

## DESCRIPTION

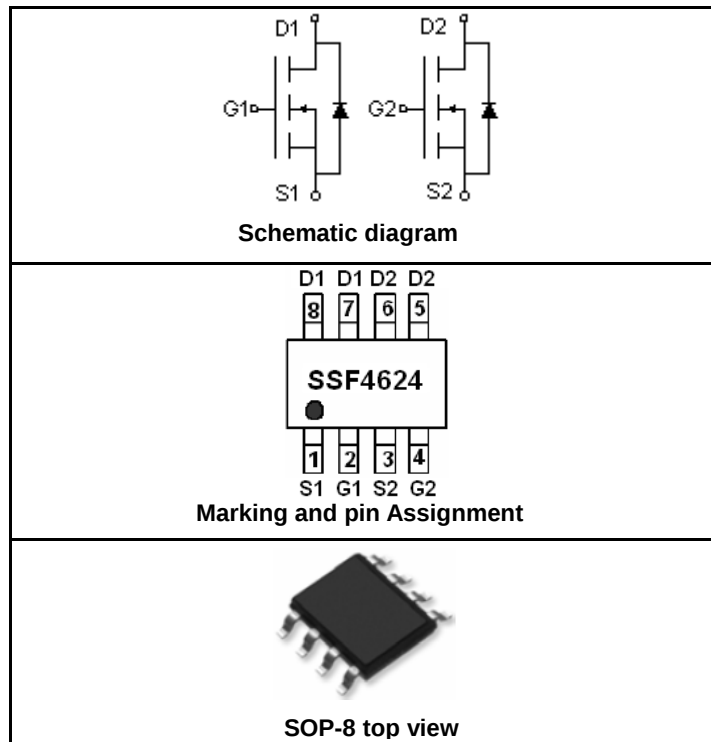
The SSF4624 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge. This device is suitable for use as a load switch or in PWM applications.

## GENERAL FEATURES

- $V_{DS} = 40V, I_D = 6A$   
 $R_{DS(ON)} < 45m\Omega @ V_{GS}=4.5V$   
 $R_{DS(ON)} < 31m\Omega @ V_{GS}=10V$
- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

## Application

- PWM applications
- Load switch
- Power management



## PACKAGE MARKING AND ORDERING INFORMATION

| Device Marking | Device  | Device Package | Reel Size | Tape width | Quantity   |
|----------------|---------|----------------|-----------|------------|------------|
| SSF4624        | SSF4624 | SOP-8          | Ø330mm    | 12mm       | 3000 units |

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

| Parameter                                         | Symbol             | Limit      | Unit |
|---------------------------------------------------|--------------------|------------|------|
| Drain-Source Voltage                              | $V_{DS}$           | 40         | V    |
| Gate-Source Voltage                               | $V_{GS}$           | ±20        | V    |
| Drain Current-Continuous@ Current-Pulsed (Note 1) | $I_D (25^\circ C)$ | 6          | A    |
|                                                   | $I_D (70^\circ C)$ | 5          | A    |
|                                                   | $I_{DM}$           | 20         | A    |
| Maximum Power Dissipation                         | $P_D$              | 2          | W    |
| Operating Junction and Storage Temperature Range  | $T_J, T_{STG}$     | -55 To 150 | °C   |

## THERMAL CHARACTERISTICS

|                                                  |                 |      |      |
|--------------------------------------------------|-----------------|------|------|
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 62.5 | °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  | $BV_{DSS}$ | $V_{GS}=0V, I_D=250\mu A$ | 40  |     |     | V    |
| Zero Gate Voltage Drain Current | $I_{DSS}$  | $V_{DS}=32V, V_{GS}=0V$   |     |     | 1   | μA   |

