P3MND013

40V N-Channel MOSFETs

BV_{DSS}	$R_{DS(ON)}$	I_D
40 V	13 mΩ	30 A

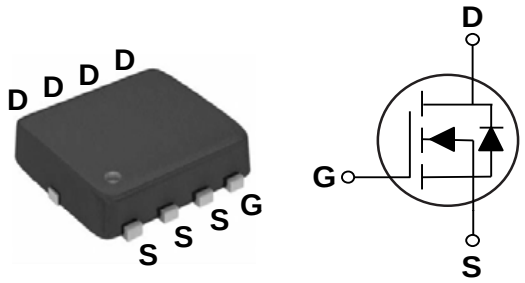
General Description

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

- 40V, 30A, $R_{DS(ON)}$=13mΩ@V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- Green Device Available

PPAK3X3 Pin Configuration



Applications

- Motor Drive
- Power Tools
- Quick Charger
- LED Lighting

Absolute Maximum Ratings T_C=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	+20 / -12	V
I_D	Drain Current - Continuous (T_C=25°C)	30	A
	Drain Current - Continuous (T_C=100°C)	19	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	120	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	29	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	24	A
P_D	Power Dissipation (T_C=25°C)	26	W
	Power Dissipation - Derate above 25°C	0.21	W/°C
T_J	Operating Junction Temperature Range	-50 to 150	°C
T_{STG}	Storage Temperature Range	-50 to 150	°C
Marking Code		ND013 / DC49B4	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	4.8	°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	40	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=40V , V_{GS}=0V , T_J=25°C	---	---	1	uA
		V_{DS}=32V , V_{GS}=0V , T_J=100°C	---	---	10	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=4A	---	11	13	mΩ
		V_{GS}=4.5V , I_D=3A	---	17	22	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	1.2	1.6	2.5	V
gfs	Forward Transconductance	V_{DS}=10V , I_S=5A	---	4	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge (NOTE 3、4)	V_{DS}=20V , V_{GS}=10V , I_D=15A	---	6.9	10	nC
Q_{gs}	Gate-Source Charge (NOTE 3、4)		---	1.3	2	
Q_{gd}	Gate-Drain Charge (NOTE 3、4)		---	3	4.5	
$T_{d(on)}$	Turn-On Delay Time (NOTE 3、4)	V_{DD}=20V , V_{GS}=10V , R_G=6Ω , I_D=10A	---	8	12	nS
T_r	Rise Time (NOTE 3、4)		---	12	18	
$T_{d(off)}$	Turn-Off Delay Time (NOTE 3、4)		---	25	38	
T_f	Fall Time (NOTE 3、4)		---	18	27	
C_{iss}	Input Capacitance	V_{DS}=20V , V_{GS}=0V , F=1MHz	---	495	740	pF
C_{oss}	Output Capacitance		---	310	460	
C_{rss}	Reverse Transfer Capacitance		---	13.5	20	
Rg	Gate resistance	V_{GS}=0V , V_{DS}=0V , F=1MHz	---	2	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	30	A
I_{SM}	Pulsed Source Current		---	---	60	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25°C	---	---	1	V
trr	Reverse Recovery Time	V_{GS}=10V , I_S=10A , dI/dt=100A/us , T_J=25°C	---	15	---	nS
Qrr	Reverse Recovery Charge		---	11	---	nC

NOTES：

1. Repetitive Rating：Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=24A, R_G=25Ω, Starting T_J=25℃.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

