



20V N-Channel MOSFETs

General Description

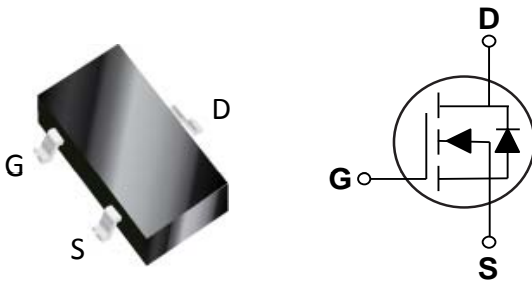
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
20 V	65 mΩ	4 A

Features

- 20V, 4A, $R_{DS(ON)}=65m\Omega @V_{GS}=4.5V$
- Improved dv/dt capability
- Fast switching
- Green Device Available
- Suit for 1.8V Gate Drive Applications

SOT-23S Pin Configuration



Applications

- Notebook
- Load Switch
- Hand-Held Instrument

Absolute Maximum Ratings $T_c=25^\circ C$ 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 ($T_c=25^\circ C$)	4	A
	Drain Current - Continuous ($T_c=100^\circ C$)	2.5	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	16	A
P_D	Power Dissipation ($T_c=25^\circ C$)	1.56	W
	Power Dissipation - Derate above $25^\circ C$	0.012	W/°C
T_J	Operating Junction Temperature Range	-50 to 150	°C
T_{STG}	Storage Temperature Range	-50 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max	Unit
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	---	80	°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, 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	---	---	±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 =3A	---	50	65	mΩ
		V _{GS} =2.5V, I _D =2A	---	60	80	
		V _{GS} =1.8V, I _D =1A	---	85	120	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	0.3	0.5	1.0	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _S =2A	---	4.4	---	S

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 =1A	---	3.6	7.2	nC
Q _{gs}	Gate-Source Charge (NOTE 2、3)		---	0.38	0.76	
Q _{gd}	Gate-Drain Charge (NOTE 2、3)		---	0.6	1.2	
T _{d(on)}	Turn-On Delay Time (NOTE 2、3)	V _{DD} =10V, V _{GS} =4.5V, R _G =25Ω, I _D =1A	---	1.8	5	nS
T _r	Rise Time (NOTE 2、3)		---	5.6	12	
T _{d(off)}	Turn-Off Delay Time (NOTE 2、3)		---	11.3	24	
T _f	Fall Time (NOTE 2、3)		---	3.2	7	
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, F=1MHz	---	180	360	pF
C _{OSS}	Output Capacitance		---	32	64	
C _{rSS}	Reverse Transfer Capacitance		---	26	52	

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	---	---	4	A
I _{SM}	Pulsed Source Current		---	---	8	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.



