

SOT223 Pin Configuration

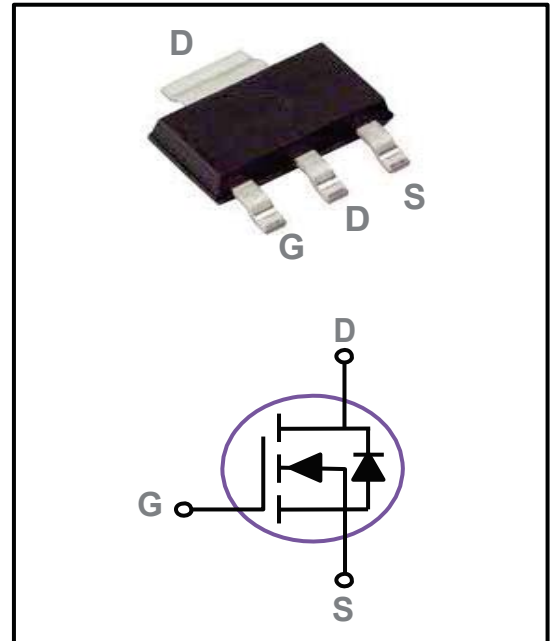
BVDSS	RDS(ON)	ID
60V	90mΩ	5A

Features

- 60V,5A, $R_{DS(ON)} = 90m\Omega @ V_{GS} = 10V$
- Improved dv/dt capability
- Fast switching

Applications

- 100% EAS Guaranteed
- Green Device Available
- Power Tools
- LED Lighting
- Motor Drive



MAXIMUM RATINGS AND CHARACTERISTICS

@ 25°C Ambient Temperature (unless otherwise noted)

Parameter	Symbol	Rating	Units
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	+20	V
Drain Current – Continuous ($T_C=25C$)	I_D	5	A
Drain Current – Continuous ($T_C=100C$)		3.2	A
Drain Current – Pulsed ¹	I_{DM}	20	A
Single Pulse Avalanche Energy ²	EAS	25	mJ
Single Pulse Avalanche Current ²	IAS	7	A
Power Dissipation ($T_C=25C$)	P_D	1.79	W
Power Dissipation – Derate above 25C		0.014	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	$R_{\theta JA}$	---	70	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	---	30	°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}	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
BV_{DSS} Temperature Coefficient	$\beta BV_{DSS}/\beta T_J$	Reference to $25^\circ\text{C}, I_D=1\text{mA}$	---	0.05	---	$V/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=60V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=48V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=+20V, V_{DS}=0V$	---	---	+100	nA

On Characteristics

Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=5A$	---	76	90	$m\Omega$
		$V_{GS}=4.5V, I_D=3A$	---	87	100	$m\Omega$
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	$\beta V_{GS(th)}$		---	-5	---	$mV/^\circ\text{C}$
Forward Transconductance	g_{fs}	$V_{DS}=10V, I_D=3A$	---	7	---	S

Dynamic and switching Characteristics

Total Gate Charge ^{2,3}	Q_g	$V_{DS}=48V, V_{GS}=10V, I_D=5A$	---	9.3	14	nC
Gate-Source Charge ^{2,3}	Q_{gs}		---	2.1	4	
Gate-Drain Charge ^{2,3}	Q_{gd}		---	1.8	4	
Turn-On Delay Time ^{2,3}	$T_{d(on)}$	$V_{DD}=30V, V_{GS}=10V, R_G=3.3\Omega, I_D=1A$	---	2.9	6	ns
Rise Time ^{2,3}	T_r		---	9.5	18	
Turn-Off Delay Time ^{2,3}	$T_{d(off)}$		---	18.4	35	
Fall Time ^{2,3}	T_f		---	5.3	10	
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V, F=1\text{MHz}$	---	500	725	pF
Output Capacitance	C_{oss}		---	45	65	
Reverse Transfer Capacitance	C_{rss}		---	16	30	
Gate resistance	R_g	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	2	4	Q

