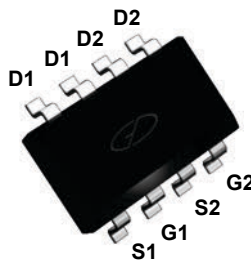
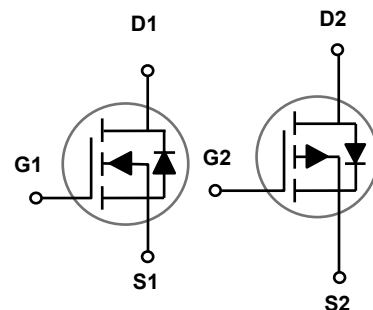


Main Product Characteristics

Polarity	N-Ch	P-Ch
V_{DSS}	60V	-60V
$R_{DS(ON)(Max.)}$	54m Ω	105m Ω
I_D	4.5A	-3.5A



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 GSFQ6710 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 ($T_c=25^\circ\text{C}$ unless otherwise specified)

Parameter	Symbol	Rating		Unit
Drain-Source Voltage	V_{DS}	60	-60	V
Gate-Source Voltage	V_{GS}	± 20	± 20	V
Drain Current – Continuous ($T_c=25^\circ\text{C}$)	I_D	4.5	-3.5	A
Drain Current – Continuous ($T_c=100^\circ\text{C}$)		2.85	-2.21	A
Drain Current – Pulsed ¹	I_{DM}	18	-14	A
Power Dissipation ($T_c=25^\circ\text{C}$)	P_D	3.57		W
Power Dissipation – Derate above 25 $^\circ\text{C}$		0.028		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 Characteristics

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	---	75	$^\circ\text{C}/\text{W}$
Thermal Resistance Junction to Case	$R_{\theta JC}$	---	35	$^\circ\text{C}/\text{W}$

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 =250μA	60	---	---	V
BV _{DSS} Temperature Coefficient	ΔBV _{DSS} /ΔT _J	Reference to 25°C, I _D =1mA	---	0.05	---	V/°C
Drain-Source Leakage Current	I _{DSS}	V _{DS} =60V, V _{GS} =0V, T _J =25°C	---	---	1	μA
		V _{DS} =48V, 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 =6A	---	45	54	mΩ
		V _{GS} =4.5V, I _D =3A	---	52	63	mΩ
Gate Threshold Voltage	V _{GS(th)}	V _{GS} =V _{DS} , I _D =250μA	1.2	1.8	2.5	V
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)}		---	-4.2	---	mV/°C
Forward Transconductance	g _{fs}	V _{DS} =10V, I _D =4A	---	4.2	---	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{2, 3}	Q _g	V _{DS} =30V, V _{GS} =10V, I _D =4A	---	14	21	nC
Gate-Source Charge ^{2, 3}	Q _{gs}		---	2.9	5	
Gate-Drain Charge ^{2, 3}	Q _{gd}		---	2.3	4	
Turn-On Delay Time ^{2, 3}	T _{d(on)}	V _{DD} =30V, V _{GS} =10V, R _G =3.3Ω, I _D =1A	---	3.9	7	nS
Rise Time ^{2, 3}	T _r		---	12.6	24	
Turn-Off Delay Time ^{2, 3}	T _{d(off)}		---	23.1	44	
Fall Time ^{2, 3}	T _f		---	6.7	13	
Input Capacitance	C _{iss}	V _{DS} =15V, V _{GS} =0V, F=1MHz	---	800	1160	pF
Output Capacitance	C _{oss}		---	380	550	
Reverse Transfer Capacitance	C _{rss}		---	115	170	
Gate Resistance	R _g	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	1.7	3.4	Ω
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I _S	V _{GS} =V _D =0V, Force Current	---	---	4.5	A
Pulsed Source Current	I _{SM}		---	---	9	A
Diode Forward Voltage	V _{SD}	V _{GS} =0V, I _S =1A, T _J =25°C	---	---	1	V

