TNMNG100

60V N-Channel MOSFETs

General Description

The TNMNG100 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.

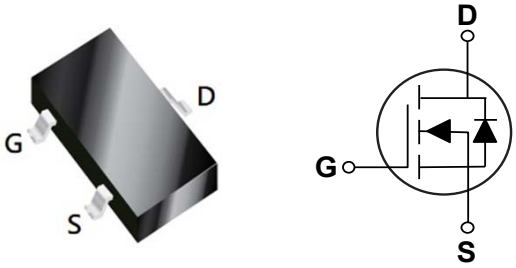
The TNMNG100 meets the RoHS and Green Product requirement with full function reliability approved.

BV_{DSS}	$R_{DS(ON)}$	I_D
60 V	100 mΩ	2.3 A

Features

- $R_{DS(ON)} \leqq 100m\Omega @ V_{GS}=10V$
- Green Device Available
- Super Low Gate Charge
- Excellent Cdv/dt Effect Decline
- Advanced High Cell Density Trench Technology

SOT-23 Pin Configuration



Applications

- Battery Protection
- Load Switch
- Uninterruptible Power Supply

Absolute Maximum Ratings T_C=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	±20	V
I_D	Drain Current - Continuous (T_A=25°C)	2.3	A
I_{DM}	Drain Current - Pulsed	9.2	A
P_D	Total Power Dissipation (NOTE 2) (T_A=25°C)	1	W
T_J	Operating Junction Temperature Range	-55 to 150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
Marking Code		A4 , 6003	

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	125	°C/W
$R_{\theta JC}$	Thermal Resistance Junction to Case	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	60	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=48V , V_{GS}=0V , T_J=25°C	---	---	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=2A	---	---	100	mΩ
		V_{GS}=4.5V , I_D=1A	---	---	110	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	1.2	---	2.5	V
gfs	Forward Transconductance	V_{DS}=5V , I_D=2A	---	13	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS}=48V , V_{GS}=4.5V , I_D=2A	---	5	---	nC
Q_{gs}	Gate-Source Charge		---	1.68	---	
Q_{gd}	Gate-Drain Charge		---	1.9	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}=30V , V_{GS}=10V , R_G=3.3Ω , I_D=2A	---	1.6	---	ns
T_r	Rise Time		---	7.2	---	
$T_{d(off)}$	Turn-Off Delay Time		---	25	---	
T_f	Fall Time		---	14.4	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , F=1MHz	---	511	---	pF
C_{oss}	Output Capacitance		---	38	---	
C_{rss}	Reverse Transfer Capacitance		---	25	---	

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	V_G=V_D=0V , Force Current	---	---	2.3	A
I_{SM}	Pulsed Source Current		---	---	9.2	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=1A , T_J=25°C	---	---	1.2	V
t_{rr}	Reverse Recovery Time	I_F=2A , dI/dt=100A/us , T_J=25°C	---	9.7	---	ns
Q_{rr}	Reverse Recovery Charge		---	5.8	---	nC

NOTES：

1. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.
2. The power dissipation is limited by 150°C junction temperature.
3. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.

