I2MNAB25H

650V N-Channel MOSFETs

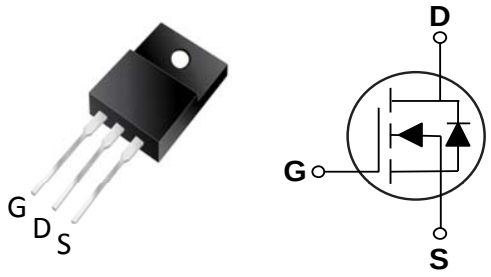
General Description

The I2MNAB25H is a high voltage power MOSFET designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristic.

This power MOSFET is usually used in high speed switching applications including power supplies, PWM motor controls, high efficient AC to DC converters and bridge circuits.

BV_{DSS}	$R_{DS(ON)}$	I_D
650 V	2.5 Ω	4 A

TO-220F Pin Configuration



Features

- $R_{DS(ON)} \leqq 2.5\Omega$ @V_{GS}=10V
- Fast Switching Capability
- Avalanche Energy Specified
- Improved dv/dt Capability, High Ruggedness

Absolute Maximum Ratings T_C=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	650	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Drain Current - Continuous	4	A
I_{DM}	Drain Current - Pulsed (NOTE 2)	16	A
EAS	Single Pulse Avalanche Energy (NOTE 3)	113	mJ
P_D	Power Dissipation	36	W
	Power Dissipation - Derate above 25°C	0.29	W/°C
T_J	Operating Junction Temperature Range	-50 to 150	°C
T_{STG}	Storage Temperature Range	-50 to 150	°C
Marking Code		NAB25H	

NOTES：

1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. L=25mH, I_{AS}=3A, V_{DD}=50V, R_G=25Ω, Starting T_J= 25°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	62.5	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	3.4	°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	650	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=650V , V_{GS}=0V	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±30V , 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=2A	---	2.2	2.5	Ω
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	2.0	---	4.0	V

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS}=100V , V_{GS}=10V , I_D=3A , I_G=1mA (NOTE 4、5)	---	13	---	nC
Q_{gs}	Gate-Source Charge		---	3.6	---	
Q_{gd}	Gate-Drain Charge		---	2	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=100V , V_{GS}=10V , R_G=25Ω , I_D=2A (NOTE 4、5)	---	30	---	ns
T_r	Rise Time		---	10	---	
$T_{d(off)}$	Turn-Off Delay Time		---	60	---	
T_f	Fall Time		---	50	---	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , F=1MHz	---	600	---	pF
C_{oss}	Output Capacitance		---	53.8	---	
C_{rss}	Reverse Transfer Capacitance		---	3.2	---	

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current		---	---	4	A
I_{SM}	Pulsed Source Current		---	---	16	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=4A	---	---	1.4	V
trr	Reverse Recovery Time	I_S=4A , V_{GS}=0V , dI_F/dt=100A/μs (NOTE 4)	---	230	---	nS
Qrr	Reverse Recovery Charge		---	1.6	---	uC