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}	$V_{GS}=0V, I_D=-250\mu A$	-60	---	---	V
BV_{DSS} Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to 25°C , $I_D=-1\text{mA}$	---	-0.05	---	$V/^\circ\text{C}$
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=-60V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	-1	μA
		$V_{DS}=-48V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	-10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
On Characteristics						
Static Drain-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-6A$	---	87	105	m Ω
		$V_{GS}=-4.5V, I_D=-3A$	---	120	145	m Ω
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=-250\mu A$	-1	-1.6	-2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		---	3	---	mV/ $^\circ\text{C}$
Forward Transconductance	g_{fs}	$V_{DS}=-10V, I_D=-6A$	---	5.5	---	S
Dynamic and Switching Characteristics						
Total Gate Charge ^{2, 3}	Q_g	$V_{DS}=-30V, V_{GS}=-10V, I_D=-4A$	---	10	15	nC
Gate-Source Charge ^{2, 3}	Q_{gs}		---	1.6	3.2	
Gate-Drain Charge ^{2, 3}	Q_{gd}		---	3	6	
Turn-On Delay Time ^{2, 3}	$T_{d(on)}$	$V_{DD}=-30V, V_{GS}=-10V, R_G=6\Omega, I_D=-1A$	---	8	16	nS
Rise Time ^{2, 3}	T_r		---	15.4	30	
Turn-Off Delay Time ^{2, 3}	$T_{d(off)}$		---	42.8	80	
Fall Time ^{2, 3}	T_f		---	8.4	16	
Input Capacitance	C_{iss}	$V_{DS}=-30V, V_{GS}=0V, F=1\text{MHz}$	---	785	1300	pF
Output Capacitance	C_{oss}		---	175	300	
Reverse Transfer Capacitance	C_{rss}		---	112	220	
Drain-Source Diode Characteristics and Maximum Ratings						
Continuous Source Current	I_S	$V_{GS}=V_D=0V$, Force Current	---	---	-3.5	A
Pulsed Source Current	I_{SM}		---	---	-7	A
Diode Forward Voltage	V_{SD}	$V_{GS}=0V, I_S=-1A, T_J=25^\circ\text{C}$	---	---	-1	V

Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. The data tested by pulsed, pulse width $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$.
3. Essentially independent of operating temperature.

