TPMNC035

30V N-Channel MOSFETs

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.

BV_{DSS}	$R_{DS(ON)}$	I_D
30 V	35 mΩ	1.8 A

Features

- 30V, 1.8A, $R_{DS(ON)}$=35mΩ @V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- Green Device Available

SOT-323 Pin Configuration
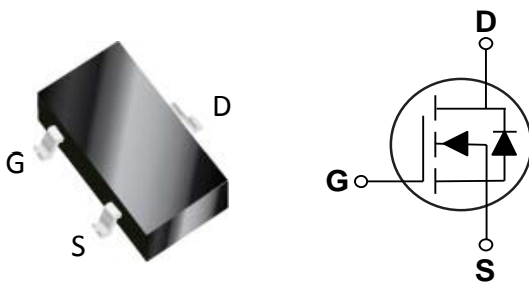
Applications

- Notebook
- Load Switch
- Battery Protection
- Hand-Held Instruments

Absolute Maximum Ratings T_C=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Drain Current - Continuous (T_C=25°C)	1.8	A
	Drain Current - Continuous (T_C=100°C)	1.15	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	7.2	A
P_D	Power Dissipation (T_C=25°C)	275	mW
	Power Dissipation - Derate above 25°C	2.2	mW/^{o}C
T_J	Operating Junction Temperature Range	-50 to 150	^{o}C
T_{STG}	Storage Temperature Range	-50 to 150	^{o}C
Marking Code		f	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	450	^{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	30	---	---	V
I$_{DSS}$	Drain-Source Leakage Current	V$_{DS}$=30V , V$_{GS}$=0V , T$_J$=25°C	---	---	1	uA
		V$_{DS}$=24V , V$_{GS}$=0V , T$_J$=125°C	---	---	10	uA
I$_{GSS}$	Gate-Source Leakage Current	V$_{GS}$=±12V , 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$_D$=1A	---	29	35	mΩ
		V$_{GS}$=4.5V , I$_D$=0.5A	---	35	46	
V$_{GS(th)}$	Gate Threshold Voltage	V$_{GS}$=V$_{DS}$, I$_D$=250uA	0.5	0.8	1.2	V
gfs	Forward Transconductance	V$_{DS}$=10V , I$_S$=2A	---	2.5	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q$_g$	Total Gate Charge	V$_{DS}$=24V , V$_{GS}$=10V , I$_D$=2A (NOTE 2、3)	---	7.4	11	nC
Q$_{gs}$	Gate-Source Charge		---	0.9	1.3	
Q$_{gd}$	Gate-Drain Charge		---	1.4	2.1	
T$_{d(on)}$	Turn-On Delay Time	V$_{DD}$=24V , V$_{GS}$=10V , R$_G$=3.3Ω , I$_D$=1A (NOTE 2、3)	---	2.2	4.5	nS
T$_r$	Rise Time		---	6.9	13.8	
T$_{d(off)}$	Turn-Off Delay Time		---	15.2	30.4	
T$_f$	Fall Time		---	4.5	9	
C$_{iss}$	Input Capacitance	V$_{DS}$=25V , V$_{GS}$=0V , F=1MHz	---	241	360	pF
C$_{oss}$	Output Capacitance		---	33	50	
C$_{rss}$	Reverse Transfer Capacitance		---	15	23	
Rg	Gate resistance	V$_{GS}$=0V , V$_{DS}$=0V , F=1MHz	---	1.1	---	Ω

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	---	---	1.8	A
I$_{SM}$	Pulsed Source Current		---	---	3.6	A
V$_{SD}$	Diode Forward Voltage	V$_{GS}$=0V , I$_S$=0.2A , T$_J$=25°C	---	---	1	V
Trr	Reverse Recovery Time	V$_{GS}$=0V , I$_S$=2A , di/dt=100A/us , T$_J$=25°C	---	87	---	nS
Qrr	Reverse Recovery Charge		---	390	---	nC

