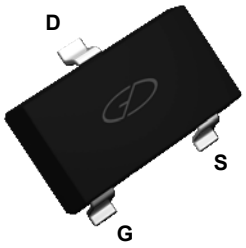
GOOD-ARK SEMICONDUCTOR

# SSF6092G1

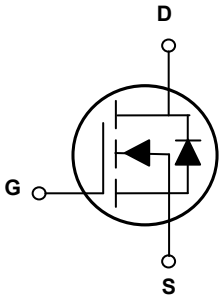
**60V N-Channel MOSFET**

## Main Product Characteristics

| | |
|---|---|
| $V_{DSS}$ | 60V |
| $R_{DS(ON)}$ | 70mΩ (typ.) |
| $I_D$ | 2.7A |




SOT-23




Schematic Diagram

## Features and Benefits

- Advanced MOSFET process technology
- Ideal for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 150°C operating temperature

## Description

The SSF6092G1 utilizes the latest trench processing techniques to achieve high cell density, low on-resistance and high repetitive avalanche rating. These features make this device extremely efficient and reliable for use in power switching applications and a wide variety of other applications.

## Absolute Maximum Ratings ($T_C$=25°C unless otherwise specified)

| Parameter | Symbol | Max. | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 60 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Drain Current-Continuous, $V_{GS}$ @ 10V[1] | $I_D$ | 2.7 | A |
| Drain Current-Pulsed[2] | $I_{DM}$ | 10.8 | A |
| Power Dissipation[3] | $P_D$ | 1.25 | W |
| Linear Derating Factor | | 0.01 | W/°C |
| Junction-to-Ambient (t ≤ 10s)[4] | $R_{\theta JA}$ | 99 | °C/W |
| Junction-to-Ambient (PCB mounted, steady-state)[4] | | 100 | °C/W |
| Operating Junction Temperature Range | $T_J$ | -55 To +150 | °C |
| Storage Temperature Range | $T_{STG}$ | -55 To +150 | °C |

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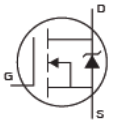
# SSF6092G1

**60V N-Channel MOSFET**

## Electrical Characteristics ($T_A$=25°C unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V, $I_D$=250uA | 60 | - | - | V |
| Drain-Source Leakage Current | $I_{DSS}$ | $V_{DS}$=60V, $V_{GS}$=0V | - | - | 1 | μA |
| Gate-Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V, $V_{DS}$=0V | - | - | ±100 | nA |
| **On Characteristics** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$=$V_{DS}$, $I_D$=250uA | 1.0 | - | 2.5 | V |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=2.7A | - | 70 | 92 | mΩ |
| **Dynamic and Switching Characteristics** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DD}$=40V, $I_D$=4A $V_{GS}$=10V | - | 12 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 3.5 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 3.7 | - | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DS}$=25V, $R_{GEN}$=50Ω $V_{GS}$=10V, $I_D$=1.2A | - | 9.2 | - | nS |
| Rise Time | $t_r$ | | - | 16.7 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 35.4 | - | |
| Fall Time | $t_f$ | | - | 8.6 | - | |
| Input Capacitance | $C_{lss}$ | $V_{DS}$=25V, $V_{GS}$=0V, F=1MHz | - | 641 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 48 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 38 | - | |
| **Drain-Source Diode Characteristics and Maximum Ratings** | | | | | | |
| Continuous Source Current (Body Diode)[1] | $I_S$ | MOSFET symbol showing the integral reverse p-n junction diode.   | - | - | 2.7 | A |
| Pulsed Source Current (Body Diode) | $I_{SM}$ | | - | - | 10.8 | A |
| Diode Forward Voltage | $V_{SD}$ | $V_{GS}$=0V, $I_S$=2.7A, $T_J$=25°C | - | 0.85 | 1.3 | V |

**Notes:**

①Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.

②Repetitive rating; pulse width limited by max. junction temperature.

③The power dissipation $P_D$ is based on max. junction temperature, using junction-to-case thermal resistance.

④The value of $R_{\theta JA}$ is measured with the device mounted on 1 $in^2$ FR-4 board with 2oz. Copper, in a still air environment with $T_A$ =25°C.