N-Channel Typical Electrical and Thermal Characteristic Curves

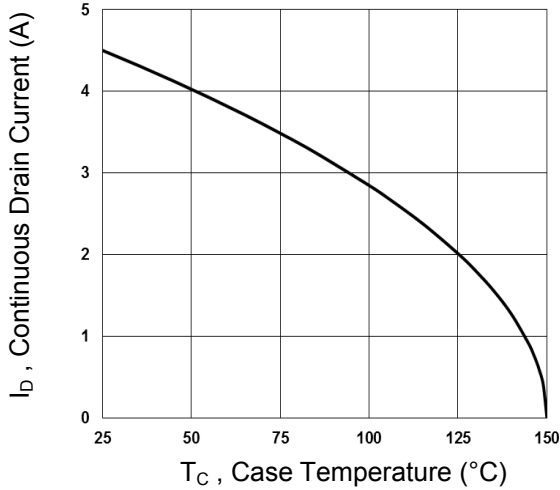


Fig.1 Continuous Drain Current vs. T_C

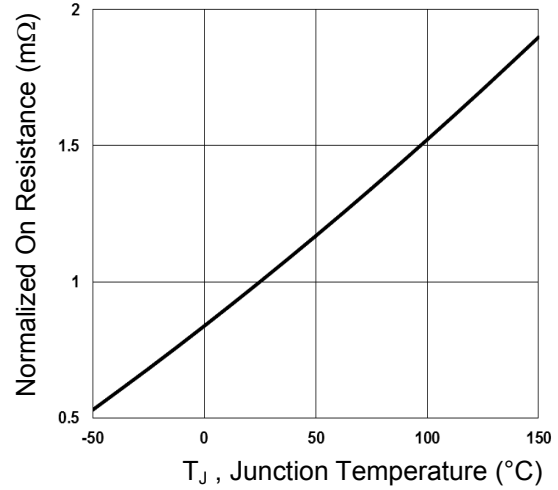


Fig.2 Normalized $R_{DS(ON)}$ vs. T_J

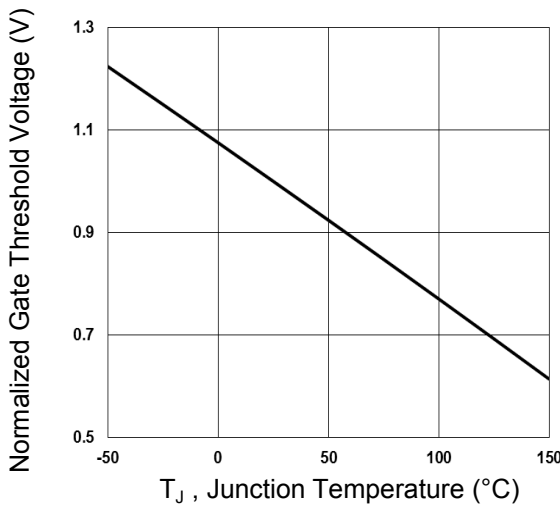


Fig.3 Normalized V_{th} vs. T_J

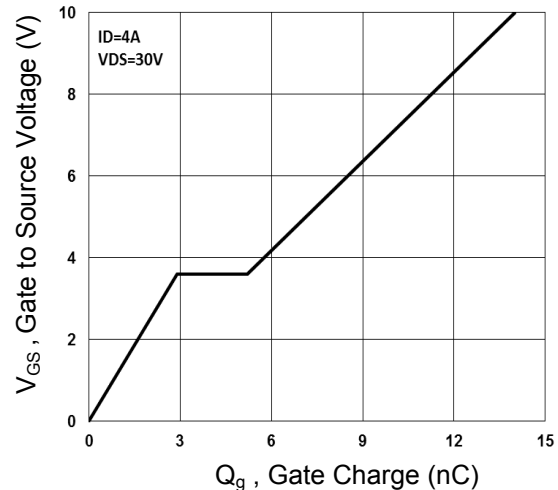


Fig.4 Gate Charge Waveform

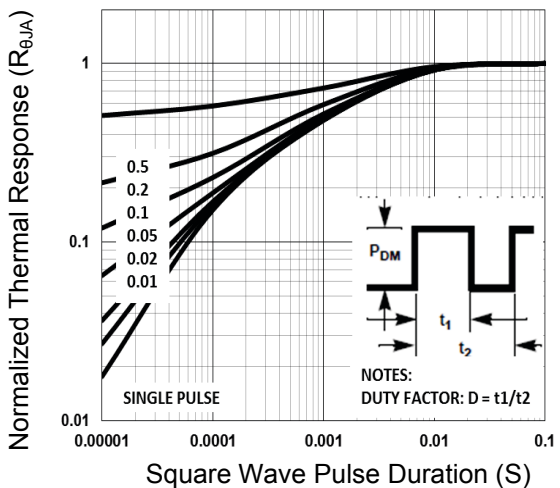


