TNMPM650

100V P-Channel MOSFETs

BV$_{DSS}$	R$_{DS(ON)}$	I$_D$
-100V	650 mΩ	-0.9 A

General Description

The TNMPM650 is the high cell density trenched P-ch MOSFETs, which provides excellent R$_{DSON}$ and efficiency for most of the small power switching and load switch applications.
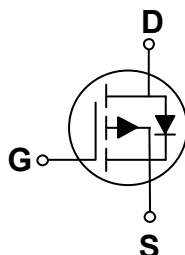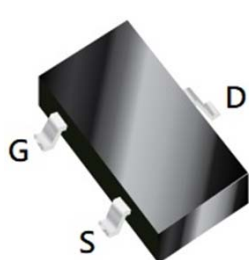
The TNMPM650 meets the RoHS and Green Product requirement with full function reliability approved.

Features

- R$_{DS(ON)}$≦650mΩ@V$_{GS}$= -10V
- Super Low Gate Charge
- Excellent Cdv/dt effect decline
- Green Device Available
- 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	-100	V
V$_{GS}$	Gate-Source Voltage	±20	V
I$_D$	Drain Current - Continuous (T$_A$=25°C)	-0.9	A
I$_{DM}$	Drain Current - Pulsed (NOTE 1)	-1.8	A
P$_D$	Total Power Dissipation (T$_A$=25°C) (NOTE 3)	1	W
T$_J$	Operating Junction Temperature Range	-50 to 150	^{o}C
T$_{STG}$	Storage Temperature Range	-50 to 150	^{o}C
Marking Code		AE , 0107	

Thermal Characteristics

Symbol	Parameter	Typ.	Max	Unit
R$_{θJA}$	Thermal Resistance Junction to Ambient	---	125	^{o}C/W
R$_{θJC}$	Thermal Resistance Junction to Case	---	80	^{o}C/W

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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	---	---	-10	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= -0.8A	---	---	650	mΩ
		V_{GS}= -4.5V , I_D= -0.4A	---	---	700	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D= -250uA	-1.0	---	-2.5	V
gfs	Forward Transconductance	V_{DS}= -5V , I_D= -0.8A	---	3	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS}= -15V , V_{GS}= -4.5V , I_D= -0.5A	---	4.5	---	nC
Q_{gs}	Gate-Source Charge		---	1.14	---	
Q_{gd}	Gate-Drain Charge		---	1.5	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}= -50V , V_{GS}= -10V , R_G= 3.3Ω , I_D= -0.5A	---	13.6	---	ns
T_r	Rise Time		---	6.8	---	
$T_{d(off)}$	Turn-Off Delay Time		---	34	---	
T_f	Fall Time		---	3	---	
C_{iss}	Input Capacitance	V_{DS}= -15V , V_{GS}= 0V , F= 1MHz	---	553	---	pF
C_{oss}	Output Capacitance		---	29	---	
C_{rss}	Reverse Transfer Capacitance		---	20	---	
Rg	Gate resistance	V_{GS}=0V , V_{DS}=0V , F=1MHz	---	16	---	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current (NOTE 4)	V_G= V_D= 0V , Force Current	---	---	-0.9	A
I_{SM}	Pulsed Source Current (NOTE 2 、 4)		---	---	-1.8	A
V_{SD}	Diode Forward Voltage (NOTE 2)	V_{GS}= 0V , I_S= -1A , T_J= 25°C	---	---	-1.2	V

