TNMPB055

20V P-Channel MOSFETs

General Description

These P-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
-20 V	55 mΩ	-4 A

Features

- $R_{DS(ON)} \leqq 55m\Omega @ V_{GS} = -4.5V$
- Fast Switching
- Green Device Available
- ESD：3KV

SOT-23 Pin Configuration
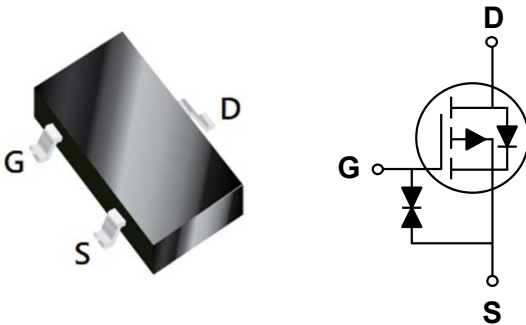
Applications

- POWER Management in Note
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- LCD Display inverter
- DSC

Absolute Maximum Ratings T_A=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_A=25°C)	-4	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	-16	A
P_D	Power Dissipation (T_A=25°C)	0.89	W
T_J	Operating Junction Temperature Range	-55 to 150	^{o}C
T_{STG}	Storage Temperature Range	-55 to 150	^{o}C

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	140	^{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	-20	---	---	V
I_{DSS}	Drain-Source Leakage Current	V_{DS}= -20V , V_{GS}= 0V	---	---	-1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}= ±8 , V_{DS}= 0V	---	---	±10	uA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}= -4.5V , I_D= -4A	---	---	55	mΩ
		V_{GS}= -2.5V , I_D= -4A	---	---	63	
		V_{GS}= -1.8V , I_D= -2A	---	---	73	
		V_{GS}= -1.5V , I_D= -1A	---	---	110	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D= -250uA	-0.3	---	-1.0	V
gfs	Forward Transconductance	V_{DS}= -5V , I_D= -4A	---	22	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	V_{DS}= -10V , V_{GS}= -4.5V , I_D= -4A	---	11.1	---	nC
Q_{gs}	Gate-Source Charge		---	3.1	---	
Q_{gd}	Gate-Drain Charge		---	2.4	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}= -10V , V_{GEN}= -4.5V , R_G= 2.5Ω , I_D= -1A	---	6	---	nS
T_r	Rise Time		---	5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	16	---	
T_f	Fall Time		---	3	---	
C_{iss}	Input Capacitance	V_{DS}= -10V , V_{GS}= 0V , F= 1MHz	---	989	---	pF
C_{oss}	Output Capacitance		---	167	---	
C_{rss}	Reverse Transfer Capacitance		---	75.5	---	

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	---	---	-2.2	A
V_{SD}	Diode Forward Voltage	V_{GS}= 0V , I_S= -1A	---	---	-1.0	V

