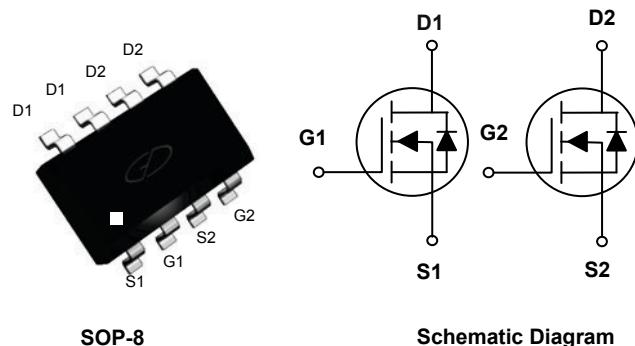


### Main Product Characteristics

$V_{(BR)DSS}$	30V
$R_{DS(ON)}$	20 mΩ@ $V_{GS}=10V$
$I_D$	7.5A



### Features and Benefits

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



### Description

The SSFQ3812 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	Max.	Unit
Drain-Source Voltage	$V_{DS}$	30	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous ( $T_c=25^\circ C$ )	$I_D$	7.5	A
Drain Current-Continuous ( $T_c=100^\circ C$ )		4.8	
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	30	A
Single Pulse Avalanche Energy <sup>2</sup>	$E_{AS}$	14	mJ
Single Pulse Avalanche Current <sup>2</sup>	$I_{AS}$	17	A
Power Dissipation ( $T_c=25^\circ C$ )	$P_D$	2.1	W
Power Dissipation-Derate above 25°C		0.017	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	60	°C/W
Operating Junction Temperature Range	$T_J$	-55 To +150	°C
Storage Temperature Range	$T_{STG}$	-55 To +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	$\text{V}_{\text{GS}}=0\text{V}$ , $\text{I}_D=250\mu\text{A}$	30	---	---	V
BV <sub>DSS</sub> Temperature Coefficient	$\Delta \text{BV}_{\text{DSS}}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $\text{I}_D=1\text{mA}$	---	0.04	---	$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	$\text{I}_{\text{DSS}}$	$\text{V}_{\text{DS}}=30\text{V}$ , $\text{V}_{\text{GS}}=0\text{V}$ , $T_J=25^\circ\text{C}$	---	---	1	$\mu\text{A}$
		$\text{V}_{\text{DS}}=24\text{V}$ , $\text{V}_{\text{GS}}=0\text{V}$ , $T_J=125^\circ\text{C}$	---	---	10	$\mu\text{A}$
Gate-Source Leakage Current	$\text{I}_{\text{GSS}}$	$\text{V}_{\text{GS}}=\pm 20\text{V}$ , $\text{V}_{\text{DS}}=0\text{V}$	---	---	$\pm 100$	nA
<b>On Characteristics</b>						
Static Drain-Source On-Resistance <sup>3</sup>	$\text{R}_{\text{DS(ON)}}$	$\text{V}_{\text{GS}}=10\text{V}$ , $\text{I}_D=6\text{A}$	---	15	20	$\text{m}\Omega$
		$\text{V}_{\text{GS}}=4.5\text{V}$ , $\text{I}_D=3\text{A}$	---	23	30	
Gate Threshold Voltage	$\text{V}_{\text{GS(th)}}$	$\text{V}_{\text{GS}}=\text{V}_{\text{DS}}$ , $\text{I}_D=250\mu\text{A}$	1.2	1.5	2.5	V
$\text{V}_{\text{GS(th)}}$ Temperature Coefficient	$\Delta \text{V}_{\text{GS(th)}}$		---	-4	---	$\text{mV}/^\circ\text{C}$
Forward Transconductance	$\text{g}_{\text{fs}}$	$\text{V}_{\text{DS}}=10\text{V}$ , $\text{I}_s=6\text{A}$	---	13	---	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>3, 4</sup>	$\text{Q}_g$	$\text{V}_{\text{DS}}=15\text{V}$ , $\text{V}_{\text{GS}}=4.5\text{V}$ , $\text{I}_D=5\text{A}$	---	4.1	8	nC
Gate-Source Charge <sup>3, 4</sup>	$\text{Q}_{\text{gs}}$		---	1	2	
Gate-Drain Charge <sup>3, 4</sup>	$\text{Q}_{\text{gd}}$		---	2.1	4	
Turn-On Delay Time <sup>3, 4</sup>	$\text{T}_{\text{d(on)}}$	$\text{V}_{\text{DD}}=15\text{V}$ , $\text{V}_{\text{GS}}=10\text{V}$ , $\text{R}_G=6\Omega$ , $\text{I}_D=1\text{A}$	---	2.6	5	nS
Rise Time <sup>3, 4</sup>	$\text{T}_r$		---	7.2	14	
Turn-Off Delay Time <sup>3, 4</sup>	$\text{T}_{\text{d(off)}}$		---	15.8	30	
Fall Time <sup>3, 4</sup>	$\text{T}_f$		---	4.6	9	
Input Capacitance	$\text{C}_{\text{iss}}$	$\text{V}_{\text{DS}}=25\text{V}$ , $\text{V}_{\text{GS}}=0\text{V}$ , $f=1\text{MHz}$	---	345	500	pF
Output Capacitance	$\text{C}_{\text{oss}}$		---	55	80	
Reverse Transfer Capacitance	$\text{C}_{\text{rss}}$		---	32	55	
Gate Resistance	$\text{R}_g$	$\text{V}_{\text{GS}}=0\text{V}$ , $\text{V}_{\text{DS}}=0\text{V}$ , $f=1\text{MHz}$	---	3.2	6.4	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$\text{I}_s$	$\text{V}_G=\text{V}_D=0\text{V}$ , Force Current	---	---	7.5	A
Pulsed Source Current <sup>3</sup>	$\text{I}_{\text{SM}}$		---	---	30	A
Diode Forward Voltage <sup>3</sup>	$\text{V}_{\text{SD}}$	$\text{V}_{\text{GS}}=0\text{V}$ , $\text{I}_s=1\text{A}$ , $T_J=25^\circ\text{C}$	---	---	1	V

