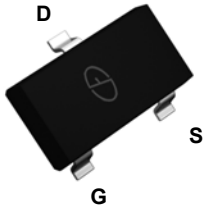
GOOD-ARK SEMICONDUCTOR

SSF3912S

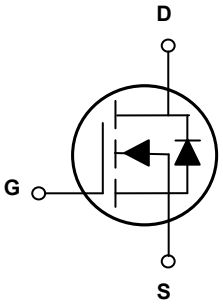
30V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	30V
$R_{DS(ON)}$	24mΩ
I_D	6.5A



SOT-23



Schematic Diagram

Features and Benefits

- Advanced MOSFET process technology
- Ideal for MB/VGA/Vcore and load switch
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery

RoHS Compliant

Description

The SSF3912S 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}	±20	V
Drain Current – Continuous (T_C=25°C)	I_D	6.5	A
Drain Current – Continuous (T_C=100°C)		4.1	A
Drain Current – Pulsed[1]	I_{DM}	26	A
Single Pulse Avalanche Energy[2]	E_{AS}	32	mJ
Single Pulse Avalanche Current[2]	I_{AS}	8	A
Power Dissipation (T_C=25°C)	P_D	1.56	W
Power Dissipation – Derate above 25°C	P_D	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	$R_{\theta JA}$	---	80	°C/W

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	---	0.04	---	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	---	---	±100	nA
On Characteristics						
Static Drain-Source On-Resistance[3]	$R_{DS(ON)}$	V_{GS}=10V , I_D=6A	---	20	24	mΩ
		V_{GS}=4.5V , I_D=4A	---	27	34	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	1.2	1.6	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		---	-4	---	mV/°C
Forward Transconductance	gfs	V_{DS}=10V , I_D=4A	---	6.5	---	S
Dynamic and Switching Characteristics						
Total Gate Charge[3 , 4]	Q_g	V_{DS}=15V , V_{GS}=4.5V , I_D=6A	---	4.1	8	nC
Gate-Source Charge[3 , 4]	Q_{gs}		---	1	2	
Gate-Drain Charge[3 , 4]	Q_{gd}		---	2.1	4	
Turn-On Delay Time[3 , 4]	$T_{d(on)}$	V_{DD}=15V , V_{GS}=10V , R_G=6Ω I_D=1A	---	2.8	5	nS
Rise Time[3 , 4]	T_r		---	7.2	14	
Turn-Off Delay Time[3 , 4]	$T_{d(off)}$		---	15.8	30	
Fall Time[3 , 4]	T_f		---	4.6	9	
Input Capacitance	C_{iss}	V_{DS}=25V , V_{GS}=0V , F=1MHz	---	345	500	pF
Output Capacitance	C_{oss}		---	55	80	
Reverse Transfer Capacitance	C_{rss}		---	32	45	
Gate Resistance	Rg	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	3.2	6.4	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V , Force Current	---	---	6.5	A
Pulsed Source Current[3]	I_{SM}		---	---	26	A
Diode Forward Voltage[3]	V_{SD}	V_{GS}=0V , I_S=1A , T_J=25°C	---	---	1	V
Reverse Recovery Time	t_{rr}	V_{GS}=0V,I_S=1A , di/dt=100A/μS, T_J=25°C	---	---	---	nS
Reverse Recovery Charge	Q_{rr}		---	---	---	nC

Note:
1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=1mH, I_{AS}=8A, 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.