NOTES：

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

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

3. Essentially independent of operating temperature.

Characteristics Curves

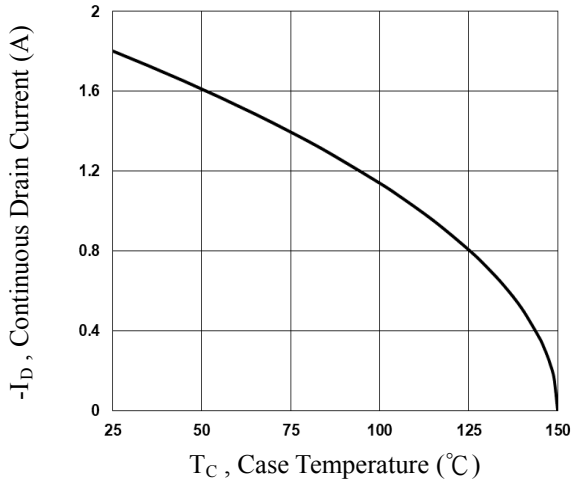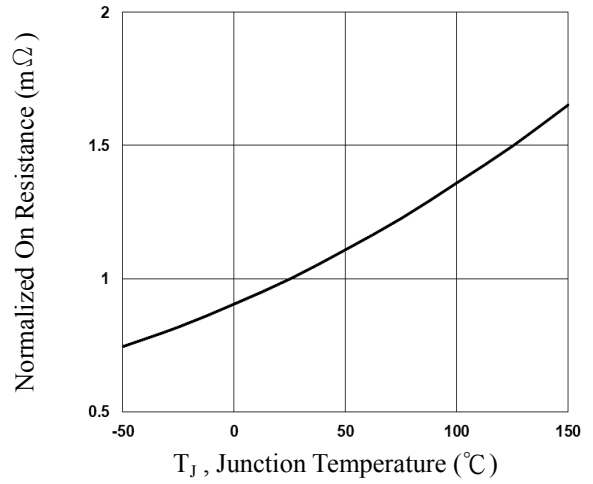**Fig.1   Continuous Drain Current vs. T_C**

