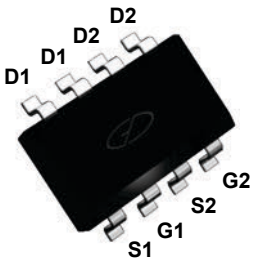
GOOD-ARK SEMICONDUCTOR

GSFQ4616

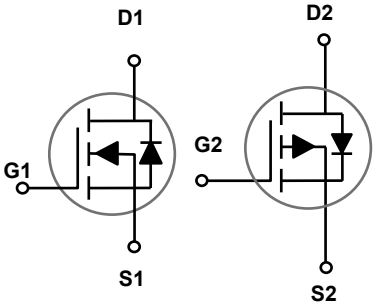
30V N-Channel + P-Channel Complementary MOSFET

Main Product Characteristics

Channel	N-Channel	P-Channel
B_{VDSS}	30V	-30V
$R_{DS(ON)}$	20mΩ	22mΩ
I_D	8A	-7A



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 GSFQ4616 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_c=25°C unless otherwise specified)

Parameter	Symbol	Rating		Unit
Drain-Source Voltage	V_{DS}	30	-30	V
Gate-Source Voltage	V_{GS}	±20	±20	V
Drain Current-Continuous (T_C=25°C)	I_D	8	-7.0	A
Drain Current-Continuous (T_C=100°C)		6.5	-6.0	A
Drain Current-Pulsed[1]	I_{DM}	32	-28	A
Single Pulse Avalanche Energy[2,6]	E_{AS}	18	36	mJ
Single Pulse Avalanche Current[2]	I_{AS}	19	27	A
Power Dissipation (T_C=25°C)	P_D	2.0		W
Power Dissipation-Derate above 25°C		0.016		W/°C
Storage Temperature Range	T_{STG}	-55 to +150		°C
Operating Junction Temperature Range	T_J	-55 to +150		°C
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	-	62.5	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	-	51	°C/W

N-Channel 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=250uA	30	-	-	V
Drain-Source Leakage Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V, T_J=25°C	-	-	1	uA
		V_{DS}=24V, V_{GS}=0V, T_J=125°C	-	-	10	uA
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=8A	-	16.5	20	mΩ
		V_{GS}=4.5V, I_D=6A	-	19.5	28	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D=250uA	1.0	1.5	2.0	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		-	-4	-	mV/°C
Forward Transconductance	g_{fs}	V_{DS}=5V, I_D=8A	-	15	-	S
Dynamic Characteristics						
Total Gate Charge[3,4]	Q_g	V_{DS}=15V, V_{GS}=10V, I_D=8A	-	15	-	nC
Gate-Source Charge[3,4]	Q_{gs}		-	2.5	-	
Gate-Drain Charge[3,4]	Q_{gd}		-	3.0	-	
Turn-On Delay Time[3,4]	$T_{d(on)}$	V_{DD}=15V, V_{GS}=10V, R_G=3Ω, I_D=8A	-	5.0	5	nS
Rise Time[3,4]	T_r		-	3.5	14	
Turn-Off Delay Time[3,4]	$T_{d(off)}$		-	9.0	30	
Fall Time[3,4]	T_f		-	3.5	9	
Input Capacitance	C_{iss}	V_{DS}=15V, V_{GS}=0V, F=1MHz	-	740	-	pF
Output Capacitance	C_{oss}		-	110	-	
Reverse Transfer Capacitance	C_{rss}		-	82	-	
Gate Resistance	R_g	V_{GS}=0V, V_{DS}=0V, F=1MHz	-	1.1	-	Ω
Drain-Source Diode Characteristics						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	8	A
Pulsed Source Current	I_{SM}		-	-	16	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. V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=19A, R_G=25Ω, Starting T_J=25°C.
3. The data tested by pulsed, pulse width ≦ 300uS, duty cycle ≦ 2%.
4. Essentially independent of operating temperature.

