



20V Dual N-Channel MOSFETs

General Description

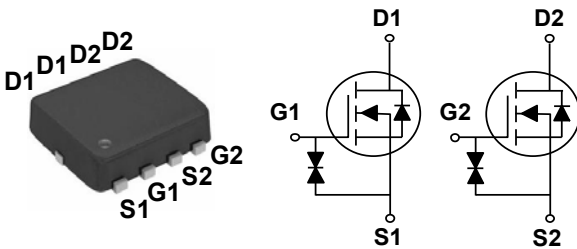
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
20 V	12 m Ω	30 A

Features

- $R_{DS(ON)} \leq 12m\Omega @ V_{GS}=4.5V$
- Improved dv/dt Capability
- Fast Switching
- Green Device Available
- ESD Protection Diode Embedded

PPAK3X3 Dual Pin Configuration



Applications

- MB / VGA / Vcore
- POL Applications
- SMPS 2nd SR
- Li-Battery Protection

Absolute Maximum Ratings $T_C=25^\circ C$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	20	V
V_{GS}	Gate-Source Voltage	± 10	V
I_D	Drain Current - Continuous ($T_C=25^\circ C$)	30	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	120	A
P_D	Power Dissipation ($T_C=25^\circ C$)	26	W
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
Marking Code		NB012	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	4.8	$^\circ C/W$



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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	20	---	---	V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =20V, V _{GS} =0V	---	---	1	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±10V, V _{DS} =0V	---	---	±10	uA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =10A	---	---	12	mΩ
		V _{GS} =3.0V, I _D =9A	---	---	13.2	
		V _{GS} =2.5V, I _D =8A	---	---	14.5	
		V _{GS} =1.8V, I _D =8A	---	---	20	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	0.3	---	1.0	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =5A	---	12	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} =10V, V _{GS} =4.5V, I _D =5A (NOTE 2、3)	---	16.9	---	nC
Q _{gs}	Gate-Source Charge		---	1.1	---	
Q _{gd}	Gate-Drain Charge		---	4	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =10V, V _{GS} =4.5V, R _G =25Ω, I _D =1A (NOTE 2、3)	---	6.8	---	nS
T _r	Rise Time		---	20	---	
T _{d(off)}	Turn-Off Delay Time		---	41.8	---	
T _f	Fall Time		---	13.2	---	
C _{iss}	Input Capacitance	V _{DS} =10V, V _{GS} =0V, F=1MHz	---	1020	---	pF
C _{oss}	Output Capacitance		---	160	---	
C _{rss}	Reverse Transfer Capacitance		---	110	---	
R _g	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	---	---	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

