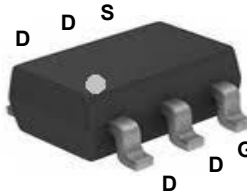
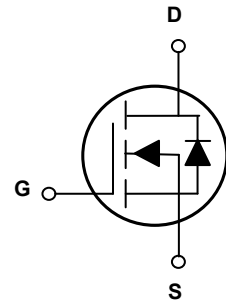


### Main Product Characteristics

|               |              |
|---------------|--------------|
| $V_{(BR)DSS}$ | 30V          |
| $R_{DS(ON)}$  | 24m $\Omega$ |
| $I_D$         | 6.5A         |



SOT-23-6L



Schematic Diagram

### Features and Benefits

- Advanced MOSFET process technology
- Ideal for MB/VGA/Vcore and load switch
- Low on-resistance with low gate charge
- Fast switching and reverse body recovery



### Description

The SSF3912 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    | Value       | Unit                  |
|--|-----------|-------------|-----------------------|
| Drain-Source Voltage                                     | $V_{DS}$  | 30          | V                     |
| Gate-Source Voltage                                      | $V_{GS}$  | $\pm 20$    | V                     |
| Drain Current – Continuous ( $T_C=25^{\circ}\text{C}$ )  | $I_D$     | 6.5         | A                     |
| Drain Current – Continuous ( $T_C=100^{\circ}\text{C}$ ) |           | 4.1         | A                     |
| Drain Current – Pulsed <sup>1</sup>                      | $I_{DM}$  | 26          | A                     |
| Single Pulse Avalanche Energy <sup>2</sup>               | $E_{AS}$  | 32          | mJ                    |
| Single Pulse Avalanche Current <sup>2</sup>              | $I_{AS}$  | 8           | A                     |
| Power Dissipation ( $T_C=25^{\circ}\text{C}$ )           | $P_D$     | 1.56        | W                     |
| Power Dissipation – Derate above $25^{\circ}\text{C}$    | $P_D$     | 0.012       | 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 | $R_{\theta JA}$ | ---  | 80   | $^{\circ}\text{C}/\text{W}$ |

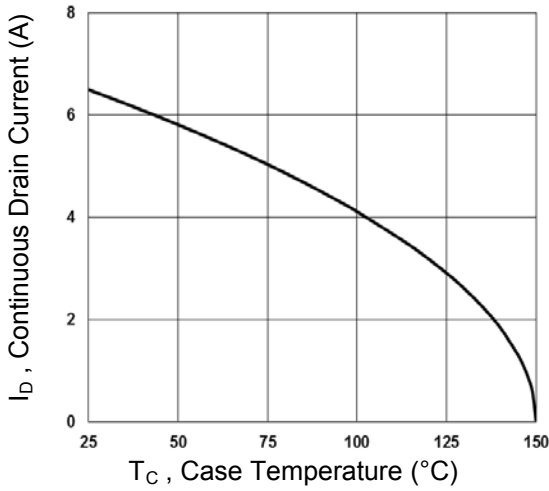
### Electrical Characteristics (T<sub>J</sub>=25°C unless otherwise specified)

