T2MNS022

200V N-Channel MOSFETs

BV_{DSS}	$R_{DS(ON)}$	I_D
200 V	22 mΩ	78 A

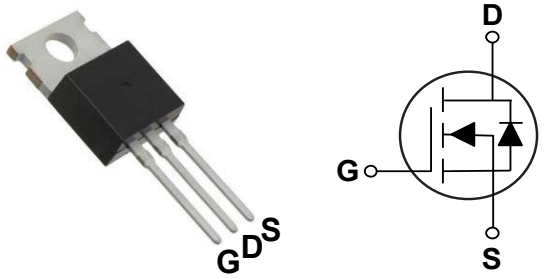
General Description

These N-Channel enhancement mode power field effect transistors are using trench MOS 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

- $R_{DS(ON)} \leqq 22m\Omega @ V_{GS}=10V$
- Fast Switching
- Green Device Available

TO-220 Pin Configuration



Applications

- DC/DC Converter
- LED Backlighting
- Motor Control

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	±20	V
I_D	Drain Current – Continuous (T_C=25°C)	78	A
I_{DM}	Drain Current – Pulsed (NOTE 1)	312	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	146	mJ
P_D	Power Dissipation (T_C=25°C)	312.5	W
T_J	Operating Junction Temperature Range	-55 to 150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
Marking Code		NS022	

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	55	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	0.4	°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	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=20A	---	---	22	mΩ
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	2	---	4	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=20A	---	37	---	nC
Q_{gs}	Gate-Source Charge		---	9.5	---	
Q_{gd}	Gate-Drain Charge		---	5.2	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DS}=100V , R_G=3Ω , I_D=20A , V_{GS}=10V	---	11.5	---	nS
T_r	Rise Time		---	18	---	
$T_{d(off)}$	Turn-Off Delay Time		---	18.5	---	
T_f	Fall Time		---	6.8	---	
C_{iss}	Input Capacitance	V_{DS}=100V , V_{GS}=0V , F=1MHz	---	2850	---	pF
C_{oss}	Output Capacitance		---	210	---	
C_{rss}	Reverse Transfer Capacitance		---	8.5	---	
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , F=1MHz	---	3.3	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Body Diode Current	V_G=V_D=0V , Force Current	---	---	78	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=20A	---	---	1.2	V
t_{rr}	Reverse Recovery Time	V_R=100V , I_F=20A , dI_F/dt=100A/us	---	110	---	nS
Q_{rr}	Reverse Recovery Charge		---	405	---	nC

NOTES：

1. Repetitive Rating：Pulsed width limited by maximum junction temperature.
2. The EAS data shows Max. rating .The test condition is V_{DD}=30V, L=0.4mH, V_{GS}=10V, I_{AS}=27A.
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-Transfer Characteristics

