



D1MNAB48H



650V N-Channel MOSFETs

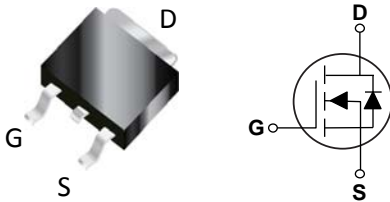
General Description

The D1MNAB48H 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 D1MNAB48H is generally applied in high efficiency switch mode power supplies.

BV_{DSS}	$R_{DS(ON)}$	I_D
650 V	4.8 Ω	2 A

TO-252 Pin Configuration



Features

- $R_{DS(ON)} \leq 4.8 \Omega @ V_{GS}=10V$
- High Switching Speed

Absolute Maximum Ratings $T_C=25^\circ C$ 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	2	A
I_{DM}	Drain Current - Pulsed (NOTE 2)	4	A
E_{AS}	Single Pulse Avalanche Energy (NOTE 3)	55	mJ
P_D	Power Dissipation	44	W
T_J	Operating Junction Temperature Range	-50 to 150	$^\circ C$
T_{STG}	Storage Temperature Range	-50 to 150	$^\circ C$
Marking Code		NAB48H	

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. $L=10mH$, $I_{AS}=3.4A$, $V_{DD}=90V$, $R_G=25 \Omega$, Starting $T_J=25^\circ C$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	110	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	---	2.87	$^\circ C/W$



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	---	---	1	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 =1A	---	---	4.8	Ω
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	2.0	---	4.0	V

Dynamic and switching Characteristics (NOTE3)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge	V _{DS} =50V, V _{GS} =10V, I _D =1.3A, I _G =100uA (NOTE 4 · 5)	---	10.8	---	nC
Q _{gs}	Gate-Source Charge		---	2.2	---	
Q _{gd}	Gate-Drain Charge		---	2.1	---	
T _{d(on)}	Turn-On Delay Time	V _{DS} =30V, V _{GS} =10V, R _G =25Ω, I _D =0.5A (NOTE 4 · 5)	---	28	---	nS
T _r	Rise Time		---	23	---	
T _{d(off)}	Turn-Off Delay Time		---	62	---	
T _f	Fall Time		---	19	---	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1MHz	---	301	---	pF
C _{oss}	Output Capacitance		---	38	---	
C _{rss}	Reverse Transfer Capacitance		---	2.5	---	

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Maximum Body-Diode Continuous Current		---	---	2	A
I _{SM}	Maximum Body-Diode Pulsed Current		---	---	8	A
V _{SD}	Diode Forward Voltage (NOTE 4)	V _{GS} =0V, I _S =2A	---	---	1.4	V
t _{rr}	Reverse Recovery Time	I _S =2A, V _{GS} =0V, di/dt=100A/μs (NOTE 4)	---	205	---	nS
Q _{rr}	Reverse Recovery Charge		---	1.2	---	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

