TQMNC500

30V N-Channel MOSFETs

BV_{DSS}	$R_{DS(ON)}$	I_D
30 V	500 mΩ	600 mA

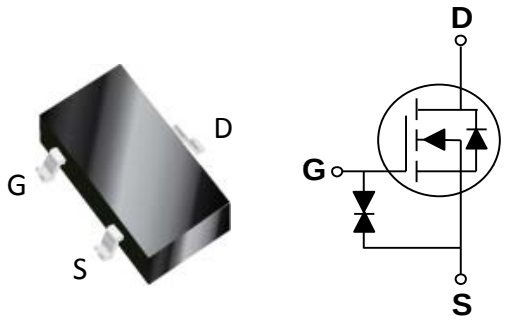
General Description

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.

Features

- 30V, 600mA, $R_{DS(ON)}$=500mΩ@V_{GS}=4.5V
- Improved dv/dt capability
- Fast switching
- Green Device Available
- Suit for 2.5V Gate Drive Applications

SOT-523 Pin Configuration



Applications

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

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)	600	mA
	Drain Current - Continuous (T_C=75°C)	460	mA
I_{DM}	Drain Current - Pulsed (NOTE 1)	2.4	A
P_D	Power Dissipation (T_C=25°C)	310	mW
	Power Dissipation - Derate above 25°C	2.5	mW/°C
T_J	Operating Junction Temperature Range	-50 to 150	°C
T_{STG}	Storage Temperature Range	-50 to 150	°C
Marking Code		O	

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	400	°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	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	---	---	±20	uA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=4.5V , I_D=0.3A	---	420	500	mΩ
		V_{GS}=2.5V , I_D=0.2A	---	550	700	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	0.5	0.8	1.2	V
gfs	Forward Transconductance	V_{DS}=4V , I_D=0.3A	---	1	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge (NOTE 2、3)	V_{DS}=15V , V_{GS}=4.5V , I_D=0.3A	---	2.6	5.2	nC
Q_{gs}	Gate-Source Charge (NOTE 2、3)		---	0.9	1.8	
Q_{gd}	Gate-Drain Charge (NOTE 2、3)		---	0.6	1.2	
$T_{d(on)}$	Turn-On Delay Time (NOTE 2、3)	V_{DD}=15V , V_{GS}=4.5V , R_G=10Ω , I_D=0.3A	---	5.5	11	nS
T_r	Rise Time (NOTE 2、3)		---	4	8	
$T_{d(off)}$	Turn-Off Delay Time (NOTE 2、3)		---	14.5	29	
T_f	Fall Time (NOTE 2、3)		---	6.5	13	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , F=1MHz	---	72.9	146	pF
C_{oss}	Output Capacitance		---	18.3	36.6	
C_{rss}	Reverse Transfer Capacitance		---	7.4	14.8	

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	---	---	0.6	A
I_{SM}	Pulsed Source Current		---	---	1.2	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=0.3A , T_J=25°C	---	---	1	V
Trr	Reverse Recovery Time	V_{GS}=0V , I_S=0.3A , di/dt=100A/us , T_J=25°C	---	13	---	nS
Qrr	Reverse Recovery Charge		---	6	---	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

