



# 30V N-Channel MOSFETs

## General Description

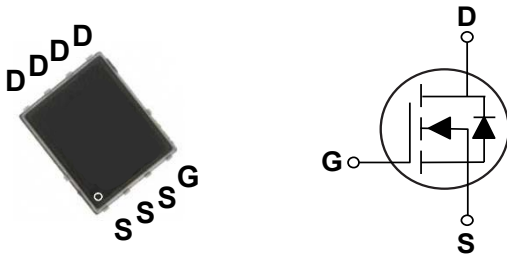
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV <sub>DSS</sub>	R <sub>DS(ON)</sub>	I <sub>D</sub>
30 V	5.1 mΩ	60 A

## Features

- $R_{DS(ON)} \leq 5.1m\Omega @ V_{GS}=10V$
- Fast Switching
- Improved dv/dt Capability
- Green Device Available

PPAK5X6 Pin Configuration



## Applications

- MB / VGA / Vcore
- POL Applications
- SMPS 2<sup>nd</sup> SR

## Absolute Maximum Ratings T<sub>C</sub>=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	30	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Drain Current - Continuous	60	A
I <sub>DM</sub>	Drain Current – Pulsed	125	A
E <sub>AS</sub>	Single Pulse Avalanche Energy (NOTE 1)	31.25	mJ
I <sub>AS</sub>	Single Pulse Avalanche Current (NOTE 1)	25	A
P <sub>D</sub>	Power Dissipation (T <sub>C</sub> =25°C) (NOTE 2)	27	W
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 150	°C
T <sub>STG</sub>	Storage Temperature Range	-55 to 150	°C
Marking Code		NC5P1	

## Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
R <sub>θJA</sub>	Thermal Resistance Junction to Ambient	---	50	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction to Case	---	4.6	°C/W



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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 (NOTE 3)	V <sub>GS</sub> =10V, I <sub>D</sub> =8A	---	---	5.1	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =8A	---	---	11	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.0	1.6	2.5	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =8A	---	8.6	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =10V, V <sub>GS</sub> =10V, I <sub>D</sub> =30A (NOTE 2)	---	40.8	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	8.1	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	7.4	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =10V, V <sub>GS</sub> =10V, R <sub>GEN</sub> =2.7Ω, I <sub>D</sub> =30A (NOTE 2)	---	7.3	---	nS
T <sub>r</sub>	Rise Time		---	75.3	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	36.6	---	
T <sub>f</sub>	Fall Time		---	53	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz (NOTE 2)	---	2117	---	pF
C <sub>oss</sub>	Output Capacitance		---	324	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	223	---	
R <sub>g</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz	---	2.8	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =1A	---	---	1	V

NOTES :

1. V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=25A.
2. The power dissipation is limited by 150°C junction temperature.
3. Guaranteed by design, not subject to production.
4. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.



