## DESCRIPTION

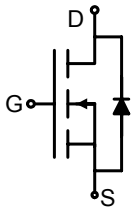
The SSF2306 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V.

## GENERAL FEATURES

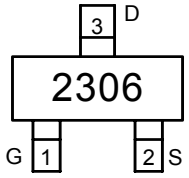
- $V_{DS}$ = 30V,$I_D$ = 5A
  $R_{DS(ON)}$ < 50mΩ @ $V_{GS}$=2.5V
  $R_{DS(ON)}$ < 35mΩ @ $V_{GS}$=4.5V
  $R_{DS(ON)}$ < 30mΩ @ $V_{GS}$=10V
- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package

## Application

- Battery protection
- Load switch
- Power management




**Schematic diagram**




**Marking and pin Assignment**


**SOT-23 top view**

## PACKAGE MARKING AND ORDERING INFORMATION

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity |
|---|---|---|---|---|---|
| 2306 | SSF2306 | SOT-23 | Ø180mm | 8 mm | 3000 units |

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

| Parameter | Symbol | Limit | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | $V_{GS}$ | ±12 | V |
| Drain Current-Continuous@ Current-Pulsed (Note 1) | $I_D$ | 5 | A |
| | $I_{DM}$ | 20 | A |
| Maximum Power Dissipation | $P_D$ | 1.38 | W |
| Operating Junction and Storage Temperature Range | $T_J$,$T_{STG}$ | -55 To 150 | ℃ |

## THERMAL CHARACTERISTICS

| | | | |
|---|---|---|---|
| Thermal Resistance,Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 90 | ℃/W |

## ELECTRICAL CHARACTERISTICS (TA=25℃unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V $I_D$=250μA | 30 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=30V,$V_{GS}$=0V | | | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$=±12V,$V_{DS}$=0V | | | ±100 | nA |

| | | | | | | |
|---|---|---|---|---|---|---|
| **ON CHARACTERISTICS (Note 3)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 0.5 | | 1.2 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}$=2.5V, $I_D$=2.6A | | | 50 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=5A | | | 35 | mΩ |
| | | $V_{GS}$=10V, $I_D$=5A | | | 30 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=5V,$I_D$=5A | | 13 | | S |
| **DYNAMIC CHARACTERISTICS (Note4)** | | | | | | |
| Input Capacitance | $C_{lss}$ | $V_{DS}$=25V,$V_{GS}$=0V, F=1.0MHz | | 660 | 1050 | PF |
| Output Capacitance | $C_{oss}$ | | | 90 | | PF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 70 | | PF |
| **SWITCHING CHARACTERISTICS (Note 4)** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DS}$=15V,$I_D$=5A $V_{GS}$=10V,$R_{GEN}$=3.3Ω $R_D$=3Ω | | 6 | | nS |
| Turn-on Rise Time | $t_r$ | | | 20 | | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | | 20 | | nS |
| Turn-Off Fall Time | $t_f$ | | | 3 | | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=16V,$I_D$=5A,$V_{GS}$=4.5V | | 8.5 | 15 | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 1.5 | | nC |
| Gate-Drain Charge | $Q_{gd}$ | | | 3.2 | | nC |
| **DRAIN-SOURCE DIODE CHARACTERISTICS** | | | | | | |
| Diode Forward Voltage (Note 3) | $V_{SD}$ | $V_{GS}$=0V,$I_S$=1.2A | | | 1.2 | V |

