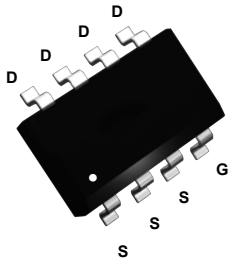
GSFQ0309

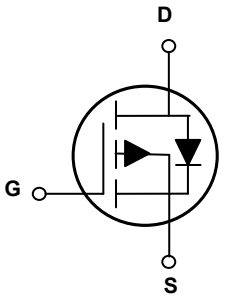
30V P-Channel MOSFET

Main Product Characteristics

BV_{DSS}	-30V
$R_{DS(ON)}$	10.8mΩ
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 GSFQ0309 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	Max.	Unit
Drain-Source Voltage	V_{DS}	-30	V
Gate-Source Voltage	V_{GS}	±20	V
Drain Current-Continuous (T_A=25°C)	I_D	-10	A
Drain Current-Continuous (T_A=70°C)		-8	A
Drain Current-Pulsed[1]	I_{DM}	-40	A
Single Pulse Avalanche Energy[2]	E_{AS}	125	mJ
Single Pulse Avalanche Current[2]	I_{AS}	-50	A
Power Dissipation (T_A=25°C)	P_D	2	W
Power Dissipation-Derate Above 25°C		0.016	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	°C/W
Storage Temperature Range	T_{STG}	-55 To +150	°C
Operating Junction Temperature Range	T_J	-55 To +150	°C

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=-250μA	-30	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-30V, V_{GS}=0V, T_J=25°C	-	-	-1	μA
		V_{DS}=-24V, V_{GS}=0V, T_J=125°C	-	-	-10	μA
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=-15A	-	9	10.8	mΩ
		V_{GS}=-4.5V, I_D=-10A	-	14	18	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=-250μA	-1.2	-1.6	-2.5	V
Forward Transconductance	g_{fs}	V_{DS}=-10V, I_D=-3A	-	11	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[3,4]	Q_g	V_{DS}=-15V, I_D=-5A, V_{GS}=-10V	-	34	50	nC
Gate-Source Charge[3,4]	Q_{gs}		-	5.2	7.8	
Gate-Drain Charge[3,4]	Q_{gd}		-	7.9	12	
Turn-On Delay Time[3,4]	$t_{d(on)}$	V_{DD}=-15V, R_G=6Ω V_{GS}=-10V, I_D=-5A	-	20	30	nS
Rise Time[3,4]	t_r		-	15	22	
Turn-Off Delay Time[3,4]	$t_{d(off)}$		-	40	60	
Fall Time[3,4]	t_f		-	30	45	
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V, F=1MHz	-	2020	3000	pF
Output Capacitance	C_{oss}		-	305	460	
Reverse Transfer Capacitance	C_{rss}		-	245	370	
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	-10	A
Pulsed Source Current	I_{SM}		-	-	-20	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-1A, T_J=25°C	-	-	-1	V
Reverse Recovery Time	T_{rr}	V_R=-30V, I_R=-10A, di/dt=100A/μs, T_J=25°C	-	80	-	nS
Reverse Recovery Charge	Q_{rr}		-	170	-	nC

Notes:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-50A, R_G=25Ω, starting T_J=25°C.
3. Pluse test: pulse width ≤300us,duty cycle ≤2%.
4. Essentially independent of operation temperature.