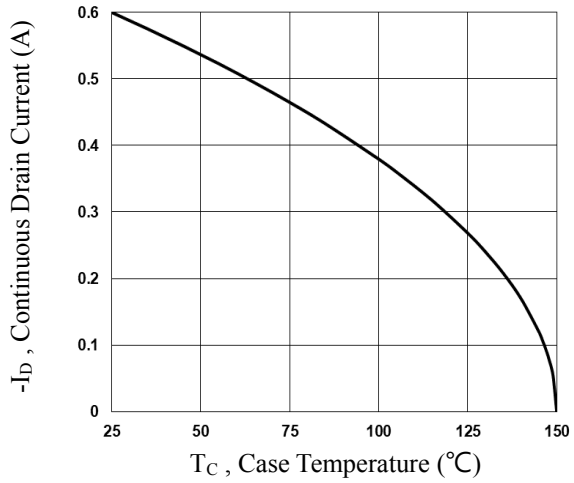


Fig.1 Continuous Drain Current vs. T_C

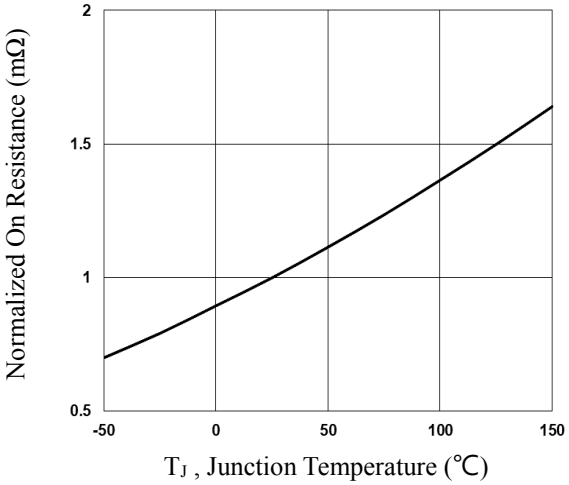


Fig.2 Normalized RDSON vs. T_J

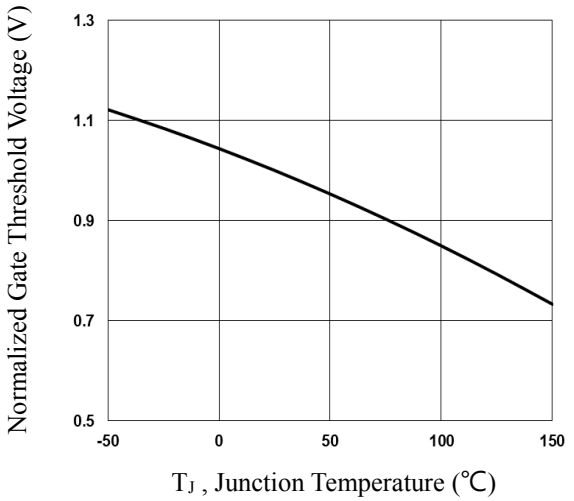


Fig.3 Normalized V_{th} vs. T_J

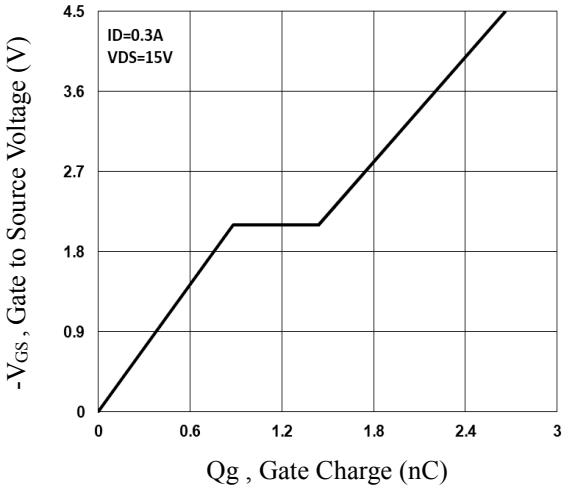


Fig.4 Gate Charge Waveform

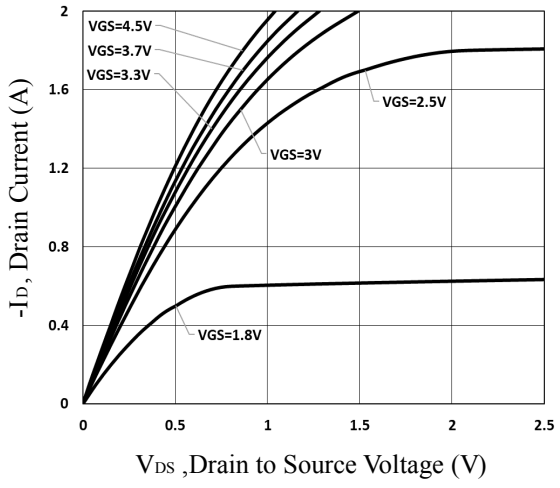


Fig.5 Typical Output Characteristics

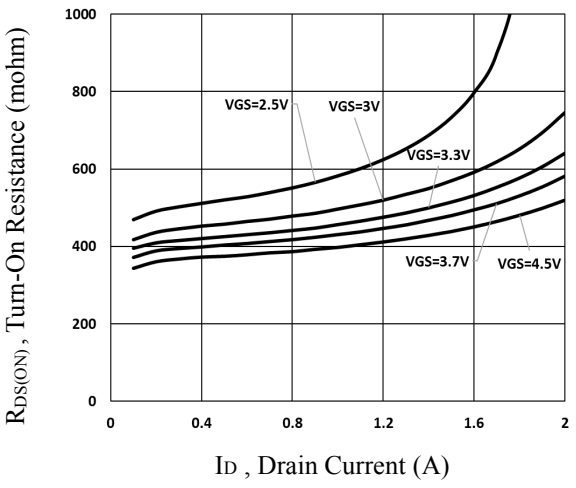


Fig.6 Turn-On Resistance vs. I_D

Characteristics Curves

