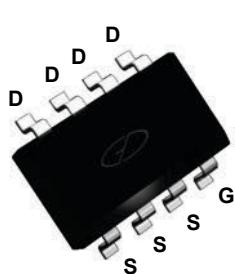
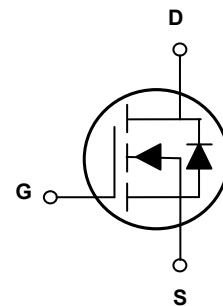


## Main Product Characteristics

BV <sub>DSS</sub>	30V
R <sub>DS(ON)</sub>	18mΩ
I <sub>D</sub>	9A



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 GSFQ3912 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<sub>C</sub>=25°C unless otherwise specified)

Parameter	Symbol	Max.	Unit
Drain-Source Voltage	V <sub>DS</sub>	30	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Drain Current-Continuous (T <sub>C</sub> =25°C)	I <sub>D</sub>	9	A
Drain Current-Continuous (T <sub>C</sub> =100°C)		5.7	
Drain Current-Pulsed <sup>1</sup>	I <sub>DM</sub>	36	A
Single Pulse Avalanche Energy <sup>2</sup>	E <sub>AS</sub>	32	mJ
Single Pulse Avalanche Current <sup>2</sup>	I <sub>AS</sub>	8	A
Power Dissipation (T <sub>C</sub> =25°C)	P <sub>D</sub>	2.5	W
Power Dissipation-Derate above 25°C		0.02	W/°C
Thermal Resistance, Junction-to-Ambient	R <sub>θJA</sub>	50	°C/W
Operating Junction Temperature Range	T <sub>J</sub>	-55 To +150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 To +150	°C

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On/Off Characteristics</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=250\mu\text{A}$	30	-	-	V
$\text{BV}_{\text{DSS}}$ Temperature Coefficient	$\Delta \text{BV}_{\text{DSS}}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_{\text{D}}=1\text{mA}$	-	0.04	-	$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	$I_{\text{DSS}}$	$V_{\text{DS}}=30\text{V}, V_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	-	-	1	$\mu\text{A}$
		$V_{\text{DS}}=24\text{V}, V_{\text{GS}}=0\text{V}, T_J=125^\circ\text{C}$	-	-	10	$\mu\text{A}$
Gate-Source Leakage Current	$I_{\text{GSS}}$	$V_{\text{GS}}=\pm 20\text{V}, V_{\text{DS}}=0\text{V}$	-	-	$\pm 100$	nA
Static Drain-Source On-Resistance <sup>3</sup>	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=10\text{V}, I_{\text{D}}=8\text{A}$	-	16	18	$\text{m}\Omega$
		$V_{\text{GS}}=4.5\text{V}, I_{\text{D}}=5\text{A}$	-	23	28	
Gate Threshold Voltage	$V_{\text{GS}(\text{th})}$	$V_{\text{GS}}=V_{\text{DS}}, I_{\text{D}}=250\mu\text{A}$	1.2	1.6	2	V
$V_{\text{GS}(\text{th})}$ Temperature Coefficient	$\Delta V_{\text{GS}(\text{th})}$		-	-4	-	$\text{mV}/^\circ\text{C}$
Forward Transconductance	$g_{\text{fs}}$	$V_{\text{DS}}=10\text{V}, I_{\text{D}}=5\text{A}$	-	4	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>3,4</sup>	$Q_g$	$V_{\text{DS}}=15\text{V}, I_{\text{D}}=8\text{A}, V_{\text{GS}}=4.5\text{V}$	-	4.1	6	nC
Gate-Source Charge <sup>3,4</sup>	$Q_{\text{gs}}$		-	1	1.4	
Gate-Drain Charge <sup>3,4</sup>	$Q_{\text{gd}}$		-	2.1	4	
Turn-On Delay Time <sup>3,4</sup>	$t_{\text{d}(\text{on})}$	$V_{\text{DD}}=15\text{V}, R_{\text{G}}=6\Omega, V_{\text{GS}}=10\text{V}, I_{\text{D}}=1\text{A}$	-	2.8	5	nS
Rise Time <sup>3,4</sup>	$t_r$		-	7.2	14	
Turn-Off Delay Time <sup>3,4</sup>	$t_{\text{d}(\text{off})}$		-	15.8	30	
Fall Time <sup>3,4</sup>	$t_f$		-	4.6	9	
Input Capacitance	$C_{\text{iss}}$	$V_{\text{DS}}=25\text{V}, V_{\text{GS}}=0\text{V}, F=1\text{MHz}$	-	345	500	pF
Output Capacitance	$C_{\text{oss}}$		-	55	80	
Reverse Transfer Capacitance	$C_{\text{rss}}$		-	32	45	
Gate Resistance	$R_g$	$V_{\text{GS}}=0\text{V}, V_{\text{DS}}=0\text{V}, F=1\text{MHz}$	-	3.2	6.4	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_s$	$V_G=V_D=0\text{V}$ , Force Current	-	-	9	A
Pulsed Source Current <sup>3</sup>	$I_{\text{SM}}$		-	-	36	A
Diode Forward Voltage <sup>3</sup>	$V_{\text{SD}}$	$V_{\text{GS}}=0\text{V}, I_{\text{s}}=1\text{A}, T_J=25^\circ\text{C}$	-	-	1	V

