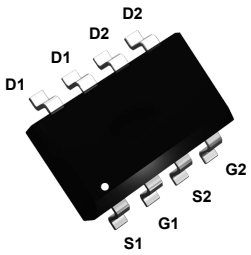
GOOD-ARK SEMICONDUCTOR

GSFQ1916

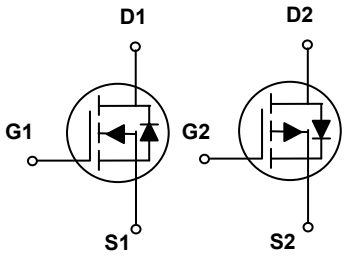
100V N-Channel + P-Channel MOSFET

Main Product Characteristics

Channel	N-Channel	P-Channel
V_{DSS}	100V	-100V
$R_{DS(ON)(max.)}$	160mΩ	180mΩ
I_D	3A	-2.2A



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 GSFQ1916 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 supplies and a wide variety of other applications.

Absolute Maximum Ratings (T_A=25°C unless otherwise specified)

Parameter	Symbol	Rating		Unit
Drain-Source Voltage	V_{DS}	100	-100	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Drain Current-Continuous (T_C=25°C)	I_D	3.0	-2.2	A
Drain Current-Continuous (T_C=100°C)		1.8	-1.4	A
Drain Current Pulsed[1]	I_{DM}	12	-8.8	A
Power Dissipation (T_C=25°C)	P_D	2.3		W
Power Dissipation Derate above 25°C		0.02		W/°C
Max. Thermal Resistance Junction to Case	$R_{\theta JC}$	50.0		°C/W
Max. Thermal Resistance Junction to Ambient	$R_{\theta JA}$	62.0		°C/W
Storage Temperature Range	T_{STG}	-55 to +150		°C
Operating Junction Temperature Range	T_J	-55 to +150		°C

N-Channel Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=250μA	100	-	-	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=1mA	-	0.1	-	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=100V, V_{GS}=0V, T_J=25°C	-	-	1	μA
		V_{DS}=80V, V_{GS}=0V, T_J=125°C	-	-	10	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=2A	-	106	160	mΩ
		V_{GS}=4.5V, I_D=1A	-	110	180	
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.1	-	2.9	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		-	-4	-	mV/°C
Forward Transconductance	gfs	V_{DS}=10V, I_D=1A	-	2	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[2,3]	Q_g	V_{DS}=50V, I_D=2A, V_{GS}=10V	-	13.4	-	nC
Gate-Source Charge[2,3]	Q_{gs}		-	2.9	-	
Gate-Drain Charge[2,3]	Q_{gd}		-	1.7	-	
Turn-On Delay Time[2,3]	$t_{d(on)}$	V_{DD}=30V, R_G=3.3Ω, V_{GS}=10V, I_D=1A	-	1.7	-	nS
Rise Time[2,3]	t_r		-	6.7	-	
Turn-Off Delay Time[2,3]	$t_{d(off)}$		-	11.4	-	
Fall Time[2,3]	t_f		-	3.7	-	
Input Capacitance	C_{iss}	V_{DS}=50V, V_{GS}=0V, F=1MHz	-	821	-	pF
Output Capacitance	C_{oss}		-	35	-	
Reverse Transfer Capacitance	C_{rss}		-	20	-	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	1.3	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	3	A
Pulsed Source Current	I_{SM}		-	-	12	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. The data tested by pulsed, pulse width ≦ 300 uS, duty cycle ≦ 2%.
3. Essentially independent of operating temperature.

