P5MPB2P3

20V P-Channel MOSFETs

General Description

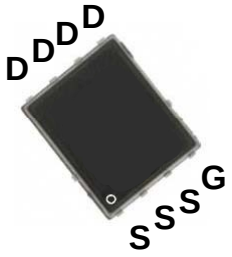
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

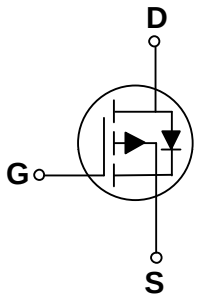
BV_{DSS}	$R_{DS(ON)}$	I_D
-20 V	2.3 mΩ	-90 A

Features

- $R_{DS(ON)} \leqq 2.3m\Omega @ V_{GS}$= -10V
- Fast switching
- Green Device Available
- Improved dv/dt capability

PPAK5X6 Pin Configuration





Applications

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

Absolute Maximum Ratings T_C=25°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°C)	-90	A
	Drain Current - Continuous (T_C=100°C)	-54	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	-360	A
P_D	Power Dissipation (T_C=25°C)	41.67	W
	Power Dissipation - Derate above 25°C	0.33	W/°C
T_J	Operating Junction Temperature Range	-55 to 150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
Marking Code		PB2P3	

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	---	3	°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
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	---	---	-30	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}= ±12V , V_{DS}=0V	---	---	±500	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}= -10V , I_D= -20A	---	1.8	2.3	mΩ
		V_{GS}= -4.5V , I_D= -20A	---	2.1	2.6	
		V_{GS}= -2.5V , I_D= -20A	---	2.7	3.6	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D= -250uA	-0.4	-0.6	-1.0	V
gfs	Forward Transconductance	V_{DS}= -10V , I_S= -3A	---	30	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS}= -16V , V_{GS}= -4.5V , I_D= -5A (NOTE 2、3)	---	149	225	nC
Q_{gs}	Gate-Source Charge		---	14.4	22	
Q_{gd}	Gate-Drain Charge		---	42.8	65	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}= -15V , V_{GS}= -4.5V , R_G= 25Ω , I_D= -1A (NOTE 2、3)	---	21.2	42	nS
T_r	Rise Time		---	20.6	40	
$T_{d(off)}$	Turn-Off Delay Time		---	26	52	
T_f	Fall Time		---	400	600	
C_{iss}	Input Capacitance	V_{DS}= -15V , V_{GS}= 0V , F= 1MHz	---	14000	21000	pF
C_{oss}	Output Capacitance		---	1670	2500	
C_{rss}	Reverse Transfer Capacitance		---	730	1100	
Rg	Gate resistance	V_{GS}= 0V , V_{DS}= 0V , F=1MHz	---	2.6	---	Ω

Drain-Source Diode Characteristics and Ratings

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

NOTES：

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.

