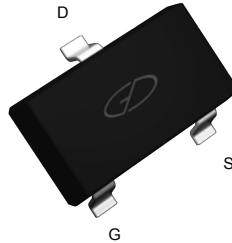
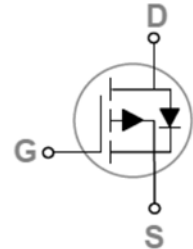


**Main Product Characteristics**

$V_{(BR)DSS}$	-20V
$R_{DS(ON)}$	50mΩ
$I_D$	-4.7A



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 SSF2311S 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** ( $T_C=25^{\circ}C$  unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	-20	V
Gate-Source Voltage	$V_{GS}$	$\pm 10$	V
Drain Current – Continuous ( $T_C=25^{\circ}C$ )	$I_D$	-4.7	A
Drain Current – Continuous ( $T_C=100^{\circ}C$ )		-3	A
Drain Current – Pulsed <sup>1</sup>	$I_{DM}$	-18.8	A
Power Dissipation ( $T_C=25^{\circ}C$ )	$P_D$	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	$R_{\theta JA}$	---	80	°C/W

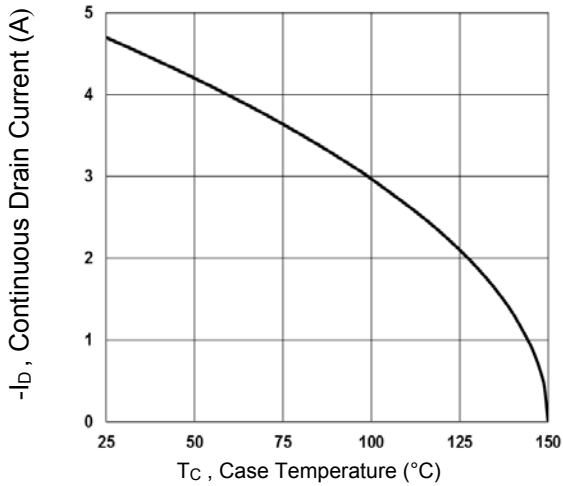
**Electrical Characteristics** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-20	---	---	V
$BV_{DSS}$ Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=-1\text{mA}$	---	-0.02	---	$V/^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=-20V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	-1	$\mu A$
		$V_{DS}=-16V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	-10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=\pm 10V, V_{DS}=0V$	---	---	$\pm 100$	nA
<b>On Characteristics</b>						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=-4.5V, I_D=-3A$	---	40	50	m $\Omega$
		$V_{GS}=-2.5V, I_D=-2A$	---	54	65	
		$V_{GS}=-1.8V, I_D=-1A$	---	67	85	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-0.3	-0.6	-0.8	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		---	2	---	$\text{mV}/^\circ\text{C}$
Forward Transconductance	$g_{fs}$	$V_{DS}=-10V, I_S=-3A$	---	7	---	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>2,3</sup>	$Q_g$	$V_{DS}=-10V, V_{GS}=-4.5V, I_D=-3A$	---	9.6	13	nC
Gate-Source Charge <sup>2,3</sup>	$Q_{gs}$		---	1.6	2	
Gate-Drain Charge <sup>2,3</sup>	$Q_{gd}$		---	2	4	
Turn-On Delay Time <sup>2,3</sup>	$T_{d(on)}$	$V_{DD}=-10V, V_{GS}=-4.5V, R_G=25\Omega, I_D=-1A$	---	6	11	nS
Rise Time <sup>2,3</sup>	$T_r$		---	21.6	41	
Turn-Off Delay Time <sup>2,3</sup>	$T_{d(off)}$		---	51	97	
Fall Time <sup>2,3</sup>	$T_f$		---	13.8	26	
Input Capacitance	$C_{iss}$	$V_{DS}=-10V, V_{GS}=0V, F=1\text{MHz}$	---	850	1230	pF
Output Capacitance	$C_{oss}$		---	70	100	
Reverse Transfer Capacitance	$C_{rss}$		---	55	80	
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V, \text{Force Current}$	---	---	-4.7	A
Pulsed Source Current	$I_{SM}$		---	---	-18.8	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1	V

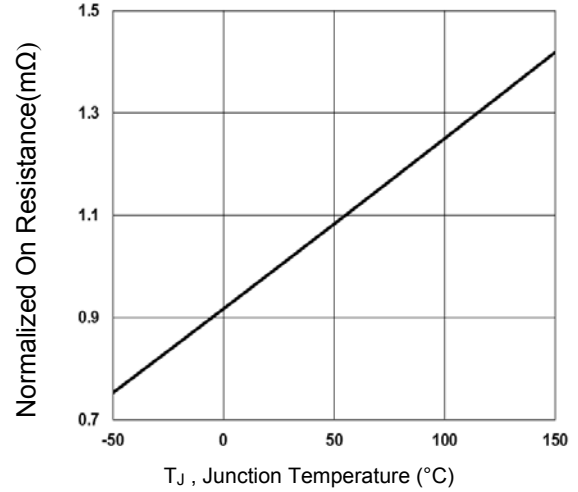
Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
3. Essentially independent of operating temperature.

