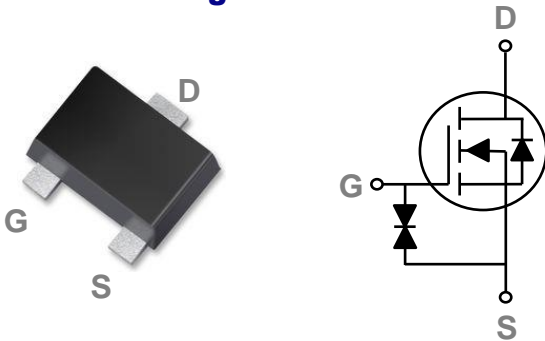


### General Description

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.

### SOT723 Pin Configuration



BVDSS	RDSON	ID
30V	450mΩ	780mA

### Features

- 30V, 780mA,  $R_{DS(ON)} = 450m\Omega @ V_{GS} = 4.5V$
- Improved  $dv/dt$  capability
- Fast switching
- Green Device Available
- Suit for 2.5V 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	$\pm 12$	V
$I_D$	Drain Current – Continuous ( $T_A=25^\circ C$ )	780	mA
	Drain Current – Continuous ( $T_A=70^\circ C$ )	620	mA
$I_{DM}$	Drain Current – Pulsed <sup>1</sup>	3.12	A
$P_D$	Power Dissipation ( $T_A=25^\circ C$ )	446	mW
	Power Dissipation – Derate above $25^\circ C$	3.57	mW/ $^\circ C$
$T_{STG}$	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	---	280	$^\circ C/W$

**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	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	$BV_{DSS}$ Temperature Coefficient	Reference to $25^\circ\text{C}, I_D=1\text{mA}$	---	-0.03	---	$V/^\circ\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=24V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	$\mu A$
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	$\pm 20$	$\mu A$

**On Characteristics**

$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=4.5V, I_D=0.3A$	---	370	450	$m\Omega$
		$V_{GS}=2.5V, I_D=0.2A$	---	510	650	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.5	0.7	1.2	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-1.74	---	$mV/^\circ\text{C}$
$g_{fs}$	Forward Transconductance	$V_{DS}=4V, I_D=0.3A$	---	0.8	---	S

**Dynamic and switching Characteristics**

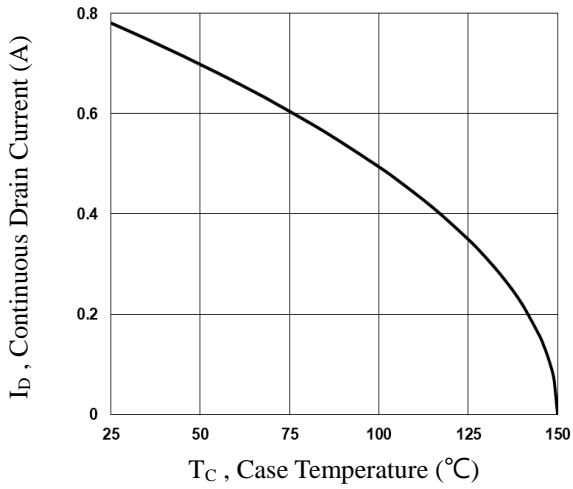
$Q_g$	Total Gate Charge <sup>2, 3</sup>	$V_{DS}=15V, V_{GS}=4.5V, I_D=0.3A$	---	2.6	5.2	$nC$
$Q_{gs}$	Gate-Source Charge <sup>2, 3</sup>		---	0.9	1.8	
$Q_{gd}$	Gate-Drain Charge <sup>2, 3</sup>		---	0.6	1.2	
$T_{d(on)}$	Turn-On Delay Time <sup>2, 3</sup>	$V_{DD}=15V, V_{GS}=4.5V, R_G=10\Omega$ $I_D=0.3A$	---	5.5	11	$ns$
$T_r$	Rise Time <sup>2, 3</sup>		---	4	8	
$T_{d(off)}$	Turn-Off Delay Time <sup>2, 3</sup>		---	14.5	29	
$T_f$	Fall Time <sup>2, 3</sup>		---	6.5	13	
$C_{iss}$	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, F=1\text{MHz}$	---	72.9	146	$pF$
$C_{oss}$	Output Capacitance		---	18.3	36.6	
$C_{rss}$	Reverse Transfer Capacitance		---	7.4	14.8	

