

SOT-89 Plastic-Encapsulate Transistors

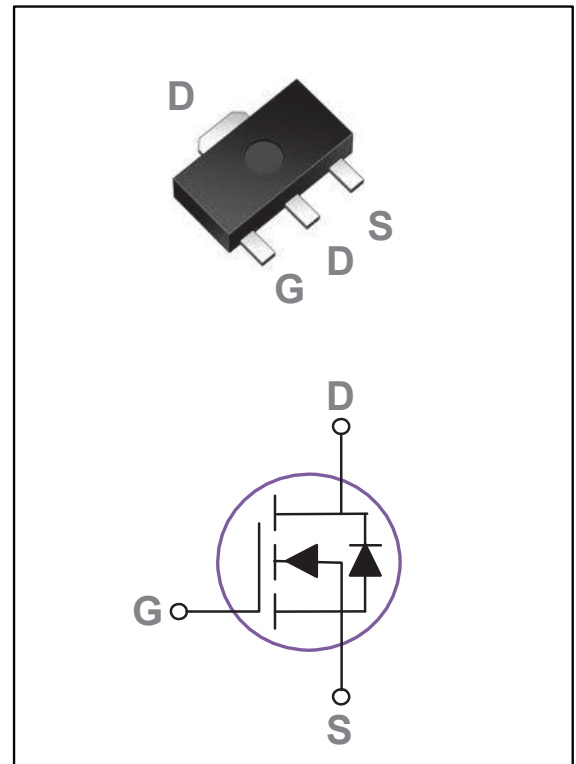
BVDSS	R _{DS(ON)}	I _D
100V	350mΩ	3A

Features

- 100V, 3A , R_{DS(ON)}=350mΩ@V_{GS}=10V
- Improved dv/dt capability
- Fast switching
- Green Device Available

Applications

- Networking
- Load Switch
- LED applications


MAXIMUM RATINGS AND CHARACTERISTICS

@ 25°C Ambient Temperature (unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V _{DS}	100	V
Gate-Source Voltage	V _{GS}	±20	V
Drain Current – Continuous (T _C =25°C)	I _D	3	A
Drain Current – Continuous (T _C =100°C)		1.9	A
Drain Current – Pulsed ¹	I _{DM}	12	A
Single Pulse Avalanche Energy ²	EAS	6	mJ
Single Pulse Avalanche Current ²	IAS	11	A
Power Dissipation (T _C =25°C)	P _D	6.9	W
Power Dissipation – Derate above 25°C		0.06	W/°C
Storage Temperature Range	T _{STG}	-50 to 150	°C
Operating Junction Temperature Range	T _J	-50 to 150	°C

Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction to ambient	R _{θJA}	---	80	°C/W
Thermal Resistance Junction to Case	R _{θJC}	---	18	°C/W

MOSFET ELECTRICAL CHARACTERISTICS $T_A=25^{\circ}\text{C}$ unless otherwise specified

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	100	---	---	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=1\text{mA}$	---	0.09	---	$\text{V}/^{\circ}\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=80V, V_{GS}=0V, T_J=125^{\circ}\text{C}$	---	---	10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA

On Characteristics

Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=2A$	---	280	350	$\text{m}\Omega$
		$V_{GS}=4.5V, I_D=1A$	---	290	360	$\text{m}\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.8	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		---	-4.4	---	$\text{mV}/^{\circ}\text{C}$
Forward Transconductance	g_{fs}	$V_{DS}=10V, I_D=2A$	---	3	---	S

Dynamic and switching Characteristics

Total Gate Charge ^{3, 4}	Q_g	$V_{DS}=50V, V_{GS}=10V, I_D=1A$	---	5.8	11	nC
Gate-Source Charge ^{3, 4}	Q_{gs}		---	0.7	3	
Gate-Drain Charge ^{3, 4}	Q_{gd}		---	2.5	5	
Turn-On Delay Time ^{3, 4}	$T_{d(on)}$	$V_{DD}=50V, V_{GS}=10V, R_G=3.3\Omega, I_D=1A$	---	5.2	10	ns
Rise Time ^{3, 4}	T_r		---	6.8	12	
Turn-Off Delay Time ^{3, 4}	$T_{d(off)}$		---	14.5	28	
Fall Time ^{3, 4}	T_f		---	2.1	5	
Input Capacitance	C_{iss}	$V_{DS}=50V, V_{GS}=0V, F=1\text{MHz}$	---	480	960	pF
Output Capacitance	C_{oss}		---	25	50	
Reverse Transfer Capacitance	C_{rss}		---	14	28	
Gate resistance	R_g	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	2	4	Ω

