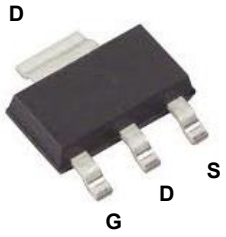
GOOD-ARK SEMICONDUCTOR

SSF6909

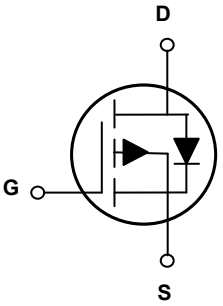
60V P-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	-60V
$R_{DS(ON)}$	105mΩ
I_D	-3.2A



SOT-223



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for motor drive, power tools and LED lighting
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery

Description

The SSF6909 utilizes the latest techniques to achieve high cell density and low on-resistance. These features make this device extremely efficient and reliable for use in high efficiency switch mode power supply and a wide variety of other applications.

Absolute Maximum Ratings (T_C=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V_{DS}	-60	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous(T_A=25°C)	I_D	-3.2	A
Drain Current-Continuous(T_C=70°C)		-5	A
Drain Current-Pulsed(T_A=25°C)[1]	I_{DM}	-12.8	A
Single Pulse Avalanche Energy[2]	E_{AS}	25	mJ
Single Pulse Avalanched Current[2]	I_{AS}	-18	A
Power Dissipation(T_A=25°C)	P_D	2	W
Power Dissipation(T_C=25°C)		5.4	W/°C
Thermal Resistance, Junction-to-Ambient[5]	$R_{\theta JA}$	62	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	23	°C/W
Storage Temperature Range	T_{STG}	-55 To +150	°C
Operating Junction Temperature Range	T_J	-55 To +150	°C

Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250μA	-60	-	-	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C, I_D=-1mA	-	-0.05	-	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-60V , V_{GS}=0V, T_J=25°C	-	-	-1	μA
		V_{DS}=-48V , V_{GS}=0V, T_J=125°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=-3A	-	87	105	mΩ
		V_{GS}=-4.5V, I_D=-2A	-	107	140	
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-250μA	-1.0	-1.6	-2.5	V
Gate Threshold Voltage	$V_{GS(th)}$		-	3	-	mV/°C
Forward Transconductance	g_{FS}	V_{DS}=-10V, I_D=-3A	-	5.5	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[3,4]	Q_g	V_{DS}=-30V, I_D=-2A, V_{GS}=-10V	-	10	15	nC
Gate-Source Charge[3,4]	Q_{gs}		-	1.6	3.2	
Gate-Drain Charge[3,4]	Q_{gd}		-	3	6	
Turn-On Delay Time[3,4]	$t_{d(on)}$	V_{DD}=-30V, R_G=6Ω V_{GS}=-10V, I_D=-1A	-	8	16	nS
Rise Time[3,4]	t_r		-	15.4	30	
Turn-Off Delay Time[3,4]	$t_{d(off)}$		-	42.8	80	
Fall Time[3,4]	t_f		-	8.4	16	
Input Capacitance	C_{lss}	V_{DS}=-30V, V_{GS}=0V, F=1MHz	-	785	1300	pF
Output Capacitance	C_{oss}		-	175	300	
Reverse Transfer Capacitance	C_{rss}		-	112	220	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	36	-	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	-3.2	A
Pulsed Source Current	I_{SM}		-	-	-6.4	A
Diode Forward Voltage	V_{SD}	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=0.1mH, I_{AS}=-18A, 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.
5. Thermal resistance, Junction-to-Ambient measured in board size of 1inch x 1inch, 1oz copper.