Characteristics Curves

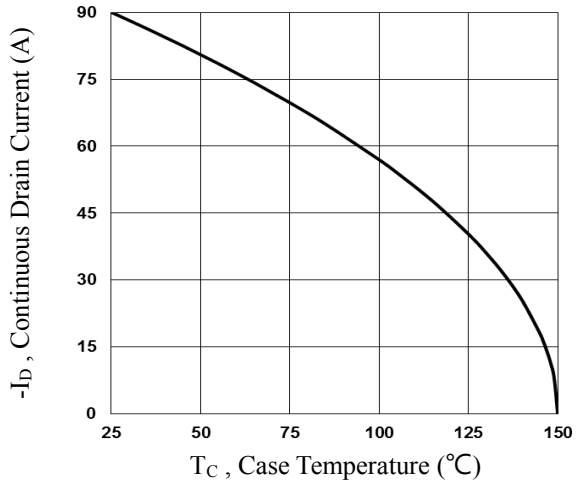


Fig.1 Continuous Drain Current vs. T_C

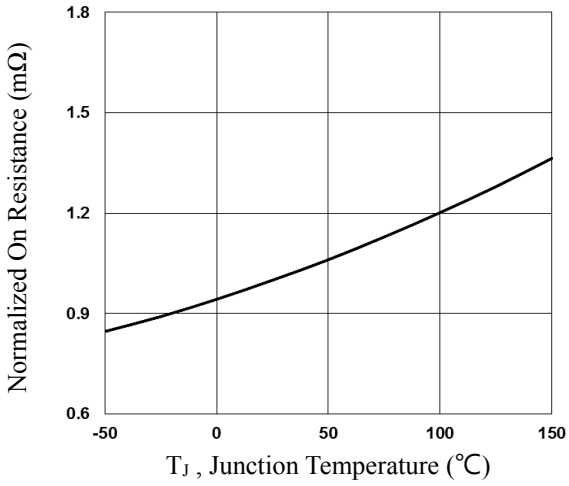


Fig.2 Normalized RDSON vs. T_J

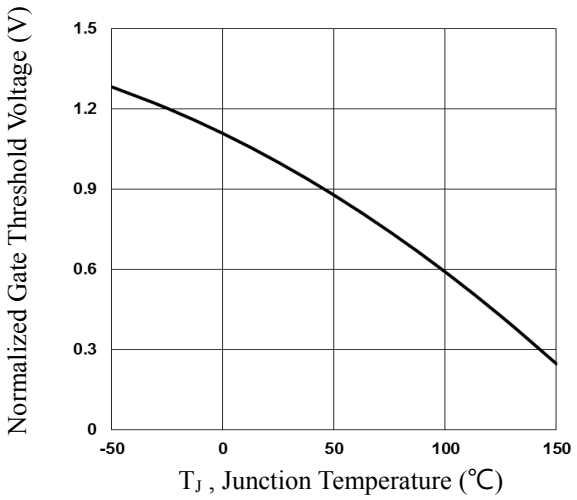


Fig.3 Normalized V_{th} vs. T_J

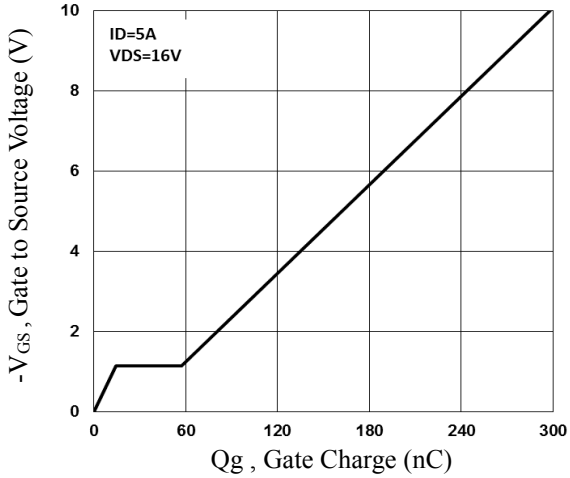


Fig.4 Gate Charge Waveform

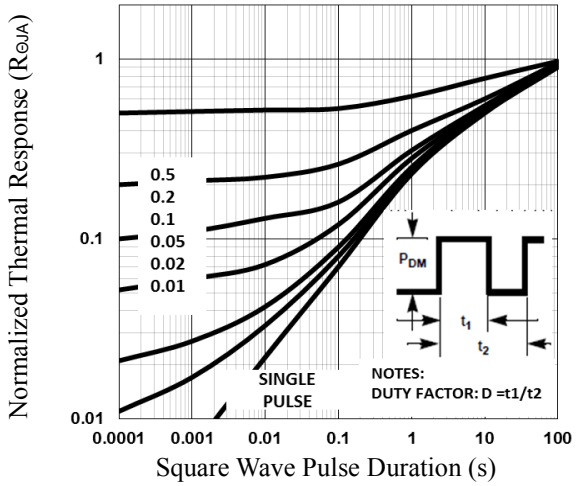


Fig.5 Normalized Transient Response

