



30V N-Channel MOSFETs

General Description

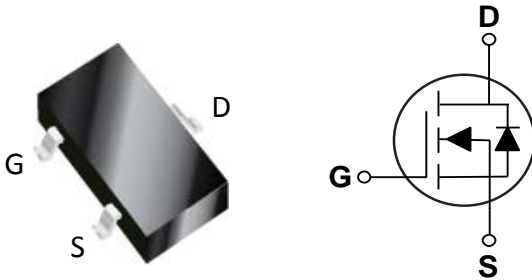
These N-Channel enhancement mode power field effect transistors are using trench DMOS technology. This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These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

BV_{DSS}	$R_{DS(ON)}$	I_D
30 V	24 m Ω	6.5 A

Features

- 30V, 6.5A, $R_{DS(ON)}=24m\Omega @V_{GS}=10V$
- Improved dv/dt capability
- Fast switching
- Green Device Available

SOT-23S 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	± 20	V
I_D	Drain Current - Continuous ($T_C=25^\circ C$)	6.5	A
	Drain Current - Continuous ($T_C=100^\circ C$)	4.1	A
I_{DM}	Drain Current - Pulsed (NOTE 1)	26	A
EAS	Single Pulse Avalanche Energy (NOTE 2)	32	mJ
IAS	Single Pulse Avalanche Current (NOTE 2)	8	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_J	Operating Junction Temperature Range	-50 to 150	$^\circ C$
T_{STG}	Storage Temperature Range	-50 to 150	$^\circ C$
Marking Code		I	

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
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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R _{DS(ON)}	Static Drain-Source On-Resistance (NOTE 3)	V _{GS} =10V, I _D =6A	---	20	24	mΩ
		V _{GS} =4.5V, I _D =4A	---	27	34	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.2	1.6	2.5	V
g _{fs}	Forward Transconductance	V _{DS} =10V, I _D =4A	---	6.5	---	S

Dynamic and switching Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Q _g	Total Gate Charge (NOTE 3、4)	V _{DS} =15V, V _{GS} =4.5V, I _D =6A	---	4.1	8	nC
Q _{gs}	Gate-Source Charge (NOTE 3、4)		---	1	2	
Q _{gd}	Gate-Drain Charge (NOTE 3、4)		---	2.1	4	
T _{d(on)}	Turn-On Delay Time (NOTE 3、4)	V _{DD} =15V, V _{GS} =10V, R _G =6Ω, I _D =1A	---	2.8	5	ns
T _r	Rise Time (NOTE 3、4)		---	7.2	14	
T _{d(off)}	Turn-Off Delay Time (NOTE 3、4)		---	15.8	30	
T _f	Fall Time (NOTE 3、4)		---	4.6	9	
C _{iss}	Input Capacitance	V _{DS} =25V, V _{GS} =0V, F=1MHz	---	345	500	pF
C _{oss}	Output Capacitance		---	55	80	
C _{rss}	Reverse Transfer Capacitance		---	32	45	
R _g	Gate resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	3.2	6.4	Ω

Drain-Source Diode Characteristics and Ratings

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I _S	Continuous Source Current	V _G =V _D =0V, Force Current	---	---	6.5	A
I _{SM}	Pulsed Source Current (NOTE 3)		---	---	26	A
V _{SD}	Diode Forward Voltage (NOTE 3)	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1	V

NOTES :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=1mH, I_{AS}=8A, R_G=25Ω, Starting T_J=25°C.
3. The data tested by pulsed, pulse width ≤ 300us, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.