P-Channel Electrical Characteristics (T_J=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V, I_D=-250uA	-100	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-100V, V_{GS}=0V, T_J=25°C	-	-	-1	μA
		V_{DS}=-80V, V_{GS}=0V, T_J=125°C	-	-	-10	μA
Gate-Source Leakage Current	I_{GSS}	V_{GS}=±20V, V_{DS}=0V	-	-	±100	nA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=-10V, I_D=-2A	-	150	180	mΩ
		V_{GS}=-4.5V, I_D=-1A	-	165	210	
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=-250uA	-1.2	-1.6	-2.7	V
Forward Transconductance	gfs	V_{DS}=-10V, I_D=-1.5A	-	6.5	-	S
Dynamic and Switching Characteristics						
Total Gate Charge[3,4]	Q_g	V_{DS}=-50V, I_D=-1A, V_{GS}=-10V	-	20	-	nC
Gate-Source Charge[3,4]	Q_{gs}		-	2.4	-	
Gate-Drain Charge[3,4]	Q_{gd}		-	3.3	-	
Turn-On Delay Time[3,4]	$t_{d(on)}$	V_{DD}=-50V, R_G=6Ω, V_{GS}=-10V, I_D=-1A	-	18	-	nS
Rise Time[3,4]	t_r		-	8	-	
Turn-Off Delay Time[3,4]	$t_{d(off)}$		-	100	-	
Fall Time[3,4]	t_f		-	30	-	
Input Capacitance	C_{iss}	V_{DS}=-50V, V_{GS}=0V, F=1MHz	-	1280	-	pF
Output Capacitance	C_{oss}		-	55	-	
Reverse Transfer Capacitance	C_{rss}		-	30	-	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	16	-	Ω
Source-Drain Ratings and Characteristics						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	-2.2	A
Pulsed Source Current	I_{SM}		-	-	-8.8	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=-100V, I_S=-1A, di/dt=100A/μs, T_J=25°C	-	35	-	nS
Reverse Recovery Charge	Q_{rr}		-	30	-	nC

Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=22A, starting T_J=25°C.
3. Pulse test: pulse width ≤ 300us, duty cycle≤ 2%.
4. Essentially independent of operating temperature.

