GOOD-ARK
SEMICONDUCTOR

SSFQ3910
30V N-Channel MOSFET

Main Product Characteristics

V_{DS}	30V
$R_{DS(ON)}$	12mΩ
I_D	10A
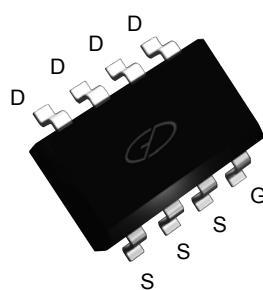
SOP-8
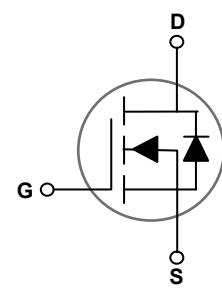
Schematic Diagram

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 SSFQ3910 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	Rating	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current – Continuous (T_C=25°C)	I_D	10	A
Drain Current – Continuous (T_C=100°C)		6.3	A
Drain Current – Pulsed[1]	I_{DM}	40	A
Single Pulse Avalanche Energy[2]	E_{AS}	13	mJ
Single Pulse Avalanche Current[2]	I_{AS}	16	A
Power Dissipation (T_C=25°C)	P_D	2.1	W
Power Dissipation – Derate above 25°C		0.017	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	$R_{θJA}$	---	60	°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}=30V , 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	$R_{DS(ON)}$	V_{GS}=10V , I_D=10A	---	9.5	12	mΩ
		V_{GS}=4.5V , I_D=5A	---	13	18	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS} , I_D =250uA	1.2	1.8	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		---	-4	---	mV/°C
Forward Transconductance	gfs	V_{DS}=10V , I_D=3A	---	6	---	S
Dynamic and Switching Characteristics						
Total Gate Charge[2, 3]	Q_g	V_{DS}=15V , V_{GS}=4.5V , I_D=5A	---	7.4	12	nC
Gate-Source Charge[2, 3]	Q_{gs}		---	2.3	5	
Gate-Drain Charge[2, 3]	Q_{gd}		---	3	6	
Turn-On Delay Time[2, 3]	$T_{d(on)}$	V_{DD}=15V , V_{GS}=10V , R_G=6Ω I_D=1A	---	3.8	7	nS
Rise Time[2, 3]	T_r		---	10	19	
Turn-Off Delay Time[2, 3]	$T_{d(off)}$		---	22	42	
Fall Time[2, 3]	T_f		---	6.6	13	
Input Capacitance	C_{iss}	V_{DS}=25V , V_{GS}=0V , F=1MHz	---	620	900	pF
Output Capacitance	C_{oss}		---	85	125	
Reverse Transfer Capacitance	C_{rss}		---	60	90	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	---	2.8	5.6	Ω
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	---	---	10	A
Pulsed Source Current	I_{SM}		---	---	40	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. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=16A, 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 Characteristic Curves
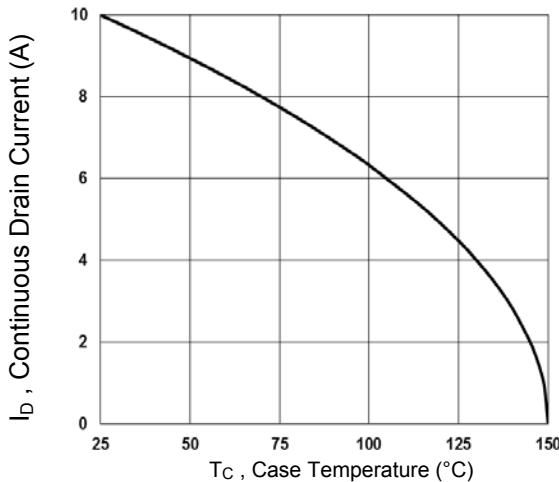
Fig.1   Continuous Drain Current vs. T_C
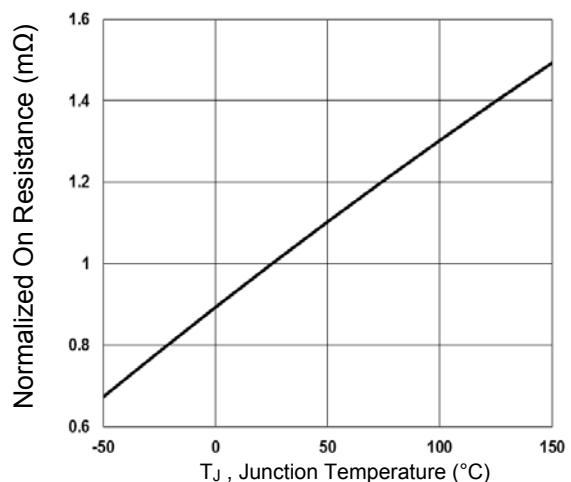

