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}	$R_{DS(ON)}$Max.	I_D
20V	45mΩ	4.5A

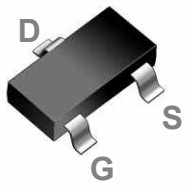
Features

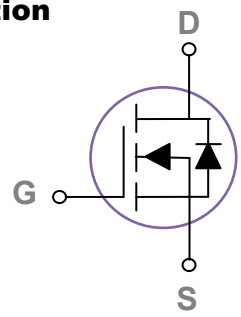
- *20V, 4.5A, $R_{DS(ON)}$Max. = 45mΩ@V_{GS} = 4.5V*
- *Improved dv/dt capability*
- *Fast switching*
- *Green Device Available*
- *Suit for 1.8V Gate Drive Applications*

Applications

- *Notebook*
- *Load Switch*
- *Hend-Held Instruments*

SOT-23 Pin Configuration





Absolute Maximum Ratings Tc=25℃ 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 (T_C=25℃)	4.5	A
I_{DM}	Drain Current – Pulsed[1]	18	A
P_D	Power Dissipation (T_C=25℃)	1.4	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃

Note 1: Exceed these limits to damage to the device.
Note 2: Exposure to absolute maximum rating conditions may affect device reliability.

Electrical Characteristics (T_J=25 ℃, 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℃			1	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±10V , V_{DS}=0V			±100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	V_{GS}=4.5V , I_D=4.5A		33	45	mΩ
		V_{GS}=2.5V , I_D=3A		42	50	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.5	0.6	1	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient			-2		mV/℃
gfs	Forward Transconductance	V_{DS}=5V , I_D=1.5A		30		S

Dynamic and switching Characteristics

Q_g	Total Gate Charge[2,3]	V_{DS}=10V , V_{GS}=4.5V , I_D=3A		4		nC
Q_{gs}	Gate-Source Charge[2,3]			0.65		
Q_{gd}	Gate-Drain Charge[2,3]			1.2		
$T_{d(on)}$	Turn-On Delay Time[2,3]	V_{DD}=10V , V_{GS}=4.5V , R_G=6Ω I_D=3A		3.5		nS
T_r	Rise Time[2,3]			5		
$T_{d(off)}$	Turn-Off Delay Time[2,3]			27		
T_f	Fall Time[2,3]			4		
C_{iss}	Input Capacitance	V_{DS}=10V , V_{GS}=0V , F=1MHz		338		pF
C_{oss}	Output Capacitance			120		
C_{rss}	Reverse Transfer Capacitance			80		

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Diode Forward Current				4.5	A
V_{SD}	Diode Forward Voltage	V_{GS}=0V , I_S=3A			1.2	V

Note :
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.