N-Channel Typical Electrical and Thermal Characteristic Curves

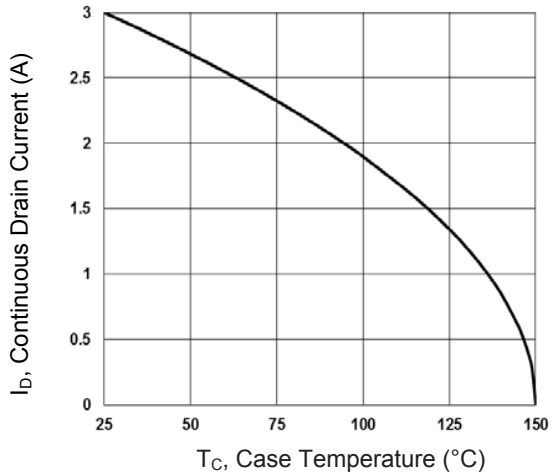


Figure 1. Continuous Drain Current vs. T_C

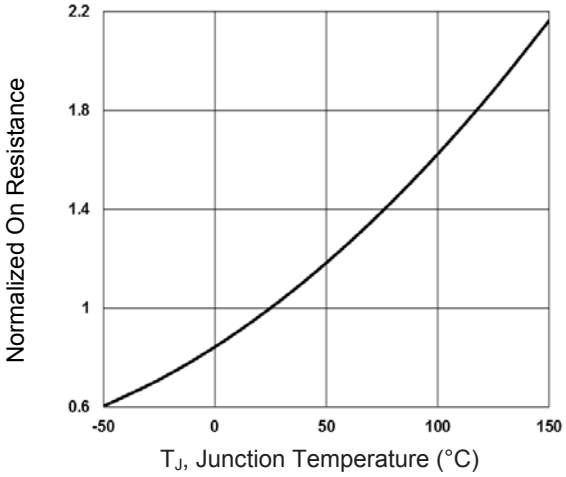


Figure 2. Normalized $R_{DS(ON)}$ vs. T_J

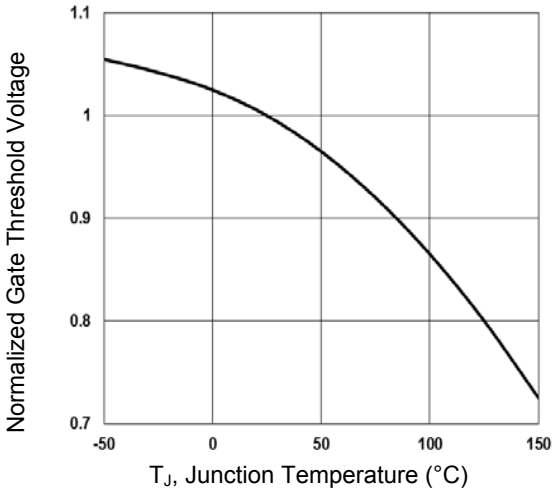


Figure 3. Normalized V_{th} vs. T_J

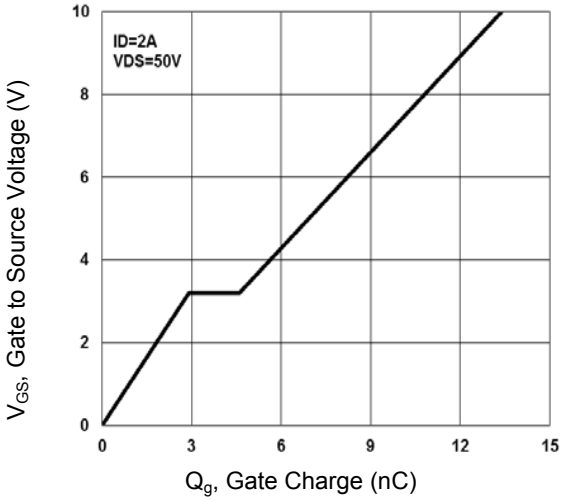


Figure 4. Gate Charge Waveform

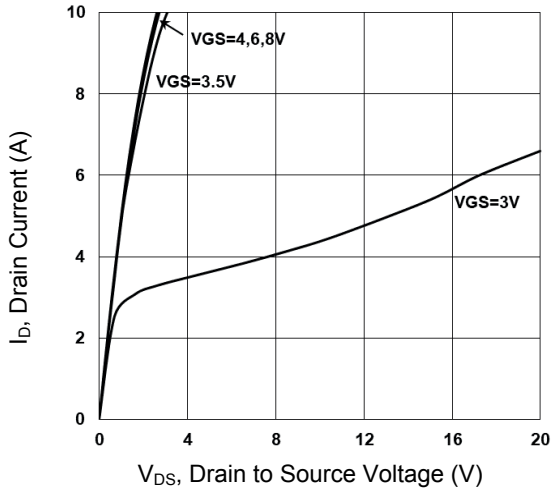


Figure 5. Typical Output Characteristics

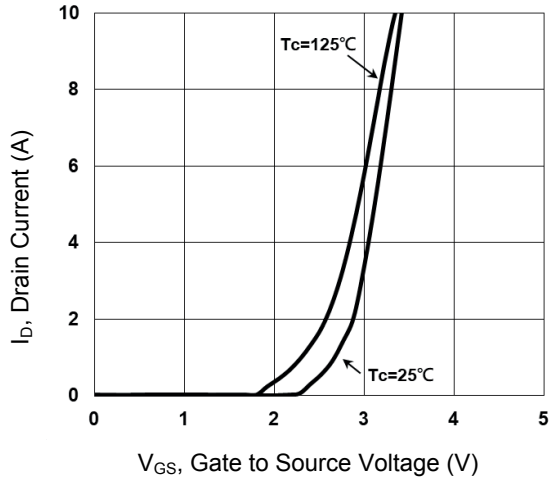


