



# STS3DPF30L

## DUAL P-CHANNEL 30V - 0.13 Ω - 3A SO-8 STripFET™ POWER MOSFET

PRELIMINARY DATA

| TYPE       | V <sub>DSS</sub> | R <sub>DS(on)</sub> | I <sub>D</sub> |
|------------|------------------|---------------------|----------------|
| STS3DPF30L | 30 V             | <0.165 Ω            | 3 A            |

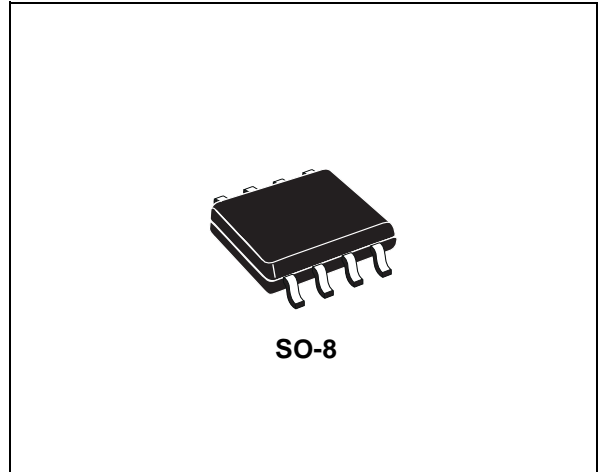
- TYPICAL R<sub>DS(on)</sub> = 0.13 Ω
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY
- LOW THRESHOLD DRIVE

### DESCRIPTION

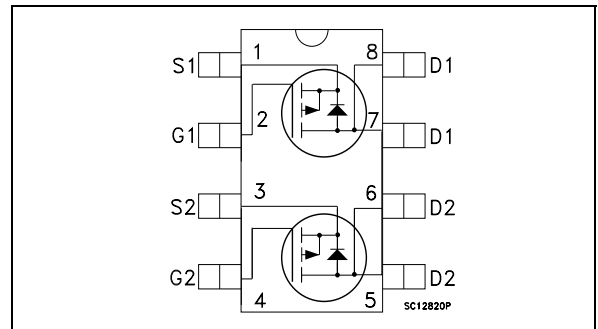
This Power MOSFET is the latest development of STMicroelectronics unique "Single Feature Size™" strip-based process. The resulting transistor shows extremely high packing density for low on-resistance, rugged avalanche characteristics and less critical alignment steps therefore a remarkable manufacturing reproducibility.

### APPLICATIONS

- BATTERY MANAGEMENT IN NOMADIC EQUIPMENT
- POWER MANAGEMENT IN CELLULAR PHONES
- DC-DC CONVERTER



### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

| Symbol              | Parameter   | Value | Unit |
|---------------------|---|-------|------|
| V <sub>DS</sub>     | Drain-source Voltage (V <sub>GS</sub> = 0)                            | 30    | V    |
| V <sub>DGR</sub>    | Drain-gate Voltage (R <sub>GS</sub> = 20 kΩ)                          | 30    | V    |
| V <sub>GS</sub>     | Gate- source Voltage  | ± 15  | V    |
| I <sub>D</sub>      | Drain Current (continuous) at T <sub>C</sub> = 25°C Single Operation  | 3     | A    |
|                     | Drain Current (continuous) at T <sub>C</sub> = 100°C Single Operation | 1.9   | A    |
| I <sub>DM</sub> (●) | Drain Current (pulsed)  | 12    | A    |
| P <sub>tot</sub>    | Total Dissipation at T <sub>C</sub> = 25°C Dual Operation             | 2     | W    |
|                     | Total Dissipation at T <sub>C</sub> = 25°C Single Operation           | 1.6   | W    |

(●) Pulse width limited by safe operating area.

