



60V P-Channel MOSFETs

General Description

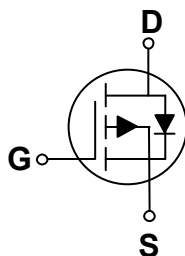
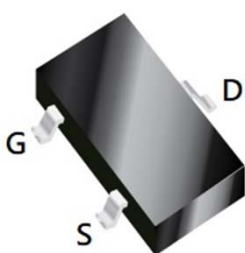
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
-60 V	200 m Ω	-2.8 A

Features

- $R_{DS(ON)} \leq 200m\Omega @ V_{GS} = -10V$
- Fast Switching
- Green Device Available

SOT-23 Pin Configuration



Applications

- Battery Protection
- Load Switch
- Uninterruptible Power Supply

Absolute Maximum Ratings $T_C=25^\circ C$ unless otherwise noted

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-60	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current - Continuous ($T_C=25^\circ C$)	-2.8	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	-8.4	A
P_D	Power Dissipation ($T_C=25^\circ C$)	1.5	W
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Rating	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	125	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	80	$^\circ C/W$



Electrical Characteristics ($T_J=25^\circ\text{C}$, unless otherwise noted)

Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu\text{A}$	-60	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-48V, V_{GS}=0V$	---	---	-1	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-1.5A$	---	---	200	m Ω
		$V_{GS}=-4.5V, I_D=-1A$	---	---	250	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu\text{A}$	-1.0	---	-2.5	V
gfs	Forward Transconductance	$V_{DS}=-5V, I_D=-1.5A$	---	5.9	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q_g	Total Gate Charge	$V_{DS}=-20V, V_{GS}=-4.5V, I_D=-1.5A$	---	4.6	---	nC
Q_{gs}	Gate-Source Charge		---	1.4	---	
Q_{gd}	Gate-Drain Charge		---	1.62	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DS}=-15V, V_{GS}=-10V, R_G=3.3\Omega, I_D=-1A$	---	17.4	---	nS
T_r	Rise Time		---	5.4	---	
$T_{d(off)}$	Turn-Off Delay Time		---	37.2	---	
T_f	Fall Time		---	2.4	---	
C_{iss}	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, F=1\text{MHz}$	---	453	---	pF
C_{oss}	Output Capacitance		---	59	---	
C_{riss}	Reverse Transfer Capacitance		---	38	---	

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	---	---	-1.7	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A$	---	---	-1.2	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
3. The data is theoretically the same as I_D and I_{DM} , in real applications, should be limited by total power dissipation.



