



20V P-Channel MOSFETs

General Description

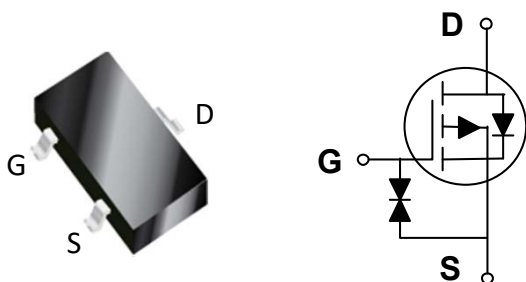
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
-20 V	33 m Ω	-5.8 A

Features

- $R_{DS(ON)} \leq 33m\Omega @ V_{GS} = -4.5V$
- Improved dv/dt capability
- Fast switching
- Green Device Available
- Suit for -1.8V Gate Drive Applications

SOT-23S Pin Configuration



Applications

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

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 10	V
I_D	Drain Current - Continuous ($T_C=25^\circ\text{C}$)	-5.8	A
	Drain Current - Continuous ($T_C=100^\circ\text{C}$)	-3.7	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	-23.2	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	1.56	W
	Power Dissipation – Derate above 25°C	0.012	W/ $^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	80	$^\circ\text{C}/\text{W}$



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} = ±10V , 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	---	28	33	mΩ
		V _{GS} = -2.5V , I _D = -3A	---	37	45	
		V _{GS} = -1.8V , I _D = -2A	---	49	65	
		V _{GS} = -1.5V , I _D = -2A	---	56	80	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D = -250uA	-0.3	---	-1	V
g _{fs}	Forward Transconductance	V _{DS} = -10V , I _D = -3A	---	8.4	---	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 = -4A (NOTE 2、3)	---	16.1	25	nC
Q _{gs}	Gate-Source Charge		---	1.8	3	
Q _{gd}	Gate-Drain Charge		---	3.8	7	
T _{d(on)}	Turn-On Delay Time	V _{DD} = -10V , V _{GS} = -4.5V , R _G = 25Ω , I _D = -1A (NOTE 2、3)	---	8.2	16	nS
T _r	Rise Time		---	30	57	
T _{d(off)}	Turn-Off Delay Time		---	71.1	135	
T _f	Fall Time		---	19.8	38	
C _{iss}	Input Capacitance	V _{DS} = -15V , V _{GS} = 0V , F= 1MHz	---	1440	2100	pF
C _{oss}	Output Capacitance		---	155	230	
C _{rss}	Reverse Transfer Capacitance		---	115	170	

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	---	---	-5.8	A
I _{SM}	Pulsed Source Current		---	---	-23.2	A
V _{SD}	Diode Forward Voltage	V _{GS} = 0V , I _S = -1A , 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