NOTES：

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

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

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20V P-Channel MOSFETs

Characteristics Curves
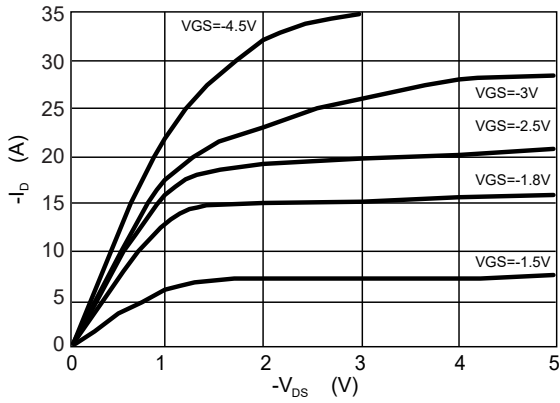
FIG. 1-Output Characteristics
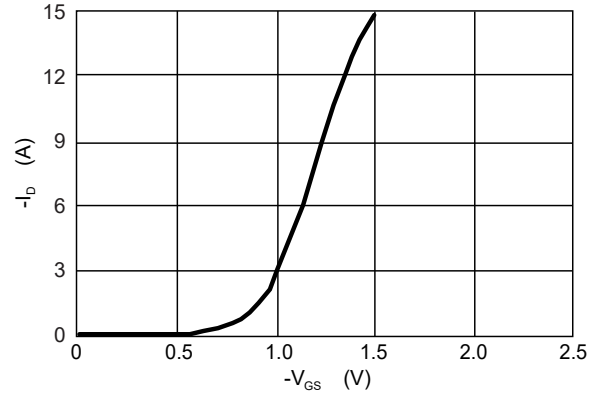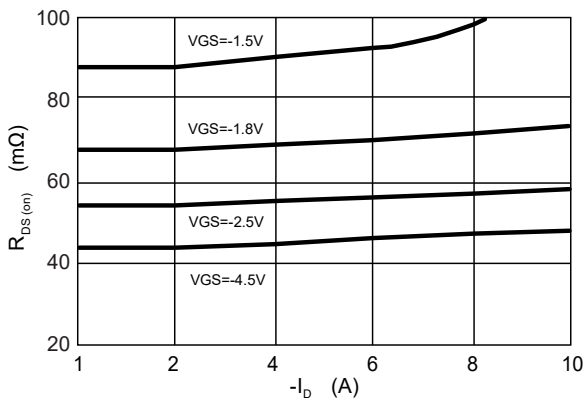

FIG. 2-Transfer Characteristics

FIG. 3-$R_{DS(ON)}$ vs I_D

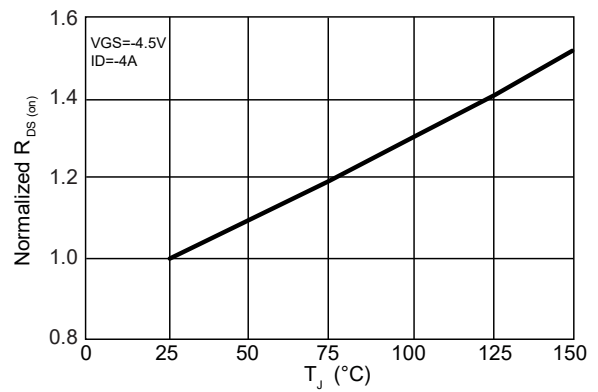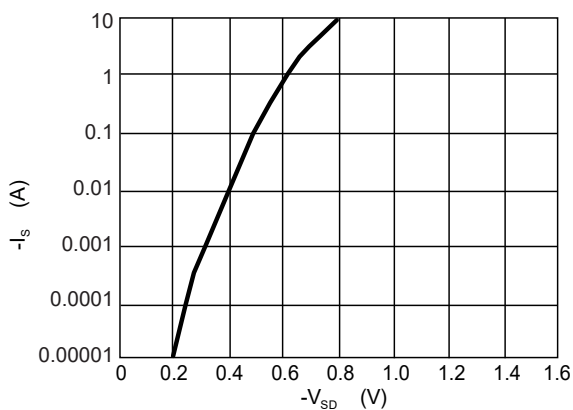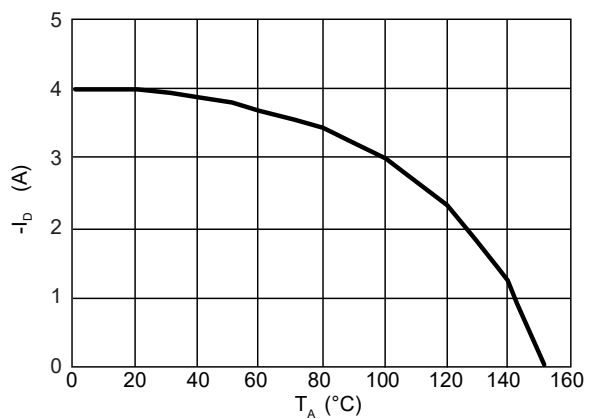FIG. 4-Normalized $R_{DS(ON)}$ vs T_J

