TNMPB165

20V P-Channel MOSFETs

General Description

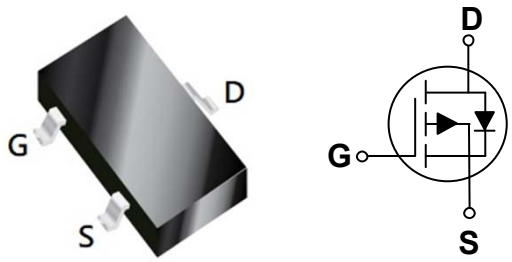
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency fast switching applications.

BV_{DSS}	$R_{DS(ON)}$	I_D
-20 V	165 mΩ	-2.3 A

Features

- $R_{DS(ON)} \leqq 165m\Omega @ V_{GS}$= -4.5V
- Fast Switching
- Green Device Available

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	-20	V
V_{GS}	Gate-Source Voltage	±12	V
I_D	Drain Current - Continuous	-2.3	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	-10	A
P_D	Power Dissipation (T_A=25°C)	0.7	W
T_J	Operating Junction Temperature Range	-55 to 150	°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
Marking Code		A1SHB	

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	178	°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	---	---	-1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}= ±12 , V_{DS}= 0V	---	---	±100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}= -4.5V , I_D= -2A	---	---	165	mΩ
		V_{GS}= -2.5V , I_D= -1.8A	---	---	185	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D= -250uA	-0.5	---	-1.2	V
gfs	Forward Transconductance	V_{DS}= -5V , I_D= -2A	4	---	---	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= -2A	---	3	---	nC
Q_{gs}	Gate-Source Charge		---	0.5	---	
Q_{gd}	Gate-Drain Charge		---	0.8	---	
$T_{d(on)}$	Turn-On Delay Time	V_{DD}= -10V , V_{GS}= -4.5V , R_{GEN}= 3Ω , R_L= 5Ω	---	10	---	nS
T_r	Rise Time		---	5	---	
$T_{d(off)}$	Turn-Off Delay Time		---	21	---	
T_f	Fall Time		---	7	---	
C_{iss}	Input Capacitance	V_{DS}= -10V , V_{GS}= 0V , F= 1MHz	---	200	---	pF
C_{oss}	Output Capacitance		---	60	---	
C_{rss}	Reverse Transfer Capacitance		---	34	---	

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode Forward Voltage	V_{GS}= 0V , I_S= -2A	---	---	-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. Guaranteed by design, not subject to production.

