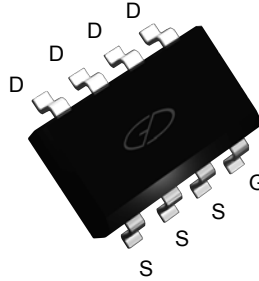
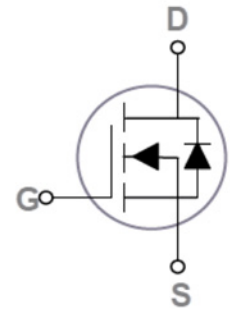


Main Product Characteristics

$V_{(BR)DSS}$	60V
$R_{DS(ON)}$	21m Ω
I_D	6A



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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 SSFQ6906 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 ($T_C=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current – Continuous ($T_C=25^\circ\text{C}$)	I_D	6	A
Drain Current – Continuous ($T_C=100^\circ\text{C}$)		3.6	A
Drain Current – Pulsed ¹	I_{DM}	24	A
Single Pulse Avalanche Energy ²	E_{AS}	42	mJ
Single Pulse Avalanche Current ²	I_{AS}	29	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	1.47	W
Power Dissipation – Derate above 25°C		0.0117	W/ $^\circ\text{C}$
Storage Temperature Range	T_{STG}	-50 to +150	$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-50 to +150	$^\circ\text{C}$

Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	---	85	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction to Case	$R_{\theta JC}$	---	23	$^\circ\text{C}/\text{W}$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	---	0.07	---	$\text{V}/^{\circ}\text{C}$
I_{DSS}	Drain-Source Leakage Current	$V_{DS}=60V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	μA
		$V_{DS}=48V, V_{GS}=0V, T_J=125^{\circ}\text{C}$	---	---	10	μA
I_{GSS}	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
On Characteristics						
$R_{DS(ON)}$	Static Drain-Source On-Resistance	$V_{GS}=10V, I_D=3A$	---	17	21	$\text{m}\Omega$
		$V_{GS}=4.5V, I_D=2A$	---	20	24	$\text{m}\Omega$
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.8	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	5	---	$\text{mV}/^{\circ}\text{C}$
g_{fs}	Forward Transconductance	$V_{DS}=10V, I_D=10A$	---	9	---	S
Dynamic and Switching Characteristics						
Q_g	Total Gate Charge ^{2, 3}	$V_{DS}=30V, V_{GS}=10V, I_D=3A$	---	28	42	nC
Q_{gs}	Gate-Source Charge ^{2, 3}		---	3.5	7	
Q_{gd}	Gate-Drain Charge ^{2, 3}		---	6.5	10	
$T_{d(on)}$	Turn-On Delay Time ^{2, 3}	$V_{DD}=30V, V_{GS}=10V, R_G=6\Omega, I_D=-1A$	---	7.2	14	nS
T_r	Rise Time ^{2, 3}		---	38	72	
$T_{d(off)}$	Turn-Off Delay Time ^{2, 3}		---	34	65	
T_f	Fall Time ^{2, 3}		---	8.2	16	
C_{iss}	Input Capacitance	$V_{DS}=20V, V_{GS}=0V, F=1\text{MHz}$	---	1680	2440	pF
C_{oss}	Output Capacitance		---	115	170	
C_{rss}	Reverse Transfer Capacitance		---	85	125	
R_g	Gate resistance	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	2.2	4.4	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	6	A
I_{SM}	Pulsed Source Current		---	---	24	A
V_{SD}	Diode Forward Voltage	$V_{GS}=0V, I_S=1A, T_J=25^{\circ}\text{C}$	---	---	1	V
t_{rr}	Reverse Recovery Time ²	$V_{GS}=0V, I_S=-1A, dI/dt=100A/\mu\text{S}, T_J=25^{\circ}\text{C}$	---	19.6	---	nS
Q_{rr}	Reverse Recovery Charge ²		---	14.2	---	nC

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=29A, R_G=25\Omega$. Starting $T_J=25^{\circ}\text{C}$.
3. The data tested by pulsed, pulse width $\leq 300\mu\text{S}$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