NOTES：

1. Repetitive Rating：Pulsed width limited by maximum junction temperature.

2. The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%.

3. The power dissipation is limited by 150°C 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.
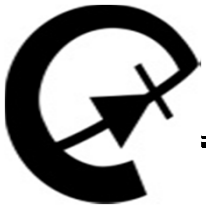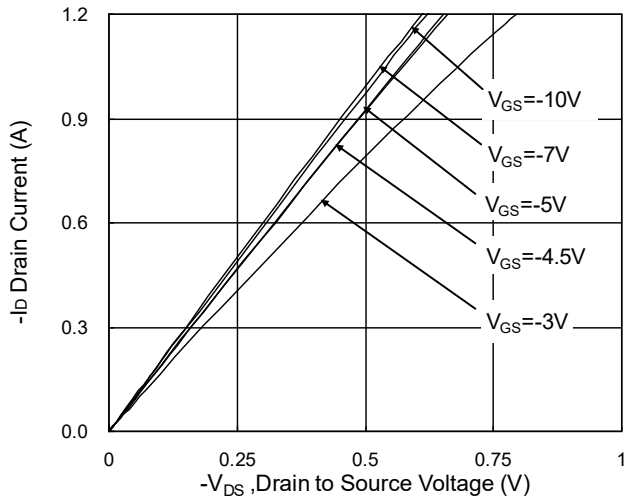
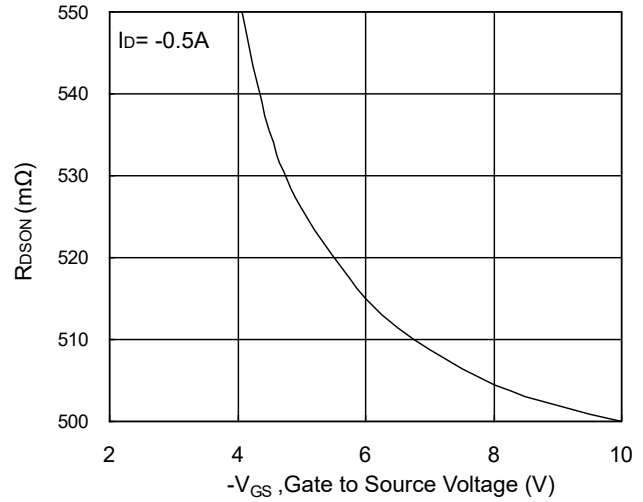## Characteristics Curves