NOTES：

4. Pulse test：pulse width ≦ 300us , duty cycle ≦ 2%.

5. Essentially independent of operating temperature.

Test Circuits And Waveforms

FIG. 1-Peak Diode Recovery dv/dt Test Circuit

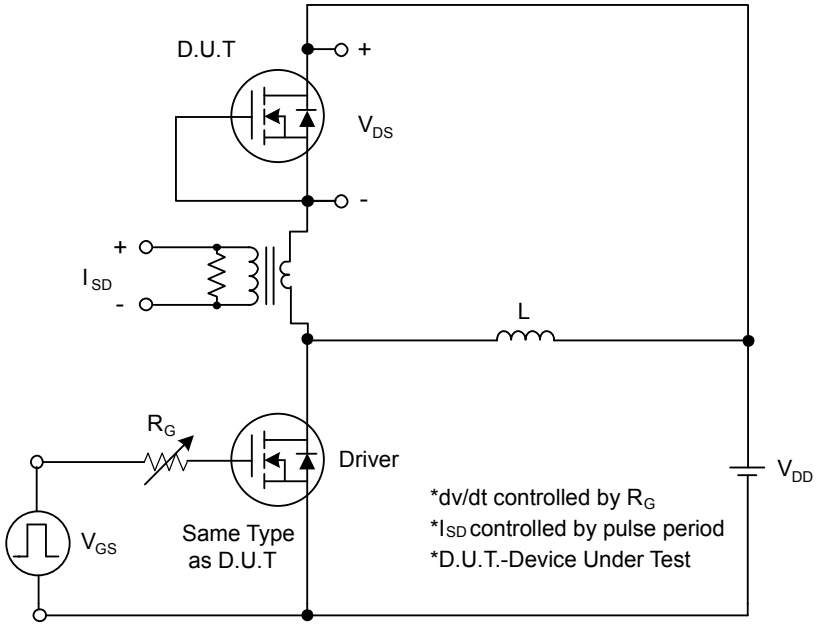
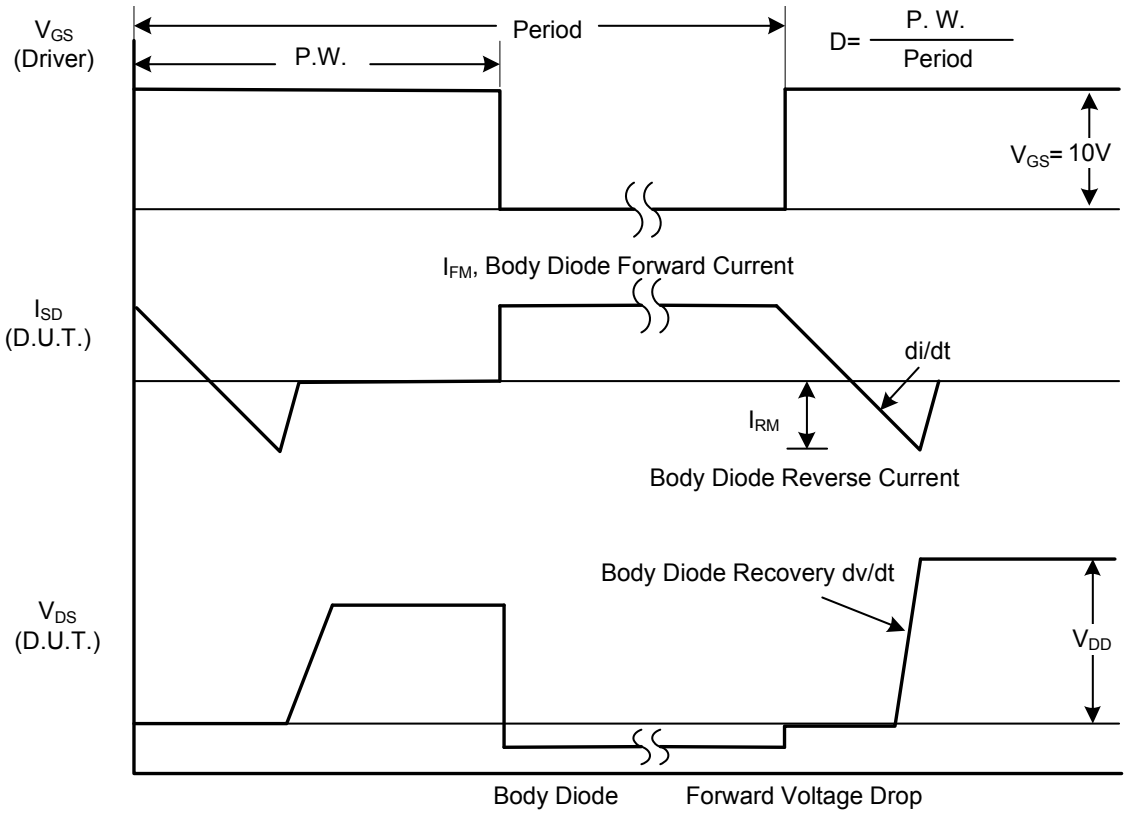