Typical Electrical and Thermal Characteristic Curves

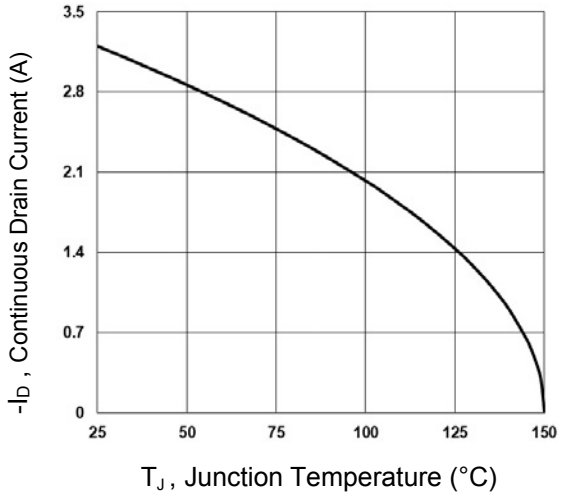


Fig.1 Continuous Drain Current vs. T_J

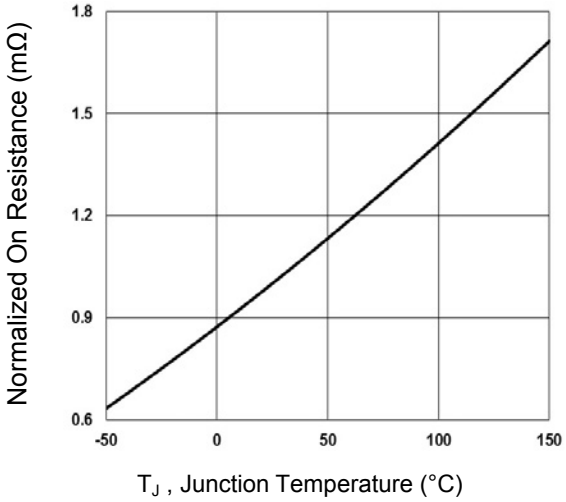


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

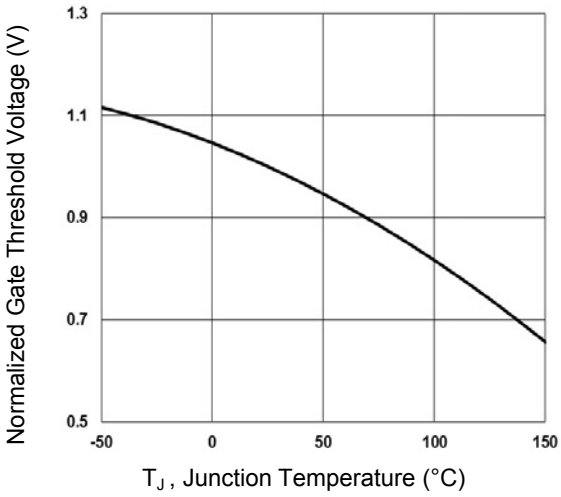


Fig.3 Normalized V_{th} vs. T_J

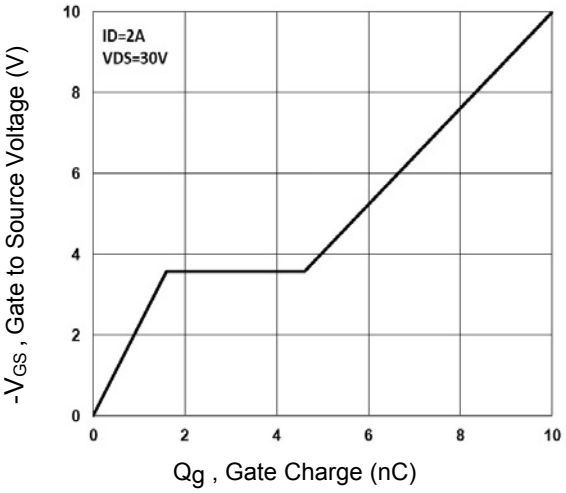


Fig.4 Gate Charge Waveform

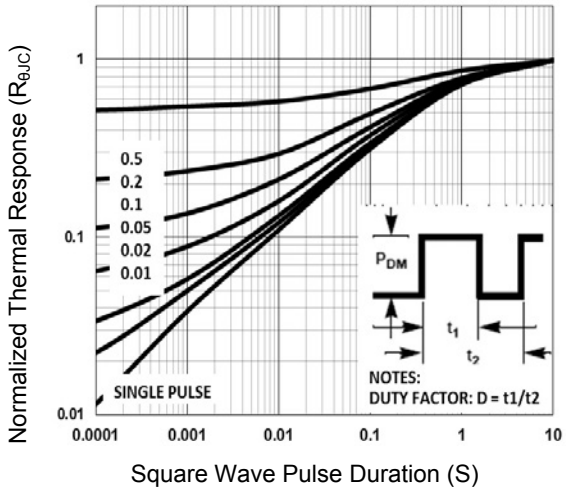