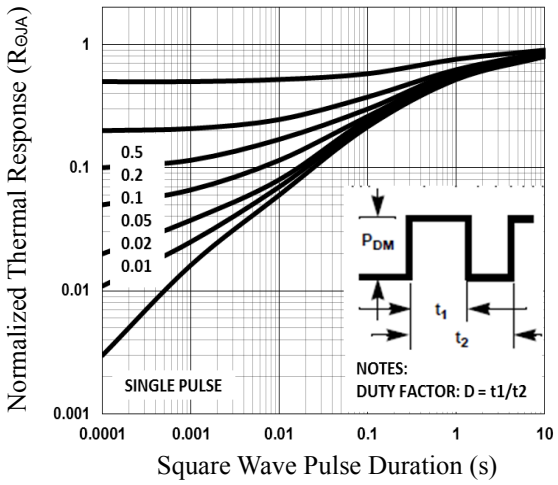


Fig.7 Normalized Transient Response

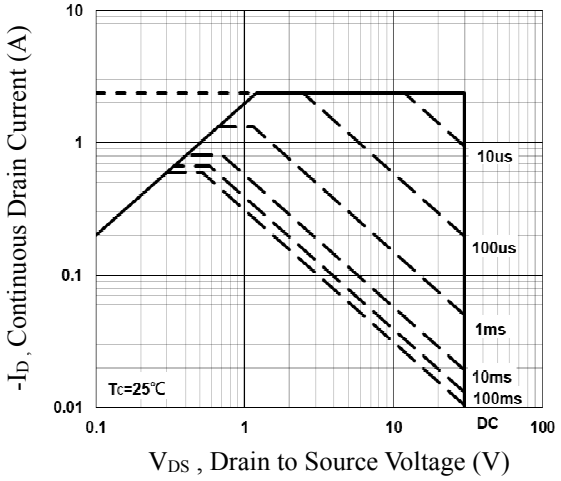


Fig.8 Maximum Safe Operation Area

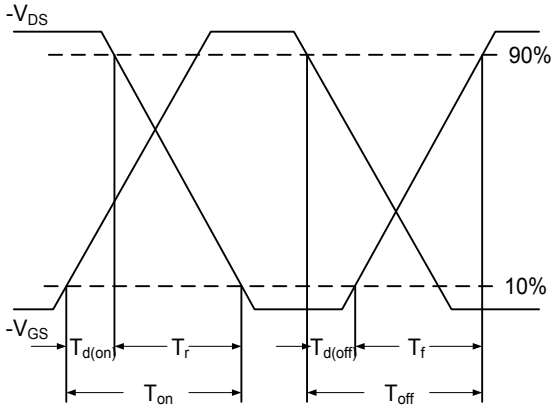


Fig.9 Switching Time Waveform

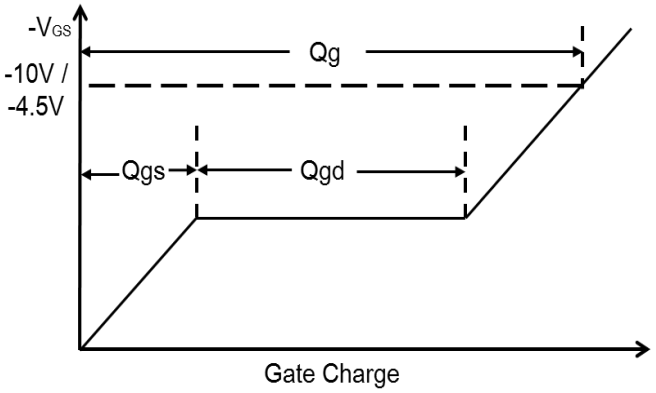
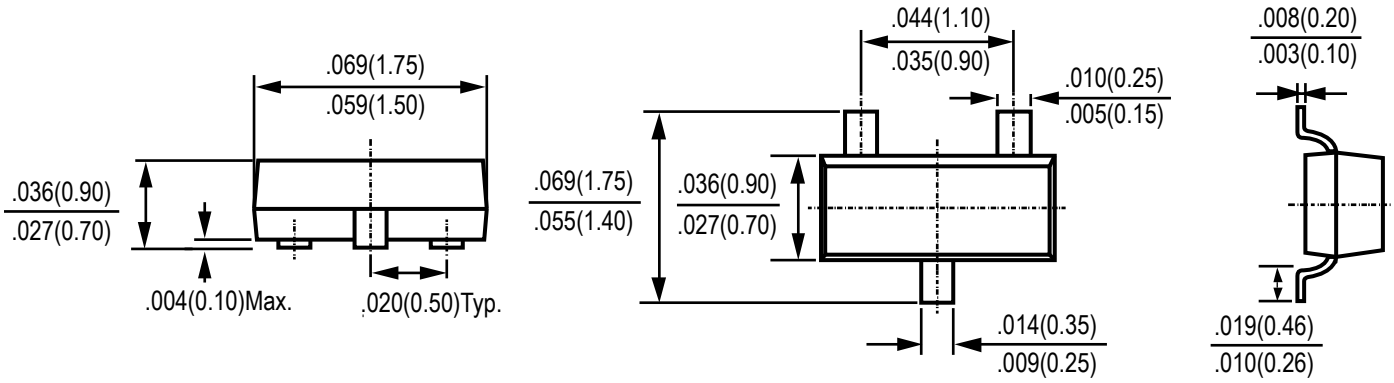


Fig.10 Gate Charge Waveform

Package Outline Dimensions



SOT-523

Dimensions in inches and (millimeters)

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