TPMNB300

20V N-Channel MOSFETs

BV_{DSS}	$R_{DS(ON)}$	I_D
20 V	300 mΩ	800 mA

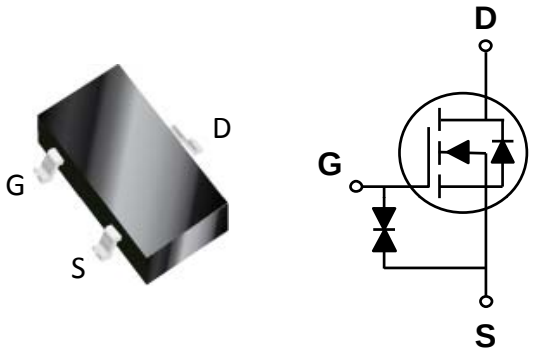
General Description

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

- 20V, 800mA, $R_{DS(ON)}$=300mΩ@V_{GS}=4.5V
- Improved dv/dt capability
- Fast switching
- Green Device Available
- Suit for 1.5V Gate Drive Applications

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	20	V
V_{GS}	Gate-Source Voltage	±8	V
I_D	Drain Current - Continuous (T_C=25°C)	800	mA
	Drain Current - Continuous (T_C=100°C)	510	mA
I_{DM}	Drain Current - Pulsed (NOTE 1)	3.2	A
P_D	Power Dissipation (T_C=25°C)	275	mW
	Power Dissipation - Derate above 25°C	2.2	mW/°C
T_J	Operating Junction Temperature Range	-50 to 150	°C
T_{STG}	Storage Temperature Range	-50 to 150	°C
Marking Code		k	

Thermal Characteristics

Symbol	Parameter	Typ.	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	450	°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	20	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}=20V , V_{GS}=0V , T_J=25°C	---	---	1	uA
		V_{DS}=16V , V_{GS}=0V , T_J=125°C	---	---	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±6V , 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=0.5A	---	200	300	mΩ
		V_{GS}=2.5V , I_D=0.4A	---	235	400	
		V_{GS}=1.8V , I_D=0.2A	---	295	550	
		V_{GS}=1.5V , I_D=0.1A	---	365	800	
		V_{GS}=1.2V , I_D=0.1A	---	600	1500	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D=250uA	0.3	0.6	1.0	V

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge (NOTE 2、3)	V_{DS}=10V , V_{GS}=4.5V , I_D=0.5A	---	1	2	nC
Q_{gs}	Gate-Source Charge (NOTE 2、3)		---	0.26	0.5	
Q_{gd}	Gate-Drain Charge (NOTE 2、3)		---	0.2	0.4	
$T_{d(on)}$	Turn-On Delay Time (NOTE 2、3)	V_{DD}=10V , V_{GS}=4.5V , R_G=10Ω , I_D=0.5A	---	5	10	ns
T_r	Rise Time (NOTE 2、3)		---	3.5	7	
$T_{d(off)}$	Turn-Off Delay Time (NOTE 2、3)		---	14	28	
T_f	Fall Time (NOTE 2、3)		---	6	12	
C_{iss}	Input Capacitance	V_{DS}=10V , V_{GS}=0V , F=1MHz	---	38.2	75	pF
C_{oss}	Output Capacitance		---	14.4	28	
C_{rss}	Reverse Transfer Capacitance		---	6	12	

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	---	---	0.8	A
I_{SM}	Pulsed Source Current		---	---	1.6	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=0.2A , T_J=25°C	---	---	1	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. Essentially independent of operating temperature.