Typical Electrical and Thermal Characteristic Curves

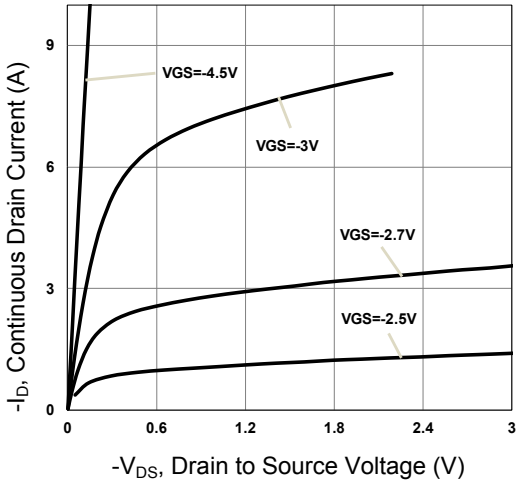


Figure 1. Typical Output Characteristics

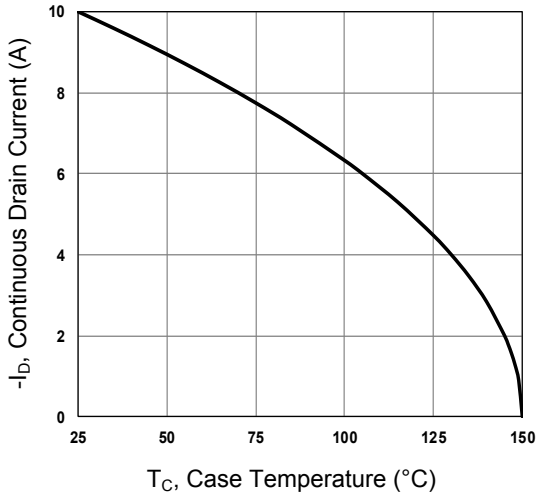


Figure 2. Continuous Drain Current vs. T_C

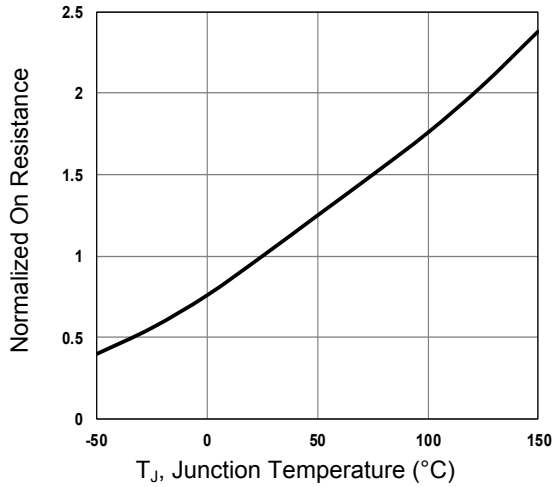


Figure 3. Normalized $R_{DS(ON)}$ vs. T_J

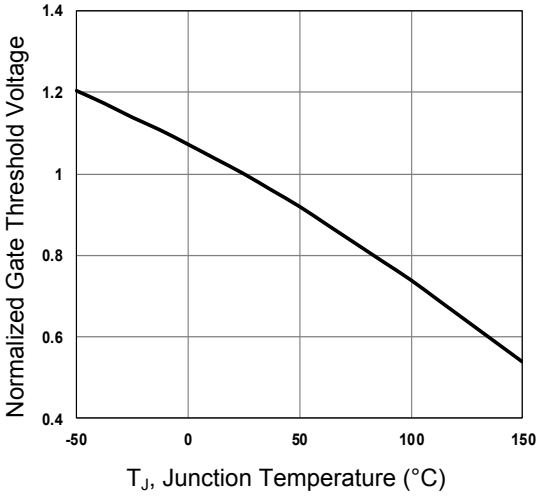


Figure 4. Normalized V_{th} vs. T_J

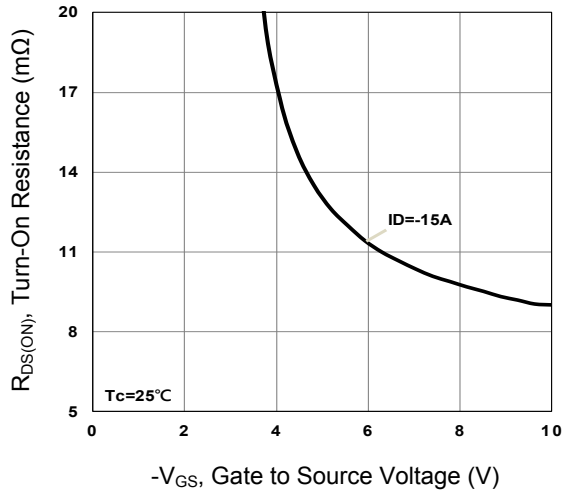


Figure 5. Turn-On Resistance vs. V_{GS}

