TNMNM310

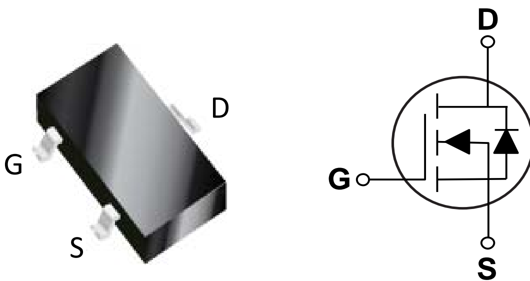
100V N-Channel MOSFETs

General Description

The TNMNM310 is the high cell density trenched N-ch MOSFETs, which provides excellent R_{DSON} and efficiency for most of the small power switching and load switch applications.
The TNMNM310 meets the RoHS and Green Product requirement with full function reliability approved.

BV_{DSS}	$R_{DS(ON)}$	I_D
100V	310 mΩ	1.2 A

SOT-23 Pin Configuration



Features

- 100V, 1.2A, $R_{DS(ON)}$=310mΩ @V_{GS}=10V
- Super Low Gate Charge
- Excellent Cdv/dt effect decline
- Green Device Available
- Advanced high cell density Trench technology

Absolute Maximum Ratings T_C=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current - Continuous, V_{GS}@10V (NOTE 1) (T_A=25°C)	1.2	A
	Drain Current - Continuous, V_{GS}@10V (NOTE 1) (T_A=70°C)	1	A
I_{DM}	Drain Current - Pulsed (NOTE 2)	5	A
P_D	Total Power Dissipation (T_A=25°C) (NOTE 3)	1	W
T_J	Operating Junction Temperature Range	-50 to 150	°C
T_{STG}	Storage Temperature Range	-50 to 150	°C
Marking Code		A5	

Thermal Characteristics

Symbol	Parameter	Typ.	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient (NOTE 1)	---	125	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case (NOTE 1)	---	80	°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	100	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}= 80V , V_{GS}= 0V , T_J=25°C	---	---	1	uA
		V_{DS}= 80V , V_{GS}= 0V , T_J=55°C	---	---	5	
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 (NOTE 2)	V_{GS}= 10V , I_D= 1A	---	260	310	mΩ
		V_{GS}= 4.5V , I_D= 0.5A	---	270	320	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D= 250uA	1.0	1.5	2.5	V
gfs	Forward Transconductance	V_{DS}= 5V , I_D= 1A	---	2.4	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS}= 80V , V_{GS}= 10V , I_D= 1A	---	9.7	13.6	nC
Q_{gs}	Gate-Source Charge		---	1.6	2.2	
Q_{gd}	Gate-Drain Charge		---	1.7	2.4	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}= 50V , V_{GS}= 10V , R_G= 3.3Ω , I_D= 1A	---	1.6	3.2	ns
T_r	Rise Time		---	19	34	
$T_{d(off)}$	Turn-Off Delay Time		---	13.6	27	
T_f	Fall Time		---	19	38	
C_{iss}	Input Capacitance	V_{DS}= 15V , V_{GS}= 0V , F= 1MHz	---	508	711	pF
C_{oss}	Output Capacitance		---	29	41	
C_{rss}	Reverse Transfer Capacitance		---	16.4	23	
Rg	Gate resistance	V_{GS}=0V , V_{DS}=0V , F=1MHz	---	2.8	5.6	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current (NOTE 1、4)	V_G= V_D= 0V , Force Current	---	---	1.2	A
I_{SM}	Pulsed Source Current (NOTE 2、4)		---	---	5	A
V_{SD}	Diode Forward Voltage (NOTE 2)	V_{GS}= 0V , I_S= 1A , T_J= 25°C	---	---	1.2	V

NOTES：

1. The data tested by surface mounted on a 1 inch^2 FR-4 board with 2oz copper.
2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
3. The power dissipation is limited by 150℃ junction temperature
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

