



# 30V N-Channel MOSFETs

## General Description

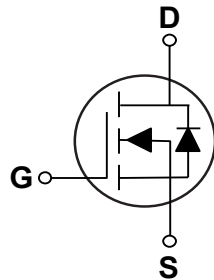
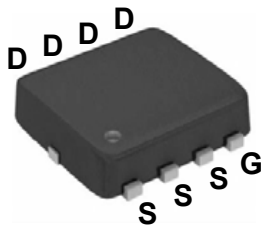
The advanced trench MOS technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and converter applications.

$BV_{DSS}$	$R_{DS(ON)}$	$I_D$
30 V	3.9 mΩ	35 A

## Features

- $R_{DS(ON)} \leq 3.9m\Omega @ V_{GS}=10V$
- Low Gate Charge
- Low  $R_{DS(ON)}$
- Green Device Available

PPAK3X3 Pin Configuration



## Applications

- Power Management in Desktop Computer or DC/DC Converters.
- Isolated DC/DC Converters in Telecom and Industrial.

## 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 ( $T_c=25^\circ C$ )	35	A
	Drain Current - Continuous ( $T_c=100^\circ C$ )	32	A
$I_{DM}$	Pulsed Drain Current (NOTE 1)	120	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	80	mJ
IAS	Avalanche Current	40	A
$P_D$	Power Dissipation (NOTE 3)	27	W
$T_J$	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$T_{STG}$	Storage Temperature Range	-55 to 150	$^\circ C$
Marking Code		NC3P9	

## Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	60	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	4.5	$^\circ C/W$

**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> =30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, T <sub>J</sub> =55°C	---	---	5	
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	---	3.2	3.9	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A	---	4.9	6.1	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.2	1.7	2.2	V
gfs	Forward Transconductance	V <sub>DS</sub> =5V, I <sub>D</sub> =20A	---	75	---	S

**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> =4.5V, I <sub>D</sub> =20A	---	14.7	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	5.8	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	3.5	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>DD</sub> =15V, V <sub>GS</sub> =10V, R <sub>G</sub> =3Ω, I <sub>D</sub> =20A	---	7.5	---	nS
T <sub>r</sub>	Rise Time		---	20.2	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	21.6	---	
T <sub>f</sub>	Fall Time		---	4.4	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, F=1MHz	---	1476	---	pF
C <sub>oss</sub>	Output Capacitance		---	556	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	70	---	
R <sub>g</sub>	Gate resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	---	1.65	---	Ω

**Drain-Source Diode Characteristics and Ratings**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current (NOTE 4)	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	30	A
V <sub>SD</sub>	Diode Forward Voltage (NOTE 1)	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1	V

**NOTES :**

1. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
2. The EAS data shows Max. rating. The test condition is V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, I<sub>AS</sub>=40A, L=0.1mH.
3. The power dissipation is limited by 150°C junction temperature.
4. The data is theoretically the same as I<sub>D</sub> and I<sub>DM</sub>, in real applications, should be limited by total power dissipation.