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2.  $V_{\text{DD}}=25\text{V}, V_{\text{GS}}=10\text{V}, L=1\text{mH}, I_{\text{AS}}=8\text{A}, R_{\text{G}}=25\Omega$ , starting  $T_J=25^\circ\text{C}$ .
3. Pulse test: pulse width  $\leq 300\text{us}$ , duty cycle  $\leq 2\%$ .
4. Essentially independent of operation temperature.

## Typical Electrical and Thermal Characteristic Curves

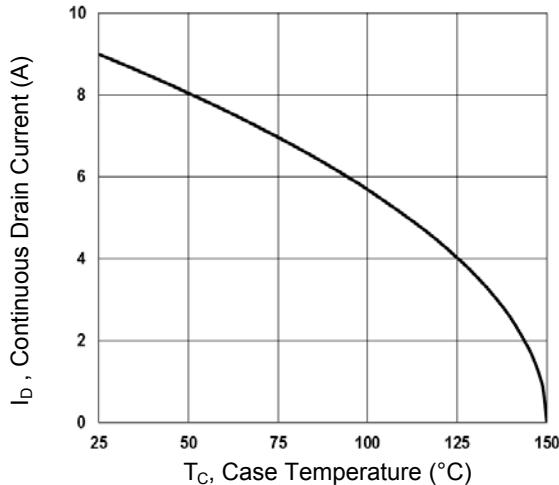


