N8MNB013

20V N-Channel MOSFETs

BV_{DSS}	$R_{DS(ON)}$	I_D
20 V	13 mΩ	9.9 A

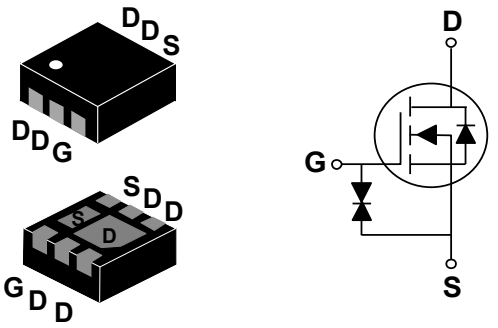
General Description

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

- $R_{DS(ON)}$≤13mΩ@V_{GS}=4.5V
- Improved dv/dt capability
- Green Device Available

DFN2x2-6L Pin Configuration



Applications

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

Absolute Maximum Ratings T_C=25°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_A=25°C)	9.9	A
	Drain Current - Continuous (T_A=70°C)	7.9	A
I_{DM}	Drain Current - Pulsed (NOTE 1) (Chip Limitation)	39.6	A
P_D	Power Dissipation (T_A=25°C)	2.01	W
	Power Dissipation - Derate above 25°C	0.016	W/°C
T_J	Operating Junction Temperature Range	-55 to 150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
Marking Code		p	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62	°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	20	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=20V , V_{GS}=0V , T_J=25°C	---	---	1	uA
		V_{DS}=16V , V_{GS}=0V , T_J=125°C	---	---	10	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=5A	---	10	13	mΩ
		V_{GS}=2.5V , I_D=3A	---	11.5	15.5	
		V_{GS}=1.8V , I_D=2A	---	15	21	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	0.3	0.6	1	V
gfs	Forward Transconductance	V_{DS}=10V , I_S=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=5.A (NOTE 2、3)	---	16.9	26	nC
Q_{gs}	Gate-Source Charge		---	1.1	3	
Q_{gd}	Gate-Drain Charge		---	4	7	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=10V , V_{GS}=4.5V , R_G=25Ω , I_D=1A (NOTE 2、3)	---	6.8	13	nS
T_r	Rise Time		---	20	38	
$T_{d(off)}$	Turn-Off Delay Time		---	41.8	79	
T_f	Fall Time		---	13.2	25	
C_{iss}	Input Capacitance	V_{DS}=10V , V_{GS}=0V , F=1MHz	---	1020	1480	pF
C_{oss}	Output Capacitance		---	160	240	
C_{rss}	Reverse Transfer Capacitance		---	110	160	
R_g	Gate resistance	V_{GS}=0V , V_{DS}=0V , F=1MHz	---	2	4	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	---	---	9.9	A
I_{SM}	Pulsed Source Current		---	---	19.8	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=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

