

30V P-Channel MOSFETs

General Description

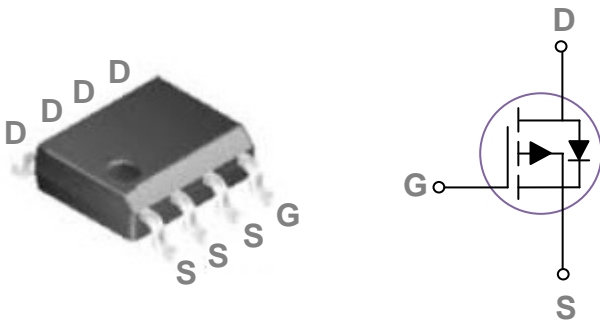
These P-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)Max.}$	I_D
-30V	32mΩ	-10.5A

Features

- -30V, -10.5A, $R_{DS(ON)Max.} = 32m\Omega @ V_{GS} = -10V$
- Fast switching
- Green Device Available
- Suit for -4.5V Gate Drive Applications

SOP-8 Pin Configuration



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	± 12	V
I_D	Drain Current – Continuous ($T_c=25^\circ C$)	-10.5	A
	Drain Current – Continuous ($T_c=100^\circ C$)	-6.3	A
I_{DM}	Drain Current – Pulsed ¹	-42	A
E_{AS}	Single Pulse Avalanche Energy ²	78.4	mJ
I_{AS}	Single Pulse Avalanche Current ²	56	A
P_D	Power Dissipation ($T_c=25^\circ C$)	1.56	W
	Power Dissipation – Derate above $25^\circ C$	0.012	W/ $^\circ C$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

Thermal Characteristics

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

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	-30			V
ΔBV _{DSS} /ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA		-0.03		V/°C
I _{DSS}	Drain-Source Leakage Current	V _{DS} =-30V, V _{GS} =0V, T _J =25°C			-1	uA
		V _{DS} =-24V, V _{GS} =0V, T _J =125°C			-10	uA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V			±100	nA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-4A		27	32	mΩ
		V _{GS} =-4.5V, I _D =-2A		38	46	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-0.5	-1.0	-1.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient			4		mV/°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		nC
Q _{gs}	Gate-Source Charge ^{2,3}			3.3		
Q _{gd}	Gate-Drain Charge ^{2,3}			2.3		
T _{d(on)}	Turn-On Delay Time ^{2,3}	V _{DD} =-15V, V _{GS} =-10V, R _G =6Ω I _D =-1A		4.6		ns
T _r	Rise Time ^{2,3}			14		
T _{d(off)}	Turn-Off Delay Time ^{2,3}			34		
T _f	Fall Time ^{2,3}			18		
C _{iss}	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, F=1MHz		757		pF
C _{oss}	Output Capacitance			122		
C _{rss}	Reverse Transfer Capacitance			88		

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			-10.5	A
I _{SM}	Pulsed Source Current				-42	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =-1A, T _J =25°C			-1	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.