Characteristics Curves

FIG. 1-I_D vs T_J

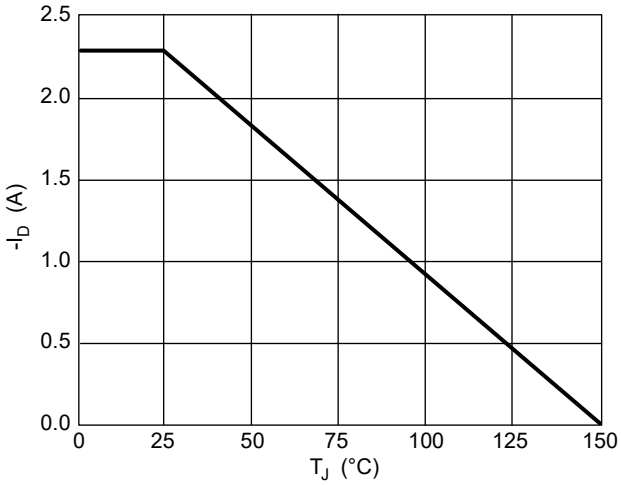


FIG. 3-Normalized $R_{DS(ON)}$ vs T_J

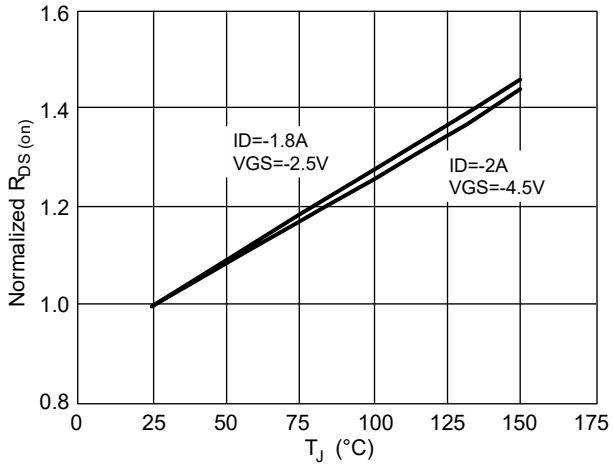


FIG. 3-Source- Drain Diode Forward Characteristics

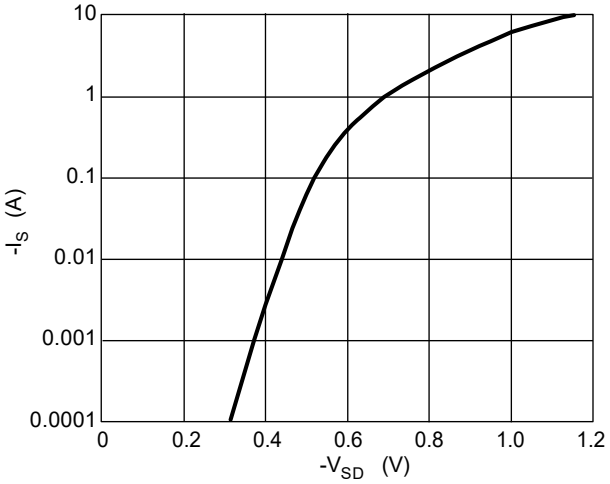


FIG. 4-Gate Charge Waveform

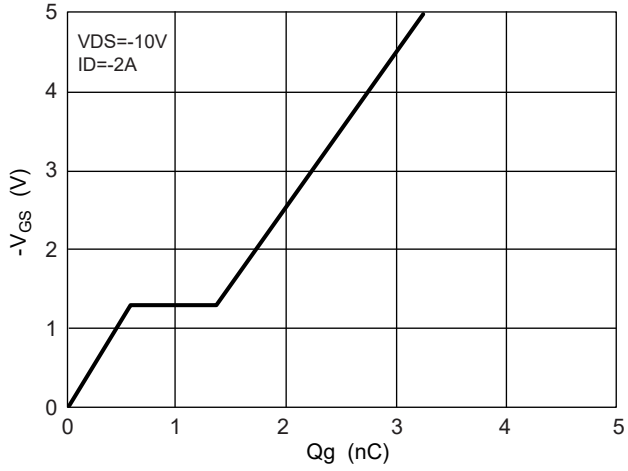
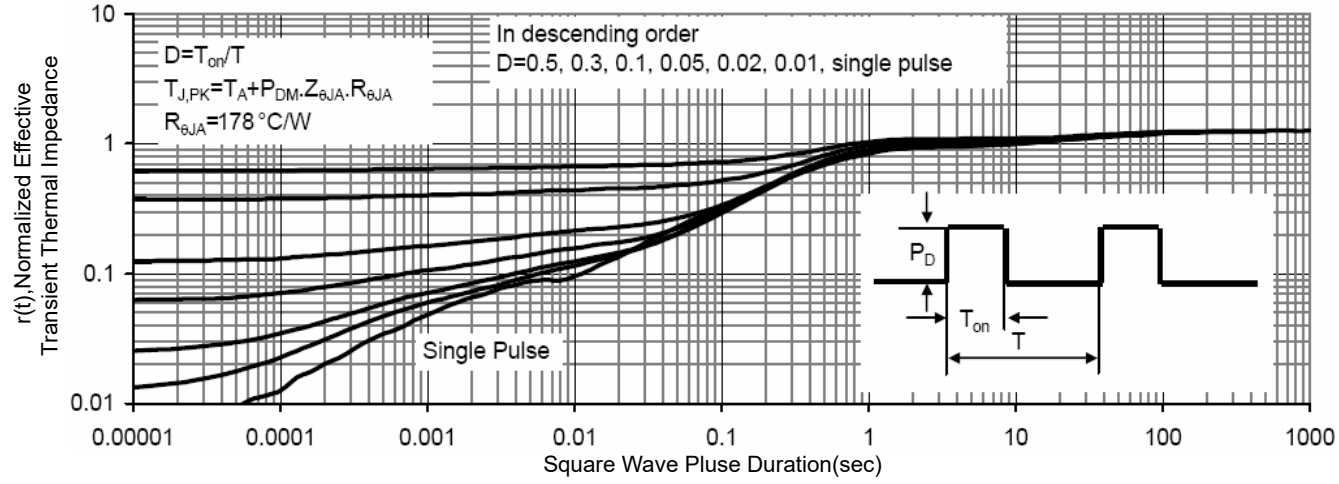


