



20V Dual N-Channel MOSFETs

General Description

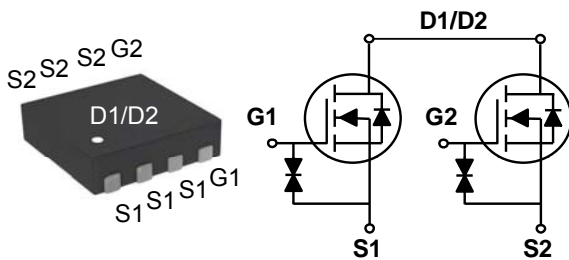
These N Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
20 V	8 m Ω	24 A

Features

- $R_{DS(ON)} \leq 8m\Omega @ V_{GS}=4.5V$
- Fast switching
- Green Device Available
- Improved dv/dt capability

DFN3x3 Dual Pin Configuration



Applications

- Handheld Instruments
- POL Applications
- Battery Protection Applications

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	± 12	V
I_D	Drain Current - Continuous ($T_C=25^\circ C$)	24	A
	Drain Current - Continuous ($T_C=100^\circ C$)	15	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	96	A
P_D	Power Dissipation ($T_C=25^\circ C$)	27	W
	Power Dissipation - Derate above $25^\circ C$	0.22	W/ $^\circ C$
T_J	Operating Junction Temperature Range	-50 to 150	$^\circ C$
T_{STG}	Storage Temperature Range	-50 to 150	$^\circ C$
Marking Code		NB8P0 , EB2594P	

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	---	4.55	$^\circ C/W$



N3MNB8P0



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

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
B _V 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 =85°C	---	---	10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±12V, V _{DS} =0V	---	---	±20	uA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R _{DS(on)}	Static Drain-Source On-Resistance (NOTE 3)	V _{GS} =4.5V, I _D =2.4A	---	6.7	8	mΩ
		V _{GS} =4.0V, I _D =2.4A	---	7.1	8.5	
		V _{GS} =3.7V, I _D =2.4A	---	7.3	9	
		V _{GS} =3.1V, I _D =2.4A	---	8	10.5	
		V _{GS} =2.5V, I _D =2.4A	---	9.2	12	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	0.5	0.65	1.5	V
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =5A	---	15	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} =20V, V _{GS} =4.5V, I _D =5A (NOTE 2、3)	---	13.8	---	nC
Q _{gs}	Gate-Source Charge		---	2.1	---	
Q _{gd}	Gate-Drain Charge		---	4.5	---	
T _{d(on)}	Turn-On Delay Time	V _{DD} =15V, V _{GS} =10V, I _D =5A, R _G =6Ω (NOTE 2、3)	---	28	---	nS
T _r	Rise Time		---	64	---	
T _{d(off)}	Turn-Off Delay Time		---	60	---	
T _f	Fall Time		---	55	---	
C _{iss}	Input Capacitance	V _{DS} =20V, V _{GS} =0V, F=1MHz	---	1514	---	pF
C _{oss}	Output Capacitance		---	178	---	
C _{rss}	Reverse Transfer Capacitance		---	145	---	

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	---	---	24	A
I _{SM}	Pulsed Source Current		---	---	48	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.



