

30V N-Channel MOSFETs

General Description

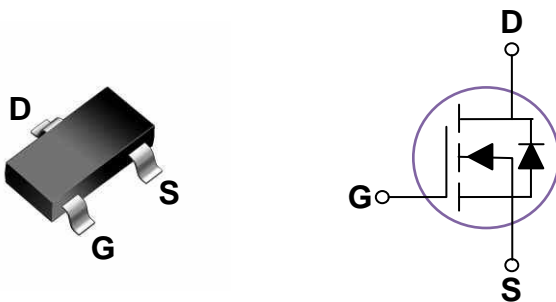
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)Max.}$	I_D
30V	30mΩ	5.8A

Features

- 30V, 5.8A, $R_{DS(ON)Max.} = 30m\Omega @ V_{GS} = 4.5V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

SOT-23 Pin Configuration



Applications

- MB / VGA / Vcore
- Load Switch
- Hand-Held Instrument

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 ($T_c=25^\circ C$)	5.8	A
	Drain Current – Continuous ($T_c=100^\circ C$)	3.5	A
I_{DM}	Drain Current – Pulsed ¹	22	A
E_{AS}	Single Pulse Avalanche Energy ²	7.32	mJ
I_{AS}	Single Pulse Avalanche Current ²	12.1	A
P_D	Power Dissipation ($T_c=25^\circ C$)	1.56	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$

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	30			V
I _{DSS}	Drain-Source Leakage Current	V _{DS} =30V, V _{GS} =0V, T _J =25°C			1	μA
		V _{DS} =24V, V _{GS} =0V, T _J =125°C			10	μA
I _{GSS}	Gate-Source Leakage Current	V _{GS} =±12V, V _{DS} =0V			±100	nA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance ³	V _{GS} =10V, I _D =4A		21	25	mΩ
		V _{GS} =4.5V, I _D =3A		25	30	mΩ
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250μA	0.6		1.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient			-3		mV/°C
gfs	Forward Transconductance	V _{DS} =5V, I _D =3A		15		S

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{3,4}	V _{DS} =15V, V _{GS} =4.5V, I _D =3A		3.7		nC
Q _{gs}	Gate-Source Charge ^{3,4}			1.48		
Q _{gd}	Gate-Drain Charge ^{3,4}			1.56		
T _{d(on)}	Turn-On Delay Time ^{3,4}	V _{DD} =15V, V _{GS} =10V, R _G =6Ω I _D =1A		2.6		ns
T _r	Rise Time ^{3,4}			8.8		
T _{d(off)}	Turn-Off Delay Time ^{3,4}			18.4		
T _f	Fall Time ^{3,4}			5.1		
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, F=1MHz		293		pF
C _{oss}	Output Capacitance			57		
C _{riss}	Reverse Transfer Capacitance			40		
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz		1.15		Ω

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			5.8	A
I _{SM}	Pulsed Source Current ³				11.6	A
V _{SD}	Diode Forward Voltage ³	V _{GS} =0V, I _S =1A, T _J =25°C			1	V

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=12.1A, Starting T_J=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