Fig.1 Typical Output Characteristics
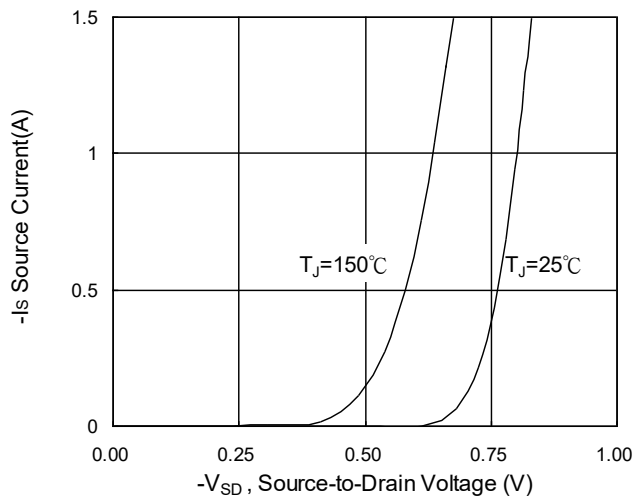

Fig.2 On-Resistance vs. Gate-Source Voltage

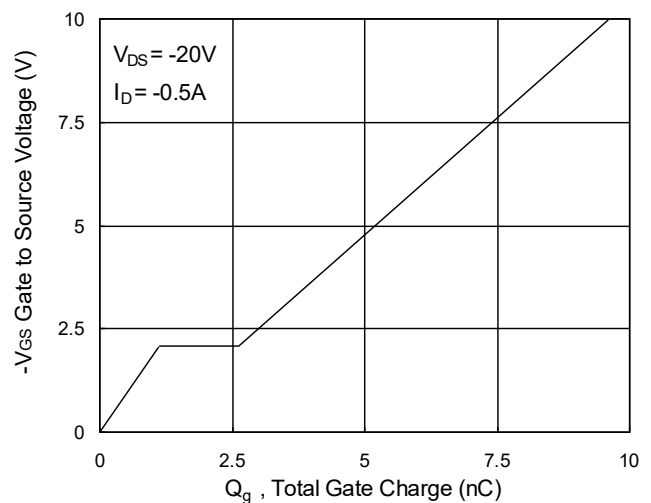
Fig.3 Forward Characteristics Of Diode

Fig.4 Gate-Charge Characteristics
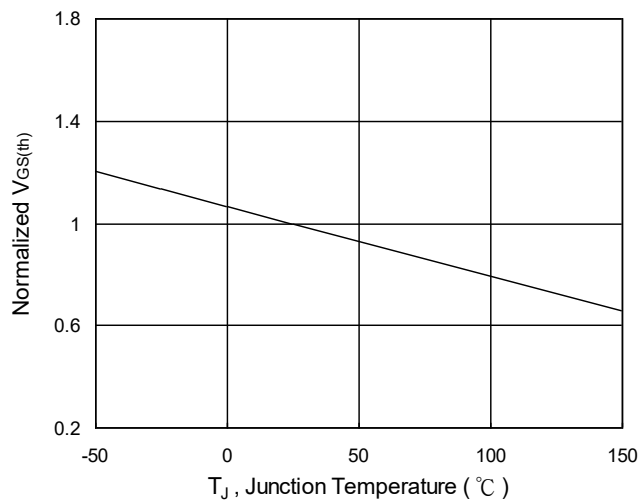
Fig.5 Normalized $V_{GS(th)}$ vs. T_J
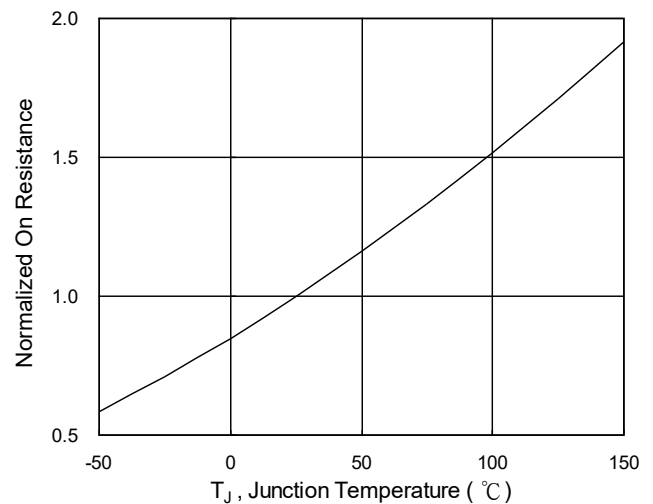
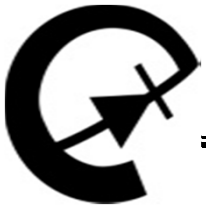**Fig.6 Normalized R_{DSON} vs. T_J**

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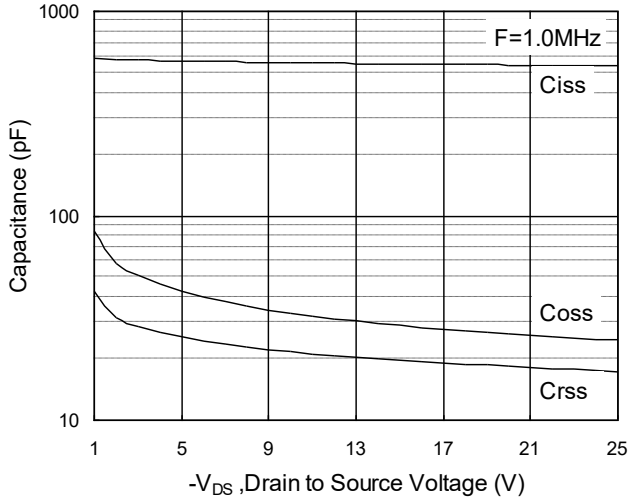**100V P-Channel MOSFETs**