Characteristics Curves

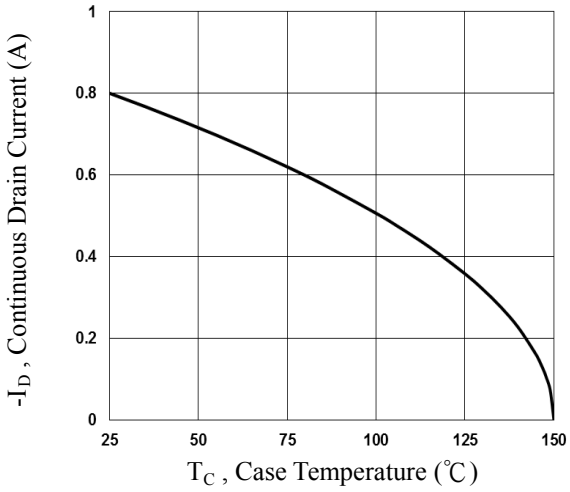


Fig.1 Continuous Drain Current vs. T_C

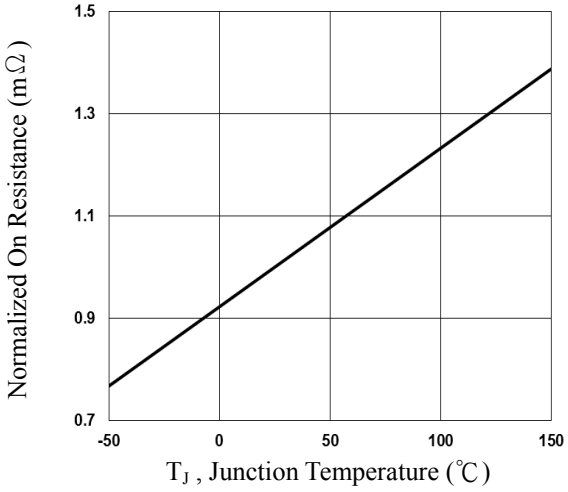


Fig.2 Normalized RDSON vs. T_J

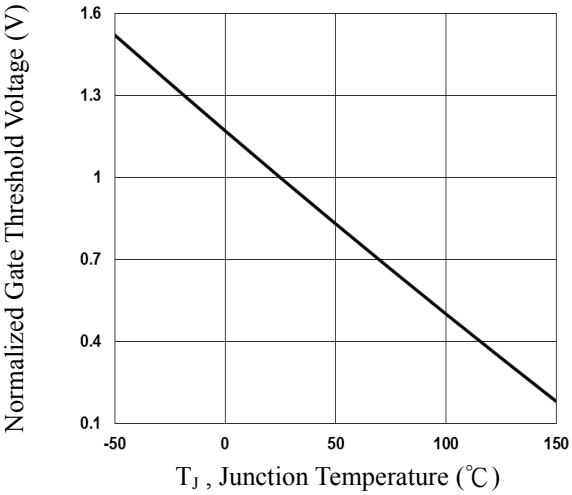


Fig.3 Normalized V_{th} vs. T_J

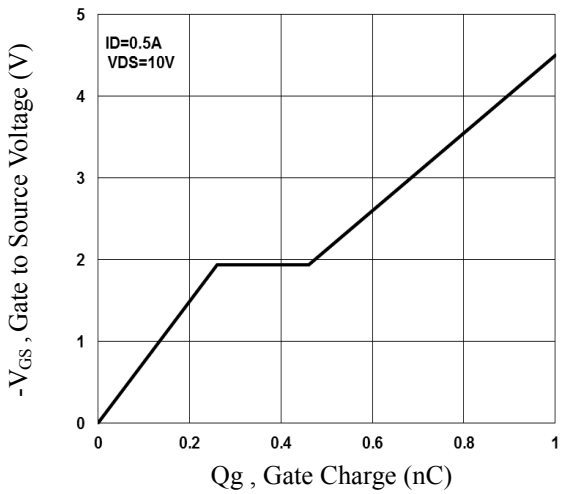


Fig.4 Gate Charge Waveform

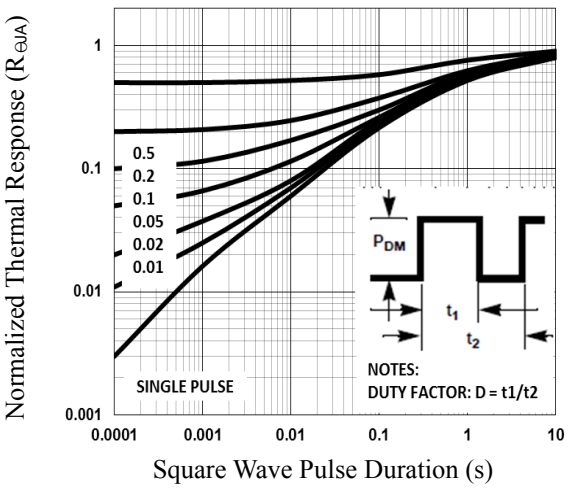


Fig.5 Normalized Transient Response

