GOOD-ARK
SEMICONDUCTOR

SSF8309S
30V P-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	-30V
$R_{DS(ON)}$	75mΩ
I_D	-3.8A
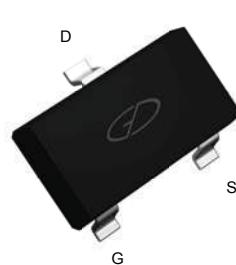
SOT-23
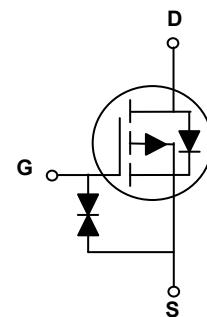
Schematic Diagram

Features and Benefits

■ Advanced MOSFET process technology

■ Ideal for high efficiency switched mode power supplies

■ Low on-resistance with low gate charge

■ Fast switching and reverse body recovery

Description

The SSF8309S 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	Value	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±25	V
Drain Current – Continuous (T_A=25°C)	I_D	-3.8	A
Drain Current – Continuous (T_A=70°C)		-3.0	A
Drain Current – Pulsed[1]	I_{DM}	-15.2	A
Power Dissipation (T_A=25°C)	P_D	1.56	W
Power Dissipation – Derate above 25°C		0.012	W/°C
Storage Temperature Range	T_{STG}	-55 to+150	°C
Operating Junction Temperature Range	T_J	-55 to+150	°C

Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction to Ambient	$R_{θJA}$	---	80	°C/W

SSF8309S

30V P-Channel MOSFET

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V$, $I_D=-250uA$	-30	---	---	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C , $I_D=-1mA$	---	-0.03	---	V/°C
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-30V$, $V_{GS}=0V$, $T_J=25°C$	---	---	-1	uA
		$V_{DS}=-24V$, $V_{GS}=0V$, $T_J=125°C$	---	---	-10	uA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=±20V$, $V_{DS}=0V$	---	---	±20	uA
On Characteristics						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=-10V$, $I_D=-3A$	---	64	75	mΩ
		$V_{GS}=-4.5V$, $I_D=-2A$	---	105	130	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}$, $I_D=-250uA$	-1.2	-1.6	-2.2	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		---	4	---	mV/°C
Forward Transconductance	gfs	$V_{DS}=-10V$, $I_D=-3A$	---	3.5	---	S
Dynamic and switching Characteristics						
Total Gate Charge[2,3]	Q_g	$V_{DS}=-15V$, $V_{GS}=-4.5V$, $I_D=-3A$	---	4.2	6	nC
Gate-Source Charge[2,3]	Q_{gs}		---	1.9	2.5	
Gate-Drain Charge[2,3]	Q_{gd}		---	1.4	2	
Turn-On Delay Time[2,3]	$T_{d(on)}$	$V_{DD}=-15V$, $V_{GS}=-10V$, $R_G=6Ω$ $I_D=-1A$	---	2.8	5	nS
Rise Time[2,3]	T_r		---	8.7	17	
Turn-Off Delay Time[2,3]	$T_{d(off)}$		---	21.4	41	
Fall Time[2,3]	T_f		---	5.7	11	
Input Capacitance	C_{iss}	$V_{DS}=-15V$, $V_{GS}=0V$, $F=1MHz$	---	460	665	pF
Output Capacitance	C_{oss}		---	45	65	
Reverse Transfer Capacitance	C_{rss}		---	30	45	
Drain-Source Diode Characteristics and Maximum Ratings						
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Continuous Source Current	I_S	$V_G=V_D=0V$, Force Current	---	---	-3.8	A
Pulsed Source Current	I_{SM}		---	---	-15.2	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V$, $I_S=-1A$, $T_J=25°C$	---	---	-1	V