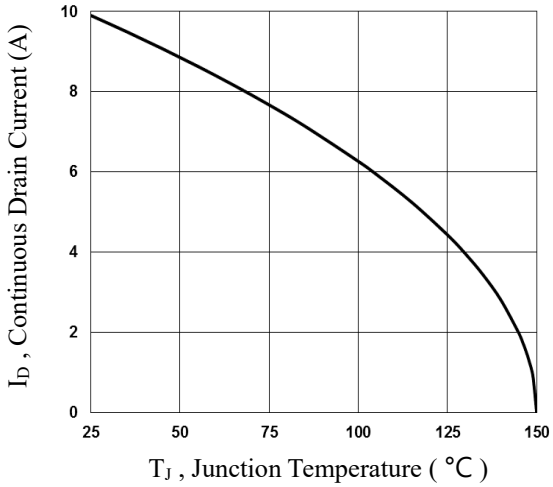


Fig.1 Continuous Drain Current vs. T_C

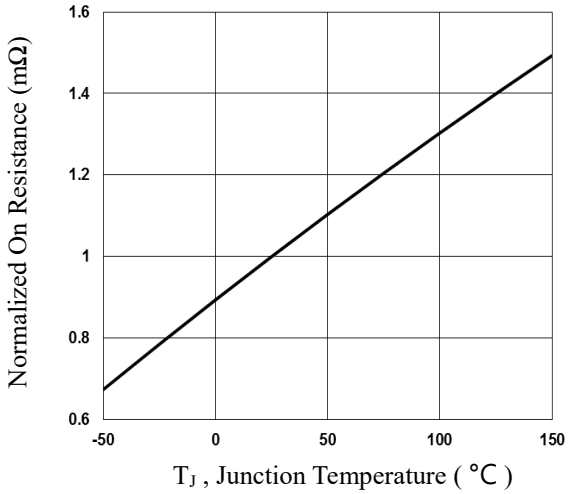


Fig.2 Normalized RDSON vs. T_J

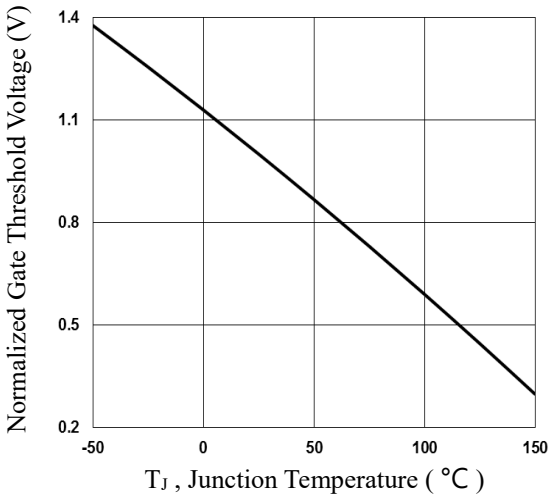


Fig.3 Normalized V_{th} vs. T_J

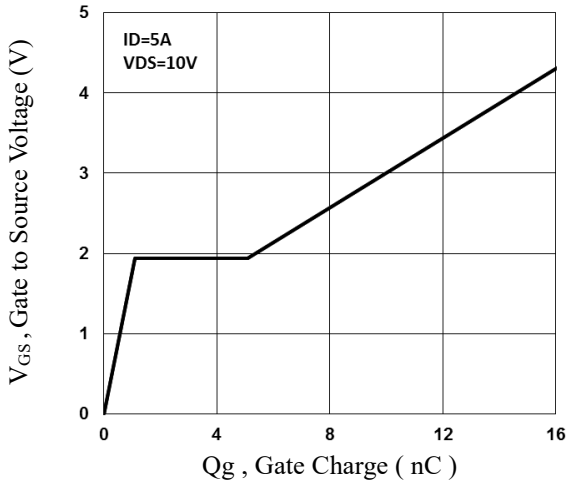


Fig.4 Gate Charge Waveform

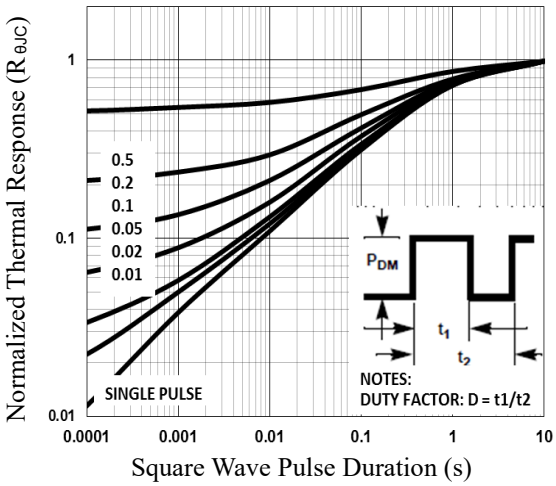


Fig.5 Normalized Transient Response

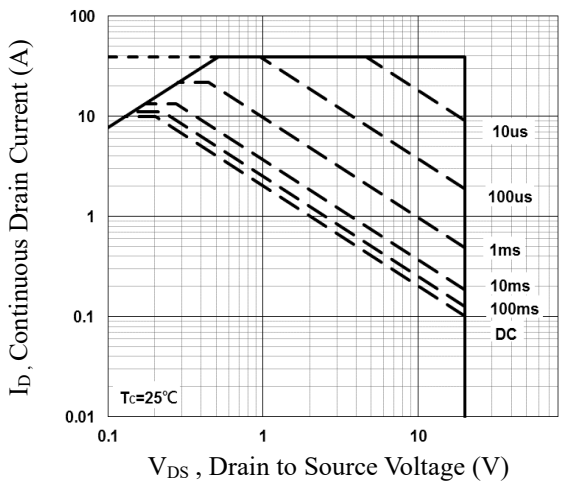


Fig.6 Maximum Safe Operation Area

Characteristics Curves

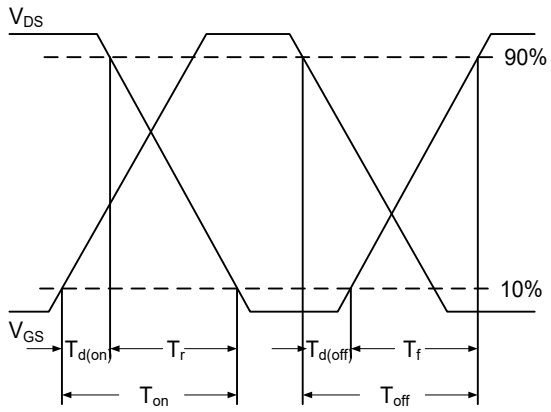