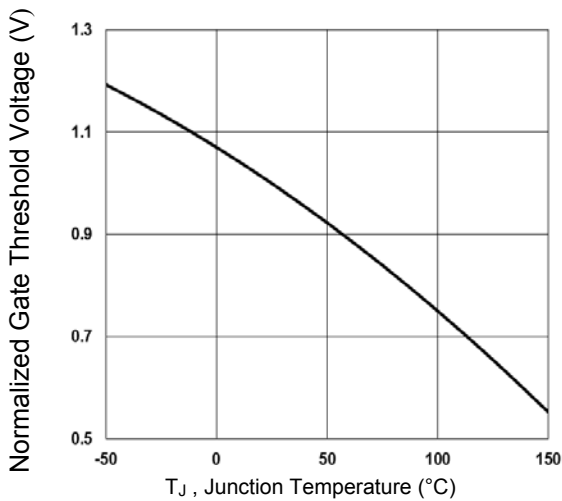
**Typical Electrical and Thermal Characteristic Curves**



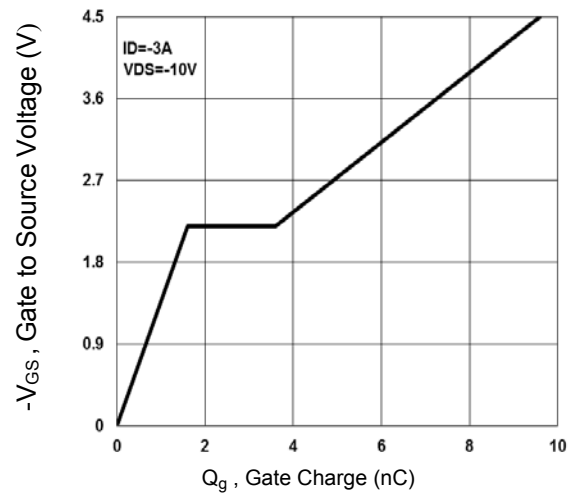
**Fig.1 Continuous Drain Current vs.  $T_c$**



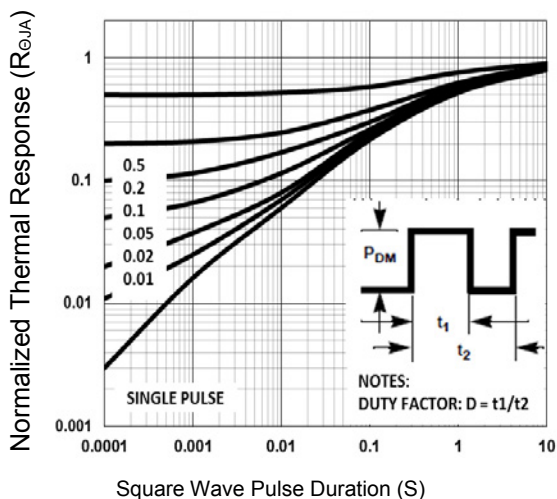
**Fig.2 Normalized  $R_{DS(ON)}$  vs.  $T_j$**



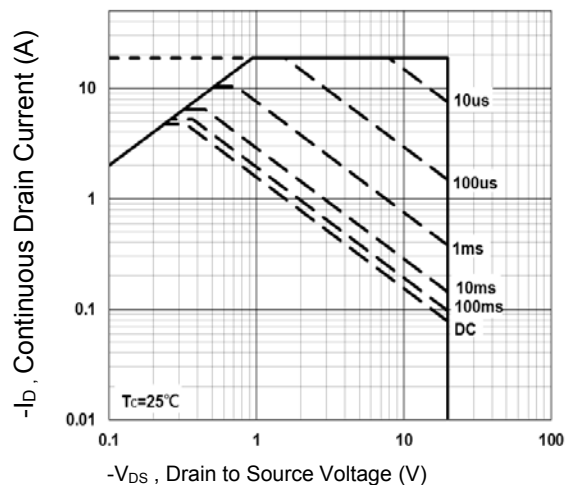
**Fig.3 Normalized  $V_{th}$  vs.  $T_j$**