Note:
1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width ≦ 300uS, duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves
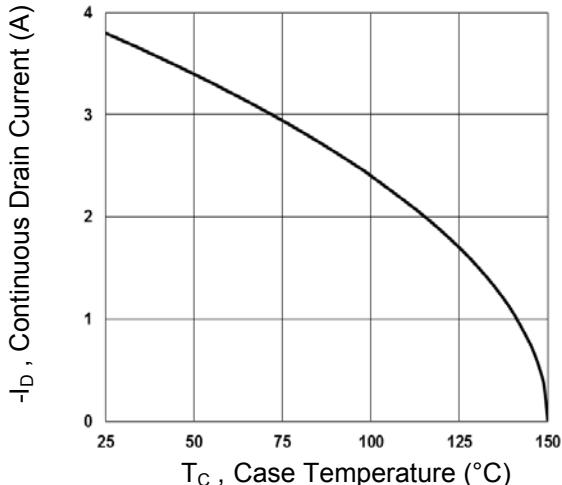
**Fig.1 Continuous Drain Current vs. T_C**
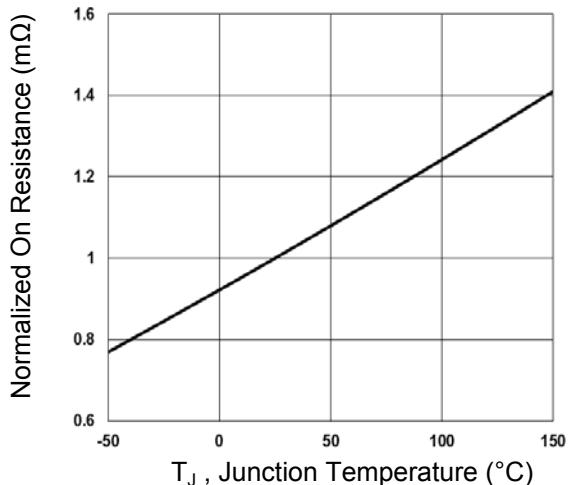
Fig.2 Normalized $R_{DS(ON)}$ vs. T_J
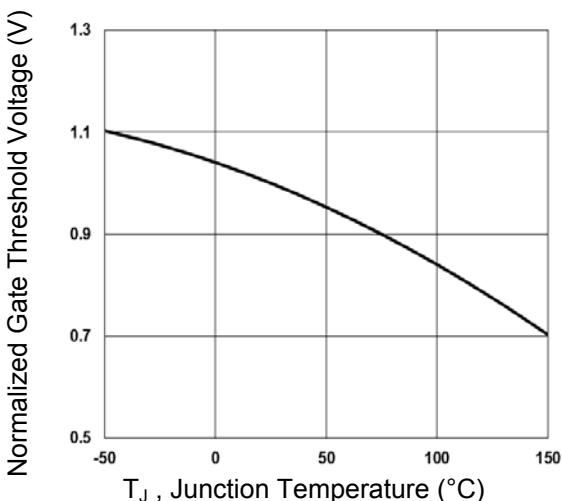
Fig.3 Normalized V_{th} vs. T_J
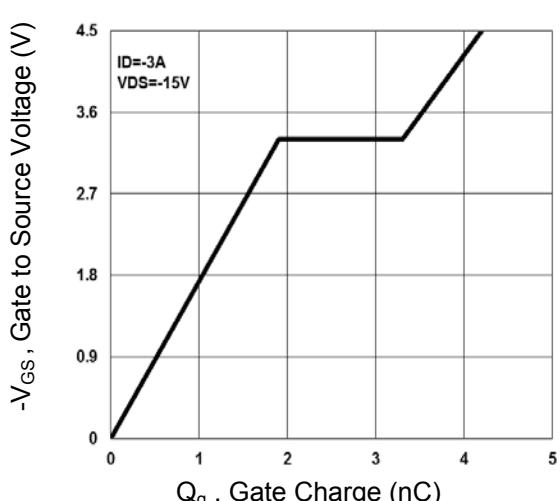
Fig.4 Gate Charge Waveform
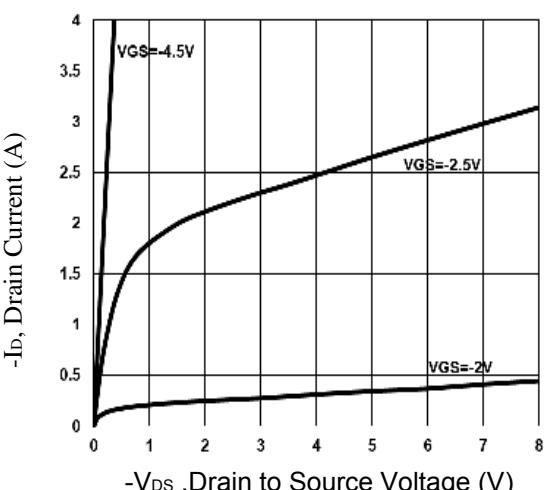
**Fig.5 Typical Output Characteristics**
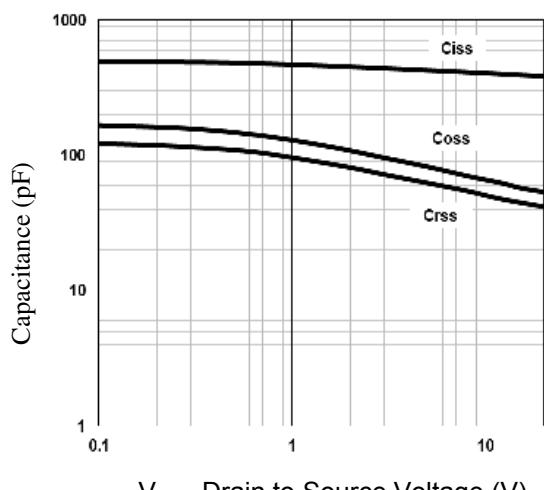
Fig.6 Capacitance Characteristics