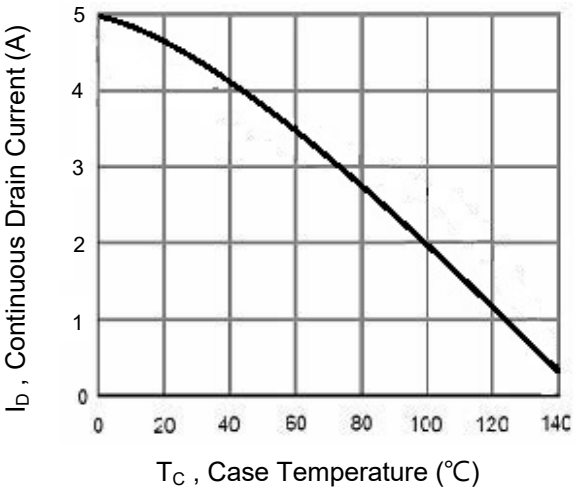


Fig.1 Continuous Drain Current vs. T_C

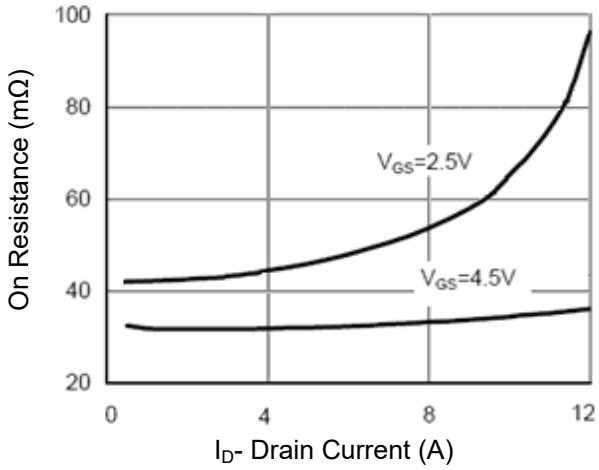


Fig.2 Drain-Source On-Resistance

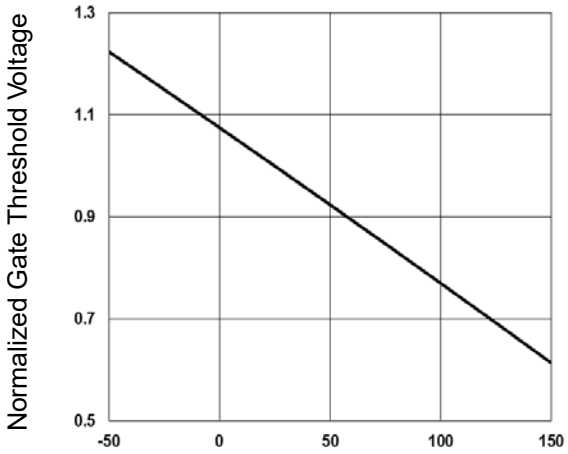


Fig.3 Normalized $V_{GS(th)}$ vs. T_J

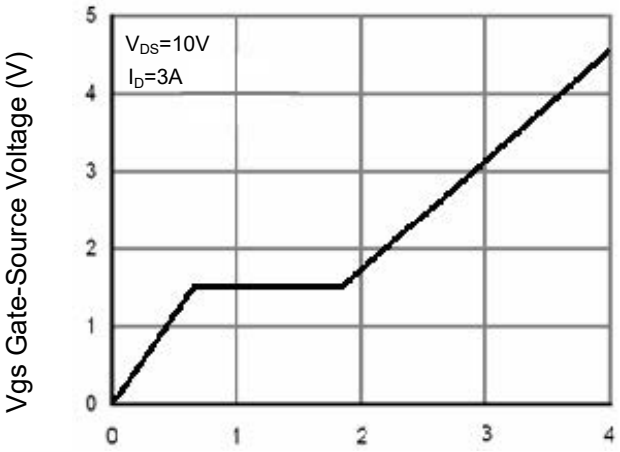


Fig.4 Gate Charge

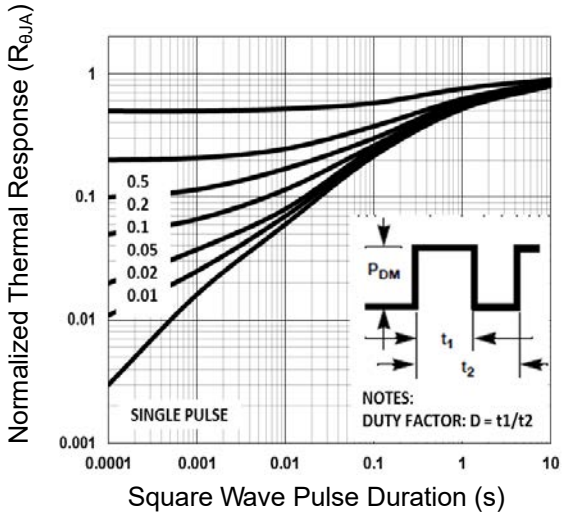


Fig.5 Normalized Transient Impedance

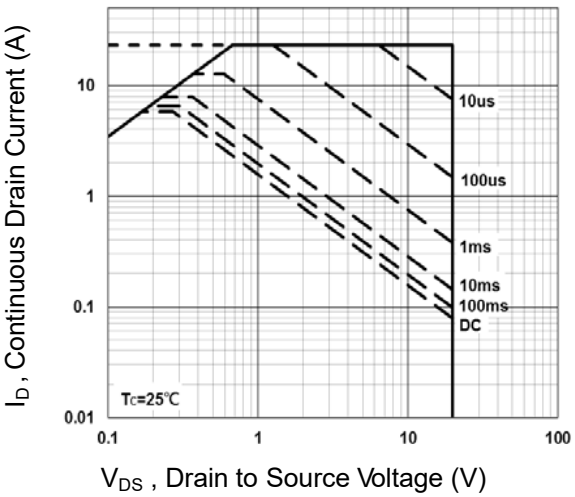


