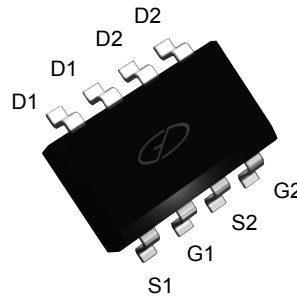
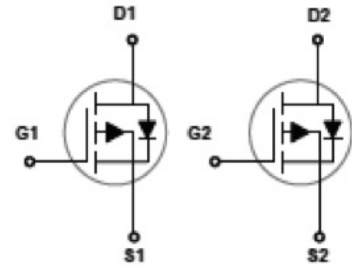


### Main Product Characteristics

|               |              |
|---------------|--------------|
| $V_{(BR)DSS}$ | -30V         |
| $R_{DS(ON)}$  | 23m $\Omega$ |
| $I_D$         | -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 SSFQ3807 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<sub>C</sub>=25°C unless otherwise specified)

| Parameter  | Symbol           | Rating      | Unit |
|--|------------------|-------------|------|
| Drain-Source Voltage                                     | V <sub>DS</sub>  | -30         | V    |
| Gate-Source Voltage(base on I <sub>GSS1</sub> condition) | V <sub>GS</sub>  | ±20         | V    |
| Gate-Source Voltage(base on I <sub>GSS2</sub> condition) | V <sub>GS</sub>  | ±25         | V    |
| Drain Current – Continuous (T <sub>C</sub> =25°C)        | I <sub>D</sub>   | -7          | A    |
| Drain Current – Continuous (T <sub>C</sub> =100°C)       |                  | -4.43       | A    |
| Drain Current – Pulsed <sup>1</sup>                      | I <sub>DM</sub>  | -28         | A    |
| Single Pulse Avalanche Energy <sup>2</sup>               | E <sub>AS</sub>  | 61          | mJ   |
| Single Pulse Avalanche Current <sup>2</sup>              | I <sub>AS</sub>  | 35          | A    |
| Power Dissipation (T <sub>C</sub> =25°C)                 | P <sub>D</sub>   | 2.1         | W    |
| Power Dissipation – Derate above 25°C                    |                  | 0.017       | W/°C |
| Storage Temperature Range                                | T <sub>STG</sub> | -55 to +150 | °C   |
| Operating Junction Temperature Range                     | T <sub>J</sub>   | -55 to +150 | °C   |

### Thermal Characteristics

| Parameter                              | Symbol           | Typ. | Max. | Unit |
|--|------------------|------|------|------|
| Thermal Resistance Junction to Ambient | R <sub>θJA</sub> | ---  | 60   | °C/W |

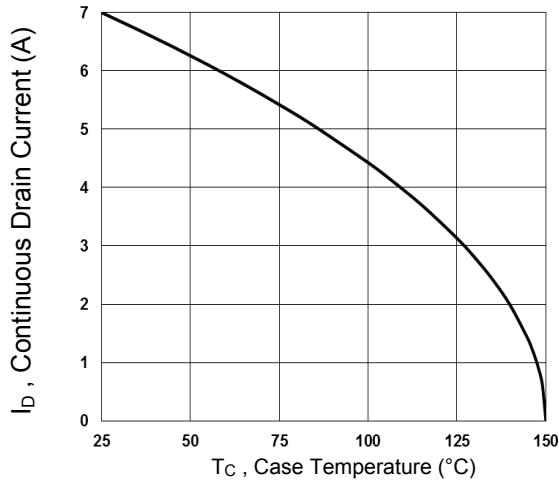
### Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