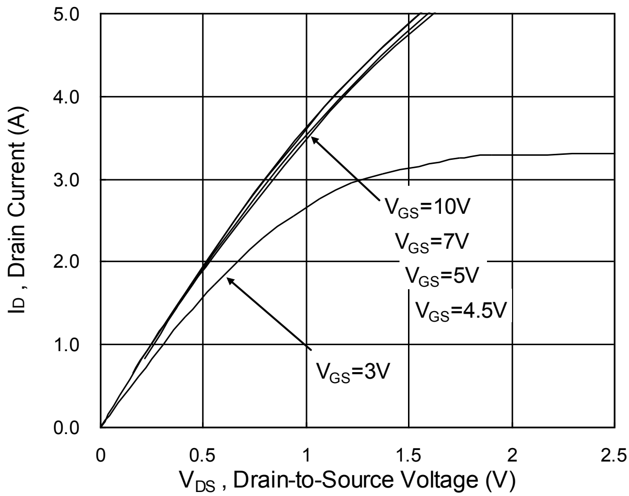


Fig.1 Typical Output Characteristics

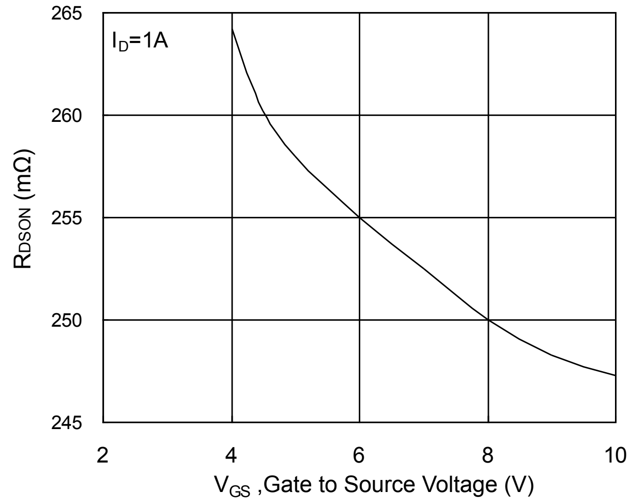


Fig.2 On-Resistance vs. Gate-Source

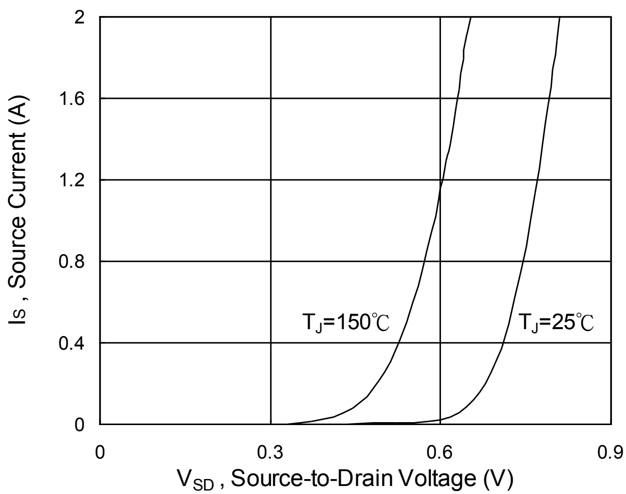


Fig.3 Forward Characteristics of Reverse

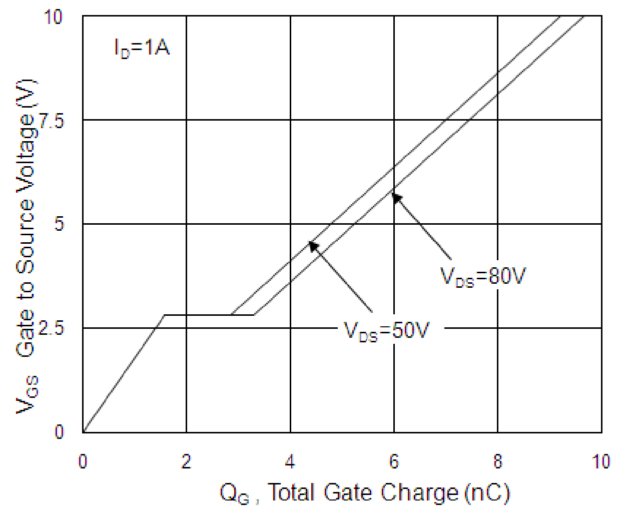


Fig.4 Gate-Charge Characteristics

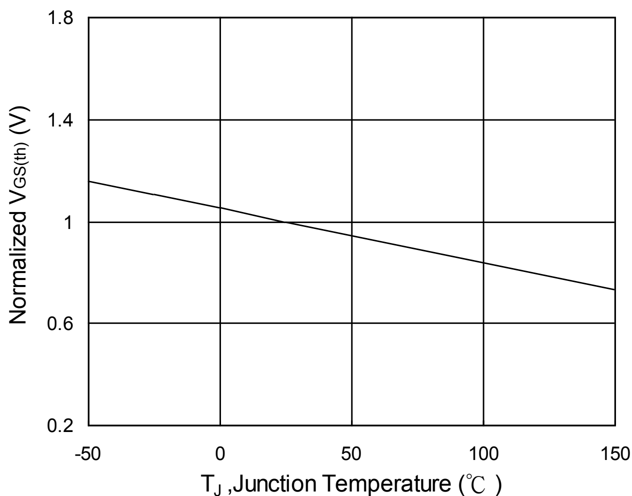


