



# 30V N-Channel MOSFETs

## General Description

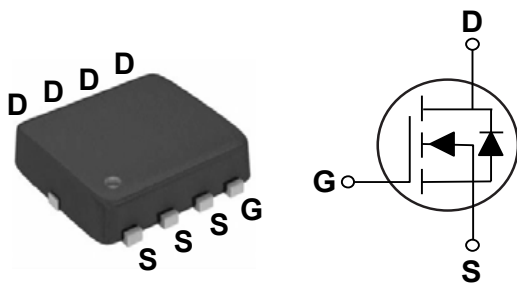
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
30V	3.8 mΩ	70 A

## Features

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

PPAK3X3 Pin Configuration



## Applications

- Networking
- Load Switch
- LED applications
- Hand-Held Device

## Absolute Maximum Ratings $T_c=25^\circ C$ 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 ( $T_c=25^\circ C$ )	70	A
	Drain Current - Continuous ( $T_c=100^\circ C$ )	50	A
$I_{DM}$	Drain Current - Pulsed (NOTE 1)	128	A
$P_D$	Power Dissipation ( $T_c=25^\circ C$ )	41	W
$T_J$	Operating Junction Temperature Range	-50 to 150	$^\circ C$
$T_{STG}$	Storage Temperature Range	-50 to 150	$^\circ C$
Marking Code		NC3P8	

## Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	80	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	3	$^\circ C/W$



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, T <sub>J</sub> =25°C	---	---	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> =9A	---	---	3.8	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A	---	---	6	
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

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, I <sub>D</sub> =1.5A	---	55	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	14.7	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	31.9	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DS</sub> =15V, V <sub>GS</sub> =10V, R <sub>GEN</sub> =3Ω, I <sub>D</sub> =1A	---	10.3	---	nS
T <sub>r</sub>	Rise Time		---	17.6	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	43.2	---	
T <sub>f</sub>	Fall Time		---	31.7	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, F=1MHz	---	2435	---	pF
C <sub>oss</sub>	Output Capacitance		---	308	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	259	---	

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	---	---	70	A
V <sub>SD</sub>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =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.  $T_C$