Figure 6. Transfer Characteristics

P-Channel Typical Electrical and Thermal Characteristic Curves

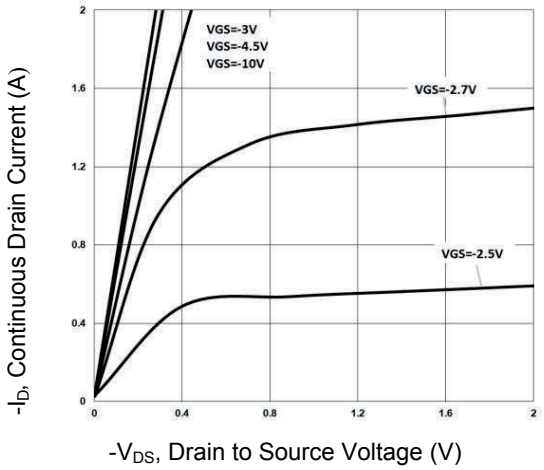


Figure 1. Typical Output Characteristics

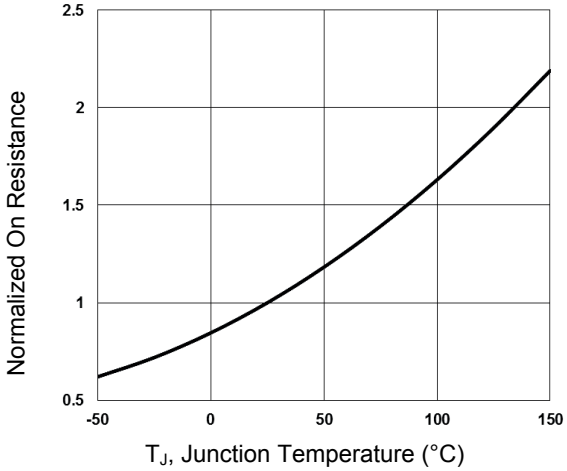


Figure 2. Normalized $R_{DS(ON)}$ vs. T_J

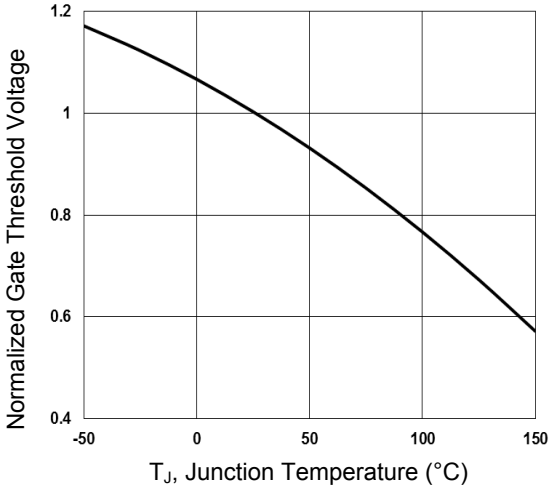


Figure 3. Normalized V_{th} vs. T_J

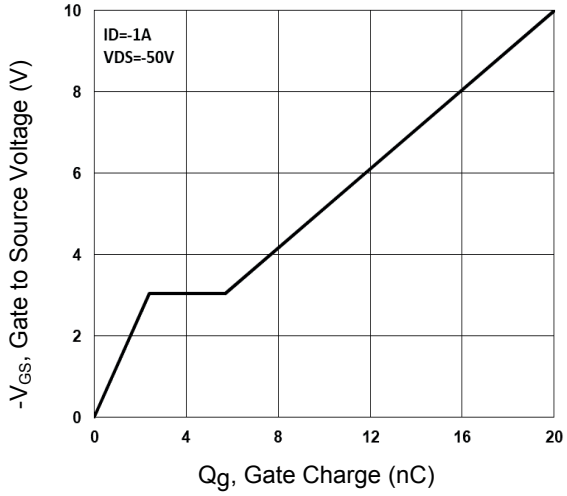


Figure 4. Gate Charge Characteristics

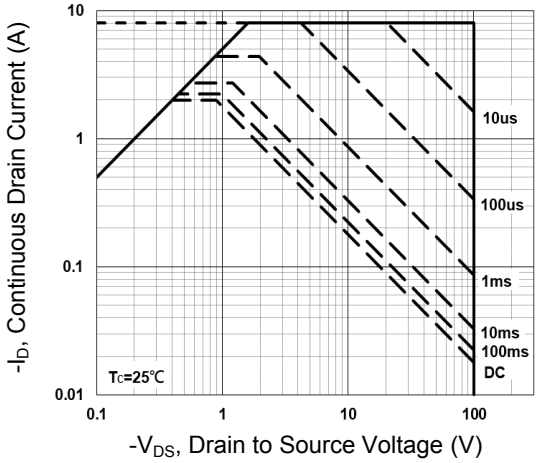


Figure 5. Maximum Safe Operation Area