Characteristics Curves

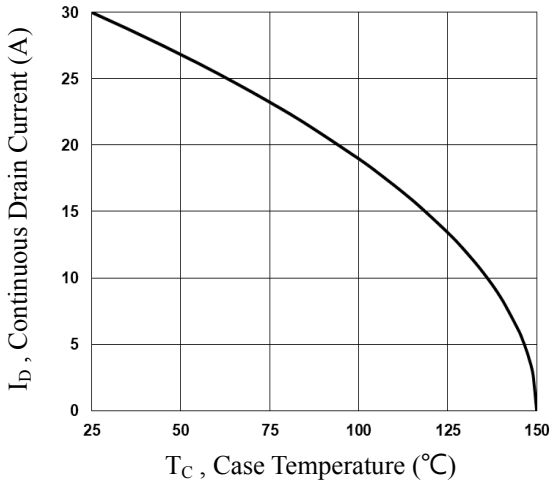


Fig.1 Continuous Drain Current vs. T_c

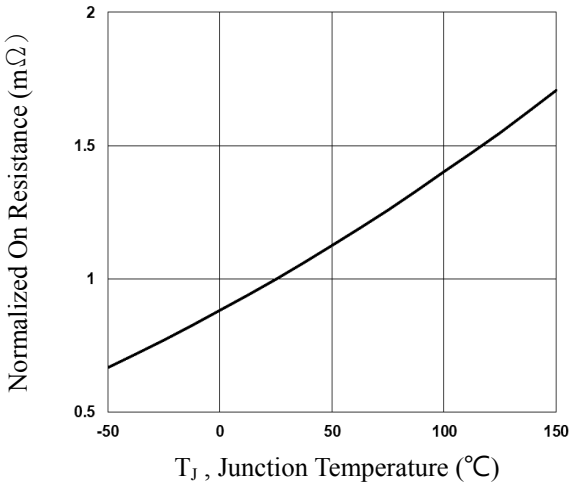


Fig.2 Normalized RDSON vs. T_J

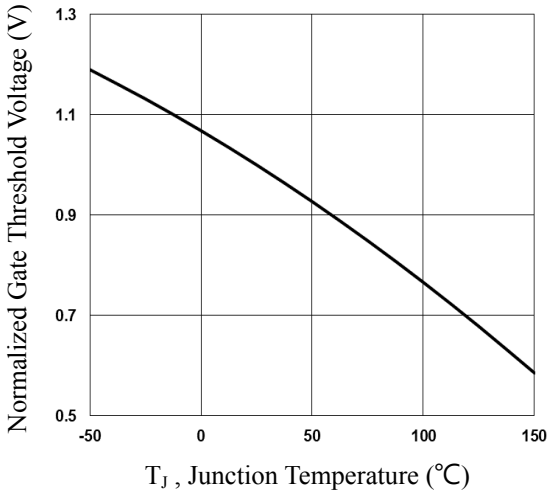


Fig.3 Normalized V_{th} vs. T_J

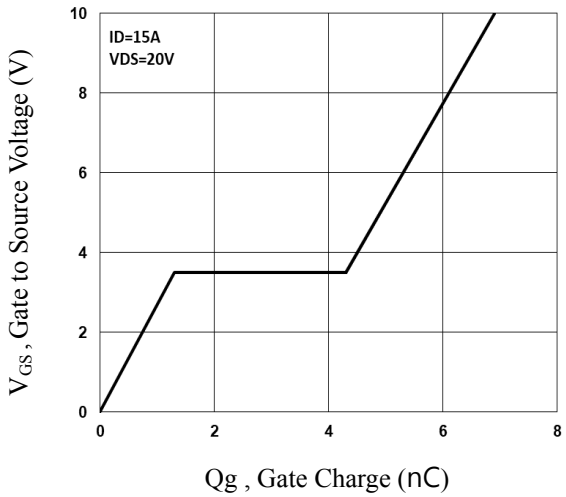


Fig.4 Gate Charge Waveform

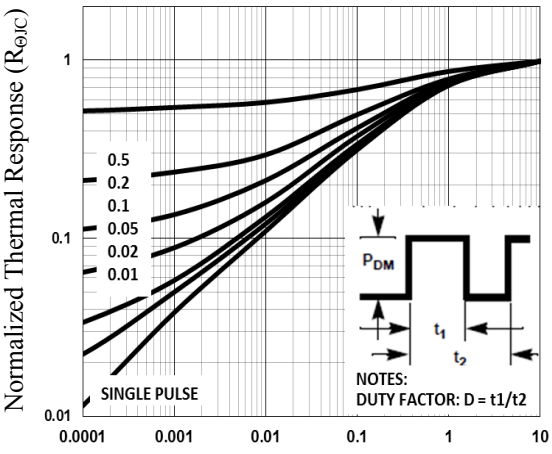


Fig.5 Normalized Transient Response