Rating and Characteristics Curves

FIG. 1-Continuous Drain Current vs.  $T_C$

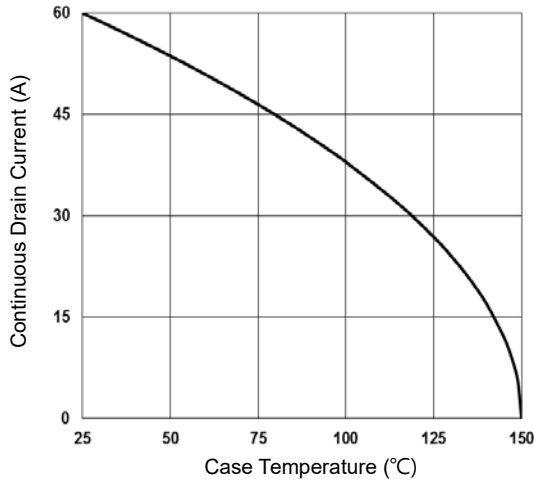


FIG. 2-Normalized  $R_{\text{DS(on)}}$  vs.  $T_J$

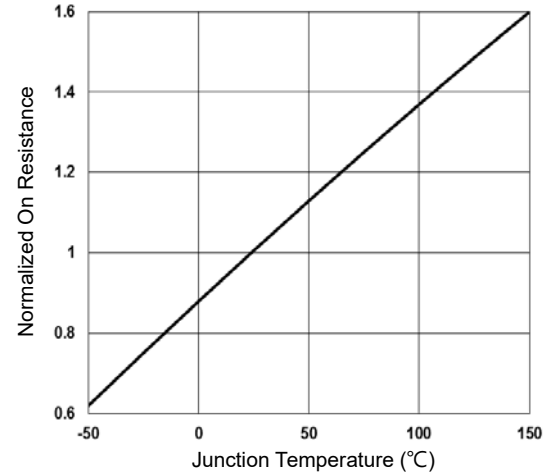


FIG. 3-Normalized  $V_{\text{th}}$  vs.  $T_C$

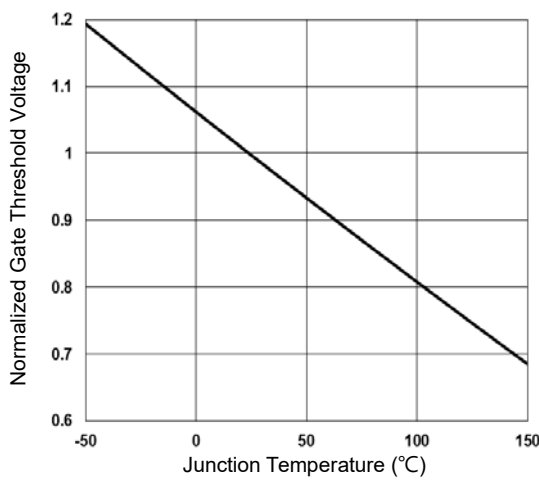


FIG. 4-Capacitance

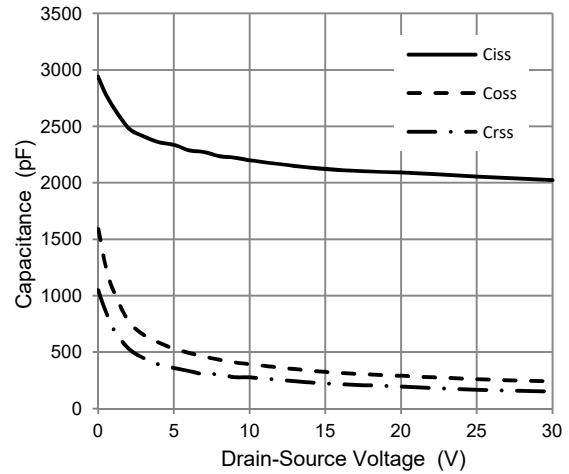


FIG. 5-Switching Time Waveform

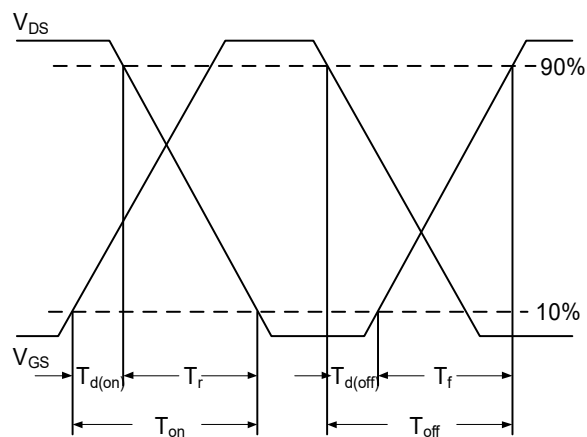
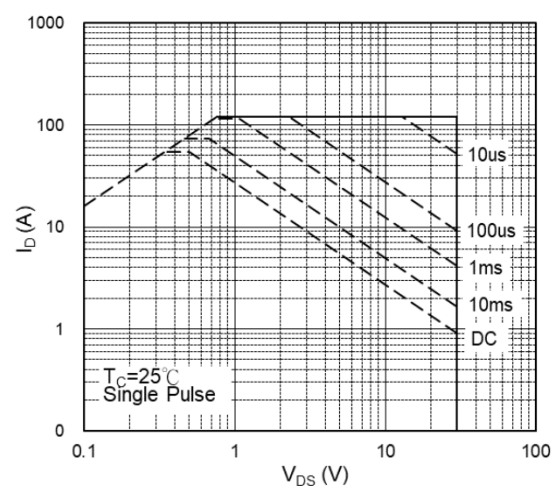


