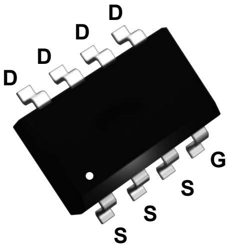
GOOD-ARK
SEMICONDUCTOR

GSFQ0390

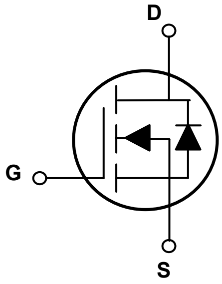
30V N-Channel MOSFET

Main Product Characteristics

$V_{(BR)DSS}$	30V
$R_{DS(ON)}$	3.5mΩ (Max.)
I_D	22A



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 GSFQ0390 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	Value	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-to-Source Voltage	V_{GS}	±20	V
Continuous Drain Current, @ Steady-State (T_A=25°C)[1]	I_D	22	A
Continuous Drain Current, @ Steady-State (T_A=70°C)[1]		17	A
Pulsed Drain Current (T_A=25°C)[2]	I_{DM}	88	A
Power Dissipation (T_A=25°C)[3]	P_D	2.6	W
Single Pulse Avalanche Energy	E_{AS}	289	mJ
Single Pulse Current	I_{AS}	34	A
Thermal Resistance, Junction-to-Ambient (PCB Mounted, Steady-State)	$R_{\theta JA}$	50	°C/W
Operating Junction and Storage Temperature Range	T_J/T_{STG}	-55 to +150	°C
Soldering Temperature (SMD)	T_{sold}	260	°C

Electrical Characteristics (T_A=25°C unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
On / Off Characteristics						
Drain-to-Source Breakdown Voltage	$V_{(BR)DSS}$	V_{GS}=0V, I_D=250μA	30	-	-	V
Drain-to-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V, T_J=25°C	-	-	1.0	μA
		V_{DS}=30V, V_{GS}=0V, T_J=125°C	-	1.5	-	
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=20A	-	2.6	3.5	mΩ
		V_{GS}=4.5V, I_D=15A	-	4.2	5.6	
Gate-to-Source Forward Leakage	I_{GSS}	V_{DS}=0V, V_{GS}=±20V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.1	-	2.5	V
Dynamic and Switching Characteristics						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V, f=1MHz	-	3260	-	pF
Output Capacitance	C_{oss}		-	344	-	
Reverse Transfer Capacitance	C_{rss}		-	302	-	
Total Gate Charge[4,5]	Q_g	I_D=20A, V_{DD}=15V, V_{GS}=10V	-	56	-	nC
Gate-to-Source Charge[4,5]	Q_{gs}		-	7.5	-	
Gate-to-Drain ("Miller") Charge[4,5]	Q_{gd}		-	15	-	
Turn-On Delay Time[4,5]	$t_{d(on)}$	V_{DD}=15V, V_{GS}=10V, R_G=3Ω, I_D=20A	-	25	-	nS
Rise Time[4,5]	t_r		-	21	-	
Turn-Off Delay Time[4,5]	$t_{d(off)}$		-	49	-	
Fall Time[4,5]	t_f		-	27	-	
Gate Resistance	R_g	f=1MHz	-	1.8	-	Ω
Drain-Source Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.	-	-	22	A
Diode Pulse Current	$I_{S.pulse}$		-	-	88	A
Diode Forward Voltage	V_{SD}	I_S=10A, V_{GS}=0V	-	-	1.4	V
Reverse Recovery Time[4]	t_{rr}	I_S=20A, V_{GS}=0V, V_R=20V, dI_F/dt=100A/us	-	56	-	nS
Reverse Recovery Charge[4]	Q_{rr}		-	42	-	nC

Notes:

1. The rated value only refers to the maximum absolute value under the case temperature of 25°C in the manual. If the case temperature is higher than 25°C, the frequency needs to be reduced according to the actual environmental conditions.
2. Pulse time of 5μs, pulse width limited by maximum junction temperature.
3. The dissipated power value will change with the temperature. When it is greater than 25°C, the dissipated power value will decrease by 0.74°C/W for every 1 degree of temperature increase.
4. Pulse test: Pulse width ≤300μs, duty cycle ≤2%.
5. Basically unaffected by operating temperature.

