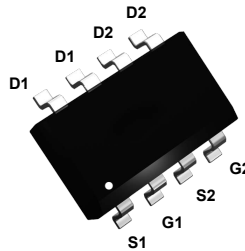
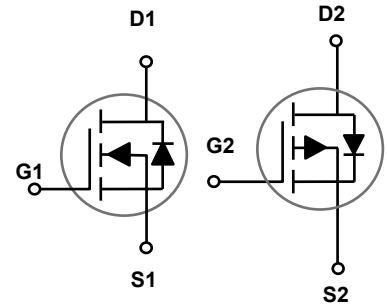


Main Product Characteristics

Channel	N-Channel	P-Channel
B_{VDSS}	30V	-30V
$R_{DS(ON)}$	20m Ω	22m Ω
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 ($T_c=25^\circ\text{C}$ 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 ($T_c=25^\circ\text{C}$)	I_D	8	-7.0	A
Drain Current-Continuous ($T_c=100^\circ\text{C}$)		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 ($T_c=25^\circ\text{C}$)	P_D	2.0		W
Power Dissipation-Derate above 25°C		0.016		W/ $^\circ\text{C}$
Storage Temperature Range	T_{STG}	-55 to +150		$^\circ\text{C}$
Operating Junction Temperature Range	T_J	-55 to +150		$^\circ\text{C}$
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	-	62.5	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction to Case	$R_{\theta JC}$	-	51	$^\circ\text{C}/\text{W}$

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=-1\text{mA}$	-	-0.03	-	$V/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0V, T_J=25^\circ\text{C}$	-	-	-1	μA
		$V_{DS}=-24V, V_{GS}=0V, T_J=125^\circ\text{C}$	-	-	-10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	-	-	± 100	nA
On Characteristics						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-7A$	-	17.5	22	$m\Omega$
		$V_{GS}=-4.5V, I_D=-6A$	-	22.5	30	$m\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-0.85	-1.5	-2.4	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		-	4	-	$mV/^\circ\text{C}$
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}	$T_{d(on)}$	$V_{DD}=-15V, V_{GS}=-10V, R_G=3\Omega, I_D=-6A$	-	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}	$V_{DS}=-15V, V_{GS}=0V, F=1\text{MHz}$	-	1040	-	pF
Output Capacitance	C_{oss}		-	180	-	
Reverse Transfer Capacitance	C_{rss}		-	125	-	
Drain-Source Diode Characteristics						
Continuous Source Current	I_s	$V_G=V_D=0V, \text{Force Current}$	-	-	-7.0	A
Pulsed Source Current	I_{SM}		-	-	-14	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_s=-1A, T_J=25^\circ\text{C}$	-	-	-1	V

Note:

5. $V_{DD}=-25V, V_{GS}=-10V, L=0.1\text{mH}, I_{AS}=-10A, R_G=25\Omega$, Starting $T_J=25^\circ\text{C}$.

6. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.