| 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>D</sub> =250uA   | 30   | ---  | ---  | V     |
| BV <sub>DSS</sub> Temperature Coefficient                     | ΔBV <sub>DSS</sub> /ΔT <sub>J</sub> | Reference to 25°C, I <sub>D</sub> =1mA   | ---  | 0.04 | ---  | 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>GSS</sub>                    | V <sub>GS</sub> =±20V, V <sub>Ds</sub> =0V   | ---  | ---  | ±100 | nA    |
| <b>On Characteristics</b>                                     |                                     |  |      |      |      |       |
| Static Drain-Source On-Resistance <sup>3</sup>                | R <sub>DS(on)</sub>                 | V <sub>GS</sub> =10V, I <sub>D</sub> =6A   | ---  | 19   | 24   | mΩ    |
|   |                                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =4A  | ---  | 25   | 34   | 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> =4A   | ---  | 6.5  | ---  | 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>D</sub> =6A                    | ---  | 4.1  | 8    | nC    |
| Gate-Source Charge <sup>3, 4</sup>                            | Q <sub>gs</sub>                     |  | ---  | 1    | 2    |       |
| Gate-Drain Charge <sup>3, 4</sup>                             | Q <sub>gd</sub>                     |  | ---  | 2.1  | 4    |       |
| 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 | ---  | 2.8  | 5    | nS    |
| Rise Time <sup>3, 4</sup>                                     | T <sub>r</sub>                      |  | ---  | 7.2  | 14   |       |
| Turn-Off Delay Time <sup>3, 4</sup>                           | T <sub>d(off)</sub>                 |  | ---  | 15.8 | 30   |       |
| Fall Time <sup>3, 4</sup>                                     | T <sub>f</sub>                      |  | ---  | 4.6  | 9    |       |
| Input Capacitance   | C <sub>iss</sub>                    | V <sub>Ds</sub> =25V, V <sub>GS</sub> =0V, F=1MHz                                  | ---  | 345  | 500  | pF    |
| Output Capacitance  | C <sub>oss</sub>                    |  | ---  | 55   | 80   |       |
| Reverse Transfer Capacitance                                  | C <sub>rss</sub>                    |  | ---  | 32   | 45   |       |
| Gate Resistance   | R <sub>g</sub>                      | V <sub>GS</sub> =0V, V <sub>Ds</sub> =0V, F=1MHz                                   | ---  | 3.2  | 6.4  | Ω     |
| <b>Drain-Source Diode Characteristics and Maximum Ratings</b> |                                     |  |      |      |      |       |
| Continuous Source Current                                     | I <sub>S</sub>                      | V <sub>G</sub> =V <sub>D</sub> =0V, Force Current                                  | ---  | ---  | 6.5  | A     |
| Pulsed Source Current <sup>3</sup>                            | I <sub>SM</sub>                     |  | ---  | ---  | 26   | A     |
| Diode Forward Voltage <sup>3</sup>                            | V <sub>SD</sub>                     | V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C                      | ---  | ---  | 1    | V     |
| Reverse Recovery Time   | t <sub>rr</sub>                     | V <sub>GS</sub> =0V, I <sub>S</sub> =1A, di/dt=100A/μS, T <sub>J</sub> =25°C       | ---  | ---  | ---  | nS    |
| Reverse Recovery Charge                                       | Q <sub>rr</sub>                     |  | ---  | ---  | ---  | nC    |

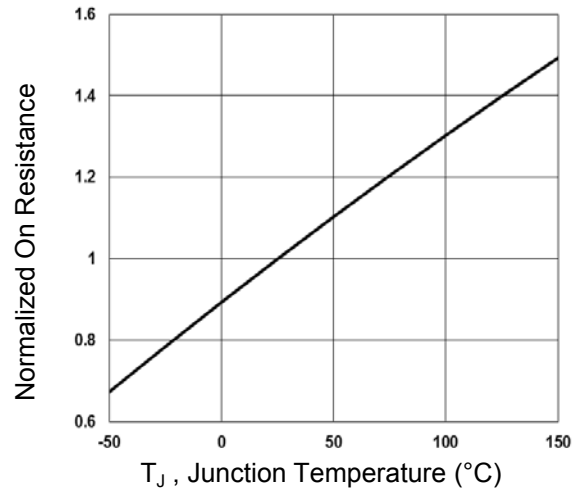
Note:

1. Repetitive Rating: Pulsed width limited by maximum junction temperature.
2. V<sub>DD</sub>=25V, V<sub>GS</sub>=10V, L=1mH, I<sub>AS</sub>=8A, 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.

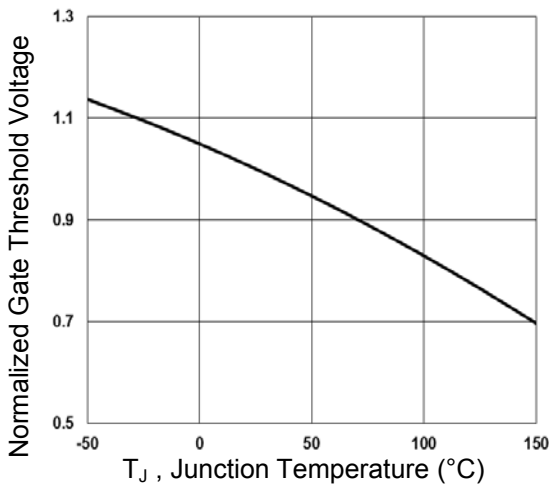
### Typical Electrical and Thermal Characteristics