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
- 2..  $\text{V}_{\text{DD}}=25\text{V}$ ,  $\text{V}_{\text{GS}}=10\text{V}$ ,  $L=0.1\text{mH}$ ,  $\text{I}_{\text{AS}}=17\text{A}$ ,  $\text{R}_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$ .
3. Pulse test: pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.

## Typical Electrical and Thermal Characteristic Curves

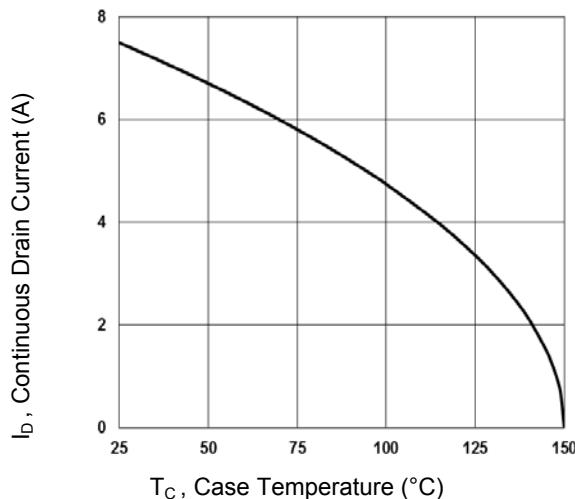


Figure 1. Continuous Drain Current vs. T<sub>c</sub>

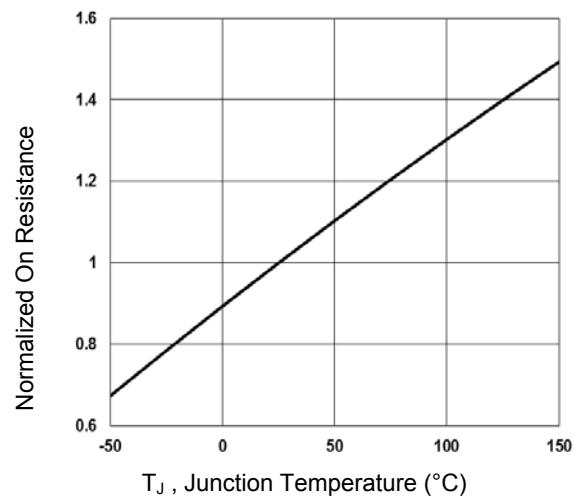