FIG. 5-Normalized Transient Impedance



Characteristics Curves

FIG. 6-Switching Time Waveform

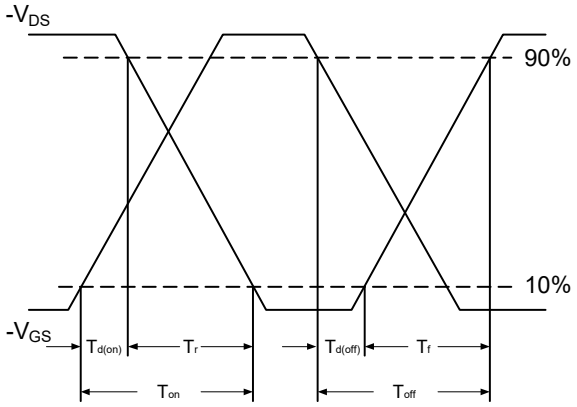
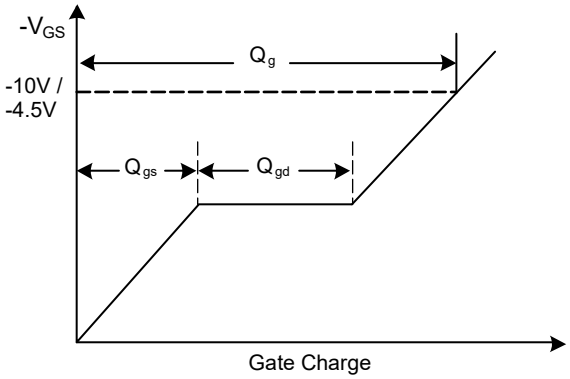
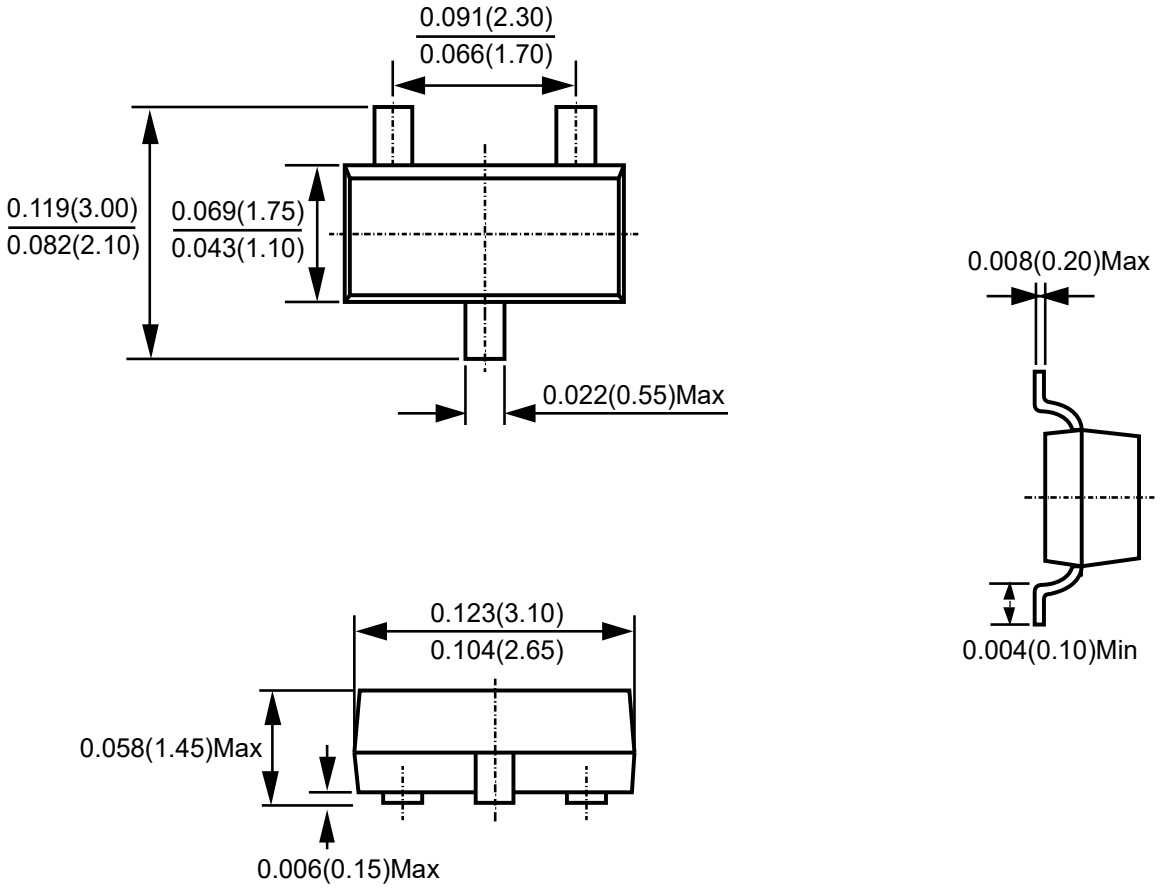


FIG. 7-Gate Charge Waveform



Package Outline Dimensions



SOT-23

Dimensions in inches and (millimeters)

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