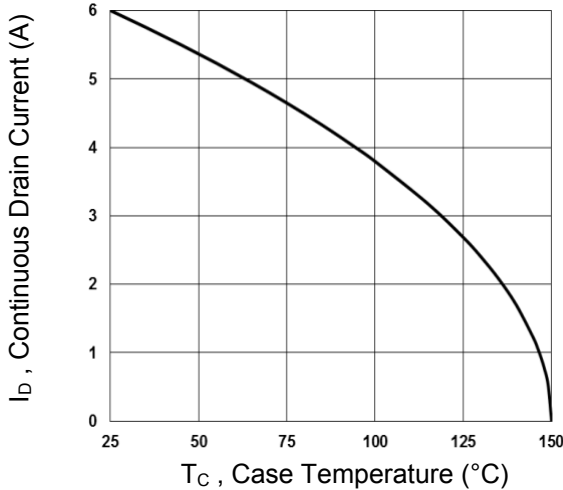


Fig.1 Continuous Drain Current vs. T_c

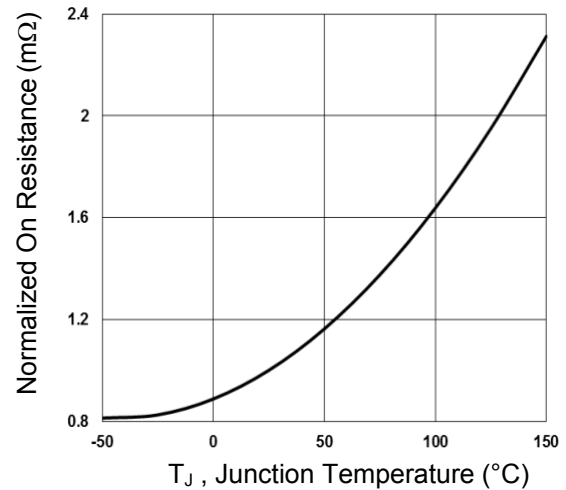


Fig.2 Normalized R_{DS(on)} vs. T_J

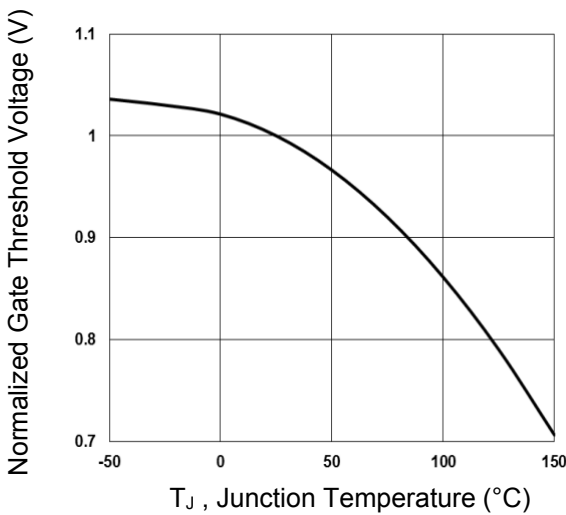


Fig.3 Normalized V_{th} vs. T_J

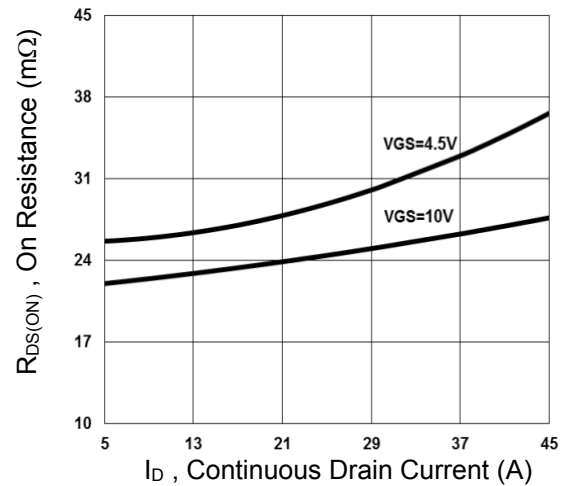


Fig.4 R_{DS(on)} vs. Continuous Drain Current

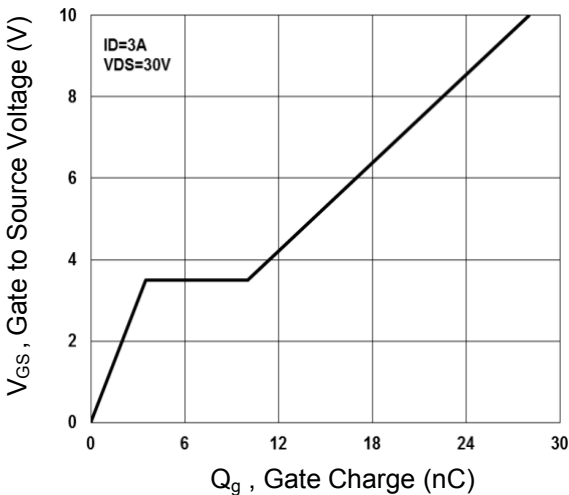


Fig.5 Gate Charge Waveform