Characteristics Curves

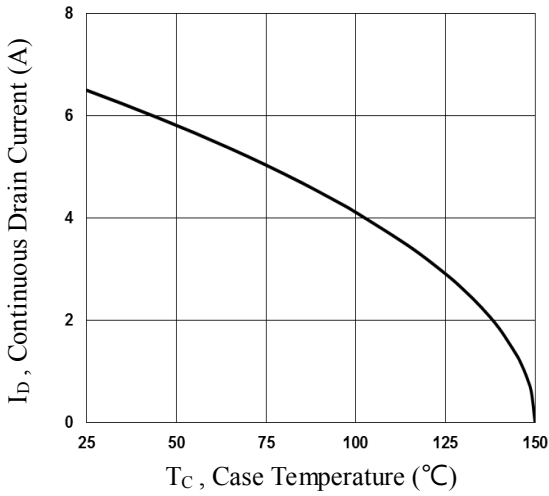


Fig.1 Continuous Drain Current vs. T_C

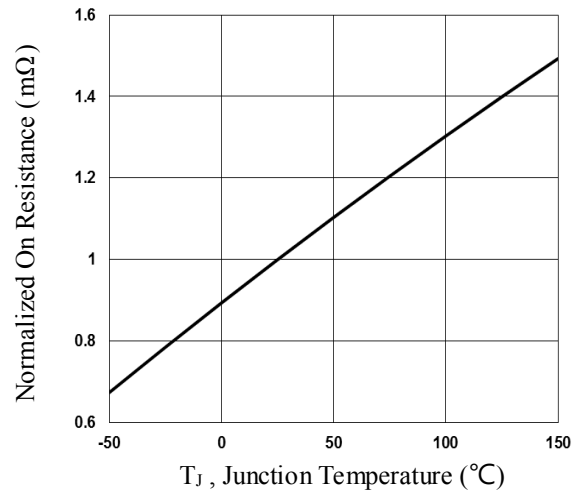


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

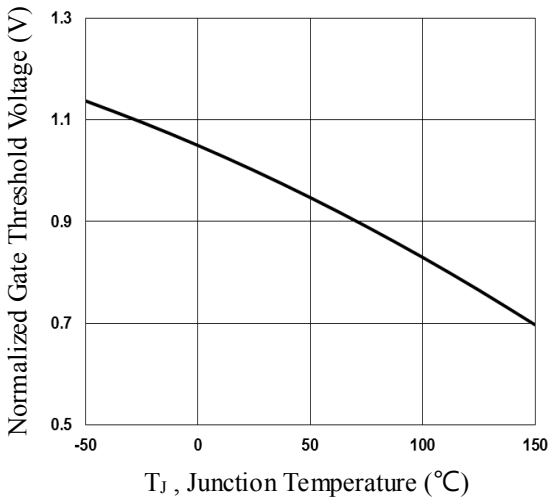


Fig.3 Normalized V_{th} vs. T_J

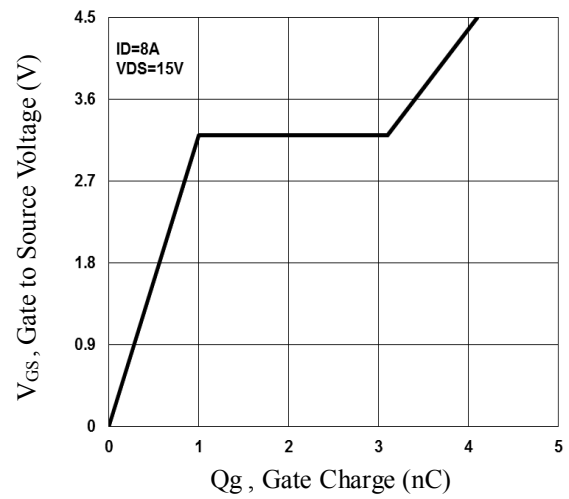


Fig.4 Gate Charge Waveform

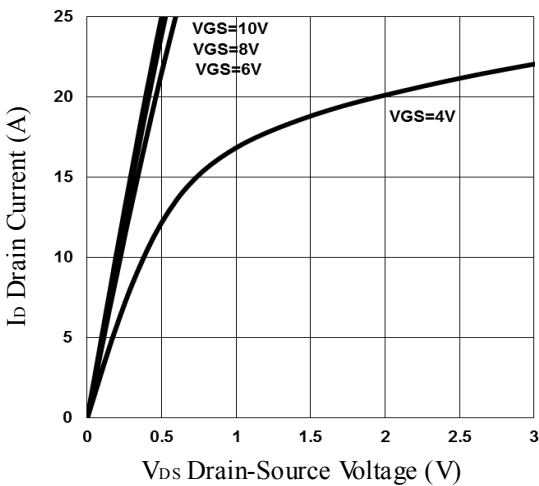


Fig.5 On Region Characteristics

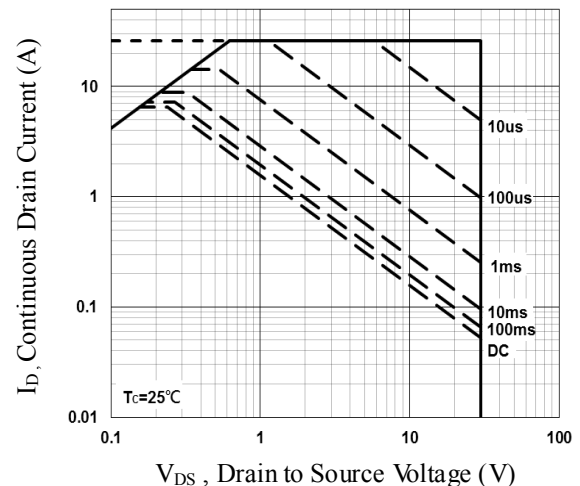


Fig.6 Maximum Safe Operation Area