P-Channel 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=-250uA	-30	-	-	V
BV_{DSS} Temperature Coefficient	$\triangle BV_{DSS}/\triangle T_J$	Reference to 25°C, I_D=-1mA	-	-0.03	-	V/°C
Drain-Source Leakage Current	I_{DSS}	V_{DS}=-30V, V_{GS}=0V, T_J=25°C	-	-	-1	uA
		V_{DS}=-24V, V_{GS}=0V, T_J=125°C	-	-	-10	uA
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=-7A	-	17.5	22	mΩ
		V_{GS}=-4.5V, I_D=-6A	-	22.5	30	mΩ
Gate Threshold Voltage	$V_{GS(th)}$	V_{GS}=V_{DS}, I_D =-250uA	-0.85	-1.5	-2.4	V
$V_{GS(th)}$ Temperature Coefficient	$\triangle V_{GS(th)}$		-	4	-	mV/°C
Forward Transconductance	gfs	V_{DS}=-5V, I_D=-7A	-	18	-	S
Dynamic Characteristics						
Total Gate Charge[6,7]	Q_g	V_{DS}=-15V, V_{GS}=-10V, I_D=-6A	-	18.6	-	nC
Gate-Source Charge[6,7]	Q_{gs}		-	3.7	-	
Gate-Drain Charge[6,7]	Q_{gd}		-	4.7	-	
Turn-On Delay Time[6,7]	$T_{d(on)}$	V_{DD}=-15V, V_{GS}=-10V, R_G=3Ω I_D=-6A	-	10	-	nS
Rise Time[6,7]	T_r		-	5.5	-	
Turn-Off Delay Time[6,7]	$T_{d(off)}$		-	3.6	-	
Fall Time[6,7]	T_f		-	6.6	-	
Input Capacitance	C_{iss}	V_{DS}=-15V, V_{GS}=0V, F=1MHz	-	1040	-	pF
Output Capacitance	C_{oss}		-	180	-	
Reverse Transfer Capacitance	C_{rss}		-	125	-	
Drain-Source Diode Characteristics						
Continuous Source Current	I_S	V_G=V_D=0V, Force Current	-	-	-7.0	A
Pulsed Source Current	I_{SM}		-	-	-14	A
Diode Forward Voltage	V_{SD}	V_{GS}=0V, I_S=-1A, T_J=25°C	-	-	-1	V

Note:

5. V_{DD}=-25V, V_{GS}=-10V, L=0.1mH, I_{AS}=-10A, R_G=25Ω, Starting T_J=25°C.
6. The data tested by pulsed, pulse width ≦ 300uS, duty cycle ≦ 2%.
7. Essentially independent of operating temperature.