Characteristics Curves

FIG. 1-Output Characteristics

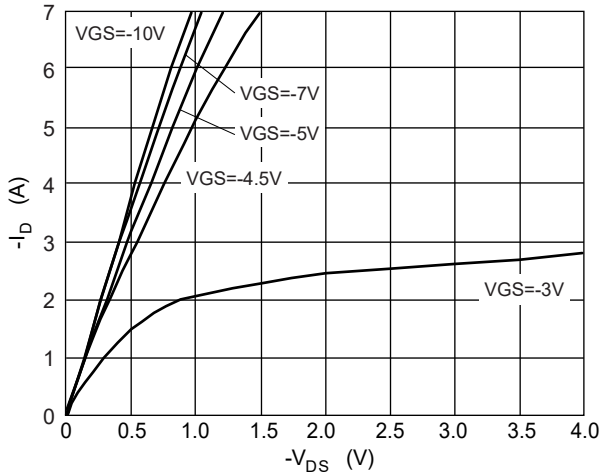


FIG. 2- $R_{DS(ON)}$ vs V_{GS}

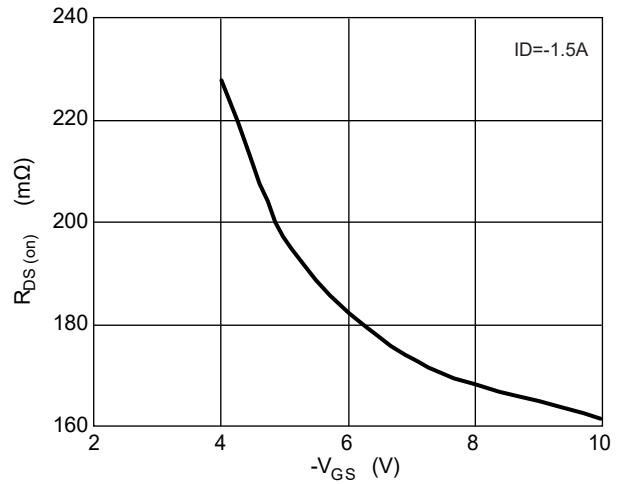


FIG. 3- I_S vs V_{SD}

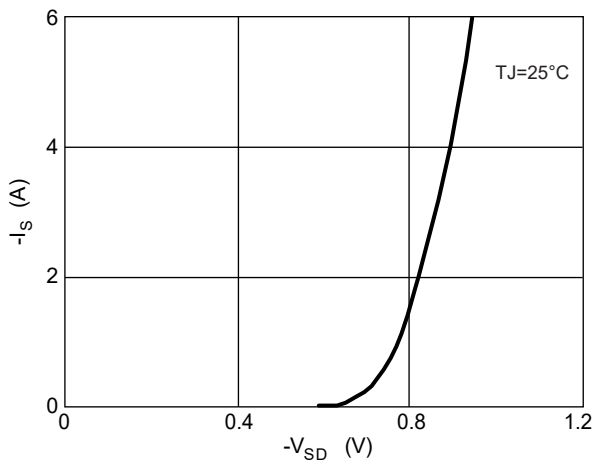


FIG. 4-Gate Charge Characteristics

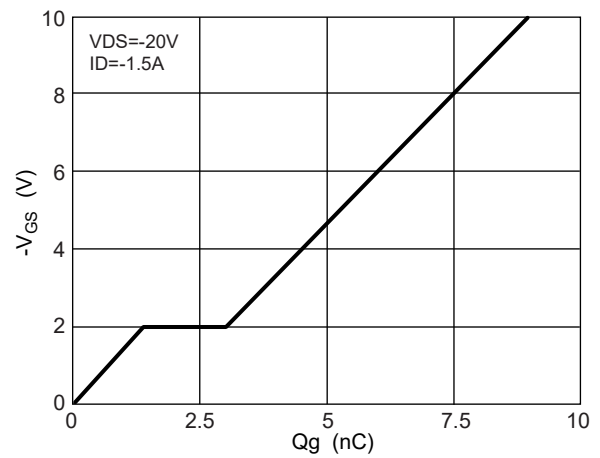


FIG. 5-Normalized $V_{GS(th)}$ vs T_J

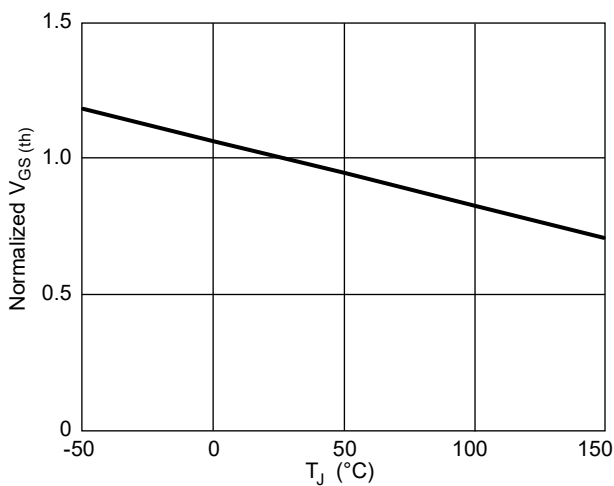
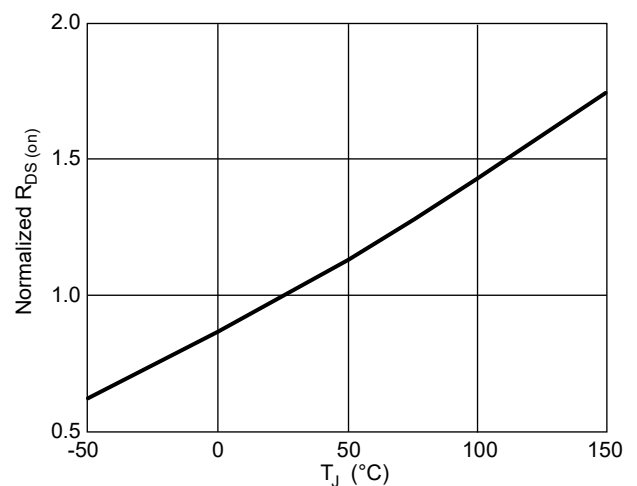


