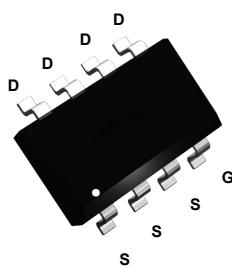
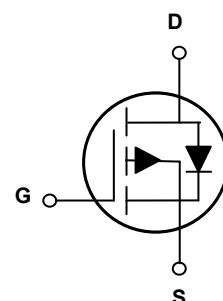


Main Product Characteristics

$V_{(BR)DSS}$	-40V
$R_{DS(ON)}$	45mΩ
I_D	-6.5A



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 GSFQ4909 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}	-40	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current – Continuous ($T_C=25^\circ\text{C}$)	I_D	-6.5	A
Drain Current – Continuous ($T_C=100^\circ\text{C}$)		-4.1	A
Drain Current – Pulsed ¹	I_{DM}	-26	A
Single Pulse Avalanche Energy ²	E_{AS}	31	mJ
Single Pulse Avalanche Current ²	I_{AS}	25	A
Power Dissipation ($T_C=25^\circ\text{C}$)	P_D	3.3	W
Power Dissipation – Derate above 25°C		0.03	W/°C
Storage Temperature Range	T_{STG}	-50 to +150	°C
Operating Junction Temperature Range	T_J	-50 to +150	°C

Thermal Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	---	62	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	---	38	°C/W

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{\text{GS}}=0\text{V}, I_{\text{D}}=-250\mu\text{A}$	-40	---	---	V
BV _{DSS} Temperature Coefficient	$\Delta \text{BV}_{\text{DSS}}/\Delta T_J$	Reference to 25°C , $I_{\text{D}}=-1\text{mA}$	---	-0.05	---	$\text{V}/^\circ\text{C}$
Drain-Source Leakage Current	$I_{\text{DS}(\text{SS})}$	$V_{\text{DS}}=-40\text{V}, V_{\text{GS}}=0\text{V}, T_J=25^\circ\text{C}$	---	---	-1	μA
		$V_{\text{DS}}=-32\text{V}, V_{\text{GS}}=0\text{V}, T_J=125^\circ\text{C}$	---	---	-10	μA
Gate-Source Leakage Current	$I_{\text{GS}(\text{SS})}$	$V_{\text{GS}}=\pm 20\text{V}, V_{\text{DS}}=0\text{V}$	---	---	± 100	nA
On Characteristics						
Static Drain-Source On-Resistance	$R_{\text{DS}(\text{ON})}$	$V_{\text{GS}}=-10\text{V}, I_{\text{D}}=-6\text{A}$	---	37	45	$\text{m}\Omega$
		$V_{\text{GS}}=-4.5\text{V}, I_{\text{D}}=-3\text{A}$	---	57	72	$\text{m}\Omega$
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	-2.5	V
$V_{\text{GS}(\text{th})}$ Temperature Coefficient	$\Delta V_{\text{GS}(\text{th})}$		---	5	---	$\text{mV}/^\circ\text{C}$
Forward Transconductance	g_{fs}	$V_{\text{DS}}=-10\text{V}, I_{\text{D}}=-5\text{A}$	---	7	---	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{3, 4}	Q_g	$V_{\text{DS}}=-20\text{V}, V_{\text{GS}}=-4.5\text{V}, I_{\text{D}}=-5\text{A}$	---	8.2	16	nC
Gate-Source Charge ^{3, 4}	Q_{gs}		---	3	6	
Gate-Drain Charge ^{3, 4}	Q_{gd}		---	2.5	5	
Turn-On Delay Time ^{3, 4}	$T_{\text{d}(\text{on})}$	$V_{\text{DD}}=-20\text{V}, V_{\text{GS}}=-10\text{V}, R_{\text{G}}=6\Omega, I_{\text{D}}=-1\text{A}$	---	6.3	12	nS
Rise Time ^{3, 4}	T_r		---	7.2	14	
Turn-Off Delay Time ^{3, 4}	$T_{\text{d}(\text{off})}$		---	46	80	
Fall Time ^{3, 4}	T_f		---	14	27	
Input Capacitance	C_{iss}	$V_{\text{DS}}=-25\text{V}, V_{\text{GS}}=0\text{V}, f=1\text{MHz}$	---	825	1480	pF
Output Capacitance	C_{oss}		---	68	130	
Reverse Transfer Capacitance	C_{rss}		---	50	100	
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_s	$V_{\text{G}}=V_{\text{D}}=0\text{V}$, Force Current	---	---	-6.5	A
Pulsed Source Current	I_{SM}		---	---	-13	A
Diode Forward Voltage	V_{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. $V_{\text{DD}}=25\text{V}, V_{\text{GS}}=10\text{V}, L=0.1\text{mH}, I_{\text{AS}}=25\text{A}$, Starting $T_J=25^\circ\text{C}$.
3. The data tested by pulsed, pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.
4. Essentially independent of operating temperature.