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

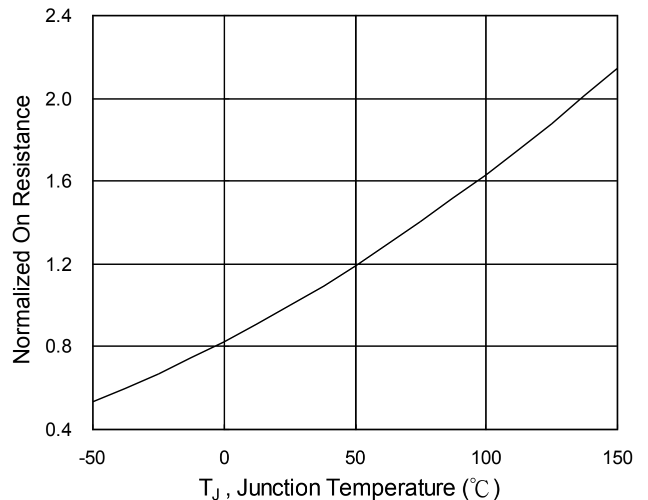


Fig.6 Normalized R_{DSON} vs. T_J

Characteristics Curves

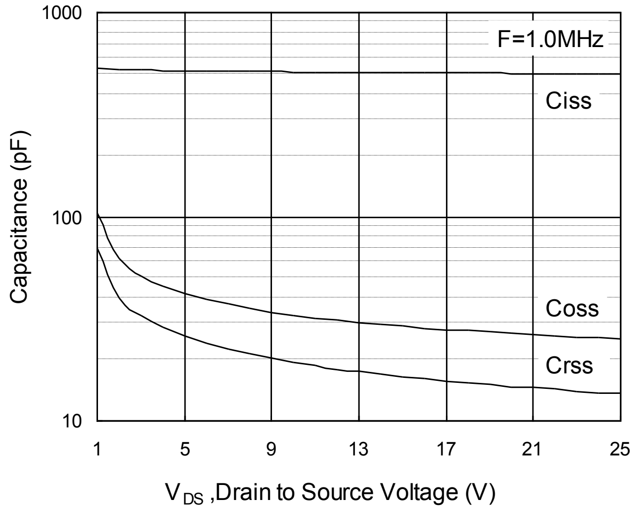


Fig.7 Capacitance

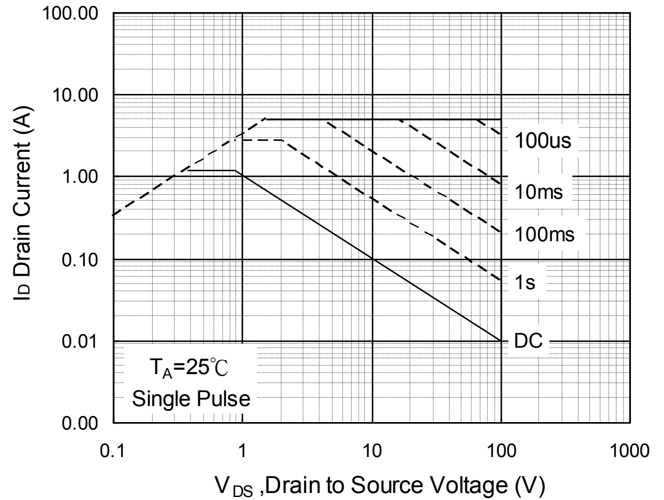


Fig.8 Safe Operating Area

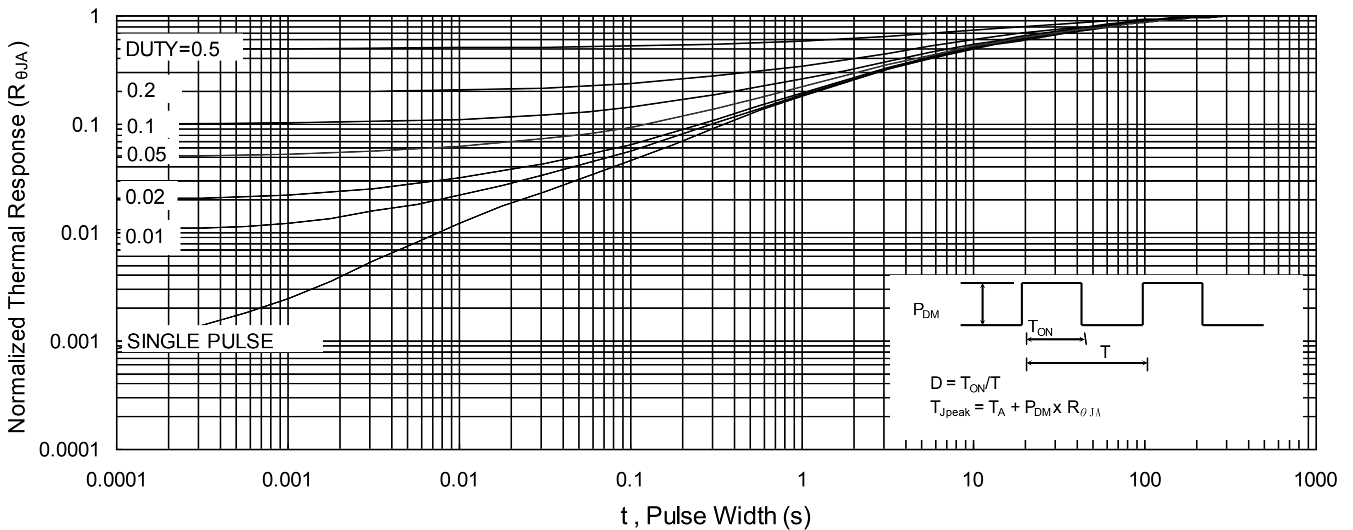


Fig.9 Normalized Maximum Transient Thermal Impedance