Characteristics Curves

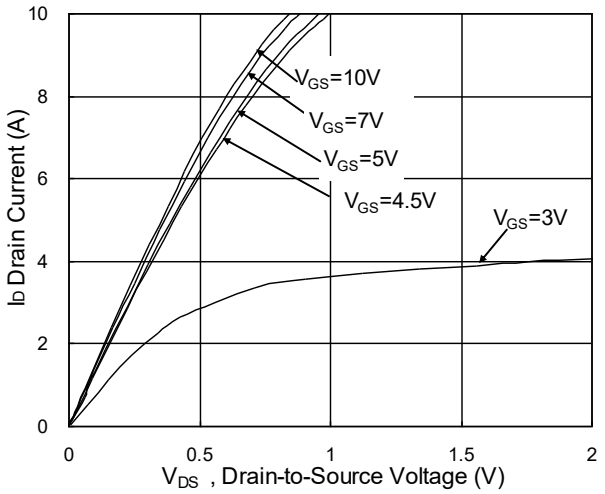


Fig.1 Typical Output Characteristics

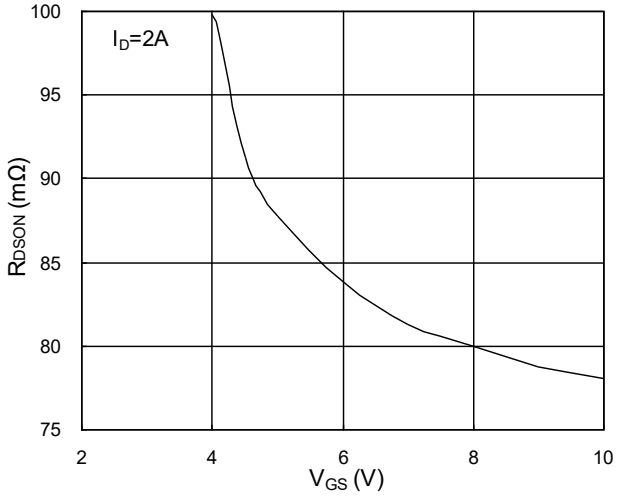


Fig.2 On-Resistance v.s Gate-Source Voltage

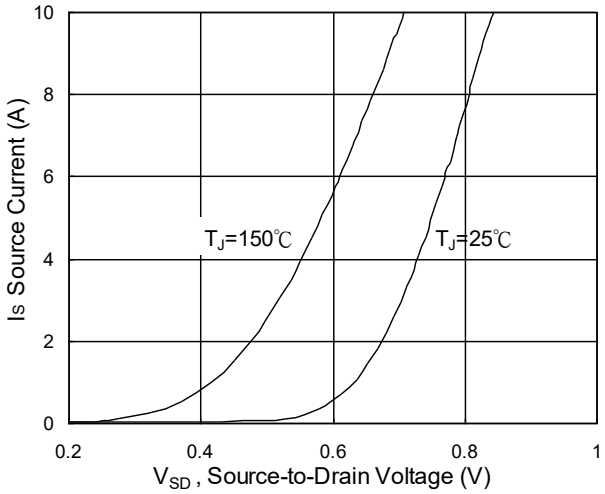


Fig.3 Source-Drain Diode Forward

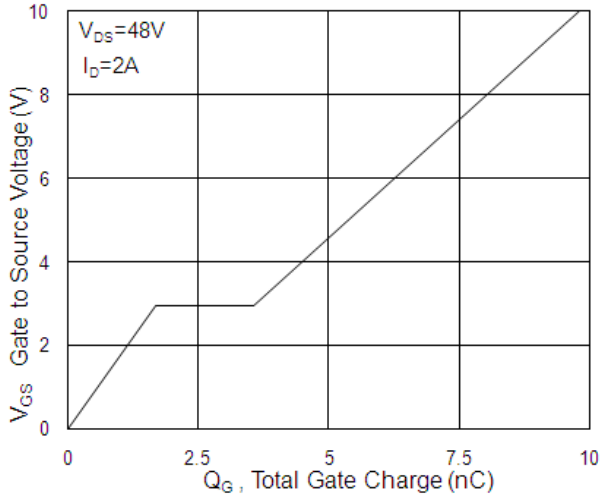


Fig.4 Gate-Charge Characteristics

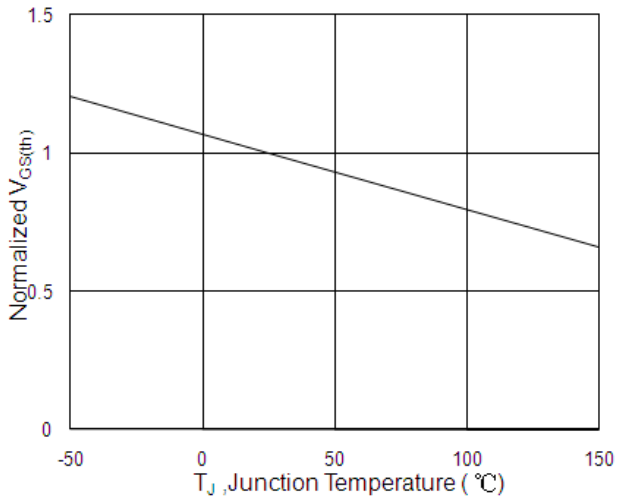


