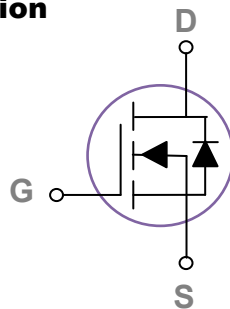
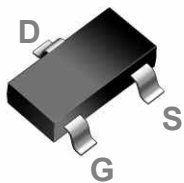


20V N-Channel MOSFETs

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.

SOT-23 Pin Configuration



BV_{DSS}	$R_{DS(ON)Max.}$	I_D
20V	45m Ω	4.5A

Features

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

Applications

- Notebook
- Load Switch
- 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	± 12	V
I_D	Drain Current – Continuous ($T_c=25^\circ\text{C}$)	4.5	A
I_{DM}	Drain Current – Pulsed ¹	18	A
P_D	Power Dissipation ($T_c=25^\circ\text{C}$)	1.4	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$

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 °C, unless otherwise noted)
Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	20			V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =20V, V _{GS} =0V, T _J =25°C			1	μA
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 =250μA	0.5	0.6	1	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient			-2		mV/°C
g _{fs}	Forward Transconductance	V _{DS} =5V, I _D =1.5A		20		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.

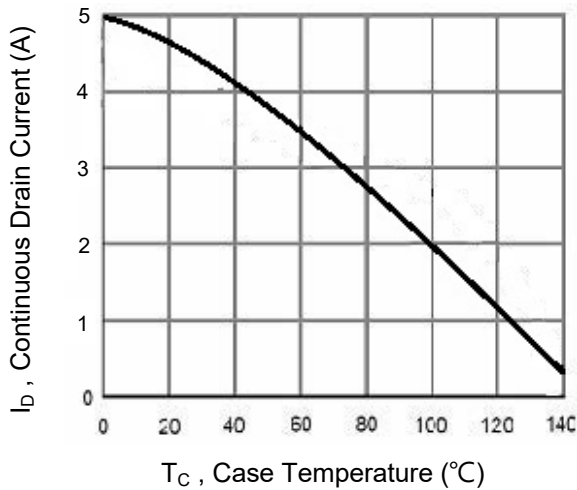


Fig.1 Continuous Drain Current vs. T_c