**Drain-Source Diode Characteristics and Maximum Ratings**

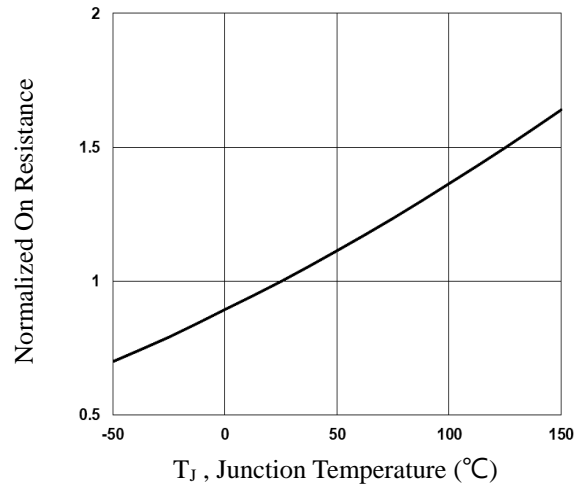
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$I_S$	Continuous Source Current	$V_G=V_D=0V, \text{Force Current}$	---	---	0.78	A
$I_{SM}$	Pulsed Source Current		---	---	1.56	A
$V_{SD}$	Diode Forward Voltage	$V_{GS}=0V, I_S=0.3A, T_J=25^\circ\text{C}$	---	---	1	V

Note :

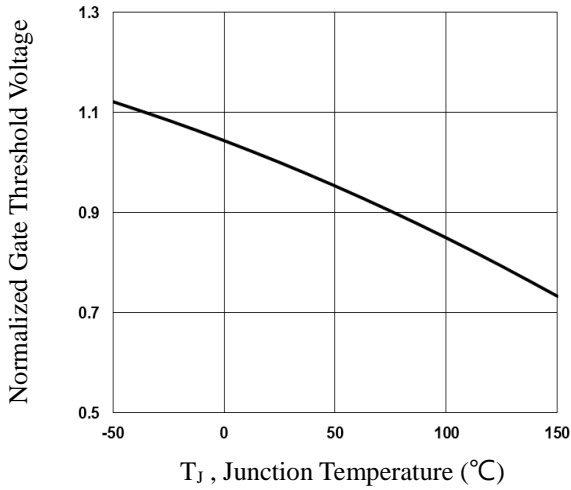
1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed , pulse width  $\leq 300\mu s$  , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.



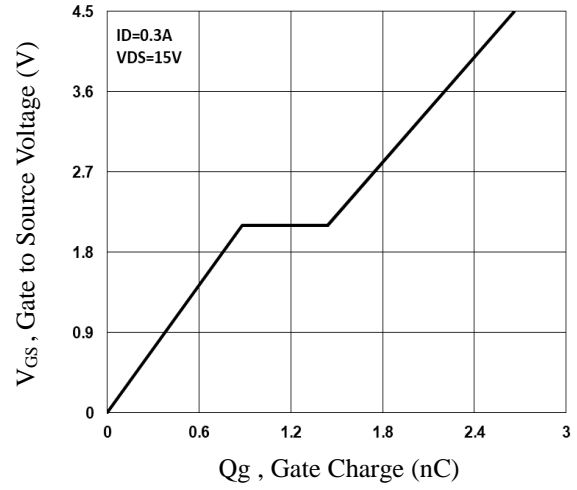
**Fig.1 Continuous Drain Current vs. T<sub>c</sub>**



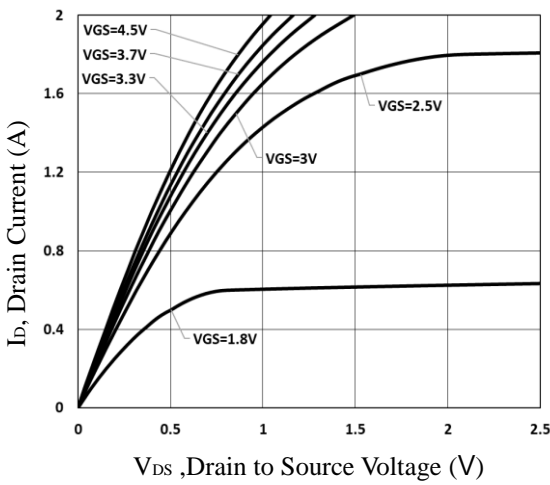
**Fig.2 Normalized R<sub>DS(on)</sub> vs. T<sub>j</sub>**