Figure 2. Normalized R<sub>DS(on)</sub> vs. T<sub>j</sub>

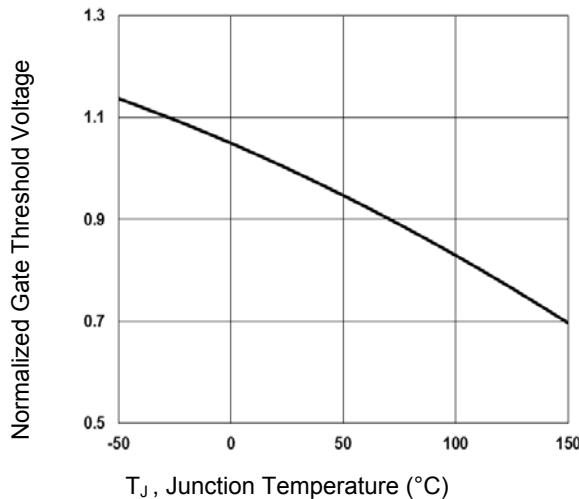


Figure 3. Normalized V<sub>th</sub> vs. T<sub>j</sub>

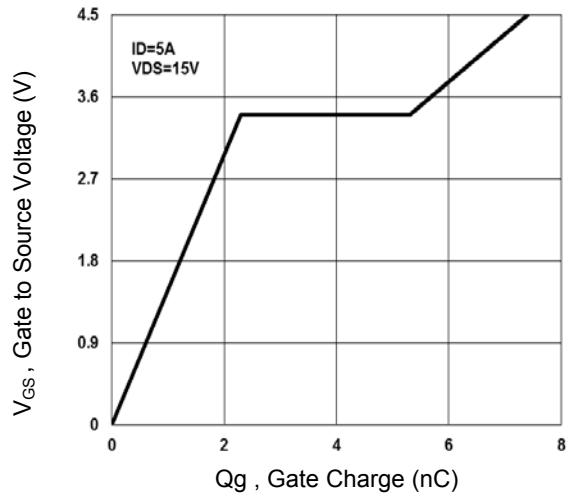


Figure 4. Gate Charge Waveform

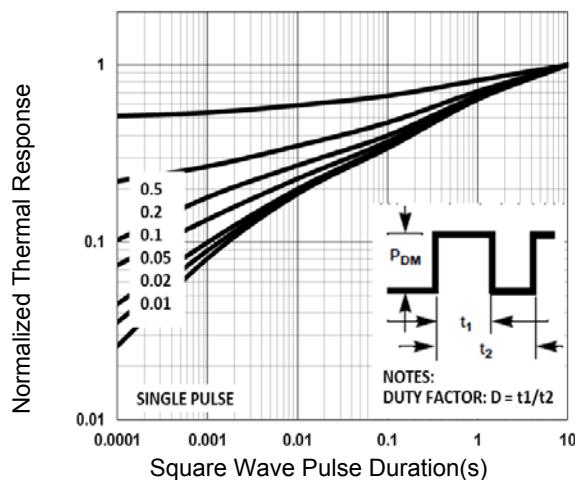


Figure 5. Normalized Transient Impedance

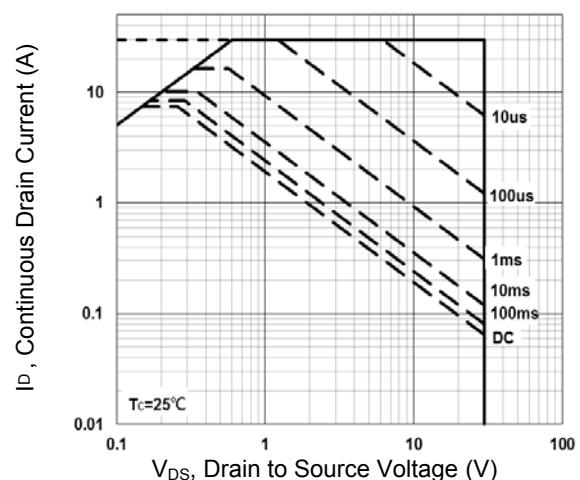


Figure 6. Maximum Safe Operation Area

## Typical Electrical and Thermal Characteristic Curves

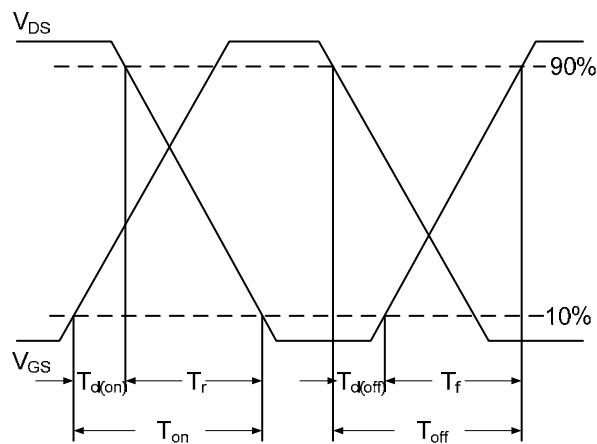