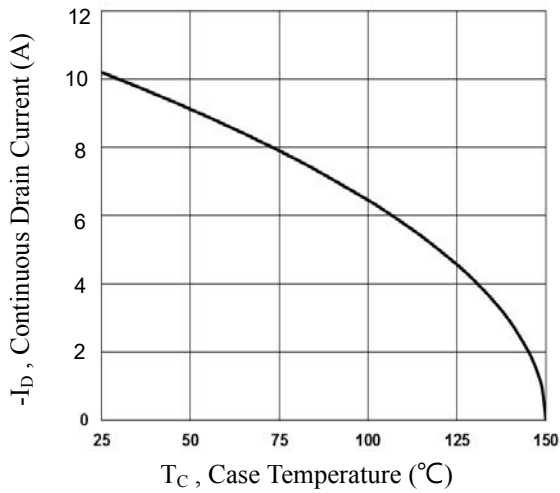


Fig.1 Continuous Drain Current vs. T_C

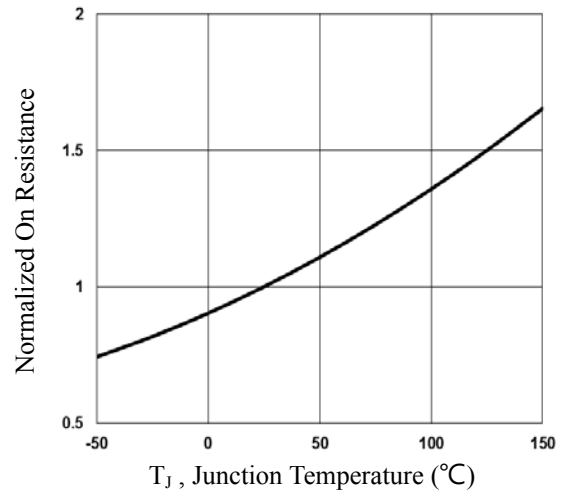


Fig.2 Normalized RDSON vs. T_J

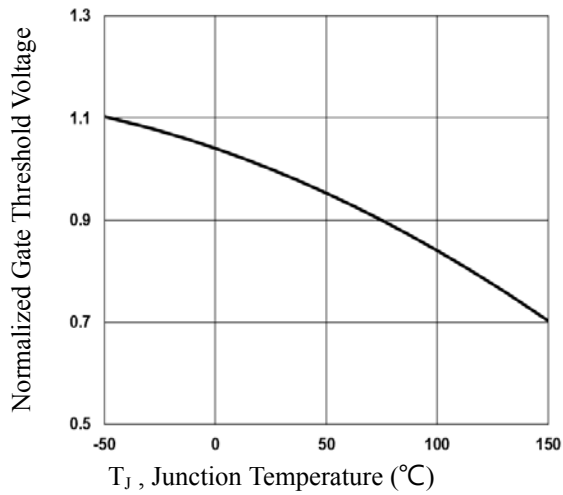


Fig.3 Normalized V_{th} vs. T_J

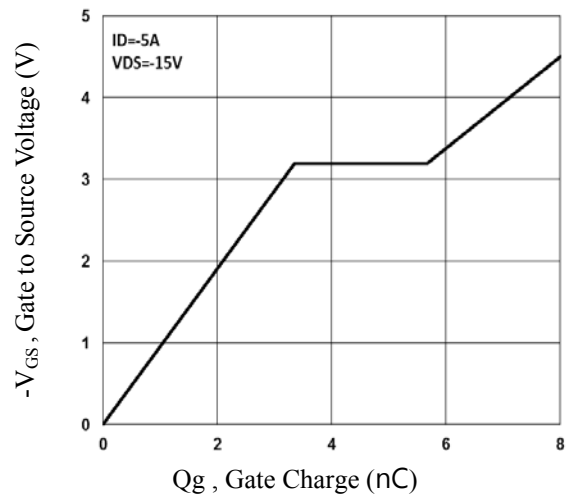


Fig.4 Gate Charge Waveform

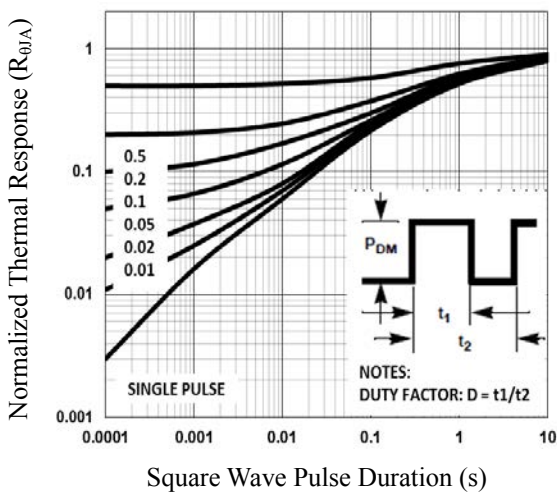


Fig.5 Normalized Transient Impedance

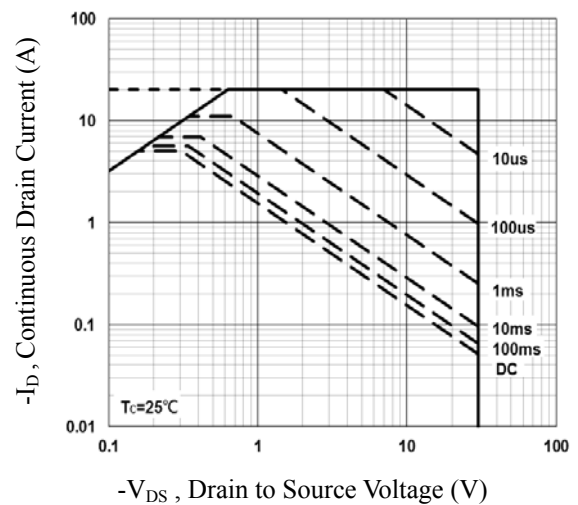


Fig.6 Maximum Safe Operation Area

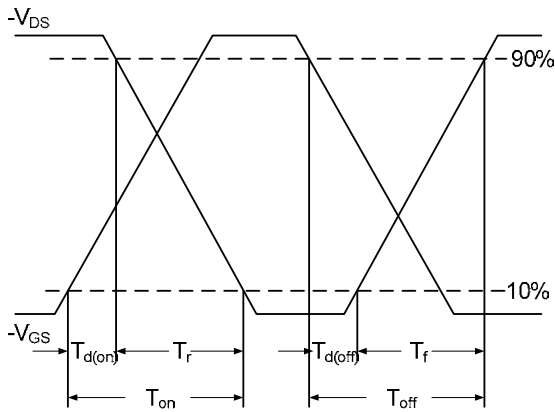


Fig.7 Switching Time Waveform