Fig.5 Normalized Transient Impedance

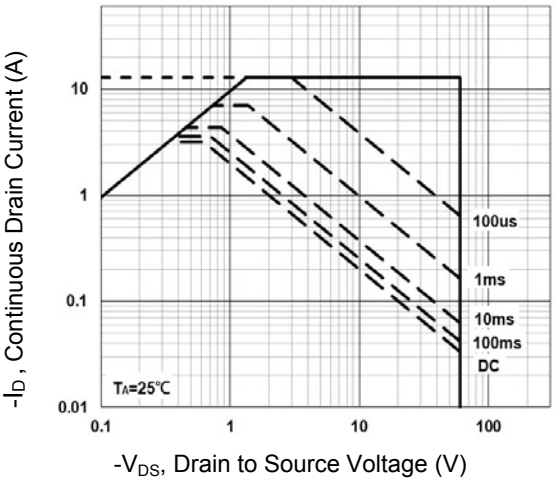


Fig.6 Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

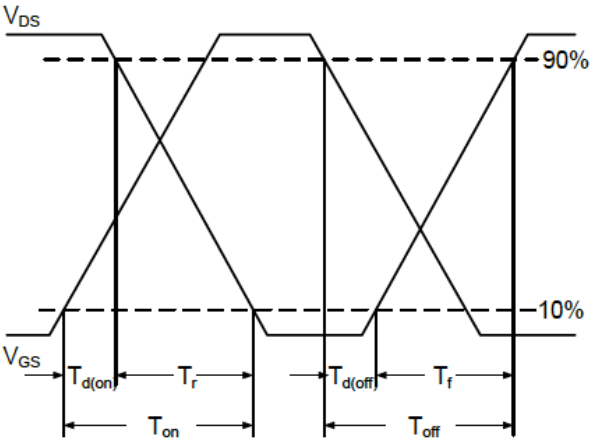


Fig.7 Switching Time Waveform

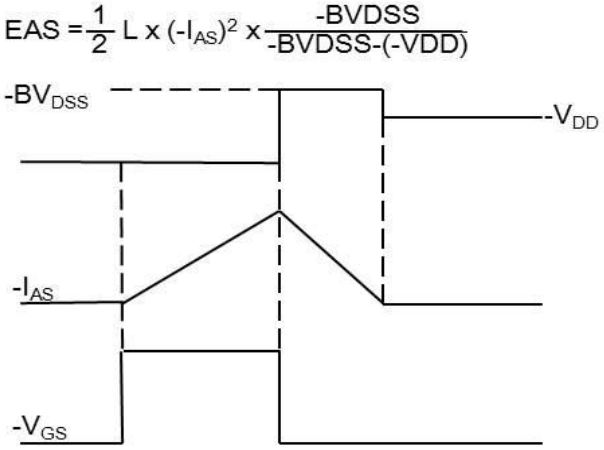
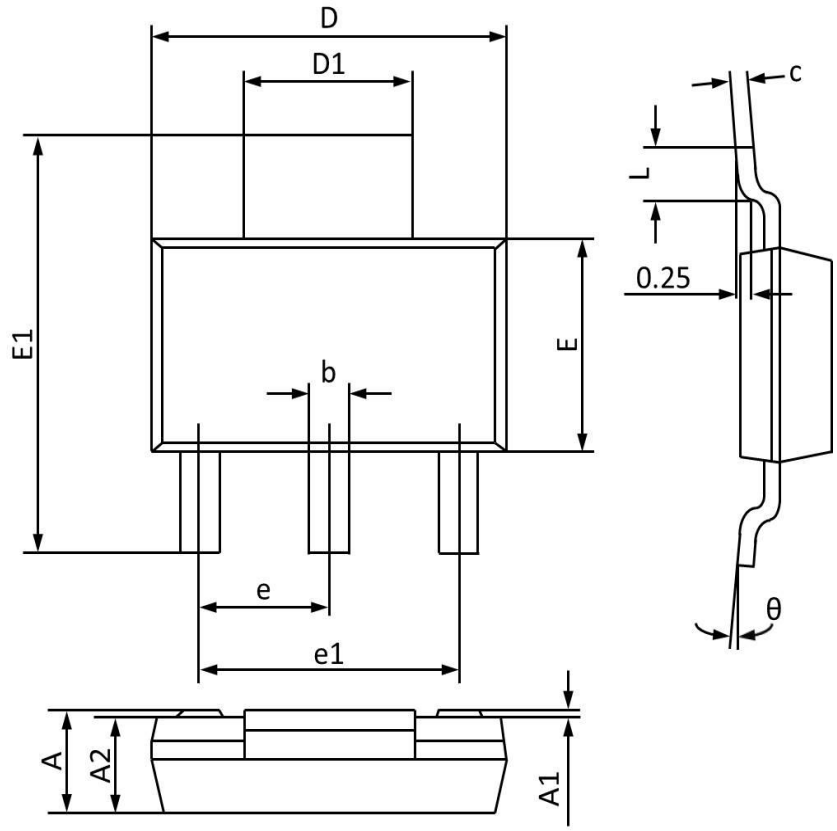


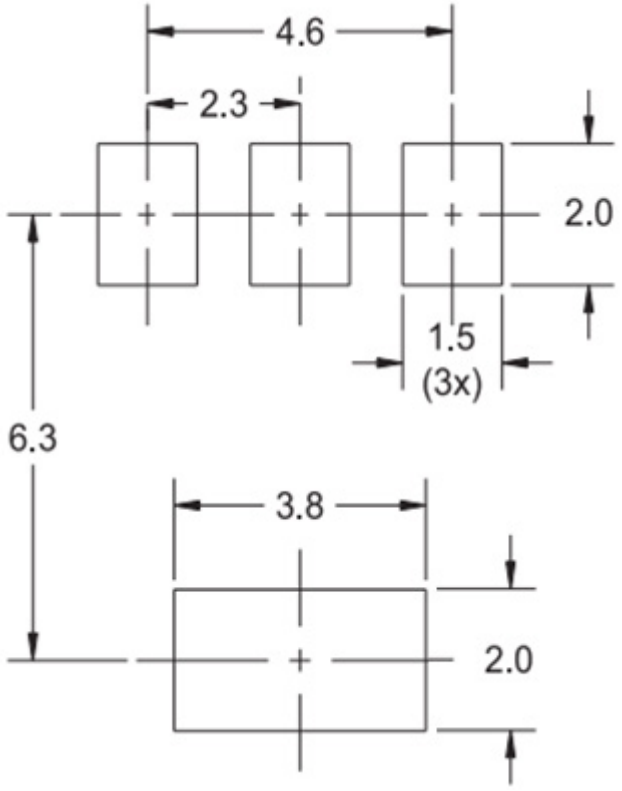
Fig.8 E_{AS} Waveform

Package Outline Dimensions SOT-223



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.800	1.520	0.071	0.060
A1	0.100	0.000	0.004	0.000
A2	1.700	1.500	0.067	0.059
b	0.820	0.660	0.032	0.026
c	0.350	0.250	0.014	0.010
D	6.400	6.200	0.252	0.244
D1	3.100	2.900	0.122	0.114
E	3.700	3.300	0.146	0.130
E1	7.070	6.830	0.278	0.269
e	2.30(BSC)		0.091(BSC)	
e1	4.700	4.500	0.185	0.177
L	1.150	0.900	0.045	0.035
θ	10°	0°	10°	0°

Recommended Pad Layout



unit: mm