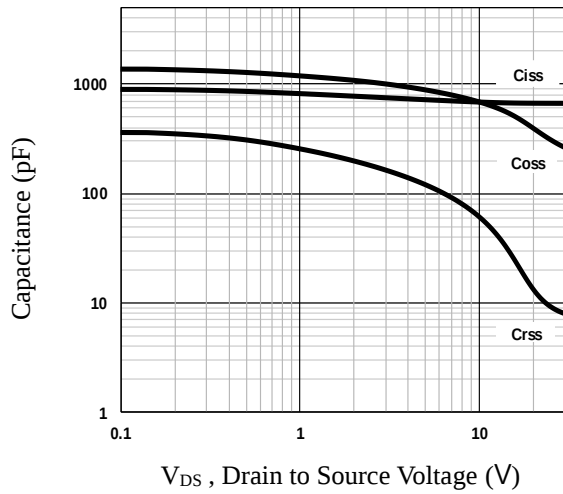


Fig.7 Capacitance Characteristics

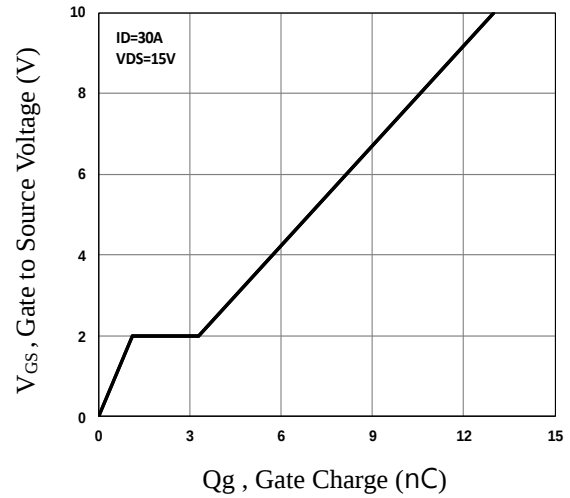


Fig.8 Gate Charge Characteristics

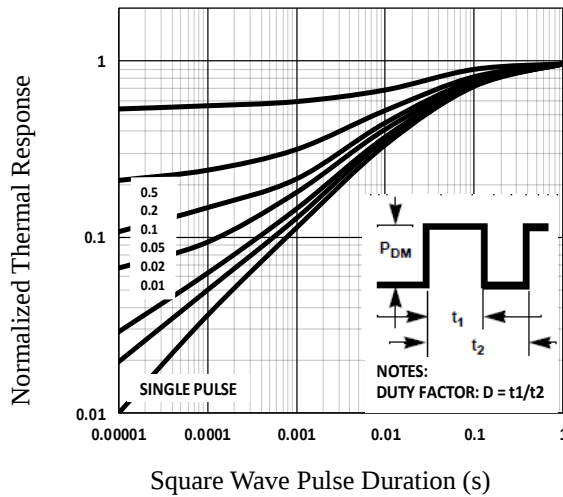


Fig.9 Normalized Transient Impedance

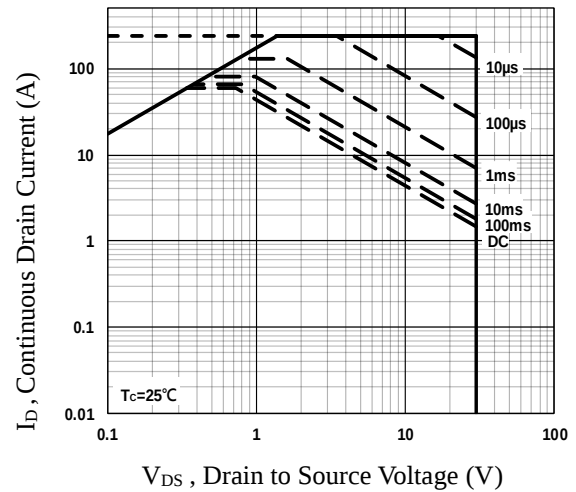


Fig.10 Maximum Safe Operation Area