Typical Electrical and Thermal Characteristic Curves

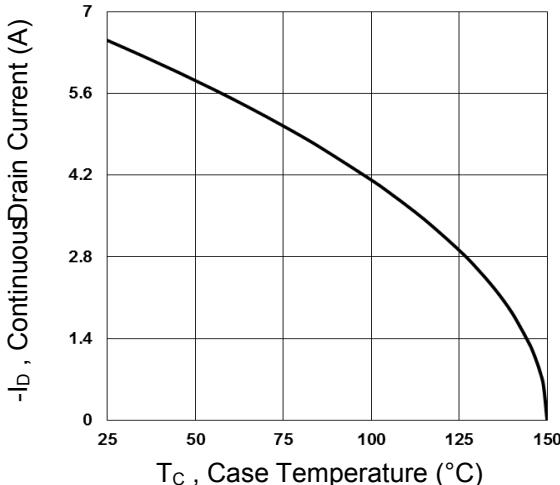


Fig.1 Continuous Drain Current vs. T_c

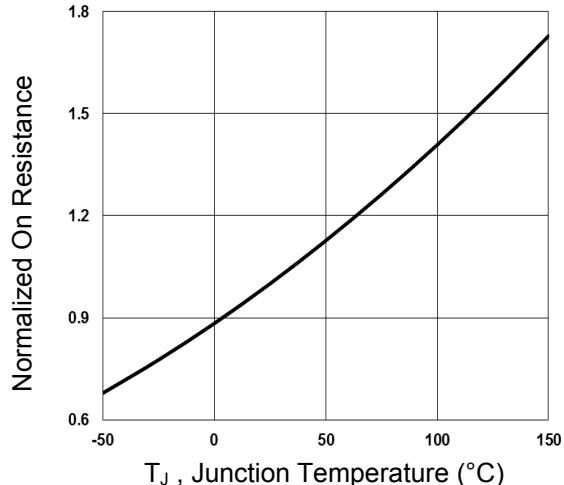


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

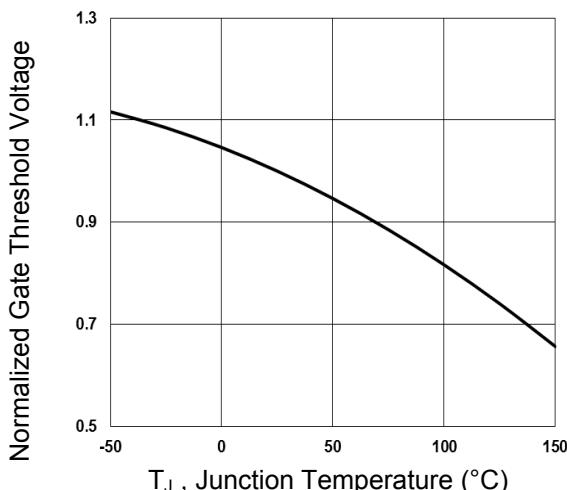


Fig.3 Normalized V_{th} vs. T_J

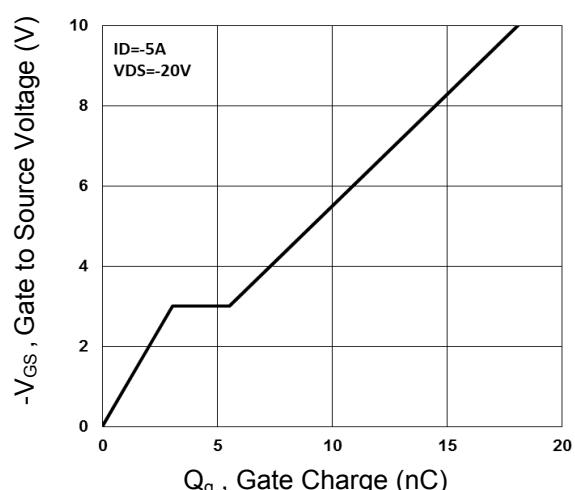


Fig.4 Gate Charge Waveform