Figure 1. Continuous Drain Current vs. T<sub>c</sub>

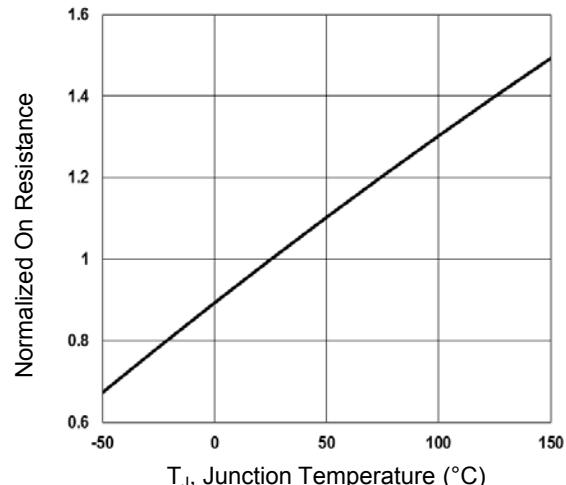


Figure 2. Normalized R<sub>DS(ON)</sub> vs. T<sub>j</sub>

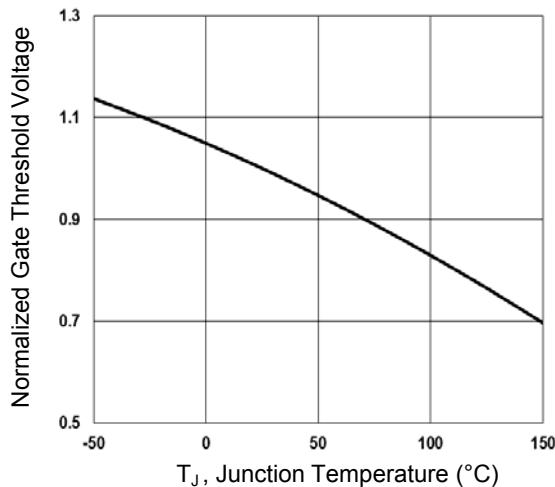


Figure 3. Normalized V<sub>th</sub> vs. T<sub>j</sub>

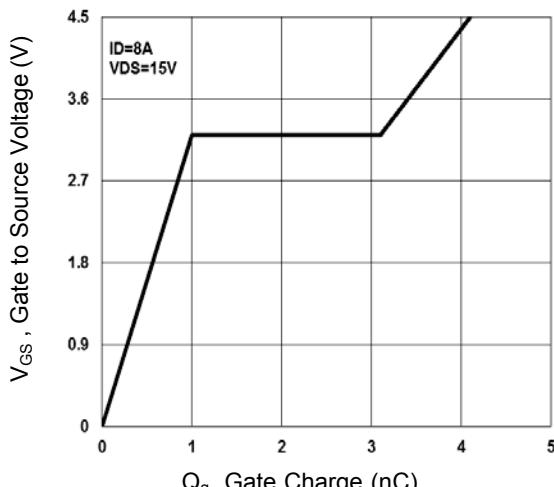


Figure 4. Gate Charge Waveform

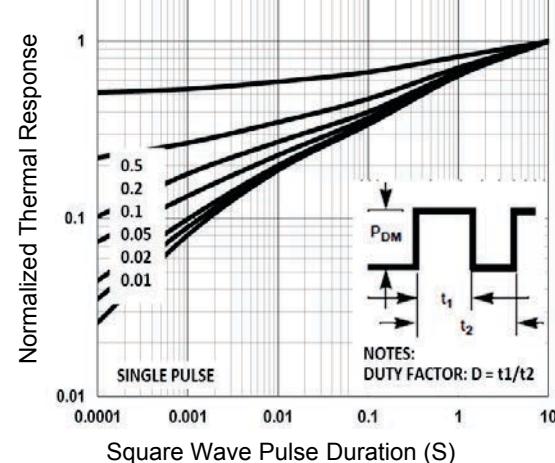


Figure 5. Normalized Transient Response

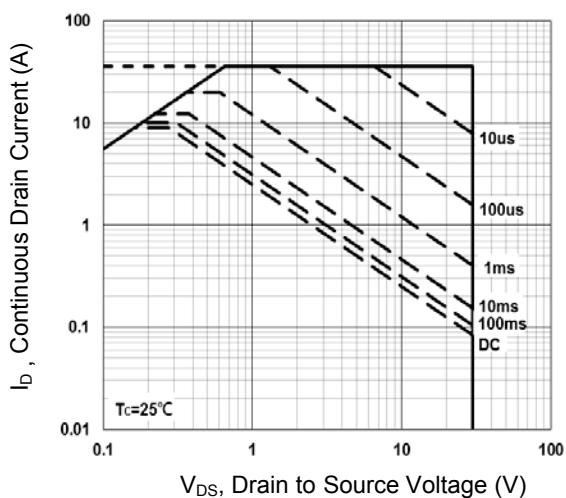


