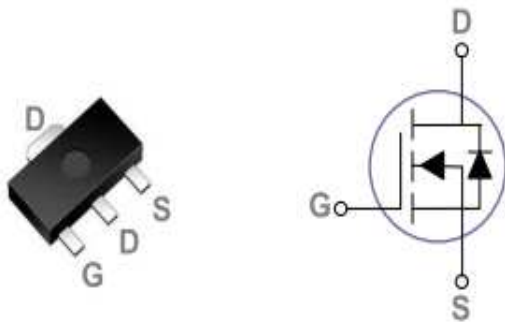


Description

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.

SOT89 Pin Configuration



BVDSS	R _{DS(ON)}	I _D
20V	26mΩ	5.6A

Features

- 20V, 5.6A, R_{DS(ON)}=26mΩ@V_{GS}=4.5V
- Improved dt/dv capability
- Fast switching
- Green Device Available
- Suit for 1.8V Gate Driver applications

Application

- Notebook
- Load switch
- Hand-held Instruments

Absolute Maximum Ratings T_c=25°C unless otherwise noted

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	20	V
V _{GS}	Gate-Source Voltage	± 10	V
I _D	Drain Current – Continuous (T _c =25°C)	5.6	A
	Drain Current – Continuous (T _c =100°C)	3.5	A
I _{DM}	Drain Current – Pulsed ¹	22.4	A
PD	Power Dissipation (T _c =25°C)	1.47	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 _{θJA}	Thermal Resistance Junction to ambient	---	85	°C/W

**Electrical Characteristics** $T_J=25^\circ\text{C}$, unless otherwise noted**Off Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250 μ A	20	---		V
Δ BV _{DSS} / Δ T _J	BV _{DSS} Temperature Coefficient	Reference to 25 $^\circ\text{C}$, I _D =1mA	---	0.02	---	V/ $^\circ\text{C}$
I _{DSS}	Drain-Source Leakage Current	V _D =16V, V _{GS} =0V, T _J =25 $^\circ\text{C}$	---	---	1	μ A
		V _D =16V, V _{GS} =0V, T _J =85 $^\circ\text{C}$	---	---	10	μ A
I _{GSS}	Gate-Source Leakage Current	V _{GS} = \pm 10V, V _D =0V	---	---	\pm 100	nA

On Characteristics

R _{DS(ON)}	Static Drain-Source On-Resistance	V _{GS} =4.5V, I _D =4A	---	22	26	m Ω
		V _{GS} =2.5V, I _D =3A	---	28	36	
		V _{GS} =1.8V, I _D =2A	---	39	51	
V _{GS(th)}	Gate Threshold Voltage	V _{GS} =V _D , I _D =250 μ A	0.4	0.6	1	V
Δ V _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-2	---	mV/ $^\circ\text{C}$
g _{fs}	Forward transconductance	V _D =10V, I _S =3A	---	7	---	S

Dynamic and switching Characteristics

Q _g	Total Gate Charge ^{2,3}	V _D =10V, V _{GS} =4.5V, I _D =4A	---	7.7	11	nC
Q _{gs}	Gate-Source Charge ^{2,3}		---	0.9	1	
Q _{gd}	Gate-Drain Charge ^{2,3}		---	2.4	5	
T _{d(on)}	Turn-On Delay Time ^{2,3}	V _{DD} =10V, V _{GS} =4.5V, R _G =25 Ω I _D =1A	---	4.1	8	nS
T _r	Rise Time ^{2,3}		---	11.6	22	
T _{d(off)}	Turn-Off Delay Time ^{2,3}		---	23.9	45	
T _f	Fall Time ^{2,3}		---	7.6	14	
C _{iss}	Input Capacitance	V _D =10V, V _{GS} =0V, F=1MHz	---	535	775	pF
C _{oss}	Output Capacitance		---	60	85	
C _{rss}	Reverse Transfer Capacitance		---	34	50	

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	---	---	5.6	A
I _{SM}	Pulsed Source Current		---	---	22.4	A
V _{SD}	Diode Forward Voltage	V _{GS} =0V, I _S =1A, 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 μ s , duty cycle \leq 2%.
3. Essentially independent of operating temperature.