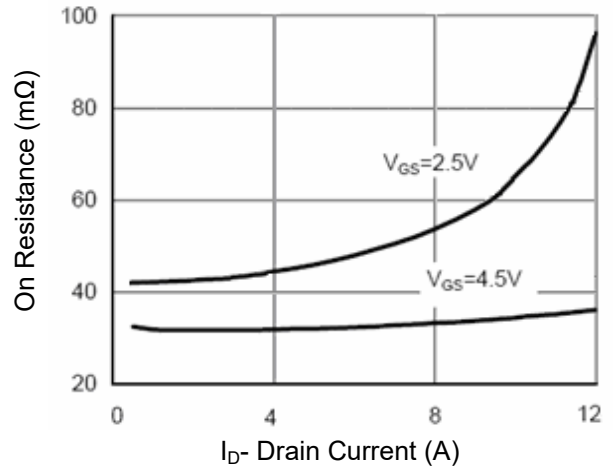


Fig.2 Drain-Source On-Resistance

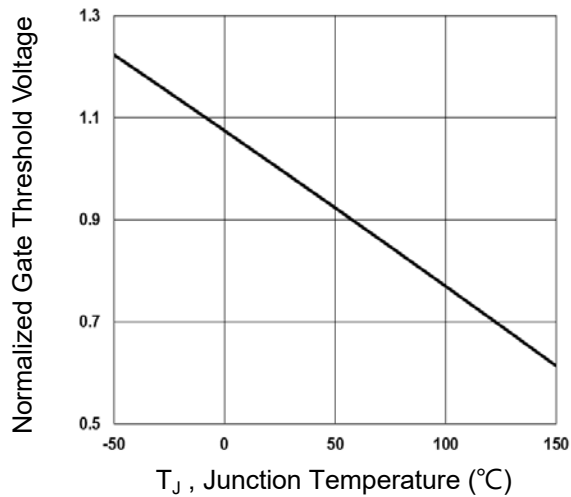


Fig.3 Normalized $V_{GS(th)}$ vs. T_j

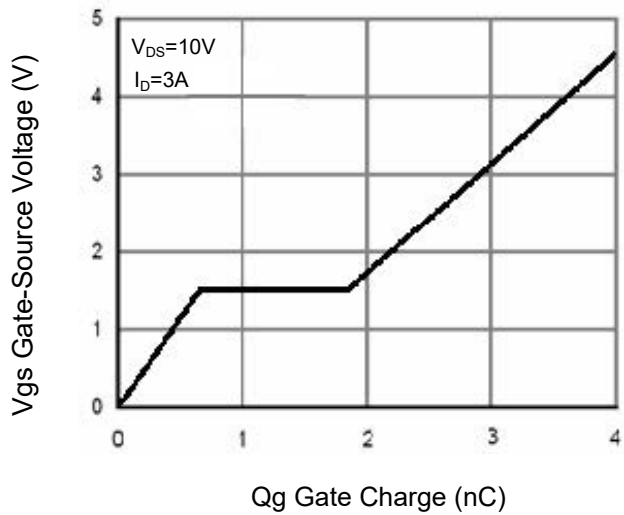


Fig.4 Gate Charge

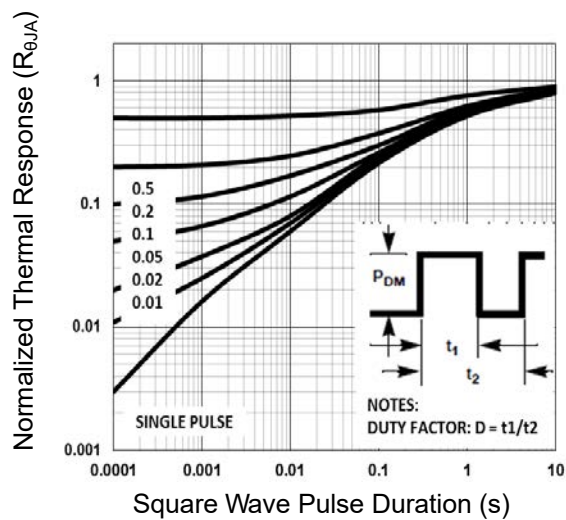


Fig.5 Normalized Transient Impedance

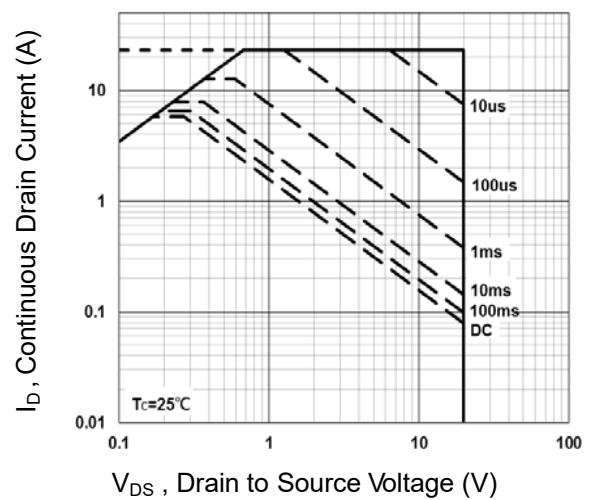


Fig.6 Maximum Safe Operation Area

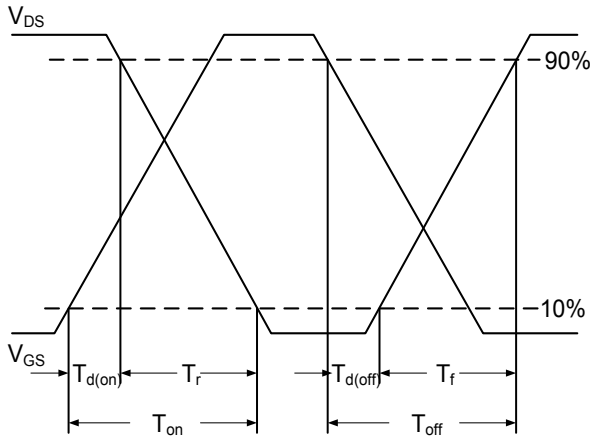


Fig.7 Switching Time Waveform

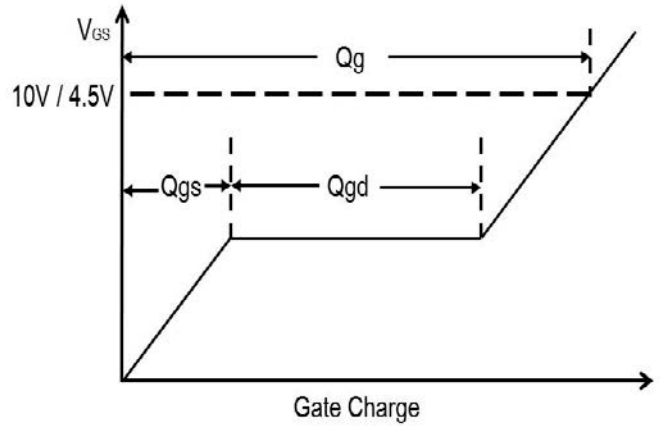
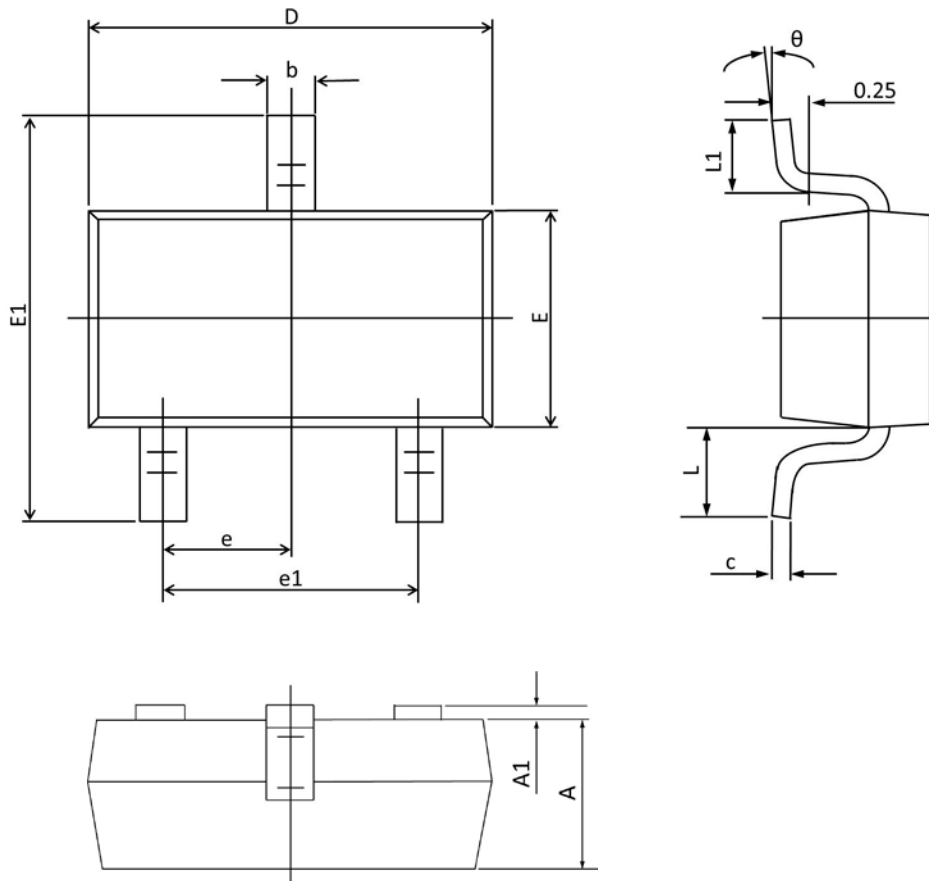


Fig.8 Gate Charge Waveform

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°