Fig.6 Maximum Safe Operation Area

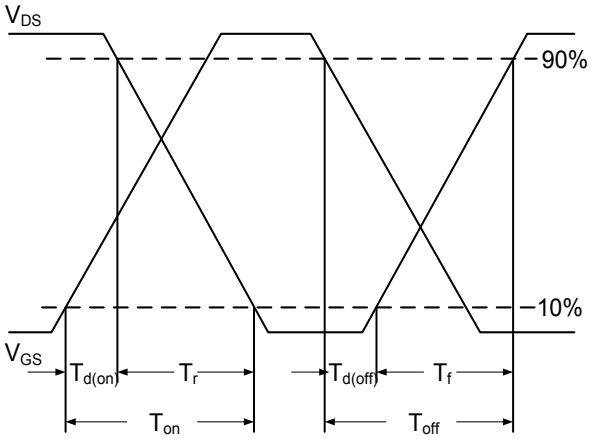


Fig.7 Switching Time Waveform

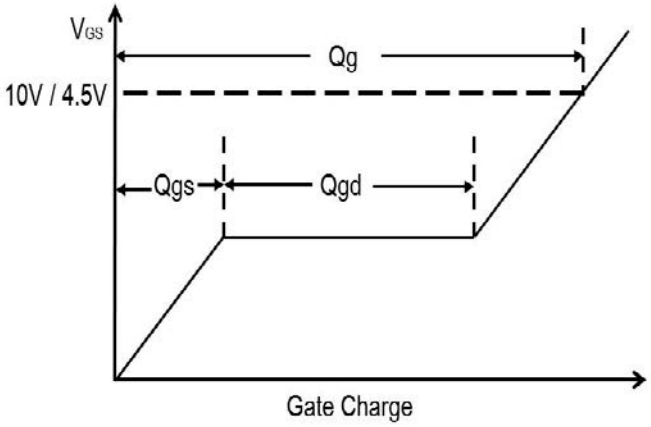
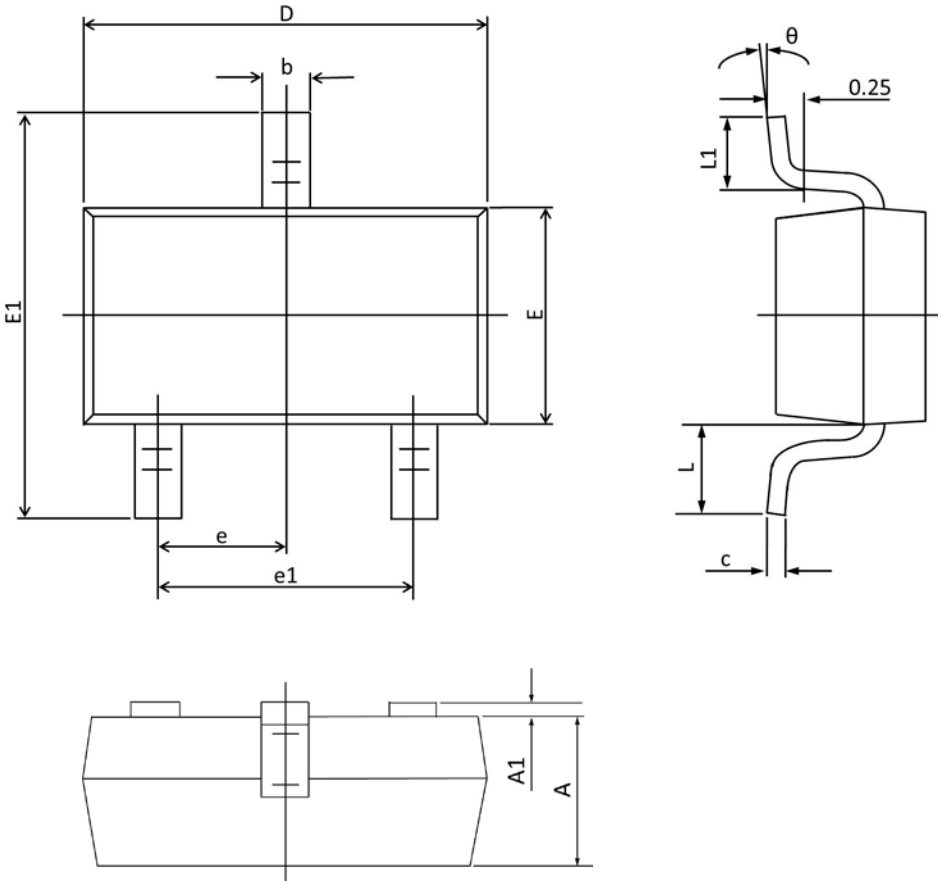


Fig.8 Gate Charge Waveform

SOT-23 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.000	0.035	0.039
A1	0.000	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.090	0.110	0.003	0.004
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	1°	7°	1°	7°