Typical Electrical and Thermal Characteristic Curves

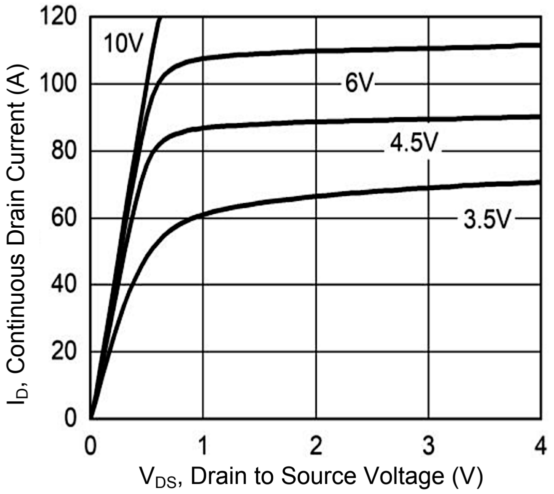


Figure 1. Output Characteristics

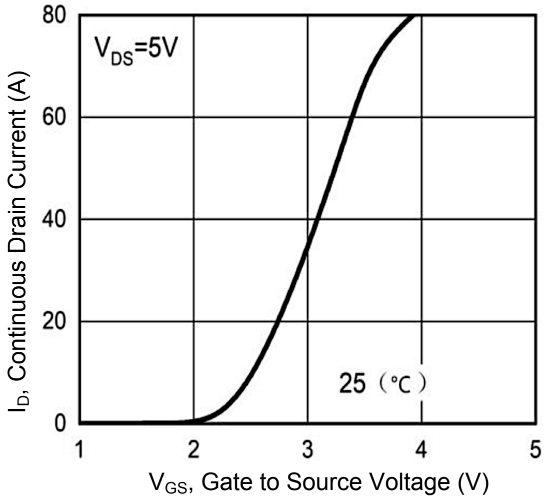


Figure 2. Transfer Characteristics

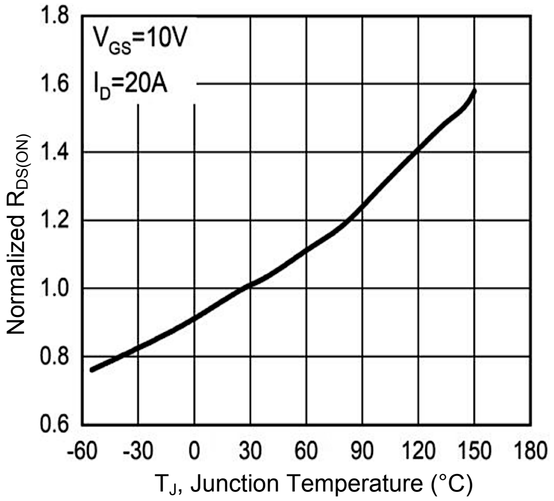


Figure 3. Normalized $R_{DS(ON)}$ vs. T_J

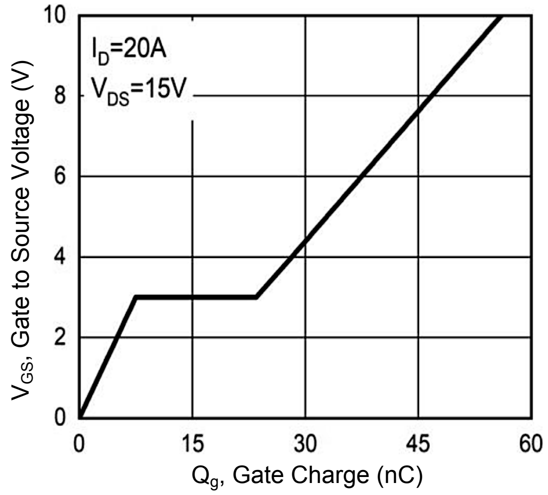


