T2MNS020

200V N-Channel MOSFETs

BV_{DSS}	$R_{DS(ON)}$	I_D
200 V	20 mΩ	75 A

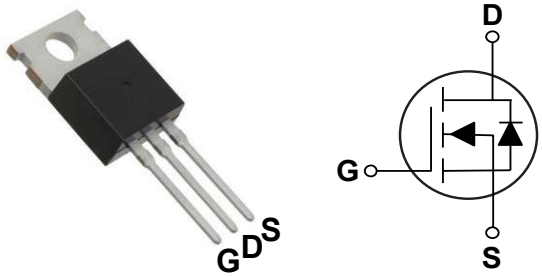
General Description

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

- $R_{DS(ON)} \leqq 20m\Omega @ V_{GS}=10V$
- Fast Switching
- Green Device Available

TO-220 Pin Configuration



Applications

- Load Switch
- PWM Application
- Power Management

Absolute Maximum Ratings T_C=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	200	V
V_{GS}	Gate-Source Voltage	±30	V
I_D	Drain Current – Continuous (T_A=25°C)	75	A
I_{DM}	Drain Current – Pulsed (NOTE 1)	250	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	300	mJ
P_D	Power Dissipation (T_C=25°C)	125	W
T_J	Operating Junction Temperature Range	-55 to 150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
Marking Code		NS020	

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	60	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	1	°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	200	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=200V , V_{GS}=0V	---	---	1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , 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=40A	---	---	20	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	3.6	---	5.0	V

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DD}=100V , V_{GS}=10V , I_D=40A	---	85	---	nC
Q_{gs}	Gate-Source Charge		---	15	---	
Q_{gd}	Gate-Drain Charge		---	25	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=50V , R_G=2.5Ω , I_D=40A , V_{GS}=10V	---	45	---	nS
T_r	Rise Time		---	70	---	
$T_{d(off)}$	Turn-Off Delay Time		---	110	---	
T_f	Fall Time		---	90	---	
C_{iss}	Input Capacitance	V_{DS}=25V , V_{GS}=0V , F=1MHz	---	7500	---	pF
C_{oss}	Output Capacitance		---	500	---	
C_{rss}	Reverse Transfer Capacitance		---	210	---	

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Body Diode Current		---	---	75	A
I_{SM}	Pulsed Diode Forward Current		---	---	150	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=40A	---	---	1.2	V
t_{rr}	Reverse Recovery Time	V_{GS}=0V , I_S=30A , V_{DD}=50V , dI_F/dt=100A/us	---	110	---	nS
Q_{rr}	Reverse Recovery Charge		---	0.55	---	uC

NOTES：

1. Repetitive Rating：Pulsed width limited by maximum junction temperature.
2. The EAS data shows Max. rating .The test condition is V_{DD}=50V, L=0.3mH, R_G=25Ω, V_{GS}=10V.
3. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
4. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Characteristics Curves