## Test Circuits and Waveforms

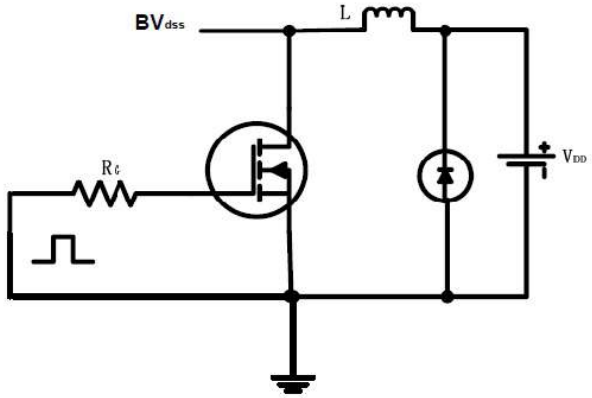



Figure 1. EAS Test Circuit:

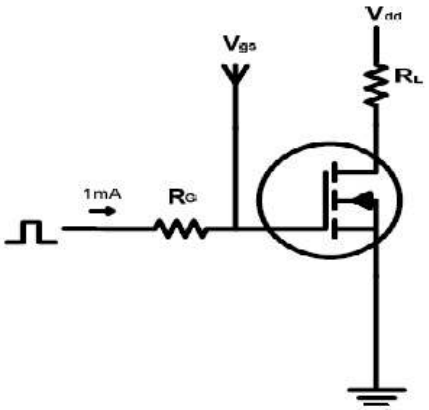



Figure 2. Gate Charge Test Circuit:

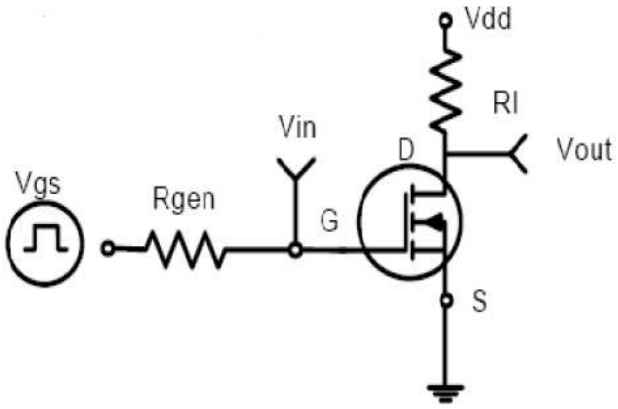



Figure 3. Switching Time Test Circuit:

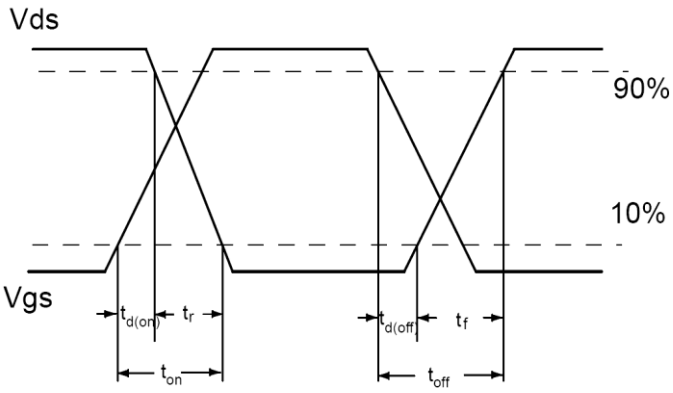



Figure 4. Switch Waveforms:

