



**General Description**

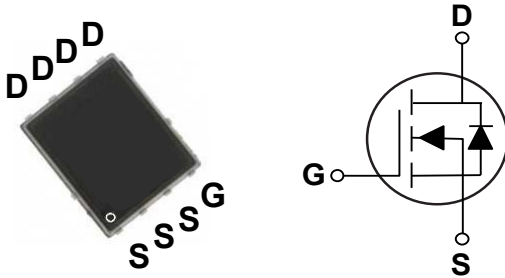
These N-Channel enhancement mode power field effect transistors are using trench MOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

<b>BV<sub>DSS</sub></b>	<b>R<sub>DS(ON)</sub></b>	<b>I<sub>D</sub></b>
40 V	3.8 mΩ	92 A

**Features**

- $R_{DS(ON)} \leq 3.8m\Omega @ V_{GS}=10V$
- Fast Switching
- Improved dv/dt Capability
- Green Device Available

PPAK5X6 Pin Configuration



**Applications**

- Motor Control
- DC/DC Converter
- Portable Equipment Application

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

Symbol	Parameter	Value	Units
V <sub>DS</sub>	Drain-Source Voltage	40	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
I <sub>D</sub>	Drain Current - Continuous (T <sub>C</sub> =25°C)	92	A
I <sub>DM</sub>	Drain Current - Pulsed (NOTE 1)	103	A
I <sub>AS</sub>	Single Pulse Avalanche Energy (L=0.1mH)	15	A
E <sub>AS</sub>	Single Pulse Avalanche Energy (L=0.1mH)	11.25	mJ
P <sub>D</sub>	Power Dissipation (T <sub>C</sub> =25°C)	50	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		ND3P8	

**Thermal Characteristics**

Symbol	Parameter	Value	Unit
R <sub>θJA</sub>	Thermal Resistance Junction to Ambient	60	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction to Case	2.5	°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	40	---	---	V
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =32V, 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> =20A	---	---	3.8	mΩ
		V <sub>GS</sub> =6V, I <sub>D</sub> =15A	---	7.4	---	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.5	---	4.0	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =18A	---	22	---	S

Dynamic and switching Characteristics (NOTE 3)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =25V, V <sub>GS</sub> =10V, I <sub>D</sub> =14A	---	53	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	11.8	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	16.2	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =15V, V <sub>GS</sub> =10V, R <sub>GEN</sub> =1Ω, I <sub>D</sub> =1A	---	28	---	nS
T <sub>r</sub>	Rise Time		---	21	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	39	---	
T <sub>f</sub>	Fall Time		---	19	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =20V, V <sub>GS</sub> =0V, F=1MHz	---	3222	---	pF
C <sub>oss</sub>	Output Capacitance		---	305	---	
C <sub>riss</sub>	Reverse Transfer Capacitance		---	183	---	
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
I <sub>S</sub>	Continuous Source Current	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	32	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =15A	---	---	1.2	V
t <sub>rr</sub>	Body Diode Reverse Recovery Time	V <sub>GS</sub> =0V, I <sub>F</sub> =15A, dl/dt=100A/us	---	19.1	---	nS
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge		---	10.4	---	nC

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
3. Guaranteed by design, not subject to production testing.