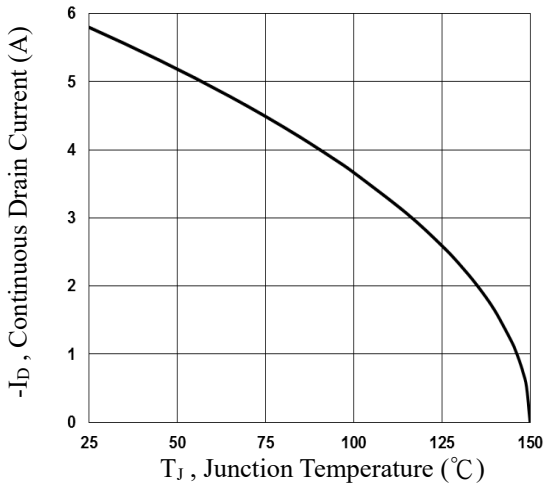


Fig.1 Continuous Drain Current vs. T_c

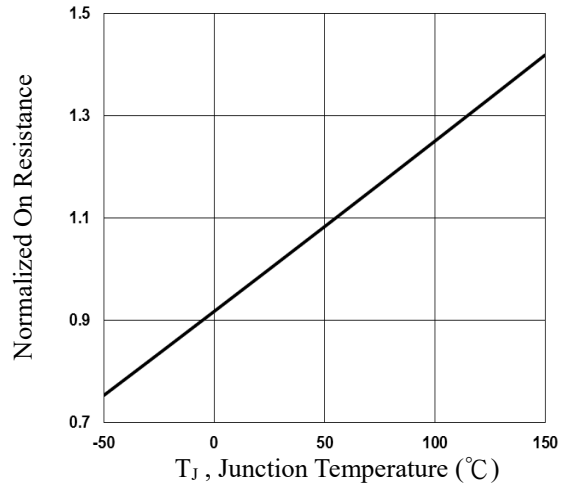


Fig.2 Normalized R_{DS(on)} vs. T_j

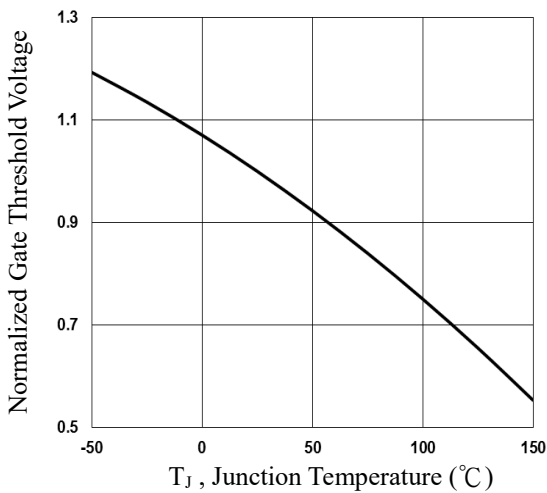


Fig.3 Normalized V_{th} vs. T_j

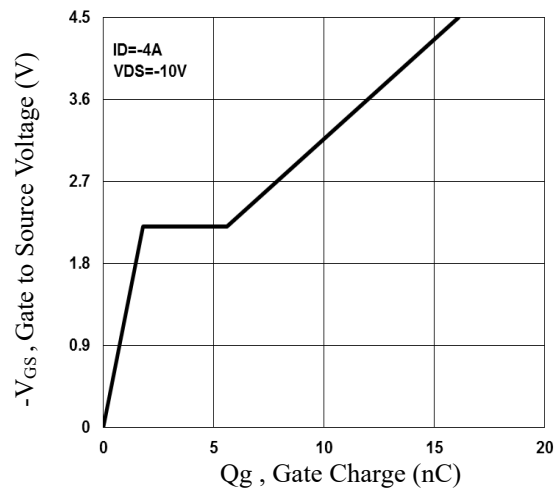


Fig.4 Gate Charge Waveform

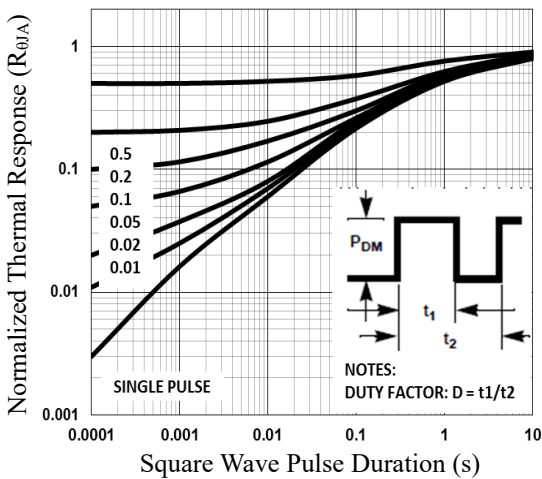


Fig.5 Normalized Transient Impedance