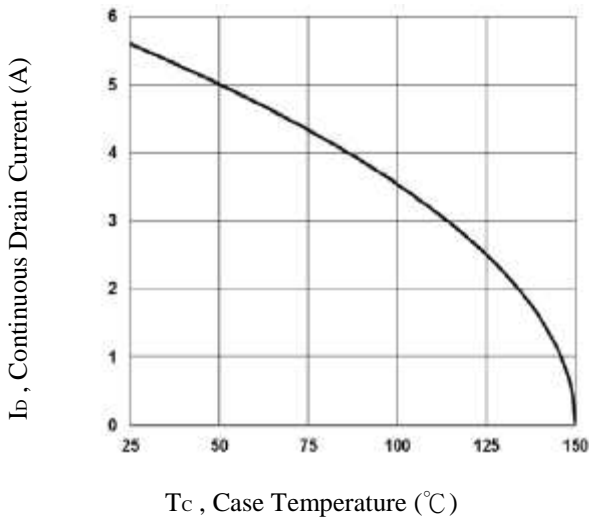


Fig.1 Continuous Drain Current vs. Tc

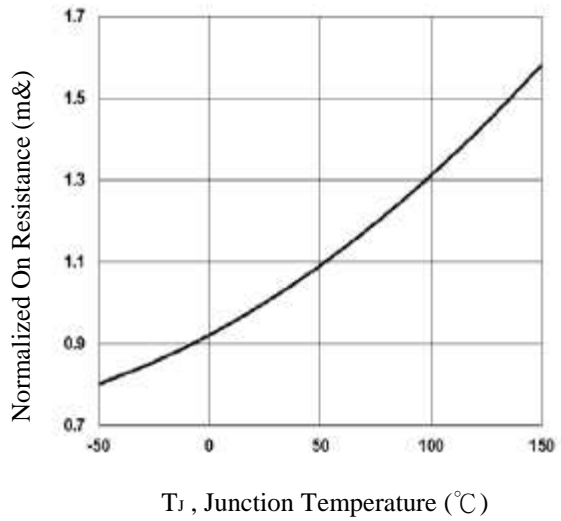


Fig.2 Normalized RDS(on) vs. Tj

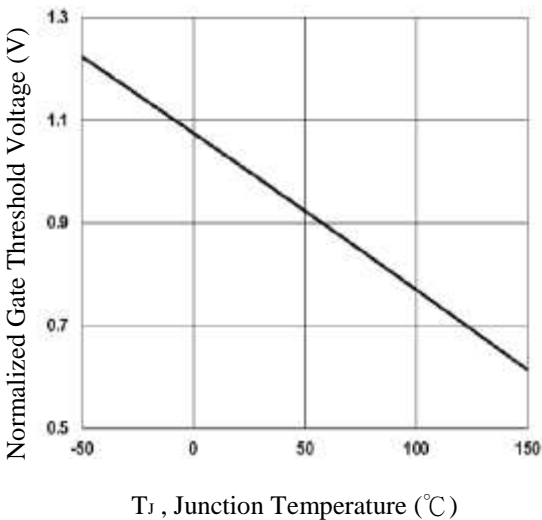


Fig.3 Normalized V_{th} vs. Tj

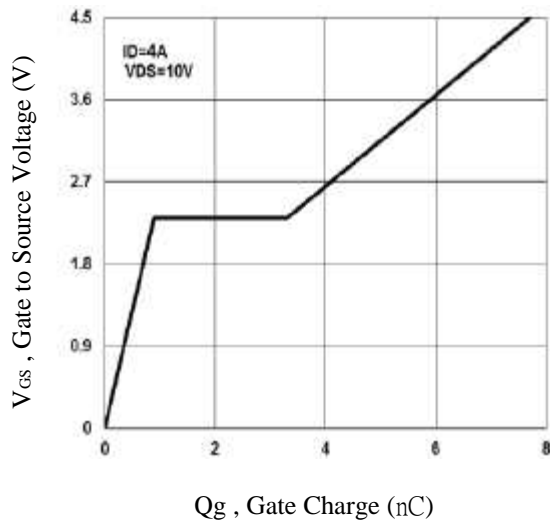