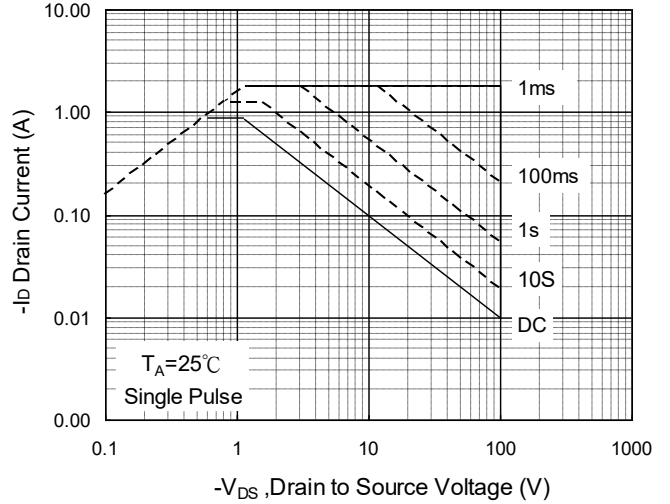## Characteristics Curves

Fig.7 Capacitance
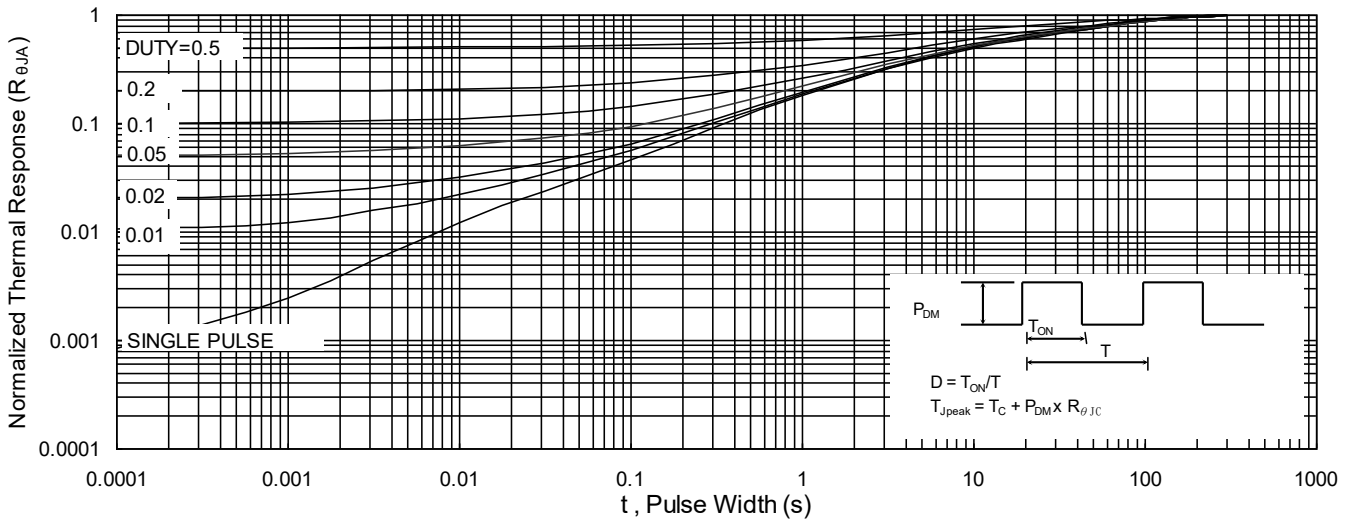

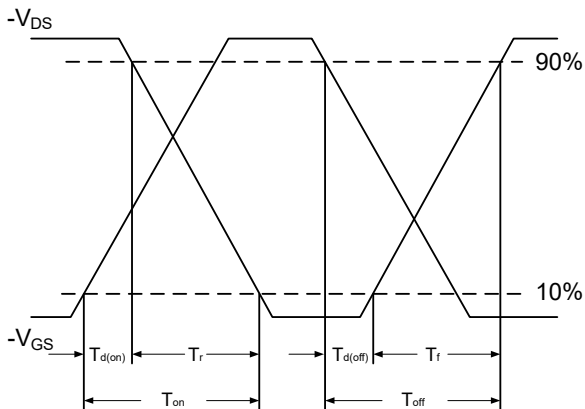**Fig.8 Safe Operating Area**

Fig.9 Normalized Maximum Transient Thermal Impedance
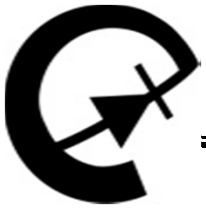

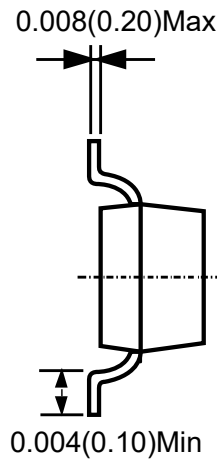**Fig.10 Switching Time Waveform**
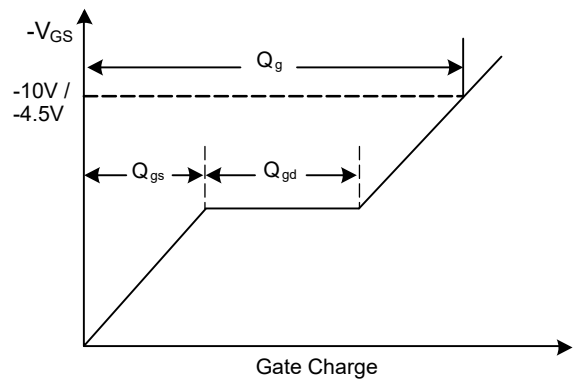
Fig.11 Gate Charge Waveform

Package Outline Dimensions

0.091(2.30)
0.066(1.70)

0.119(3.00)
0.082(2.10)

0.069(1.75)
0.043(1.10)

0.022(0.55)Max

0.123(3.10)
0.104(2.65)

0.058(1.45)Max

0.006(0.15)Max

0.008(0.20)Max

0.004(0.10)Min
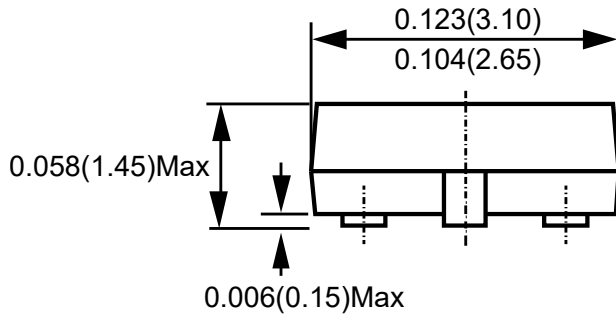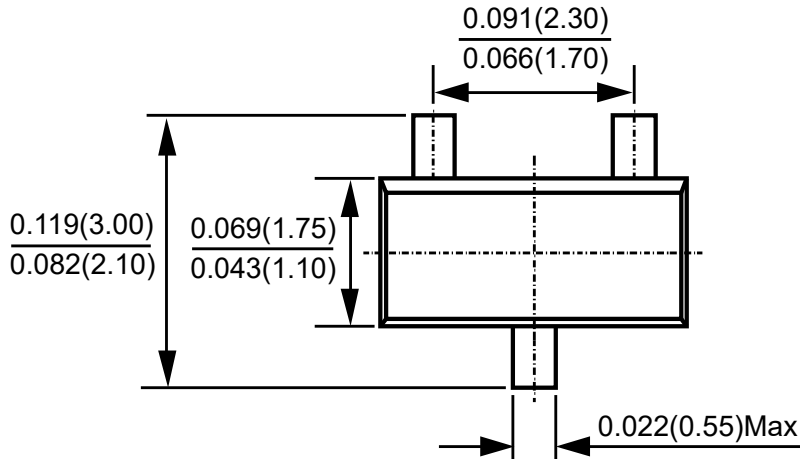
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Dimensions in inches and (millimeters)

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