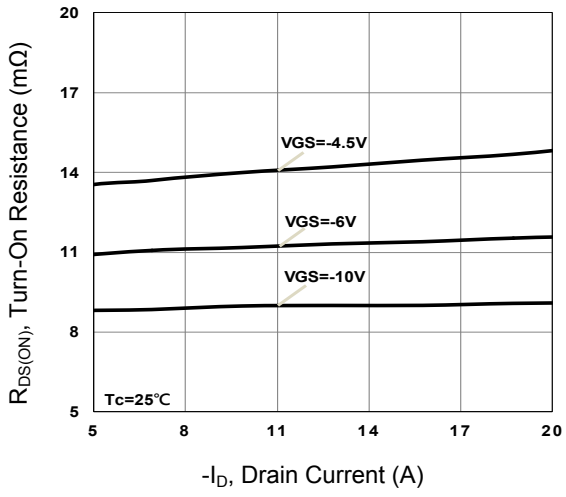


Figure 6. Turn-On Resistance vs. I_D

Typical Electrical and Thermal Characteristic Curves

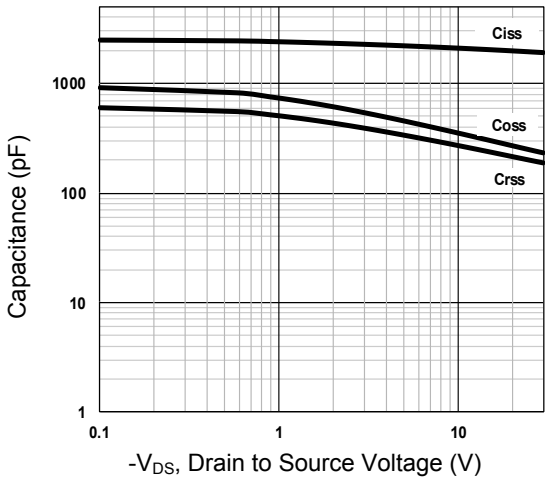


Figure 7. Capacitance Characteristics

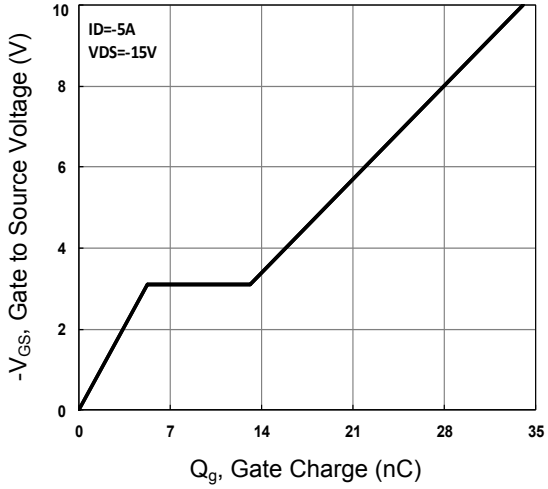


Figure 8. Gate Charge Characteristics

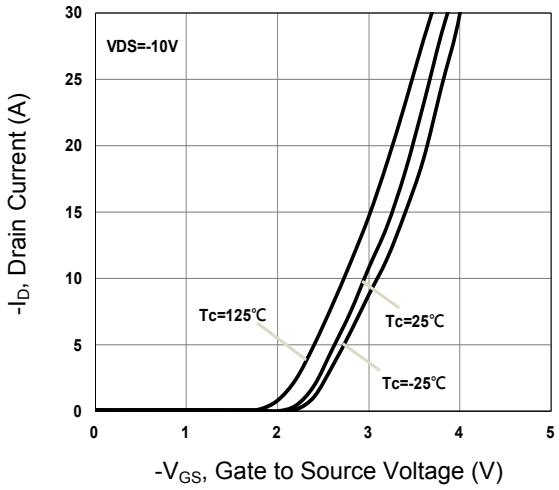


Figure 9. Transfer Characteristics

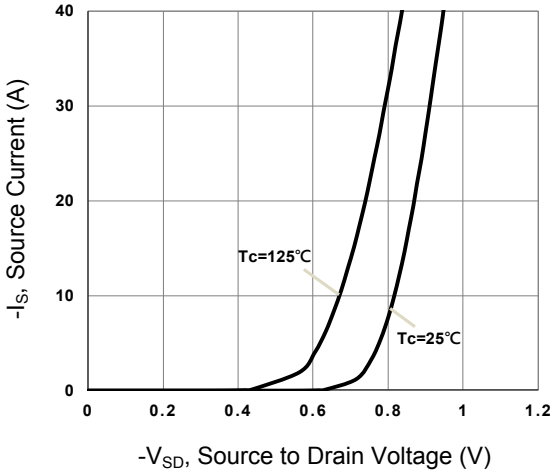


Figure 10. Source Current vs. V_{SD}