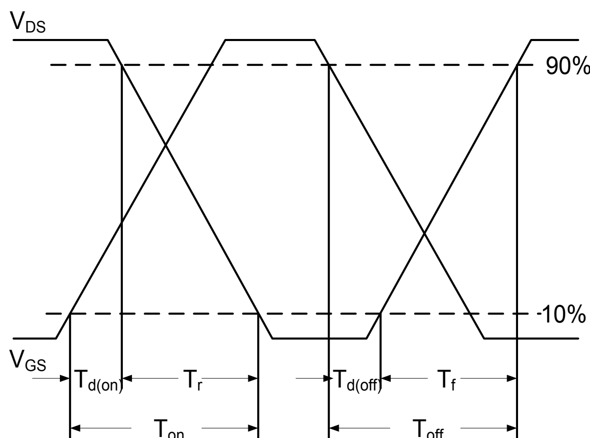


Fig.10 Switching Time Waveform

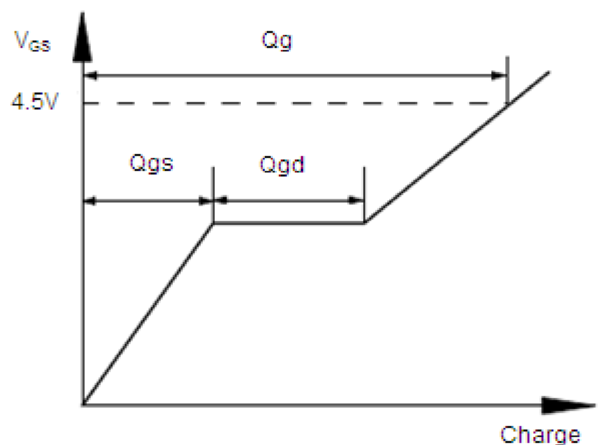
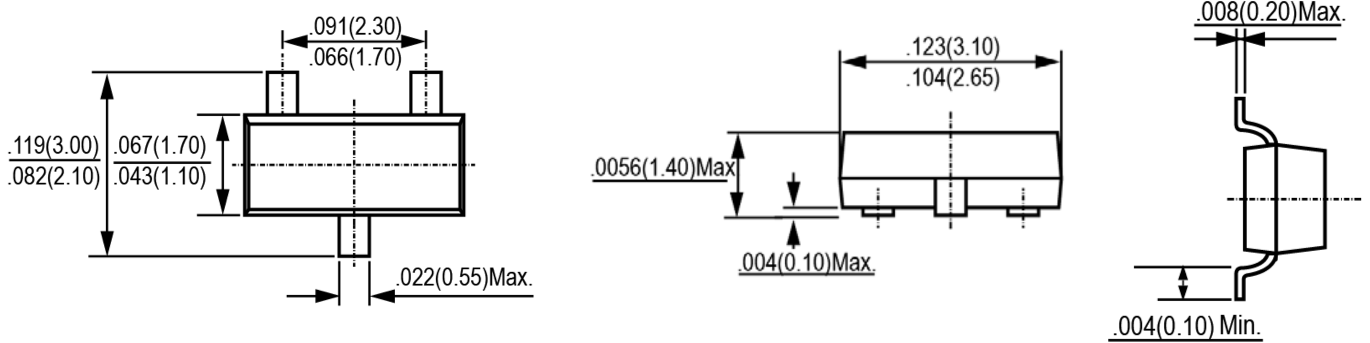


Fig.11 Gate Charge Waveform

Package Outline Dimensions



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Dimensions in inches and (millimeters)

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