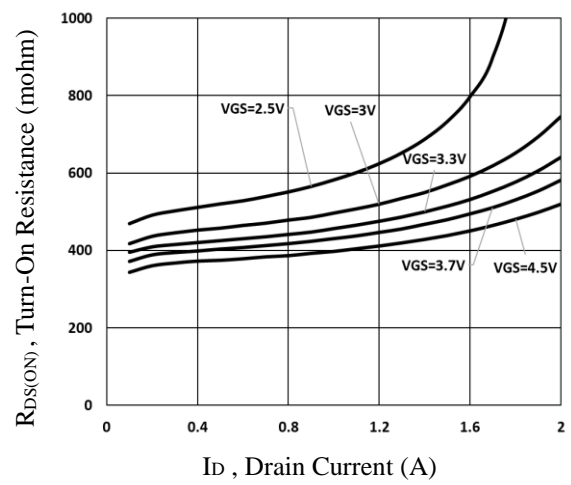
**Fig.3 Normalized V<sub>th</sub> vs. T<sub>j</sub>**



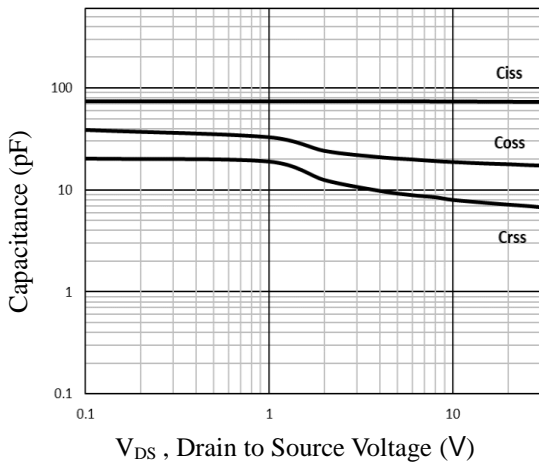
**Fig.4 Gate Charge Waveform**



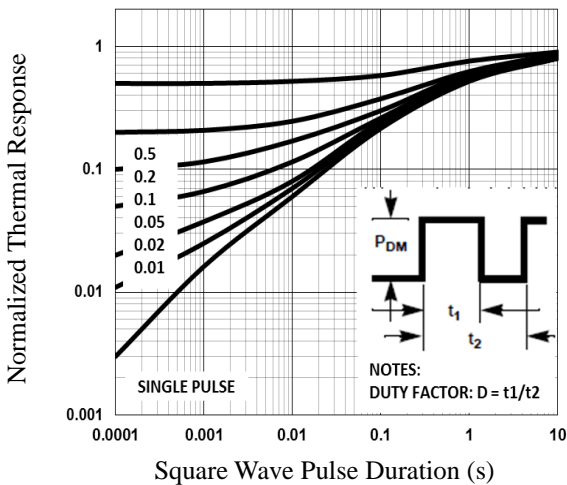
**Fig.5 Typical Output Characteristics**



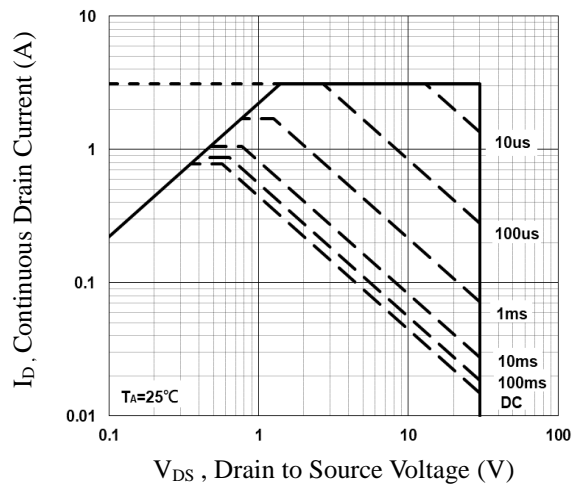
**Fig.6 Turn-On Resistance vs. I<sub>D</sub>**