N-Channel Typical Electrical and Thermal Characteristic Curves

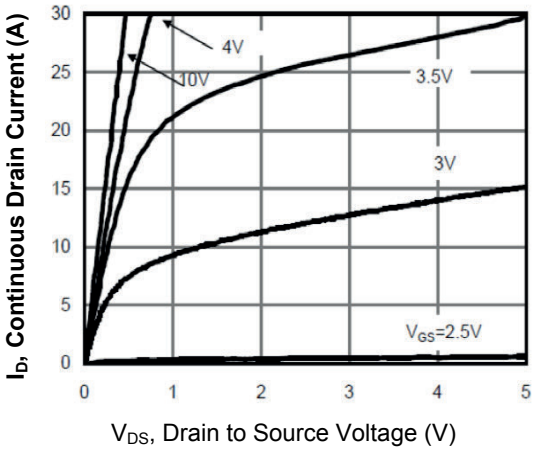


Figure 1. Output Characteristics

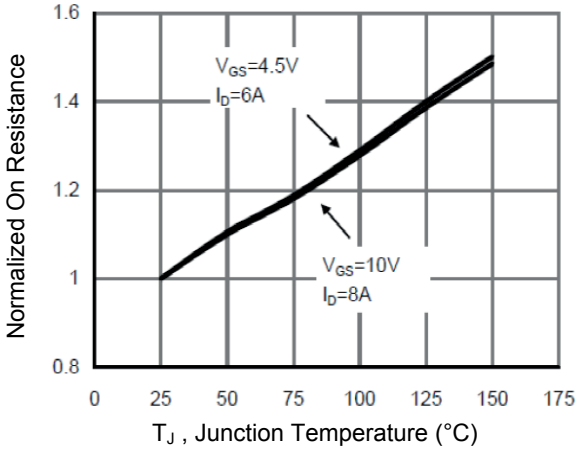


Figure 2. Normalized $R_{DS(ON)}$ vs. T_J

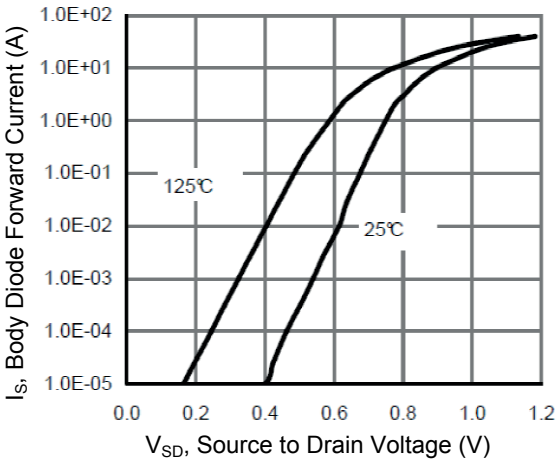


Figure 3. Body Diode Characteristics

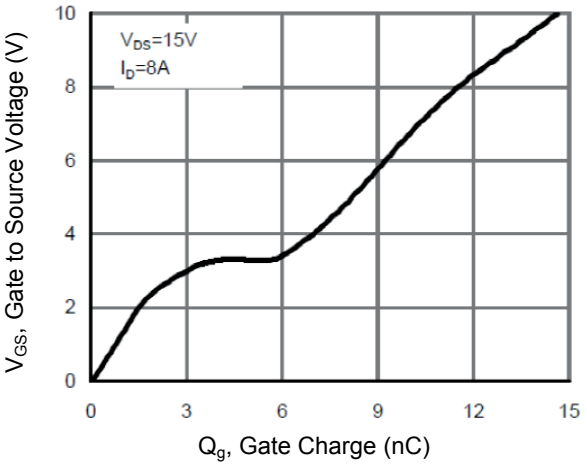


Figure 4. Gate Charge Characteristics

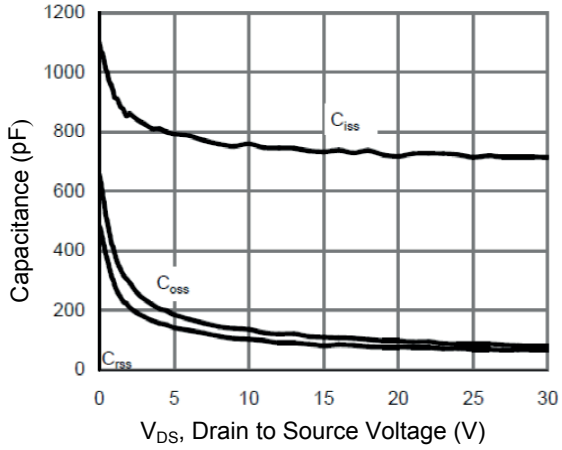


Figure 5. Capacitance Characteristics

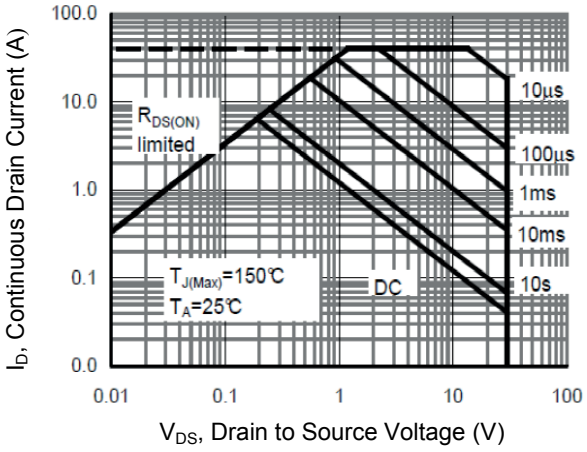