Figure 4. Gate Charge Characteristics

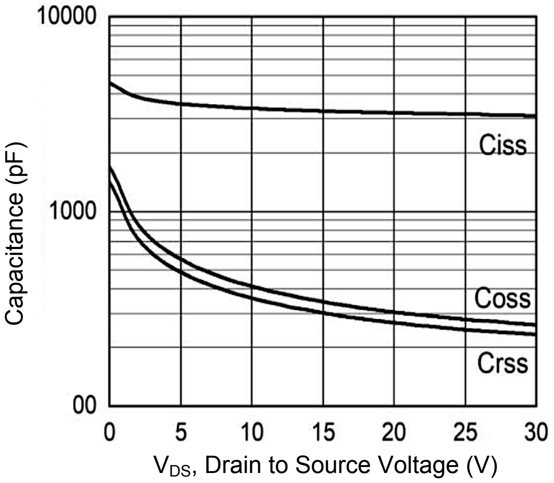


Figure 5. Capacitance Characteristics

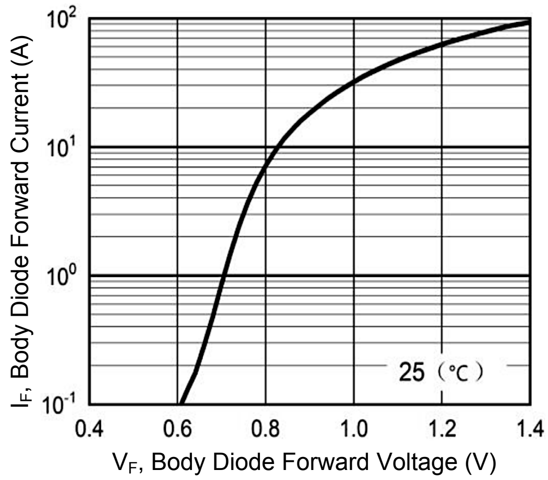
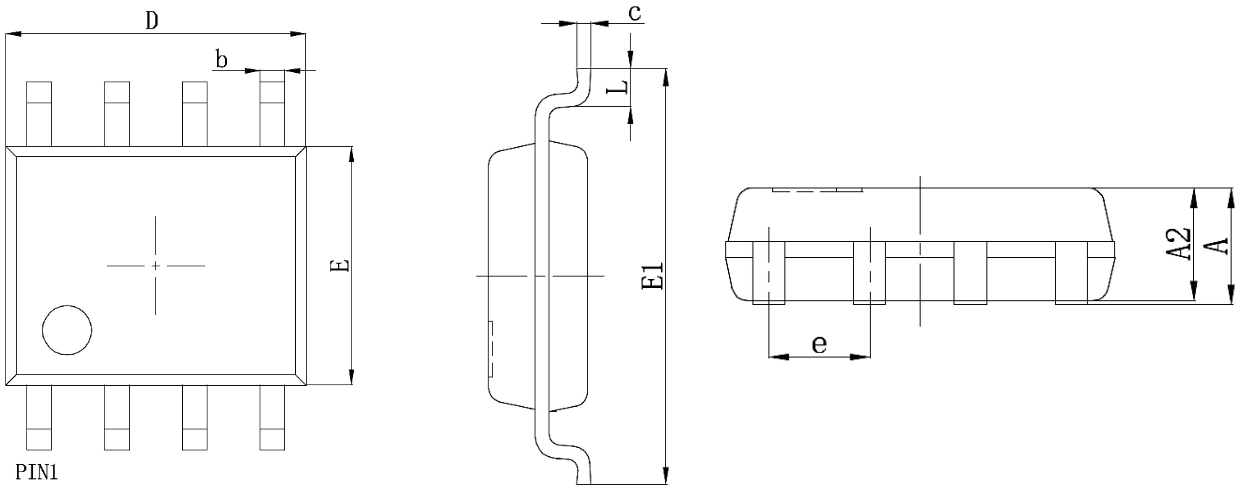


Figure 6. Body Diode Characteristics

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	Packaging	SPQ
GSFQ0390	SOP-8	Q0390	Tape & Reel	3,000 Pcs / Reel