Fig.2   Normalized $R_{DS(ON)}$ vs. T_J
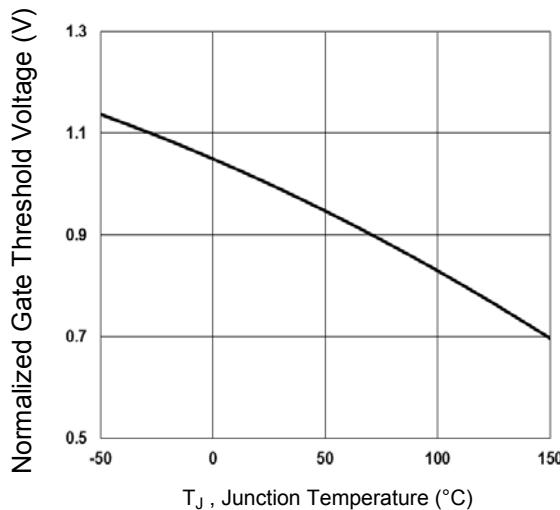
Fig.3   Normalized V_{th} vs. T_J
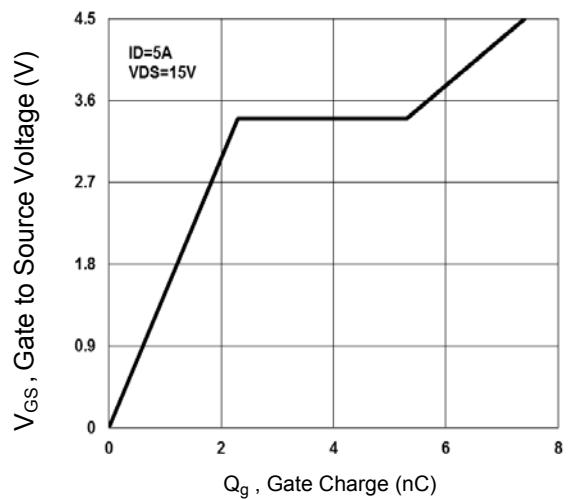

**Fig.4   Gate Charge Waveform**
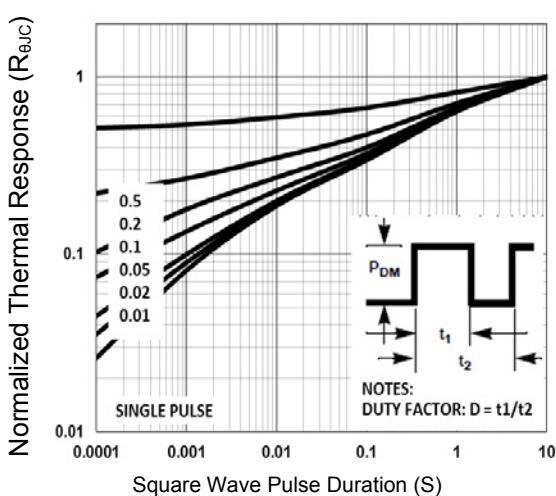
Fig.5   Normalized Transient Impedance
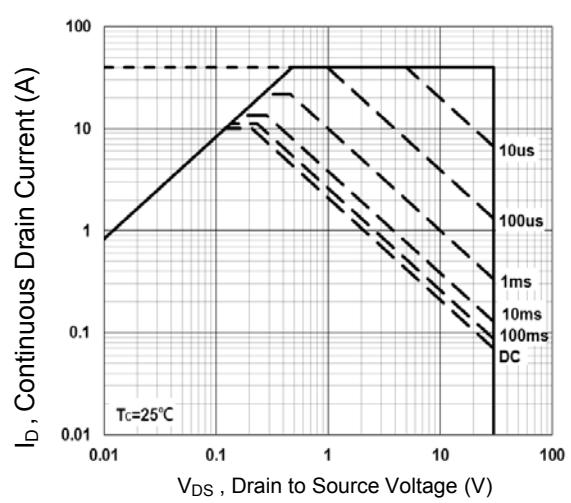

Fig.6   Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves
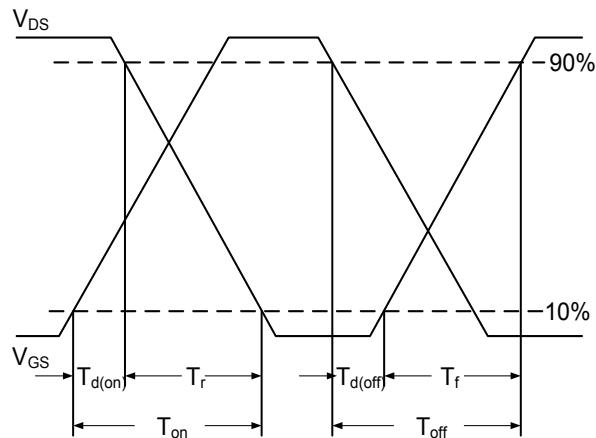