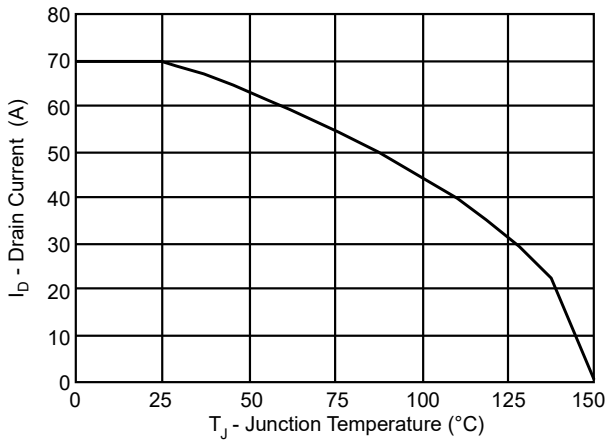


Fig. 2-Normalized  $R_{DS(ON)}$  vs.  $T_J$

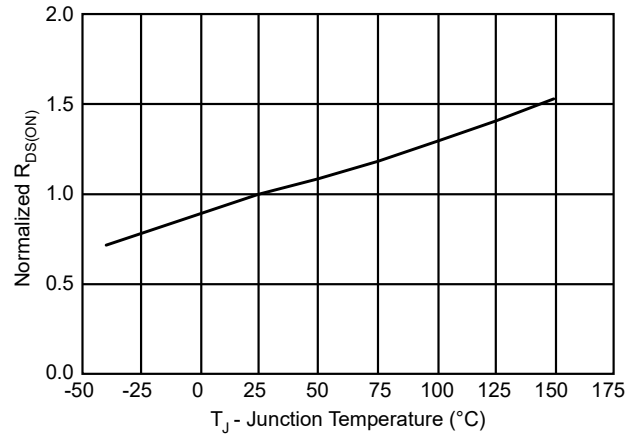


Fig. 3-Normalized  $V_{GS(th)}$  vs.  $T_J$

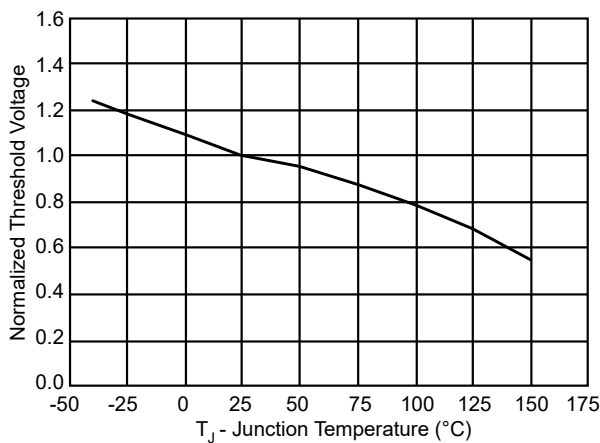


Fig. 4-Maximum Safe Operation Area

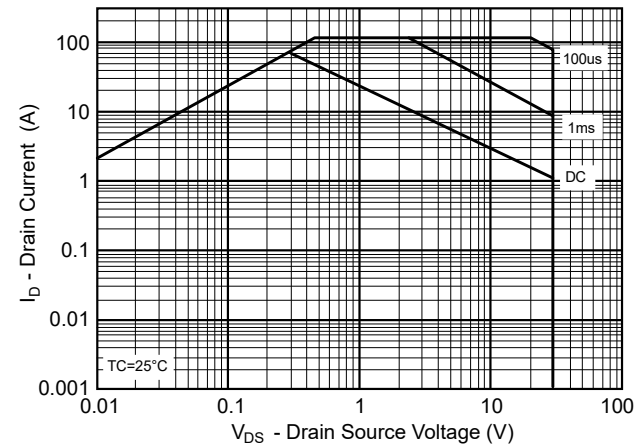


Fig. 5- $R_{\theta JC}$  Transient Thermal Impedance

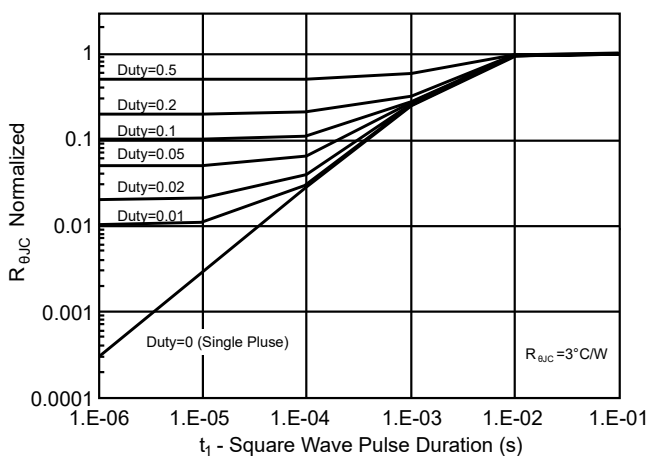
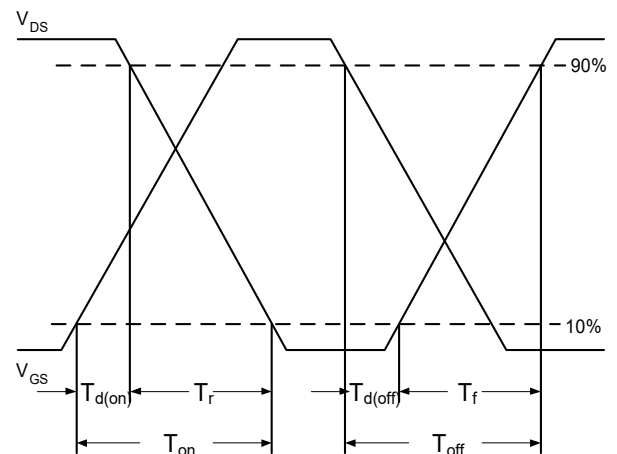