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Characteristics Curves

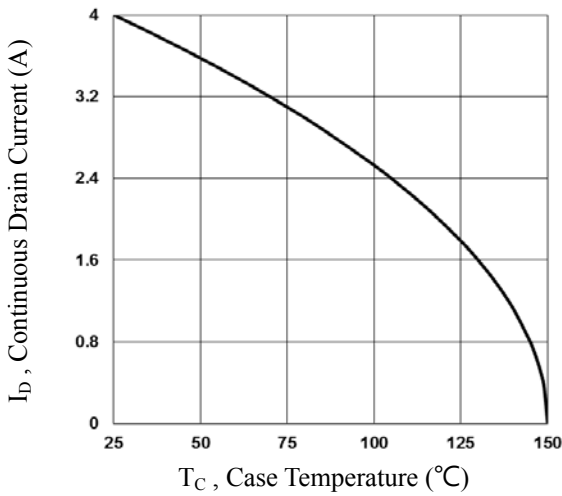


Fig.1 Continuous Drain Current vs. T_C

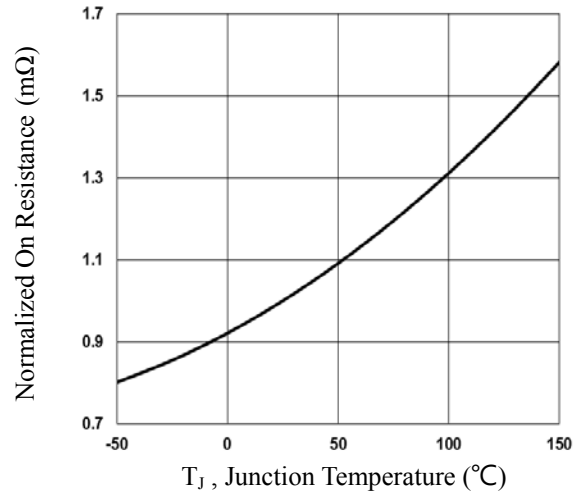


Fig.2 Normalized RDSON vs. T_J

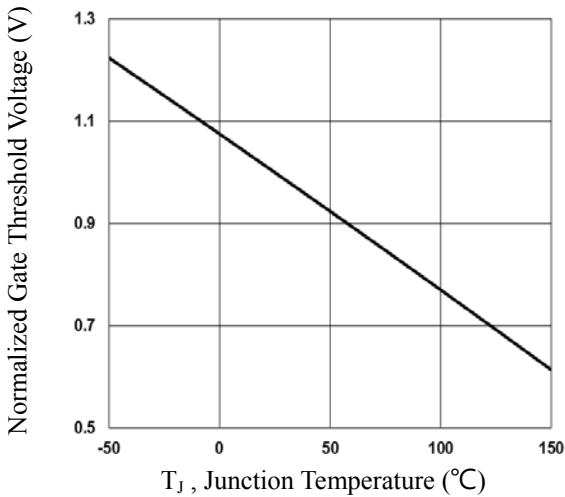


Fig.3 Normalized V_{th} vs. T_J

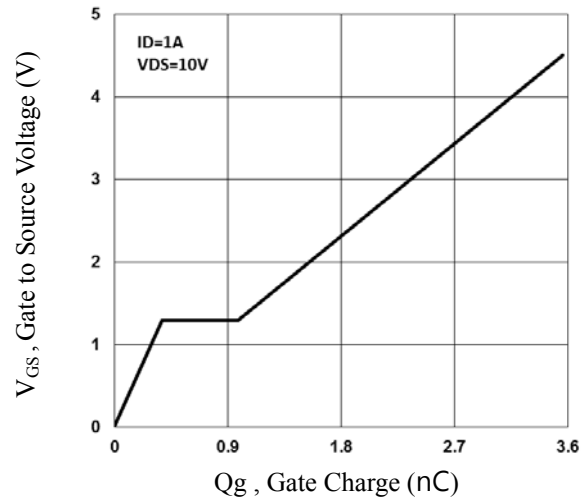


Fig.4 Gate Charge Waveform

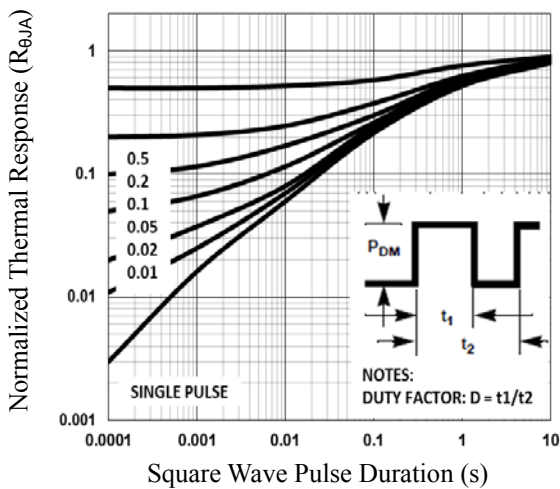