Drain-Source Diode Characteristics and Maximum Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	$V_G=V_D=0V, \text{Force Current}$	---	---	5	A
Pulsed Source Current	I_{SM}		---	---	20	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V
Reverse Recovery Time ²	t_{rr}	$V_{GS}=30V, I_S=1A, dI/dt=100A/\mu s, T_J=25^\circ\text{C}$	---	23.2	---	ns
Reverse Recovery Charge ²	Q_{rr}		---	14.3	---	nC

Note :

1. Repetitive Rating : Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=1\text{mH}, I_{AS}=7A, R_G=25\Omega, \text{Starting } T_J=25^\circ\text{C}$
3. The data tested by pulsed , pulse width $\cong 300\mu s$, duty cycle $\cong 2\%$.
4. Essentially independent of operating temperature.

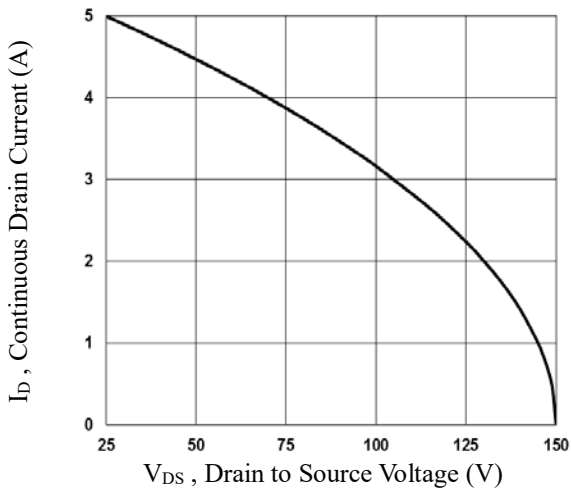


Fig.1 Output Characteristics

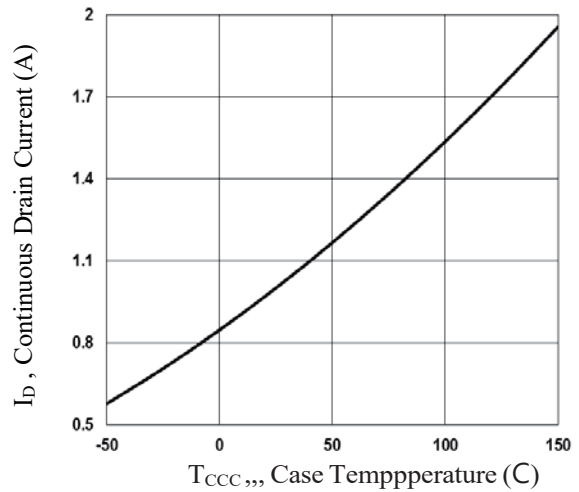


Fig.2 Continuous Drain Current vs. T_c

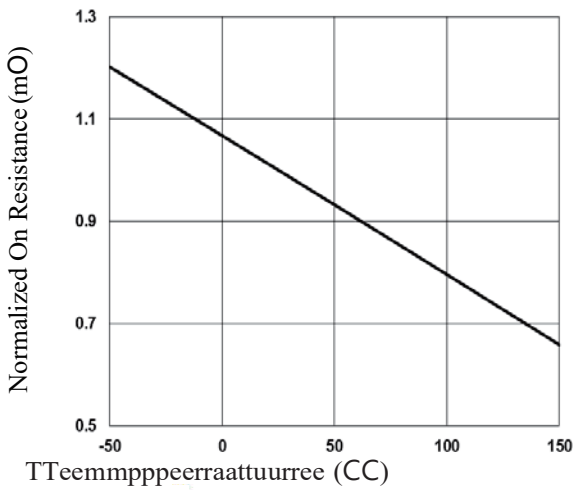


Fig.3 Normalized RDSON vs. T_j

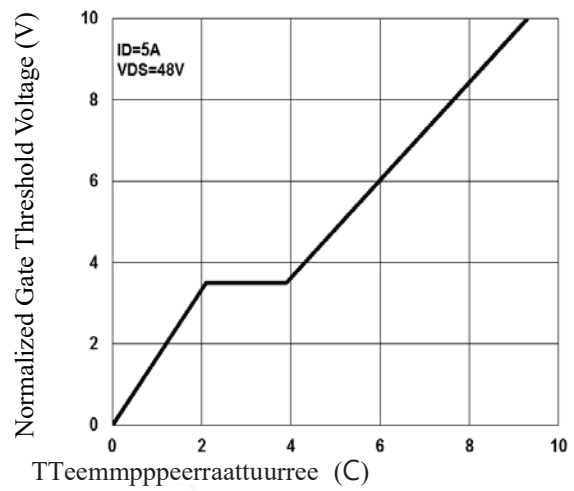


Fig.4 Normalized V_{th} vs. T_j

