

## DESCRIPTION

The SSF4703 uses advanced trench technology to provide excellent  $R_{DS(ON)}$  and low gate charge. A Schottky diode is provided to facilitate the implementation of a bidirectional blocking switch, or for DC-DC conversion applications.

## GENERAL FEATURES

### ● MOSFET

$V_{DS} = -20V, I_D = -3.4A$   
 $R_{DS(ON)} < 160m\Omega @ V_{GS} = -1.8V$   
 $R_{DS(ON)} < 120m\Omega @ V_{GS} = -2.5V$   
 $R_{DS(ON)} < 90m\Omega @ V_{GS} = -4.5V$

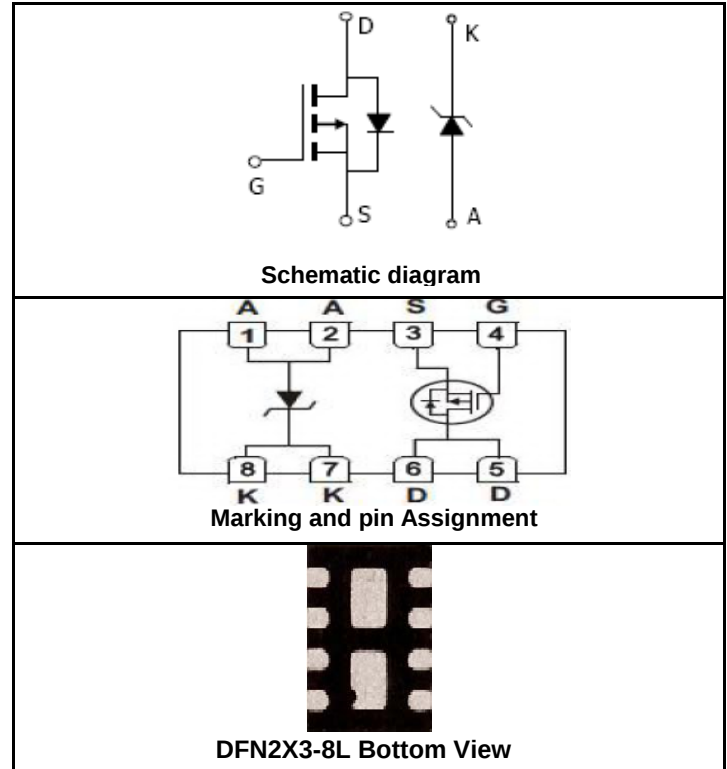
### ● SCHOTTKY

$V_R = 20V, I_F = 1A, V_F < 0.5V @ 0.5A$

- High Power and current handling capability
- Lead free product is acquired
- Surface Mount Package

## Application

- DC-DC conversion applications
- Load switch
- Power management



## PACKAGE MARKING AND ORDERING INFORMATION

| Device Marking | Device  | Device Package | Reel Size | Tape width | Quantity |
|----------------|---------|----------------|-----------|------------|----------|
| 4703           | SSF4703 | DFN2X3-8L      | —         | —          | —        |

## ABSOLUTE MAXIMUM RATINGS( $T_A = 25^\circ C$ unless otherwise noted)

| Parameter                                         | Symbol         | MOSFET     | Schottky   | Unit       |
|---------------------------------------------------|----------------|------------|------------|------------|
| Drain-Source Voltage                              | $V_{DS}$       | -20        |            | V          |
| Gate-Source Voltage                               | $V_{GS}$       | $\pm 8$    |            | V          |
| Drain Current-Continuous@ Current-Pulsed (Note 1) | $I_D$          | -3.4       |            | A          |
|                                                   | $I_{DM}$       | -15        |            | A          |
| Schottky reverse voltage                          | $V_R$          |            | 20         | V          |
| Continuous Forward Current                        | $I_F$          |            | 1.9        | A          |
| Pulsed Forward Current                            | $I_{FM}$       |            | 7          | A          |
| Maximum Power Dissipation                         | $P_D$          | 1.7        | 0.96       | W          |
| Operating Junction and Storage Temperature Range  | $T_J, T_{STG}$ | -55 To 150 | -55 To 150 | $^\circ C$ |

