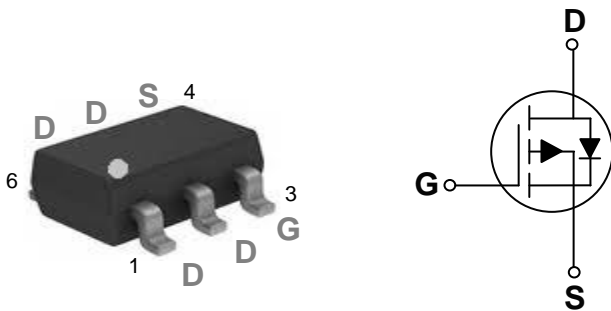


30V P-Channel MOSFETs

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.

SOT-23-6 Pin Configuration



BVDSS	RDSON	ID
-30V	32mΩ	-5.1A

Features

- -30V, -5.1A, $R_{DS(ON)} = 32m\Omega @ V_{GS} = -10V$
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

Applications

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

Absolute Maximum Ratings ($T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_C=25^\circ C$)	-5.1	A
	Drain Current – Continuous ($T_C=100^\circ C$)	-3.2	A
I_{DM}	Drain Current – Pulsed ¹	-20.4	A
EAS	Single Pulse Avalanche Energy ²	39.2	mJ
IAS	Single Pulse Avalanche Current ²	28	A
P_D	Power Dissipation ($T_C=25^\circ C$)	1.56	W
	Power Dissipation – Derate above 25 °C	0.012	W/°C
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C

Thermal Characteristics

Symbol	Parameter	Typ.	Max.	Unit
$R_{\theta JA}$	Thermal Resistance Junction to ambient	---	80	°C/W

30V P-Channel MOSFETs

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	$V_{GS}=0V, I_D=-250\mu A$	-30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to $25\text{ }^\circ\text{C}$, $I_D=-1mA$	---	-0.03	---	V/ $^\circ\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=-30V, V_{GS}=0V, T_J=25\text{ }^\circ\text{C}$	---	---	-1	μA
		$V_{DS}=-24V, V_{GS}=0V, T_J=125\text{ }^\circ\text{C}$	---	---	-10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=-10V, I_D=-4A$	---	27	32	m Ω
		$V_{GS}=-4.5V, I_D=-2A$	---	38	46	m Ω
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1.2	-1.6	-2.2	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4	---	mV/ $^\circ\text{C}$
gfs	Forward Transconductance	$V_{DS}=-10V, I_D=-3A$	---	9	---	S

Dynamic and switching Characteristics

Q_g	Total Gate Charge ^{2,3}	$V_{DS}=-15V, V_{GS}=-4.5V, I_D=-5A$	---	8	15	nC
Q_{gs}	Gate-Source Charge ^{2,3}		---	3.3	6	
Q_{gd}	Gate-Drain Charge ^{2,3}		---	2.3	5	
$T_{d(on)}$	Turn-On Delay Time ^{2,3}	$V_{DD}=-15V, V_{GS}=-10V, R_G=6\Omega$ $I_D=-1A$	---	4.6	9	ns
T_r	Rise Time ^{2,3}		---	14	26	
$T_{d(off)}$	Turn-Off Delay Time ^{2,3}		---	34	58	
T_f	Fall Time ^{2,3}		---	18	35	
C_{iss}	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, F=1MHz$	---	757	1280	pF
C_{oss}	Output Capacitance		---	122	210	
C_{rss}	Reverse Transfer Capacitance		---	88	175	

Drain-Source Diode Characteristics and Maximum Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	-5.1	A
I_{SM}	Pulsed Source Current		---	---	-10.2	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=-1A, T_J=25\text{ }^\circ\text{C}$	---	---	-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.



30V P-Channel MOSFETs

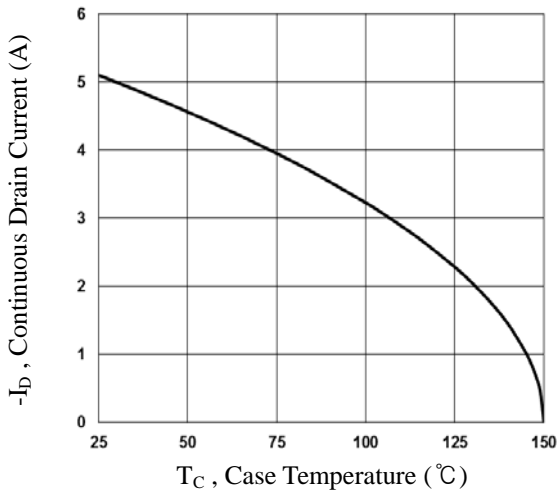


Fig.1 Continuous Drain Current vs. T_C

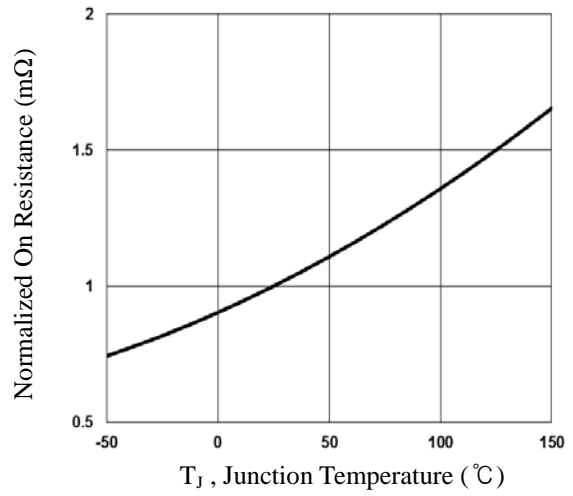


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

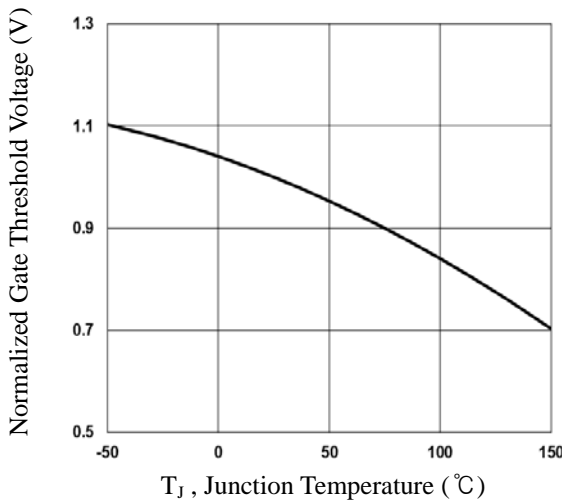


Fig.3 Normalized V_{th} vs. T_J

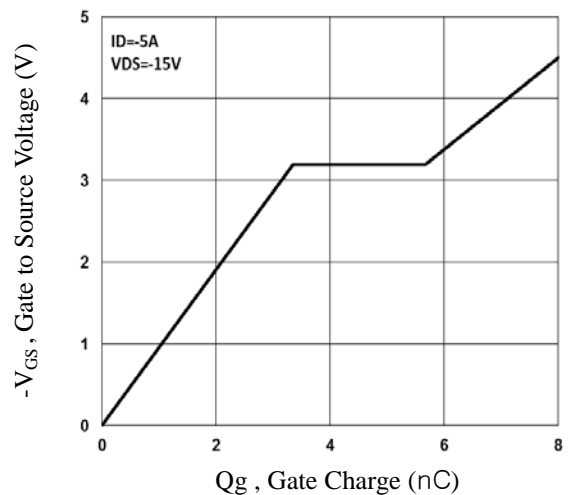


Fig.4 Gate Charge Waveform

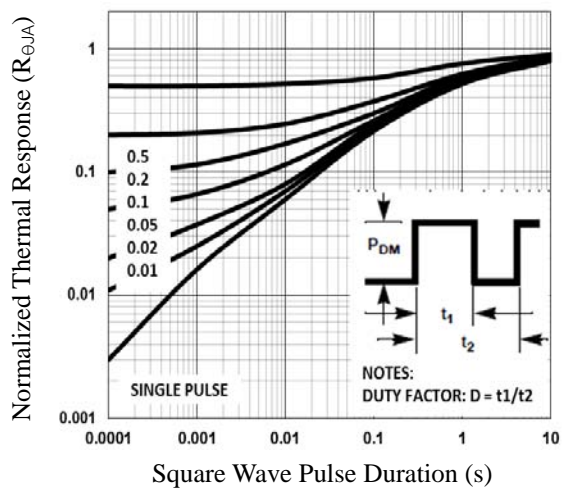


Fig.5 Normalized Transient Impedance

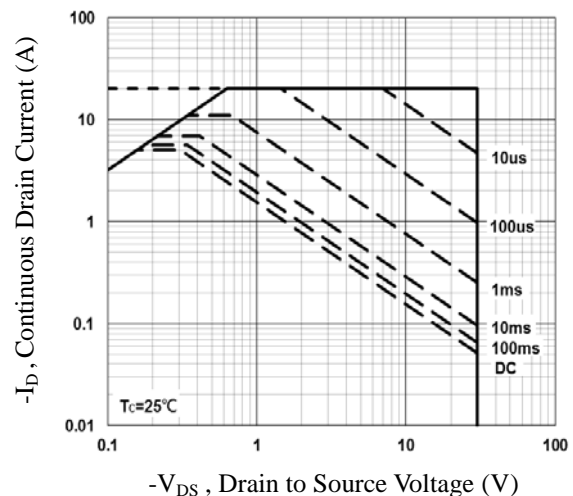


Fig.6 Maximum Safe Operation Area

30V P-Channel MOSFETs

