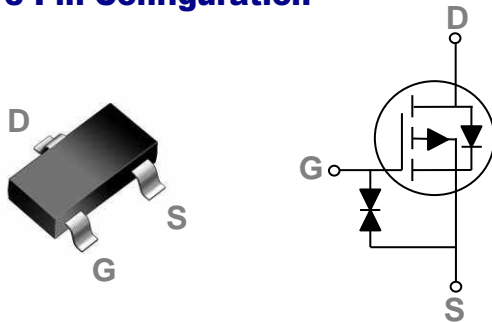


General Description

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.

SOT23-3 Pin Configuration



BVDSS	RDSON	ID
-20V	30mΩ	-5.5A

Features

- -20V, -5.5A, $R_{DS(ON)} = 30m\Omega @ V_{GS} = -4.5V$
- G-S ESD Diode Embedded
- Improved dv/dt capability
- Fast switching
- Green Device Available

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	± 12	V
I_D	Drain Current – Continuous ($T_A=25^\circ\text{C}$)	-5.5	A
	Drain Current – Continuous ($T_A=70^\circ\text{C}$)	-4.4	A
I_{DM}	Drain Current – Pulsed ¹	-22	A
P_D	Power Dissipation ($T_A=25^\circ\text{C}$)	1.6	W
	Power Dissipation – Derate above 25°C	12.5	mW/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction 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 ($T_J=25\text{ }^\circ\text{C}$, unless otherwise noted)
Off Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-20	---	---	V
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-20V, V_{GS}=0V, T_J=25^\circ C$	---	---	-1	μA
		$V_{DS}=-16V, V_{GS}=0V, T_J=125^\circ C$	---	---	-10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	± 25	μA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-4.5V, I_D=-2A$	---	25	30	$m\Omega$
		$V_{GS}=-2.5V, I_D=-1.5A$	---	34	44	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-0.5	-0.8	-1.2	V

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{2,3}	$V_{DS}=-10V, V_{GS}=-4.5V, I_D=-3A$	---	9.4	15	nC
Q_{gs}	Gate-Source Charge ^{2,3}		---	1.1	3	
Q_{gd}	Gate-Drain Charge ^{2,3}		---	2.5	5	
$T_{d(on)}$	Turn-On Delay Time ^{2,3}	$V_{DD}=-10V, V_{GS}=-4.5V, R_G=6\Omega, I_D=-3A$	---	5	8	ns
T_r	Rise Time ^{2,3}		---	10	15	
$T_{d(off)}$	Turn-Off Delay Time ^{2,3}		---	15	25	
T_f	Fall Time ^{2,3}		---	8	12	
C_{iss}	Input Capacitance	$V_{DS}=-10V, V_{GS}=0V, F=1MHz$	---	430	645	pF
C_{oss}	Output Capacitance		---	145	220	
C_{rss}	Reverse Transfer Capacitance		---	50	75	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	-5.5	A
I_{SM}	Pulsed Source Current		---	---	-11	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A, T_J=25^\circ C$	---	---	-1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.