Typical Electrical and Thermal Characteristics

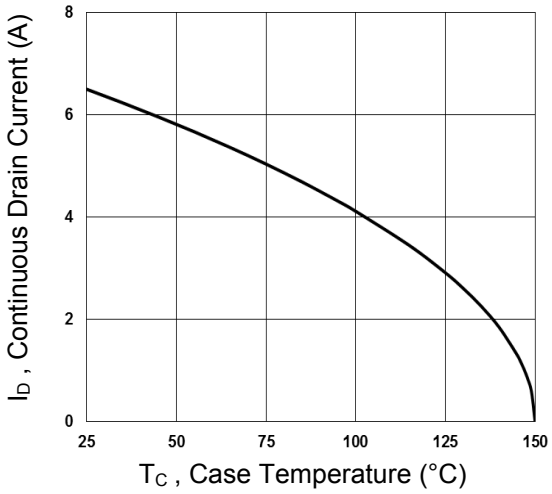


Fig.1 Continuous Drain Current vs. T_C

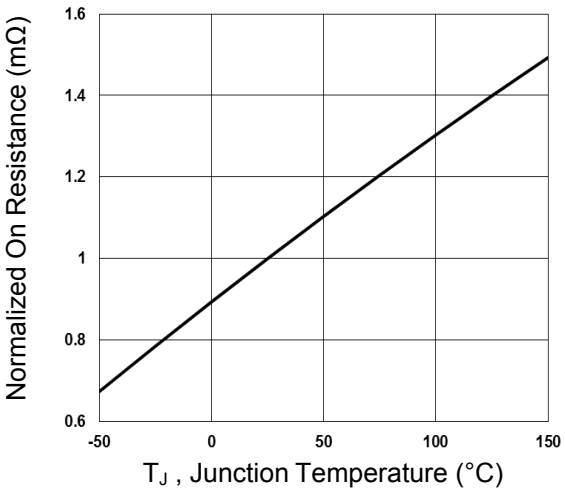


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

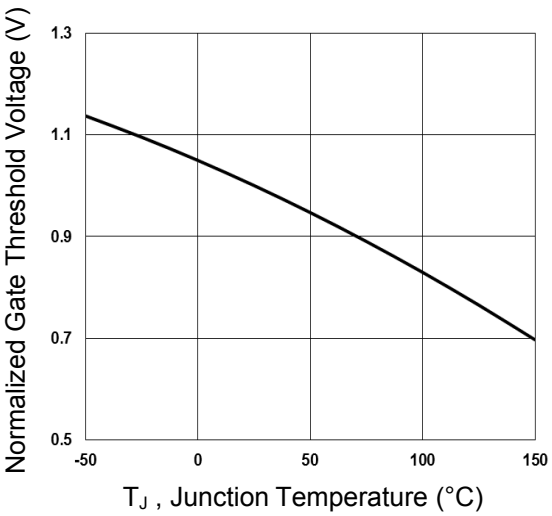


Fig.3 Normalized V_{th} vs. T_J

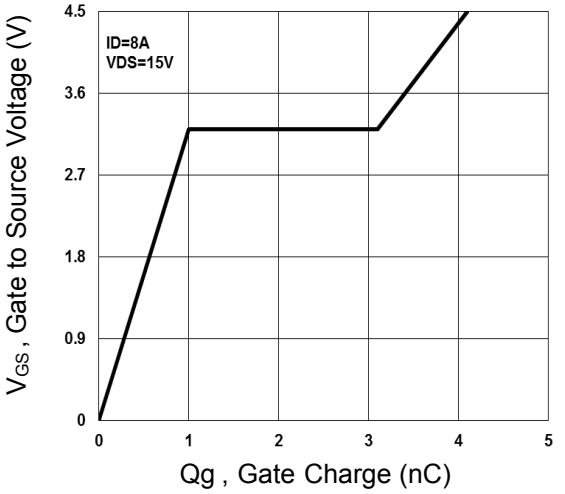


Fig.4 Gate Charge Waveform

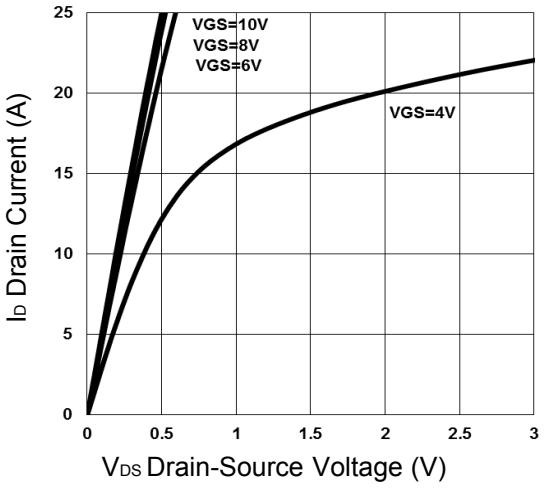


Fig.5 On Region Characteristics