Fig. 6-Switching Time Waveform



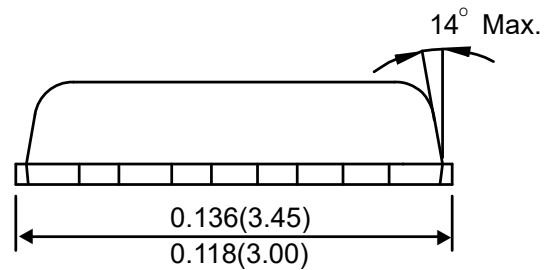
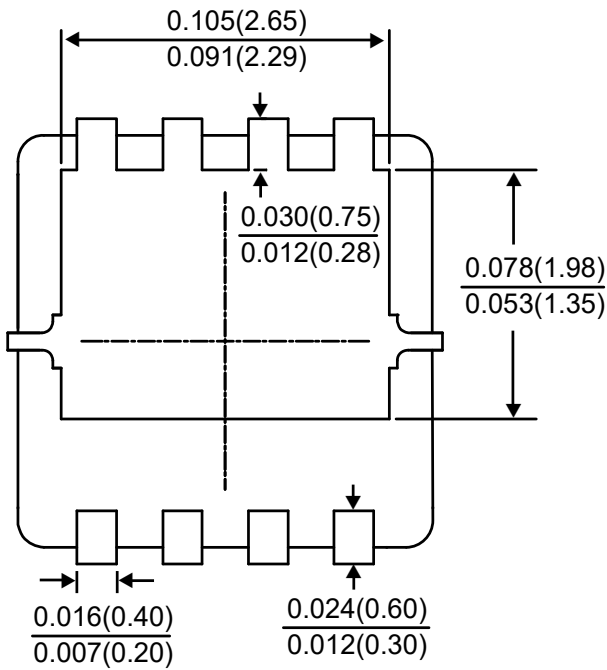
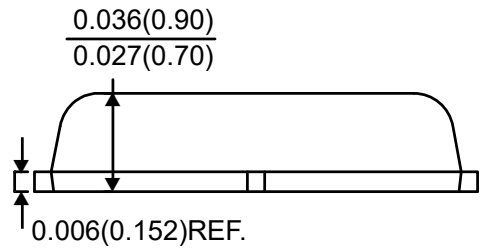
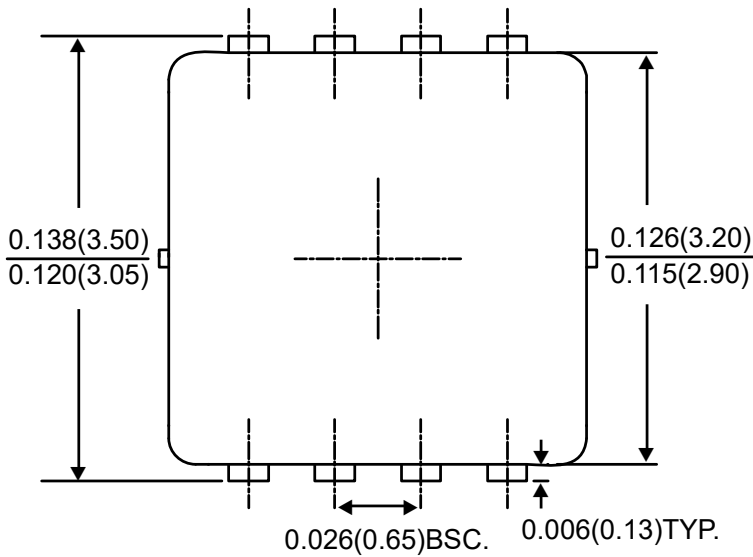


**P3MNC3P8**



**30V N-Channel MOSFETs**

**Package Outline Dimensions**



**PPAK3X3**

Dimensions in inches and (millimeters)



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