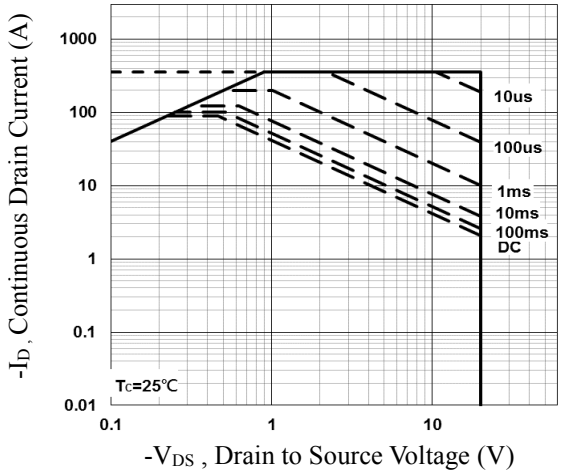


Fig.6 Maximum Safe Operation Area

Characteristics Curves

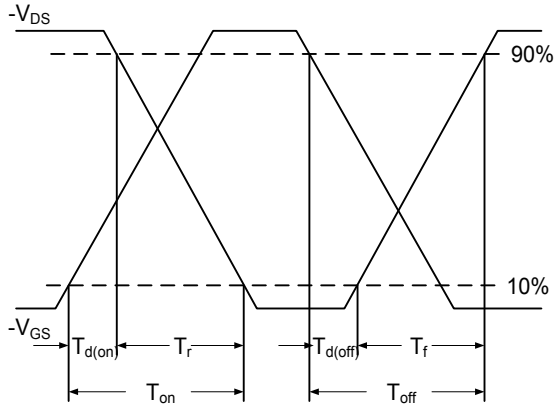


Fig.7 Switching Time Waveform

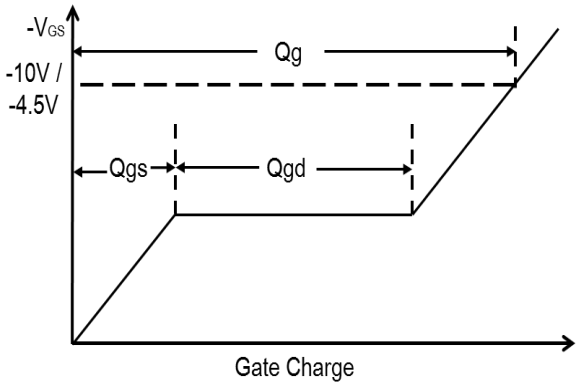
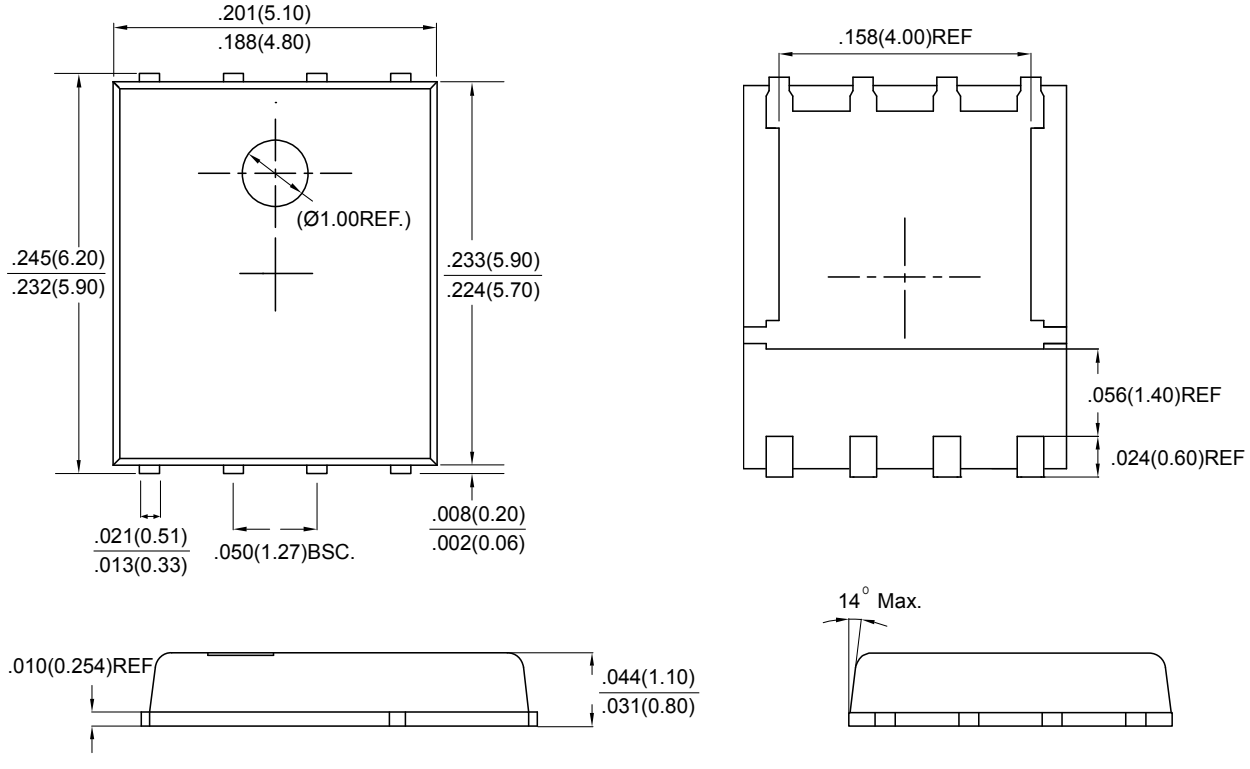


Fig.8 Gate Charge Waveform

Package Outline Dimensions



PPAK5X6

Dimensions in inches and (millimeters)

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