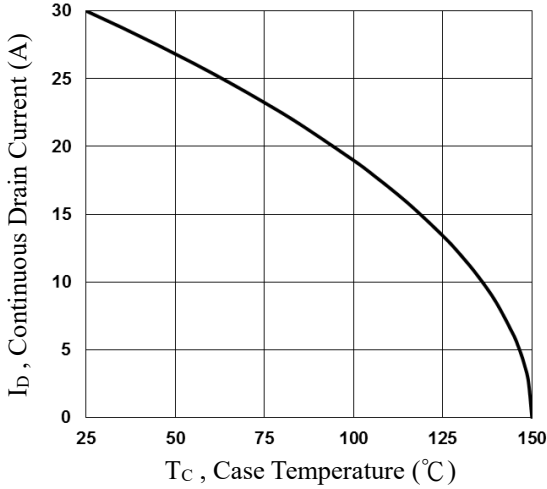


Fig.1 Continuous Drain Current vs. T_c

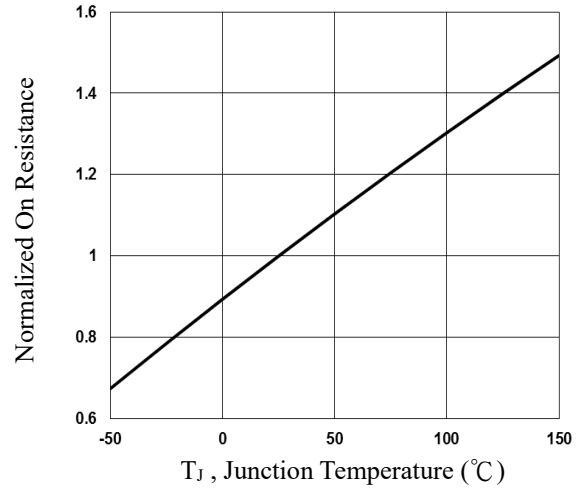


Fig.2 Normalized $R_{DS(on)}$ vs. T_j

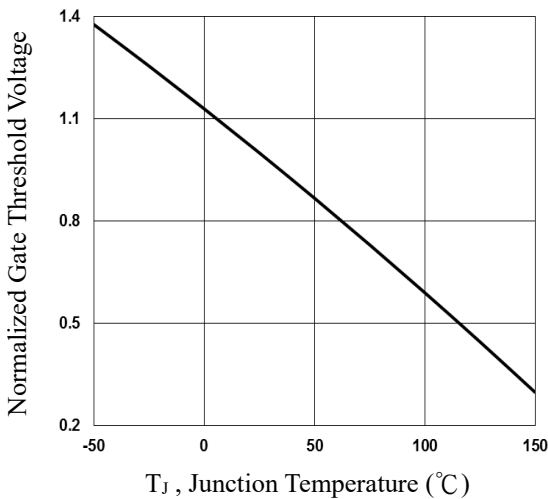


Fig.3 Normalized V_{th} vs. T_j

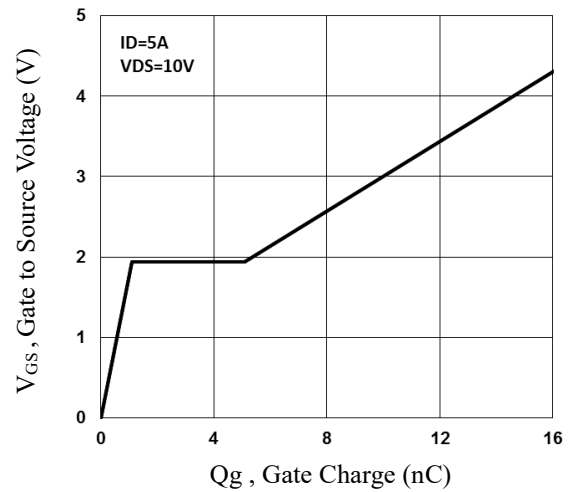


Fig.4 Gate Charge Waveform

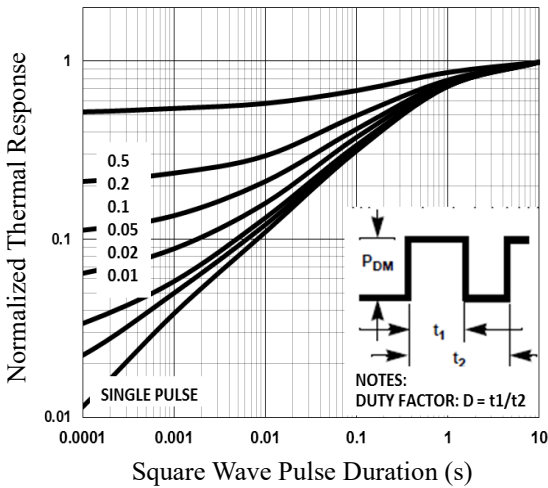


Fig.5 Normalized Transient Response