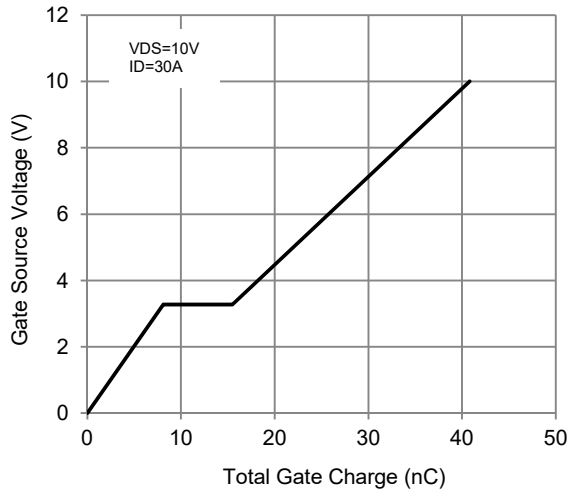
FIG. 6-Safe Operating Area



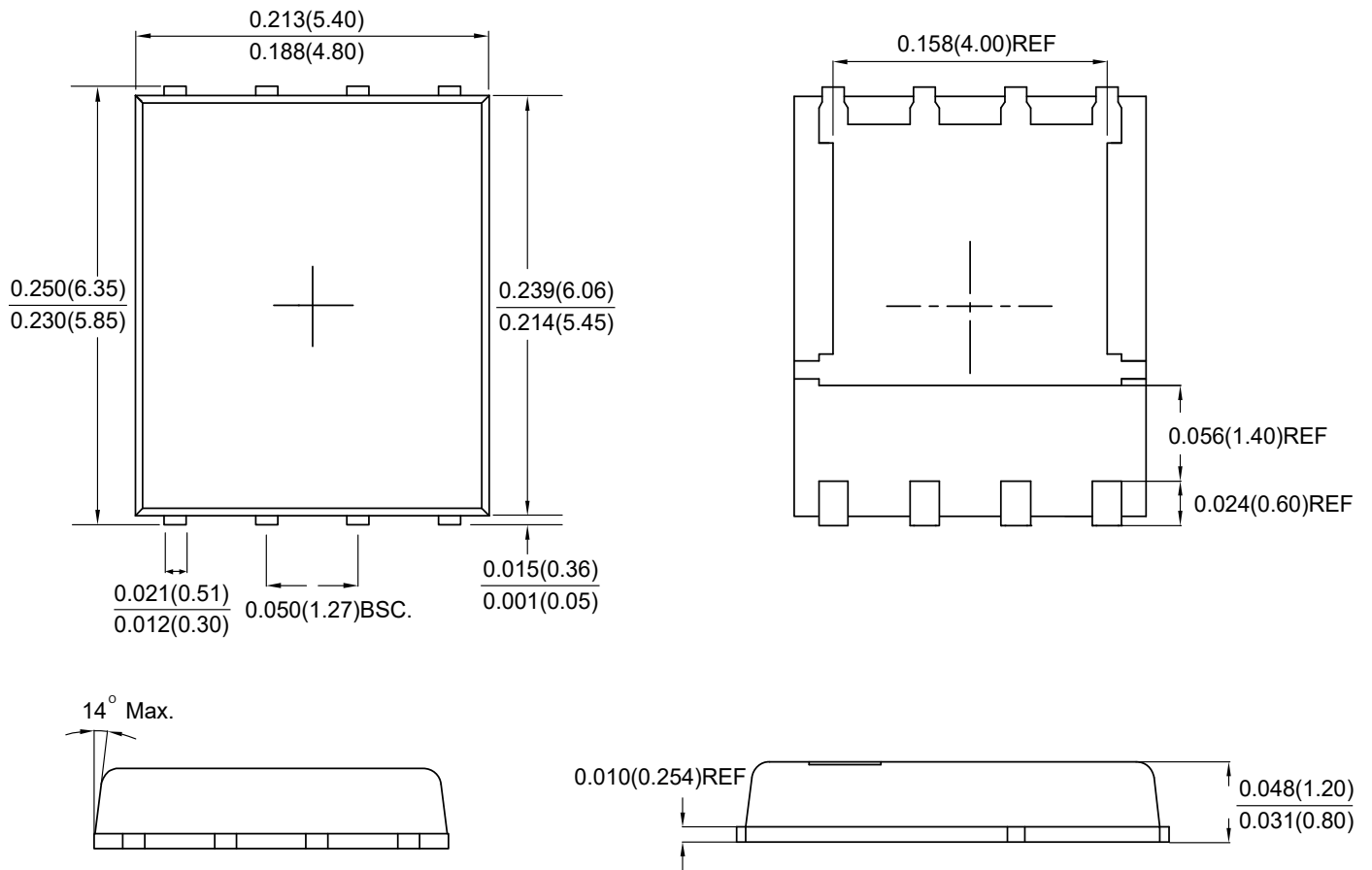


Rating and Characteristics Curves

FIG. 7-Gate Charge Characteristics



Package Outline Dimensions



PPAK5X6

Dimensions in inches and (millimeters)



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