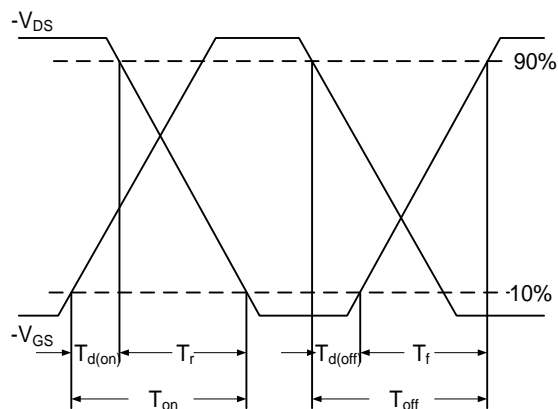


Fig.7 Switching Time Waveform

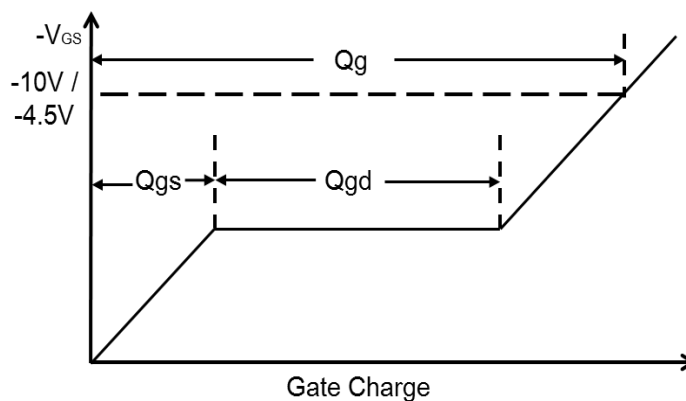
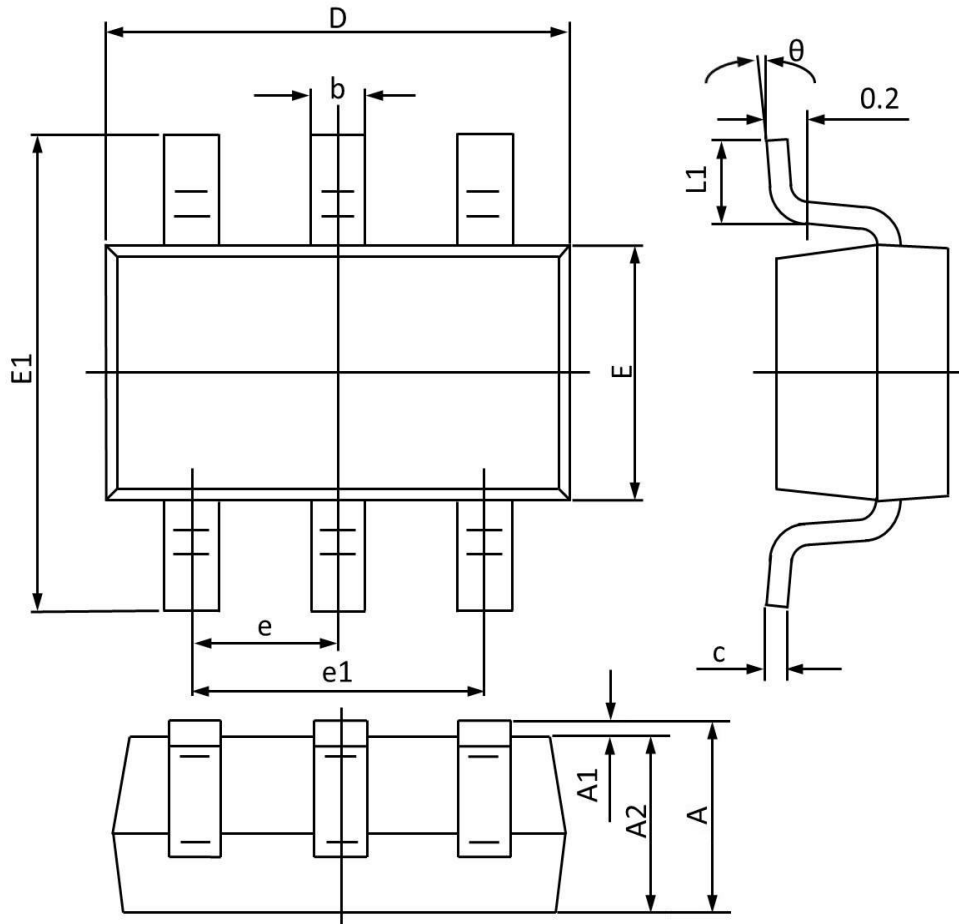


Fig.8 Gate Charge Waveform

30V P-Channel MOSFETs

SOT-23-6 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.450	-	0.057	-
A1	0.100	0.000	0.004	0.000
A2	1.300	1.050	0.051	0.041
b	0.500	0.300	0.020	0.012
c	0.200	0.100	0.008	0.004
D	3.100	2.700	0.122	0.106
E	1.800	1.400	0.071	0.055
E1	3.000	2.600	0.118	0.102
e	0.95BSC		0.037BSC	
e1	2.000	1.800	0.079	0.071
L1	0.600	0.300	0.024	0.012
theta	10°	0°	10°	0°