| Parameter   | Symbol                              | Conditions  | Min. | Typ.  | Max. | Unit  |
|---|-------------------------------------|---|------|-------|------|-------|
| <b>Off Characteristics</b>                                    |                                     |   |      |       |      |       |
| Drain-Source Breakdown Voltage                                | BV <sub>DSS</sub>                   | V <sub>GS</sub> =0V, I <sub>b</sub> =-250uA   | -30  | ---   | ---  | V     |
| BV <sub>DSS</sub> Temperature Coefficient                     | ΔBV <sub>DSS</sub> /ΔT <sub>J</sub> | Reference to 25°C, I <sub>b</sub> =-1mA   | ---  | -0.03 | ---  | V/°C  |
| Drain-Source Leakage Current                                  | I <sub>DSS</sub>                    | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C                      | ---  | ---   | -1   | uA    |
|   |                                     | V <sub>DS</sub> =-24V, V <sub>GS</sub> =0V, T <sub>J</sub> =125°C                     | ---  | ---   | -10  | uA    |
| Gate-Source Leakage Current                                   | I <sub>GSS1</sub>                   | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V  | ---  | ---   | ±100 | nA    |
| Gate-Source Leakage Current                                   | I <sub>GSS2</sub>                   | V <sub>GS</sub> =±25V, V <sub>DS</sub> =0V  | ---  | ---   | ±1   | mA    |
| <b>On Characteristics</b>                                     |                                     |   |      |       |      |       |
| Static Drain-Source On-Resistance                             | R <sub>DS(ON)</sub>                 | V <sub>GS</sub> =-10V, I <sub>D</sub> =-5A  | ---  | 20    | 23   | mΩ    |
|   |                                     | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3A   | ---  | 30    | 36   | mΩ    |
| Gate Threshold Voltage  | V <sub>GS(th)</sub>                 | V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =-250uA                             | -1.2 | -1.6  | -2.5 | V     |
| V <sub>GS(th)</sub> Temperature Coefficient                   | ΔV <sub>GS(th)</sub>                |   | ---  | 4     | ---  | mV/°C |
| Forward Transconductance                                      | g <sub>fs</sub>                     | V <sub>DS</sub> =-10V, I <sub>D</sub> =-3A  | ---  | 6.8   | ---  | S     |
| <b>Dynamic and Switching Characteristics</b>                  |                                     |   |      |       |      |       |
| Total Gate Charge <sup>3,4</sup>                              | Q <sub>g</sub>                      | V <sub>DS</sub> =-15V, V <sub>GS</sub> =-4.5V, I <sub>b</sub> =-5A                    | ---  | 11    | 17   | nC    |
| Gate-Source Charge <sup>3,4</sup>                             | Q <sub>gs</sub>                     |   | ---  | 3.4   | 6    |       |
| Gate-Drain Charge <sup>3,4</sup>                              | Q <sub>gd</sub>                     |   | ---  | 4.2   | 8    |       |
| Turn-On Delay Time <sup>3,4</sup>                             | T <sub>d(on)</sub>                  | V <sub>DD</sub> =-15V, V <sub>GS</sub> =-10V, R <sub>G</sub> =6Ω, I <sub>D</sub> =-1A | ---  | 5.8   | 11   | nS    |
| Rise Time <sup>3,4</sup>                                      | T <sub>r</sub>                      |   | ---  | 18.8  | 36   |       |
| Turn-Off Delay Time <sup>3,4</sup>                            | T <sub>d(off)</sub>                 |   | ---  | 46.9  | 89   |       |
| Fall Time <sup>3,4</sup>                                      | T <sub>f</sub>                      |   | ---  | 12.3  | 23   |       |
| Input Capacitance   | C <sub>iss</sub>                    | V <sub>DS</sub> =-15V, V <sub>GS</sub> =0V, F=1MHz                                    | ---  | 1250  | 1820 | pF    |
| Output Capacitance  | C <sub>oss</sub>                    |   | ---  | 160   | 235  |       |
| Reverse Transfer Capacitance                                  | C <sub>rss</sub>                    |   | ---  | 90    | 130  |       |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b> |                                     |   |      |       |      |       |
| Parameter   | Symbol                              | Conditions  | Min. | Typ.  | Max. | Unit  |
| Continuous Source Current                                     | I <sub>s</sub>                      | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current                                     | ---  | ---   | -7   | A     |
| Pulsed Source Current   | I <sub>SM</sub>                     |   | ---  | ---   | -28  | A     |
| Diode Forward Voltage   | V <sub>SD</sub>                     | V <sub>GS</sub> =0V, I <sub>s</sub> =-1A, T <sub>J</sub> =25°C                        | ---  | ---   | -1   | V     |

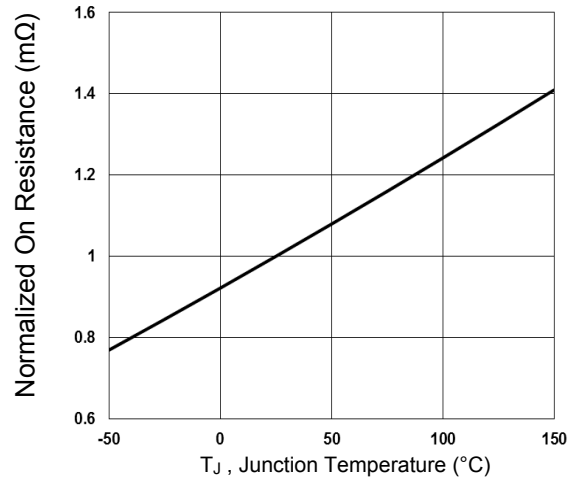
**Note:**

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=35A, R<sub>G</sub>=25Ω, Starting T<sub>J</sub>=25°C.
3. The data tested by pulsed, pulse width ≤ 300uS, duty cycle ≤ 2%.
4. Essentially independent of operating temperature.