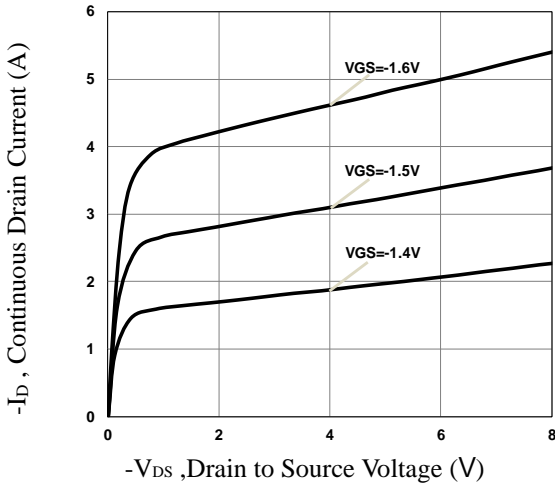


Fig.1 Typical Output Characteristics

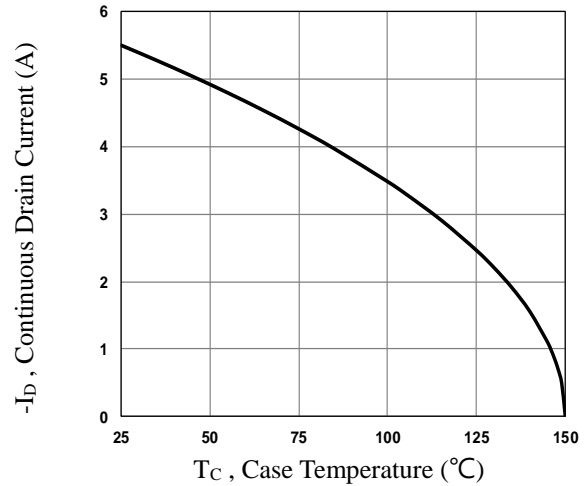


Fig.2 Continuous Drain Current vs. T_c

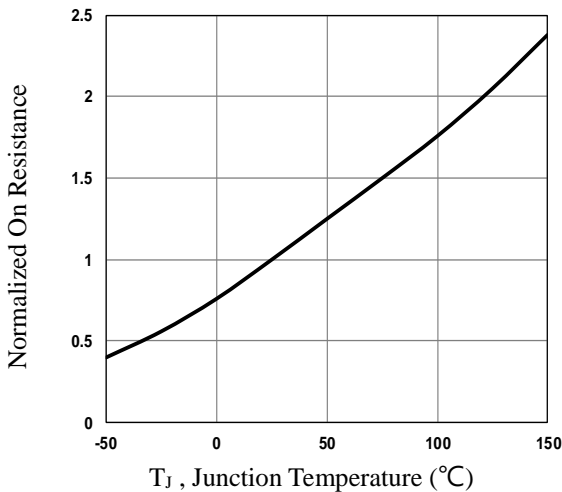


Fig.3 Normalized R_{DS(on)} vs. T_j

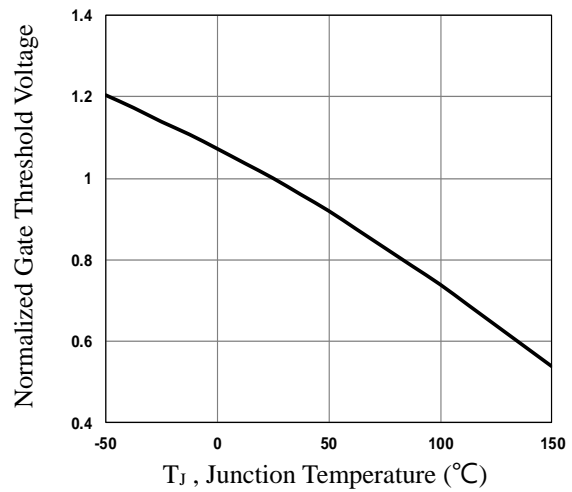


Fig.4 Normalized V_{th} vs. T_j

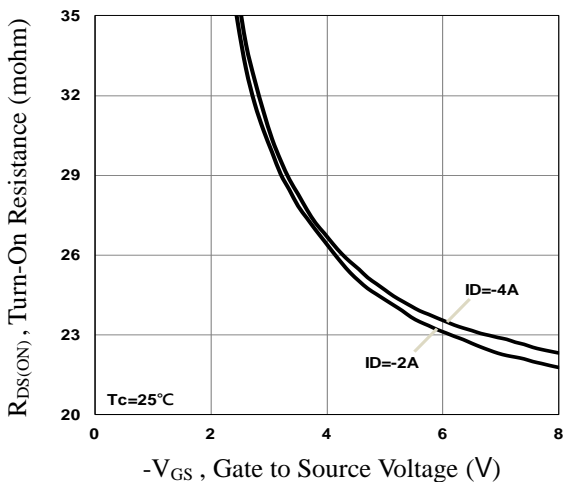


Fig.5 Turn-On Resistance vs. V_{GS}

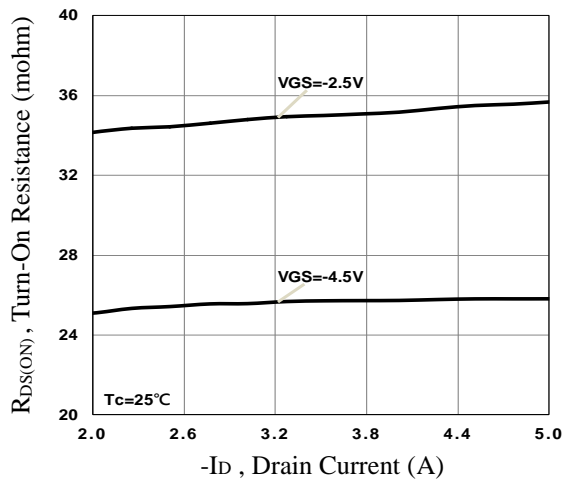