FIG. 2-Peak Diode Recovery dv/dt Waveforms



Test Circuits And Waveforms

FIG. 3-Switching Test Circuit

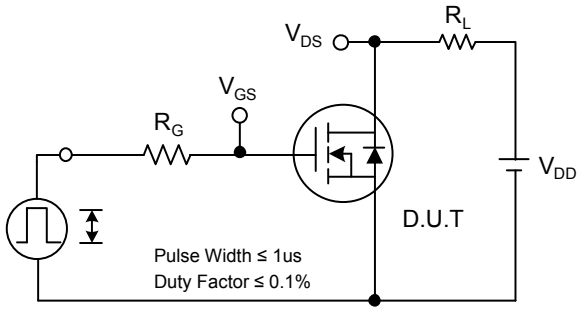


FIG. 4-Switching Waveforms

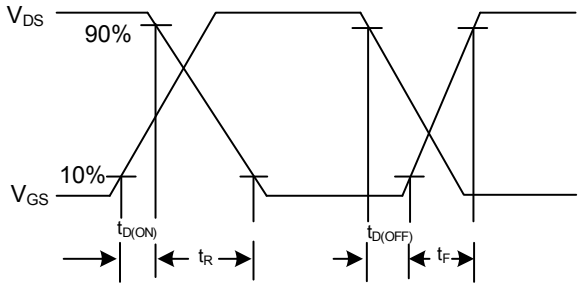


FIG. 5-Gate Charge Test Circuit

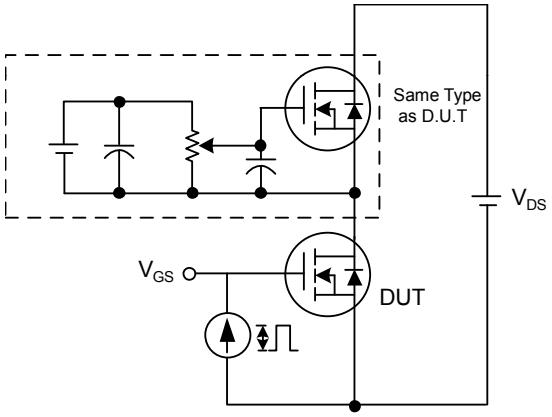


FIG. 6-Gate Charge Waveform

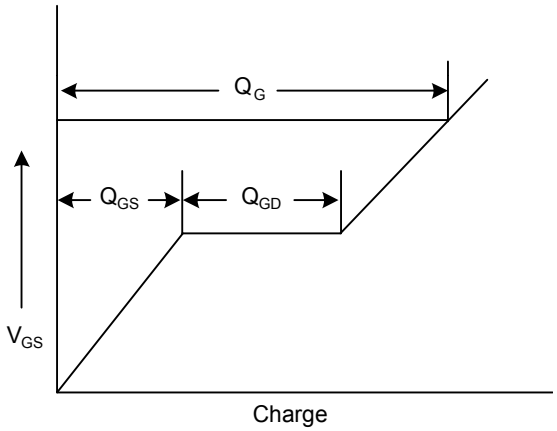


FIG. 7-Unclamped Inductive Switching Test Circuit

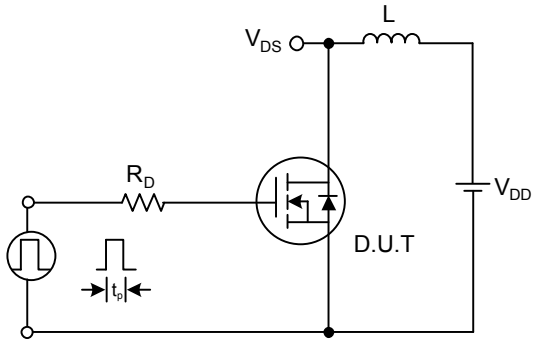
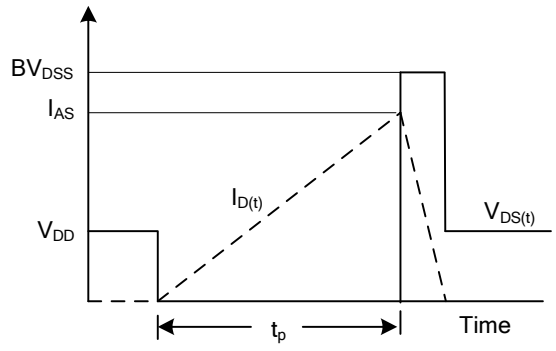