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Characteristics Curves

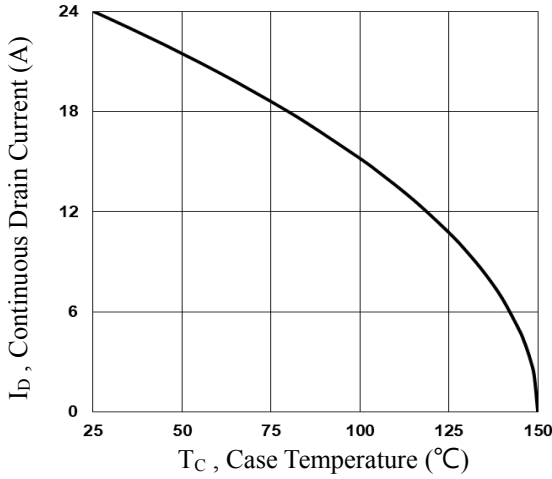


Fig.1 Continuous Drain Current vs. T_c

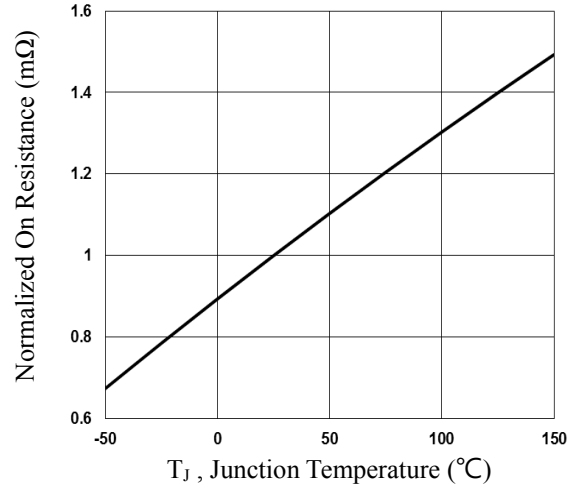


Fig.2 Normalized R_{DS(on)} vs. T_j

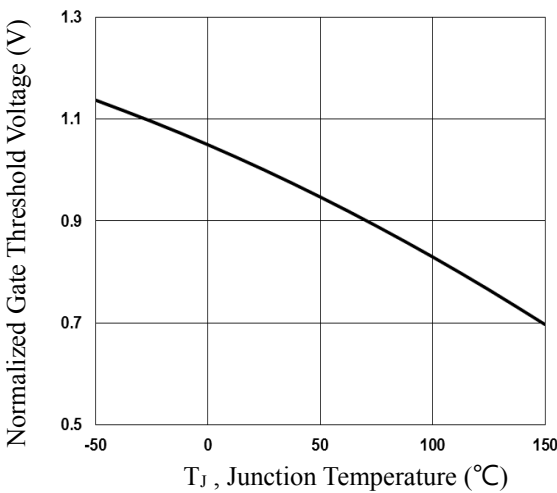


Fig.3 Normalized V_{th} vs. T_j

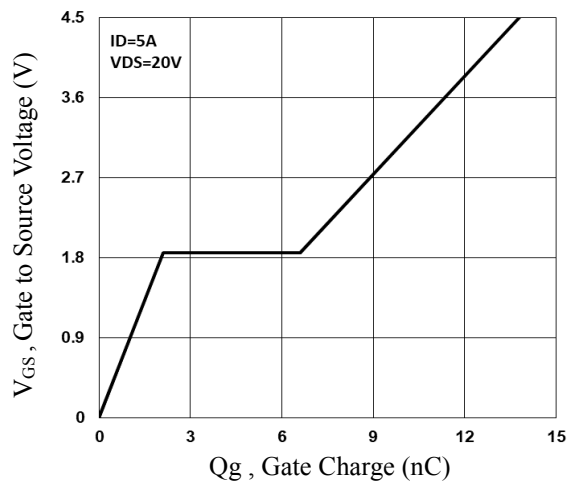


Fig.4 Gate Charge Waveform

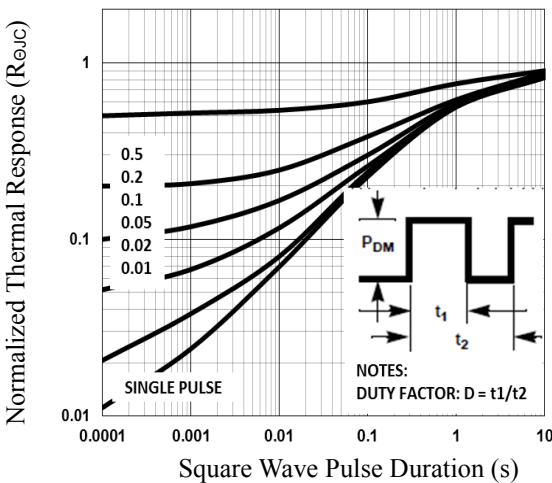