Characteristics Curves

FIG. 1-Output Characteristic

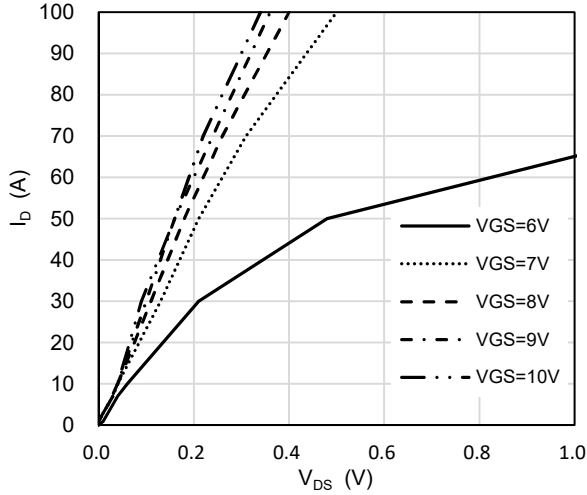


FIG. 2-On-Resistance vs.  $I_D$

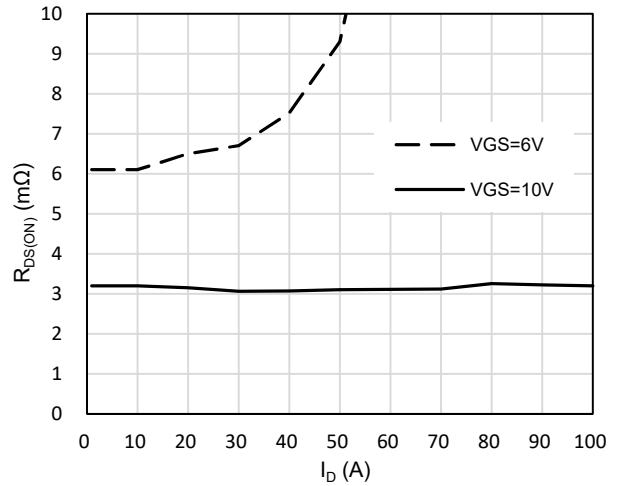


FIG. 3-On-Resistance vs.  $V_{GS}$

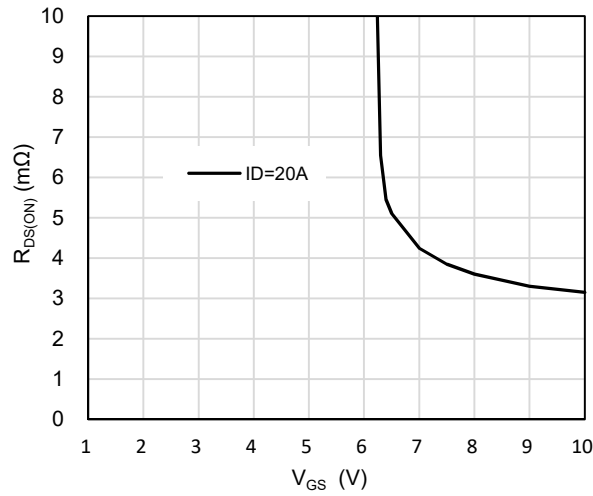


FIG. 4-Source-Drain Diode Forward

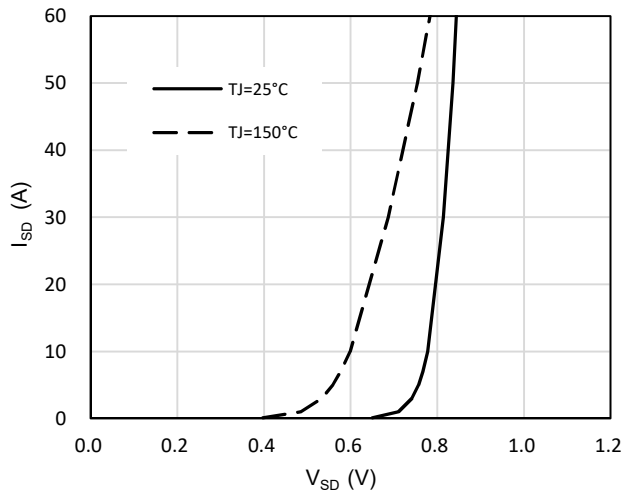


FIG. 5-Gate Charge Characteristics

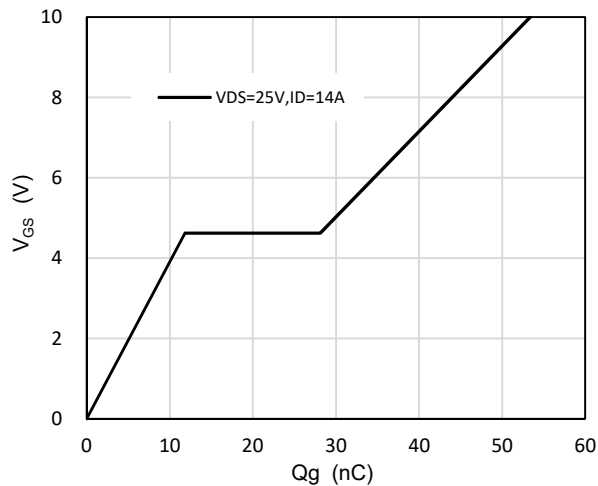
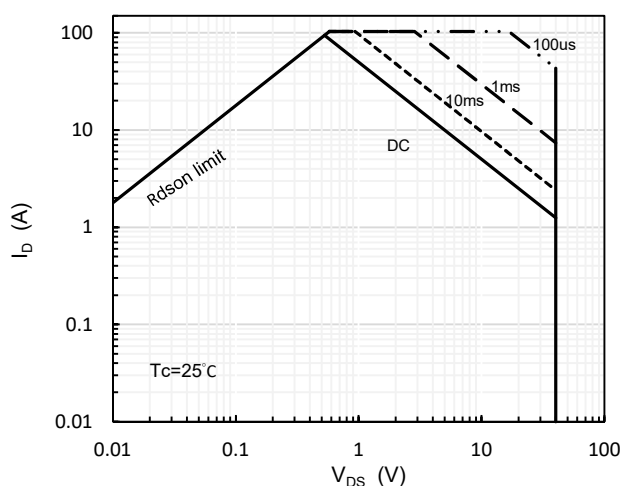