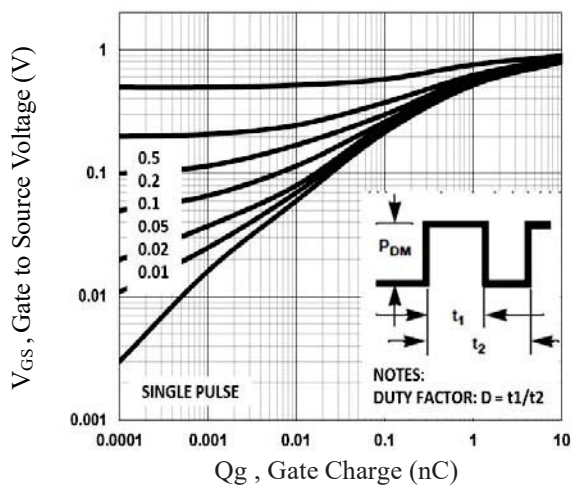


Fig.5 Gate Charge Waveform

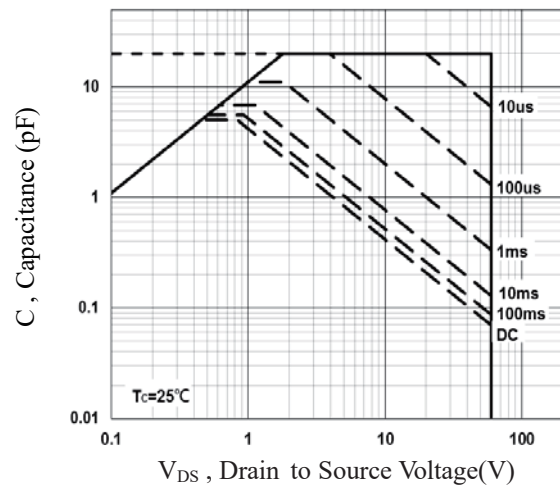


Fig.6 Capacitance Characteristics

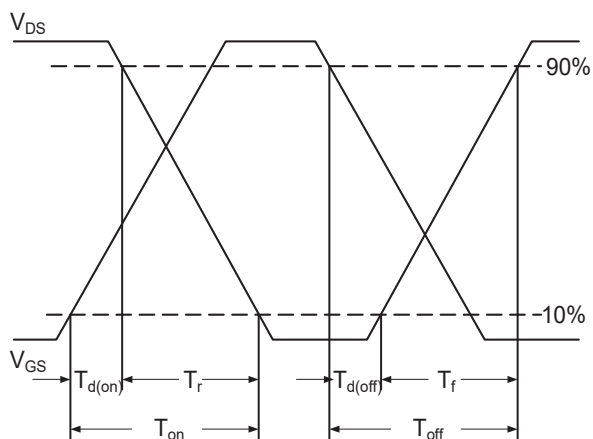


Fig.7 Switching Time Waveform

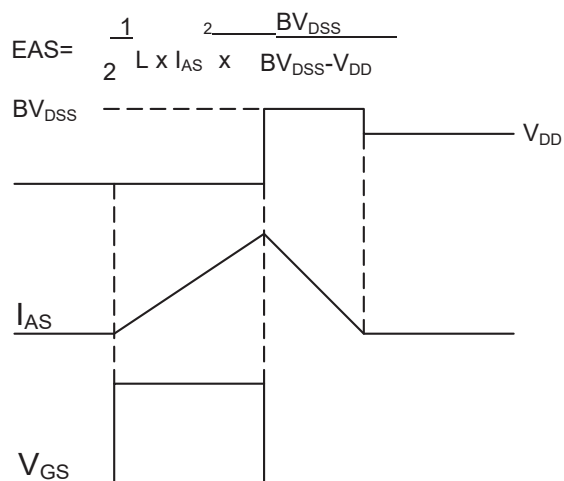
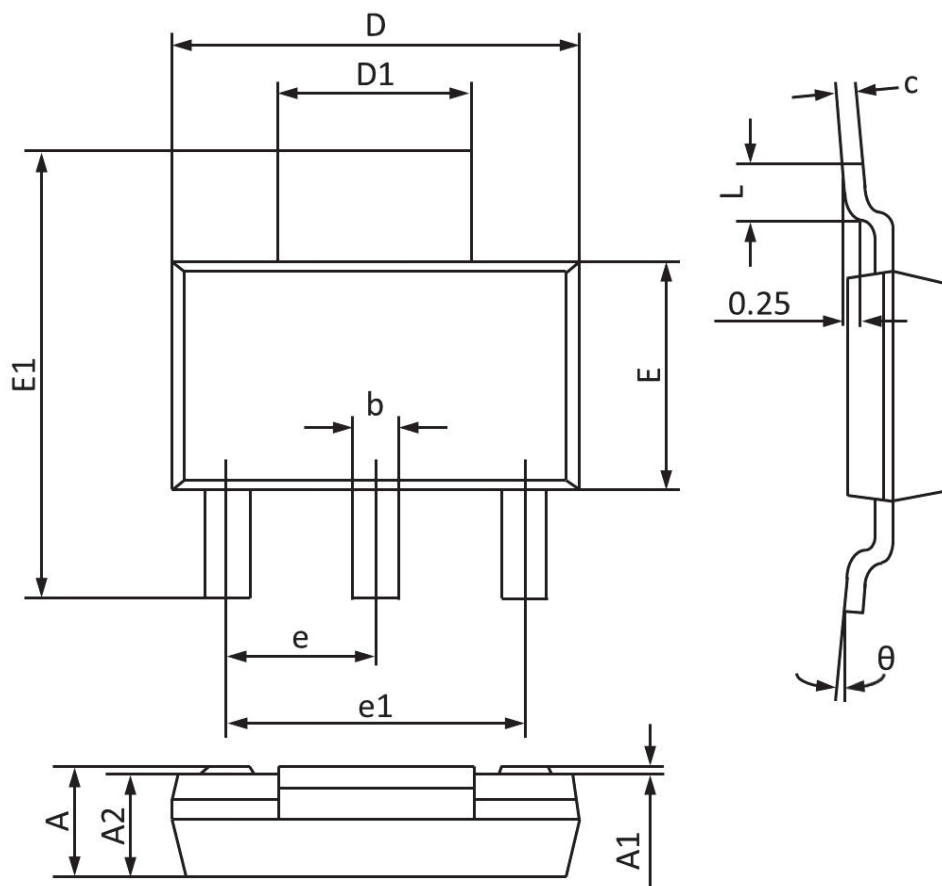


Fig.8 EAS Waveform

SOT223 PACKAGE INFORMATION


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300 (BSC)		0.091 (BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
Θ	0	10	0	10