Fig.5 Normalized Transient Impedance

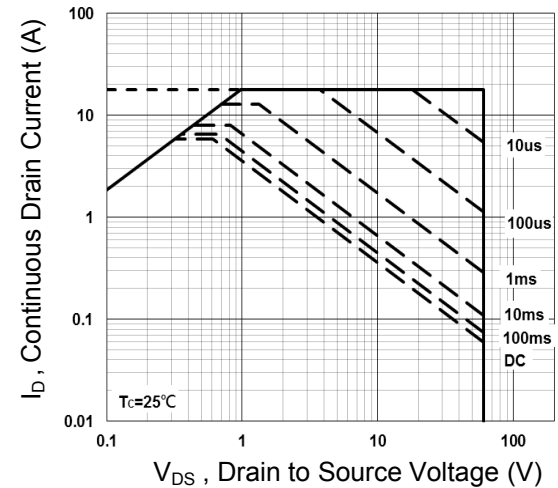


Fig.6 Maximum Safe Operation Area

P-Channel Typical Electrical and Thermal Characteristic Curves

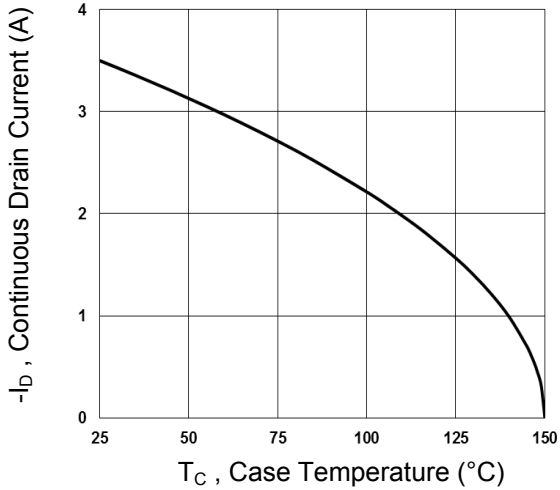


Fig.7 Continuous Drain Current vs. T_c

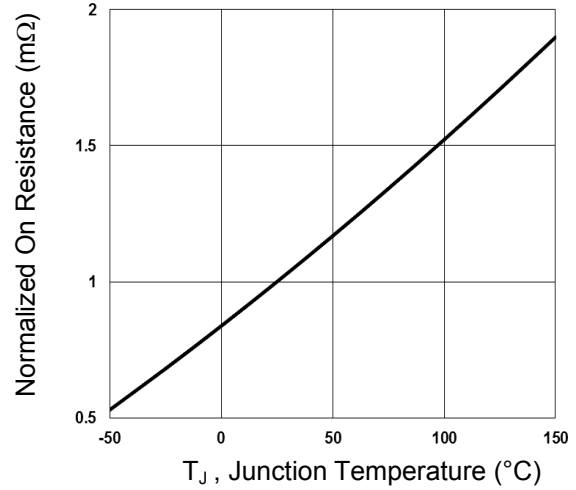


Fig.8 Normalized $R_{DS(ON)}$ vs. T_j

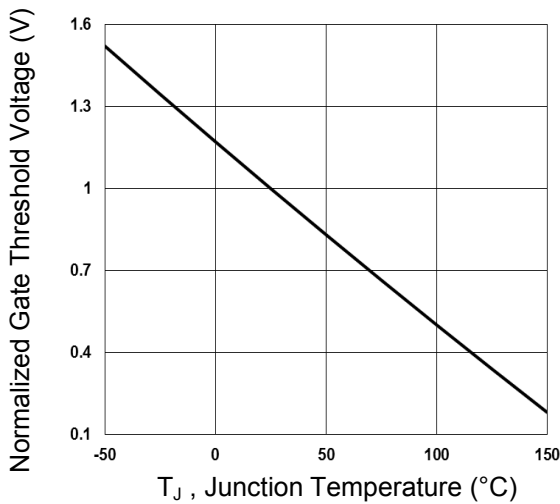