Figure 7. Switching Time Waveform

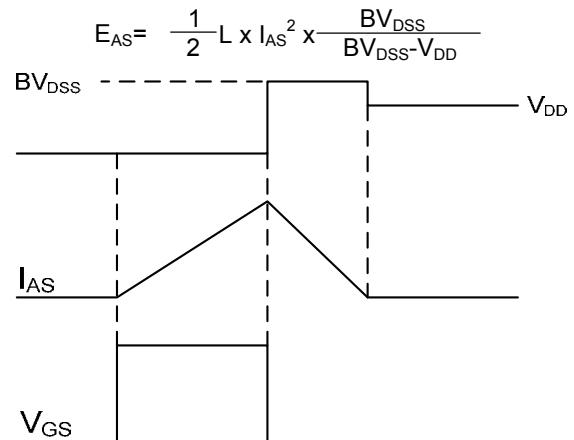
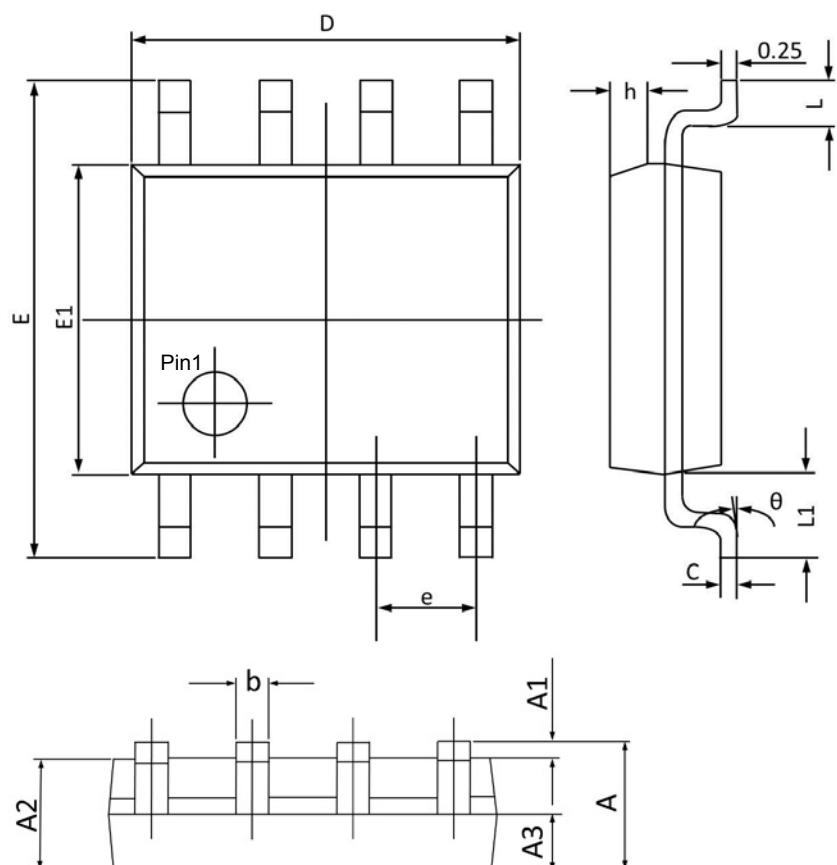


Figure 8. EAS Waveform

## Package Outline Dimensions

## SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.250	1.650	0.049	0.065
A3	0.500	0.700	0.020	0.028
b	0.380	0.510	0.015	0.020
c	0.170	0.260	0.007	0.010
D	4.700	5.100	0.185	0.201
E	5.800	6.200	0.228	0.244
E1	3.700	4.100	0.146	0.161
e	1.270(BSC)		0.050(BSC)	
h	0.250	0.500	0.010	0.020
L	0.400	0.800	0.016	0.031
L1	1.050(BSC)		0.041(BSC)	
θ	0°	8°	0°	8°