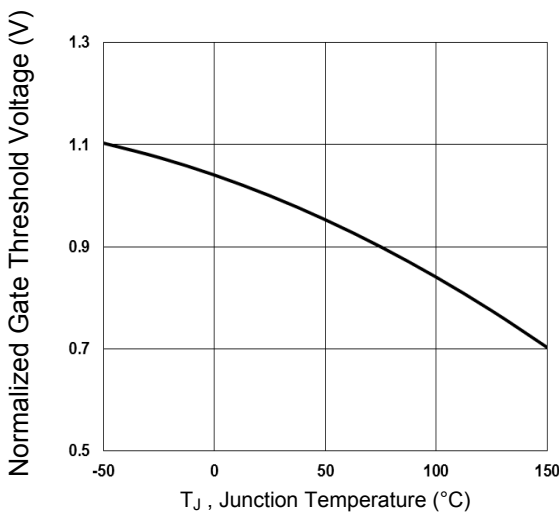
### Typical Electrical and Thermal Characteristic Curves



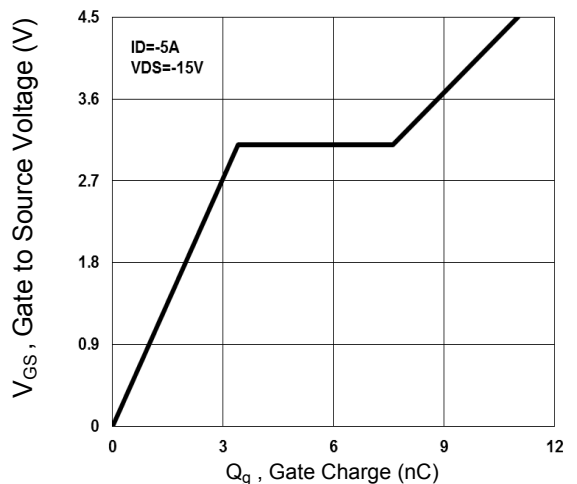
**Fig.1 Continuous Drain Current vs.  $T_c$**



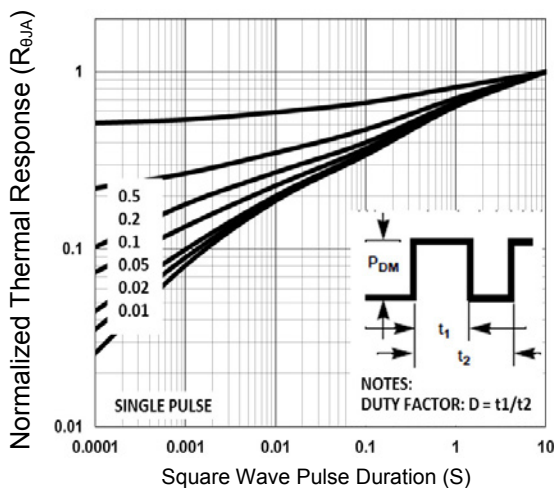
**Fig.2 Normalized  $R_{DS(ON)}$  vs.  $T_j$**



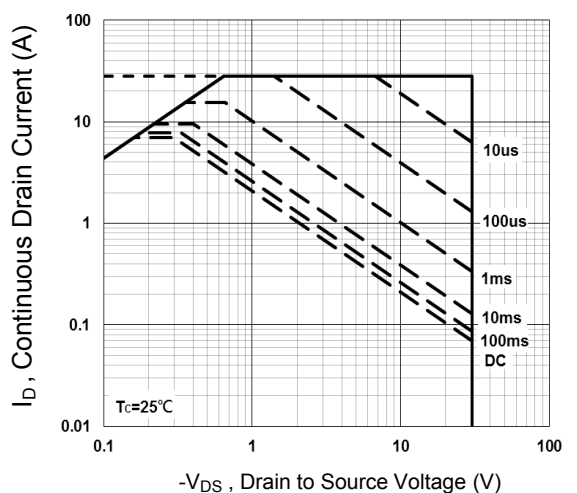
**Fig.3 Normalized  $V_{th}$  vs.  $T_j$**