Typical Electrical and Thermal Characteristic Curves
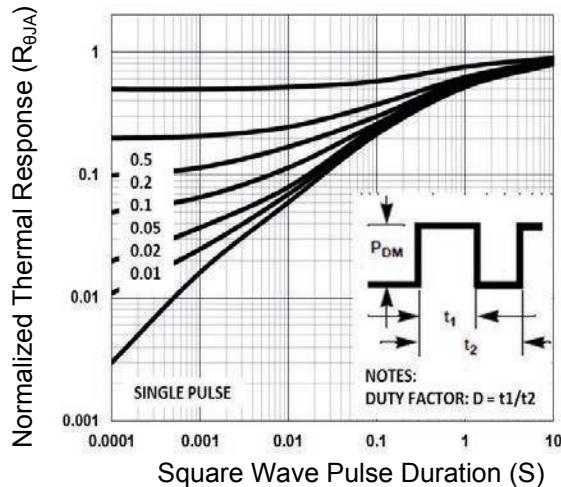

Fig.7 Normalized Tr ansient Impedance
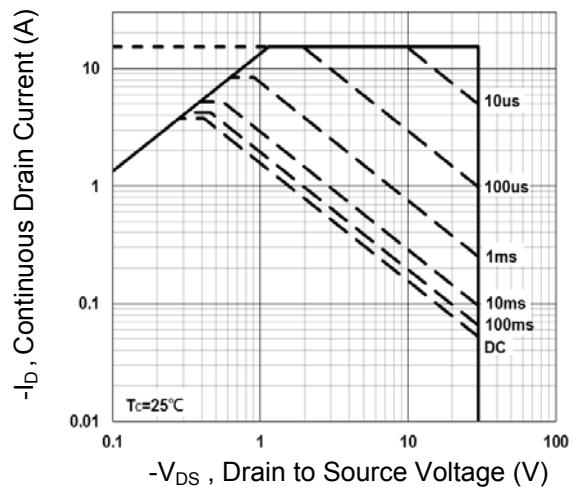

**Fig.8 Maximum Safe Operation Area**
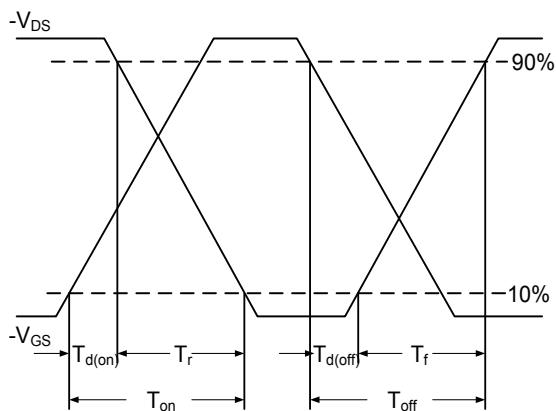
Fig.9 Switching Time Waveform
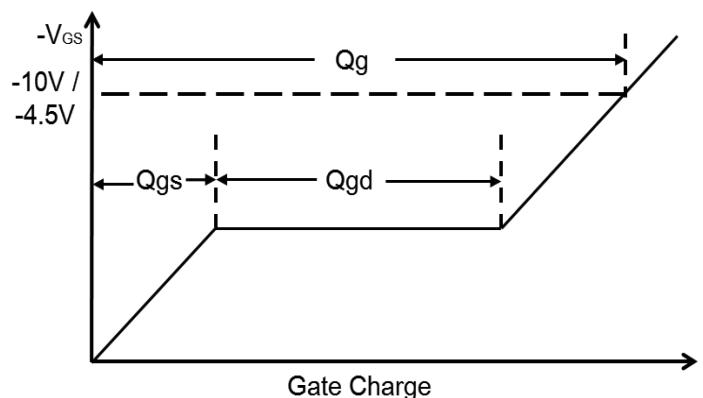
Fig.10 Gate Charge Waveform

Package Outline Dimensions　　　SOT-23