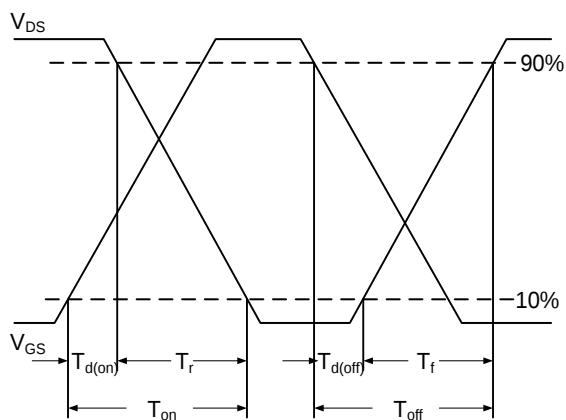


Fig.11 Switching Time Waveform

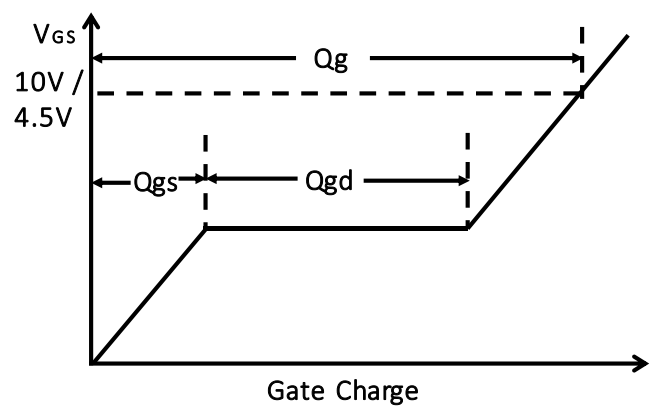
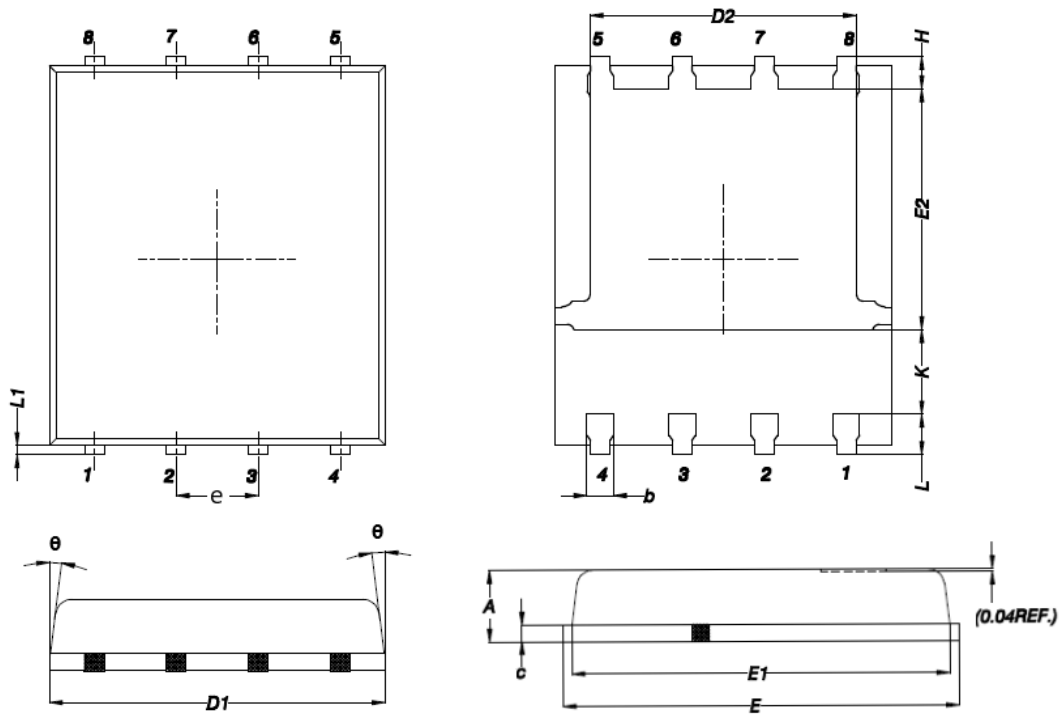


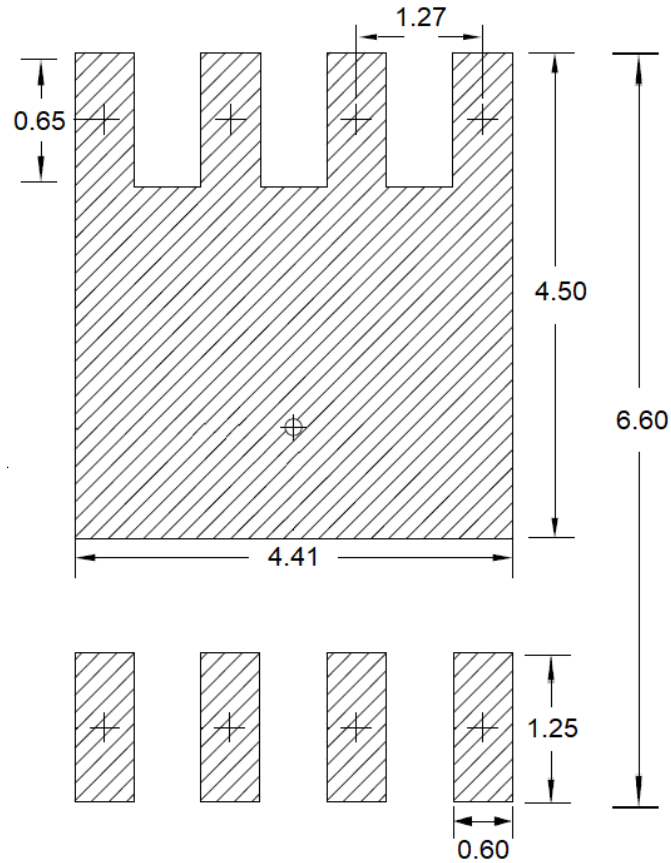
Fig.12 Gate Charge Waveform

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
θ	12°	0°	12°	0°

PPAK5X6 RECOMMENDED LAND PATTERN



unit : mm