P3MNC5P1

30V N-Channel MOSFETs

BV_{DSS}	$R_{DS(ON)}$	I_D
30V	5.1 mΩ	48 A

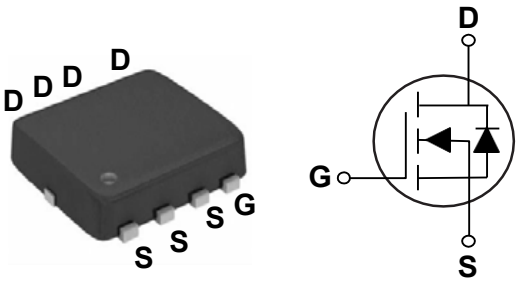
General Description

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.

Features

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

PPAK3X3 Pin Configuration



Applications

- MB / VGA / Vcore
- POL Applications
- SMPS 2nd SR

Absolute Maximum Ratings T_C=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current - Continuous	48	A
I_{DM}	Drain Current - Pulsed	100	A
EAS	Single Pulse Avalanche Energy (NOTE 1)	31.25	mJ
IAS	Single Pulse Avalanche Current (NOTE 1)	25	A
P_D	Power Dissipation (T_C=25°C) (NOTE 2)	17.4	W
T_J	Operating Junction Temperature	150	°C
T_{STG}	Storage Temperature Range	-50 to 150	°C
Marking Code		NC5P1	

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	50	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	7.2	°C/W

Electrical Characteristics (T_J=25°C, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	30	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V	---	---	1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=10V , I_D=8A	---	---	5.1	mΩ
		V_{GS}=4.5V , I_D=8A	---	---	11	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	1.0	---	2.5	V
gfs	Forward Transconductance	V_{DS}=10V , I_{DS}=8A	---	8.6	---	S

Dynamic and switching Characteristics (NOTE 4)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS}=10V , V_{GS}=10V , I_D=30A (NOTE 3)	---	40.8	---	nC
Q_{gs}	Gate-Source Charge		---	8.1	---	
Q_{gd}	Gate-Drain Charge		---	7.4	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=10V , V_{GS}=10V , R_{GEN}=2.7 Ω , I_D=30A (NOTE 3)	---	7.3	---	nS
T_r	Rise Time		---	75.3	---	
$T_{d(off)}$	Turn-Off Delay Time		---	36.6	---	
T_f	Fall Time		---	53	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , F=1MHz (NOTE 3)	---	2117	---	pF
C_{oss}	Output Capacitance		---	324	---	
C_{rss}	Reverse Transfer Capacitance		---	223	---	
R_g	Gate Resistance	V_{GS}=0V , V_{DS}=0V , F=1MHz	---	2.8	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A	---	---	1	V

NOTES：

1. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=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%.