## THERMAL CHARACTERISTICS

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

|                                                  |                 |    |                      |
|--------------------------------------------------|-----------------|----|----------------------|
| <b>Schottky</b>                                  |                 |    |                      |
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 80 | $^{\circ}\text{C/W}$ |

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

| Parameter                          | Symbol              | Condition                                                                                    | Min   | Typ   | Max  | Unit |
|------------------------------------|---------------------|----------------------------------------------------------------------------------------------|-------|-------|------|------|
| OFF CHARACTERISTICS                |                     |                                                                                              |       |       |      |      |
| Drain-Source Breakdown Voltage     | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V I <sub>D</sub> =-250μA                                                   | -20   |       |      | V    |
| Zero Gate Voltage Drain Current    | I <sub>DSS</sub>    | V <sub>DS</sub> =-16V, V <sub>GS</sub> =0V                                                   |       |       | -1   | μA   |
| Gate-Body Leakage Current          | I <sub>GSS</sub>    | V <sub>GS</sub> =±8V, 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                                    | -0.45 | -0.7  | -1   | V    |
| Static Drain-Source On-Resistance  | R <sub>DS(ON)</sub> | V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-3.4A                                                |       | 73    | 90   | mΩ   |
|                                    |                     | V <sub>GS</sub> =-2.5V, I <sub>D</sub> =-2.5A                                                |       | 99    | 120  |      |
|                                    |                     | V <sub>GS</sub> =-1.8V, I <sub>D</sub> =-1.5A                                                |       | 133   | 160  |      |
| Forward Transconductance           | g <sub>FS</sub>     | V <sub>DS</sub> =-5V, I <sub>D</sub> =-3.4A                                                  | 4     | 7     |      | S    |
| DYNAMIC CHARACTERISTICS (Note4)    |                     |                                                                                              |       |       |      |      |
| Input Capacitance                  | C <sub>iss</sub>    | V <sub>DS</sub> =-10V, V <sub>GS</sub> =0V, F=1.0MHz                                         |       | 540   |      | PF   |
| Output Capacitance                 | C <sub>oss</sub>    |                                                                                              |       | 70    |      | PF   |
| Reverse Transfer Capacitance       | C <sub>rss</sub>    |                                                                                              |       | 50    |      | PF   |
| SWITCHING CHARACTERISTICS (Note 4) |                     |                                                                                              |       |       |      |      |
| Turn-on Delay Time                 | t <sub>d(on)</sub>  | V <sub>DD</sub> =-10V, I <sub>D</sub> =-3.4A<br>V <sub>GS</sub> =-4.5V, R <sub>GEN</sub> =3Ω |       | 10    |      | nS   |
| Turn-on Rise Time                  | t <sub>r</sub>      |                                                                                              |       | 12    |      | nS   |
| Turn-Off Delay Time                | t <sub>d(off)</sub> |                                                                                              |       | 44    |      | nS   |
| Turn-Off Fall Time                 | t <sub>f</sub>      |                                                                                              |       | 22    |      | nS   |
| Total Gate Charge                  | Q <sub>g</sub>      | V <sub>DS</sub> =-10V, I <sub>D</sub> =-3.4A, V <sub>GS</sub> =-4.5V                         |       | 6.1   |      | nC   |
| Gate-Source Charge                 | Q <sub>gs</sub>     |                                                                                              |       | 0.6   |      | nC   |
| Gate-Drain Charge                  | Q <sub>gd</sub>     |                                                                                              |       | 1.6   |      | nC   |
| DRAIN-SOURCE DIODE CHARACTERISTICS |                     |                                                                                              |       |       |      |      |
| Diode Forward Voltage (Note 3)     | V <sub>SD</sub>     | V <sub>GS</sub> =0V, I <sub>S</sub> =-1A                                                     |       | -0.83 | -1   | V    |
| Diode Forward Current (Note 2)     | I <sub>S</sub>      |                                                                                              |       |       | -2   | A    |
| SCHOTTKY PARAMETERS                |                     |                                                                                              |       |       |      |      |
| Forward Voltage Drop               | V <sub>F</sub>      | I <sub>F</sub> =0.5A                                                                         |       | 0.39  | 0.5  | V    |
| Maximum reverse leakage current    | I <sub>rm</sub>     | V <sub>R</sub> =16V                                                                          |       |       | 0.1  | mA   |
| Junction Capacitance               | C <sub>T</sub>      | V <sub>R</sub> =10V                                                                          |       | 34    |      | pF   |
| Schottky Reverse Recovery Time     | t <sub>rr</sub>     | I <sub>F</sub> =1A, dI/dt=100A/μs                                                            |       | 5.2   | 10   | ns   |
| Schottky Reverse Recovery Charge   | Q <sub>rr</sub>     | I <sub>F</sub> =1A, dI/dt=100A/μs                                                            |       | 0.8   |      | 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