Characteristics Curves

FIG.1-Typical Output Characteristics

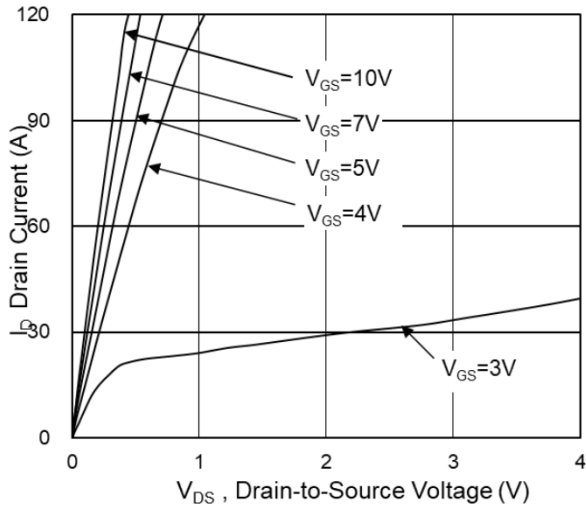


FIG.2-On-Resistance vs. G-S Voltage

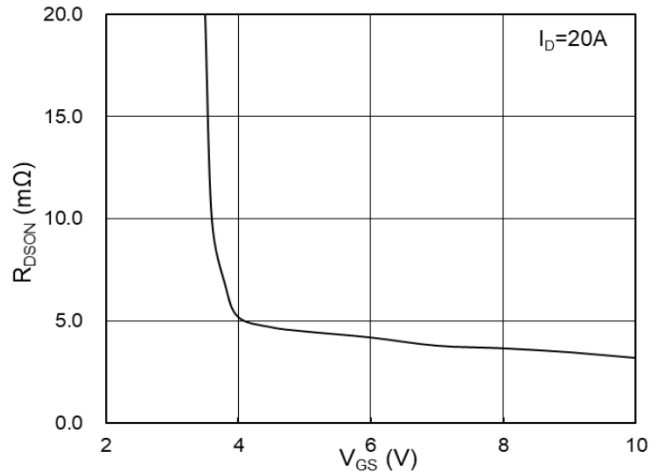


FIG.3-Source Drain Forward Characteristics

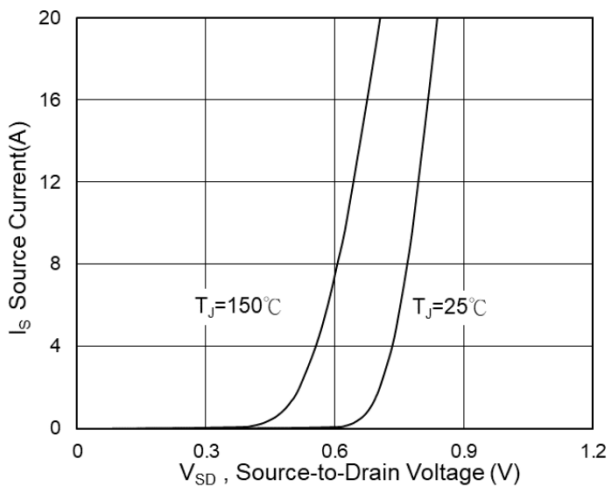


FIG.4-Gate Charge Characteristics

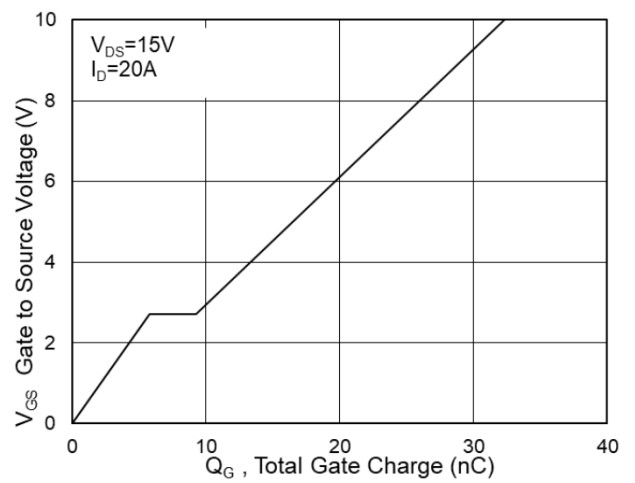


FIG.5-Normalized  $V_{GS(th)}$  vs.  $T_J$

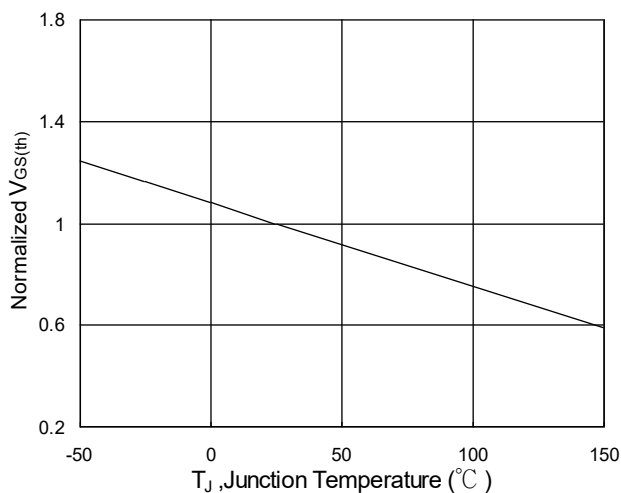
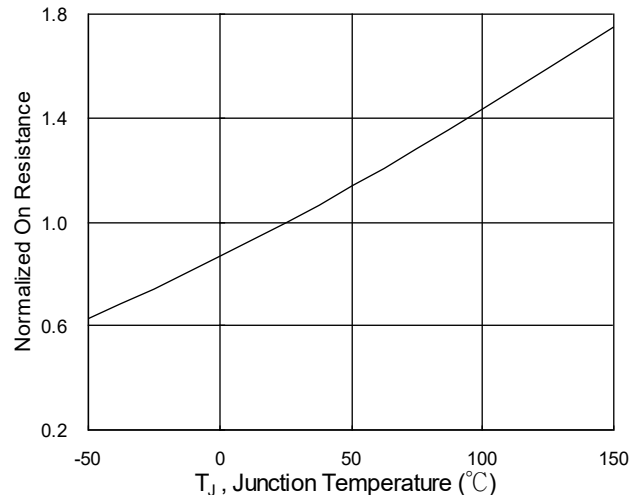


