DESCRIPTION

These P-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.

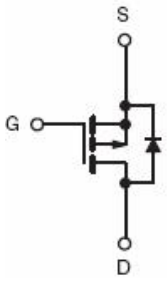
GENERAL FEATURES

- V_{DS}=-18V, I_D=-70A
  $R_{DS(ON)}$(Typ.)=3.8mΩ @ V_{GS}=-2.5V
  $R_{DS(ON)}$(Typ.)=2.7mΩ @ V_{GS}=-4.5V
- Improved dv/dt capability
- Fast switching
- Green Device Available

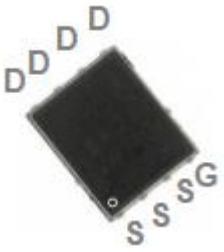
APPLICATION

- Notebook
- Load switch
- Networking
- Hand-Held Instruments

PINOUT



Schematic diagram



PPAK5X6 top view

ABSOLUTE MAXIMUM RATINGS(T_C=25°C unless otherwise noted)

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	-18	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	I_D	-70	A
Drain Current-Continuous(T_C=100°C)	I_D	-54	A
Drain Current-Pulsed(Note1)	I_{DM}	-360	A
Power Dissipation	P_D	41.67	W
Power Dissipation - Derate above 25°C	P_D	0.33	W/°C
Operating Junction and Storage Temperature Range	T_J, T_{STG}	-55 to 150	°C

Note 1. Repetitive Rating: Pulse width limited by maximum junction temperature.

THERMAL CHARACTERISTICS

Parameter	Symbol	Limit	Unit
Thermal Resistance Junction to ambient	$R_{\theta JA}$	62	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	3	°C/W

ELECTRICAL CHARACTERISTICS(T_A=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250μA	-18	-	-	V
B_{VDSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C , ID=-1mA	-	-0.008	-	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-20V, V_{GS}=0V, T_J=25°C	-	-	-1	μA
		V_{DS}=-16V, V_{GS}=0V, T_J=125°C	-	-	-30	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±12V, V_{DS}=0V	-	-	±500	nA
On Characteristics						
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-0.4	-0.6	-1.0	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS}$		-	-3.44	-	mV/°C
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-2.5V, I_D=-20A	-	3.8	5.0	mΩ
		V_{GS}=-4.5V, I_D=-20A	-	2.7	3.5	mΩ
Forward Transconductance	g_{FS}	V_{DS}=-10V, I_D=-3A	-	30	-	S
Dynamic and switching Characteristics(Note2)						
Total Gate Charge	Q_g	V_{DS}=-16V, I_D=-5A, V_{GS}=-4.5V	-	149	225	nC
Gate-Source Charge	Q_{gs}		-	14.4	22	nC
Gate-Drain Charge	Q_{gd}		-	42.8	65	nC
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-15V,V_{GS}=-4.5V, R_G=25Ω,I_D=-1A	-	21.2	42	nS
Turn-on Rise Time	t_r		-	20.6	40	nS
Turn-Off Delay Time	$t_{d(off)}$		-	26	52	nS
Turn-Off Fall Time	t_f		-	400	600	nS
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V, F=1.0MHz	-	12000	16000	pF
Output Capacitance	C_{oss}		-	1670	2500	pF
Reverse Transfer Capacitance	C_{rss}		-	730	1100	pF
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1.0MHz	-	2.6	-	Ω
Drain-Source Diode Characteristics						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	-90	A
Pulsed Source Current	I_{SM}		-	-	-180	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-4.2A	-	-	-1	V

Note 2. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%. Essentially independent of operating temperature.

TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1. Continuous Drain Current vs. T_C