## Thermal Characteristics

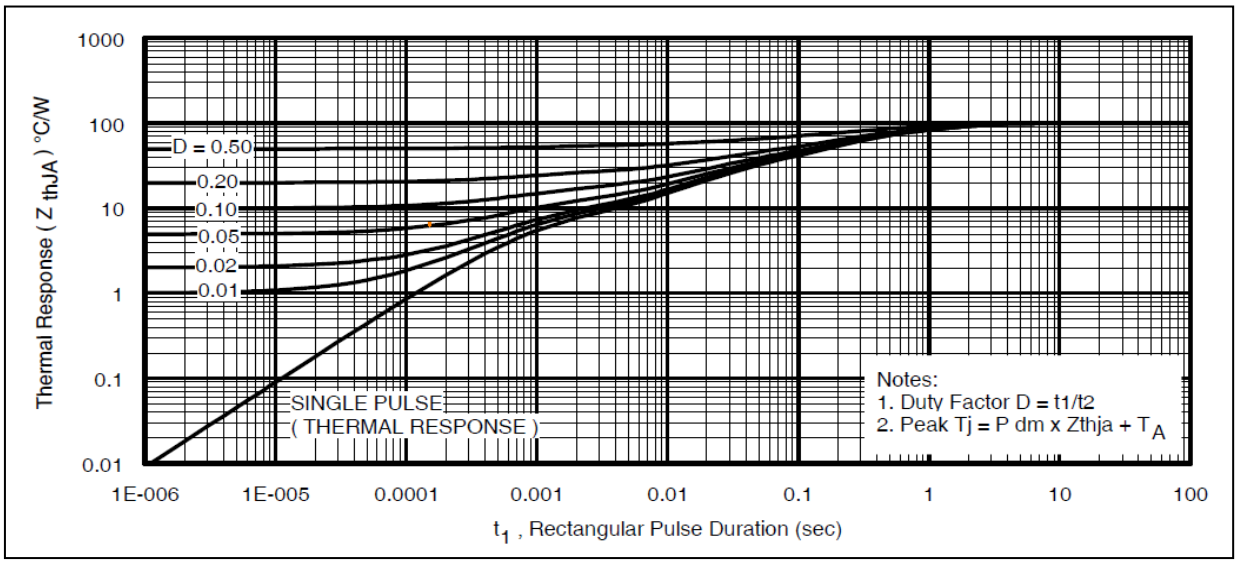
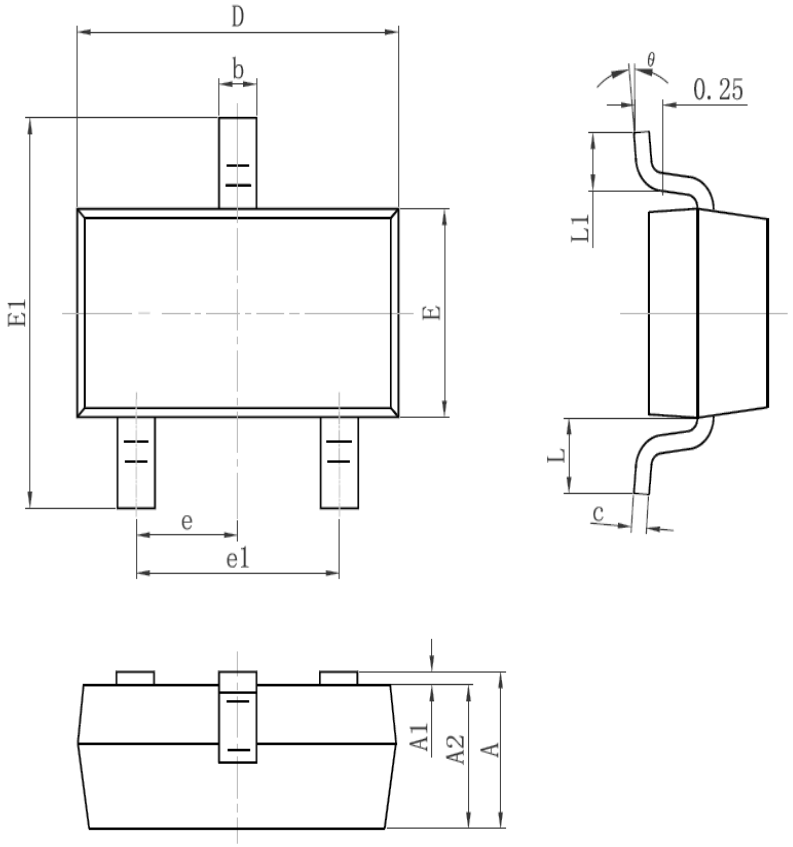



**Figure 5. Typical Effective Transient Thermal Impedance, Junction-to-Ambient**

## Package Outline Dimensions (SOT-23)




| Symbol | Dimension In Millimeters | | Dimension In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.95TYP | | 0.037TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.55REF | | 0.022REF | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | $0^0$ | $8^0$ | $0^0$ | $8^0$ |