Note: For the P-CHANNEL MOSFET actual polarity of voltages and current has to be reversed

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## THERMAL DATA

|                  |  |                                    |            |              |
|------------------|--|------------------------------------|------------|--------------|
| Rthj-amb         | (*)Thermal Resistance Junction-ambient | Single Operation<br>Dual Operating | 78<br>62.5 | °C/W<br>°C/W |
| T <sub>j</sub>   | Thermal Operating Junction-ambient     |                                    | 150        | °C           |
| T <sub>stg</sub> | Storage Temperature                    |                                    | -55 to 150 | °C           |

(\*) Mounted on FR-4 board (Steady State)

## ELECTRICAL CHARACTERISTICS (T<sub>CASE</sub> = 25 °C UNLESS OTHERWISE SPECIFIED)

### OFF

| Symbol               | Parameter   | Test Conditions   | Min. | Typ. | Max.    | Unit     |
|----------------------|---|---|------|------|---------|----------|
| V <sub>(BR)DSS</sub> | Drain-source Breakdown Voltage                        | I <sub>D</sub> = 250 μA, V <sub>GS</sub> = 0  | 30   |      |         | V        |
| I <sub>DSS</sub>     | Zero Gate Voltage Drain Current (V <sub>GS</sub> = 0) | V <sub>DS</sub> = Max Rating<br>V <sub>DS</sub> = Max Rating T <sub>C</sub> = 125°C |      |      | 1<br>10 | μA<br>μA |
| I <sub>GSS</sub>     | Gate-body Leakage Current (V <sub>DS</sub> = 0)       | V <sub>GS</sub> = ± 15V   |      |      | ±100    | nA       |

### ON (\*)

| Symbol              | Parameter                         | Test Conditions   | Min. | Typ.         | Max.          | Unit   |
|---------------------|-----------------------------------|---|------|--------------|---------------|--------|
| V <sub>GS(th)</sub> | Gate Threshold Voltage            | V <sub>DS</sub> = V <sub>GS</sub> I <sub>D</sub> = 250 μA                                       | 1    | 1.6          | 2.5           | V      |
| R <sub>DS(on)</sub> | Static Drain-source On Resistance | V <sub>GS</sub> = 10 V I <sub>D</sub> = 1.5 A<br>V <sub>GS</sub> = 4.5 V I <sub>D</sub> = 1.5 A |      | 0.13<br>0.15 | 0.165<br>0.20 | Ω<br>Ω |

### DYNAMIC

| Symbol              | Parameter                    | Test Conditions   | Min. | Typ. | Max. | Unit |
|---------------------|------------------------------|---|------|------|------|------|
| g <sub>fs</sub> (*) | Forward Transconductance     | V <sub>DS</sub> > I <sub>D(on)</sub> × R <sub>DS(on)max</sub> I <sub>D</sub> = 1.5A |      | 3.5  |      | S    |
| C <sub>iss</sub>    | Input Capacitance            | V <sub>DS</sub> = 25V f = 1 MHz V <sub>GS</sub> = 0                                 |      | 510  |      | pF   |
| C <sub>oss</sub>    | Output Capacitance           |   |      | 170  |      | pF   |
| C <sub>rss</sub>    | Reverse Transfer Capacitance |   |      | 55   |      | pF   |

**ELECTRICAL CHARACTERISTICS** (continued)

**SWITCHING ON**

| Symbol                        | Parameter  | Test Conditions  | Min. | Typ.              | Max. | Unit           |
|-------------------------------|--|--|------|-------------------|------|----------------|
| $t_{d(on)}$<br>$t_r$          | Turn-on Delay Time<br>Rise Time                              | $V_{DD} = 15\text{ V}$ $I_D = 1.5\text{ A}$<br>$R_G = 4.7\ \Omega$ $V_{GS} = 4.5\text{ V}$<br>(Resistive Load, Figure 1) |      | 15<br>37          |      | ns<br>ns       |
| $Q_g$<br>$Q_{gs}$<br>$Q_{gd}$ | Total Gate Charge<br>Gate-Source Charge<br>Gate-Drain Charge | $V_{DD} = 15\text{ V}$ $I_D = 3\text{ A}$ $V_{GS} = 4.5\text{ V}$<br>(See test circuit, Figure 2)                        |      | 5.5<br>1.7<br>1.8 | 7.5  | nC<br>nC<br>nC |

**SWITCHING OFF**

| Symbol                | Parameter                        | Test Conditions  | Min. | Typ.     | Max. | Unit     |
|-----------------------|----------------------------------|--|------|----------|------|----------|
| $t_{d(off)}$<br>$t_f$ | Turn-off Delay Time<br>Fall Time | $V_{DD} = 15\text{ V}$ $I_D = 1.5\text{ A}$<br>$R_G = 4.7\ \Omega$ $V_{GS} = 4.5\text{ V}$<br>(Resistive Load, Figure 1) |      | 88<br>23 |      | ns<br>ns |