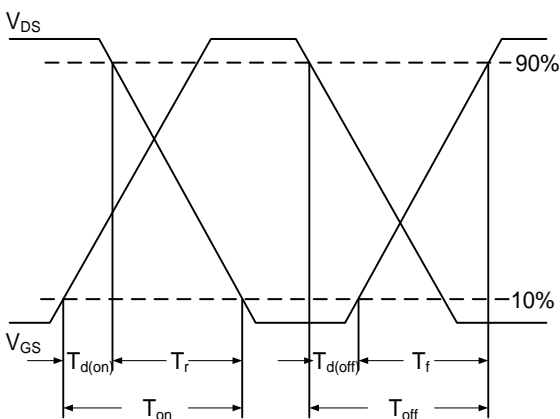
**Fig.7 Capacitance Characteristics**



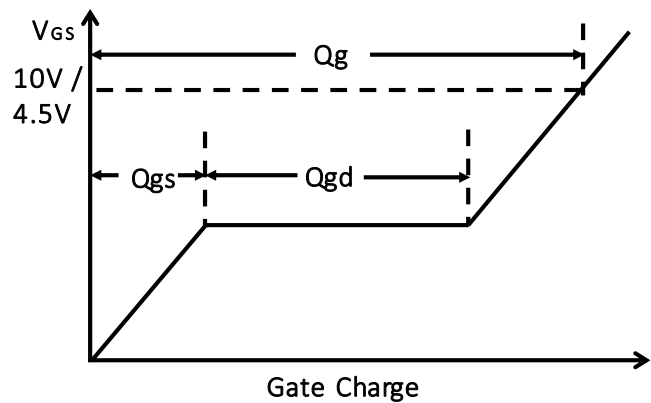
**Fig.8 Normalized Transient Response**



**Fig.9 Maximum Safe Operation Area**

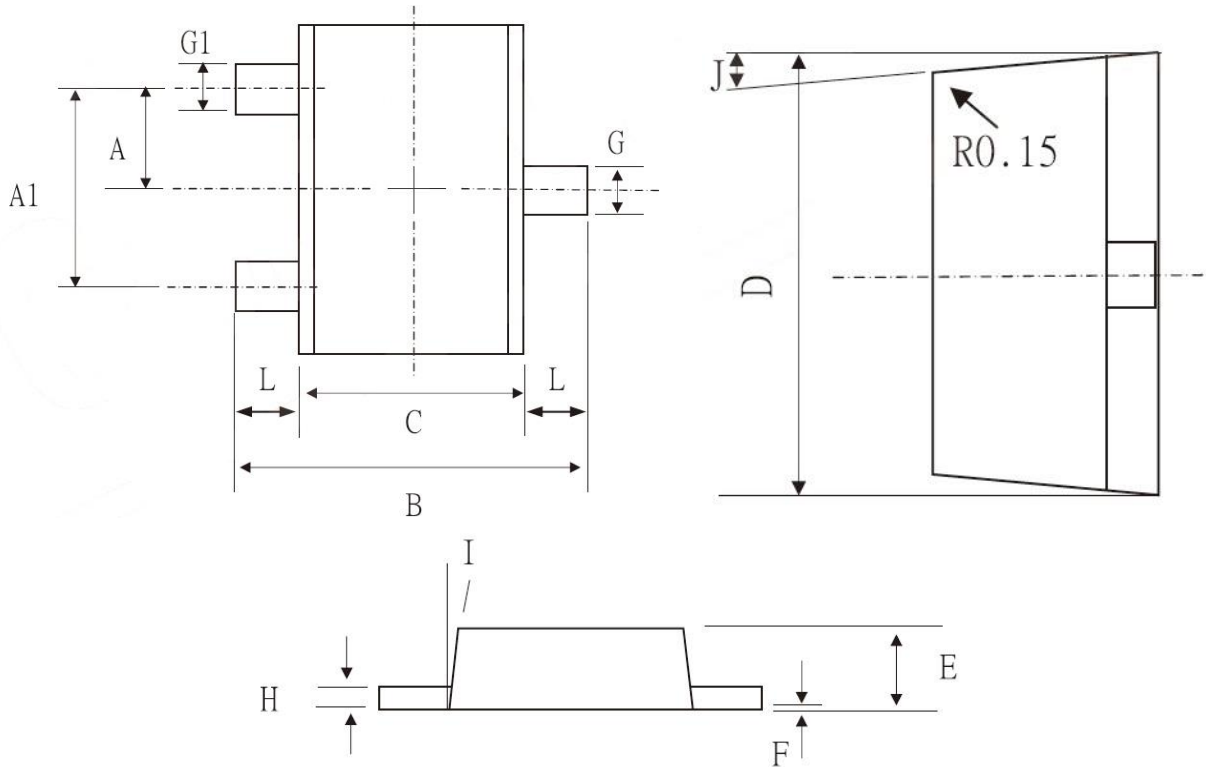


**Fig.10 Switching Time Waveform**



**Fig.11 Gate Charge Waveform**

**SOT723 PACKAGE INFORMATION**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	0.4 BSC		0.016 BSC	
A1	0.8 BSC		0.031 BSC	
B	1.250	1.150	0.049	0.045
C	0.850	0.750	0.033	0.030
D	1.250	1.150	0.049	0.045
E	0.390	0.370	0.015	0.015
F	0.050	0.000	0.002	0.000
G	0.270	0.220	0.011	0.009
G1	0.250	0.170	0.010	0.007
H	0.150	0.080	0.006	0.003
I	13°	9°	13°	9°
L	0.250	0.150	0.010	0.006
J	11°	7°	11°	7°