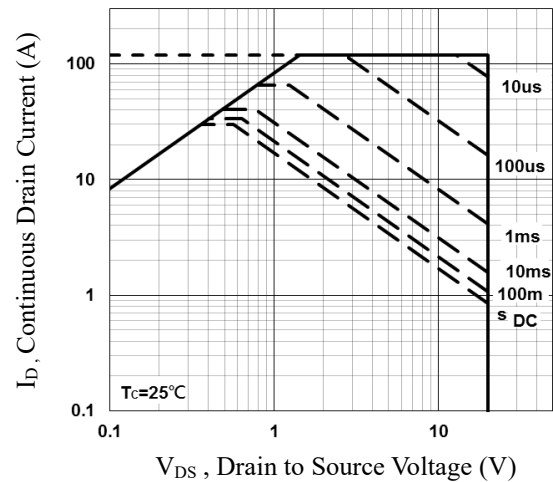


Fig.6 Maximum Safe Operation Area



Characteristics Curves

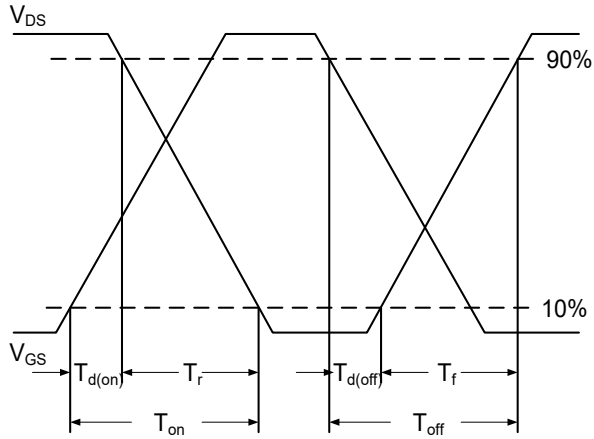
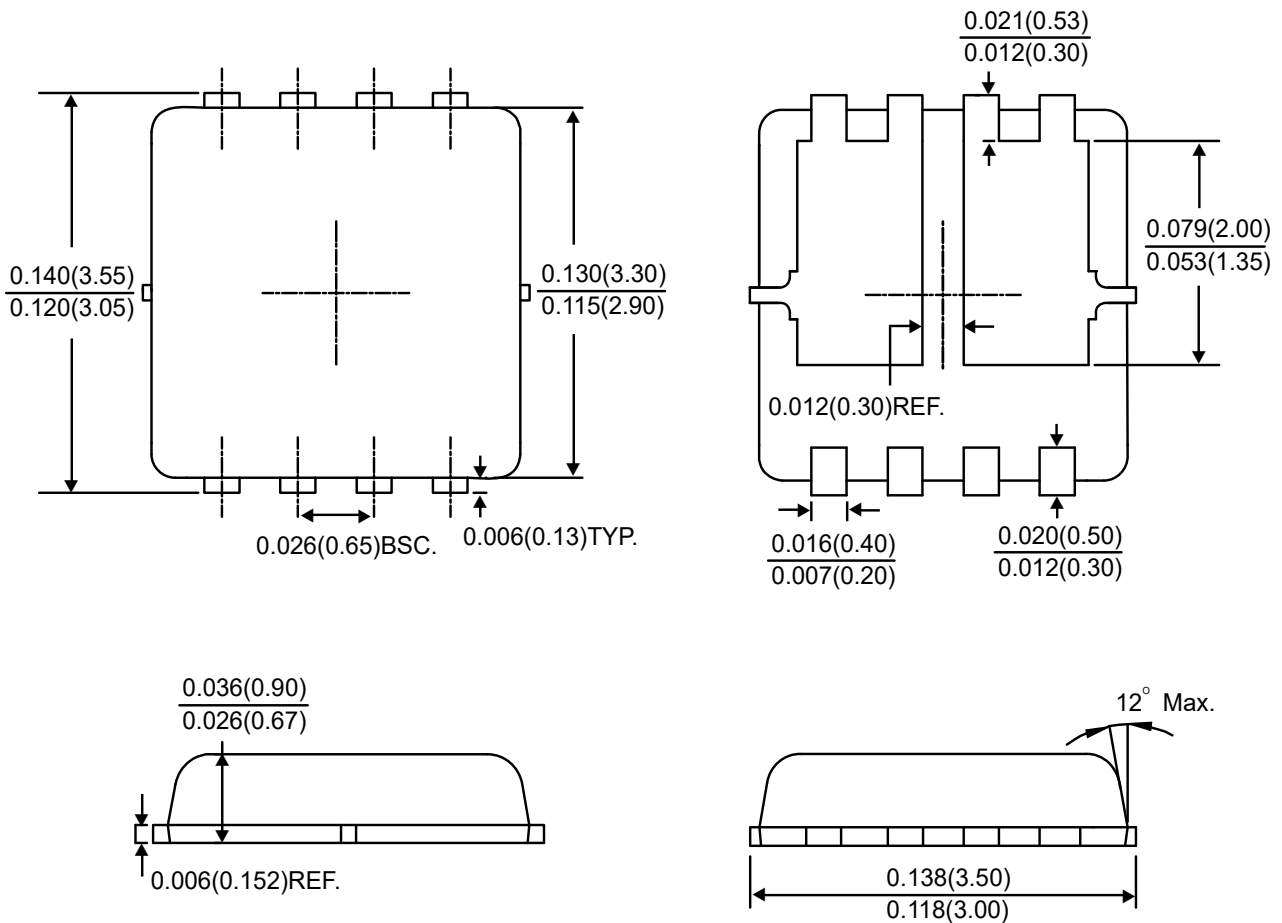


Fig.7 Switching Time Waveform

Package Outline Dimensions



PPAK3X3 Dual

Dimensions in inches and (millimeters)



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