**Fig.4 Gate Charge Waveform**

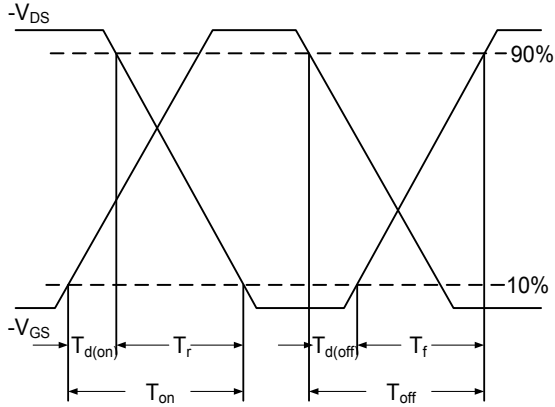


**Fig.5 Normalized Transient Response**

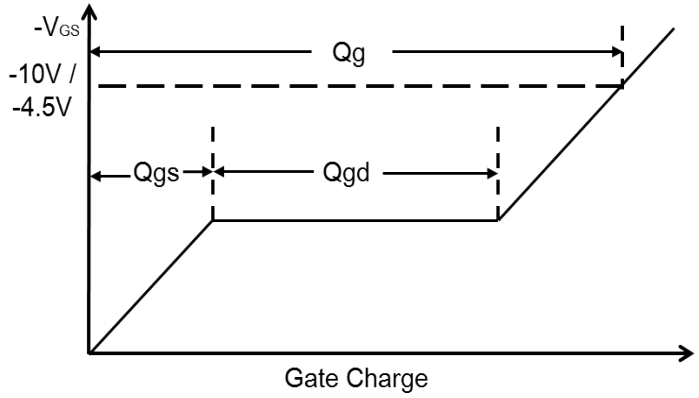


**Fig.6 Maximum Safe Operation Area**

**Typical Electrical and Thermal Characteristic Curves**



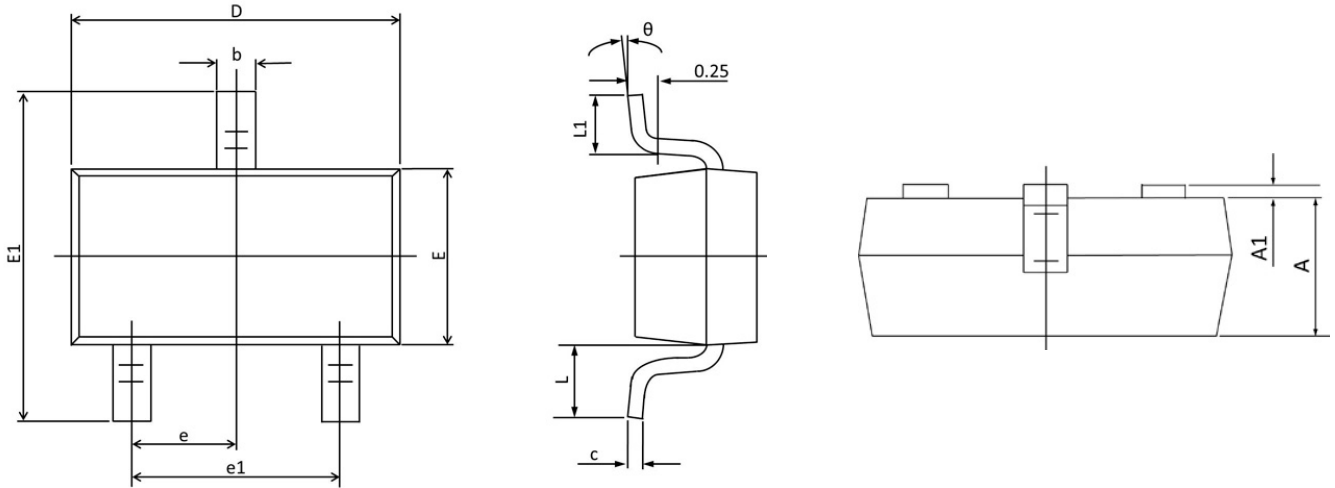
**Fig.7 Switching Time Waveform**



**Fig.8 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°

**Order Information**

Device	Package	Marking Code	Carrier	Quantity	HSF Status
SSF2311S	SOT-23	S	Tape & Reel	3000/Reel	RoHS Compliant