Characteristics Curves

FIG. 1-Continuous Drain Current vs. T_C

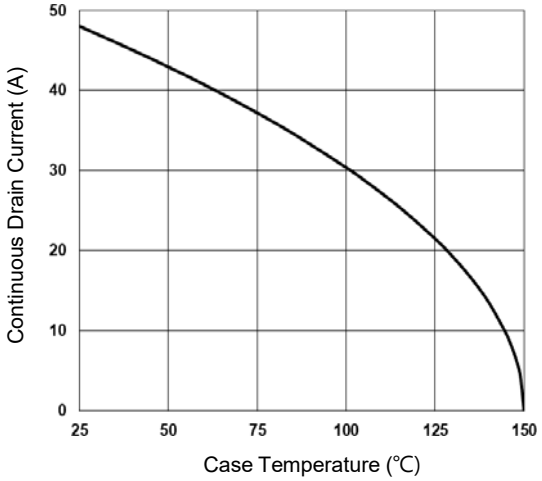


FIG. 2-Normalized RDSON vs. T_J

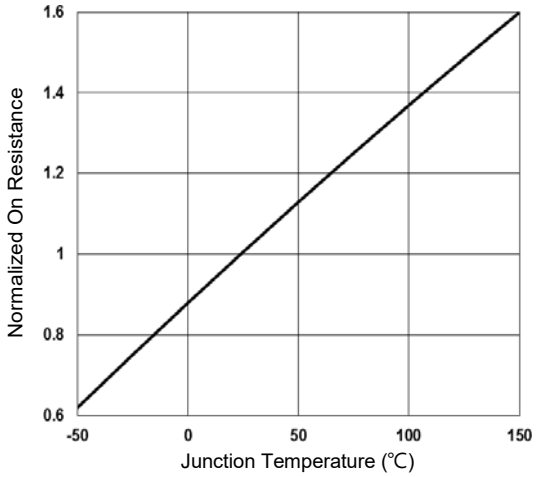


FIG. 3-Normalized V_{th} vs. T_C

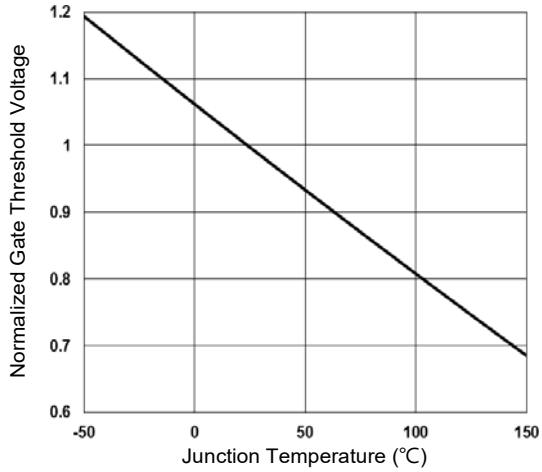


FIG. 4-Capacitance

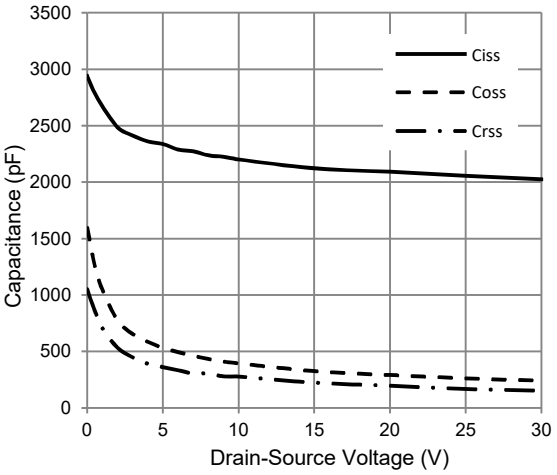


FIG. 5-Switching Time Waveform

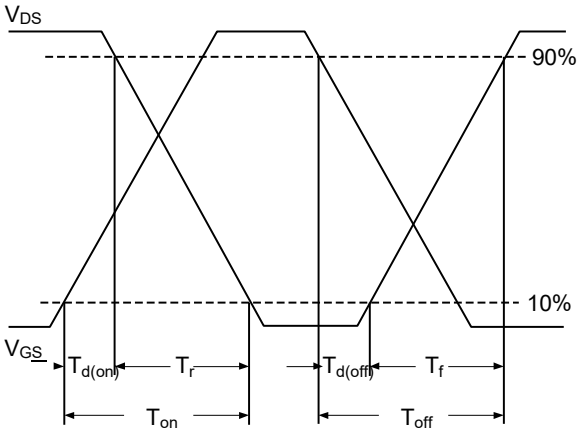
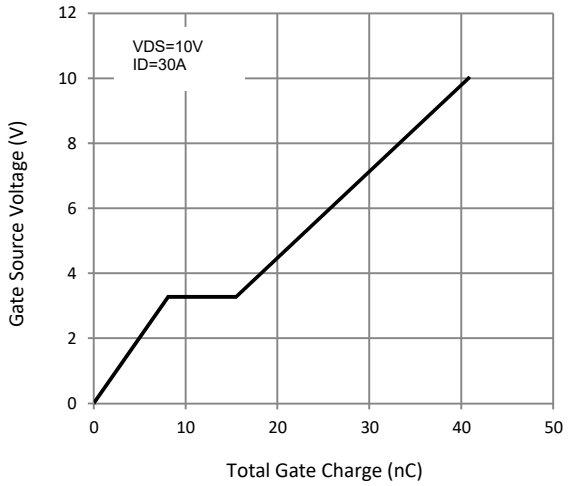
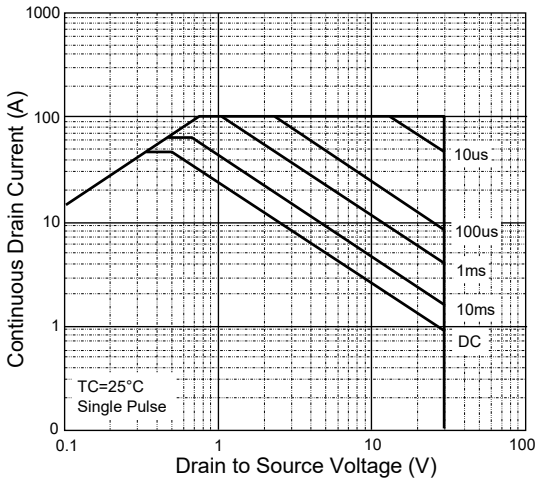