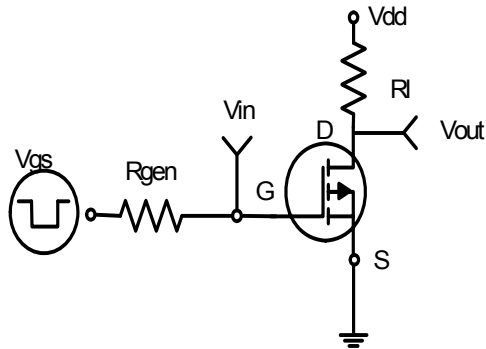


Figure1:Switching Test Circuit

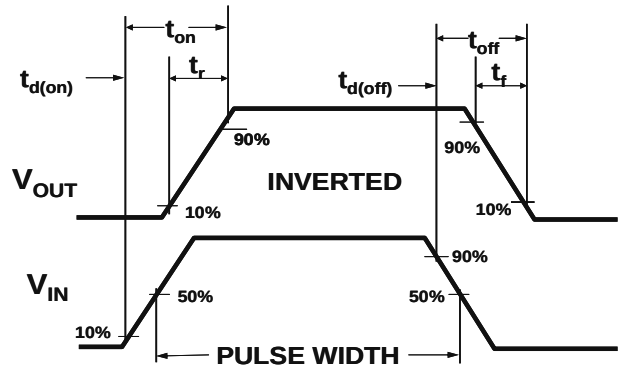


Figure 2:Switching Waveforms

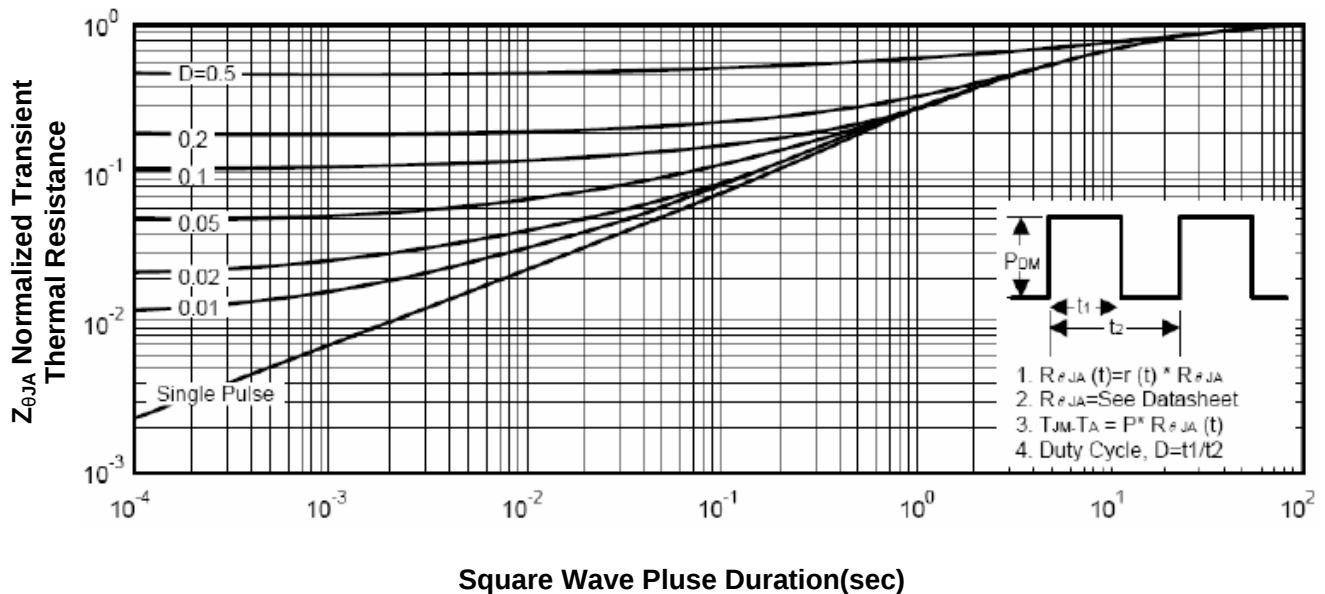
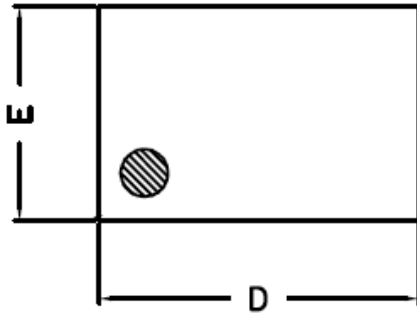


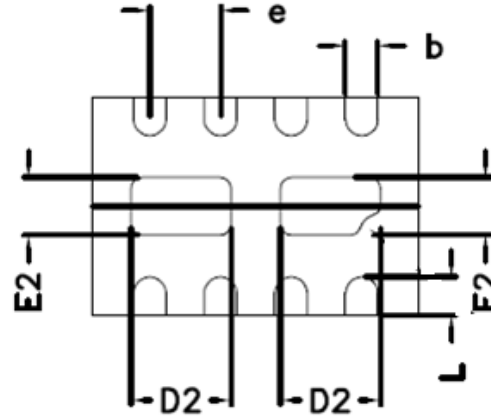
Figure 3: Normalized Maximum Transient Thermal Impedanc

## DFN2X3-8L PACKAGE INFORMATION

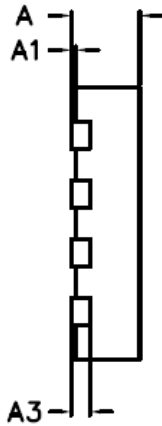
Dimensions in Millimeters (UNIT:mm)



Top View



Bottom View



Side View

| COMMON DIMENSIONS(MM) |                  |      |      |
|-----------------------|------------------|------|------|
| PKG.                  | W:VERY VERY THIN |      |      |
| REF.                  | MIN.             | NOM. | MAX. |
| A                     | 0.70             | 0.75 | 0.80 |
| A1                    | 0.00             | —    | 0.05 |
| A3                    | 0.2 REF.         |      |      |
| D                     | 2.95             | 3.00 | 3.05 |
| E                     | 1.95             | 2.00 | 2.05 |
| b                     | 0.25             | 0.30 | 0.35 |
| L                     | 0.25             | 0.35 | 0.45 |
| D2                    | 0.77             | 0.92 | 1.02 |
| E2                    | 0.38             | 0.53 | 0.63 |
| e                     | 0.65 BCS.        |      |      |

### NOTES:

1. All dimensions are in millimeters.
2. Tolerance  $\pm 0.10\text{mm}$  (4 mil) unless otherwise specified
3. Package body sizes exclude mold flash and gate burrs. Mold flash at the non-lead sides should be less than 5 mils.
4. Dimension L is measured in gauge plane.
5. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

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