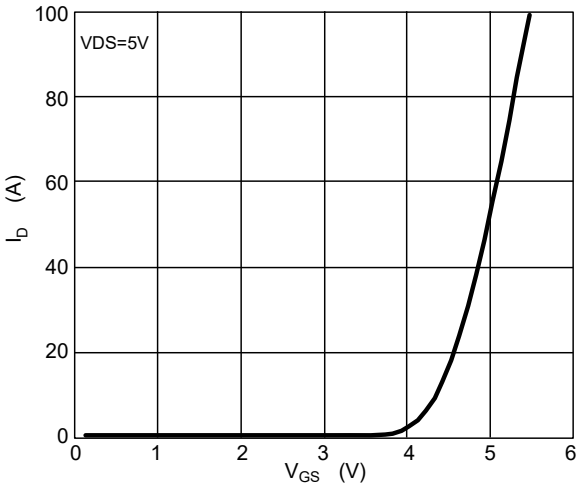


FIG. 2-I_S vs V_{SD}

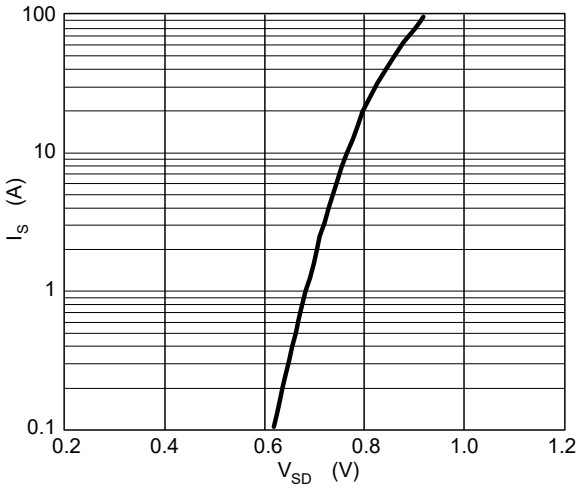


FIG. 3-$R_{DS(on)}$ vs I_D

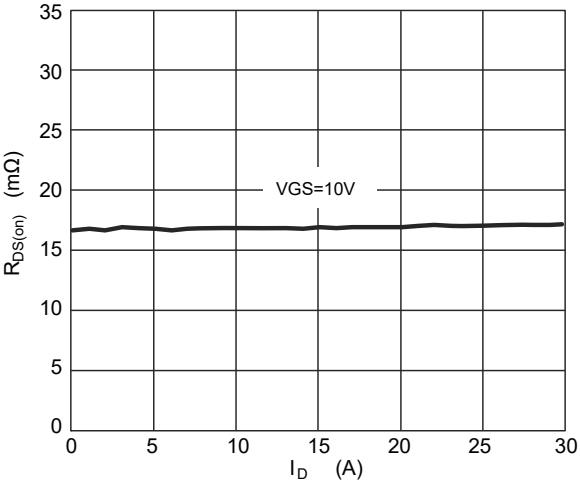


FIG. 4-Normalized $R_{DS(on)}$ vs T_J

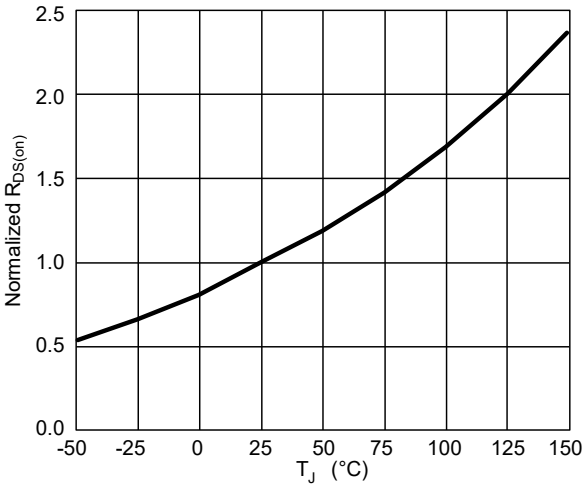


FIG. 5-Gate Charge Characteristics

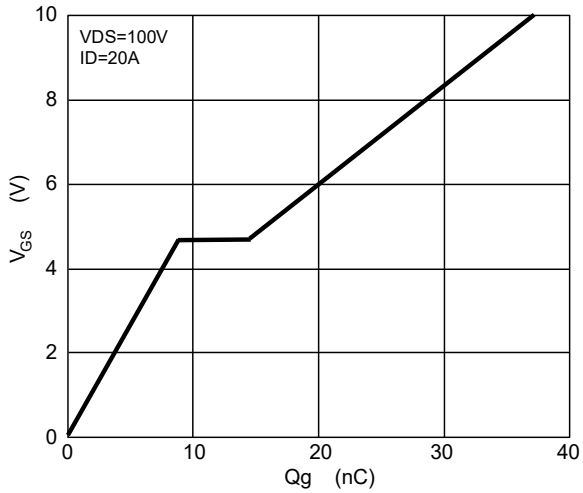
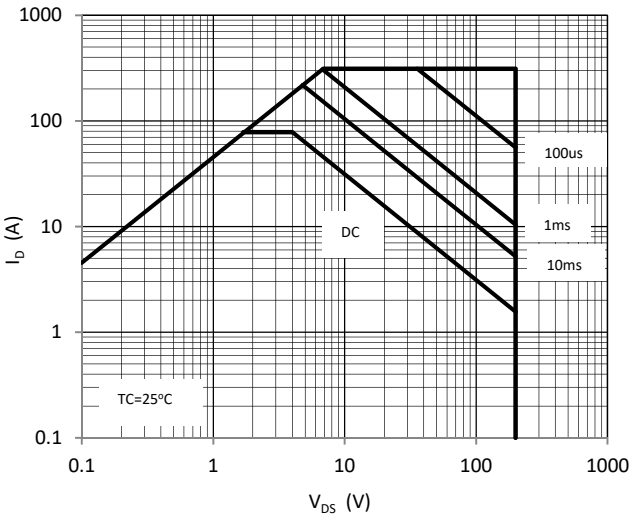