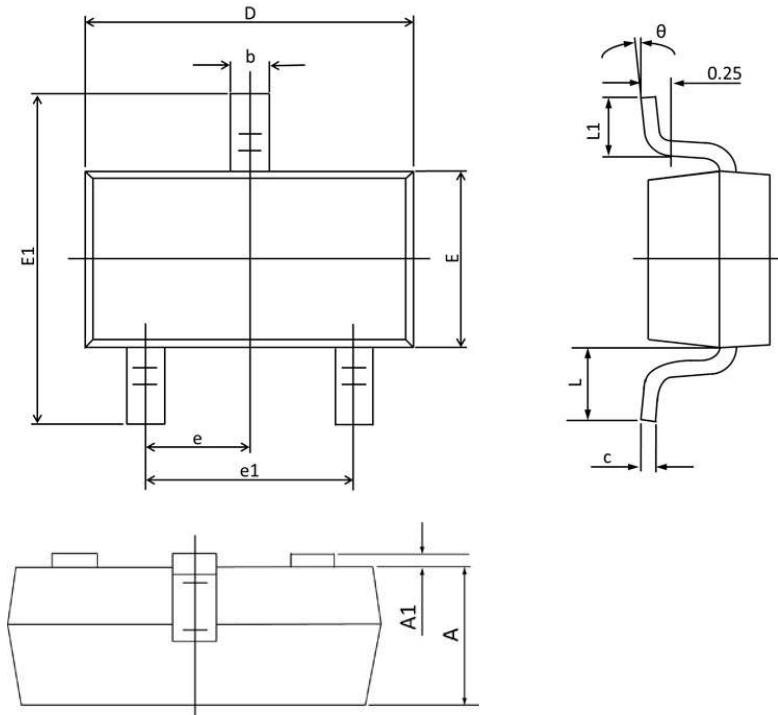
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	**Max**	**Min**	**Max**
A	0.900	1.000	0.035	0.039
A1	0.000	0.100	0.000	0.004
b	0.300	0.500	0.012	0.020
c	0.090	0.110	0.003	0.004
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		0.037 TYP.	
e1	1.800	2.000	0.071	0.079
L	0.550 REF.		0.022 REF.	
L1	0.300	0.500	0.012	0.020
θ	1°	7°	1°	7°