N3MNB5P8

20V Dual N-Channel MOSFETs

General Description

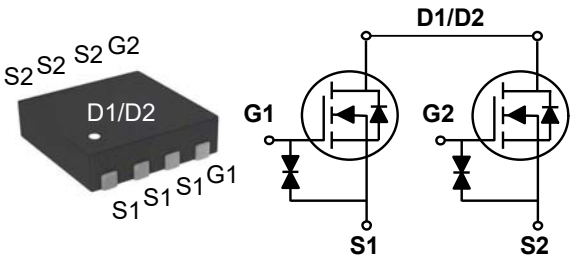
The N3MNB5P8 is the highest performance trench N-ch MOSFETs with extreme high cell density, which provide excellent $R_{DS(ON)}$ and gate charge for most of the small power switching and load switch applications.

BV_{DSS}	$R_{DS(ON)}$	I_D
20 V	5.8 mΩ	56 A

Features

- $R_{DS(ON)} \leqq 5.8m\Omega @ V_{GS}=4.5V$
- Super Low Gate Charge
- Green Device Available
- Excellent CdV/dt effect decline

DFN3x3 Dual Pin Configuration



Applications

- Handheld Instruments
- POL Applications
- Battery Protection Applications

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	±8	V
I_D	Drain Current - Continuous (T_C=25°C)	56	A
	Drain Current - Continuous (T_C=100°C)	35.6	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	100	A
P_D	Power Dissipation (T_C=25°C)	31	W
T_J	Operating Junction Temperature Range	-55 to 150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
Marking Code		NB5P8 , A2030	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	35	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	4	°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}=16V , V_{GS}=0V , T_J=25°C	---	---	1	uA
		V_{DS}=16V , V_{GS}=0V , T_J=55°C	---	---	5	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±8V , V_{DS}=0V	---	---	±10	uA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance (NOTE 1)	V_{GS}=4.5V , I_D=3A	---	4.3	5.8	mΩ
		V_{GS}=3.9V , I_D=3A	---	4.5	6.5	
		V_{GS}=2.5V , I_D=3A	---	5	7	
		V_{GS}=1.8V , I_D=3A	---	7	11	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	0.4	---	1.0	V
gfs	Forward Transconductance	V_{DS}=5V , I_D=3A	---	42	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge (4.5V)	V_{DS}=10V , I_D=3A	---	38	---	nC
	Total Gate Charge (3.9V)		---	33	---	
Q_{gs}	Gate-Source Charge		---	4.5	---	
Q_{gd}	Gate-Drain Charge		---	12	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=16V , V_{GS}=4.5V , I_D=3A , R_G=6Ω	---	22	---	nS
T_r	Rise Time		---	41	---	
$T_{d(off)}$	Turn-Off Delay Time		---	77	---	
T_f	Fall Time		---	21	---	
C_{iss}	Input Capacitance	V_{DS}=10V , V_{GS}=0V , F=1MHz	---	3165	---	pF
C_{oss}	Output Capacitance		---	380	---	
C_{rss}	Reverse Transfer Capacitance		---	325	---	

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 (NOTE 1)		---	---	100	A
V_{SD}	Diode Forward Voltage (NOTE 1)	V_{GS}=0V , I_S=3A , T_J=25°C	---	---	1.2	V

NOTES：

1. The data tested by pulsed , pulse width ≦ 10us , duty cycle ≦ 1%.

Characteristics Curves

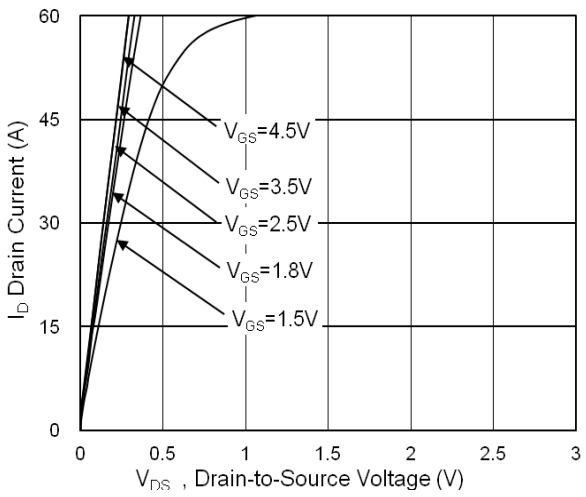


Fig.1 Typical Output Characteristics

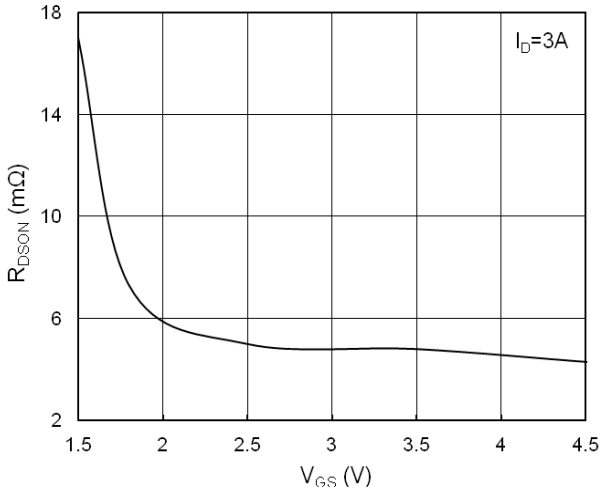


Fig.2 On-Resistance vs. Gate-Source

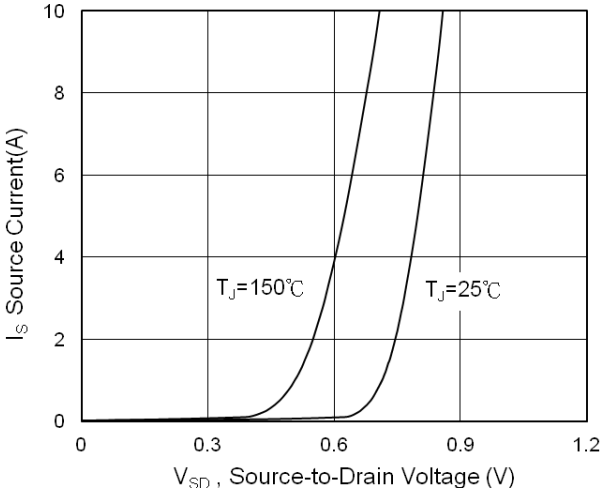


Fig.3 Forward Characteristics

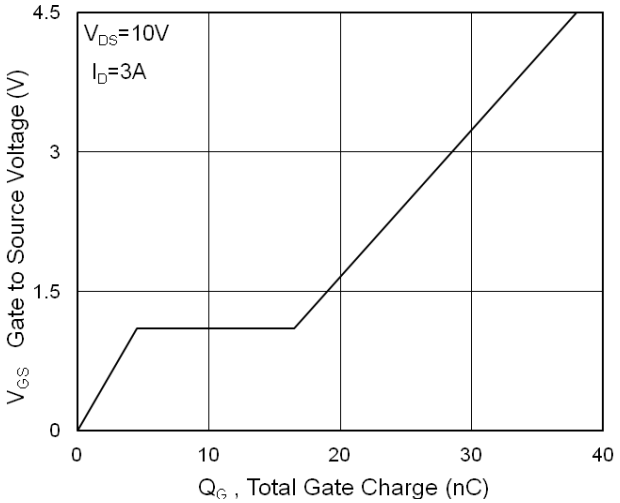


Fig.4 Gate-Charge Characteristics

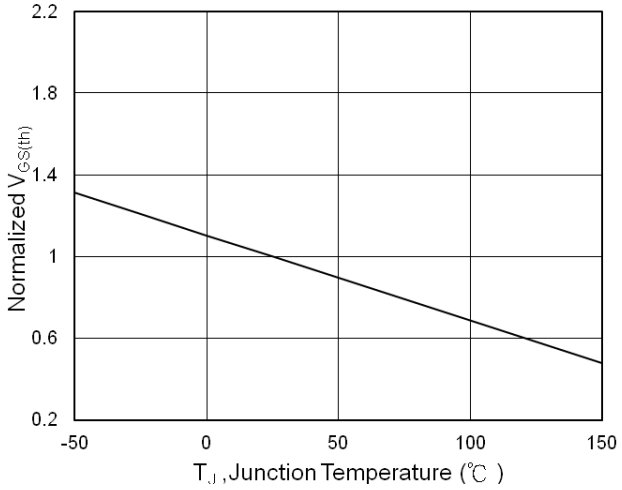