|                                    |                     |                                                                                      |   |      |      |    |
|------------------------------------|---------------------|--------------------------------------------------------------------------------------|---|------|------|----|
| Gate-Body Leakage Current          | I <sub>GSS</sub>    | V <sub>GS</sub> =±20V,V <sub>DS</sub> =0V                                            |   |      | ±100 | nA |
| ON CHARACTERISTICS (Note 3)        |                     |                                                                                      |   |      |      |    |
| Gate Threshold Voltage             | V <sub>GS(th)</sub> | V <sub>DS</sub> =V <sub>GS</sub> ,I <sub>D</sub> =250μA                              | 1 | 2.3  | 3    | V  |
| Drain-Source On-State Resistance   | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =6A                                             |   | 24   | 31   | mΩ |
|                                    |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A                                            |   | 34   | 45   | mΩ |
| Forward Transconductance           | g <sub>FS</sub>     | V <sub>DS</sub> =5V,I <sub>D</sub> =6A                                               | 5 |      |      | S  |
| DYNAMIC CHARACTERISTICS (Note4)    |                     |                                                                                      |   |      |      |    |
| Input Capacitance                  | C <sub>iss</sub>    | V <sub>DS</sub> =20V,V <sub>GS</sub> =0V,<br>F=1.0MHz                                |   | 400  |      | PF |
| Output Capacitance                 | C <sub>oss</sub>    |                                                                                      |   | 95   |      | PF |
| Reverse Transfer Capacitance       | C <sub>rss</sub>    |                                                                                      |   | 35   |      | PF |
| SWITCHING CHARACTERISTICS (Note 4) |                     |                                                                                      |   |      |      |    |
| Turn-on Delay Time                 | t <sub>d(on)</sub>  | V <sub>DS</sub> =20V,V <sub>GS</sub> =10V,R <sub>GEN</sub> =6Ω<br>I <sub>D</sub> =6A |   | 4    |      | nS |
| Turn-on Rise Time                  | t <sub>r</sub>      |                                                                                      |   | 3    |      | nS |
| Turn-Off Delay Time                | t <sub>d(off)</sub> |                                                                                      |   | 15   |      | nS |
| Turn-Off Fall Time                 | t <sub>f</sub>      |                                                                                      |   | 3    |      | nS |
| Total Gate Charge                  | Q <sub>g</sub>      | V <sub>DS</sub> =20V,I <sub>D</sub> =6A,V <sub>GS</sub> =10V                         |   | 8    |      | nC |
| Gate-Source Charge                 | Q <sub>gs</sub>     |                                                                                      |   | 1.3  |      | nC |
| Gate-Drain Charge                  | Q <sub>gd</sub>     |                                                                                      |   | 2.3  |      | nC |
| Body Diode Reverse Recovery Time   | T <sub>rr</sub>     | I <sub>F</sub> =6A, dl/dt=100A/μs                                                    |   | 20   |      | nS |
| Body Diode Reverse Recovery Charge | Q <sub>rr</sub>     |                                                                                      |   | 14   |      | nC |
| DRAIN-SOURCE DIODE CHARACTERISTICS |                     |                                                                                      |   |      |      |    |
| Diode Forward Voltage (Note 3)     | V <sub>SD</sub>     | V <sub>GS</sub> =0V,I <sub>S</sub> =1A                                               |   | 0.75 | 1.2  | V  |

## NOTES:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on 1in<sup>2</sup> 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