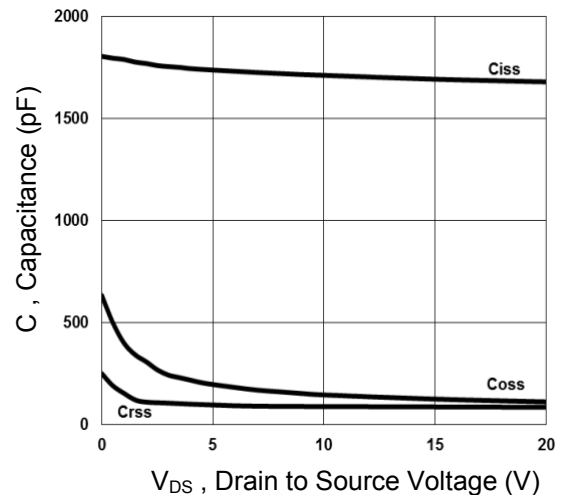


Fig.6 Capacitance Characteristics

Typical Electrical and Thermal Characteristic Curves

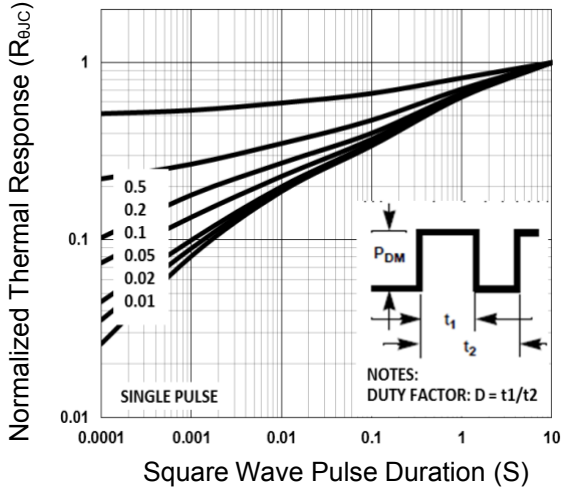


Fig.7 Normalized Transient Impedance

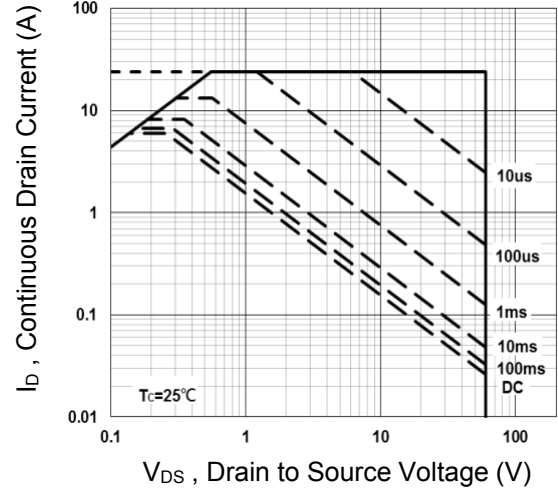


Fig.8 Maximum Safe Operation Area

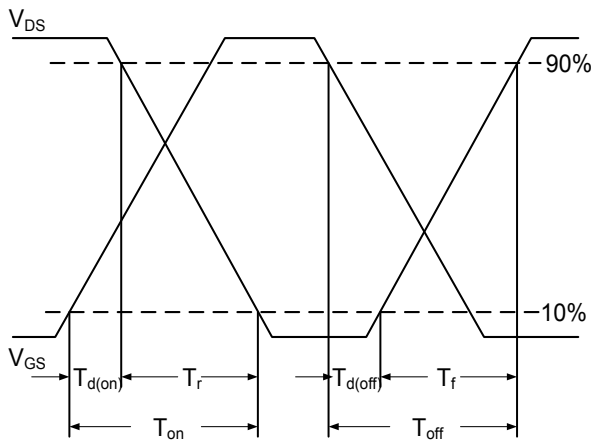


Fig.9 Switching Time Waveform

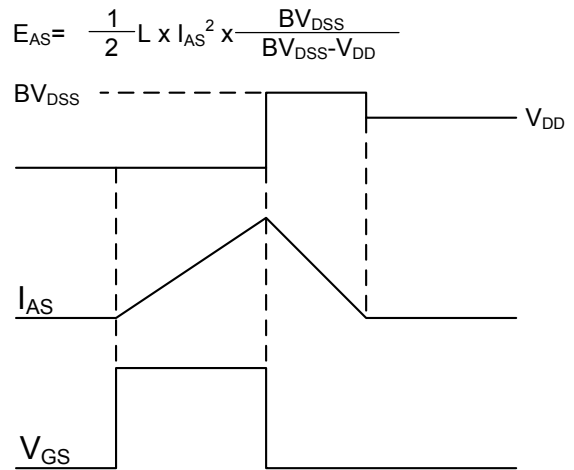