Fig.5 $V_{GS(th)}$ vs. T_J

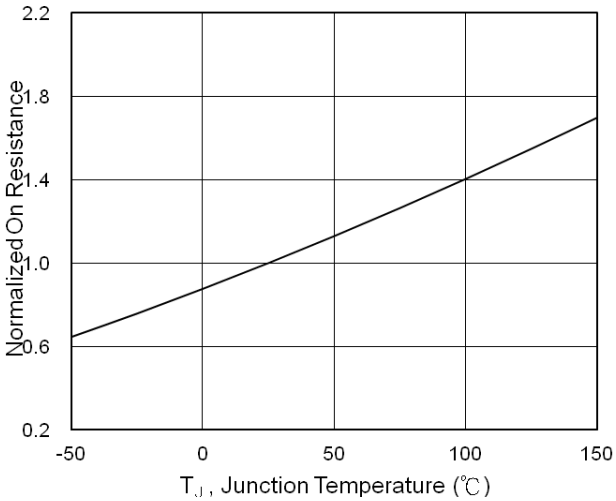


Fig.6 Normalized R_{DSON} vs. T_J

Characteristics Curves

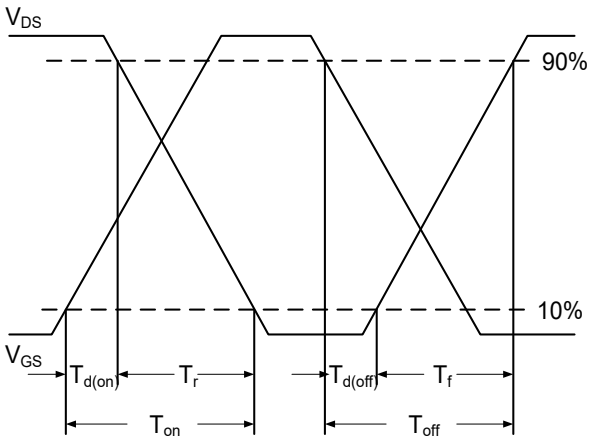


Fig. 7 Switching Time Waveform

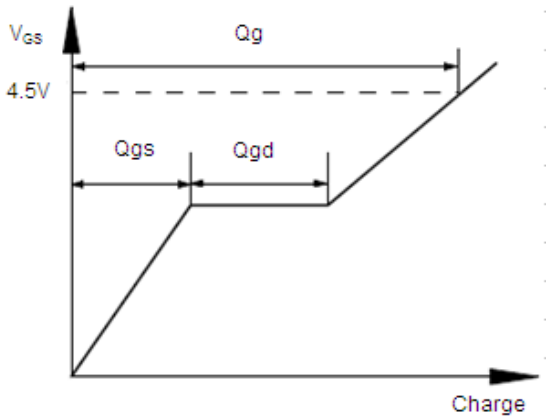
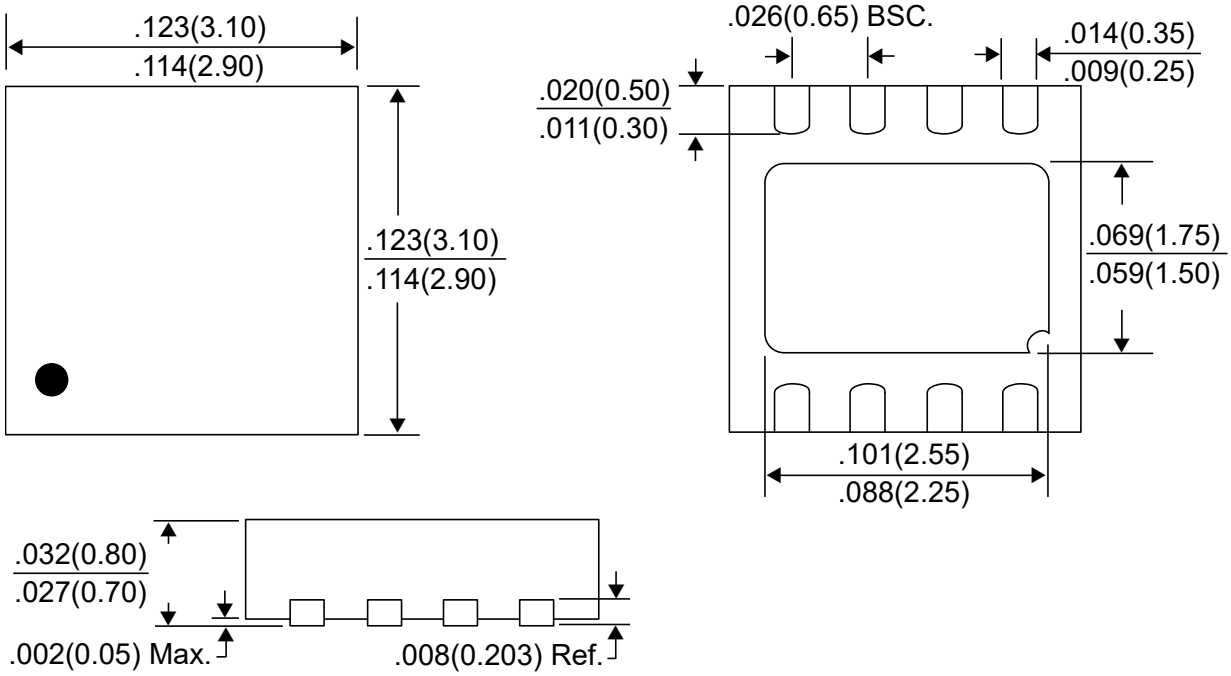


Fig. 8 Gate Charge Waveform

Package Outline Dimensions



DFN3x3

Dimensions in inches and (millimeters)

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