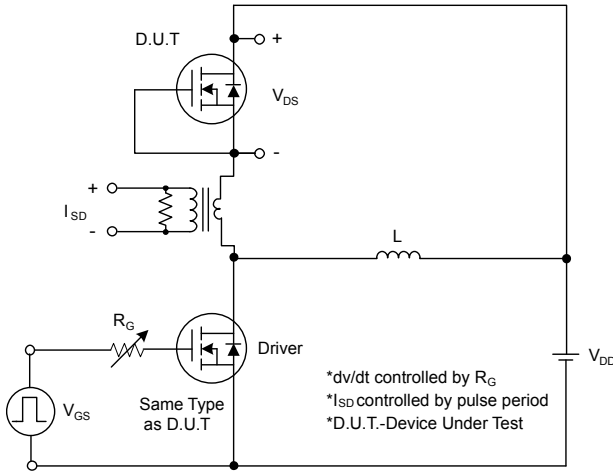


FIG. 2-Peak Diode Recovery dv/dt Waveforms

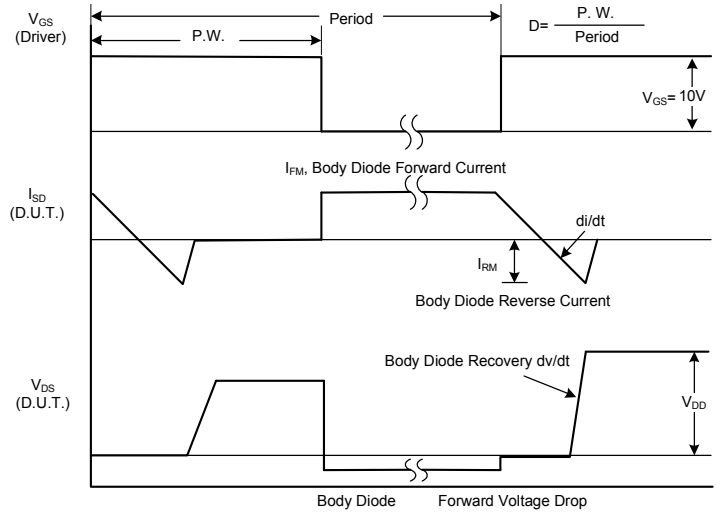


FIG. 3-Switching Test Circuit

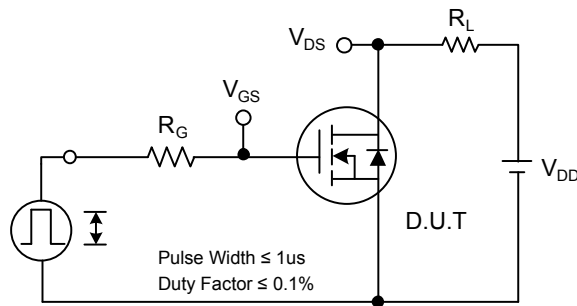


FIG. 4-Switching Waveforms

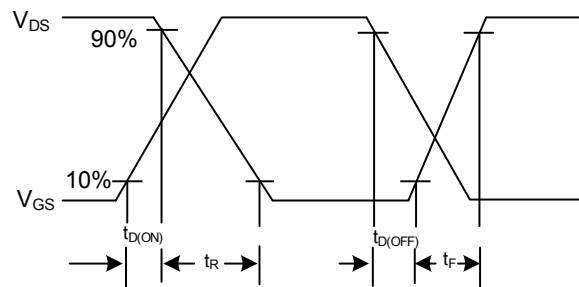


FIG. 5-Gate Charge Test Circuit

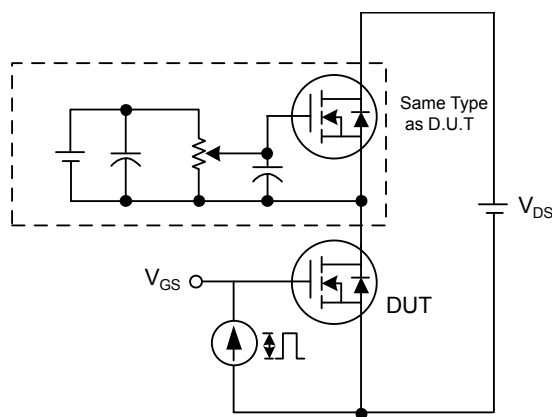
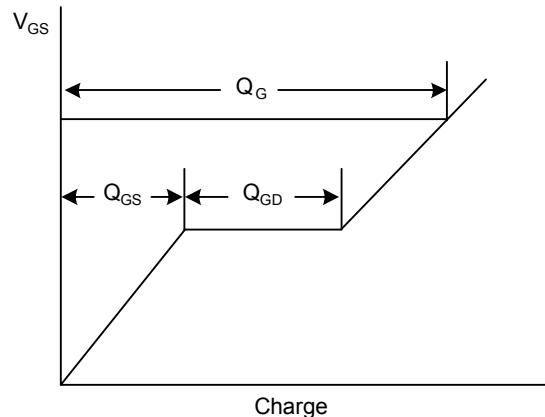


