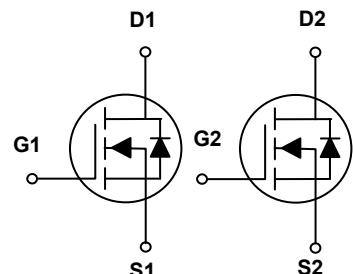
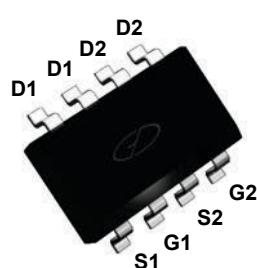


## Main Product Characteristics

|               |      |
|---------------|------|
| $V_{(BR)DSS}$ | 40V  |
| $R_{DS(ON)}$  | 13mΩ |
| $I_D$         | 12A  |



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 GSFQ4806 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                                   | $V_{DS}$  | 40          | V    |
| Gate-Source Voltage                                    | $V_{GS}$  | $\pm 20$    | V    |
| Drain Current – Continuous ( $T_c=25^\circ\text{C}$ )  | $I_D$     | 12          | A    |
| Drain Current – Continuous ( $T_c=100^\circ\text{C}$ ) |           | 7.5         | A    |
| Drain Current – Pulsed <sup>1</sup>                    | $I_{DM}$  | 48          | 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 |
| 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 | $R_{\theta JA}$ | ---  | 60   | °C/W |

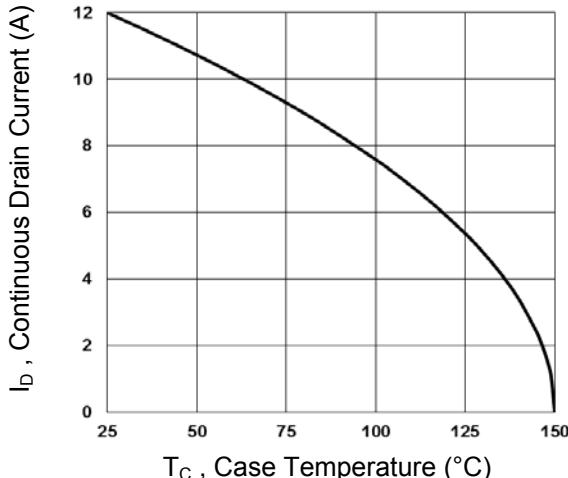
## Electrical Characteristics ( $T_J=25^\circ\text{C}$ unless otherwise specified)