Drain-Source Diode Characteristics and Maximum Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	$V_G=V_D=0V, \text{Force Current}$	---	---	3	A
Pulsed Source Current	I_{SM}		---	---	6	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	---	---	1	V
Reverse Recovery Time	t_{rr}	$V_{GS}=0V, I_S=1A, di/dt=100A/\mu\text{s}, T_J=25^{\circ}\text{C}$	---	70	---	ns
Reverse Recovery Charge	Q_{rr}		---	114	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=50V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=11A, R_G=25\Omega, \text{Starting } T_J=25^{\circ}\text{C}$.
3. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

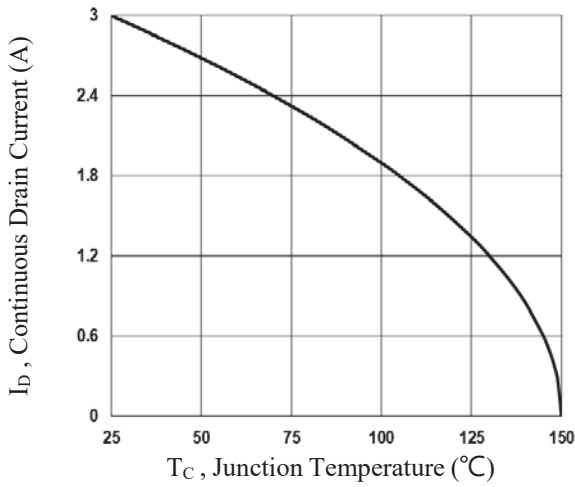


Fig.1 Continuous Drain Current vs. T_c

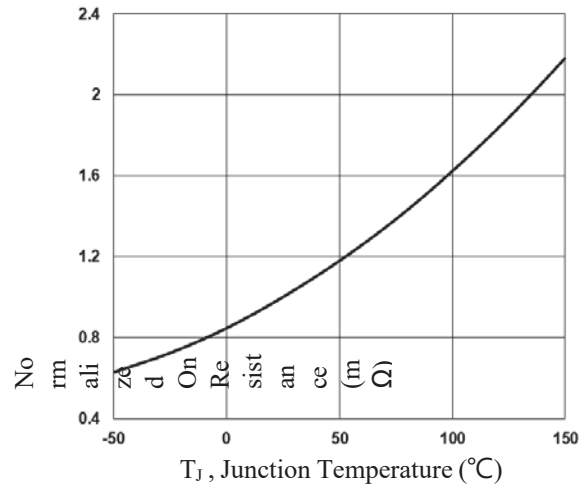


Fig.2 Normalized R_{DS(on)} vs. T_j

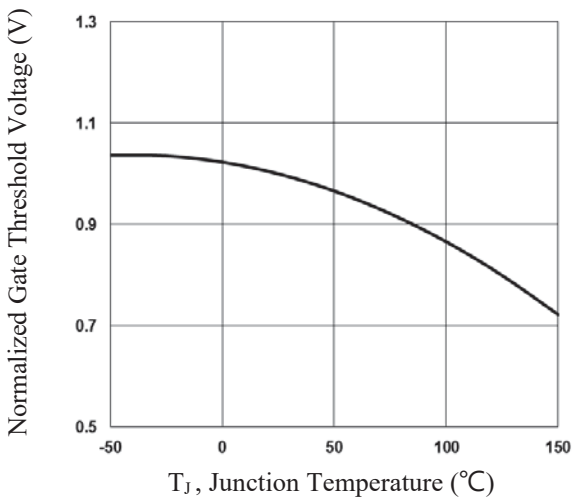


Fig.3 Normalized V_{th} vs. T_j

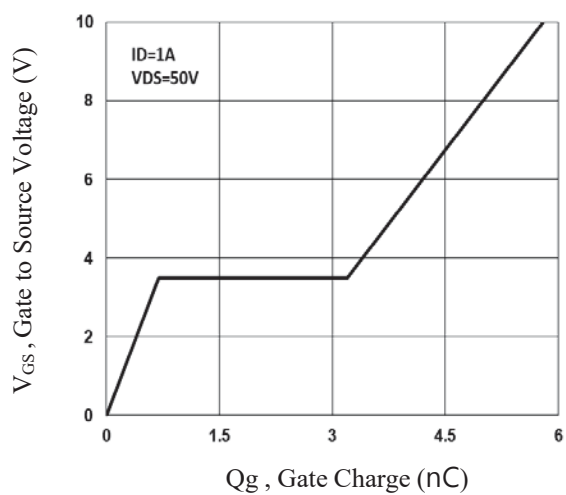


Fig.4 Gate Charge Waveform

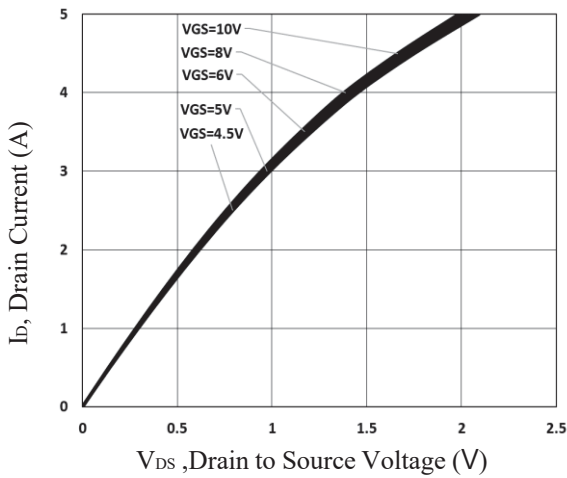


Fig.5 Typical Output Characteristics

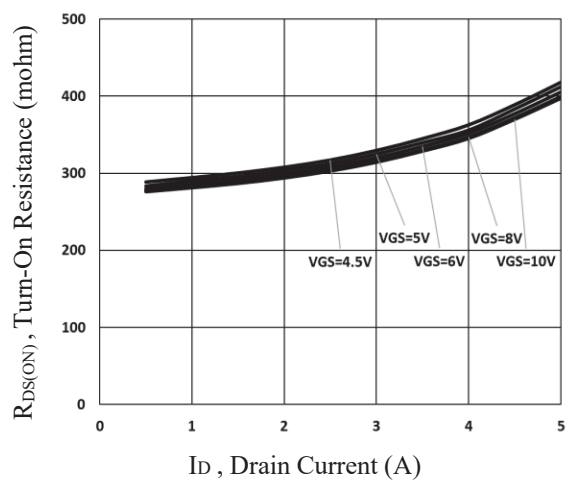