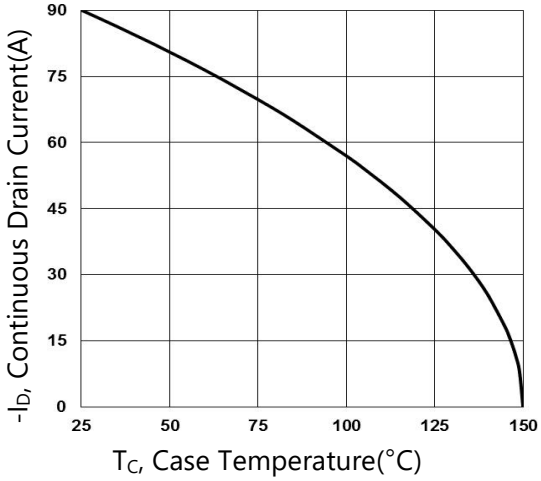


Figure 2. Normalized R_{DSON} vs. T_J

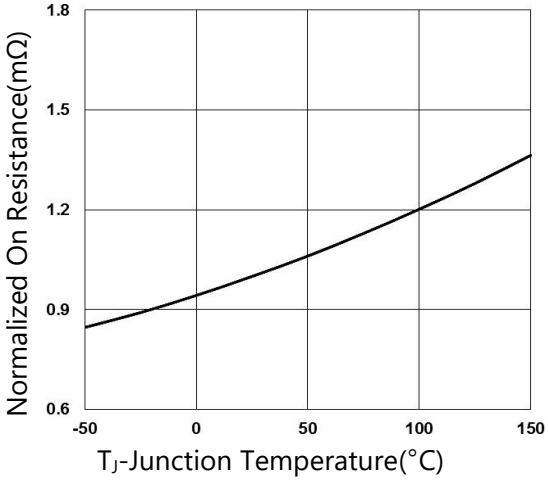


Figure 3. Normalized V_{th} vs. T_J

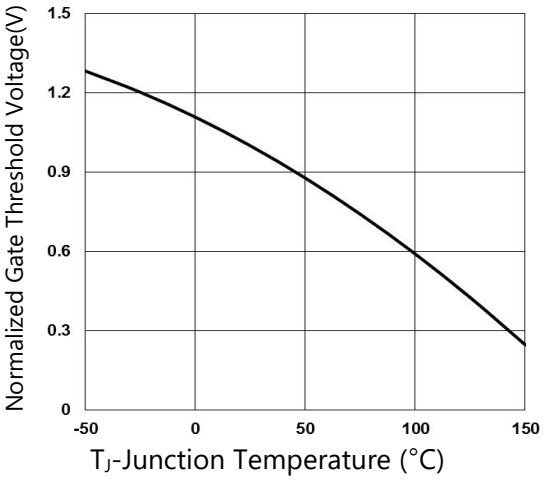


Figure 4. Gate Charge Waveform

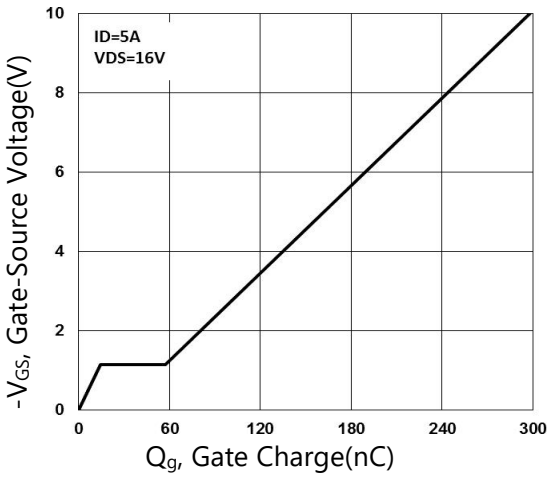


Figure 5. Normalized Transient Response

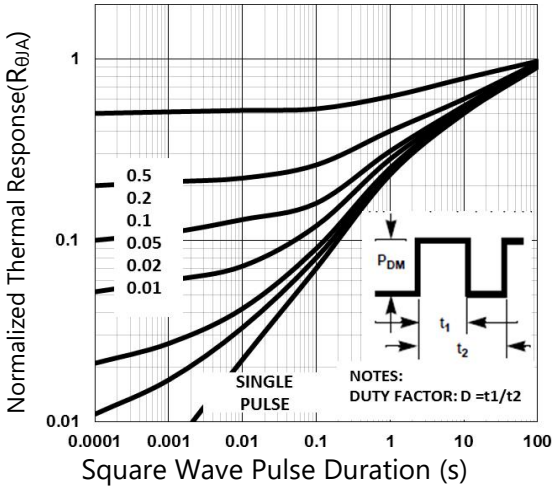
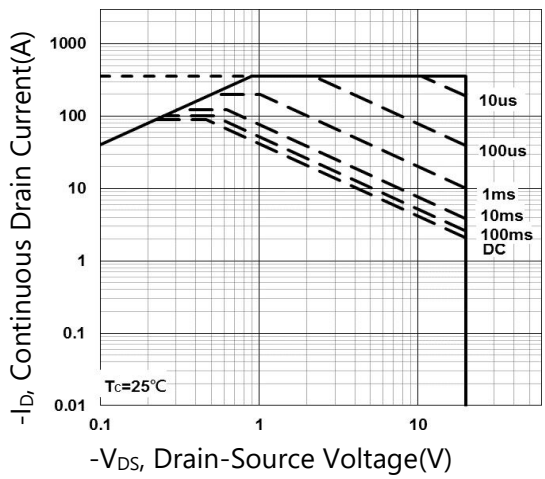