Fig.5 Normalized $V_{GS(th)}$ v.s T_J

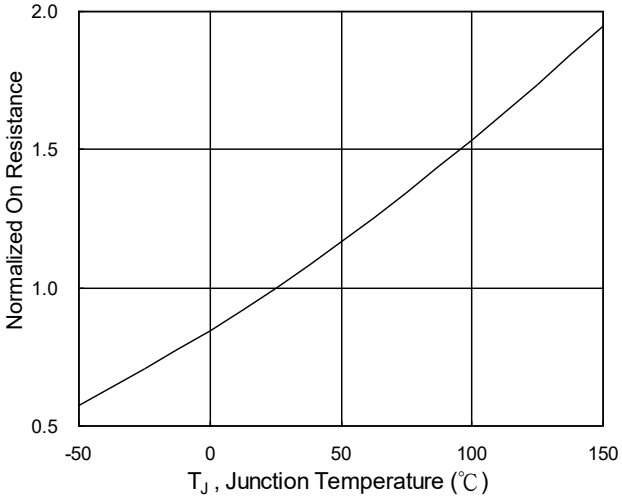


Fig.6 Normalized R_{DSON} v.s T_J

Characteristics Curves

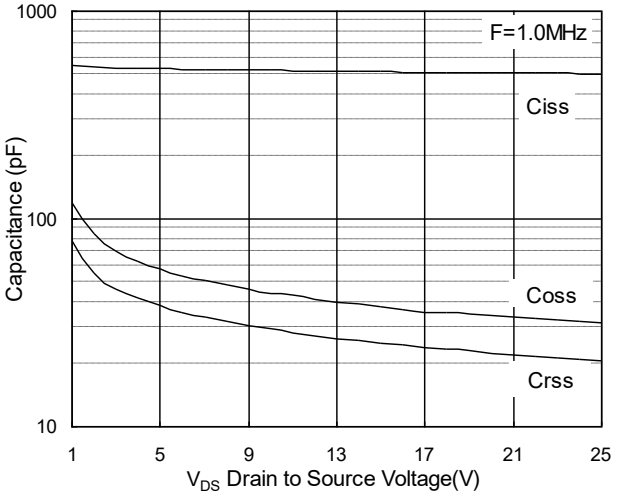


Fig.7 Capacitance

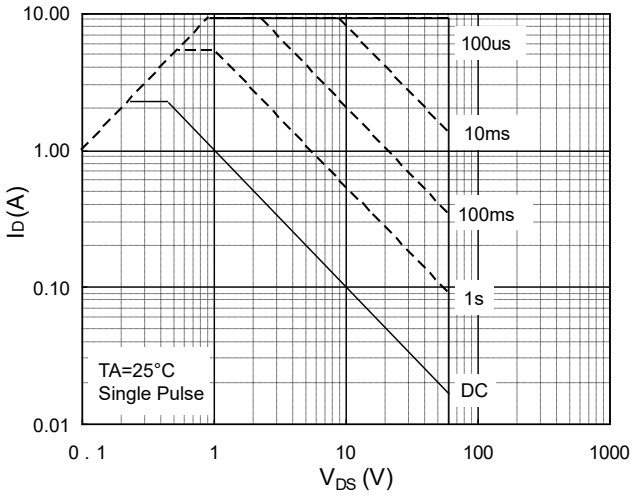


Fig.8 Safe Operating Area

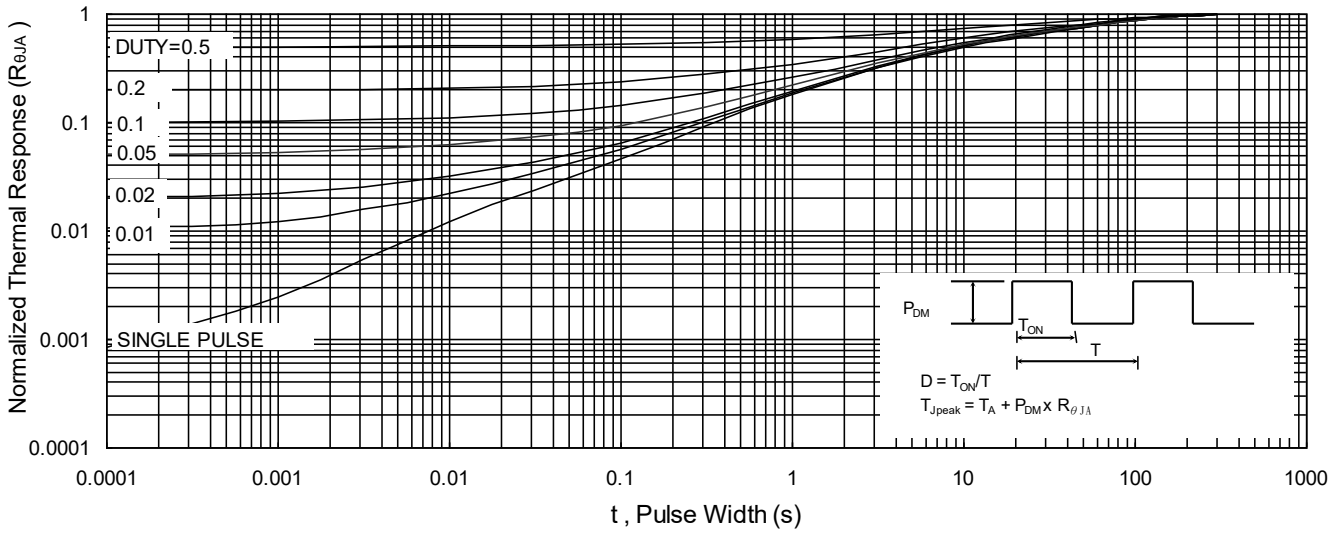


Fig.9 Normalized Maximum Transient Thermal Impedance