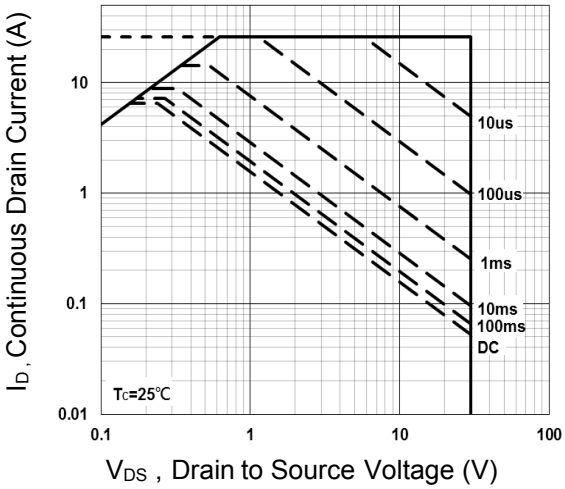


Fig.6 Maximum Safe Operation Area

Typical Electrical and Thermal Characteristics

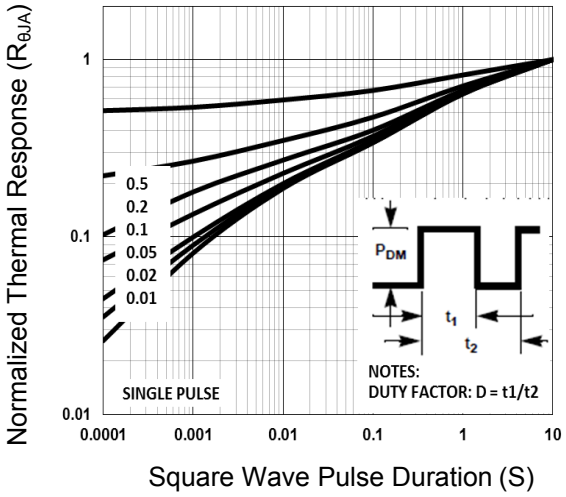


Fig.7 Normalized Transient Response

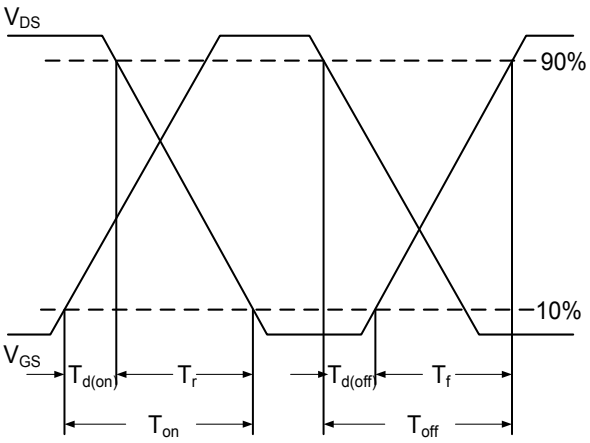


Fig.8 Switching Time Waveform

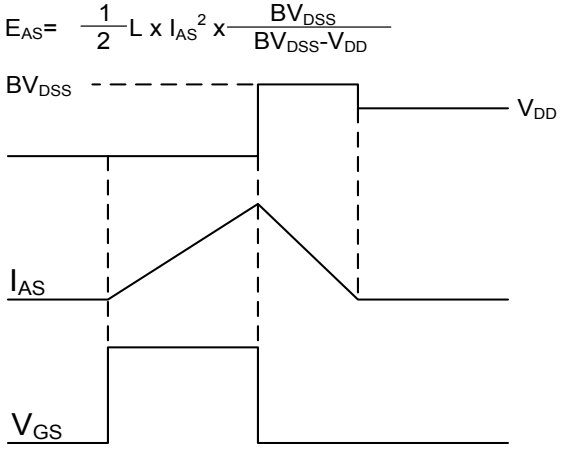
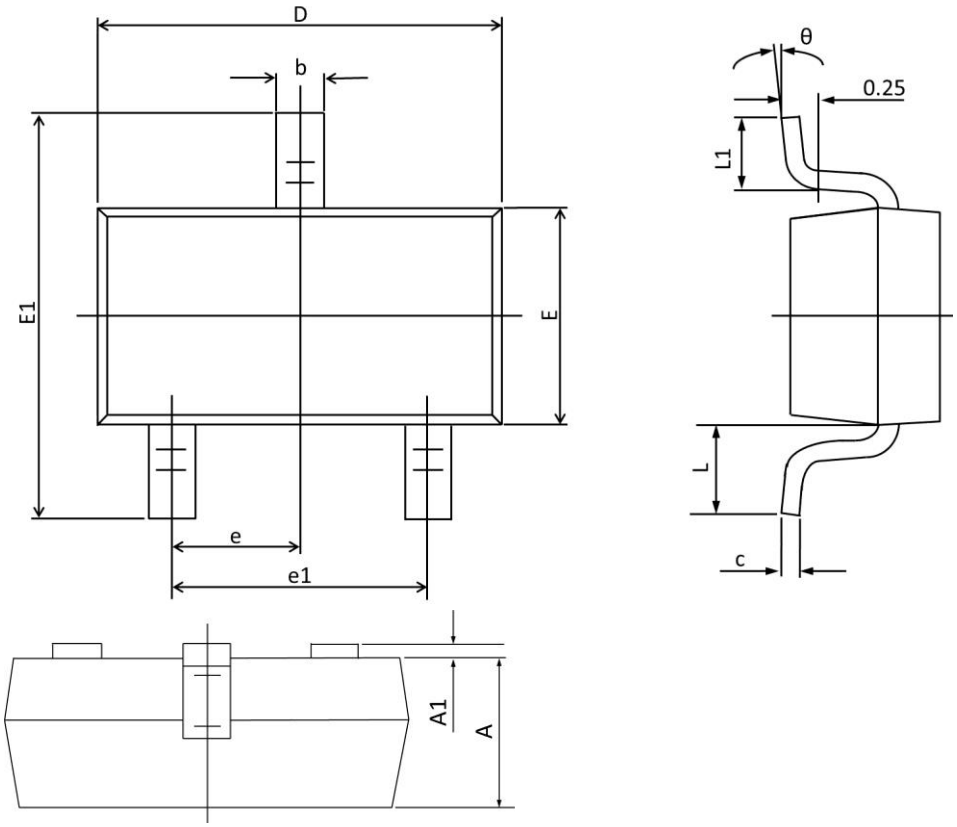


Fig. 9 E_{AS} Waveform

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°