Fig.9 Normalized V_{th} vs. T_j

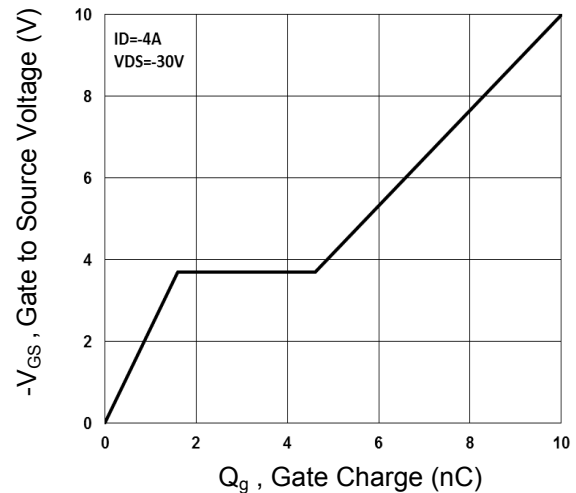


Fig.10 Gate Charge Waveform

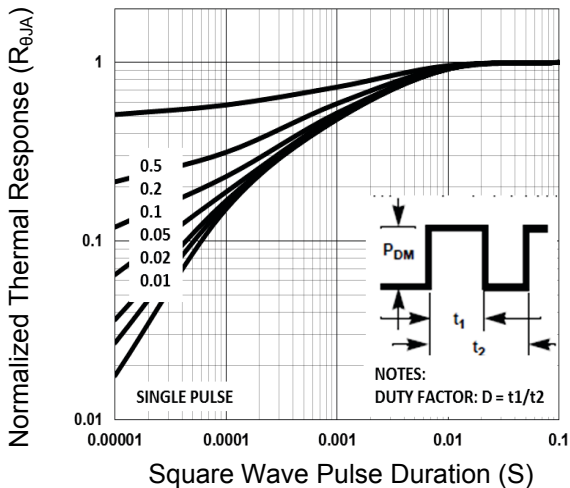


Fig.11 Normalized Transient Impedance

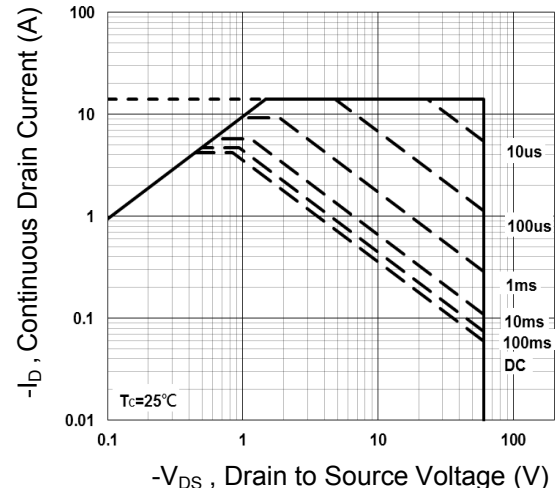
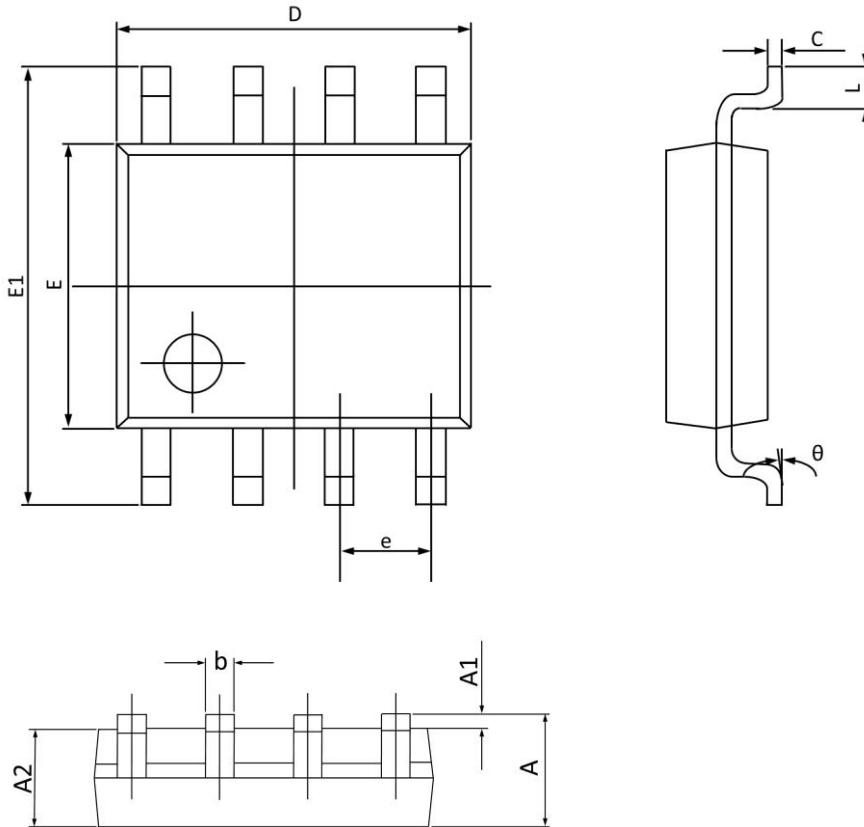


Fig.12 Maximum Safe Operation Area

Package Outline Dimensions

SOP-8



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