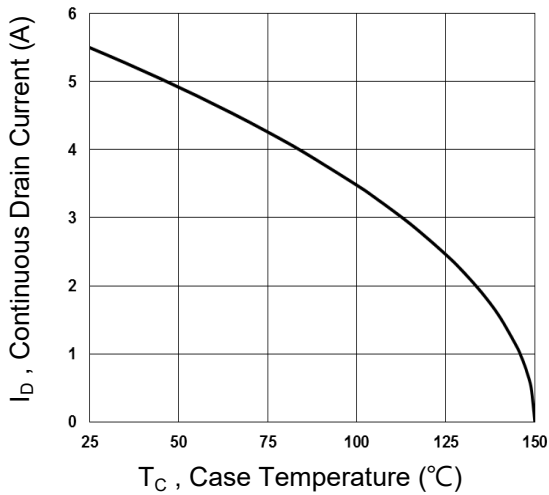


Fig.1 Continuous Drain Current vs. T_C

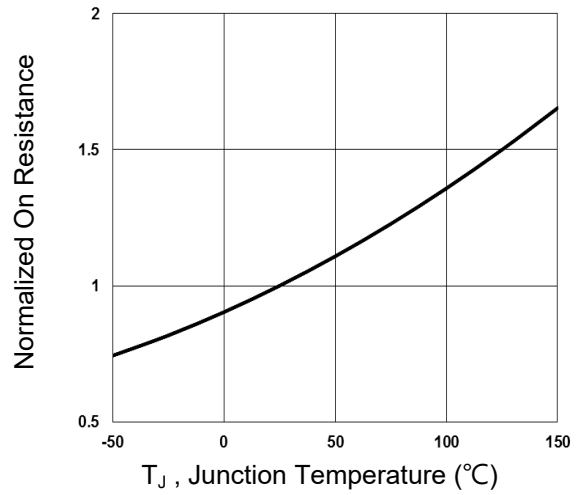


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

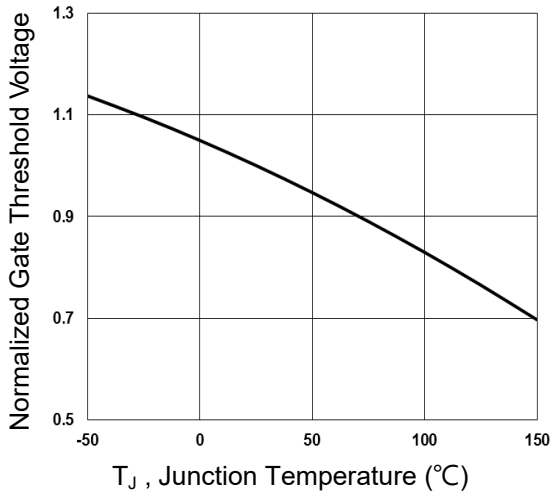


Fig.3 Normalized V_{th} vs. T_J

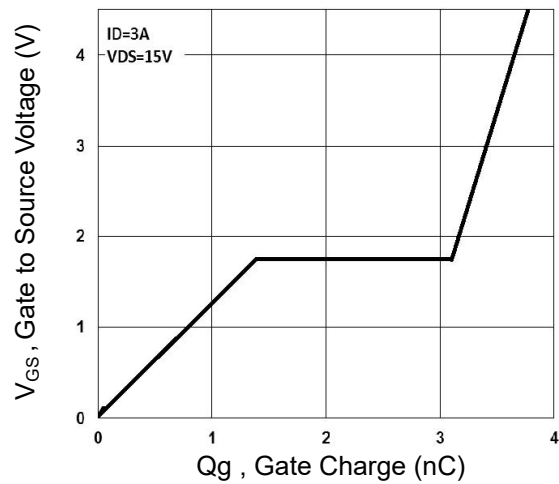


Fig.4 Gate Charge Waveform

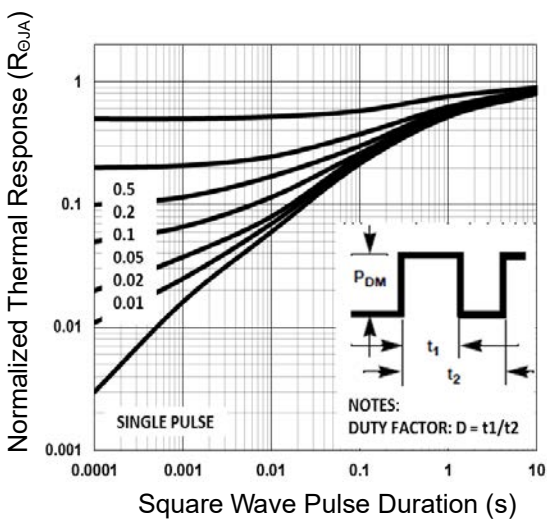