FIG. 6-Switching Time Waveform



Characteristics Curves

FIG. 7-Normalized Maximum Transient Thermal Impedance

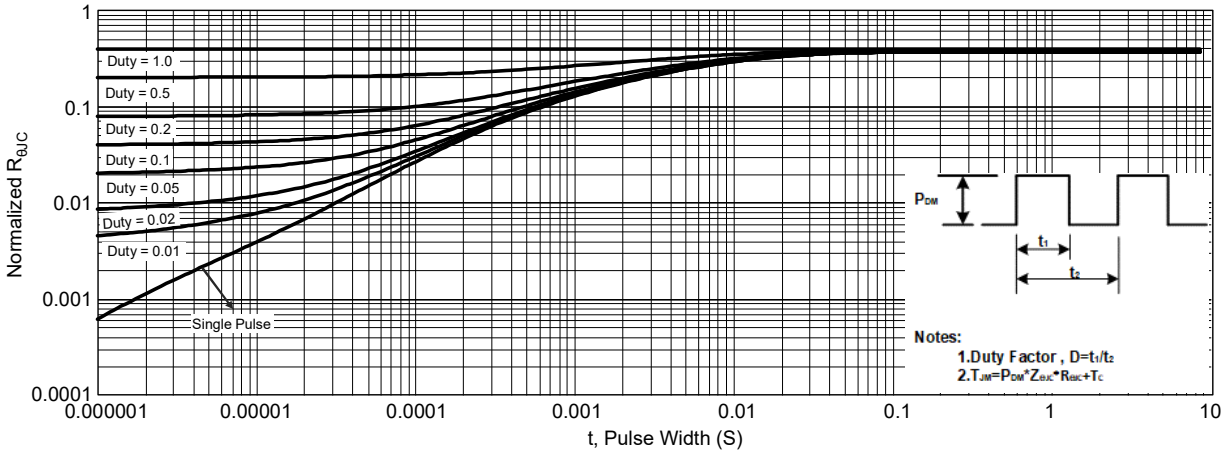


FIG. 8- Switching Time Waveform

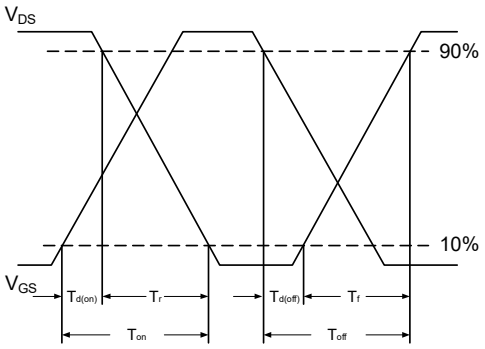
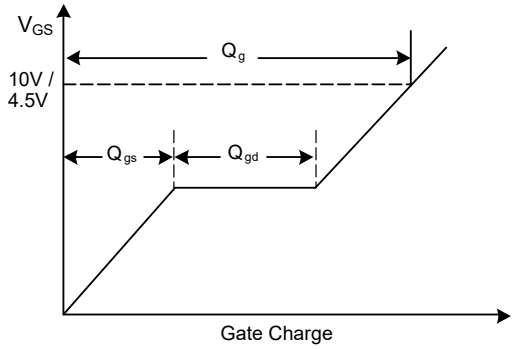
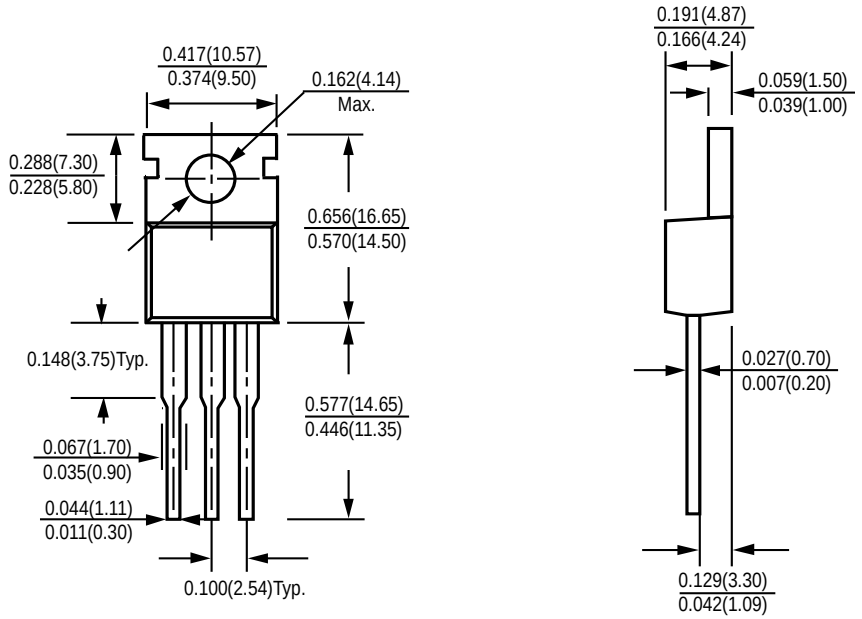


FIG. 9- Gate Charge Waveform



Package Outline Dimensions



TO-220

Dimensions in inches and (millimeters)

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