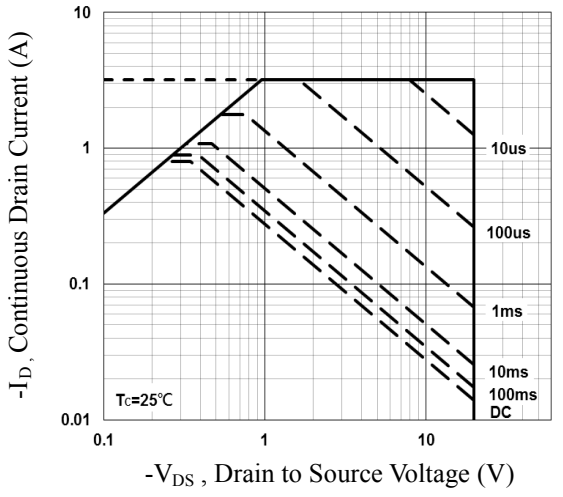


Fig.6 Maximum Safe Operation Area

Characteristics Curves

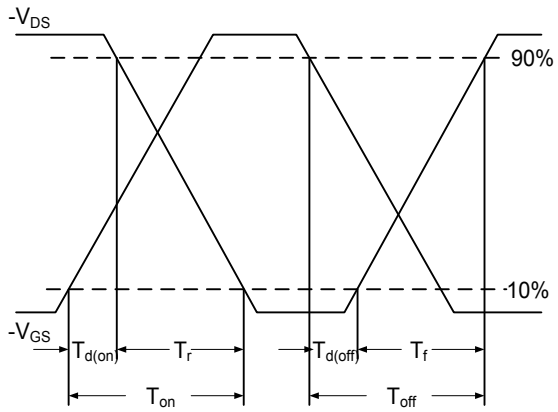


Fig.7 Switching Time Waveform

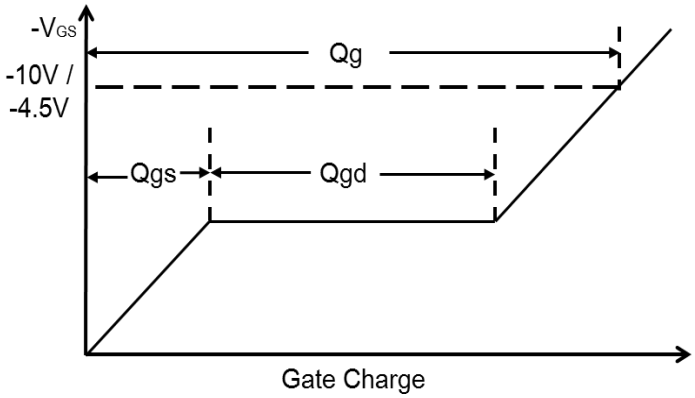
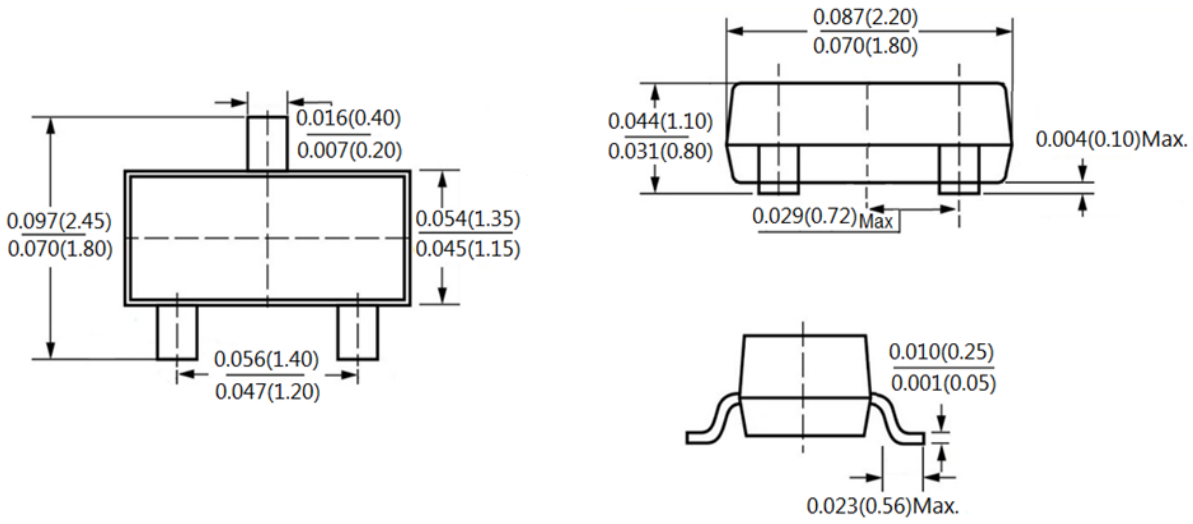


Fig.8 Gate Charge Waveform

Package Outline Dimensions



SOT-323

Dimensions in inches and (millimeters)

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