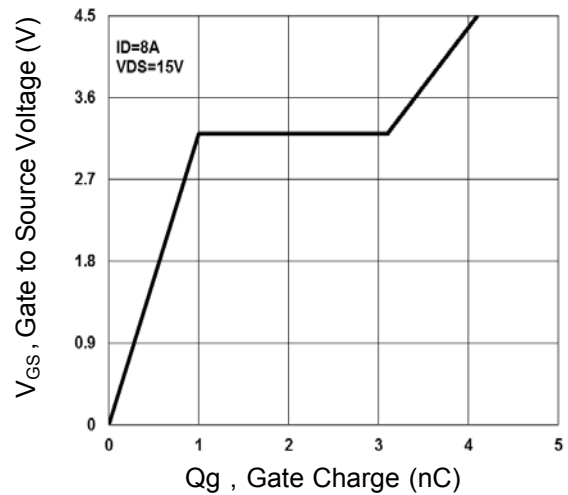
**Fig.1 Continuous Drain Current vs.  $T_C$**



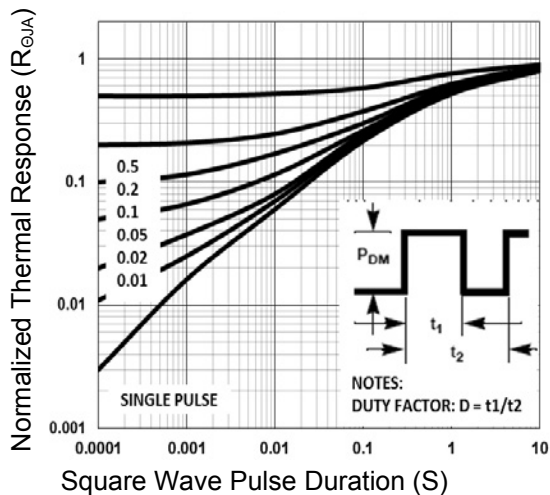
**Fig.2 Normalized  $R_{DS(ON)}$  vs.  $T_J$**



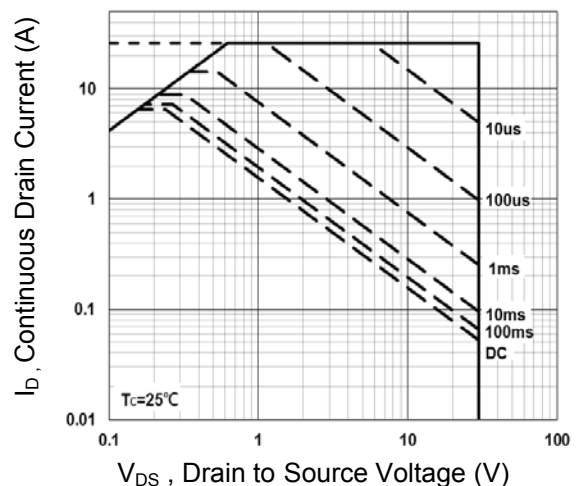
**Fig.3 Normalized  $V_{th}$  vs.  $T_J$**