FIG. 8-Unclamped Inductive Switching Waveforms



Characteristics Curves

FIG. 1-Transfer Characteristics

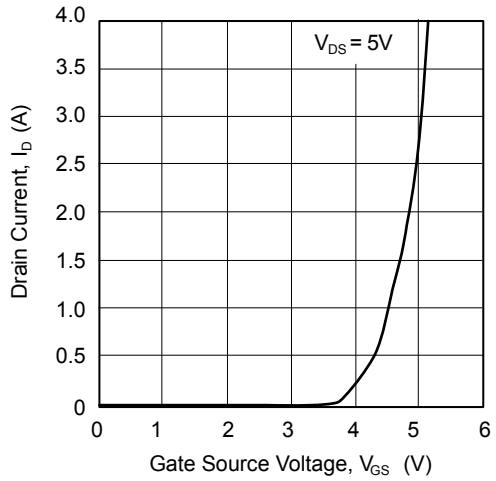


FIG. 2-Drain Current vs. Gate Threshold Voltage

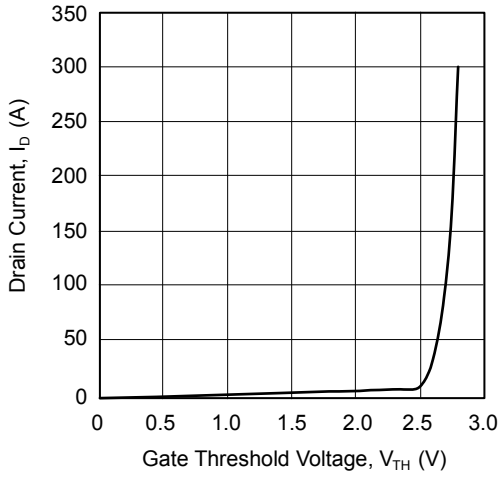


FIG. 3-Drain Current vs. Drain-Source Breakdown Voltage

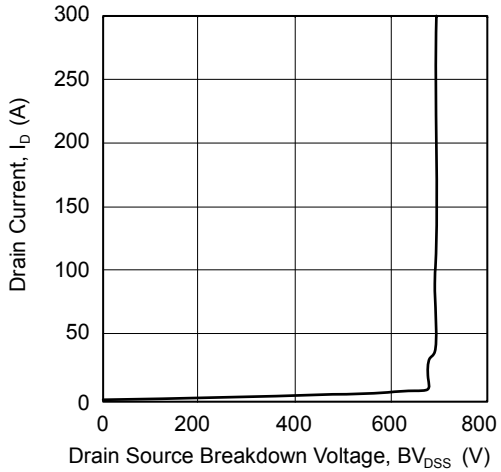


FIG. 4-On State Characteristics

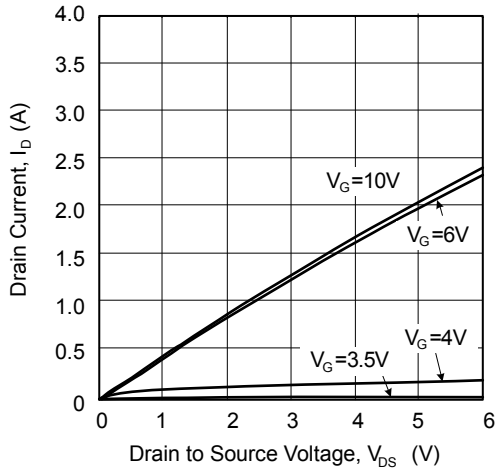