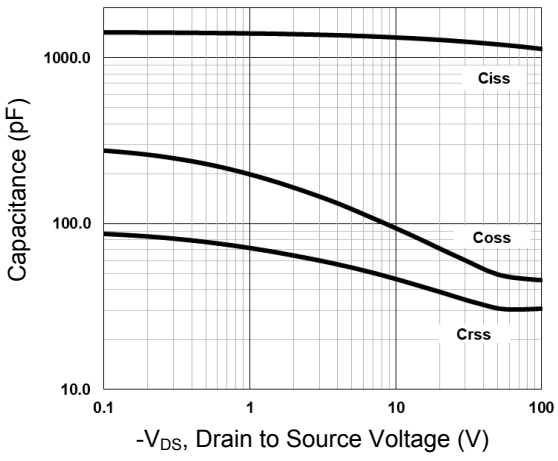
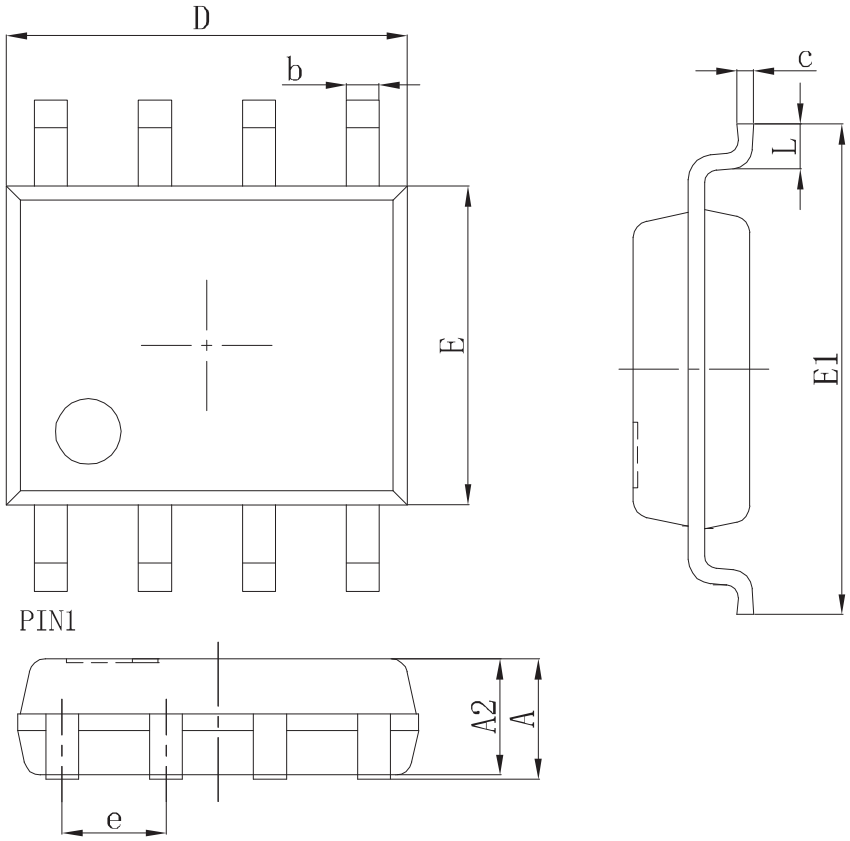


Figure 6. Capacitance Characteristics

Package Outline Dimensions (SOP-8)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.30	1.70	0.051	0.067
A2	1.25	1.55	0.049	0.061
c	0.17	0.25	0.007	0.010
E	3.80	4.00	0.150	0.157
E1	5.80	6.20	0.228	0.244
L	0.45	0.75	0.018	0.030
b	0.33	0.51	0.013	0.020
D	4.80	5.00	0.189	0.197
e	1.27 BSC		0.050 BSC	

Order Information

Device	Package	Marking	Carrier	Quantity
GSFQ1916	SOP-8	Q1916	Tape & Reel	3,000 Pcs / Reel