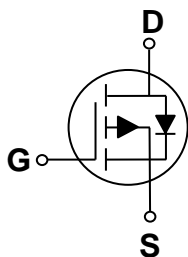


General Description

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.

PPAK3X3 Pin Configuration



BVDSS	RDSON	ID
-20V	8mΩ	-60A

Features

- -20V, -60A, $R_{DS(ON)} = 8m\Omega @ V_{GS} = -4.5V$
- Improved dv/dt capability
- Fast switching
- Green Device Available
- Suit for -1.8V Gate Drive Applications

Applications

- Notebook
- Load Switch
- Networking
- Hand-Held Instruments



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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	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
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	62.5	W
	Power Dissipation – Derate above 25°C	0.5	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	$^\circ\text{C/W}$

Electrical Characteristics (T_J=25 °C, unless otherwise noted)
Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-20	---	---	V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.01	---	V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-20V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-16V, V _{GS} =0V, T _J =125°C	---	---	-10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±12V, V _{DS} =0V	---	---	±100	nA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-4.5V, I _D =-8A	---	6	8	mΩ
		V _{GS} =-2.5V, I _D =-5A	---	8	11	
		V _{GS} =-1.8V, I _D =-3A	---	11	16	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-0.3	-0.6	-1.0	V
g _{fs}	Forward Transconductance	V _{DS} =-10V, I _S =-5A	---	20	---	S

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{2, 3}	V _{DS} =-10V, V _{GS} =-4.5V, I _D =-5A	---	44.4	80	nC
Q _{gs}	Gate-Source Charge ^{2, 3}		---	7.2	14	
Q _{gd}	Gate-Drain Charge ^{2, 3}		---	10.2	20	
T _{d(on)}	Turn-On Delay Time ^{2, 3}	V _{DD} =-10V, V _{GS} =-4.5V, R _G =25Ω I _D =-1A	---	13.2	26	nS
T _r	Rise Time ^{2, 3}		---	68	120	
T _{d(off)}	Turn-Off Delay Time ^{2, 3}		---	160	320	
T _f	Fall Time ^{2, 3}		---	154	300	
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, F=1MHz	---	4060	8000	pF
C _{oss}	Output Capacitance		---	520	1000	
C _{rss}	Reverse Transfer Capacitance		---	400	800	

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°C	---	---	-1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
3. Essentially independent of operating temperature.