7. Essentially independent of operating temperature.

N-Channel Typical Electrical and Thermal Characteristic Curves

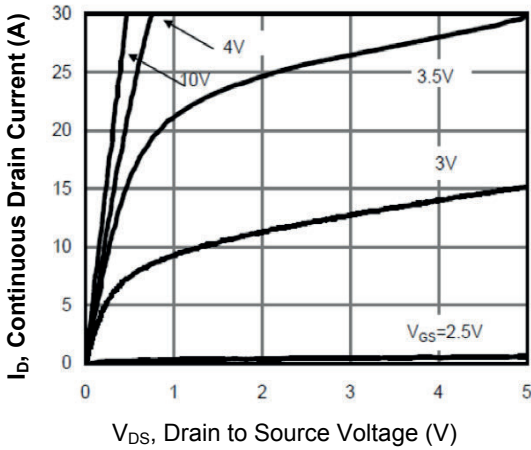


Figure 1. Output Characteristics

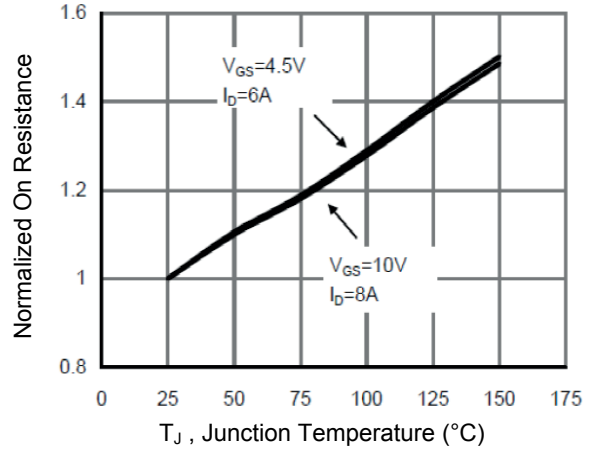


Figure 2. Normalized $R_{DS(ON)}$ vs. T_J

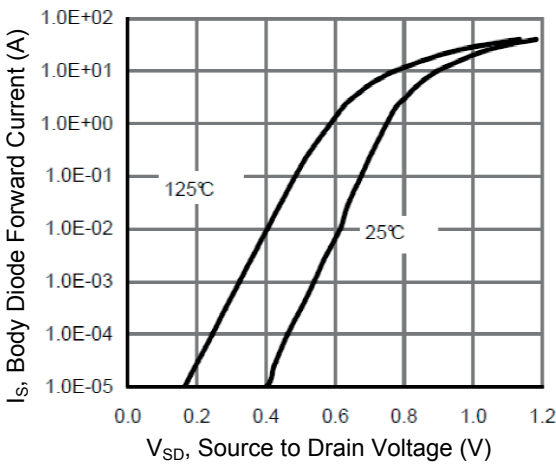


Figure 3. Body Diode Characteristics

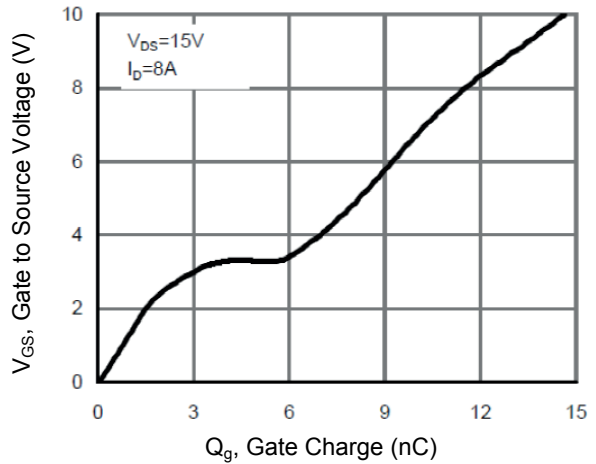