Fig.4 Gate Charge Waveform

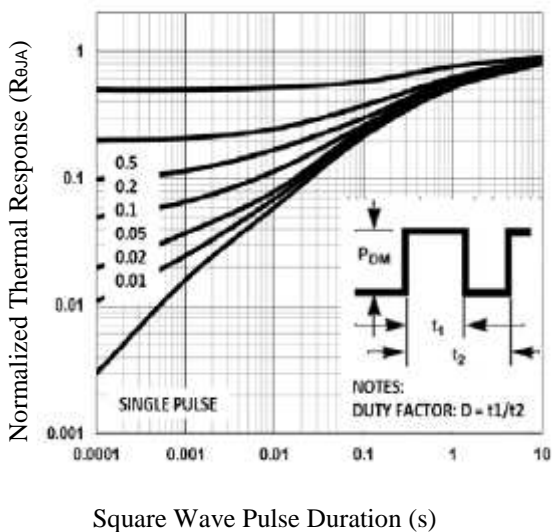


Fig.5 Normalized Transient Impedance

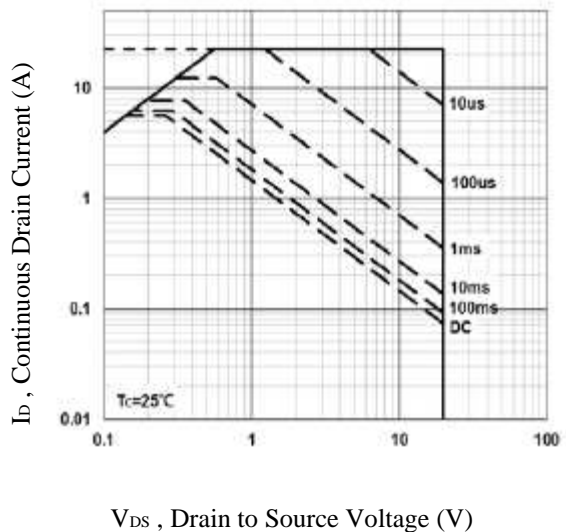


Fig.6 Maximum Safe Operation Area

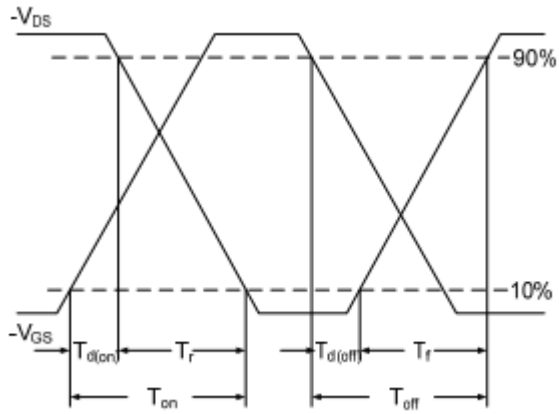


Fig.7 Switching Time Waveform

