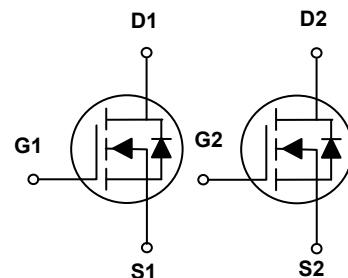
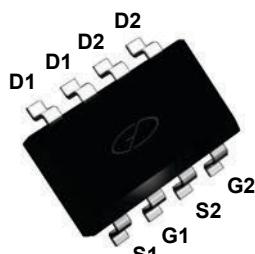


## Main Product Characteristics

$V_{(BR)DSS}$	40V
$R_{DS(ON)}$	15mΩ
$I_D$	10A



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 GSFQ4856 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	Max.	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous ( $T_c=25^\circ\text{C}$ )	$I_D$	10	A
Drain Current-Continuous ( $T_c=100^\circ\text{C}$ )		6.3	
Drain Current-Pulsed <sup>1</sup>	$I_{DM}$	40	A
Single Pulse Avalanche Energy <sup>2</sup>	$E_{AS}$	76	mJ
Single Pulse Avalanche Current <sup>2</sup>	$I_{AS}$	39	A
Power Dissipation ( $T_c=25^\circ\text{C}$ )	$P_D$	2.1	W
Power Dissipation-Derate above 25°C		0.017	W/°C
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	60	°C/W
Operating Junction Temperature Range	$T_J$	-50 To +150	°C
Storage Temperature Range	$T_{STG}$	-50 To +150	°C

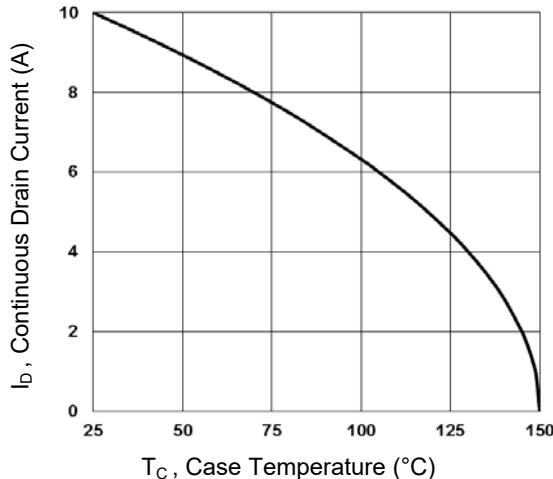
**Electrical Characteristics** ( $T_J=25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>On/Off Characteristics</b>						
Drain-Source Breakdown Voltage	$\text{BV}_{\text{DSS}}$	$\text{V}_{\text{GS}}=0\text{V}, \text{I}_D=250\mu\text{A}$	40	-	-	V
Drain-Source Leakage Current	$\text{I}_{\text{DSS}}$	$\text{V}_{\text{DS}}=40\text{V}, \text{V}_{\text{GS}}=0\text{V}, \text{T}_J=25^\circ\text{C}$	-	-	1	$\mu\text{A}$
		$\text{V}_{\text{DS}}=32\text{V}, \text{V}_{\text{GS}}=0\text{V}, \text{T}_J=125^\circ\text{C}$	-	-	10	$\mu\text{A}$
Gate-Source Leakage Current	$\text{I}_{\text{GSS}}$	$\text{V}_{\text{GS}}=\pm 20\text{V}, \text{V}_{\text{DS}}=0\text{V}$	-	-	$\pm 100$	nA
Static Drain-Source On-Resistance	$\text{R}_{\text{DS(ON)}}$	$\text{V}_{\text{GS}}=10\text{V}, \text{I}_D=8\text{A}$	-	12	15	$\text{m}\Omega$
		$\text{V}_{\text{GS}}=4.5\text{V}, \text{I}_D=6\text{A}$	-	15	20	
Gate Threshold Voltage	$\text{V}_{\text{GS(th)}}$	$\text{V}_{\text{GS}}=\text{V}_{\text{DS}}, \text{I}_D=250\mu\text{A}$	1.2	1.8	2.5	V
Forward Transconductance	$\text{g}_{\text{fs}}$	$\text{V}_{\text{DS}}=10\text{V}, \text{I}_D=1\text{A}$	-	5	-	S
<b>Dynamic and Switching Characteristics</b>						
Total Gate Charge <sup>3,4</sup>	$\text{Q}_g$	$\text{V}_{\text{DS}}=20\text{V}, \text{I}_D=10\text{A}, \text{V}_{\text{GS}}=4.5\text{V}$	-	13	26	nC
Gate-Source Charge <sup>3,4</sup>	$\text{Q}_{\text{gs}}$		-	4	8	
Gate-Drain Charge <sup>3,4</sup>	$\text{Q}_{\text{gd}}$		-	5.3	10	
Turn-On Delay Time <sup>3,4</sup>	$\text{t}_{\text{d(on)}}$	$\text{V}_{\text{DD}}=20\text{V}, \text{R}_G=6\Omega, \text{V}_{\text{GS}}=10\text{V}, \text{I}_D=1\text{A}$	-	8	16	nS
Rise Time <sup>3,4</sup>	$\text{t}_r$		-	3.2	8	
Turn-Off Delay Time <sup>3,4</sup>	$\text{t}_{\text{d(off)}}$		-	26.4	52	
Fall Time <sup>3,4</sup>	$\text{t}_f$		-	3.8	8	
Input Capacitance	$\text{C}_{\text{iss}}$	$\text{V}_{\text{DS}}=20\text{V}, \text{V}_{\text{GS}}=0\text{V}, \text{F}=1\text{MHz}$	-	1088	2000	pF
Output Capacitance	$\text{C}_{\text{oss}}$		-	110	200	
Reverse Transfer Capacitance	$\text{C}_{\text{rss}}$		-	80	160	
Gate Resistance	$\text{R}_g$	$\text{V}_{\text{GS}}=0\text{V}, \text{V}_{\text{DS}}=0\text{V}, \text{F}=1\text{MHz}$	-	3	6	$\Omega$
<b>Drain-Source Diode Characteristics and Maximum Ratings</b>						
Continuous Source Current	$\text{I}_s$	$\text{V}_G=\text{V}_D=0\text{V}, \text{Force Current}$	-	-	10	A
Pulsed Source Current	$\text{I}_{\text{SM}}$		-	-	20	A
Diode Forward Voltage	$\text{V}_{\text{SD}}$	$\text{V}_{\text{GS}}=0\text{V}, \text{I}_s=1\text{A}, \text{T}_J=25^\circ\text{C}$	-	-	1	V