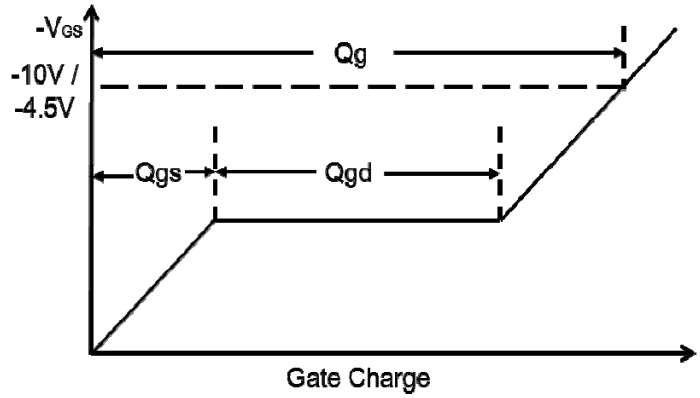
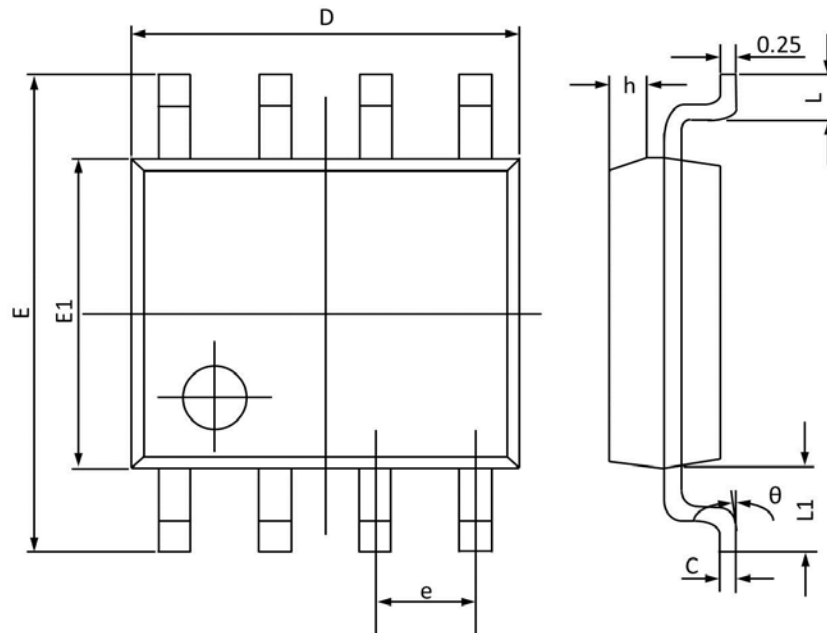


Fig.8 Gate Charge Waveform

SOP-8 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.150	0.900	0.045	0.035
A1	0.100	0.000	0.004	0.000
A2	1.050	0.900	0.041	0.035
b	0.500	0.300	0.020	0.012
c	0.150	0.080	0.006	0.003
D	3.000	2.800	0.118	0.110
E	1.400	1.200	0.055	0.047
E1	2.550	2.250	0.100	0.089
e	0.95 TYP.		0.037 TYP.	
e1	2.000	1.800	0.079	0.071
L	0.55 REF.		0.022 REF.	
L1	0.500	0.300	0.020	0.012
L2	0.25 TYP.		0.01 TYP.	
θ	8°	0°	8°	0°