FIG. 1- I_D vs. T_A

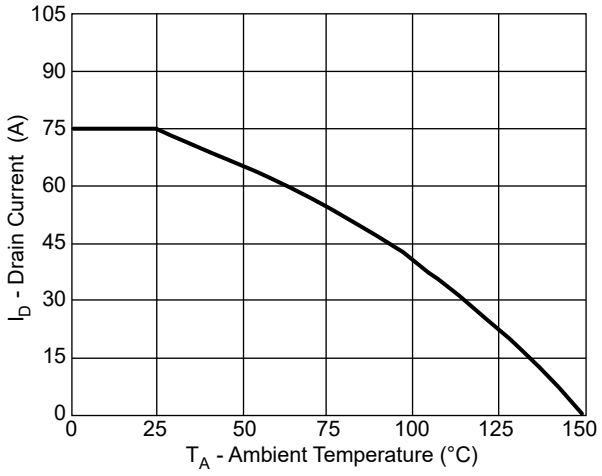


FIG. 2- Normalized BV_{DSS} vs. T_J

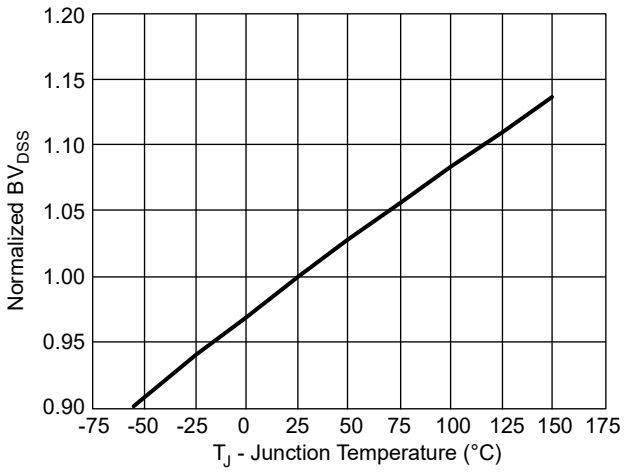


FIG. 3- Normalized $R_{DS(ON)}$ vs. T_J

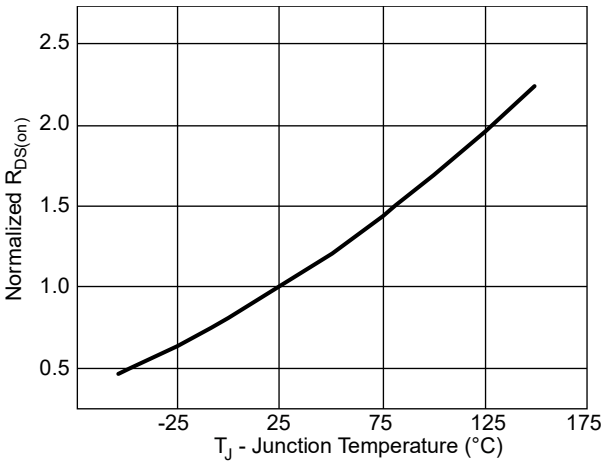


FIG. 4- Transfer Characteristics

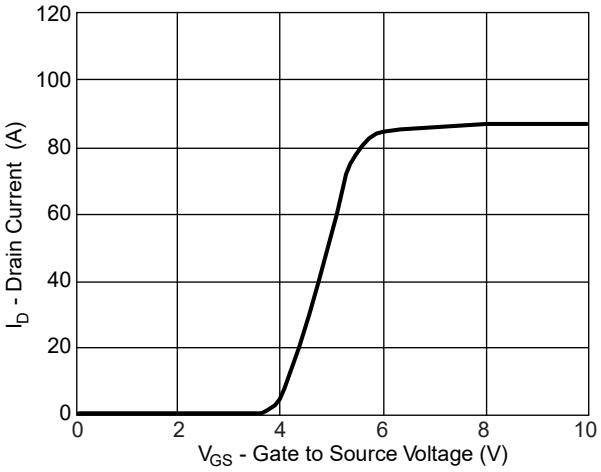


FIG. 5- Drain-Source Diode Forward

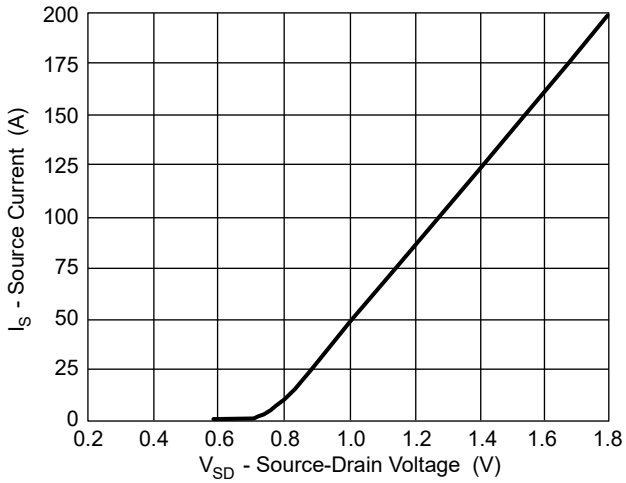
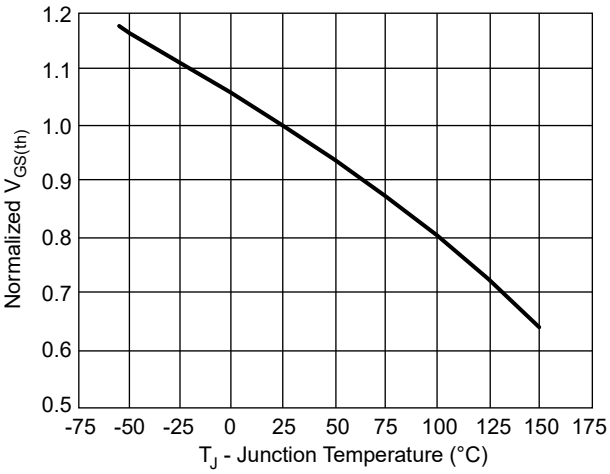