Figure 6. Maximum Safe Operation Area



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 7. Switching Time Waveform

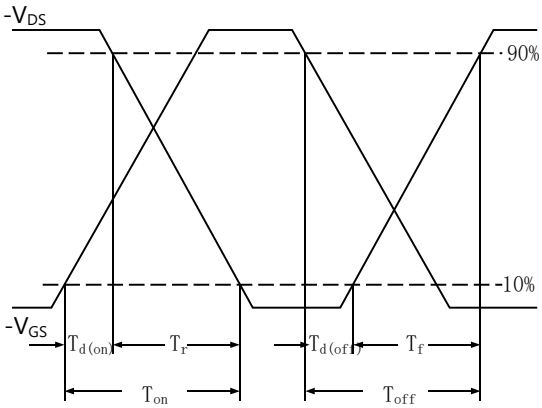
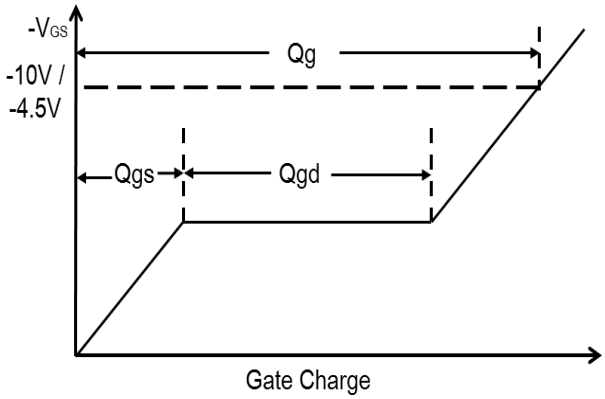
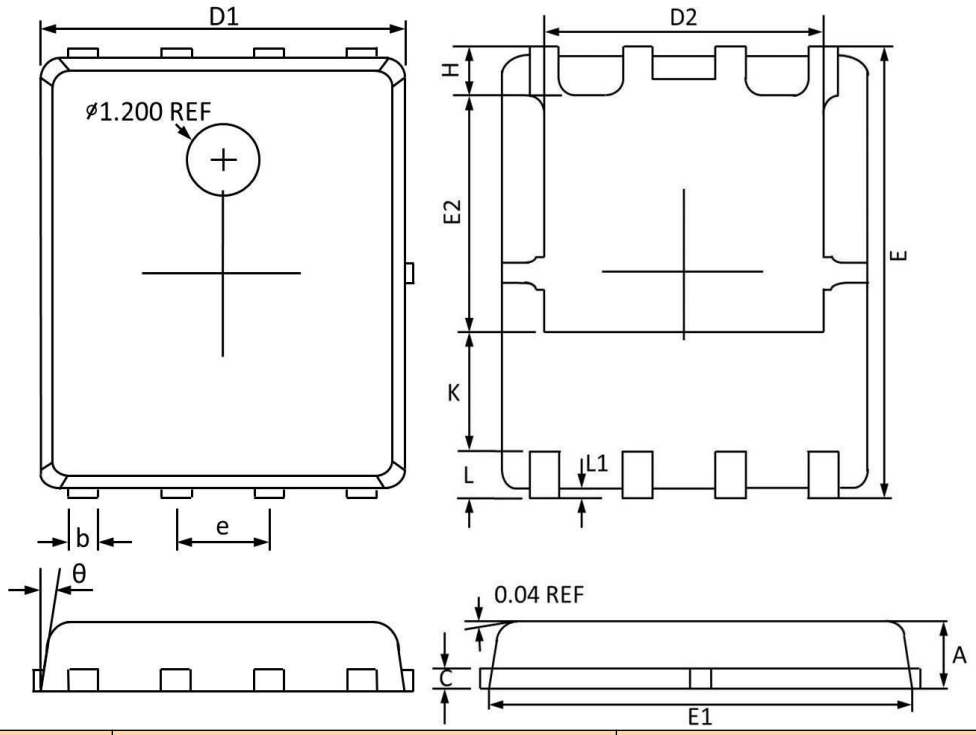


Figure 8. Gate Charge Waveform



PACKAGE INFORMATION

PPAK5X6



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