Fig.6 Turn-On Resistance vs. I_D

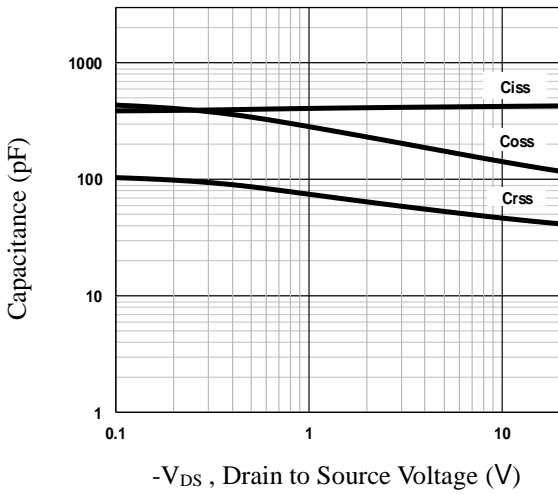


Fig.7 Capacitance Characteristics

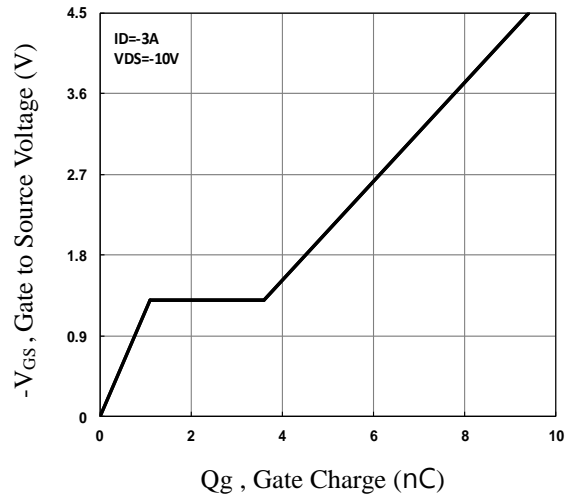


Fig.8 Gate Charge Characteristics

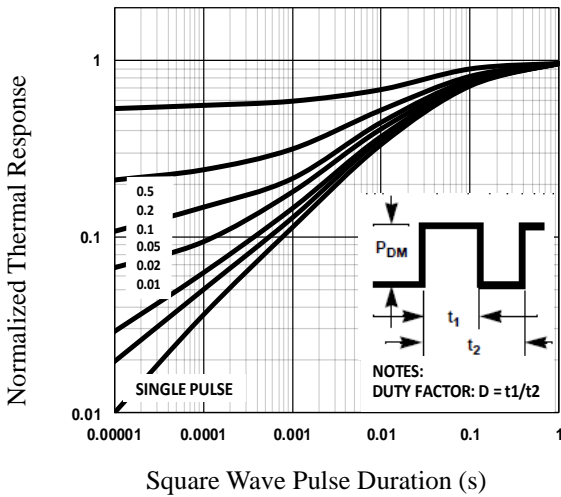


Fig.9 Normalized Transient Impedance

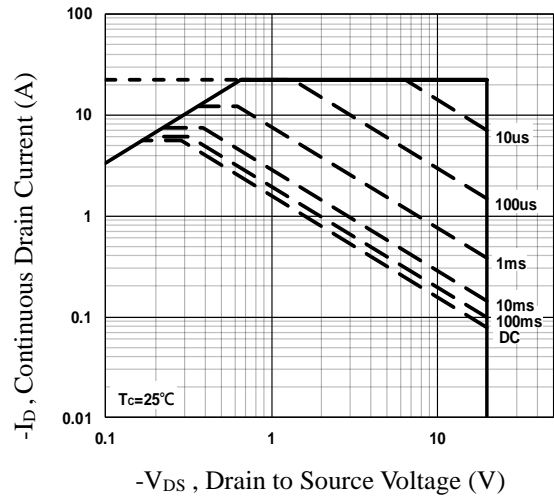


Fig.10 Maximum Safe Operation Area

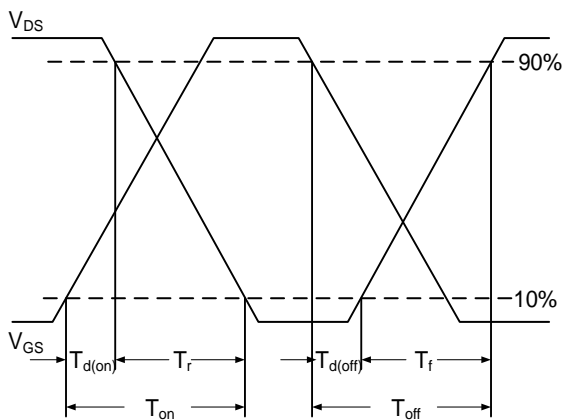


Fig.11 Switching Time Waveform

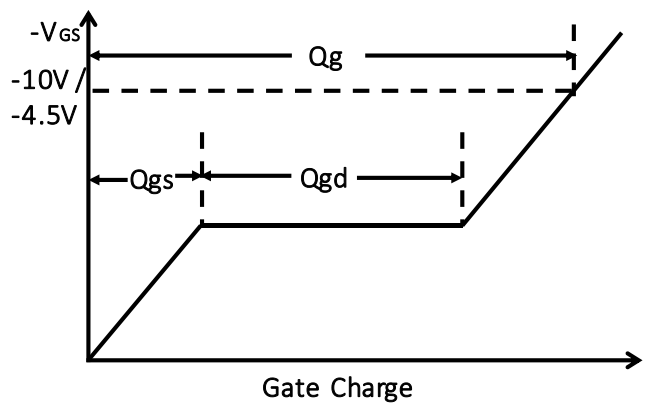