Fig.5 Normalized Transient Response

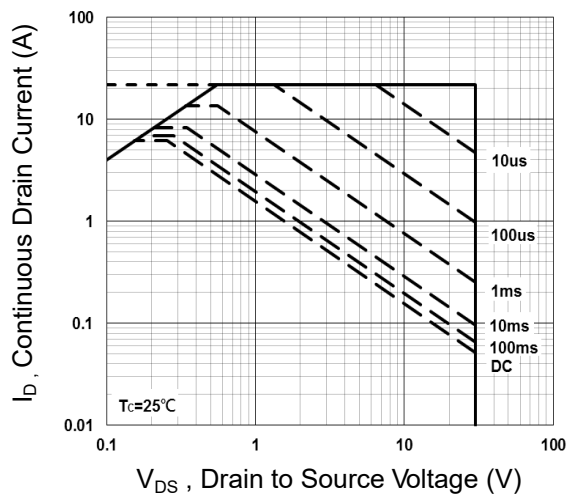


Fig.6 Maximum Safe Operation Area

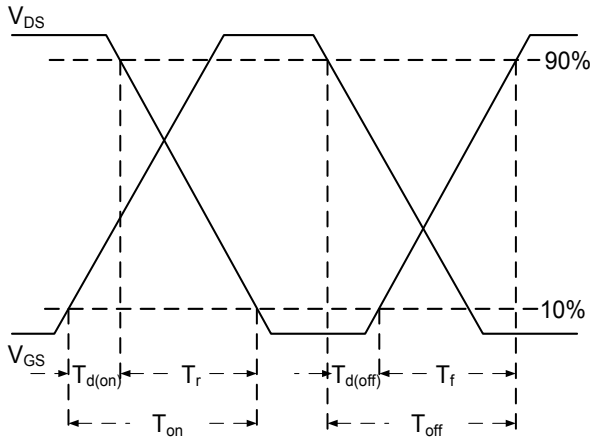


Fig.7 Switching Time Waveform

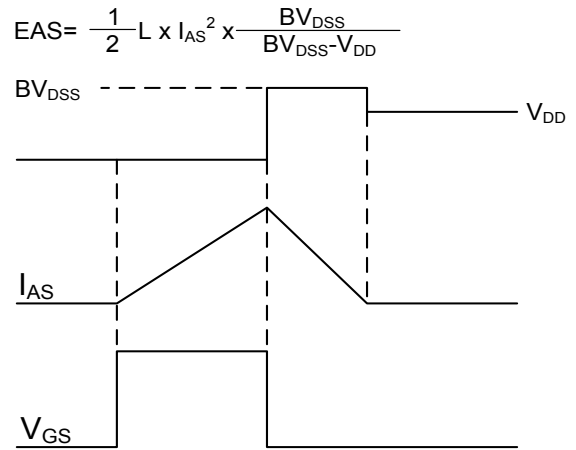
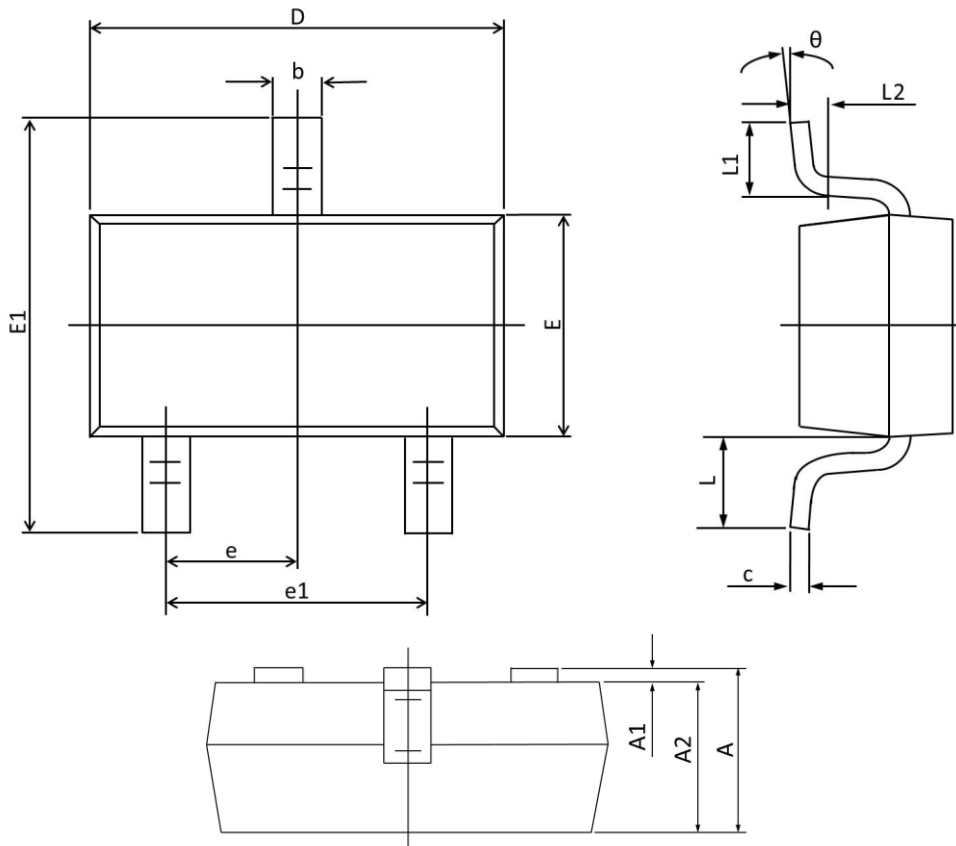


Fig.8 EAS Waveform

SOT-23 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°