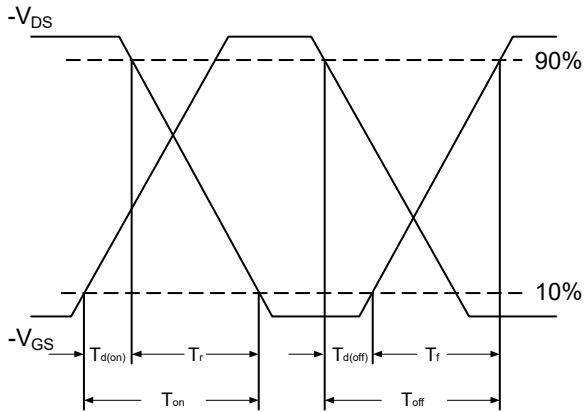
FIG. 6-Normalized $R_{DS(ON)}$ vs T_J



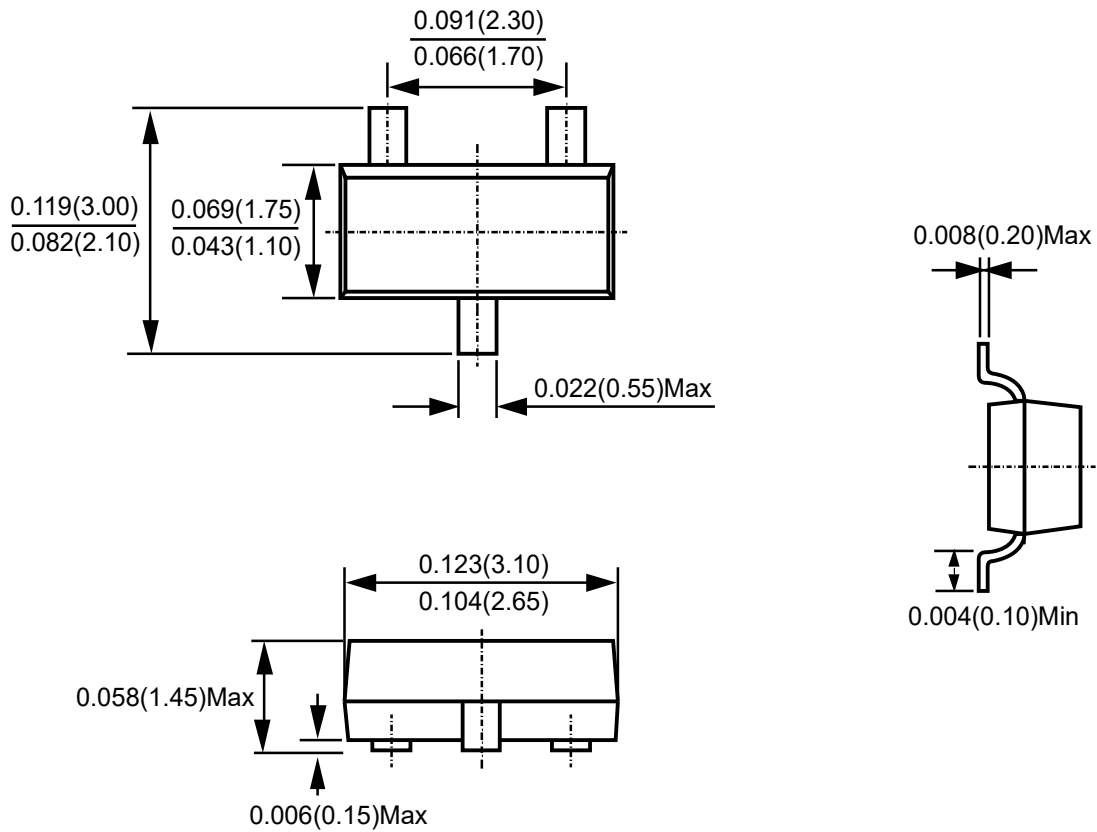


Characteristics Curves

FIG. 7-Switching Time Waveform



Package Outline Dimensions



SOT-23

Dimensions in inches and (millimeters)



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