**Fig.4 Gate Charge Waveform**

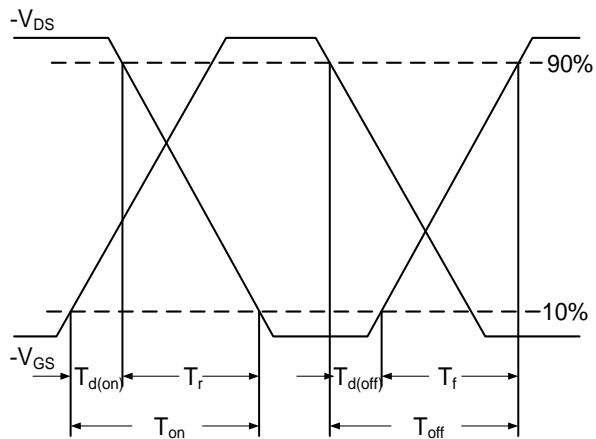


**Fig.5 Normalized Transient Impedance**

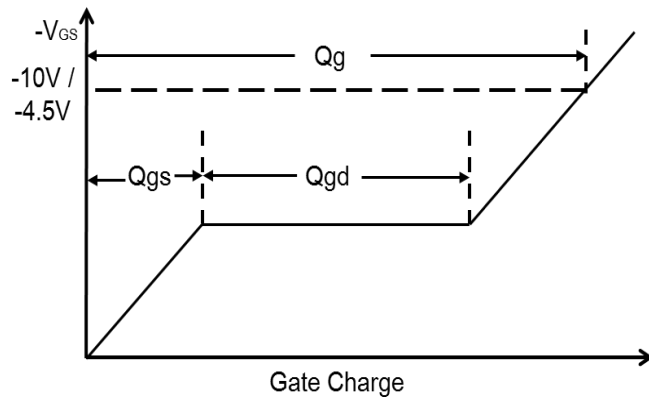


**Fig.6 Maximum Safe Operation Area**

**Typical Electrical and Thermal Characteristic Curves**



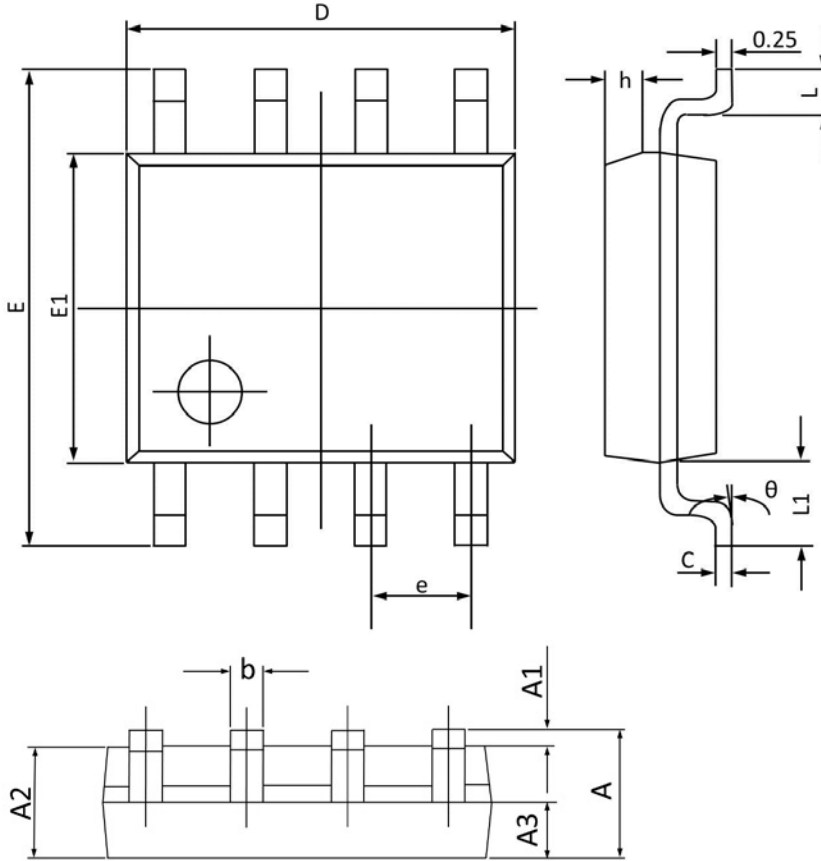
**Fig.7 Switching Time Waveform**



**Fig.8 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°    |