Figure 6. Maximum Safe Operation Area

P-Channel Typical Electrical and Thermal Characteristic Curves

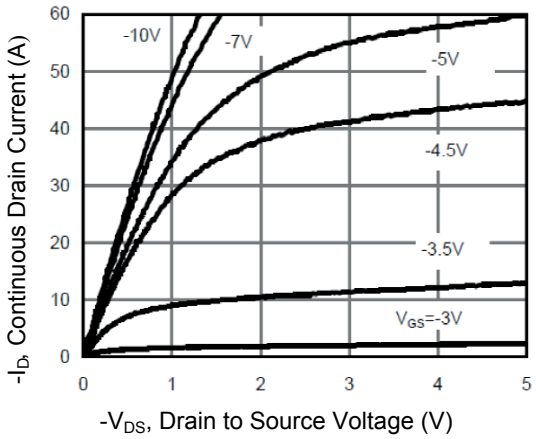


Figure 1. Output Characteristics

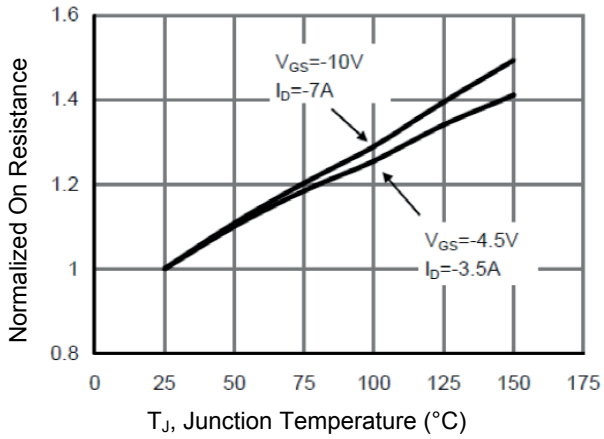


Figure 2. Normalized $R_{DS(ON)}$ vs. T_J

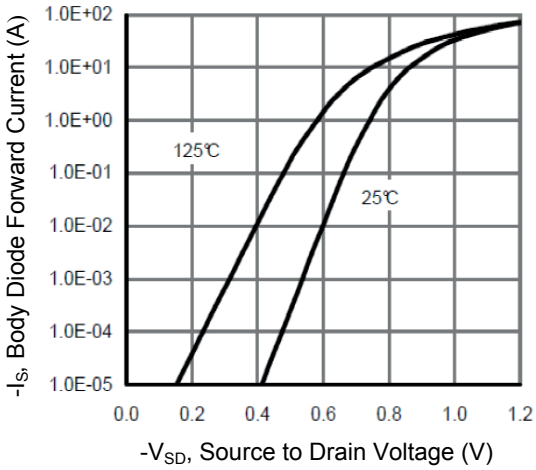


Figure 3. Body Diode Characteristics

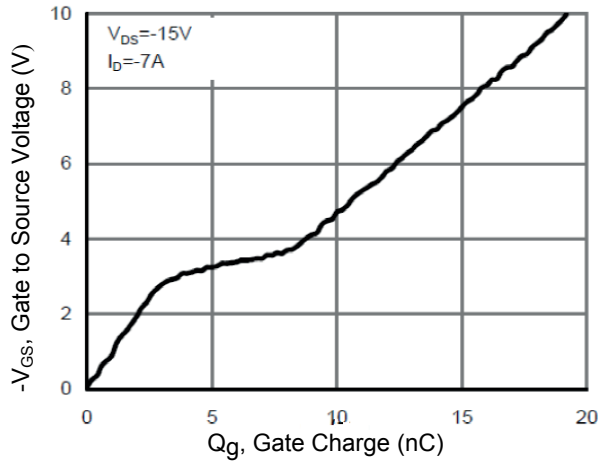


Figure 3. Gate Charge Characteristics

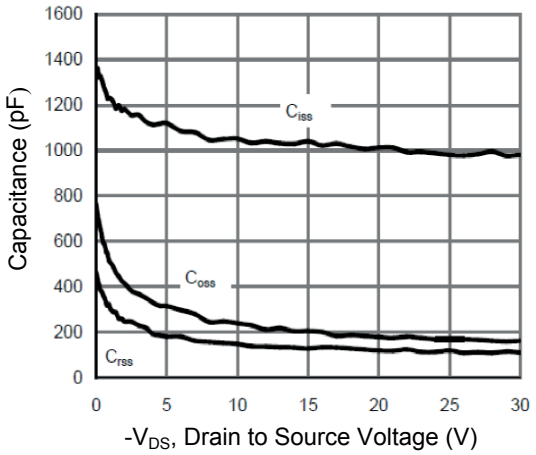


Figure 5. Capacitance Characteristics