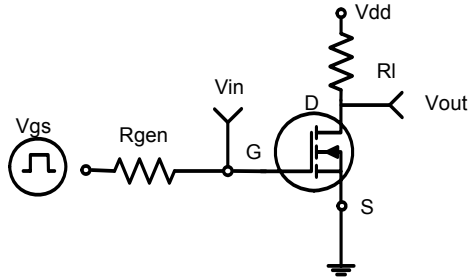


Figure 1: Switching Test Circuit

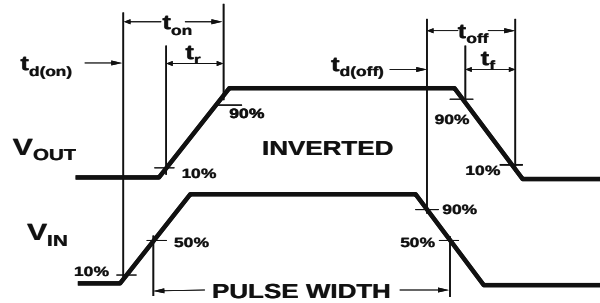


Figure 2: Switching Waveforms

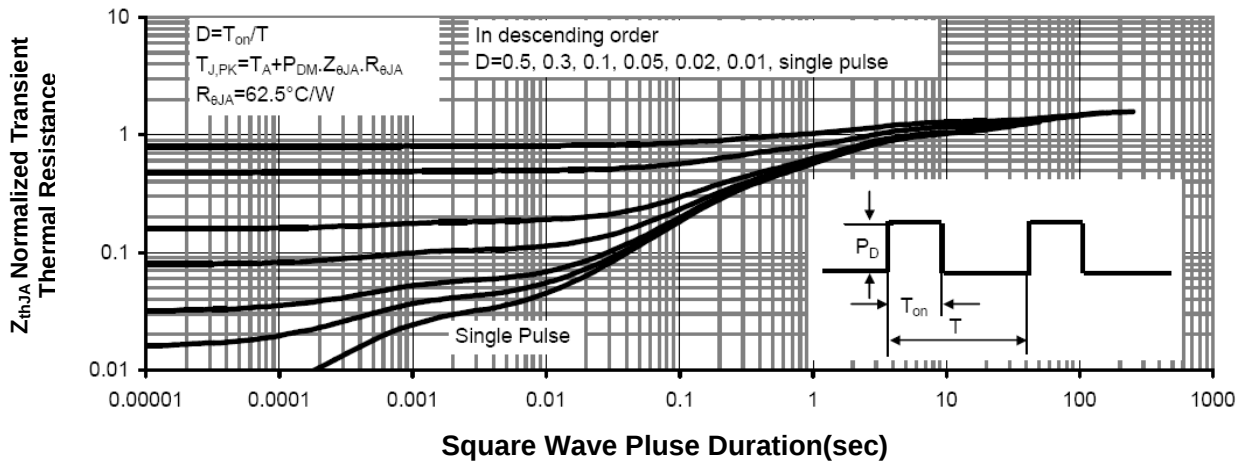
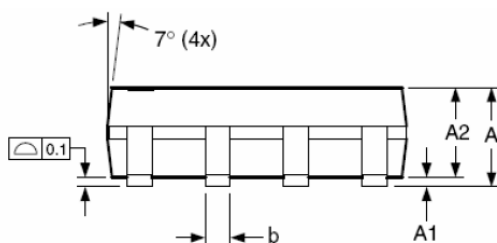
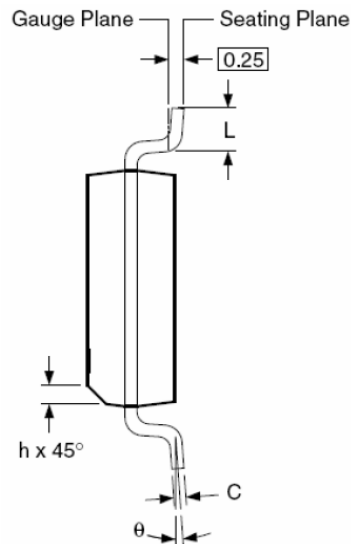
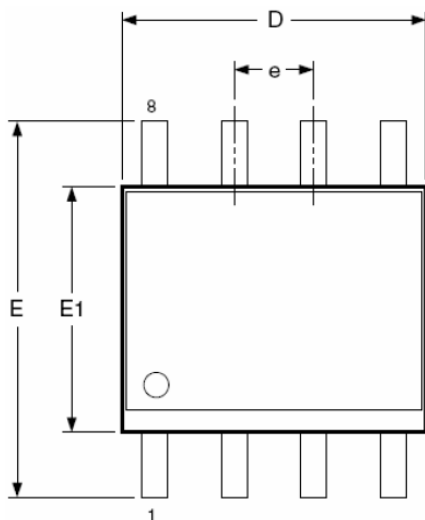
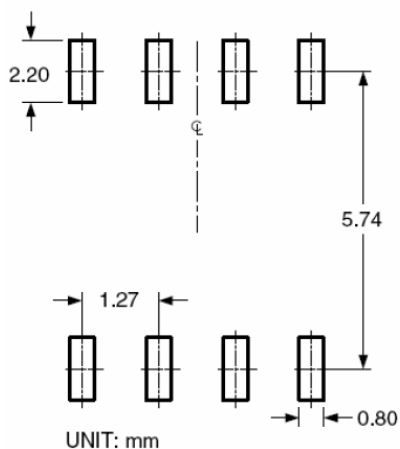


Figure 3 Normalized Maximum Transient Thermal Impedance

## SOP-8 PACKAGE INFORMATION



### RECOMMENDED LAND PATTERN



### Dimensions in millimeters

| Symbols | Min.     | Nom. | Max. |
|---------|----------|------|------|
| A       | 1.35     | 1.65 | 1.75 |
| A1      | 0.10     | —    | 0.25 |
| A2      | 1.25     | 1.50 | 1.65 |
| b       | 0.31     | —    | 0.51 |
| c       | 0.17     | —    | 0.25 |
| D       | 4.80     | 4.90 | 5.00 |
| E1      | 3.80     | 3.90 | 4.00 |
| e       | 1.27 BSC |      |      |
| E       | 5.80     | 6.00 | 6.20 |
| h       | 0.25     | —    | 0.50 |
| L       | 0.40     | —    | 1.27 |
| θ       | 0°       | —    | 8°   |

### Dimensions in inches

| Symbols | Min.      | Nom.  | Max.  |
|---------|-----------|-------|-------|
| A       | 0.053     | 0.065 | 0.069 |
| A1      | 0.004     | —     | 0.010 |
| A2      | 0.049     | 0.059 | 0.065 |
| b       | 0.012     | —     | 0.020 |
| c       | 0.007     | —     | 0.010 |
| D       | 0.189     | 0.193 | 0.197 |
| E1      | 0.150     | 0.154 | 0.157 |
| e       | 0.050 BSC |       |       |
| E       | 0.228     | 0.236 | 0.244 |
| h       | 0.010     | —     | 0.020 |
| L       | 0.016     | —     | 0.050 |
| θ       | 0°        | —     | 8°    |

### NOTES:

1. Dimensions are inclusive of plating
2. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 6 mils.
3. Dimension L is measured in gauge plane.
4. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

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