| Parameter   | Symbol                     | Conditions   | Min. | Typ. | Max.      | Unit             |
|---|----------------------------|--|------|------|-----------|------------------|
| <b>Off Characteristics</b>                                    |                            |  |      |      |           |                  |
| Drain-Source Breakdown Voltage                                | $\text{BV}_{\text{DSS}}$   | $\text{V}_{\text{GS}}=0\text{V}, \text{I}_D=250\mu\text{A}$  | 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                                   | $\text{I}_{\text{GSS}}$    | $\text{V}_{\text{GS}}=\pm 20\text{V}, \text{V}_{\text{DS}}=0\text{V}$  | ---  | ---  | $\pm 100$ | $\text{nA}$      |
| <b>On Characteristics</b>                                     |                            |  |      |      |           |                  |
| Static Drain-Source On-Resistance                             | $\text{R}_{\text{DS(ON)}}$ | $\text{V}_{\text{GS}}=10\text{V}, \text{I}_D=8\text{A}$  | ---  | 11   | 13        | $\text{m}\Omega$ |
|   |                            | $\text{V}_{\text{GS}}=4.5\text{V}, \text{I}_D=4\text{A}$   | ---  | 14   | 18        | $\text{m}\Omega$ |
| 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>2, 3</sup>                             | $\text{Q}_g$               | $\text{V}_{\text{DS}}=20\text{V}, \text{V}_{\text{GS}}=4.5\text{V}, \text{I}_D=8\text{A}$                      | ---  | 12.2 | 24        | nC               |
| Gate-Source Charge <sup>2, 3</sup>                            | $\text{Q}_{\text{gs}}$     |  | ---  | 3.3  | 7         |                  |
| Gate-Drain Charge <sup>2, 3</sup>                             | $\text{Q}_{\text{gd}}$     |  | ---  | 6.7  | 13        |                  |
| Turn-On Delay Time <sup>2, 3</sup>                            | $\text{T}_{\text{d(on)}}$  | $\text{V}_{\text{DD}}=15\text{V}, \text{V}_{\text{GS}}=10\text{V}, \text{R}_g=3.3\Omega, \text{I}_D=1\text{A}$ | ---  | 13.2 | 25        | nS               |
| Rise Time <sup>2, 3</sup>                                     | $\text{T}_r$               |  | ---  | 2.2  | 5         |                  |
| Turn-Off Delay Time <sup>2, 3</sup>                           | $\text{T}_{\text{d(off)}}$ |  | ---  | 72   | 130       |                  |
| Fall Time <sup>2, 3</sup>                                     | $\text{T}_f$               |  | ---  | 4.5  | 10        |                  |
| Input Capacitance   | $\text{C}_{\text{iss}}$    | $\text{V}_{\text{DS}}=25\text{V}, \text{V}_{\text{GS}}=0\text{V}, \text{F}=1\text{MHz}$                        | ---  | 1220 | 2200      | pF               |
| Output Capacitance  | $\text{C}_{\text{oss}}$    |  | ---  | 130  | 250       |                  |
| Reverse Transfer Capacitance                                  | $\text{C}_{\text{rss}}$    |  | ---  | 55   | 110       |                  |
| Gate Resistance   | $\text{R}_g$               | $\text{V}_{\text{GS}}=0\text{V}, \text{V}_{\text{DS}}=0\text{V}, \text{F}=1\text{MHz}$                         | ---  | 2.2  | ---       | $\Omega$         |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b> |                            |  |      |      |           |                  |
| Continuous Source Current                                     | $\text{I}_s$               | $\text{V}_{\text{G}}=\text{V}_{\text{D}}=0\text{V}, \text{Force Current}$                                      | ---  | ---  | 12        | A                |
| Pulsed Source Current   | $\text{I}_{\text{SM}}$     |  | ---  | ---  | 24        | 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                |

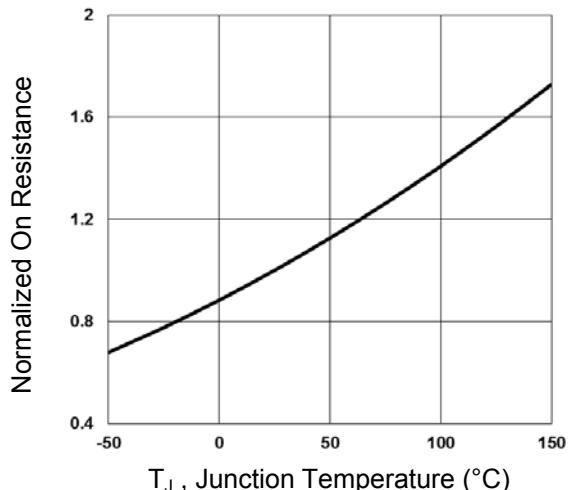
Note:

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. The data tested by pulsed, pulse width  $\leq 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .
4. Essentially independent of operating temperature.

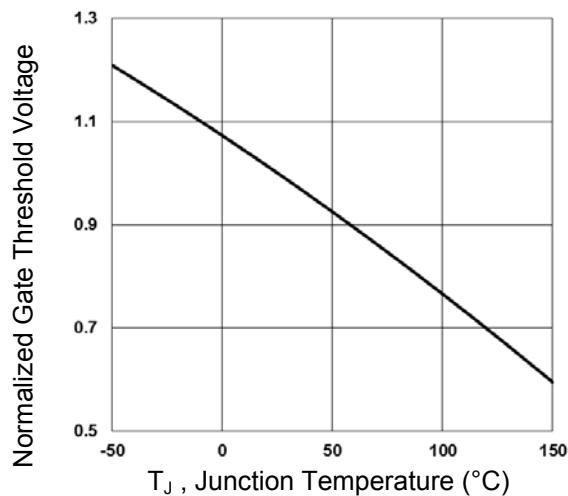
## Typical Electrical and Thermal Characteristic Curves