FIG.6-Normalized  $R_{DS(on)}$  vs.  $T_J$





Characteristics Curves

FIG.7-Switching Time Waveform

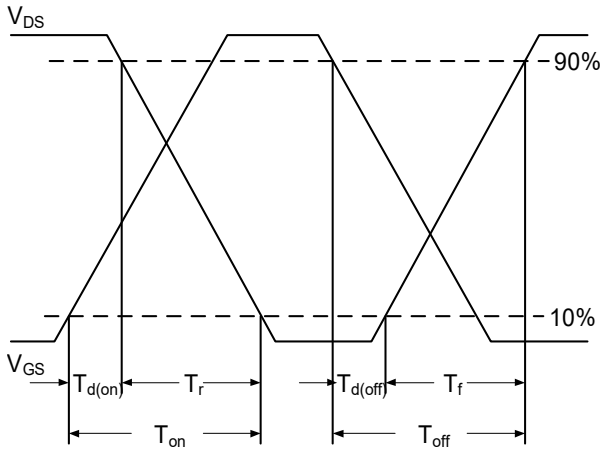
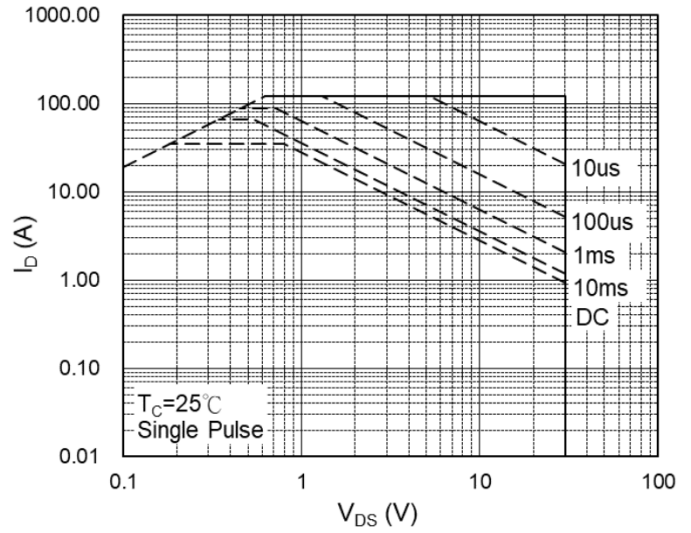
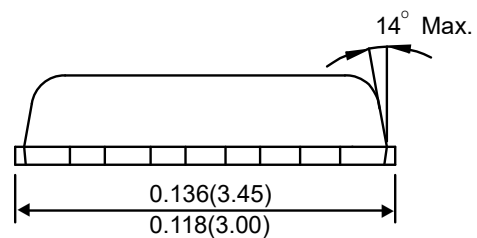
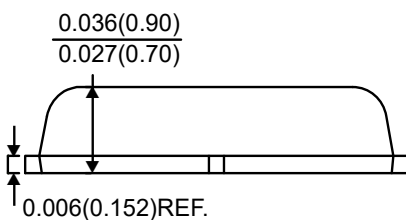
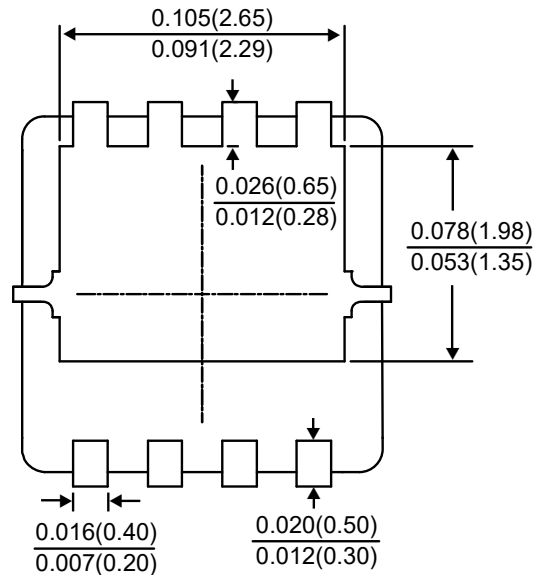
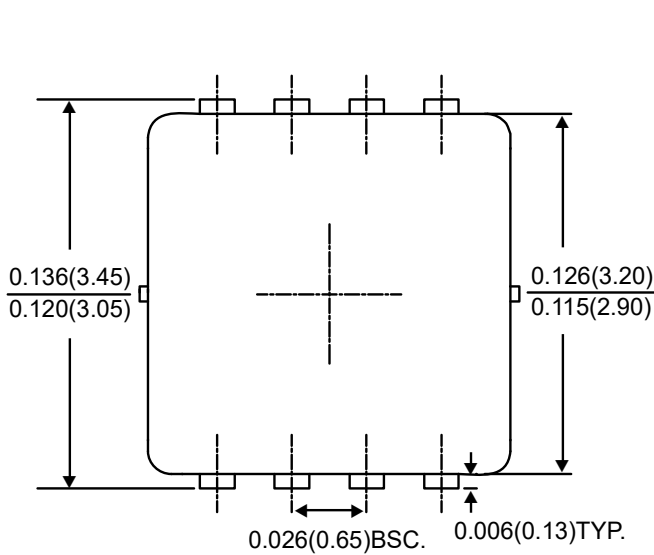


FIG.8-Safe Operating Area



Package Outline Dimensions



PPAK3X3

Dimensions in inches and (millimeters)



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