Figure 4. Gate Charge Characteristics

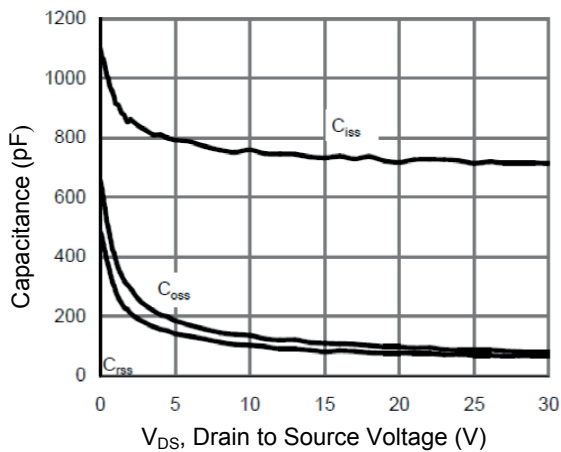


Figure 5. Capacitance Characteristics

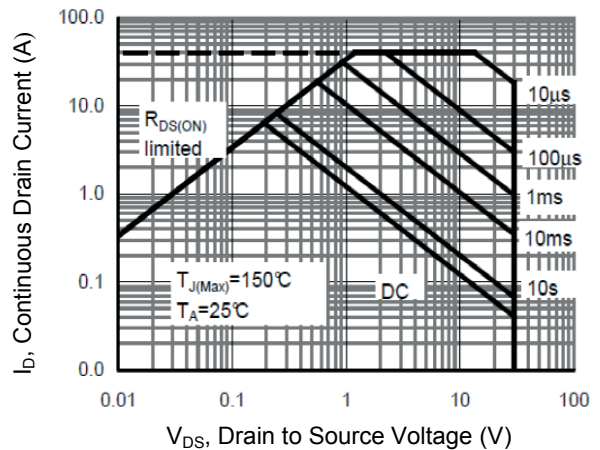


Figure 6. Maximum Safe Operation Area

P-Channel Typical Electrical and Thermal Characteristic Curves

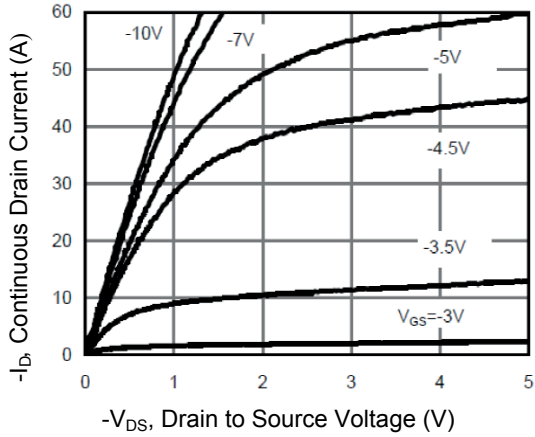


Figure 1. Output Characteristics

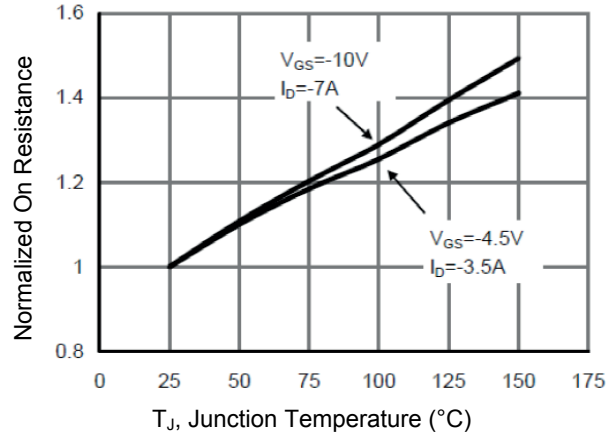


Figure 2. Normalized $R_{DS(ON)}$ vs. T_J

