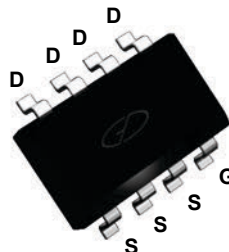
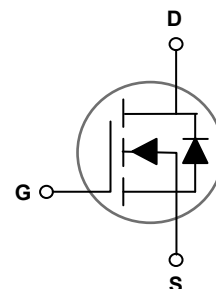


**Main Product Characteristics**

$V_{(BR)DSS}$	65V
$R_{DS(ON)}$	4.5mΩ
$I_D$	33A



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 GSFQ6976 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** ( $T_C=25^{\circ}C$  unless otherwise specified)

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DS}$	65	V
Gate-Source Voltage	$V_{GS}$	+20/-12	V
Drain Current – Continuous ( $T_C=25^{\circ}C$ )	$I_D$	33	A
Drain Current – Continuous ( $T_C=100^{\circ}C$ )		20.8	A
Drain Current – Pulsed <sup>1</sup>	$I_{DM}$	132	A
Single Pulse Avalanche Energy <sup>2</sup>	$E_{AS}$	174	mJ
Single Pulse Avalanche Current <sup>2</sup>	$I_{AS}$	59	A
Power Dissipation ( $T_C=25^{\circ}C$ )	$P_D$	9.4	W
Power Dissipation – Derate above 25°C		0.08	W/°C
Storage Temperature Range	$T_{STG}$	-50 to +150	°C
Operating Junction Temperature Range	$T_J$	-50 to +150	°C

**Thermal Characteristics**

Parameter	Symbol	Typ.	Max.	Unit
Thermal Resistance Junction to Ambient	$R_{\theta JA}$	---	62	°C/W
Thermal Resistance Junction to Case	$R_{\theta JC}$	---	13.3	°C/W

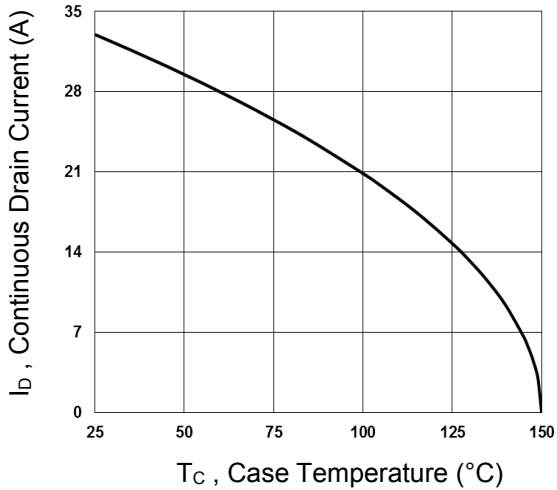
**Electrical Characteristics** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>Off Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$V_{GS}=0V, I_D=250\mu A$	65	---	---	V
$BV_{DSS}$ Temperature Coefficient	$\Delta BV_{DSS}/\Delta T_J$	Reference to $25^\circ\text{C}$ , $I_D=1\text{mA}$	---	0.02	---	$V/^\circ\text{C}$
Drain-Source Leakage Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	$\mu A$
		$V_{DS}=48V, V_{GS}=0V, T_J=85^\circ\text{C}$	---	---	10	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{GS}=20V, V_{DS}=0V$	---	---	100	nA
<b>On Characteristics</b>						
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=8A$	---	3.7	4.5	m $\Omega$
		$V_{GS}=4.5V, I_D=4A$	---	5.7	7.5	m $\Omega$
Gate Threshold Voltage	$V_{GS(th)}$	$V_{GS}=V_{DS}, I_D=250\mu A$	1	1.5	2.5	V
$V_{GS(th)}$ Temperature Coefficient	$\Delta V_{GS(th)}$		---	-5.1	---	$\text{mV}/^\circ\text{C}$
Forward Transconductance	$g_{fs}$	$V_{DS}=10V, I_D=3A$	---	12	---	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>3, 4</sup>	$Q_g$	$V_{DS}=48V, V_{GS}=10V, I_D=5A$	---	54	108	nC
Gate-Source Charge <sup>3, 4</sup>	$Q_{gs}$		---	5.2	10.4	
Gate-Drain Charge <sup>3, 4</sup>	$Q_{gd}$		---	16.1	32.2	
Turn-On Delay Time <sup>3, 4</sup>	$T_{d(on)}$	$V_{DD}=30V, V_{GS}=10V, R_G=6\Omega, I_D=1A$	---	10.6	21	nS
Rise Time <sup>3, 4</sup>	$T_r$		---	16.5	33	
Turn-Off Delay Time <sup>3, 4</sup>	$T_{d(off)}$		---	48	96	
Fall Time <sup>3, 4</sup>	$T_f$		---	78	150	
Input Capacitance	$C_{iss}$	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	2976	5800	pF
Output Capacitance	$C_{oss}$		---	950	190	
Reverse Transfer Capacitance	$C_{rss}$		---	24	48	
Gate Resistance	$R_g$	$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	1.24	---	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$I_S$	$V_G=V_D=0V$ , Force Current	---	---	33	A
Pulsed Source Current	$I_{SM}$		---	---	66	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V

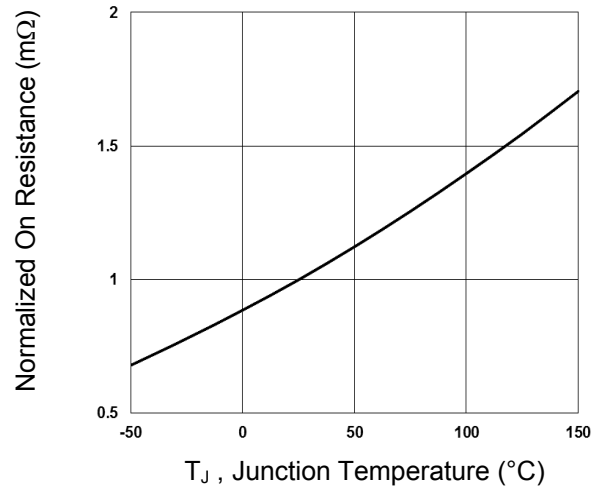
Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2.  $V_{DD}=25V, V_{GS}=10V, L=0.1\text{mH}, I_{AS}=59A, R_G=25\Omega$ , Starting  $T_J=25^\circ\text{C}$ .
3. The data tested by pulsed, pulse width  $\leq 300\mu\text{s}$ , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.

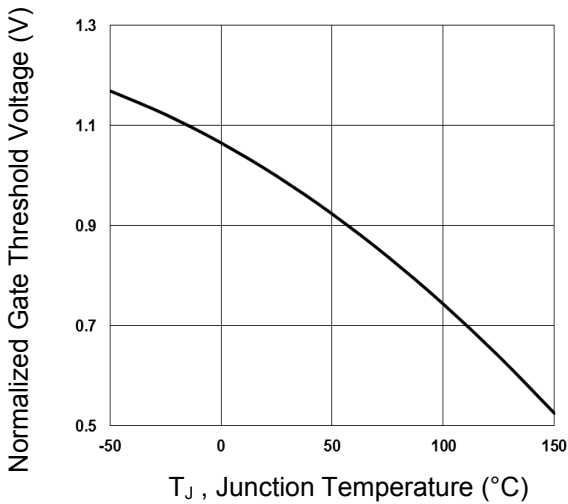
**Typical Electrical and Thermal Characteristic Curves**



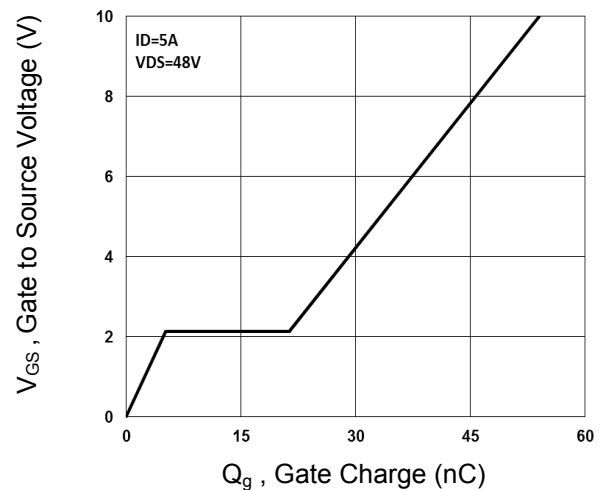
**Fig.1 Continuous Drain Current vs.  $T_c$**



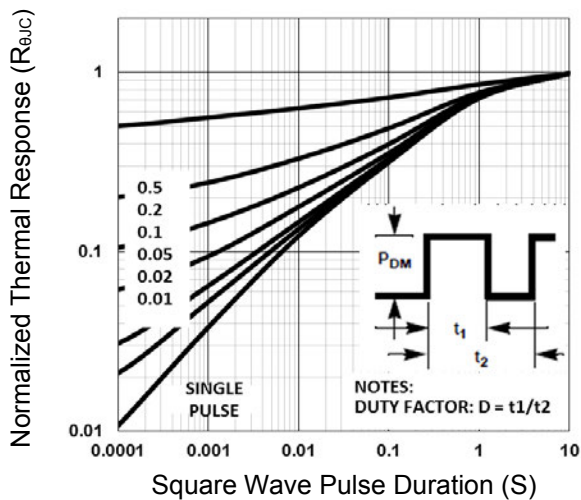
**Fig.2 Normalized  $R_{DS(ON)}$  vs.  $T_j$**



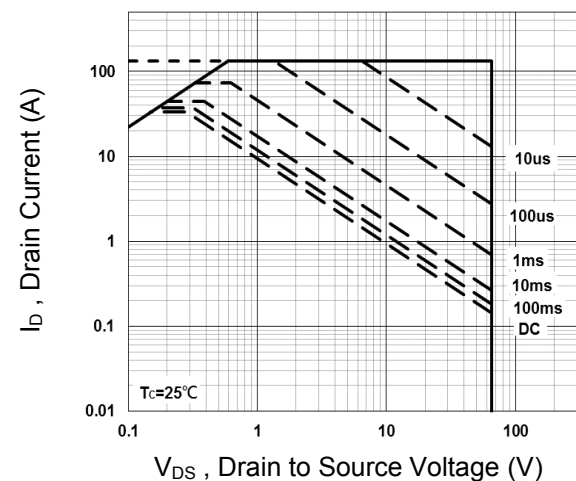
**Fig.3 Normalized  $V_{th}$  vs.  $T_j$**



**Fig.4 Gate Charge Characteristics**

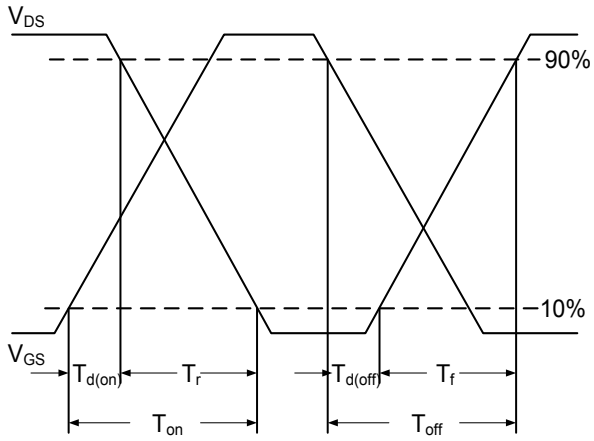


**Fig.5 Normalized Transient Impedance**

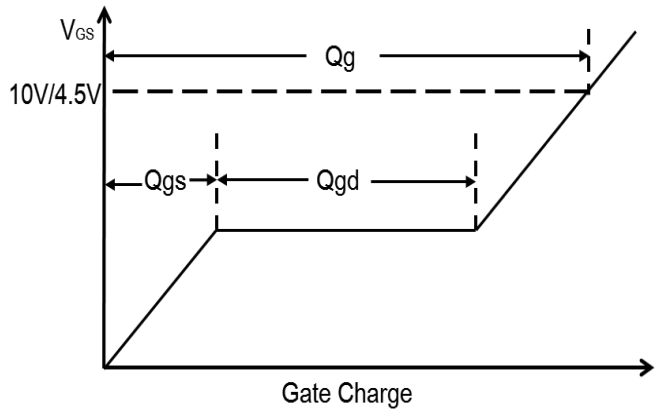


**Fig.6 Maximum Safe Operation Area**

**Typical Electrical and Thermal Characteristic Curves**



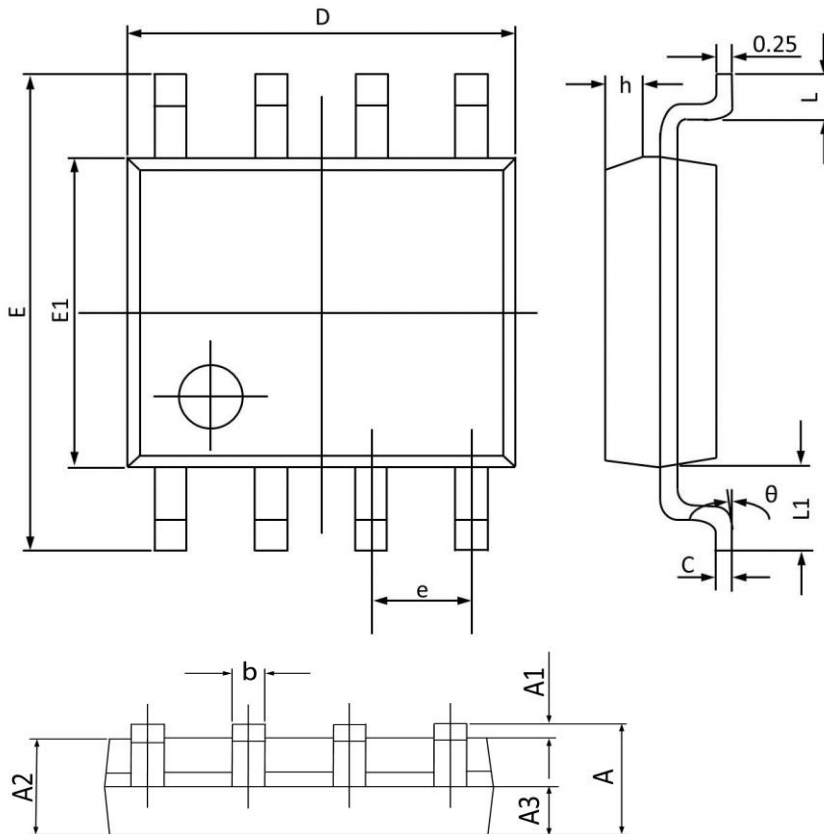
**Fig.7 Switching Time Waveform**



**Fig.8 Gate Charge Waveform**

**Package Outline Dimensions**

**SOP-8**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.068
A1	0.100	0.250	0.004	0.009
A2	1.300	1.500	0.052	0.059
A3	0.600	0.700	0.024	0.027
b	0.390	0.480	0.016	0.018
c	0.210	0.260	0.009	0.010
D	4.700	5.100	0.186	0.200
E	5.800	6.200	0.229	0.244
E1	3.700	4.100	0.146	0.161
e	1.270(BSC)		0.050(BSC)	
h	0.250	0.500	0.010	0.019
L	0.500	0.800	0.019	0.031
L1	1.050(BSC)		0.041(BSC)	
θ	0°	8°	0°	8°