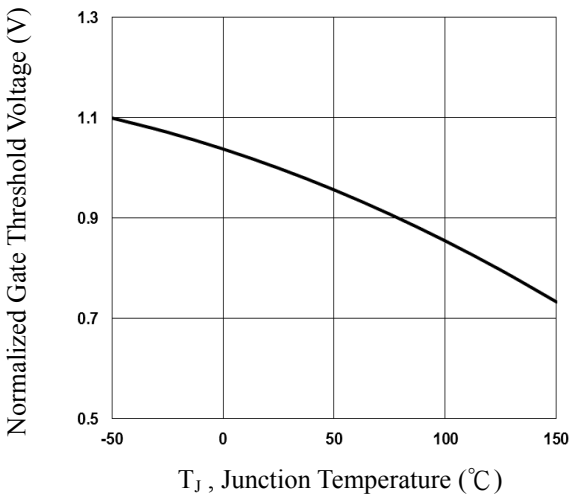**Fig.2   Normalized RDSON vs. T_J**

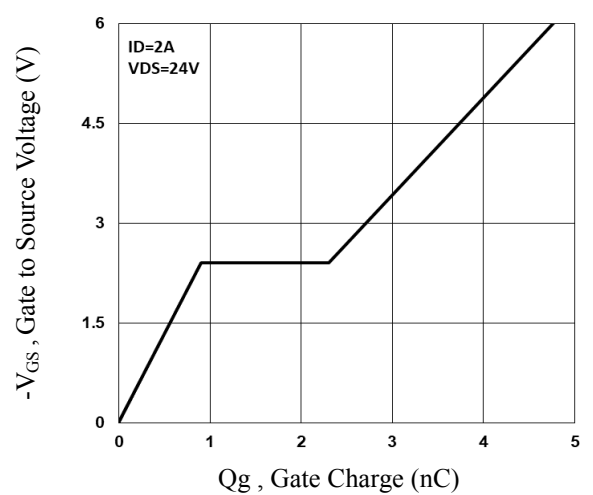**Fig.3   Normalized V_{th} vs. T_J**

Fig.4   Gate Charge Waveform
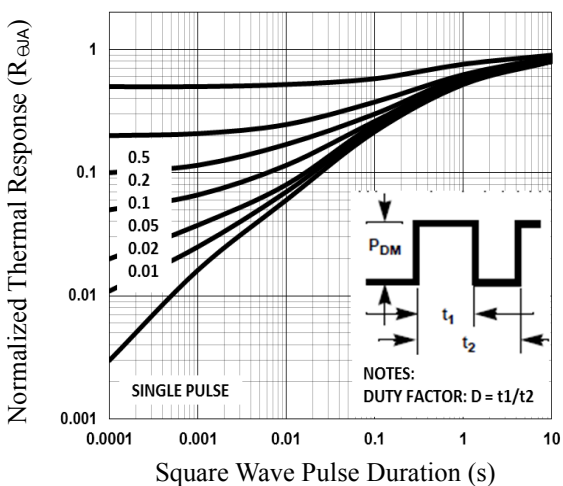

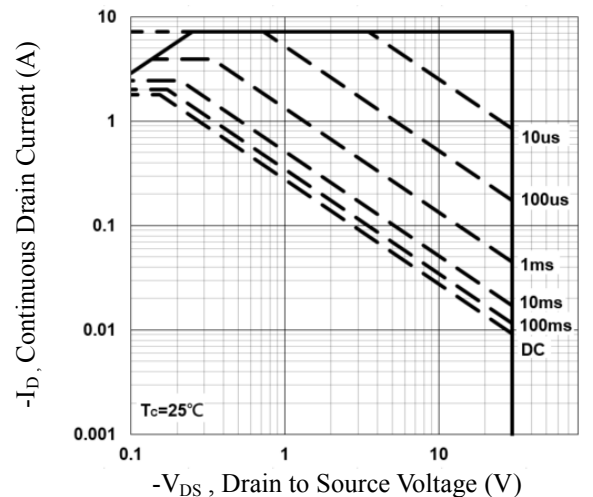**Fig.5   Normalized Transient Response**

Fig.6   Maximum Safe Operation Area

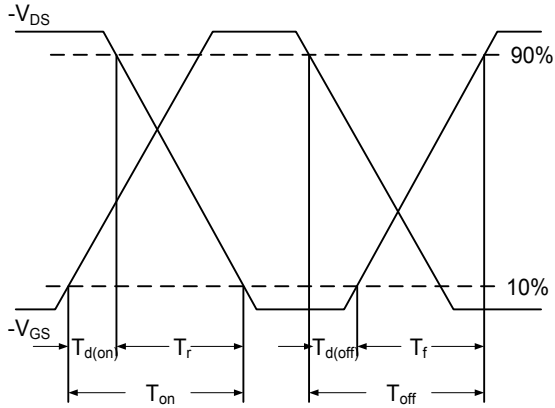# 30V N-Channel MOSFETs

Characteristics Curves
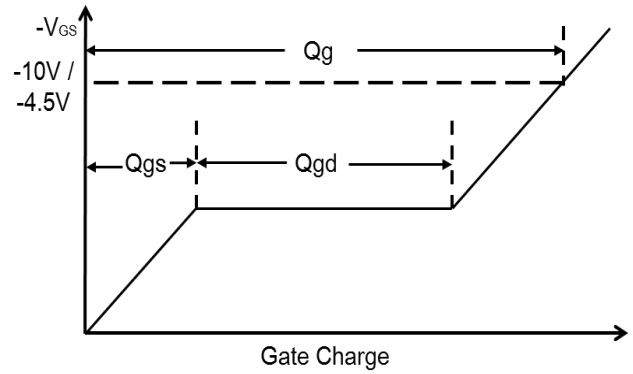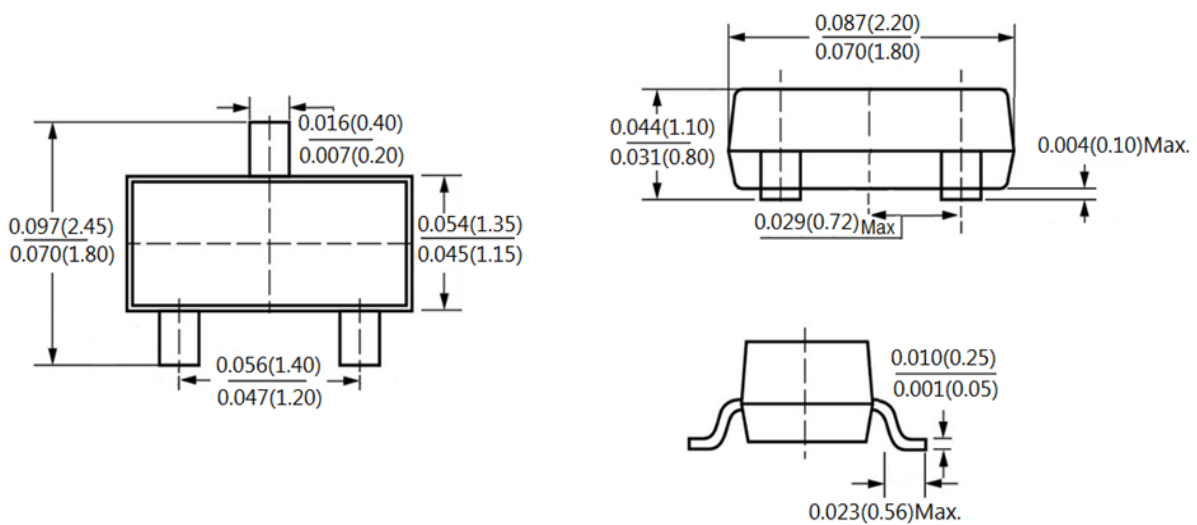

Fig.7 Switching Time Waveform

Fig.8 Gate Charge Waveform

Package Outline Dimensions

SOT-323

Dimensions in inches and (millimeters)

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