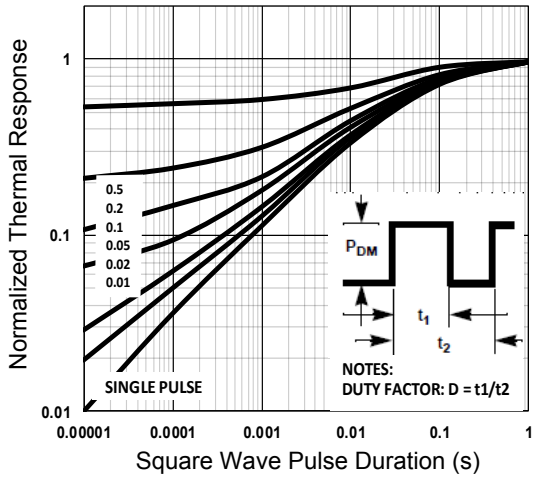


Figure 11. Normalized Transient Impedance

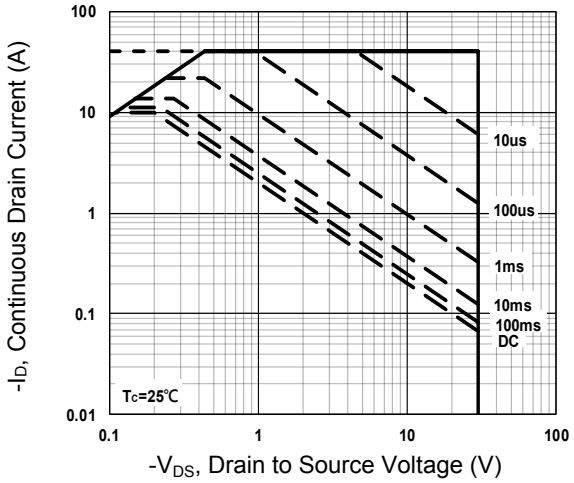


Figure 12. Maximum Safe Operation Area

Typical Electrical and Thermal Characteristic Curves

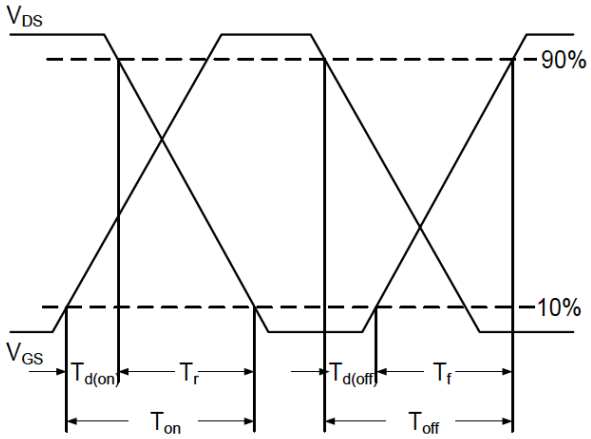


Figure 13. Switching Time Waveform

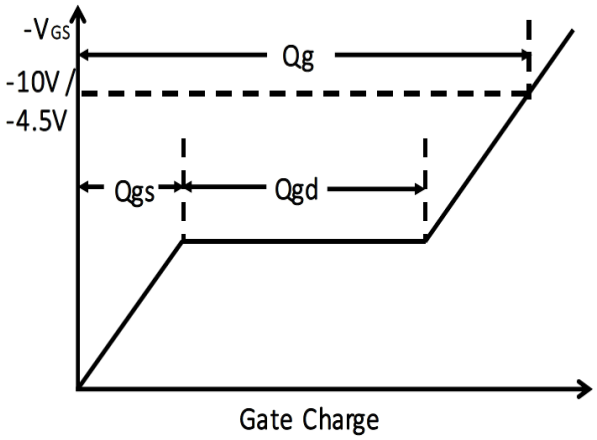
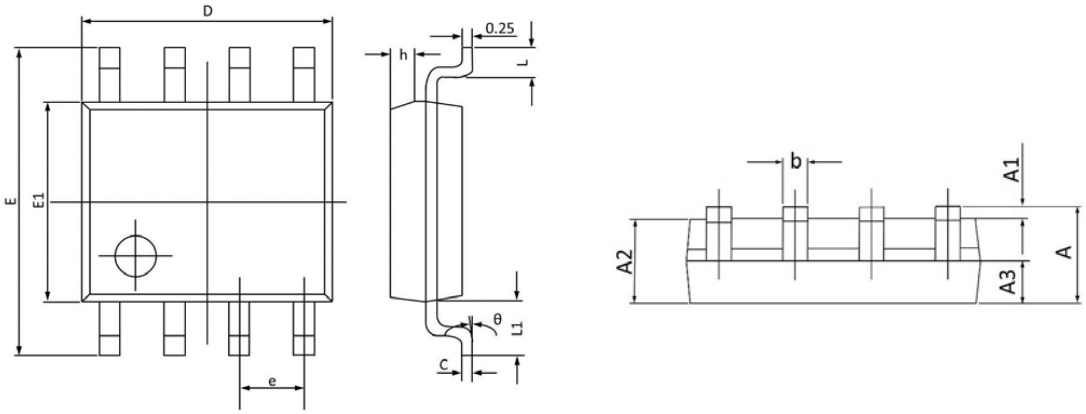


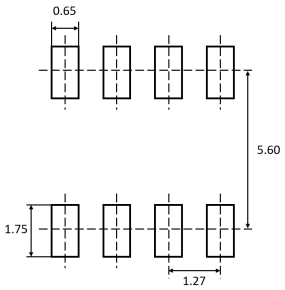
Figure 14. Gate Charge Waveform

Package Outline Dimensions (SOP-8)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.800	0.053	0.071
A1	0.050	0.250	0.002	0.010
A2	1.250	1.650	0.049	0.065
A3	0.500	0.700	0.020	0.028
b	0.300	0.510	0.012	0.020
c	0.150	0.260	0.006	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	1.000	0.016	0.039
L1	1.050 BSC		0.041 BSC	
θ	0°	8°	0°	8°

Recommended Pad Layout



unit : mm

Order information

Device	Package	Marking	Carrier	Quantity
GSFQ0309	SOP-8	DS3963C	Tape & Reel	3,000 pcs / Reel