FIG. 5-Drain to Source On Resistance vs. Drain Current

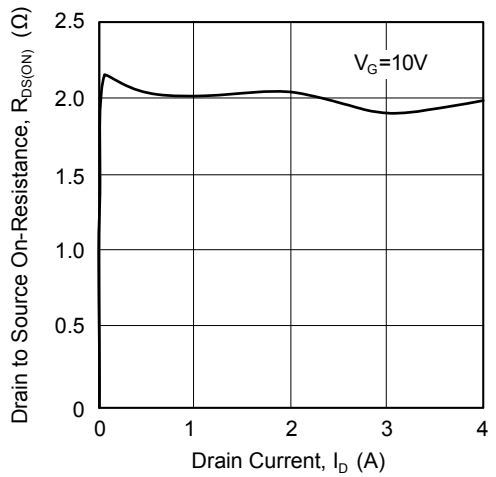
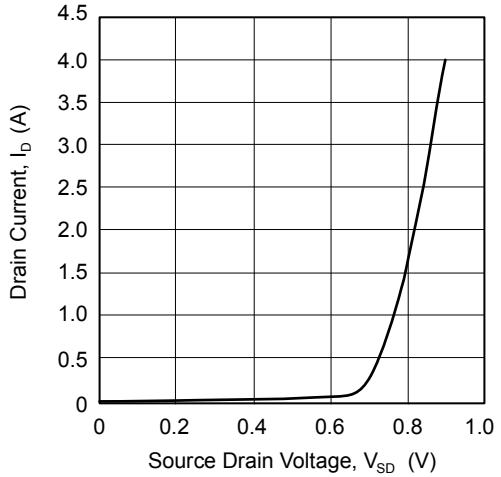
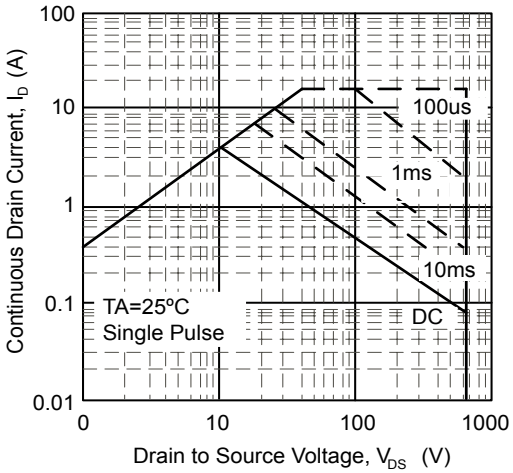


FIG. 6-Drain Current vs. Source Drain Voltage

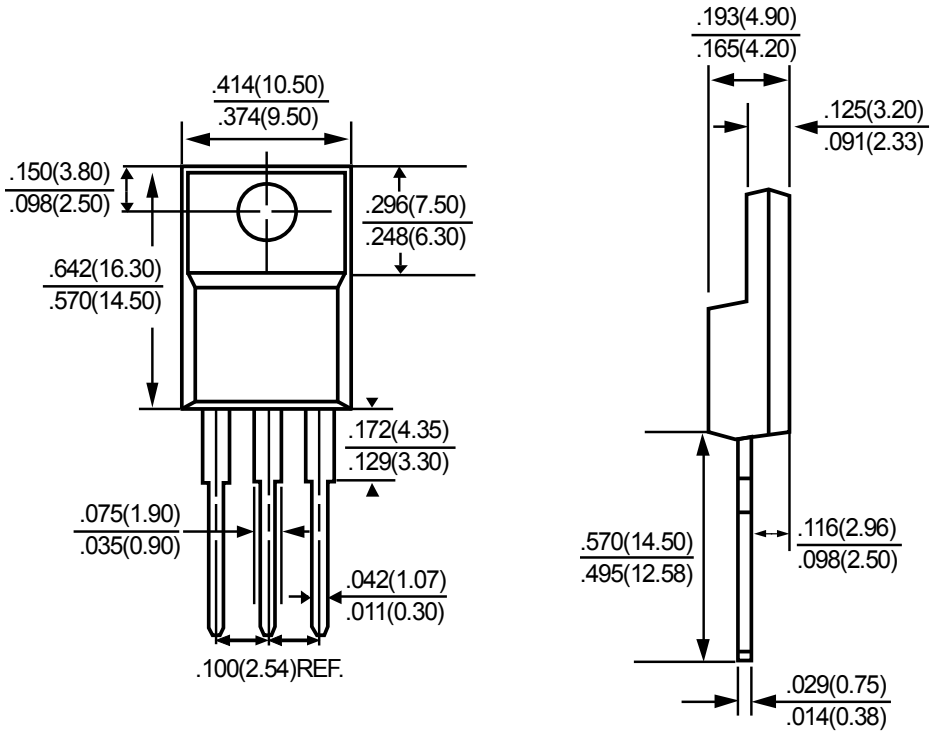


Characteristics Curves

FIG. 7-Maximum Safe Operating Area



Package Outline Dimensions



TO-220F

Dimensions in inches and (millimeters)

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