Fig.7   Switching Time Waveform

$$E_{AS} = \frac{1}{2} L \times I_{AS}^2 \times \frac{BV_{DSS}}{BV_{DSS}-V_{DD}}$$
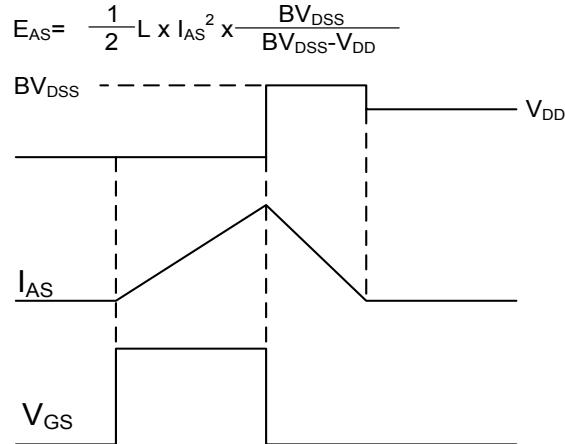
Fig.8 E_{AS} Waveform

Package Outline Dimensions   SOP-8
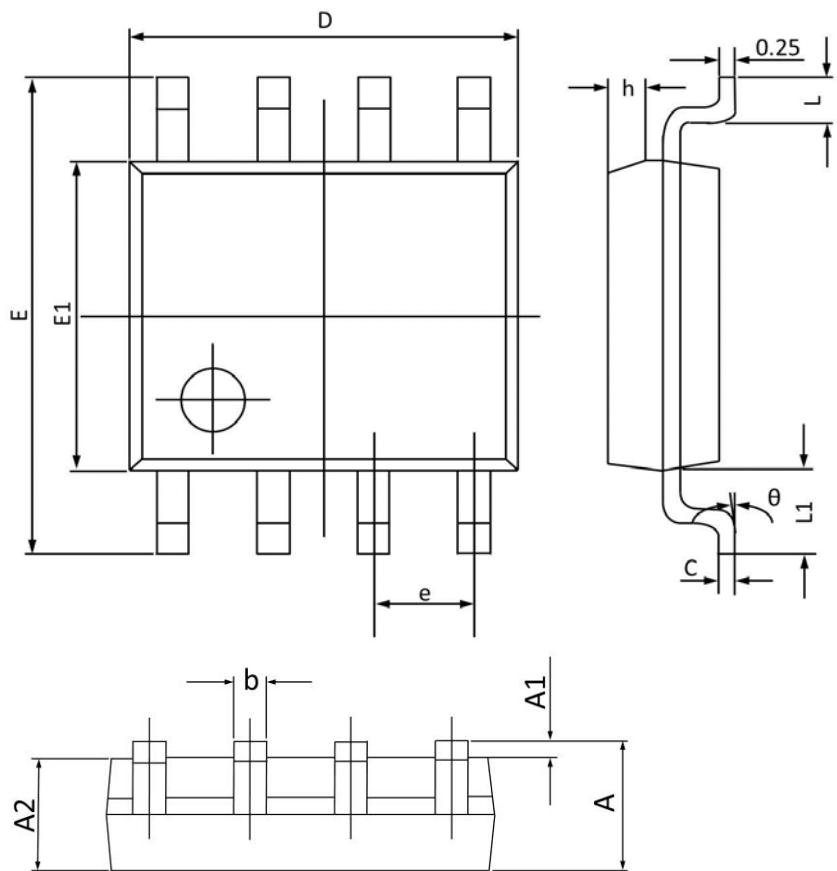
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.068
A1	0.100	0.250	0.004	0.009
A2	1.300	1.500	0.052	0.059
A3	0.600	0.700	0.024	0.027
b	0.390	0.480	0.016	0.018
c	0.210	0.260	0.009	0.010
D	4.700	5.100	0.186	0.200
E	5.800	6.200	0.229	0.244
E1	3.700	4.100	0.146	0.161
e	1.270(BSC)		0.050(BSC)	
h	0.250	0.500	0.010	0.019
L	0.500	0.800	0.019	0.031
L1	1.050(BSC)		0.041(BSC)	
θ	0°	8°	0°	8°