Fig.5 Normalized Transient Response

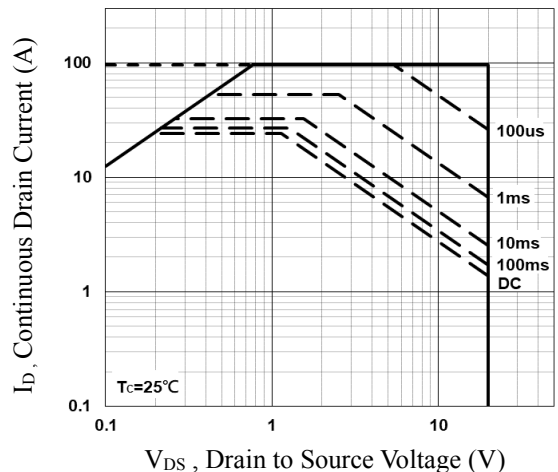


Fig.6 Maximum Safe Operation Area



Characteristics Curves

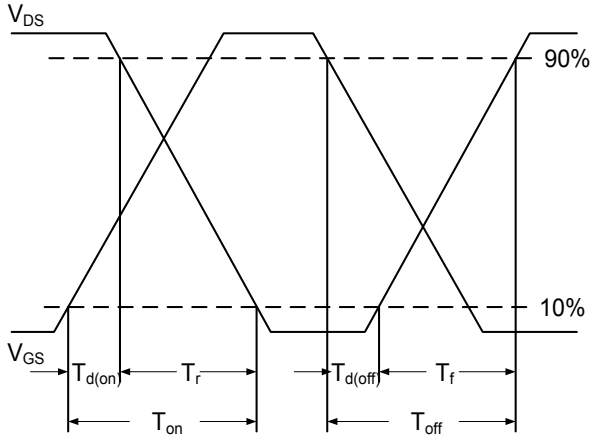


Fig.7 Switching Time Waveform

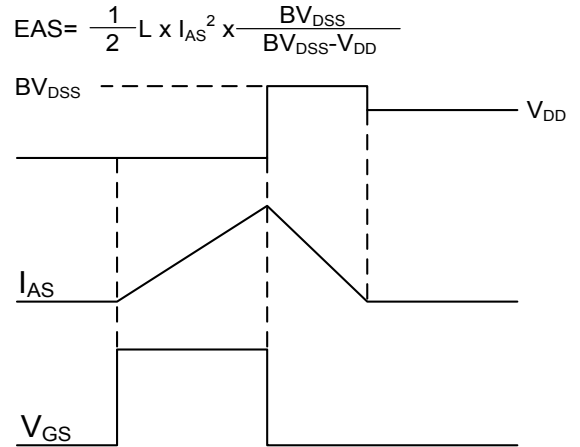
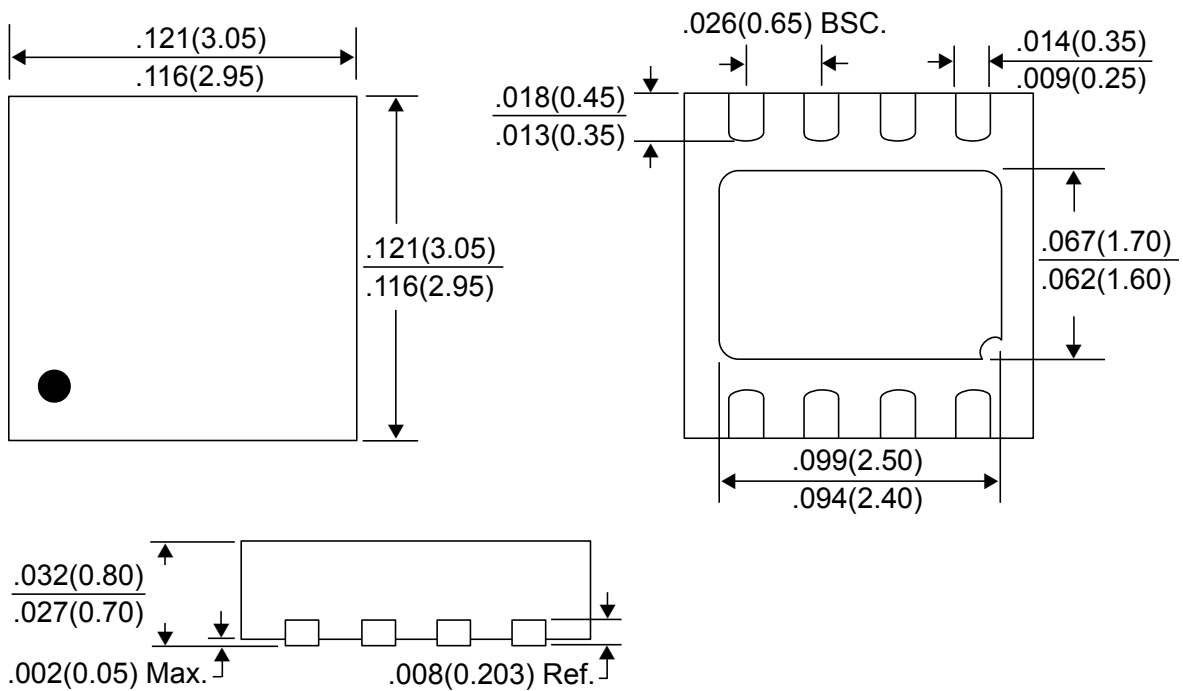


Fig.8 EAS Waveform

Package Outline Dimensions



DFN3x3

Dimensions in inches and (millimeters)



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