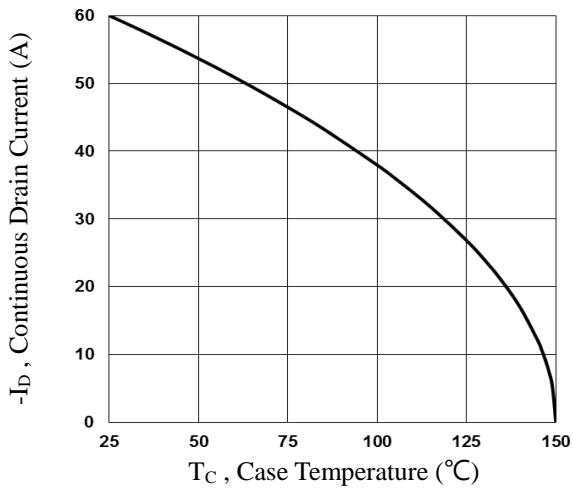


Fig.1 Continuous Drain Current vs. T_c

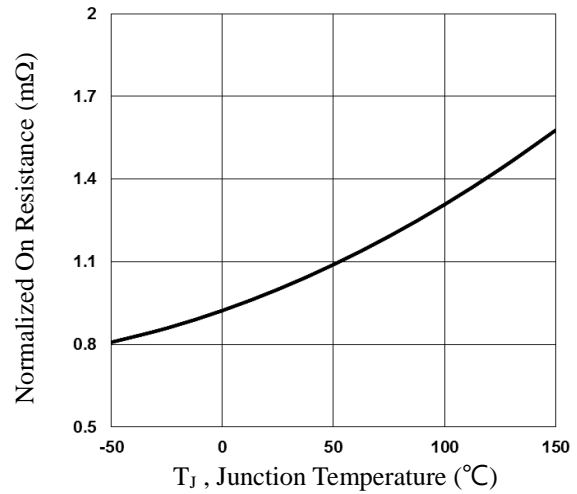


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

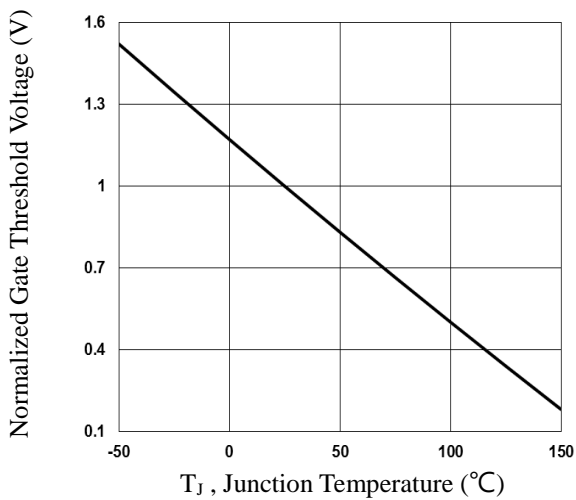


Fig.3 Normalized V_{th} vs. T_j

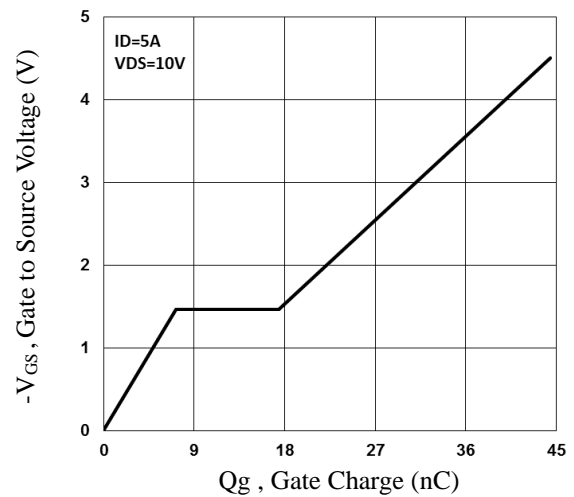


Fig.4 Gate Charge Waveform

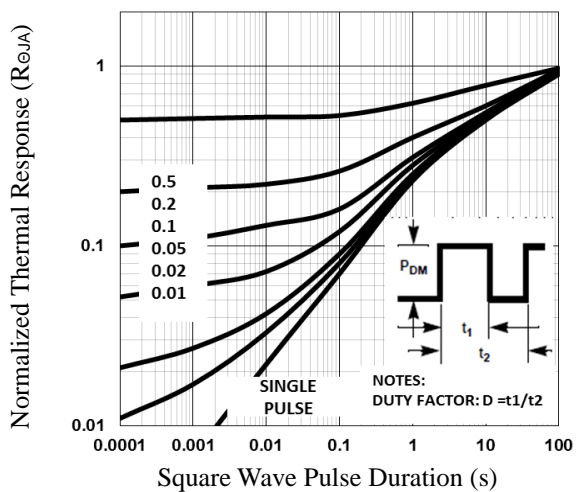


Fig.5 Normalized Transient Response

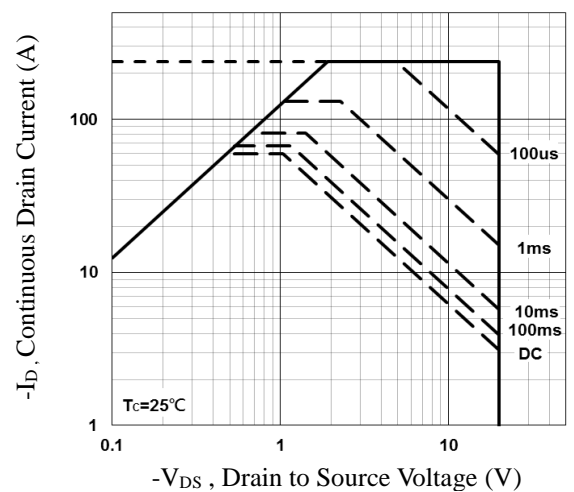
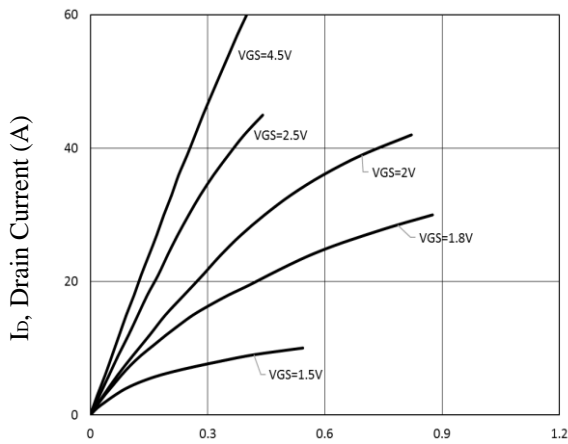
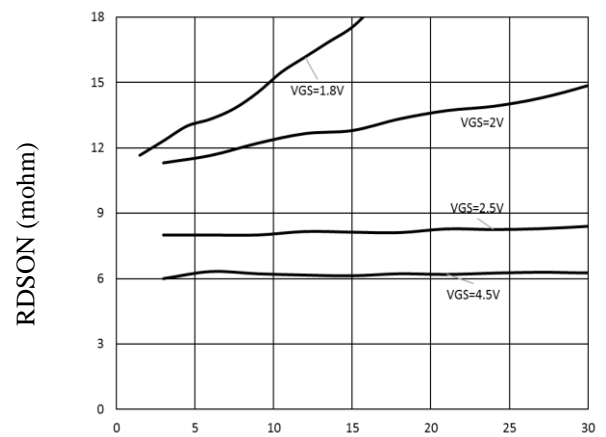


Fig.6 Maximum Safe Operation Area



V_{DS} , Drain to Source Voltage

Fig.7 Typical Output Characteristics



I_D , Drain Current (A)