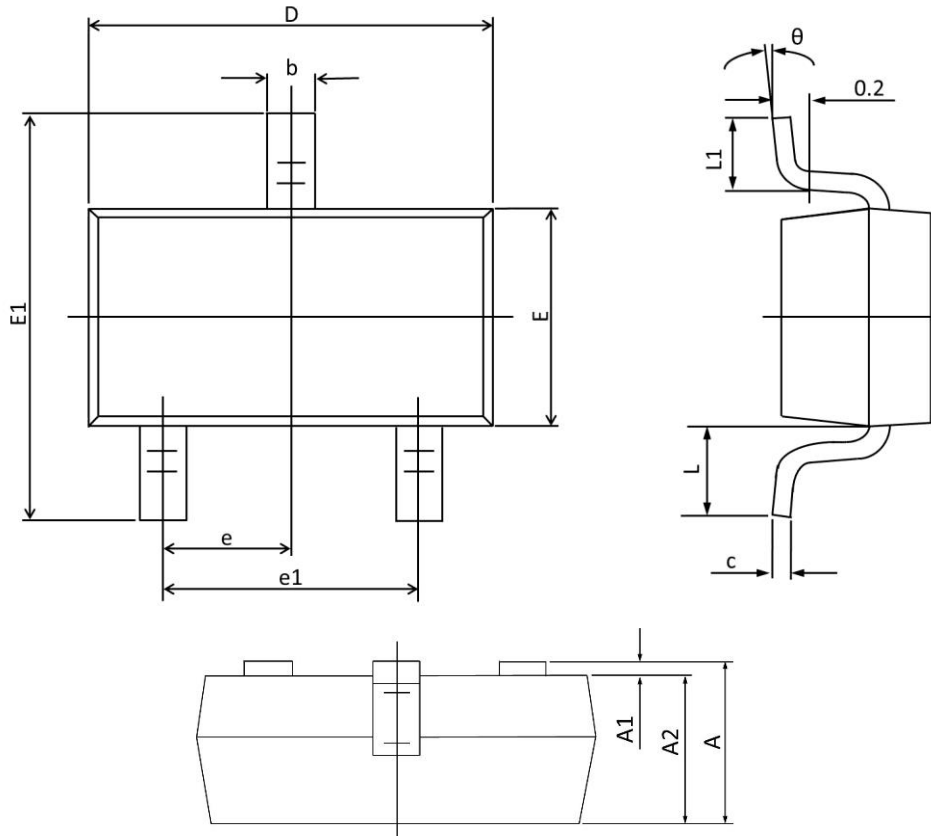


Fig.12 Gate Charge Waveform

SOT23-3 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.450	0.041	0.057
A1	---	0.150	---	0.006
A2	0.900	1.300	0.035	0.051
b	0.300	0.490	0.012	0.019
c	0.100	0.200	0.004	0.008
D	2.820	3.050	0.111	0.120
E	1.500	1.750	0.059	0.069
E1	2.600	3.000	0.102	0.118
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.700 REF.		0.028 REF.	
L1	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°