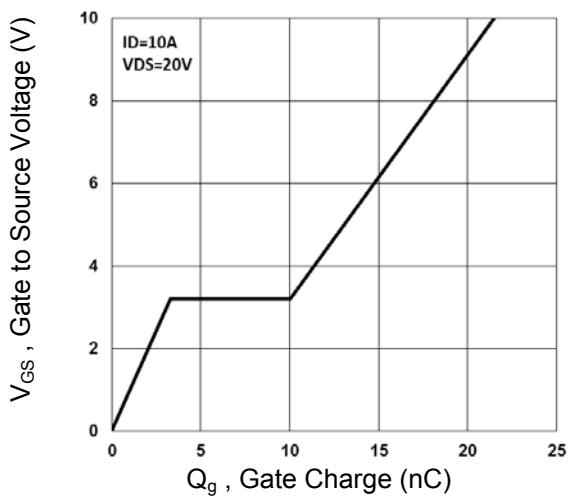
**Fig.1** Continuous Drain Current vs.  $T_c$



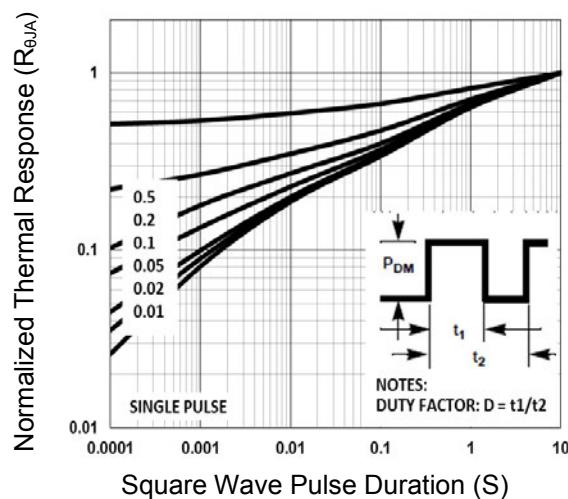
**Fig.2** Normalized  $R_{DS(ON)}$  vs.  $T_J$



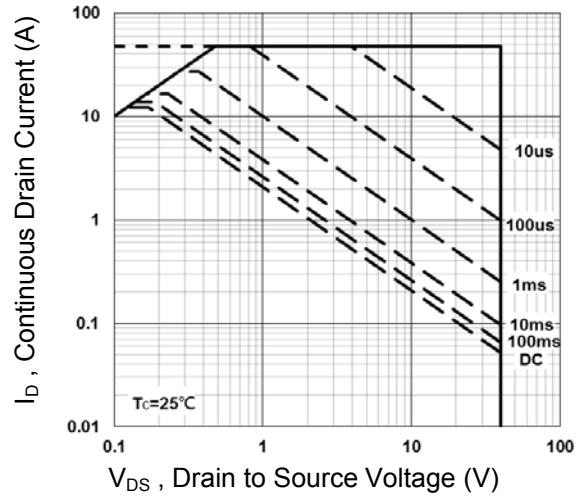
**Fig.3** Normalized  $V_{th}$  vs.  $T_J$