Fig.6 Turn-On Resistance vs. I_D

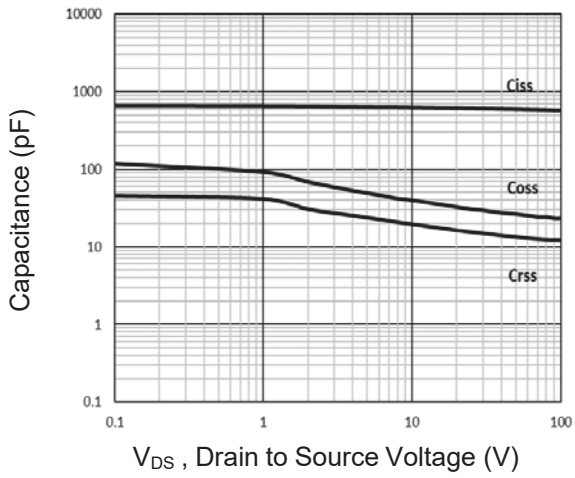


Fig.7 Capacitance Characteristics

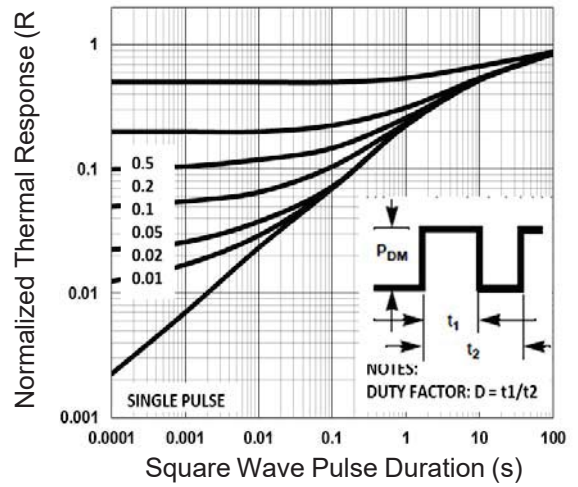


Fig.8 Normalized Transient Impedance

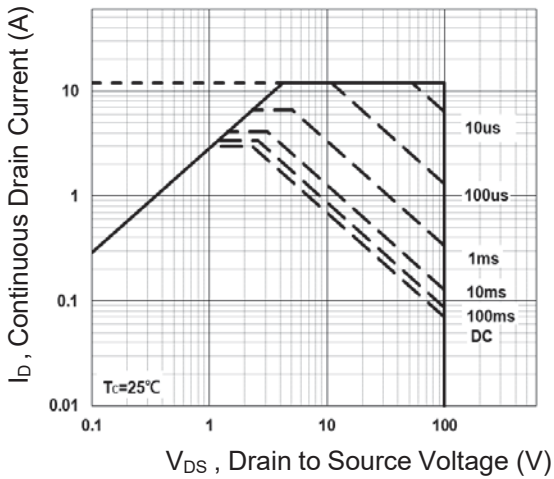


Fig.9 Maximum Safe Operation Area

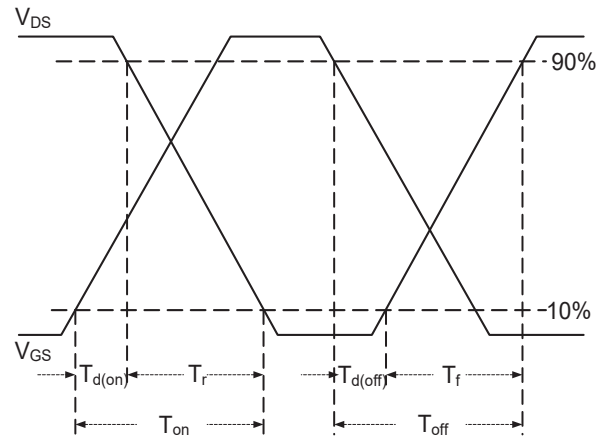


Fig.10 Switching Time Waveform

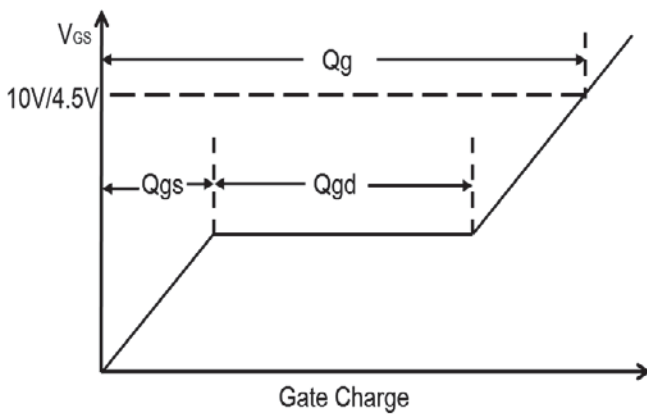
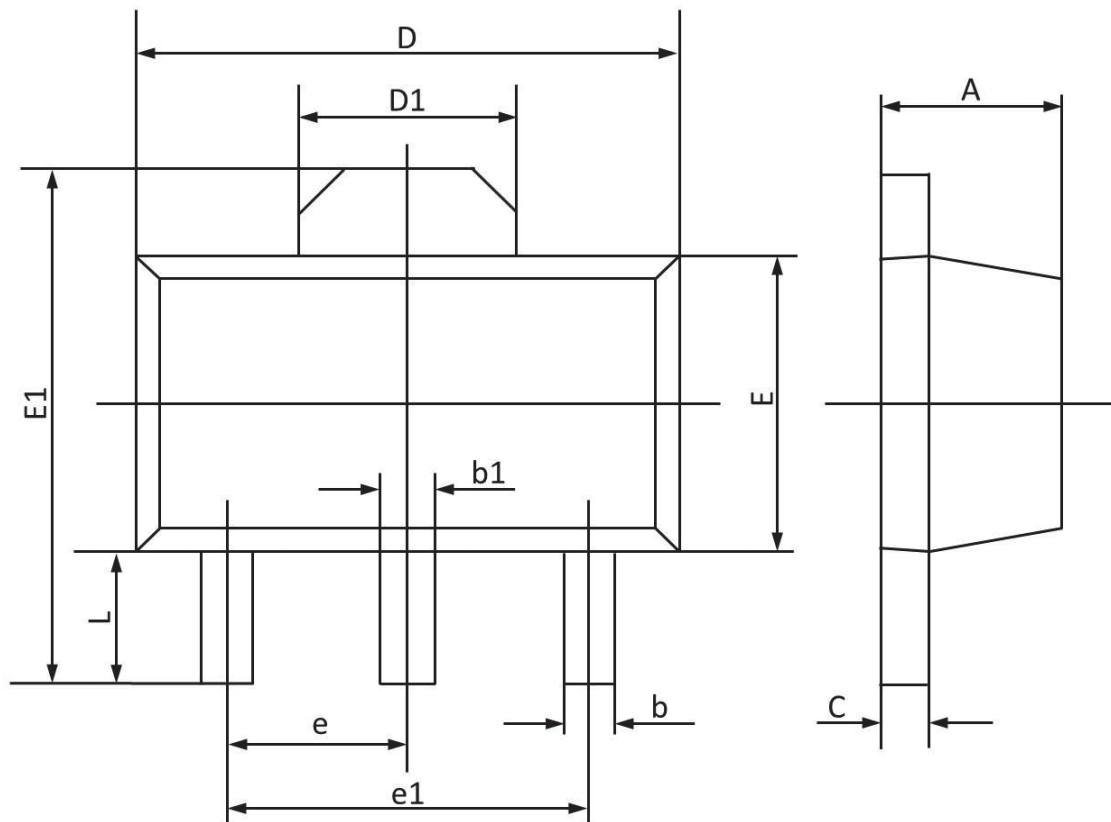


Fig.11 Gate Charge Waveform

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