FIG. 6-Gate Charge Characteristics

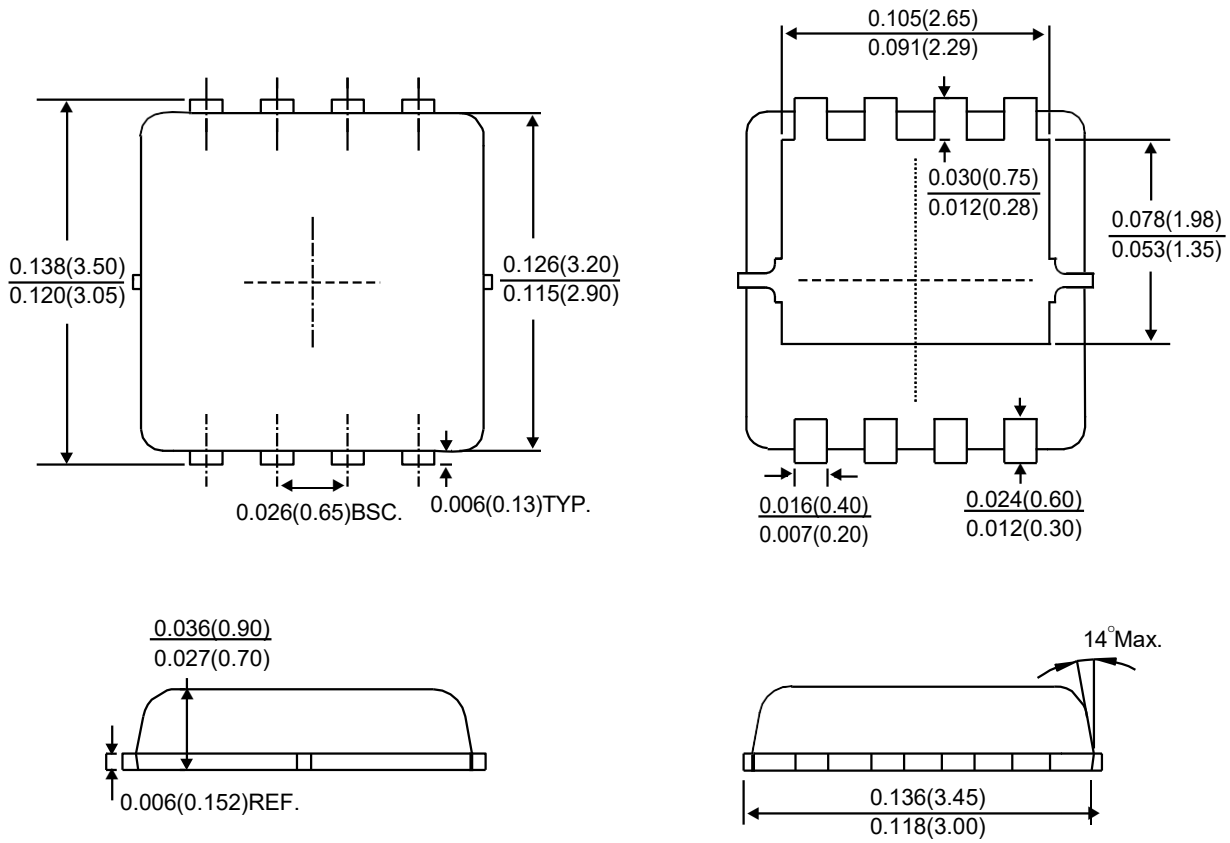


Characteristics Curves

FIG. 7-Safe Operating Area



Package Outline Dimensions



PPAK3X3

Dimensions in inches and (millimeters)

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