

## DESCRIPTION

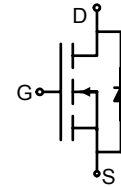
The SSF3055 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge. This device is suitable for use as a Battery protection or in other Switching application.

## GENERAL FEATURES

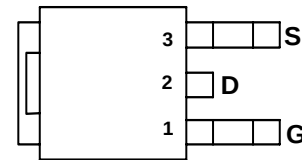
- $V_{DS} = 25V, I_D = 12A$   
 $R_{DS(ON)} < 120m\Omega @ V_{GS}=5V$   
 $R_{DS(ON)} < 90m\Omega @ V_{GS}=10V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

## Application

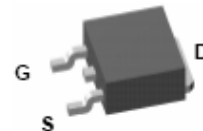
- Battery protection
- Load switch
- Power management



Schematic diagram



Marking and pin Assignment



TO-252(DPAK) top view

## PACKAGE MARKING AND ORDERING INFORMATION

| Device Marking | Device  | Device Package | Reel Size | Tape width | Quantity |
|----------------|---------|----------------|-----------|------------|----------|
| 3055           | SSF3055 | To-252(DPAK)   | -         | -          | -        |

## ABSOLUTE MAXIMUM RATINGS(TA=25°C unless otherwise noted)

| Parameter                                         | Symbol         | Limit      | Unit |
|---------------------------------------------------|----------------|------------|------|
| Drain-Source Voltage                              | $V_{DS}$       | 25         | V    |
| Gate-Source Voltage                               | $V_{GS}$       | $\pm 20$   | V    |
| Drain Current-Continuous@ Current-Pulsed (Note 1) | $I_D$          | 12         | A    |
|                                                   | $I_{DM}$       | 45         | A    |
| Maximum Power Dissipation                         | $P_D$          | 48         | W    |
| Operating Junction and Storage Temperature Range  | $T_J, T_{STG}$ | -55 To 150 | °C   |

## THERMAL CHARACTERISTICS

|                                                 |                 |    |      |
|-------------------------------------------------|-----------------|----|------|
| Thermal Resistance,Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 75 | °C/W |
|-------------------------------------------------|-----------------|----|------|

## ELECTRICAL CHARACTERISTICS (TA=25°C unless otherwise noted)

| Parameter                          | Symbol       | Condition                     | Min | Typ | Max       | Unit       |
|------------------------------------|--------------|-------------------------------|-----|-----|-----------|------------|
| <b>OFF CHARACTERISTICS</b>         |              |                               |     |     |           |            |
| Drain-Source Breakdown Voltage     | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$     | 25  |     |           | V          |
| Zero Gate Voltage Drain Current    | $I_{DSS}$    | $V_{DS}=20V, V_{GS}=0V$       |     |     | 25        | $\mu A$    |
| Gate-Body Leakage Current          | $I_{GSS}$    | $V_{GS}=\pm 20V, V_{DS}=0V$   |     |     | $\pm 250$ | nA         |
| <b>ON CHARACTERISTICS (Note 3)</b> |              |                               |     |     |           |            |
| Gate Threshold Voltage             | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$ | 0.8 | 1.2 | 2.5       | V          |
| Drain-Source On-State Resistance   | $R_{DS(ON)}$ | $V_{GS}=5V, I_D=12A$          |     | 70  | 120       | m $\Omega$ |
|                                    |              | $V_{GS}=10V, I_D=12A$         |     | 50  | 90        | m $\Omega$ |