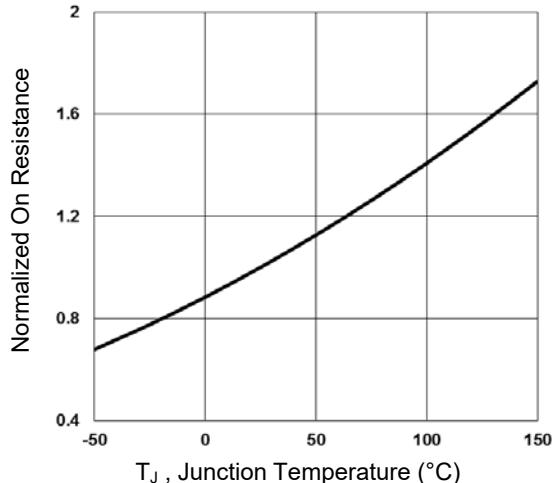
Note:

1. Repetitive rating: Pulsed width limited by maximum junction temperature.
2.  $\text{V}_{\text{DD}}=25\text{V}, \text{V}_{\text{GS}}=10\text{V}, \text{L}=0.1\text{mH}, \text{I}_{\text{AS}}=39\text{A}, \text{R}_G=25\Omega$ , starting  $\text{T}_J=25^\circ\text{C}$ .
3. Pulse test: pulse width  $\leq 300\text{us}$ , duty cycle  $\leq 2\%$ .
4. Essentially independent of operation temperature.