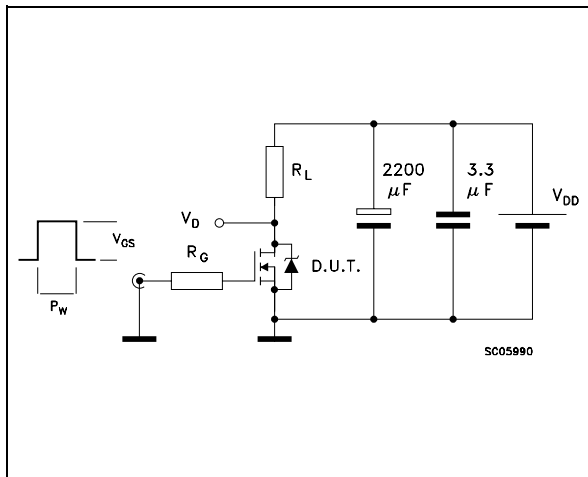
**SOURCE DRAIN DIODE**

| Symbol                            | Parameter  | Test Conditions  | Min. | Typ.             | Max.    | Unit          |
|-----------------------------------|--|--|------|------------------|---------|---------------|
| $I_{SD}$<br>$I_{SDM} (\bullet)$   | Source-drain Current<br>Source-drain Current (pulsed)                        |  |      |                  | 3<br>12 | A<br>A        |
| $V_{SD} (*)$                      | Forward On Voltage   | $I_{SD} = 3\text{ A}$ $V_{GS} = 0$   |      |                  | 1.2     | V             |
| $t_{rr}$<br>$Q_{rr}$<br>$I_{RRM}$ | Reverse Recovery Time<br>Reverse Recovery Charge<br>Reverse Recovery Current | $I_{SD} = 3\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$<br>$V_{DD} = 20\text{ V}$ $T_j = 150^\circ\text{C}$<br>(See test circuit, Figure 3) |      | 16<br>10<br>1.15 |         | ns<br>nC<br>A |

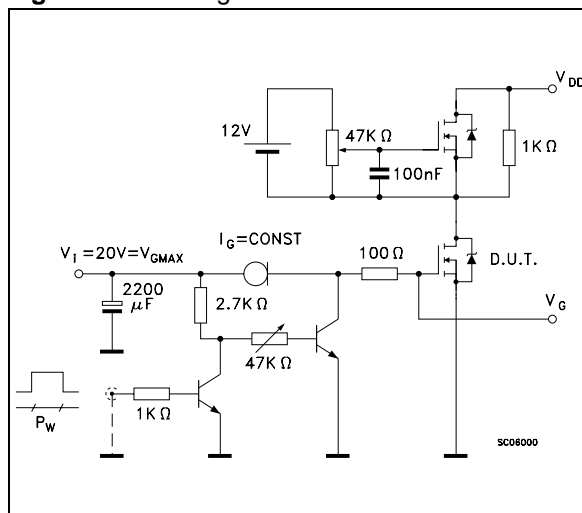
(\*) Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %.

( $\bullet$ ) Pulse width limited by safe operating area.

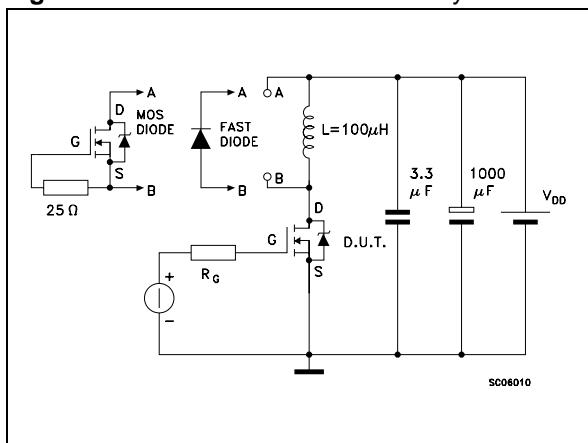
**Fig. 1: Switching Times Test Circuits For Resistive Load**