Figure 6. Maximum Safe Operation Area

### Typical Electrical and Thermal Characteristic Curves

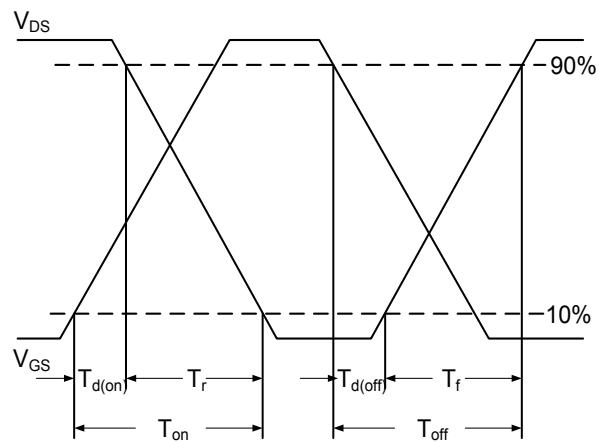


Figure 7. Switching Time Waveform

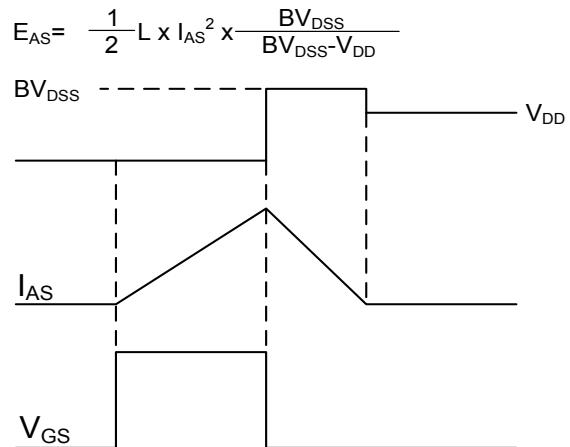
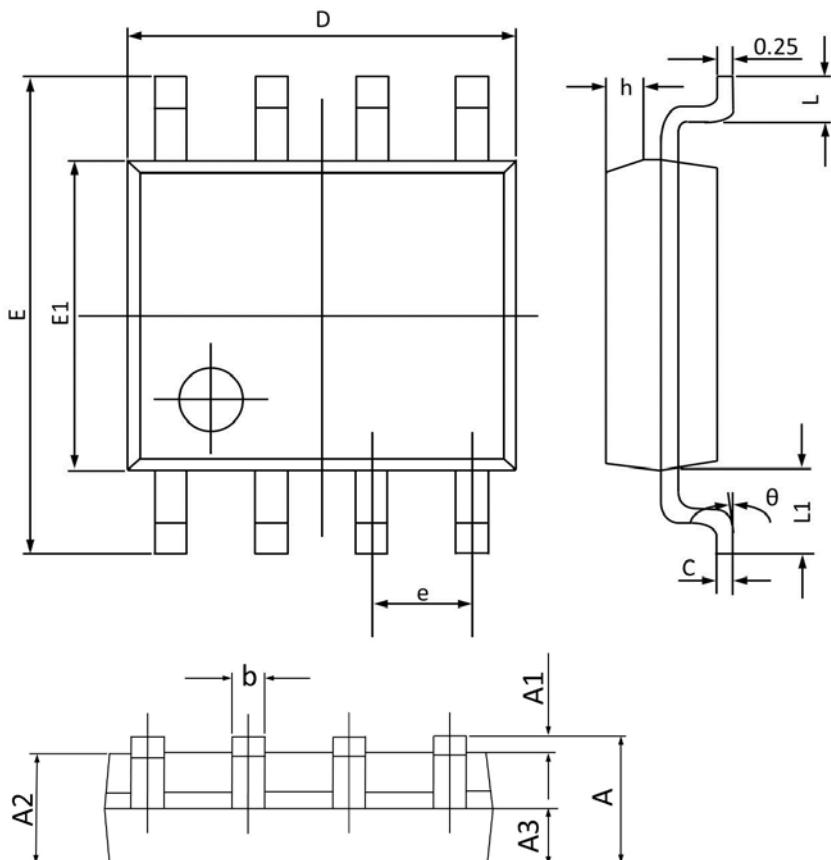


Figure 8. EAS Waveform

### Package Outline Dimensions

### SOP-8



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.068
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°