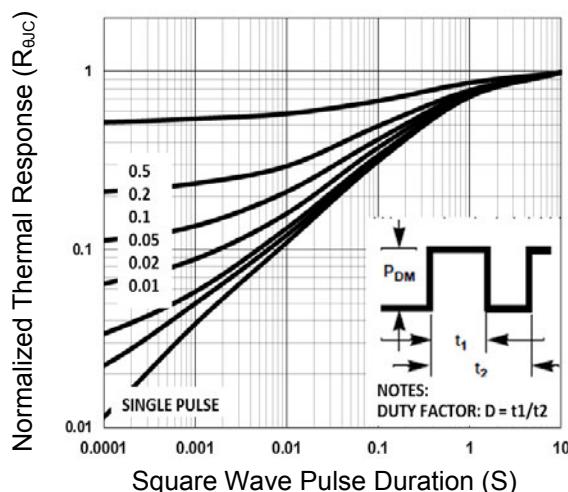


Fig.5 Normalized Transient Impedance

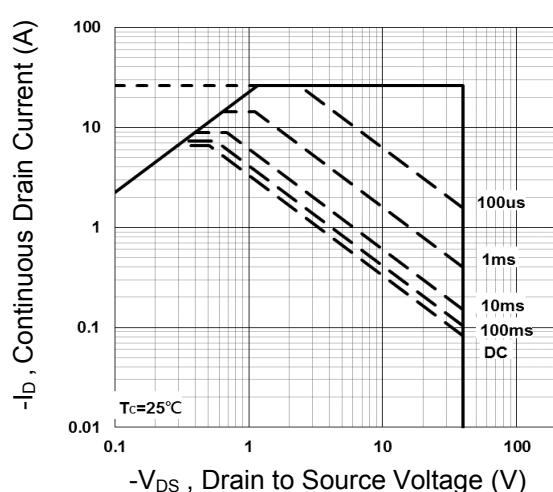


Fig.6 Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

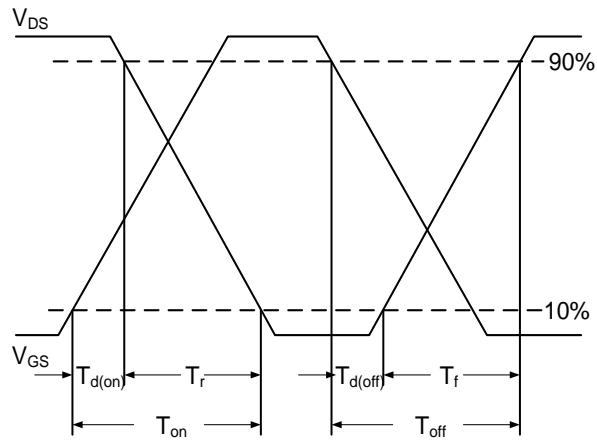


Fig.7 Switching Time Waveform

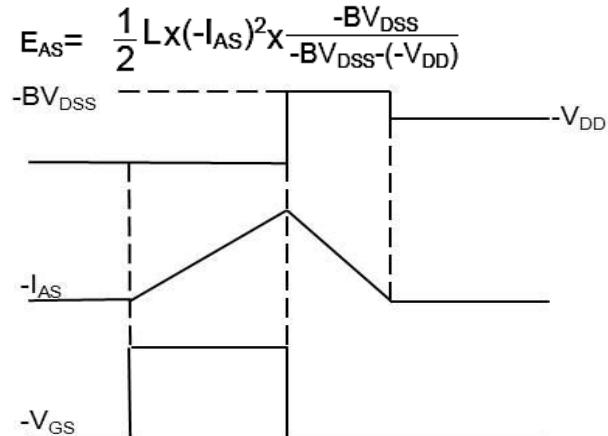
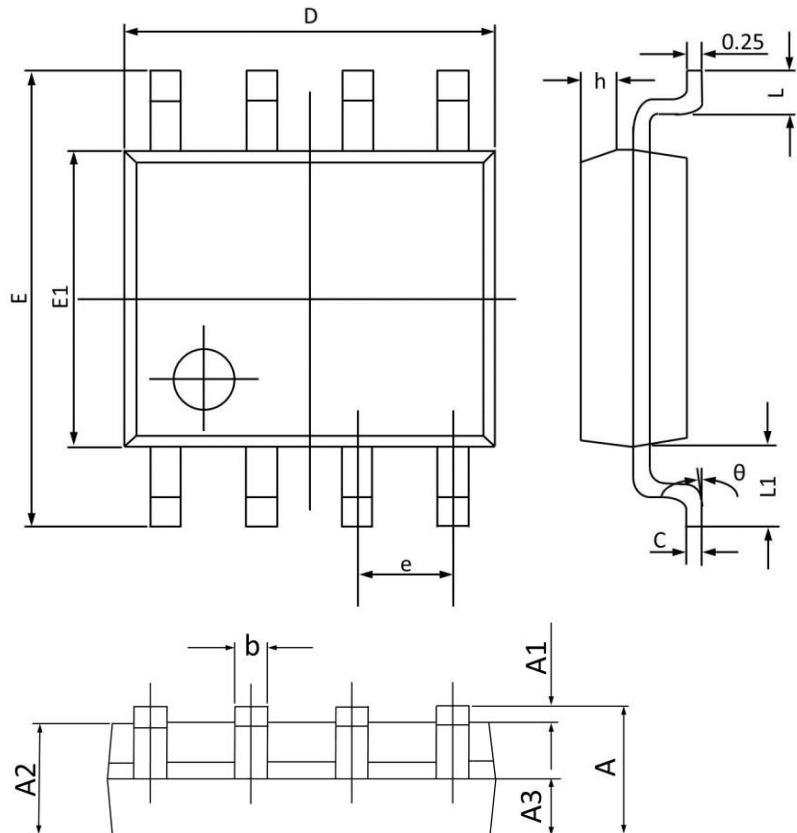


Fig.8 E_{AS} Waveform

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°