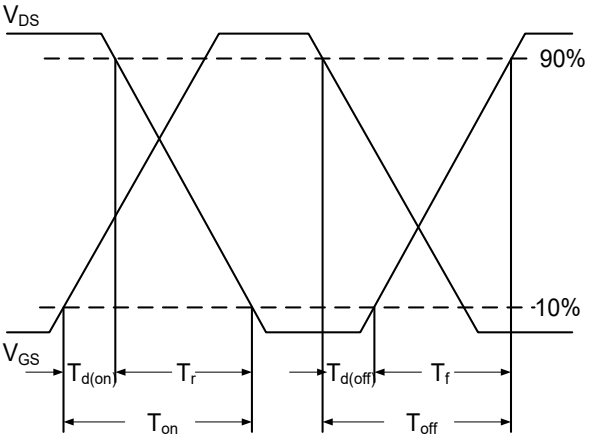


Fig.10 Switching Time Waveform

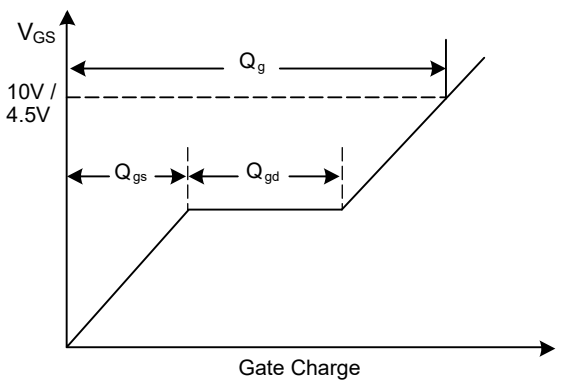
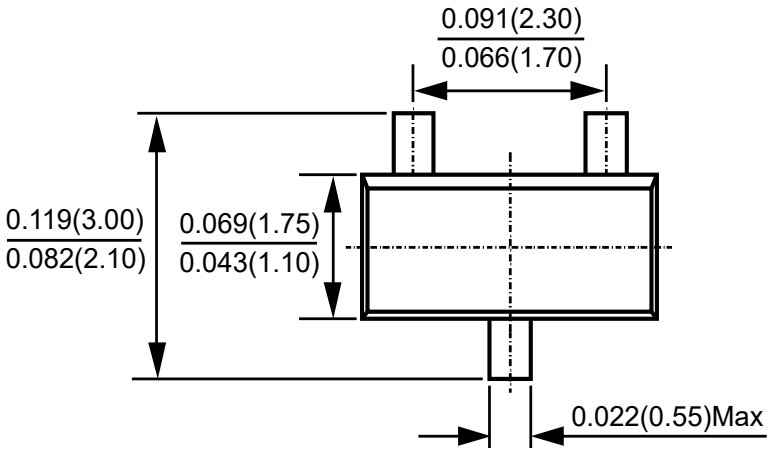
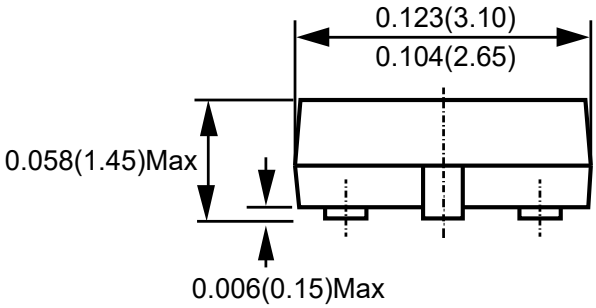
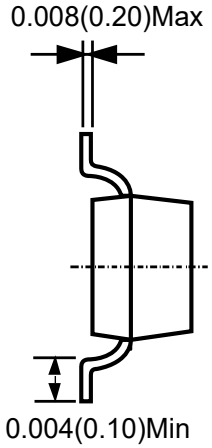


Fig.11 Gate Charge Waveform

Package Outline Dimensions







SOT-23

Dimensions in inches and (millimeters)

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