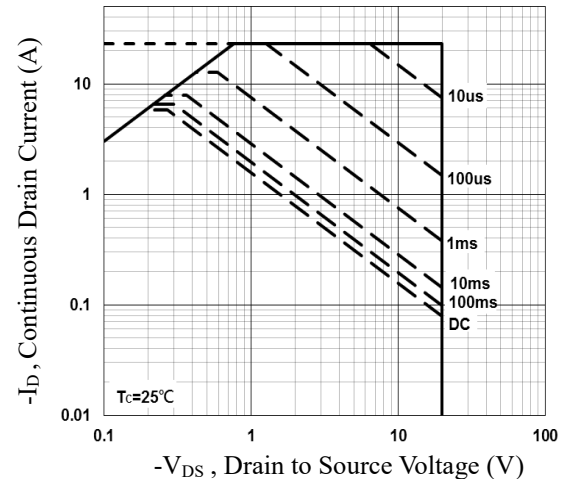


Fig.6 Maximum Safe Operation Area



Characteristics Curves

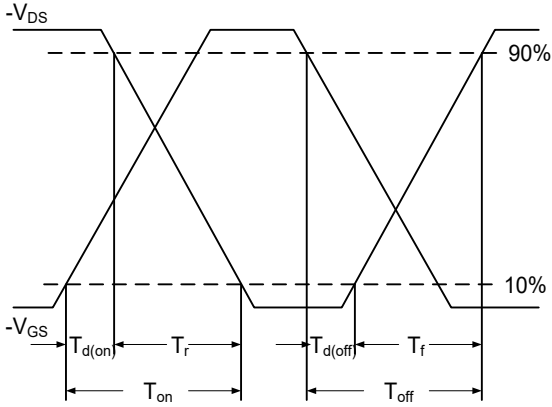


Fig.7 Switching Time Waveform

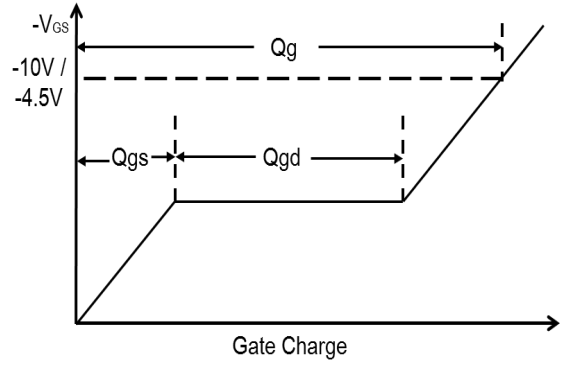
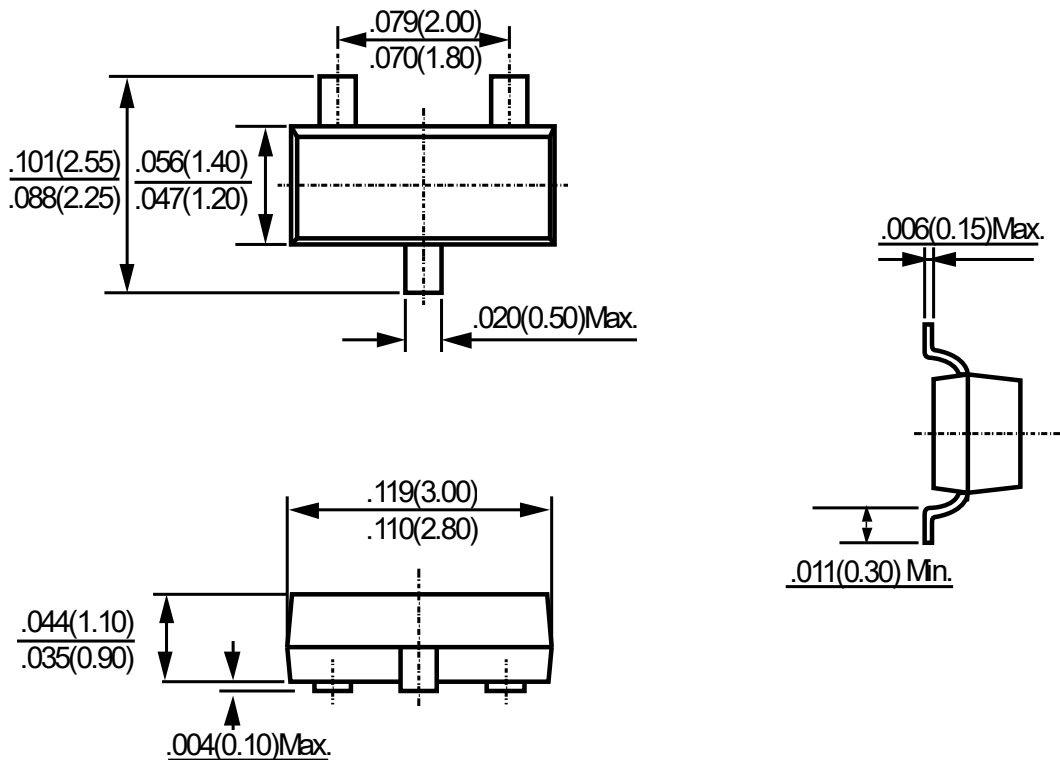


Fig.8 Gate Charge Waveform

Package Outline Dimensions



SOT-23S

Dimensions in inches and (millimeters)



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