Fig.8 $R_{DS(on)}$ vs. Drain Current

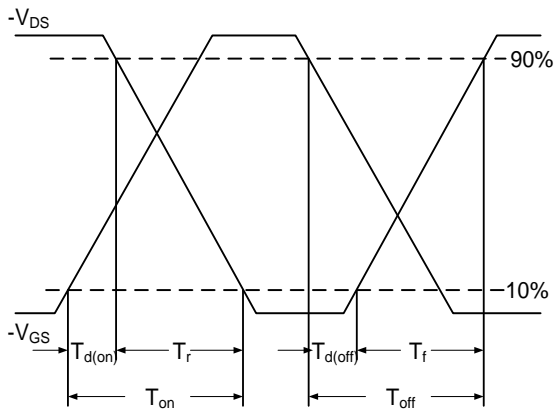


Fig.9 Switching Time Waveform

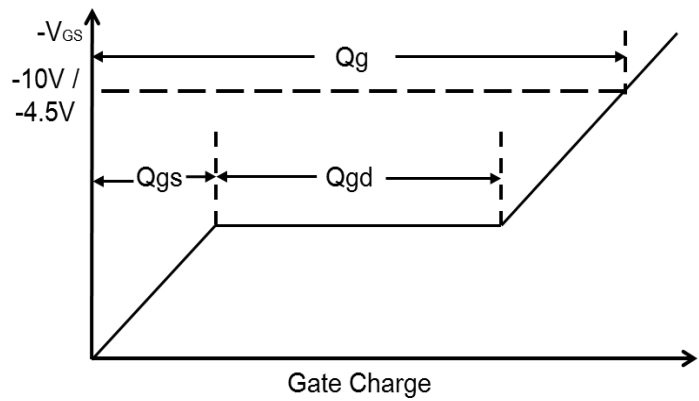
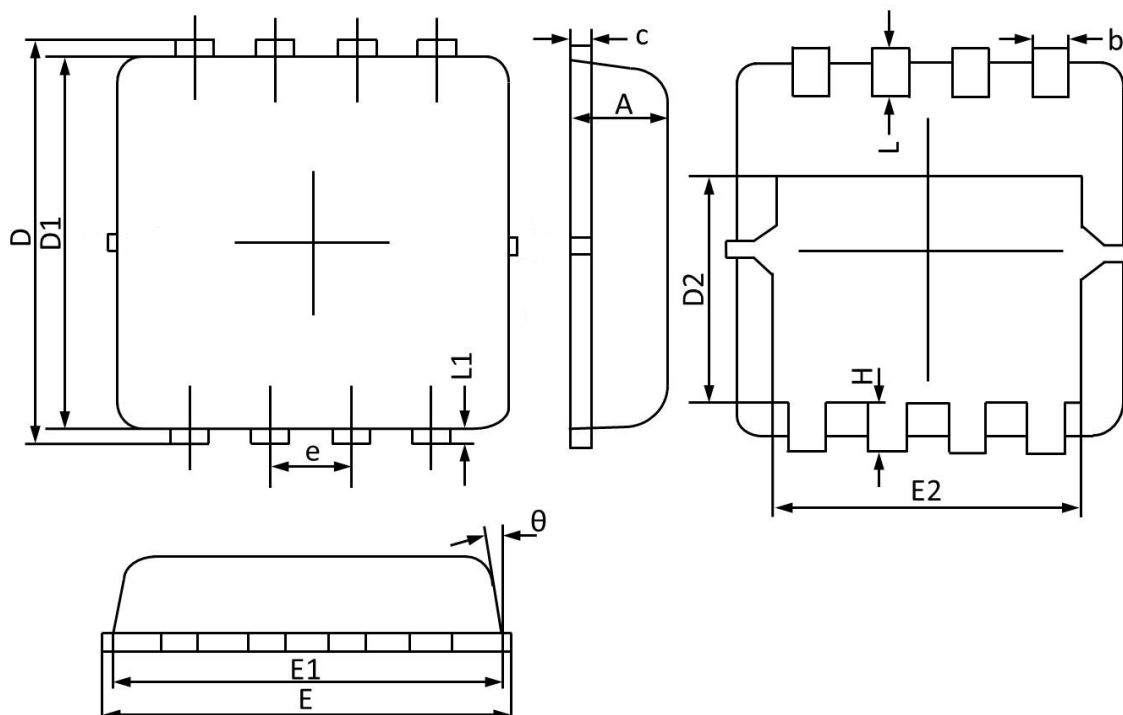


Fig.10 Gate Charge Waveform

PPAK3x3 PACKAGE INFORMATION


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.900	0.700	0.035	0.028
b	0.350	0.240	0.014	0.009
c	0.250	0.100	0.010	0.004
D	3.450	3.050	0.136	0.120
D1	3.200	2.900	0.126	0.114
D2	1.850	1.350	0.073	0.053
E	3.400	3.000	0.134	0.118
E1	3.250	2.900	0.128	0.114
E2	2.600	2.350	0.102	0.093
e	0.65BSC		0.026BSC	
H	0.500	0.300	0.020	0.012
L	0.500	0.300	0.020	0.012
L1	0.200	0.070	0.008	0.003
θ	12°	0°	12°	0°