Fig.5 Normalized Transient Impedance

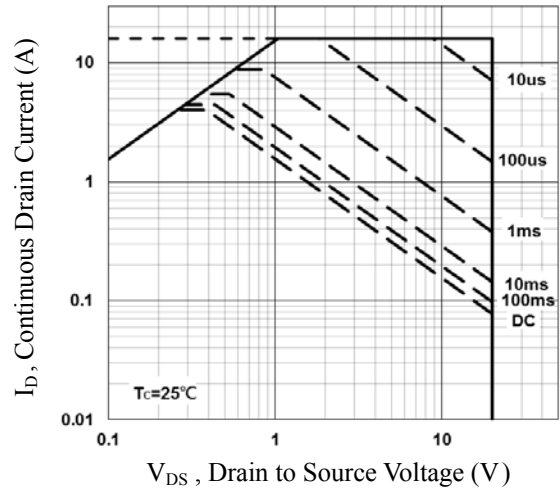


Fig.6 Maximum Safe Operation Area



Characteristics Curves

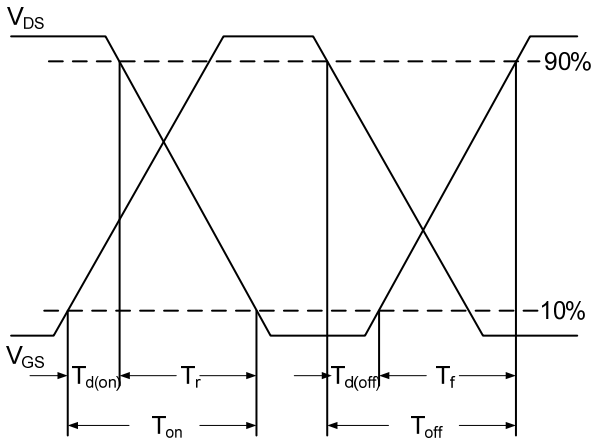


Fig.7 Switching Time Waveform

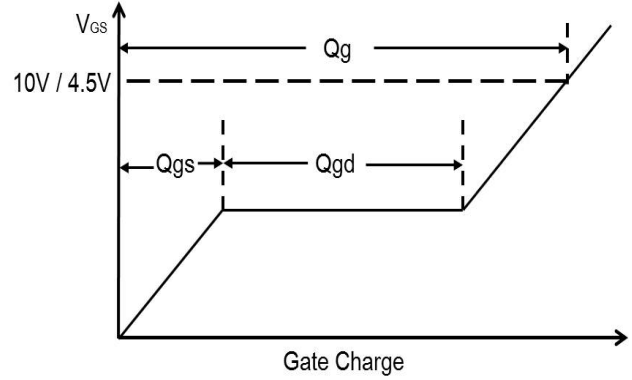
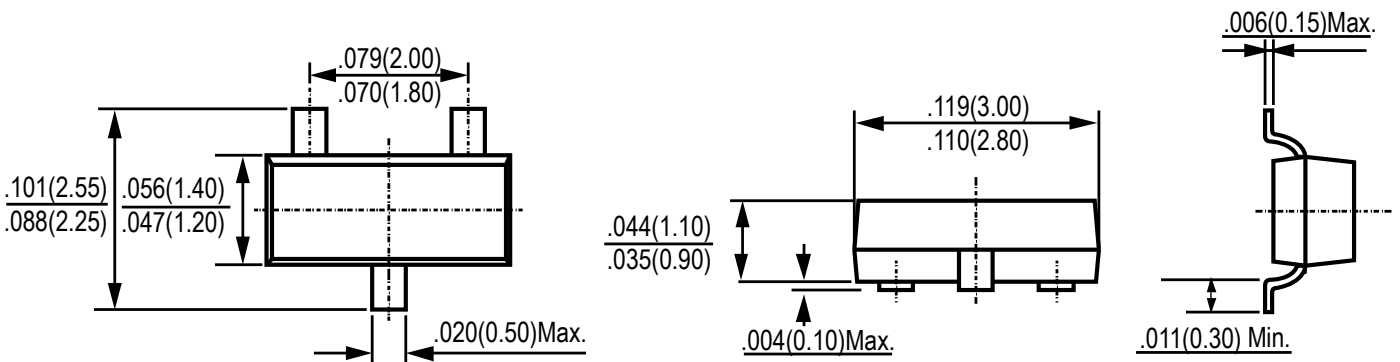


Fig.8 Gate Charge Waveform

Package Outline Dimensions



SOT-23S

Dimensions in inches and (millimeters)



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