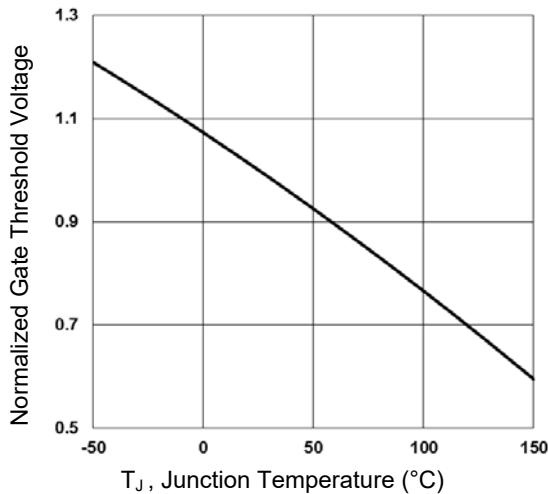
## Typical Electrical and Thermal Characteristic Curves



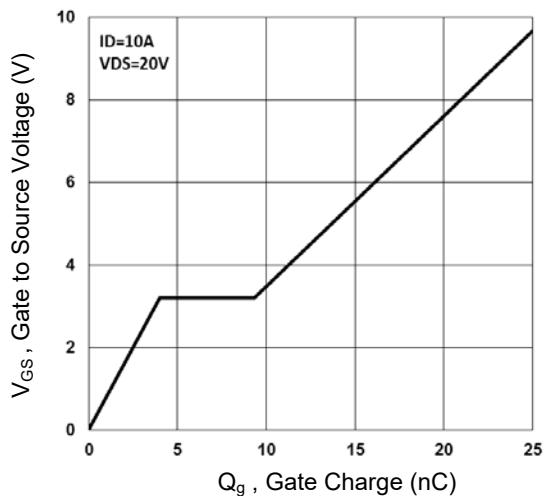
**Figure 1. Continuous Drain Current vs. T<sub>c</sub>**



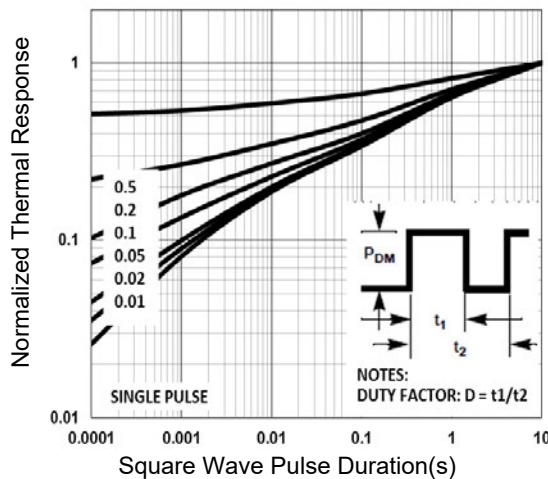
**Figure 2. Normalized R<sub>DS(on)</sub> vs. T<sub>j</sub>**



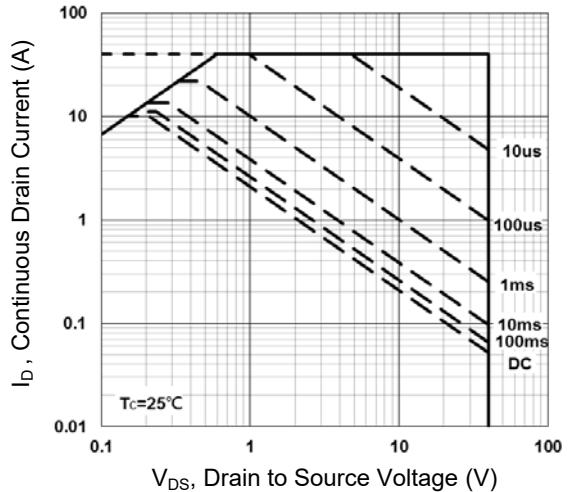
**Figure 3. Normalized V<sub>th</sub> vs. T<sub>j</sub>**



**Figure 4. Gate Charge Waveform**



**Figure 5. Normalized Transient Impedance**



**Figure 6. Maximum Safe Operation Area**

### Typical Electrical and Thermal Characteristic Curves

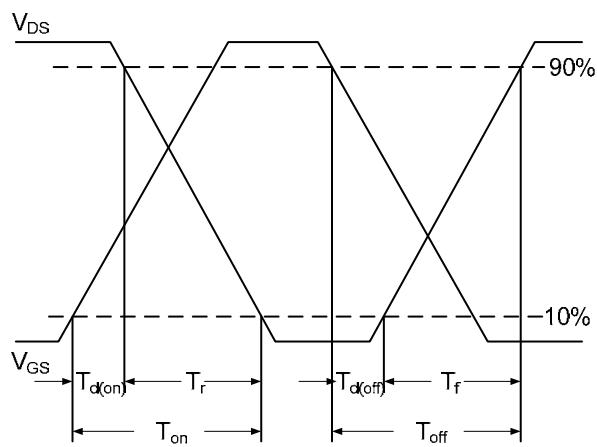


Figure 7. Switching Time Waveform

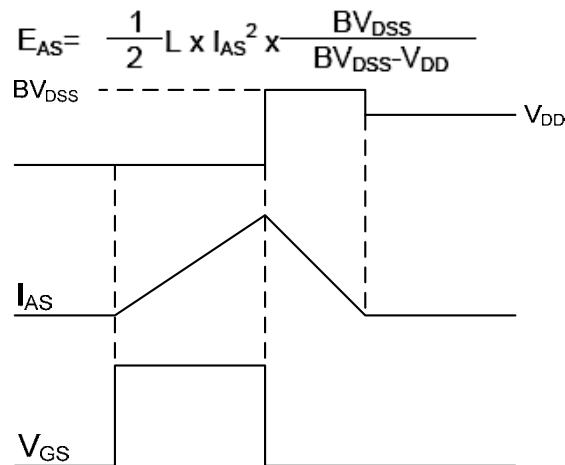
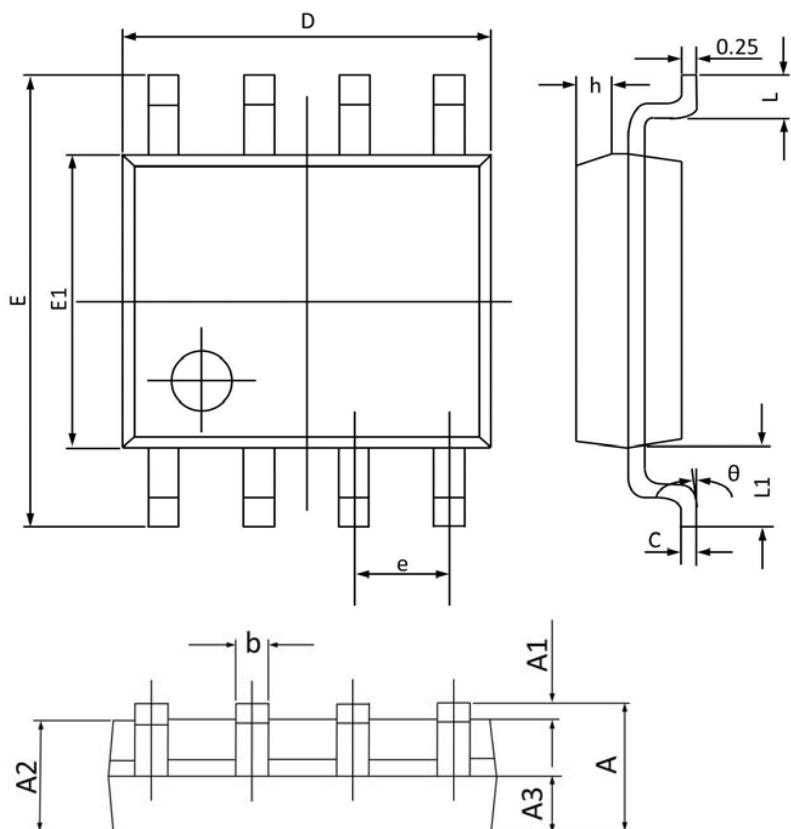


Figure 8. EAS Waveform

### Package Outline Dimensions

**SOP-8**



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.250	1.650	0.049	0.065
A3	0.500	0.700	0.020	0.028
b	0.380	0.510	0.015	0.020
c	0.170	0.260	0.007	0.010
D	4.700	5.100	0.185	0.201
E	5.800	6.200	0.228	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	0.020
L	0.400	0.800	0.016	0.031
L1	1.050(BSC)		0.041(BSC)	
θ	0°	8°	0°	8°