**Fig.4 Gate Charge Waveform**

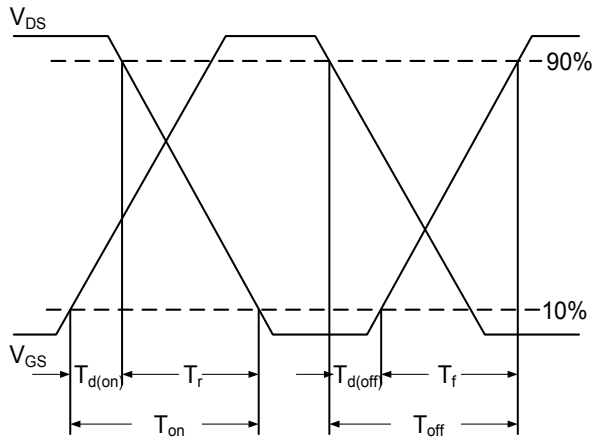


**Fig.5 Normalized Transient Response**

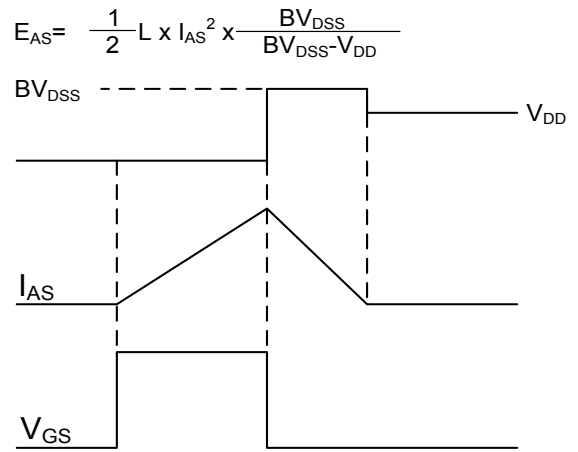


**Fig.6 Maximum Safe Operation Area**

**Typical Electrical and Thermal Characteristics**



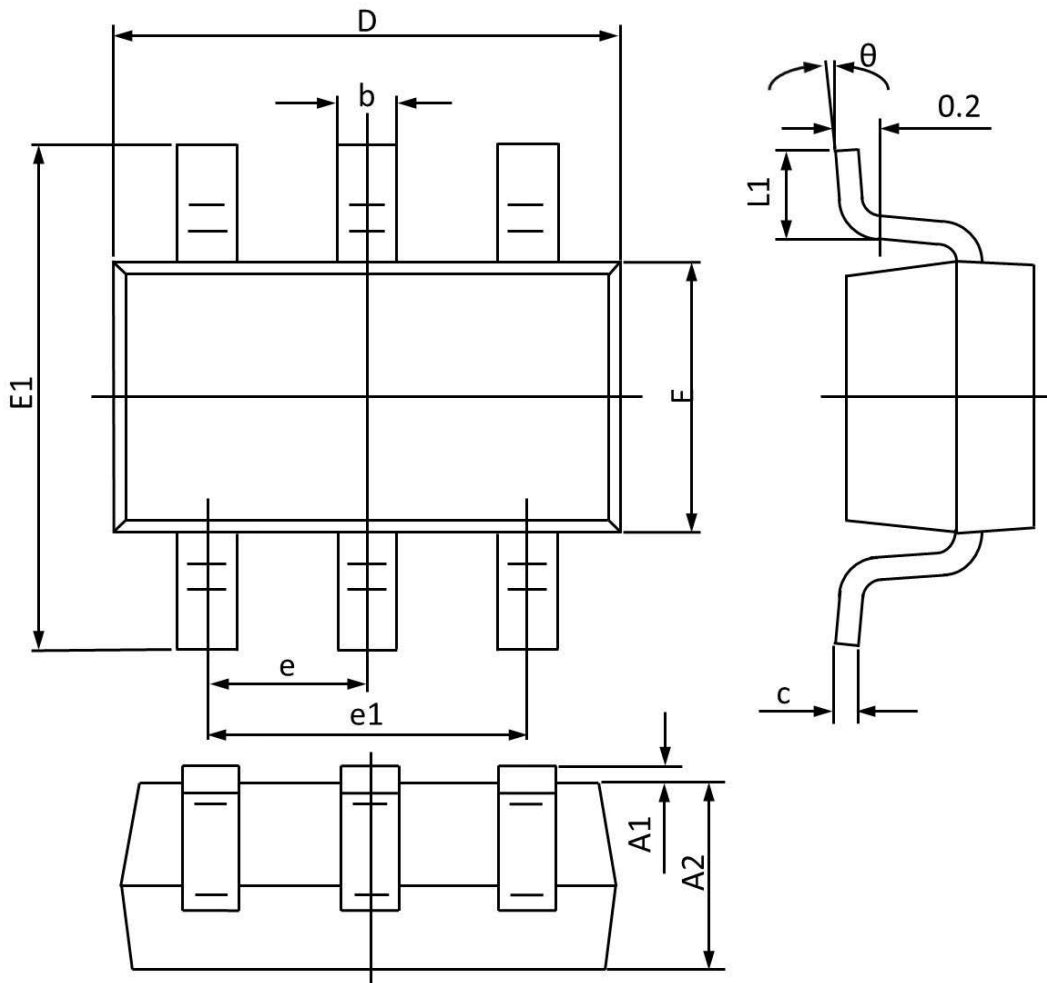
**Fig.7 Switching Time Waveform**



**Fig.8  $E_{AS}$  Waveform**

### Package Outline Dimensions

### SOT-23-6L



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 1.000                     | 1.200 | 0.040                | 0.047 |
| b      | 0.300                     | 0.500 | 0.012                | 0.019 |
| c      | 0.047                     | 0.207 | 0.002                | 0.008 |
| D      | 2.800                     | 3.000 | 0.110                | 0.118 |
| E1     | 2.600                     | 3.000 | 0.103                | 0.118 |
| e      | 0.950 TYP                 |       | 0.037 TYP            |       |
| e1     | 1.900 TYP                 |       | 0.075 TYP            |       |
| L1     | 0.250                     | 0.550 | 0.010                | 0.021 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |