



### General Description

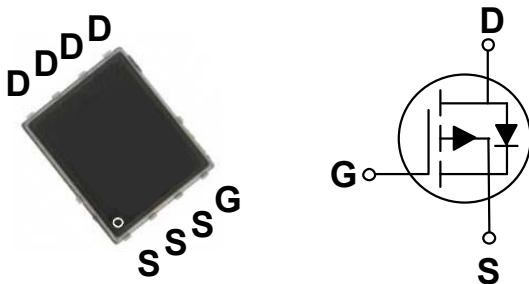
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
-30 V	32 m $\Omega$	-16 A

### Features

- $R_{DS(ON)} \leq 32m\Omega @ V_{GS} = -10V$
- Fast Switching
- Green Device Available
- Improved dv/dt Capability

PPAK5X6 Pin Configuration



### Applications

- Battery protection
- Load Switch
- Uninterruptible Power Supply

### 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	$\pm 20$	V
$I_D$	Drain Current - Continuous ( $T_c=25^\circ\text{C}$ )	-16	A
$I_{DM}$	Drain Current - Pulsed (NOTE 1)	-48	A
$P_D$	Total Power Dissipation ( $T_c=25^\circ\text{C}$ )	25	W
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
Marking Code		PC032	

### Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	85	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	5	$^\circ\text{C/W}$



Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> = 0V , I <sub>D</sub> = -250uA	-30	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> = -24V , V <sub>GS</sub> = 0V	---	---	-1	uA
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> = ±20V , V <sub>DS</sub> = 0V	---	---	±100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance	V <sub>GS</sub> = -10V , I <sub>D</sub> = -7A	---	---	32	mΩ
		V <sub>GS</sub> = -4.5V , I <sub>D</sub> = -5A	---	---	54	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> = -250uA	-1.0	---	-2.5	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> = -5V , I <sub>D</sub> = -7A	---	15	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> = -20V , V <sub>GS</sub> = -4.5V , I <sub>D</sub> = -7A	---	9.8	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	2.2	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	3.4	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> = -15V , V <sub>GS</sub> = -10V , R <sub>G</sub> = 3.3Ω , I <sub>D</sub> = -5A	---	16.4	---	nS
T <sub>r</sub>	Rise Time		---	20.2	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	55	---	
T <sub>f</sub>	Fall Time		---	10	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> = -15V , V <sub>GS</sub> = 0V , F= 1MHz	---	930	---	pF
C <sub>oss</sub>	Output Capacitance		---	148	---	
C <sub>riss</sub>	Reverse Transfer Capacitance		---	115	---	
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> = 0V , V <sub>GS</sub> = 0V , F= 1MHz		15		Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> = V <sub>D</sub> = 0V , Force Current	---	---	-16	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> = 0V , I <sub>S</sub> = -1A	---	---	-1.2	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-Forward Characteristics of Body Diode

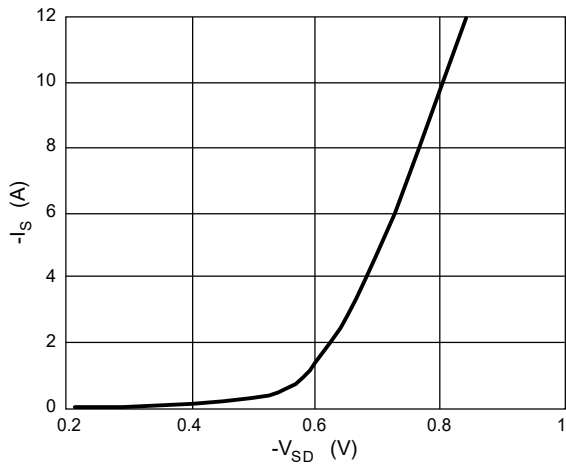


FIG. 2-Normalized  $V_{GS(th)}$  vs  $T_J$

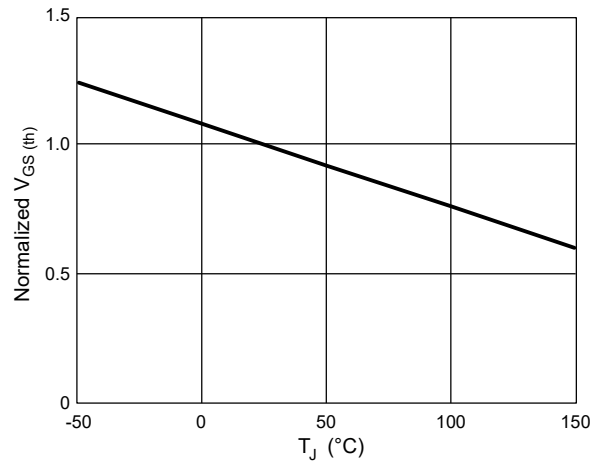


FIG. 3-Normalized  $R_{DS(on)}$  vs  $T_J$

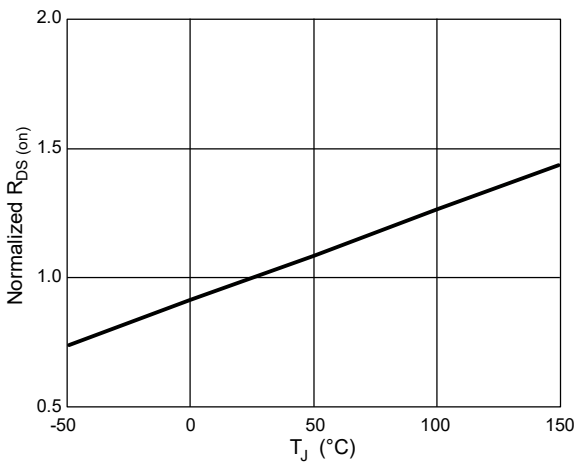


FIG. 4-Gate Charge Characteristics

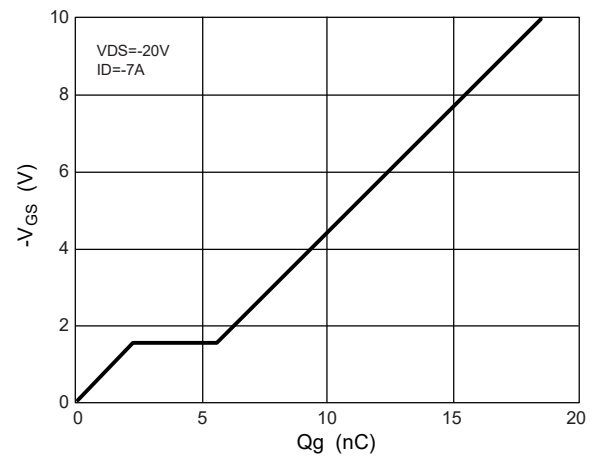


FIG. 5-Gate Charge Waveform

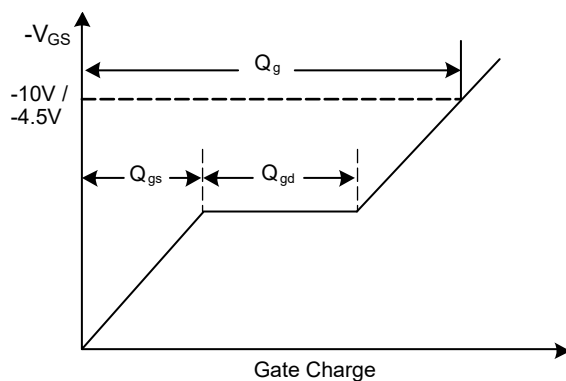
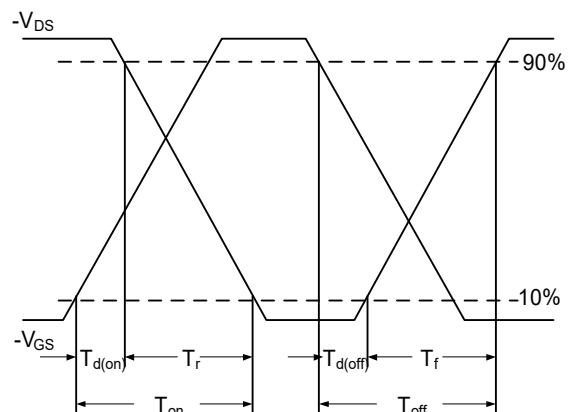
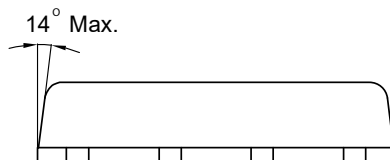
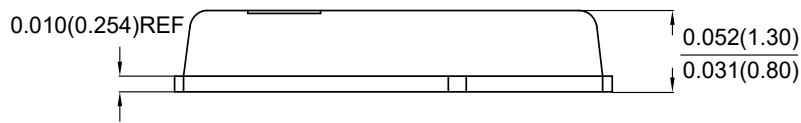
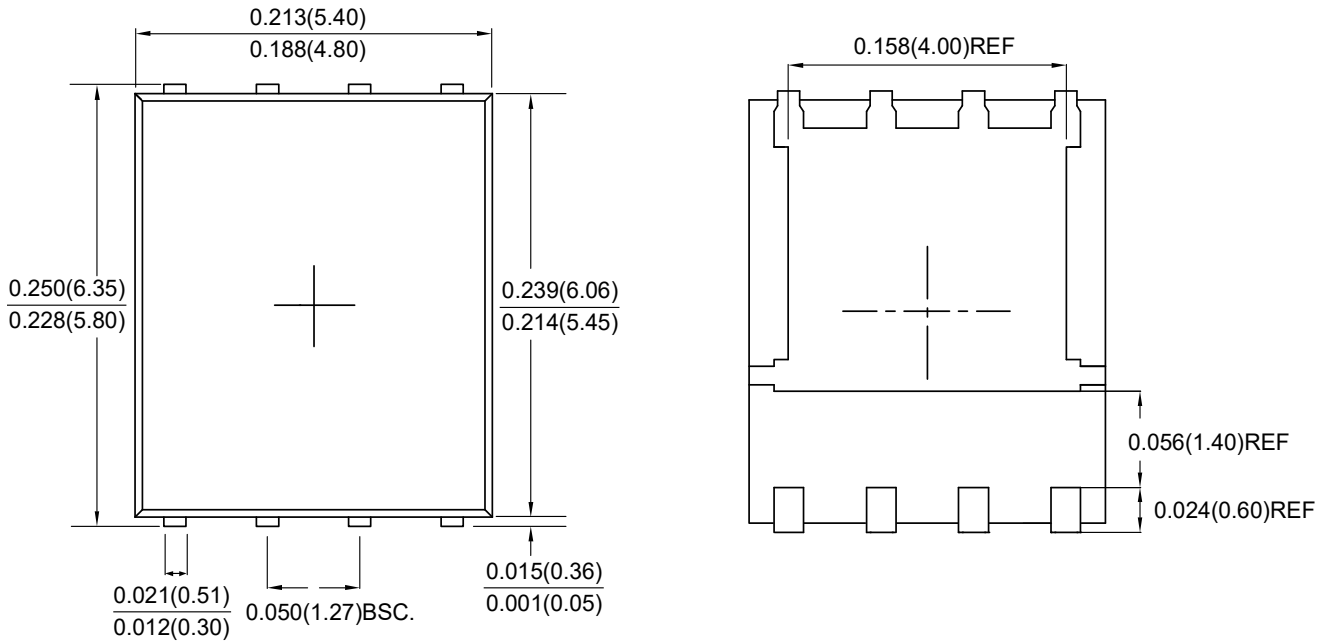


Fig.6-Switching Time Waveform





Package Outline Dimensions



PPAK5X6

Dimensions in inches and (millimeters)



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