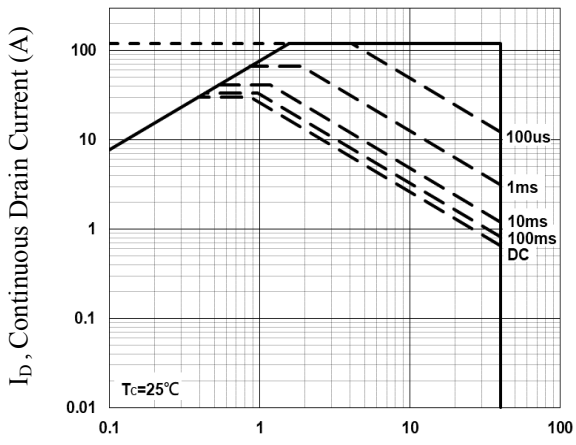


Fig.6 Maximum Safe Operation Area

Characteristics Curves

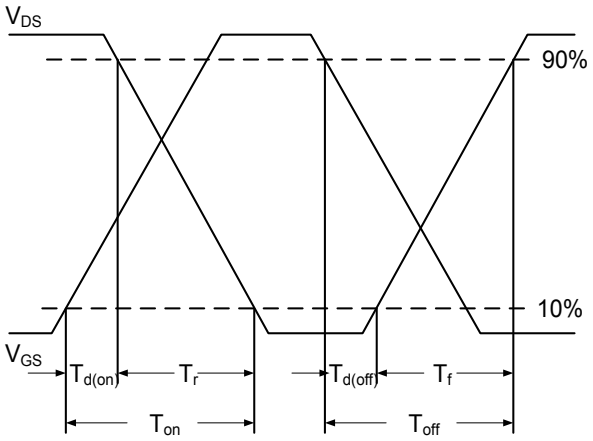


Fig.7 Switching Time Waveform

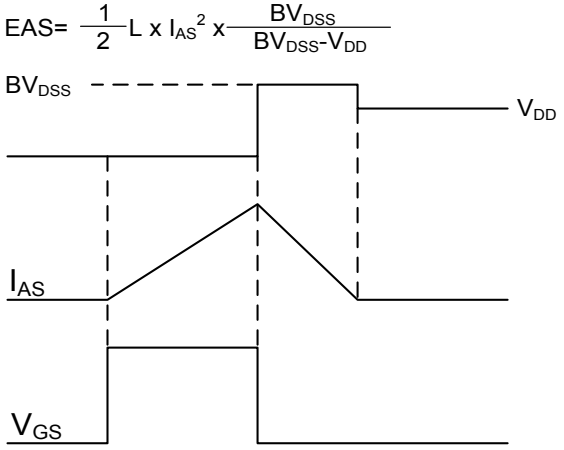
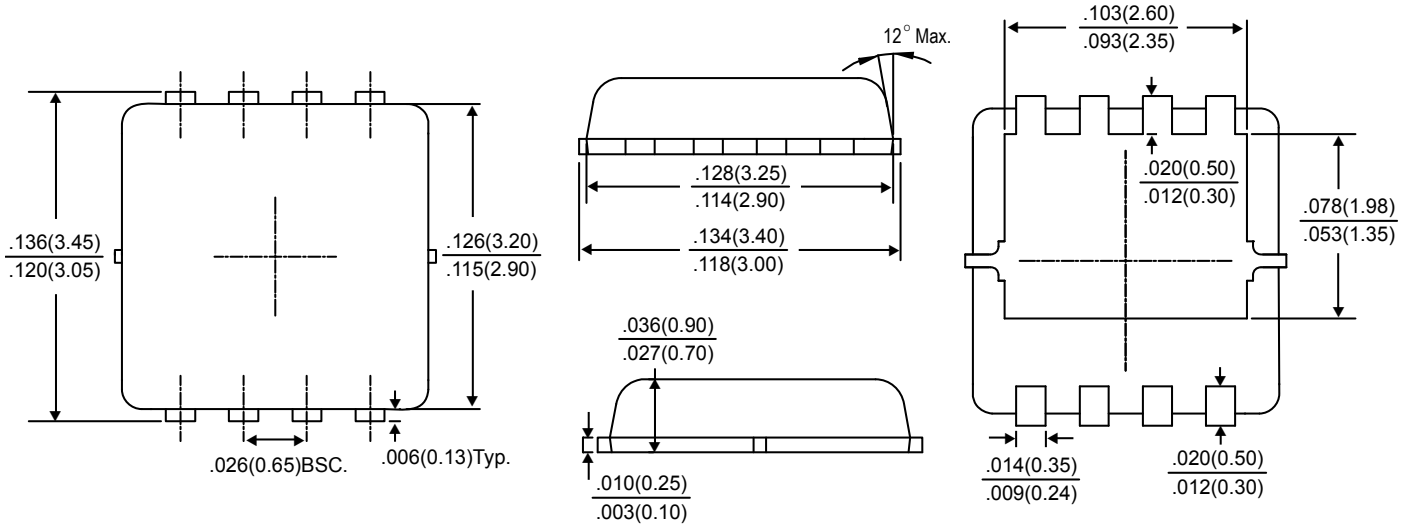


Fig.8 EAS Waveform

Package Outline Dimensions



PPAK3X3

Dimensions in inches and (millimeters)

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