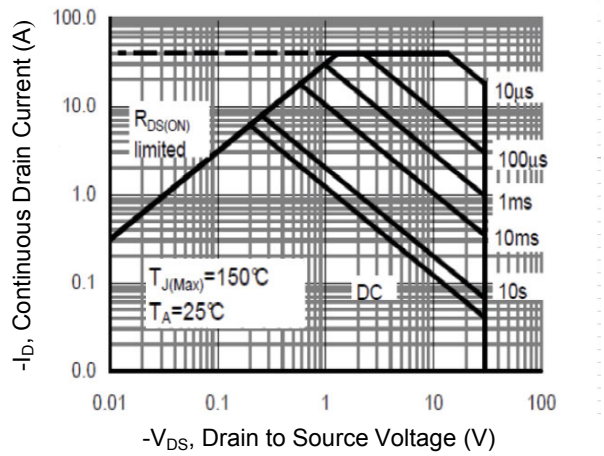
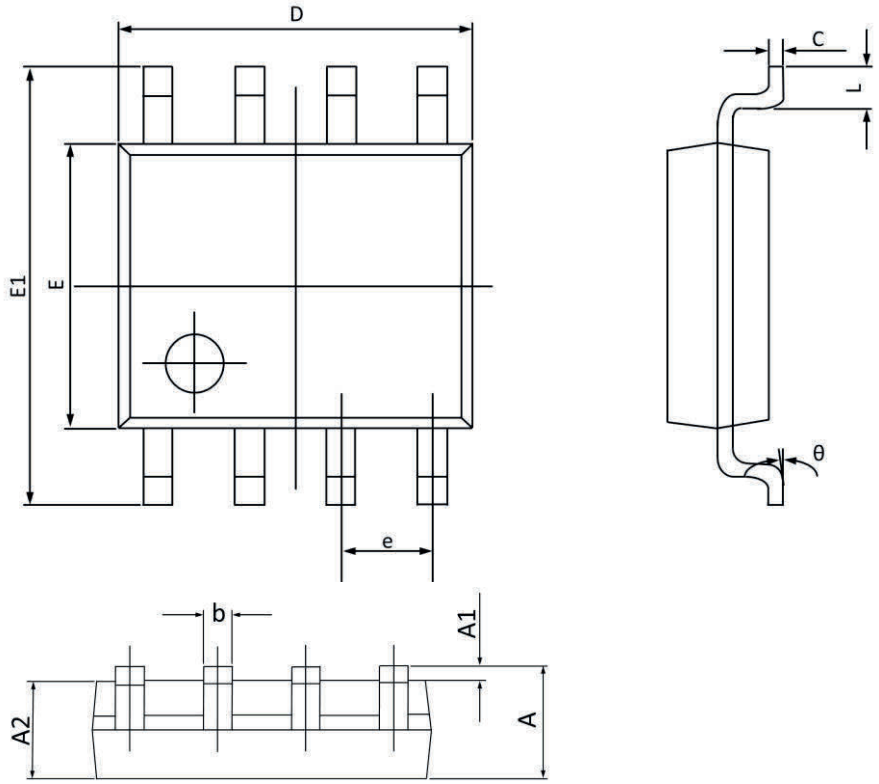


Figure 6. Maximum Safe Operation Area

Package Outline Dimensions (SOP-8)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.300	1.500	0.051	0.059
b	0.350	0.490	0.014	0.019
C	0.190	0.260	0.007	0.010
D	4.700	5.100	0.185	0.201
E	3.700	4.100	0.146	0.161
E1	5.800	6.200	0.228	0.244
e	1.27 BSC		0.05 BSC	
L	0.400	0.900	0.016	0.035
θ	0°	8°	0°	8°

Order Information

Device	Package	Marking	Quantity	HSF Status
GSFQ4616	SOP-8	4616	3,000pcs / Reel	RoHS Compliant