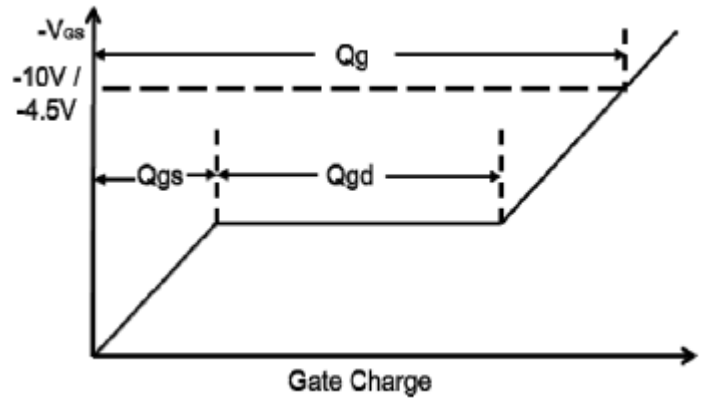
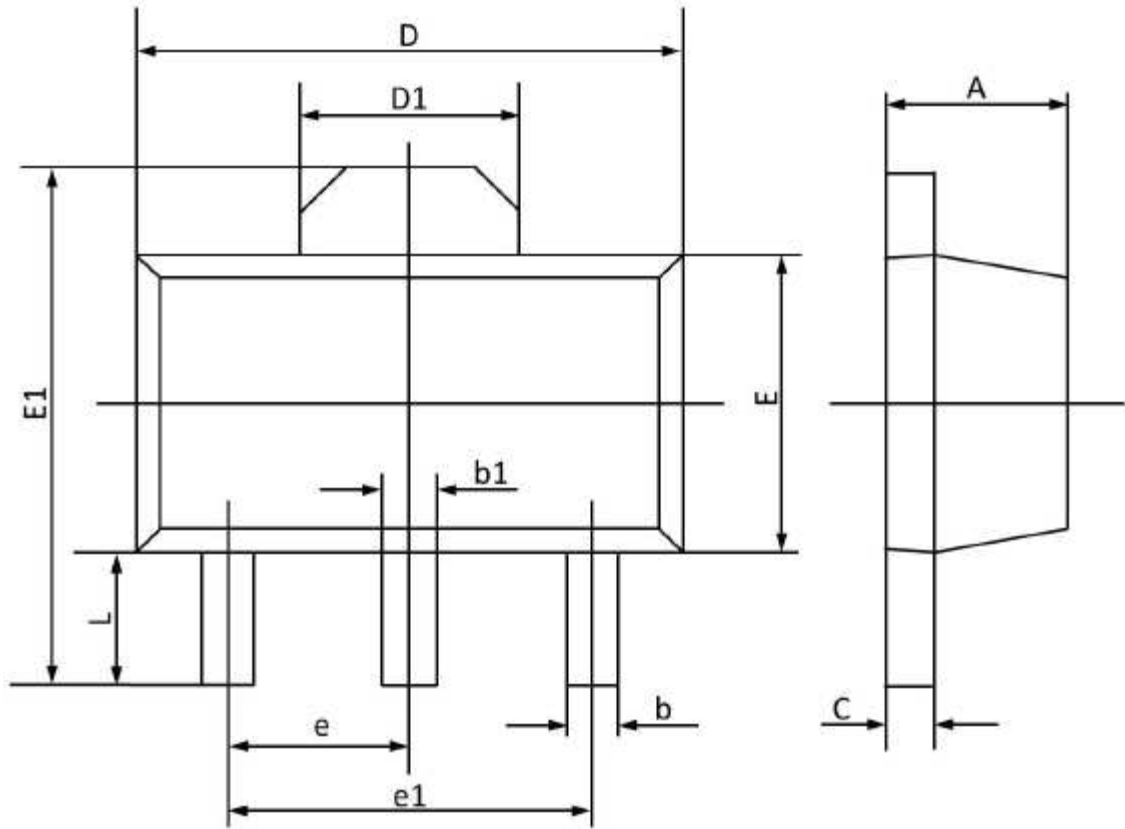


Fig.8 Gate Charge Waveform

SOT89 PACKAGE INFORMATION



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP.		0.060 TYP.	
e1	3.000 TYP		0.118 TYP	
L	0.900	1.200	0.035	0.047