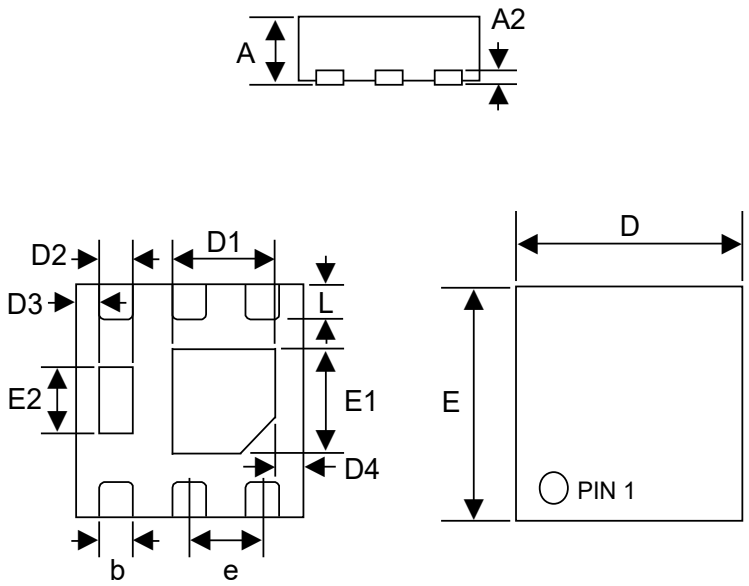


Fig.7 Switching Time Waveform

Package Outline Dimensions



Symbol	Dimensions in mm		Dimensions in inches	
	Min.	Max.	Min.	Max.
A	0.50	0.80	0.019	0.032
A2	0.152 REF		0.006 REF	
b	0.25	0.35	0.009	0.014
D	1.90	2.10	0.074	0.083
D1	0.80	1.00	0.031	0.040
D2	0.25	0.35	0.009	0.014
D3	0.20 BSC		0.008 BSC	
D4	0.25 BSC		0.010 BSC	
E	1.90	2.10	0.074	0.083
E1	0.80	1.10	0.031	0.044
E2	0.46	0.66	0.018	0.260
e	0.65 BSC		0.026 BSC	
L	0.25	0.35	0.009	0.014

DFN2x2-6L

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