## NOTES:

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

## TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

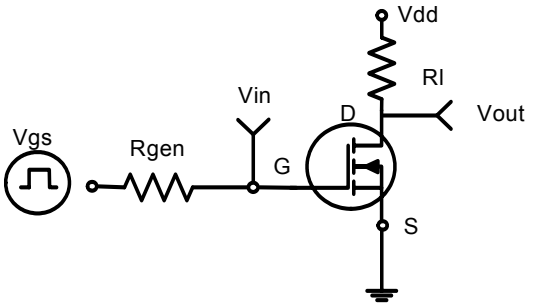



Figure 1: Switching Test Circuit

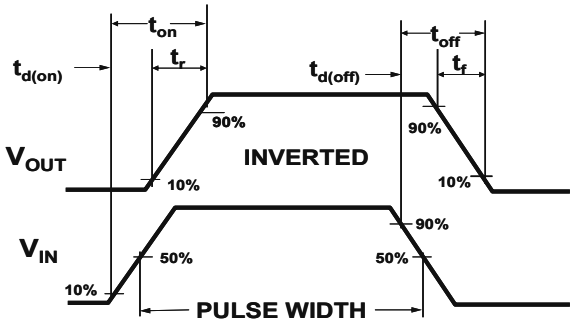



Figure 2:Switching Waveforms

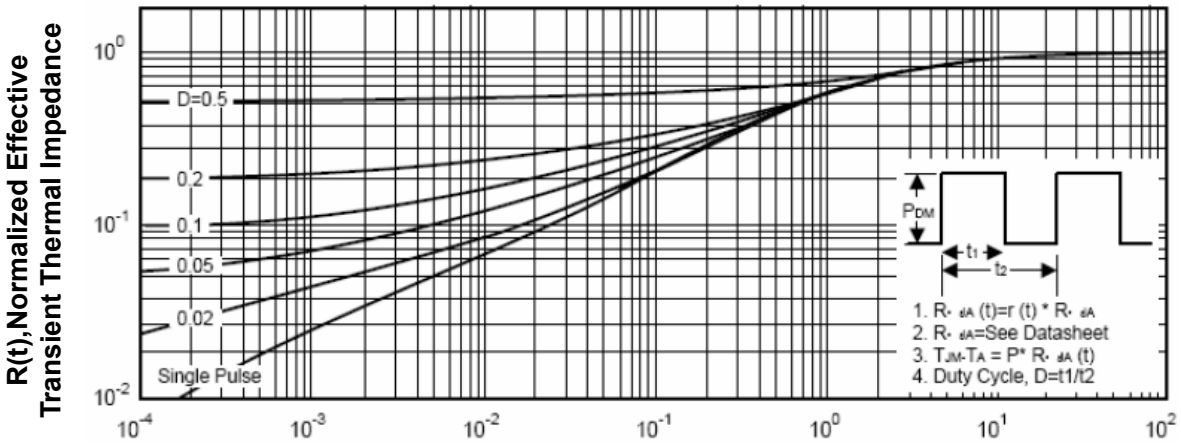
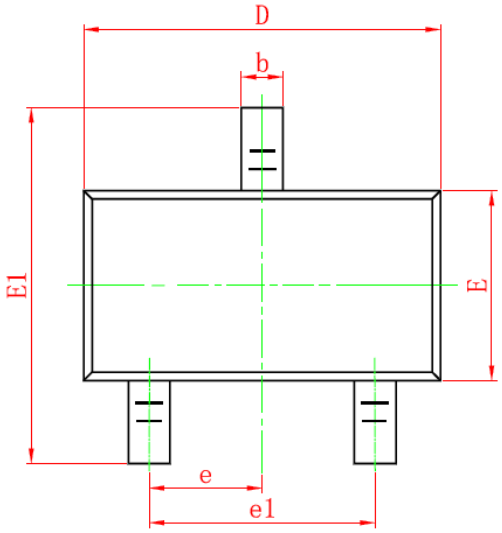
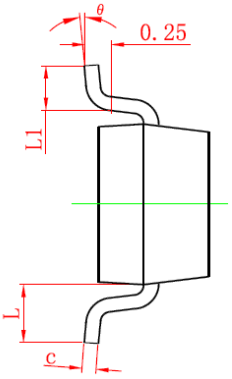


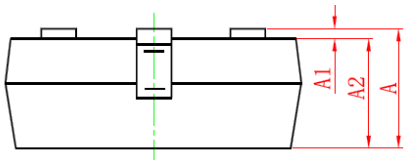

Figure 3: Normalized Maximum Transient Thermal Impedanc

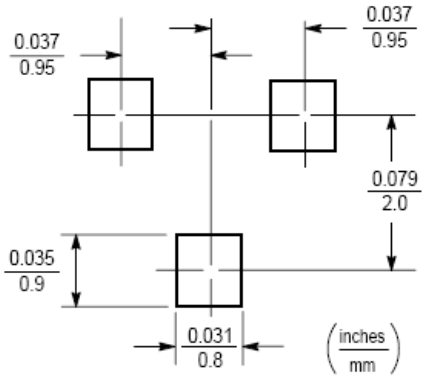
# SOT-23 PACKAGE INFORMATION

Dimensions in Millimeters (UNIT:mm)




| Symbol | Dimensions in Millimeters | |
|---|---|---|
| | MIN. | MAX. |
| A | 0.900 | 1.150 |
| A1 | 0.000 | 0.100 |
| A2 | 0.900 | 1.050 |
| b | 0.300 | 0.500 |
| c | 0.080 | 0.150 |
| D | 2.800 | 3.000 |
| E | 1.200 | 1.400 |
| E1 | 2.250 | 2.550 |
| e | 0.950TYP | |
| e1 | 1.800 | 2.000 |
| L | 0.550REF | |
| L1 | 0.300 | 0.500 |
| θ | 0° | 8° |

## NOTES

1. All dimensions are in millimeters.
2. Tolerance ±0.10mm (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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