FIG. 6- Normalized $V_{GS(th)}$ vs. T_J



Characteristics Curves

FIG. 7-Safe Operation Area

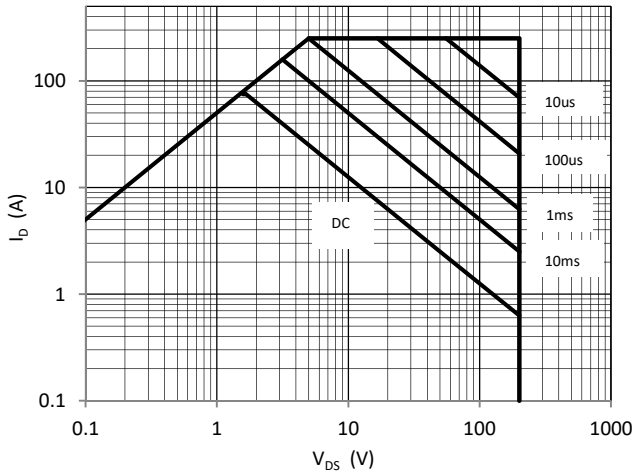


FIG. 8- Switching Time Waveform

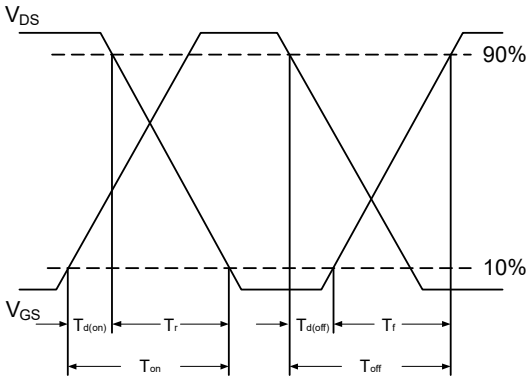
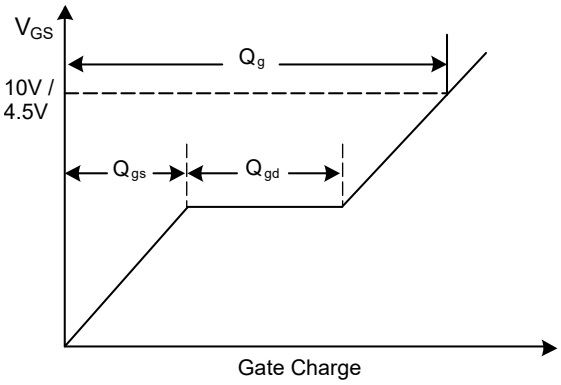
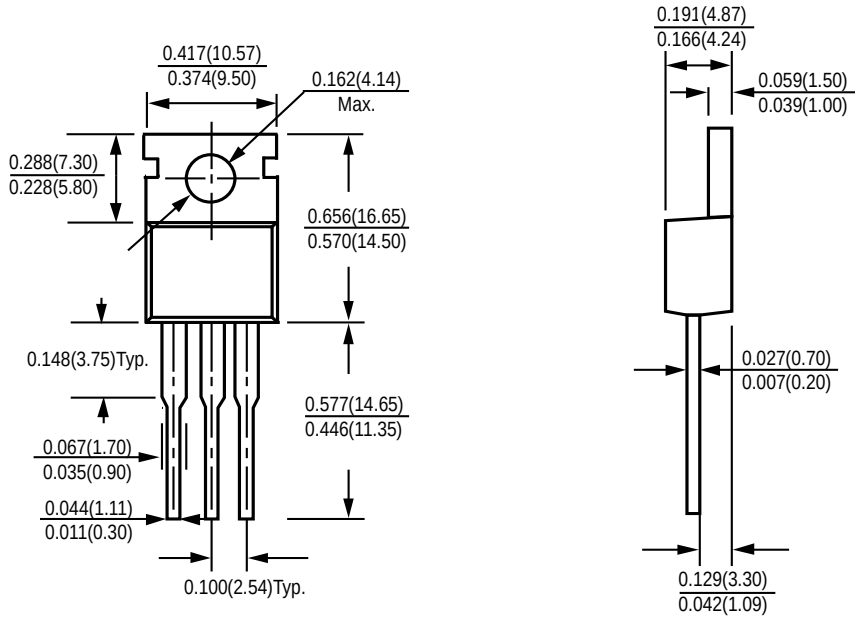


FIG. 9- Gate Charge Waveform



Package Outline Dimensions



TO-220

Dimensions in inches and (millimeters)

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