|                                    |              |                                                                           |  |     |     |    |
|------------------------------------|--------------|---------------------------------------------------------------------------|--|-----|-----|----|
| Forward Transconductance           | $g_{FS}$     | $V_{DS}=15V, I_D=12A$                                                     |  | 16  |     | S  |
| DYNAMIC CHARACTERISTICS (Note4)    |              |                                                                           |  |     |     |    |
| Input Capacitance                  | $C_{ISS}$    | $V_{DS}=15V, V_{GS}=0V,$<br>$F=1.0MHz$                                    |  | 450 |     | PF |
| Output Capacitance                 | $C_{OSS}$    |                                                                           |  | 200 |     | PF |
| Reverse Transfer Capacitance       | $C_{RSS}$    |                                                                           |  | 60  |     | PF |
| SWITCHING CHARACTERISTICS (Note 4) |              |                                                                           |  |     |     |    |
| Turn-on Delay Time                 | $t_{d(on)}$  | $V_{DS}=15V, I_D=12A$<br>$V_{GS}=10V, R_{GEN}=2.5\Omega$<br>$R_L=1\Omega$ |  | 6   |     | nS |
| Turn-on Rise Time                  | $t_r$        |                                                                           |  | 6   |     | nS |
| Turn-Off Delay Time                | $t_{d(off)}$ |                                                                           |  | 20  |     | nS |
| Turn-Off Fall Time                 | $t_f$        |                                                                           |  | 5   |     | nS |
| Total Gate Charge                  | $Q_g$        | $V_{DS}=12.5V, I_D=6A, V_{GS}=10V$                                        |  | 15  |     | nC |
| Gate-Source Charge                 | $Q_{gs}$     |                                                                           |  | 2.0 |     | nC |
| Gate-Drain Charge                  | $Q_{gd}$     |                                                                           |  | 7.0 |     | nC |
| DRAIN-SOURCE DIODE CHARACTERISTICS |              |                                                                           |  |     |     |    |
| Diode Forward Voltage (Note 3)     | $V_{SD}$     | $V_{GS}=0V, I_S=12A$                                                      |  |     | 1.5 | V  |
| Diode Forward Current (Note 2)     | $I_S$        |                                                                           |  |     | 12  | A  |
| Reverse Recovery Time              | $t_{rr}$     | $I_F = I_S, dI_F/dt = 100A / \mu S$                                       |  | 30  |     | nS |
| Reverse Recovery Charge            | $Q_{rr}$     |                                                                           |  | 43  |     | nC |

## NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production testing.

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

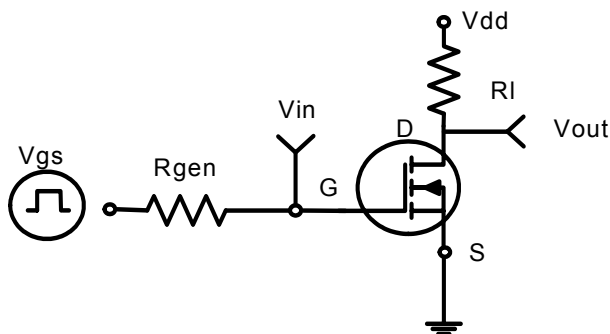


Figure 1: Switching Test Circuit

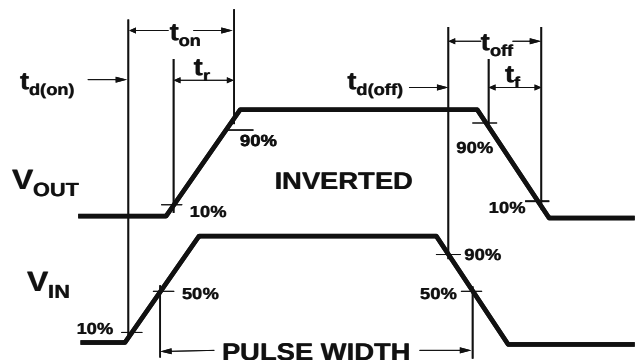
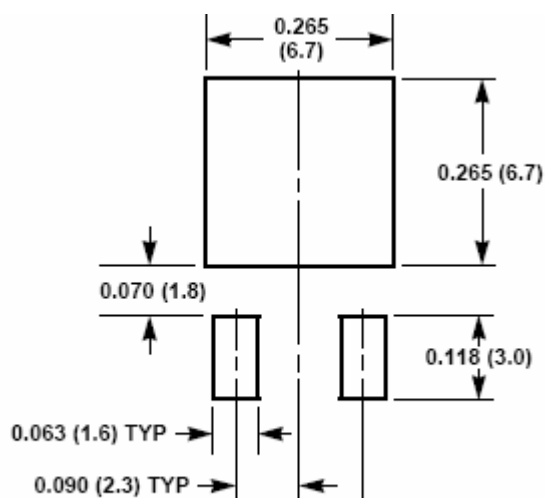
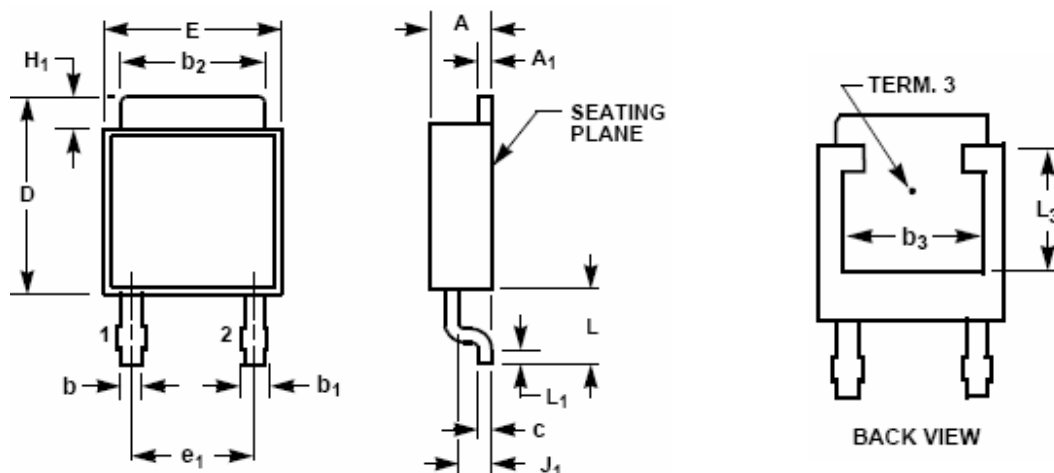


Figure 2: Switching Waveforms

## TO-252 PACKAGE INFORMATION



MINIMUM PAD SIZE RECOMMENDED FOR  
SURFACE-MOUNTED APPLICATIONS

| SYMBOL         | INCHES    |       | MILLIMETERS |      | NOTES |
|----------------|-----------|-------|-------------|------|-------|
|                | MIN       | MAX   | MIN         | MAX  |       |
| A              | 0.086     | 0.094 | 2.19        | 2.38 | -     |
| A <sub>1</sub> | 0.018     | 0.022 | 0.46        | 0.55 | 3, 4  |
| b              | 0.028     | 0.032 | 0.72        | 0.81 | 3, 4  |
| b <sub>1</sub> | 0.033     | 0.040 | 0.84        | 1.01 | 3     |
| b <sub>2</sub> | 0.205     | 0.215 | 5.21        | 5.46 | 3, 4  |
| b <sub>3</sub> | 0.190     | -     | 4.83        | -    | 2     |
| c              | 0.018     | 0.022 | 0.46        | 0.55 | 3, 4  |
| D              | 0.270     | 0.290 | 6.86        | 7.36 | -     |
| E              | 0.250     | 0.265 | 6.35        | 6.73 | -     |
| e <sub>1</sub> | 0.180 BSC |       | 4.57 BSC    |      | 6     |
| H <sub>1</sub> | 0.035     | 0.045 | 0.89        | 1.14 | -     |
| J <sub>1</sub> | 0.040     | 0.045 | 1.02        | 1.14 | -     |
| L              | 0.100     | 0.115 | 2.54        | 2.92 | -     |
| L <sub>1</sub> | 0.020     | -     | 0.51        | -    | 3, 5  |
| L <sub>3</sub> | 0.170     | -     | 4.32        | -    | 2     |

### NOTES:

1. No current JEDEC outline for this package.
2. L<sub>3</sub> and b<sub>3</sub> dimensions establish a minimum mounting surface for terminal 3.
3. Dimension (without solder).
4. Add typically 0.002 inches (0.05mm) for solder plating.
5. L<sub>1</sub> is the terminal length for soldering.
6. Position of lead to be measured 0.090 inches (2.28mm) from bottom of dimension D.
7. Controlling dimension: Inch.