**Fig.4** Gate Charge Waveform



**Fig.5** Normalized Transient Impedance



**Fig.6** Maximum Safe Operation Area

## Typical Electrical and Thermal Characteristic Curves

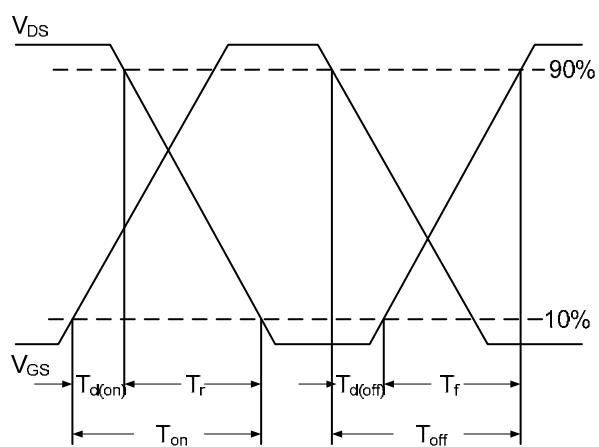


Fig.7 Switching Time Waveform

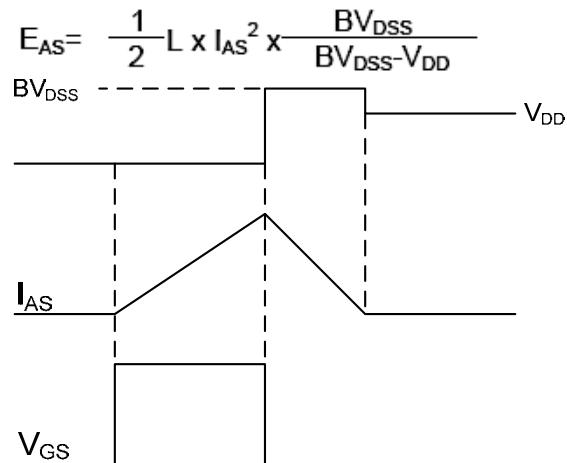
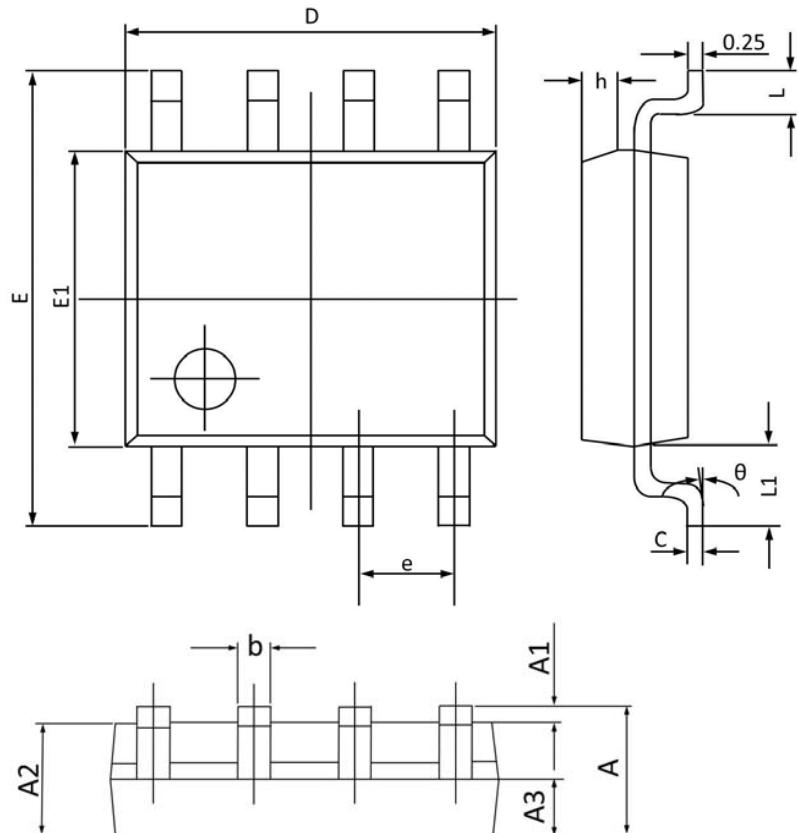


Fig.8 E<sub>AS</sub> Waveform

### Package Outline Dimensions

### SOP-8



| Symbol | Dimensions In Millimeters |      | Dimensions In Inches |       |
|--------|---------------------------|------|----------------------|-------|
|        | Min                       | Max  | Min                  | Max   |
| A      | 1.35                      | 1.75 | 0.053                | 0.068 |
| A1     | 0.1                       | 0.25 | 0.004                | 0.009 |
| A2     | 1.3                       | 1.5  | 0.052                | 0.059 |
| A3     | 0.6                       | 0.7  | 0.024                | 0.027 |
| b      | 0.39                      | 0.48 | 0.016                | 0.018 |
| c      | 0.21                      | 0.26 | 0.009                | 0.01  |
| D      | 4.7                       | 5.1  | 0.186                | 0.2   |
| E      | 5.8                       | 6.2  | 0.229                | 0.244 |
| E1     | 3.7                       | 4.1  | 0.146                | 0.161 |
| e      | 1.270(BSC)                |      | 0.050(BSC)           |       |
| h      | 0.25                      | 0.5  | 0.01                 | 0.019 |
| L      | 0.5                       | 0.8  | 0.019                | 0.031 |
| L1     | 1.050(BSC)                |      | 0.041(BSC)           |       |
| θ      | 0°                        | 8°   | 0°                   | 8°    |