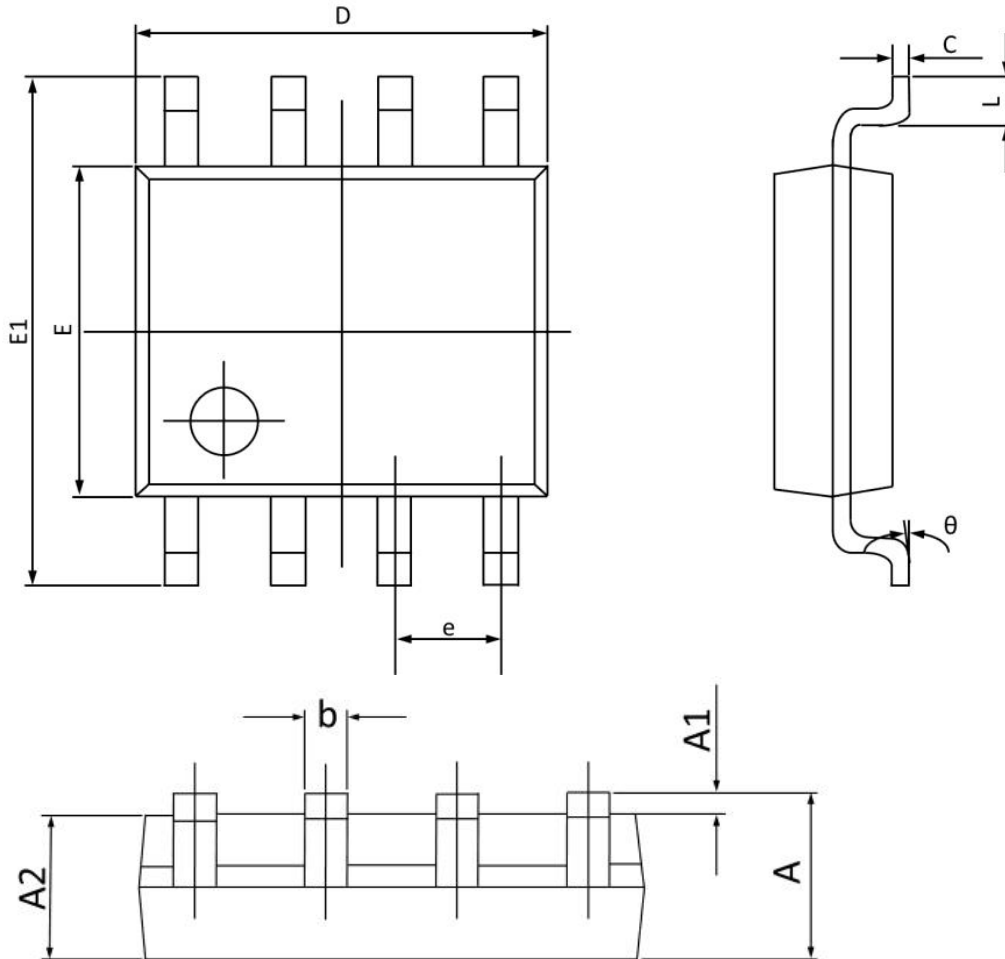


Fig.10 E_{AS} Waveform

Package Outline Dimensions

SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MAX	MIN	MAX	MIN
A	1.750	1.350	0.069	0.053
A1	0.250	0.100	0.010	0.004
A2	1.500	1.300	0.059	0.051
b	0.490	0.350	0.019	0.014
C	0.260	0.190	0.010	0.007
D	5.100	4.700	0.201	0.185
E	4.100	3.700	0.161	0.146
E1	6.200	5.800	0.244	0.228
e	1.27BSC		0.05BSC	
L	0.900	0.400	0.035	0.016
θ	8°	0°	8°	0°