FIG. 6-Safe Operating Area



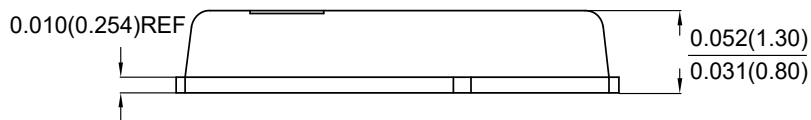
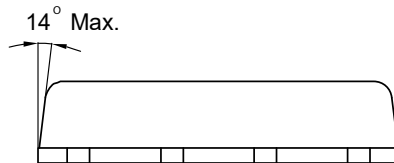
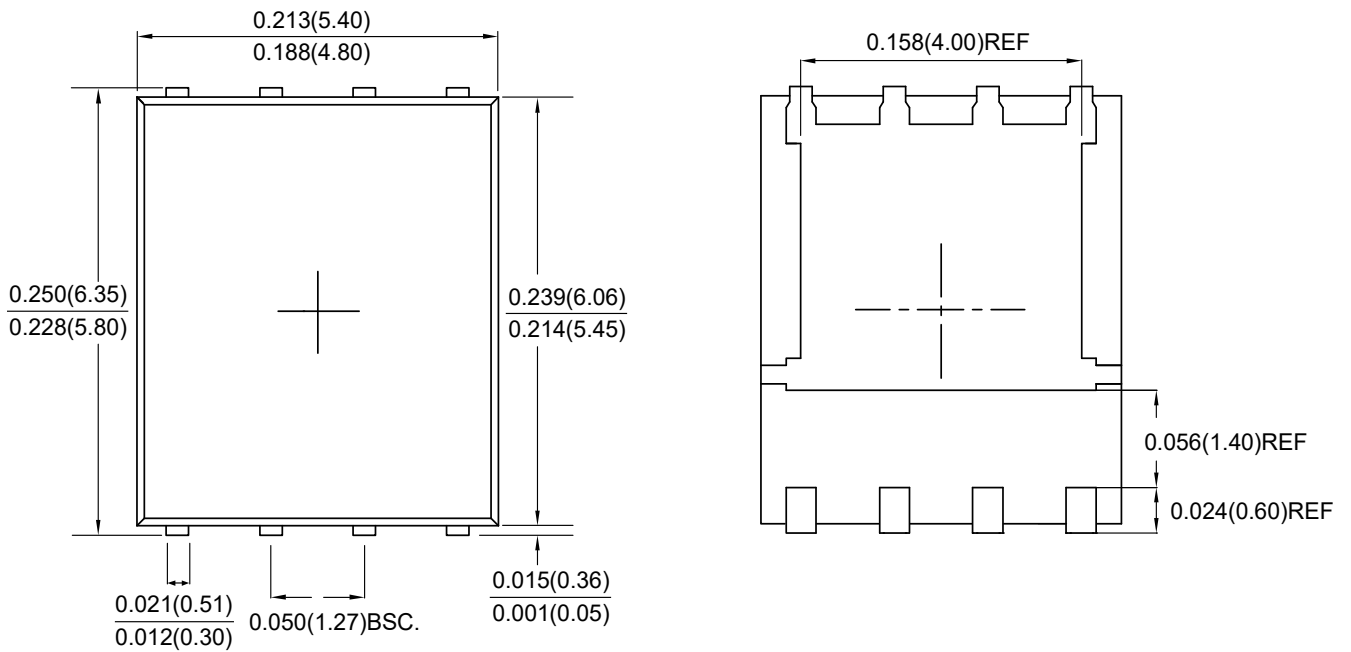


**P5MND3P8**



**40V N-Channel MOSFETs**

**Package Outline Dimensions**



**PPAK5X6**

Dimensions in inches and (millimeters)



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