Characteristics Curves

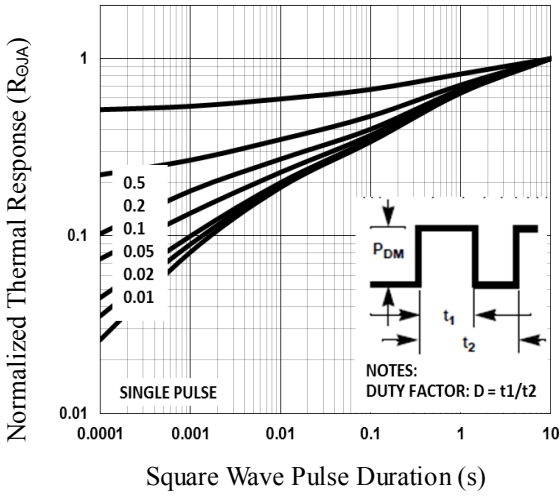


Fig.7 Normalized Transient Response

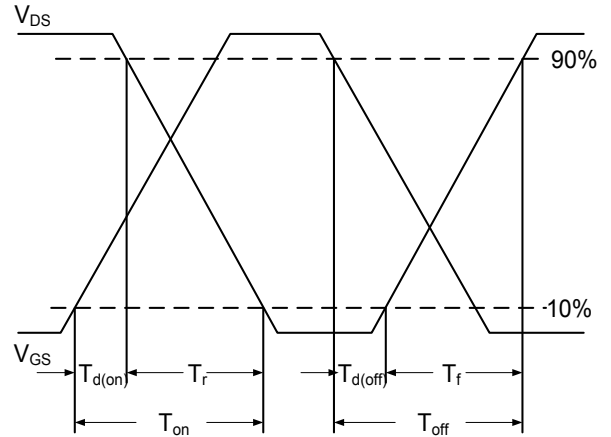


Fig.8 Switching Time Waveform

$$EAS = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS} - V_{DD}}$$

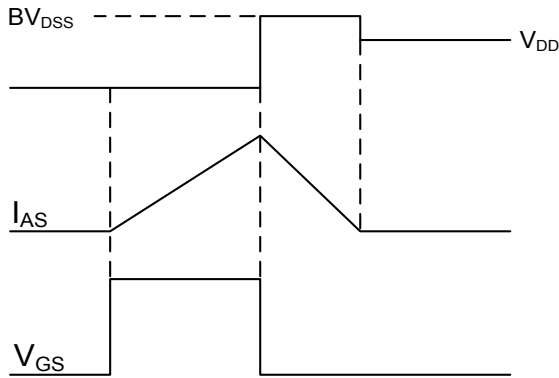
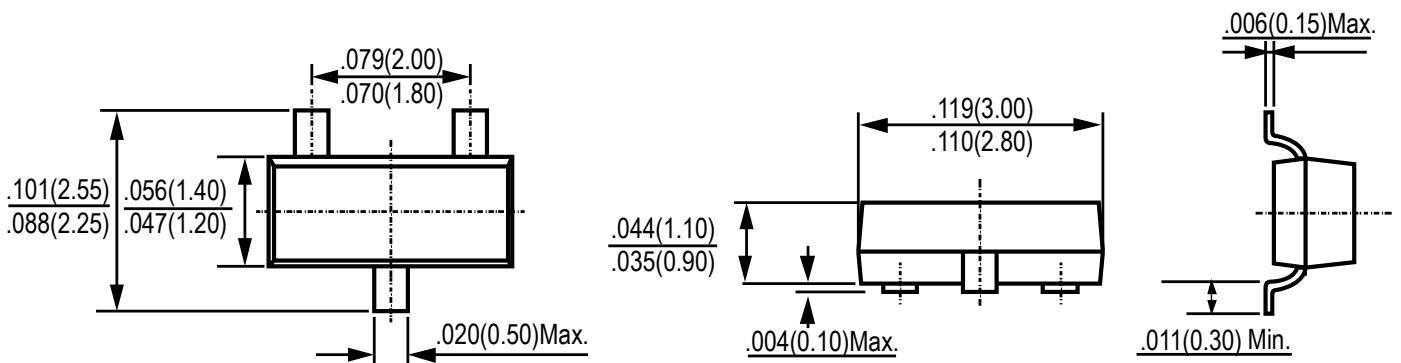


Fig.9 EAS Waveform

Package Outline Dimensions



SOT-23S

Dimensions in inches and (millimeters)



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