FIG. 5-I_S vs V_{SD}

FIG. 6-I_D vs T_A

Characteristics Curves

FIG. 7-Switching Time Waveform
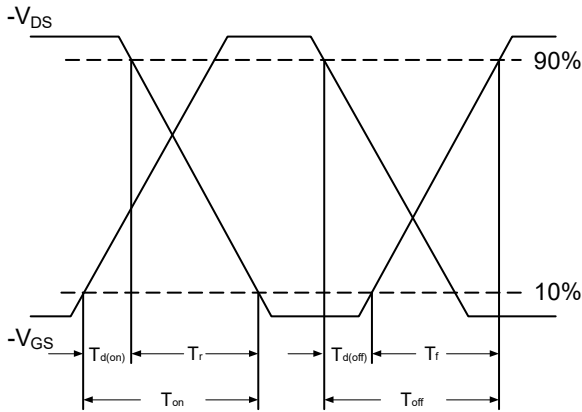
FIG. 8-Gate Charge Waveform

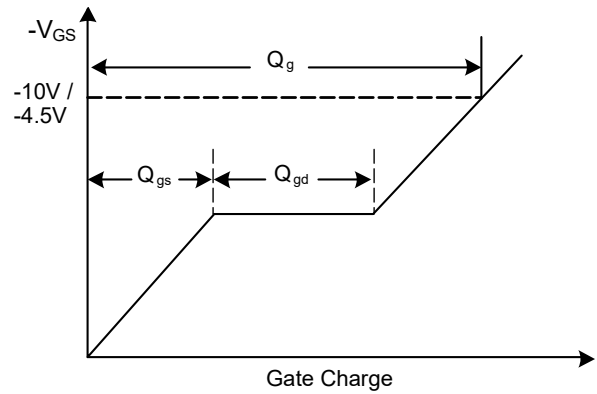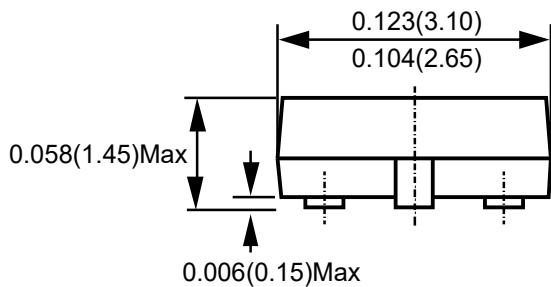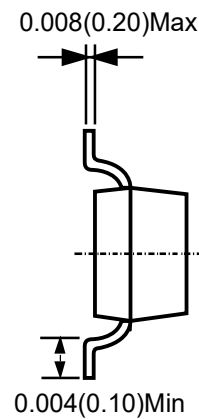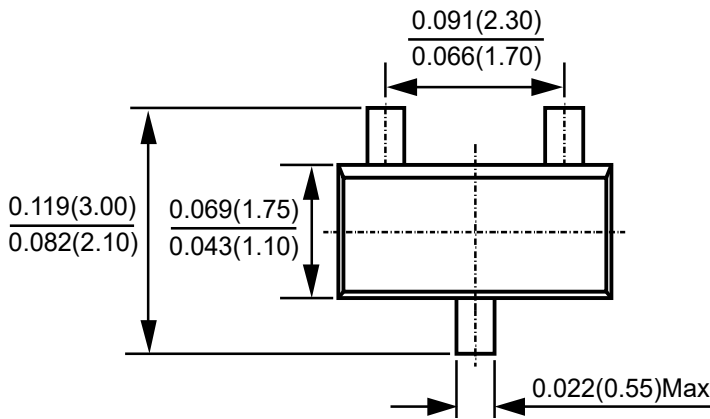## Package Outline Dimensions

SOT-23

Dimensions in inches and (millimeters)

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