**Fig. 2: Gate Charge test Circuit**

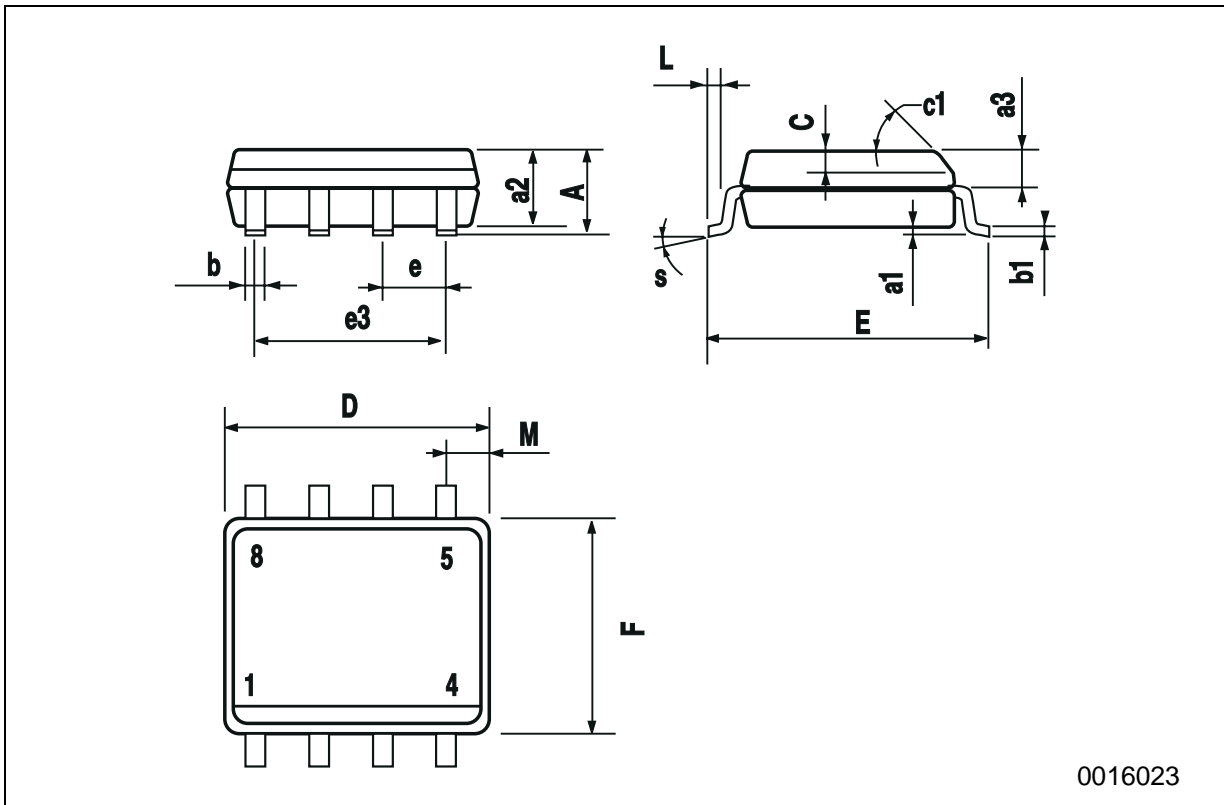


**Fig. 3: Test Circuit For Diode Recovery Behaviour**



**SO-8 MECHANICAL DATA**

| DIM. | mm        |      |      | inch  |       |       |
|------|-----------|------|------|-------|-------|-------|
|      | MIN.      | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    |           |      | 1.75 |       |       | 0.068 |
| a1   | 0.1       |      | 0.25 | 0.003 |       | 0.009 |
| a2   |           |      | 1.65 |       |       | 0.064 |
| a3   | 0.65      |      | 0.85 | 0.025 |       | 0.033 |
| b    | 0.35      |      | 0.48 | 0.013 |       | 0.018 |
| b1   | 0.19      |      | 0.25 | 0.007 |       | 0.010 |
| C    | 0.25      |      | 0.5  | 0.010 |       | 0.019 |
| c1   | 45 (typ.) |      |      |       |       |       |
| D    | 4.8       |      | 5.0  | 0.188 |       | 0.196 |
| E    | 5.8       |      | 6.2  | 0.228 |       | 0.244 |
| e    |           | 1.27 |      |       | 0.050 |       |
| e3   |           | 3.81 |      |       | 0.150 |       |
| F    | 3.8       |      | 4.0  | 0.14  |       | 0.157 |
| L    | 0.4       |      | 1.27 | 0.015 |       | 0.050 |
| M    |           |      | 0.6  |       |       | 0.023 |
| S    | 8 (max.)  |      |      |       |       |       |



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