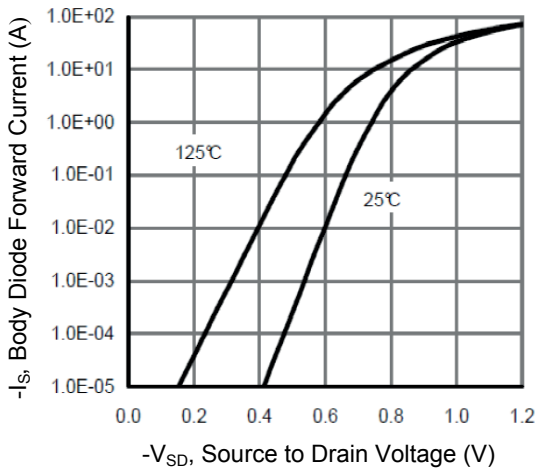


Figure 3. Body Diode Characteristics

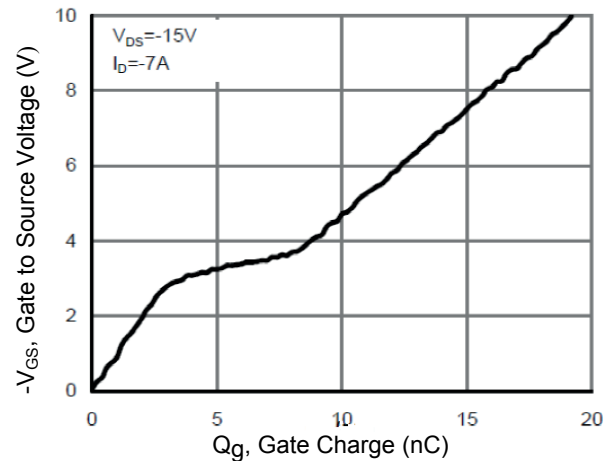


Figure 3. Gate Charge Characteristics

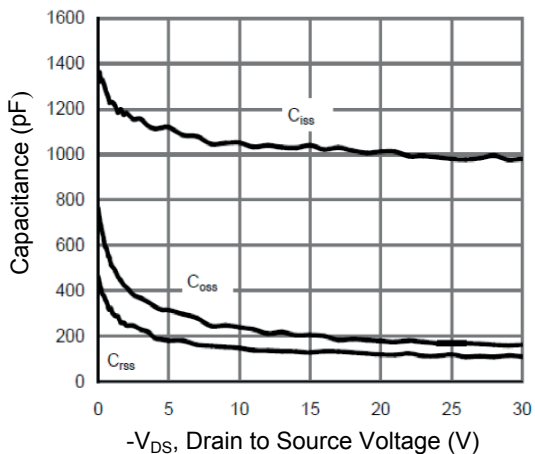


Figure 5. Capacitance Characteristics

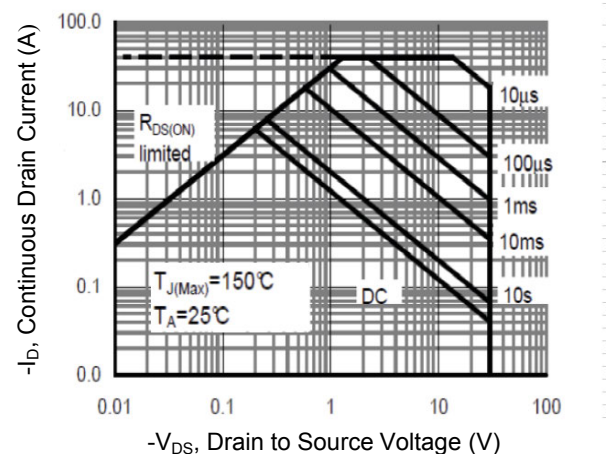
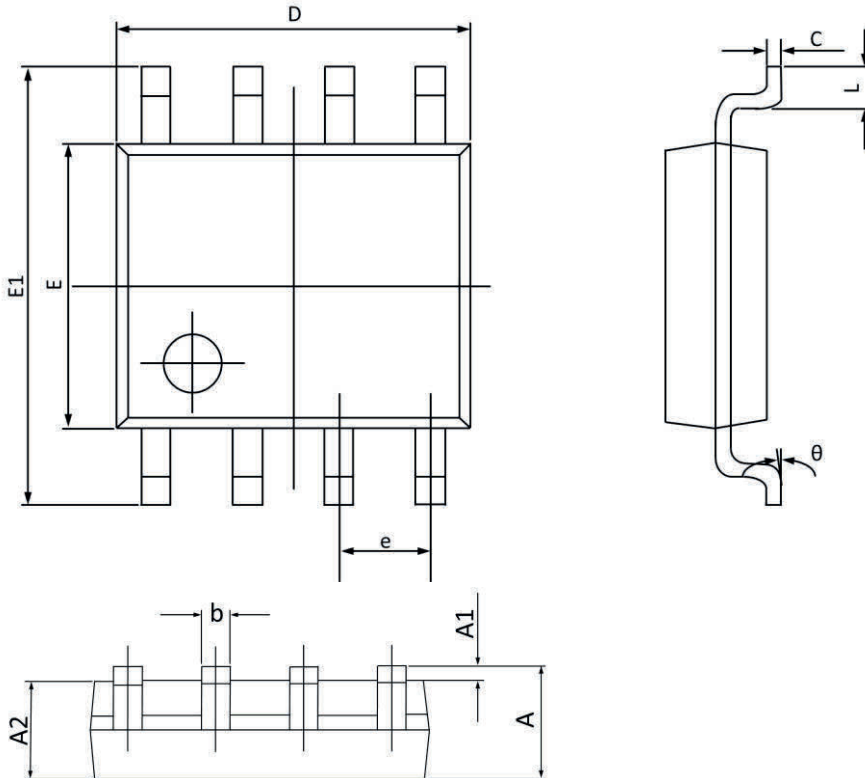


Figure 6. Maximum Safe Operation Area

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