FIG. 6-Gate Charge Waveform





Test Circuits And Waveforms

FIG. 7-Unclamped Inductive Switching Test Circuit

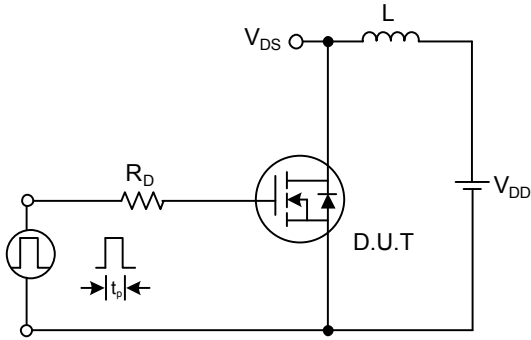
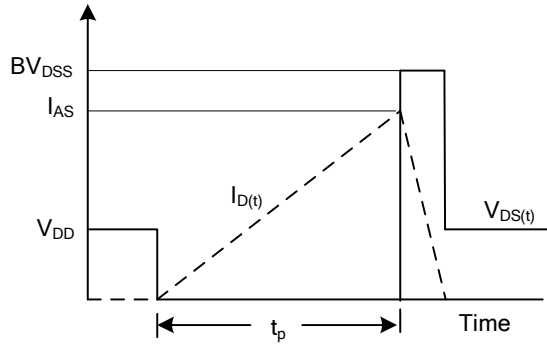
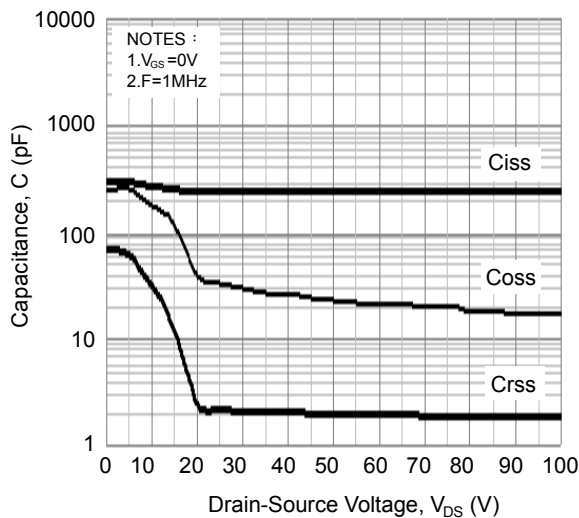


FIG. 8-Unclamped Inductive Switching Waveforms



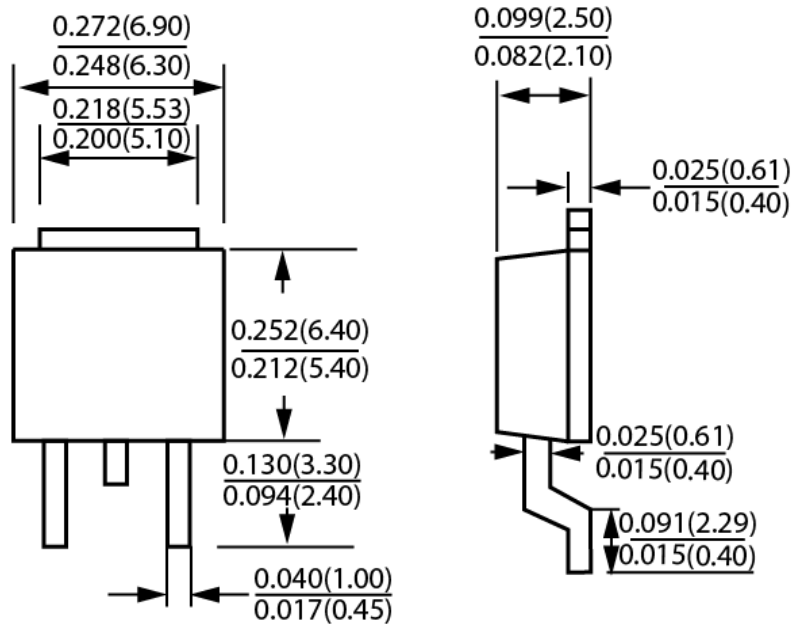
Characteristics Curves

FIG. 1-Capacitance vs. Drain-Source Voltage





Package Outline Dimensions



TO-252

Dimensions in inches and (millimeters)



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