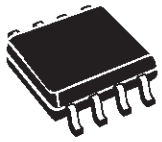
# STS17NF3LL

## N-CHANNEL 30V - 0.0045Ω - 17A SO-8
## STripFET™ MOSFET FOR DC-DC CONVERSION

**PRELIMINARY DATA**

| TYPE | $V_{DSS}$ | $R_{DS(on)}$ | $I_D$ |
|---|---|---|---|
| STS17NF3LL | 30 V | < 0.0055Ω | 17 A |

- TYPICAL $R_{DS}(on)$ = 0.0045Ω
- OPTIMAL $R_{DS(ON)}$ x $Q_g$ TRADE-OFF @4.5V
- CONDUCTION LOSSES REDUCED
- SWITCHING LOSSES REDUCED

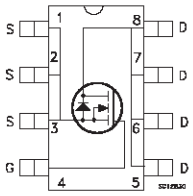


**SO-8**

### DESCRIPTION

This application specific Power MOSFET is the third generation of STMicroelectronics unique "Single Feature Size™" strip-based process. The resulting transistor shows the best trade-off between on-resistance and gate charge. Such features make it the best choice in high efficiency DC-DC converters for Telecom and Computer industries.

### INTERNAL SCHEMATIC DIAGRAM




### APPLICATIONS

- DC-DC CONVERTERS FOR TELECOM AND NOTEBOOK CPU CORE
- SYNCHRONOUS RECTIFIER

### ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{DS}$ | Drain-source Voltage ($V_{GS}$ = 0) | 30 | V |
| $V_{DGR}$ | Drain-gate Voltage ($R_{GS}$ = 20 kΩ) | 30 | V |
| $V_{GS}$ | Gate- source Voltage | ± 18 | V |
| $I_D$ | Drain Current (continuous) at $T_A$ = 25°C<br>Drain Current (continuous) at $T_A$ = 100°C | 17<br>12 | A<br>A |
| $I_{DM}$ (●) | Drain Current (pulsed) | 68 | A |
| $P_{TOT}$ | Total Dissipation at $T_A$ = 25°C | 3.2 | W |

(●) Pulse width limited by safe operating area

## THERMAL DATA

| | | | |
|---|---|---|---|
| Rthj-amb | (*) Thermal Resistance Junction-ambient Max | 47 | °C/W |
| Rthj-lead | Thermal Resistance Junction-leads Max | 16 | °C/W |
| $T_j$ | Max. Operating Junction Temperature | – 55 to 175 | °C |
| $T_{stg}$ | Storage Temperature | | |

(*) When mounted on 1inch FR4 Board, 2oz of Cu, t ≤ 10 sec.

## ELECTRICAL CHARACTERISTICS ($T_J$ = 25 °C UNLESS OTHERWISE SPECIFIED)

OFF

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_{(BR)DSS}$ | Drain-source Breakdown Voltage | $I_D$ = 250 µA, $V_{GS}$ = 0 | 30 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current ($V_{GS}$ = 0) | $V_{DS}$ = Max Rating | | | 1 | µA |
| | | $V_{DS}$ = Max Rating, $T_C$ = 125 °C | | | 10 | µA |
| $I_{GSS}$ | Gate-body Leakage Current ($V_{DS}$ = 0) | $V_{GS}$ = ± 18V | | | ±100 | nA |

ON (1)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$, $I_D$ = 250µA | 1 | | | V |
| $R_{DS(on)}$ | Static Drain-source On Resistance | $V_{GS}$ = 10 V, $I_D$ = 8.5 A | | 0.0045 | 0.0055 | Ω |
| | | $V_{GS}$ = 4.5 V, $I_D$ = 8.5 A | | 0.0055 | 0.007 | Ω |

DYNAMIC

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $g_{fs}$ (1) | Forward Transconductance | $V_{DS}$ = 15V , $I_D$ = 8.5 A | | TBD | | S |
| $C_{iss}$ | Input Capacitance | $V_{DS}$ = 25 V, f = 1 MHz, $V_{GS}$ = 0 | | 2160 | | pF |
| $C_{oss}$ | Output Capacitance | | | 614 | | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 98 | | pF |

**ELECTRICAL CHARACTERISTICS** (CONTINUED)

SWITCHING ON

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD}$ = 15 V, $I_D$ = 6A | | 23.5 | | ns |
| $t_r$ | Rise Time | $R_G$ = 4.7Ω $V_{GS}$ = 4.5V (see test circuit, Figure 1) | | 39 | | ns |
| $Q_g$ | Total Gate Charge | $V_{DD}$ = 24 V, $I_D$ = 17 A, | | 26 | 35 | nC |
| $Q_{gs}$ | Gate-Source Charge | $V_{GS}$ = 4.5 V | | 7 | | nC |
| $Q_{gd}$ | Gate-Drain Charge | (see test circuit, Figure 2) | | 12 | | nC |

SWITCHING OFF

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $t_{d(off)}$ | Turn-off-Delay Time | $V_{DD}$ = 15 V, $I_D$ = 6 A, | | 47.5 | | ns |
| $t_f$ | Fall Time | $R_G$ = 4.7Ω, $V_{GS}$ = 4.5 V (see test circuit, Figure 1) | | 37 | | ns |

SOURCE DRAIN DIODE

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_{SD}$ | Source-drain Current | | | | 17 | A |
| $I_{SDM}$ (1) | Source-drain Current (pulsed) | | | | 68 | A |
| $V_{SD}$ (2) | Forward On Voltage | $I_{SD}$ = 17 A, $V_{GS}$ = 0 | | | 1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_{SD}$ = 12.5 A, di/dt = 100A/µs, | | 39 | | ns |
| $Q_{rr}$ | Reverse Recovery | $V_{DD}$ = 15 V, $T_j$ = 150°C | | 45 | | nC |
| $I_{RRM}$ | ChargeReverse Recovery Current | (see test circuit, Figure 3) | | 2.3 | | A |

Note: 1. Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %.
2. Pulse width limited by safe operating area.

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

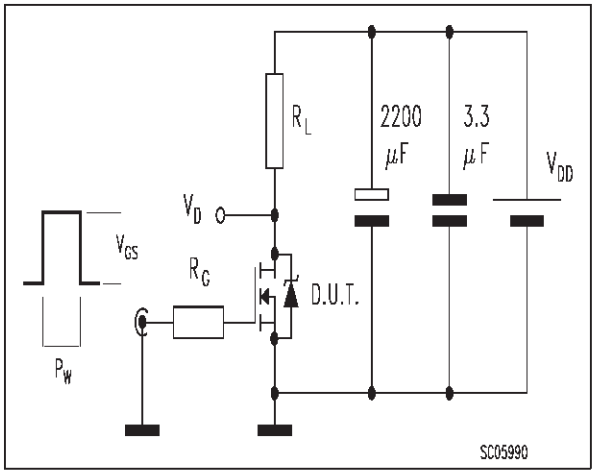



**Fig. 2:** Gate Charge test Circuit

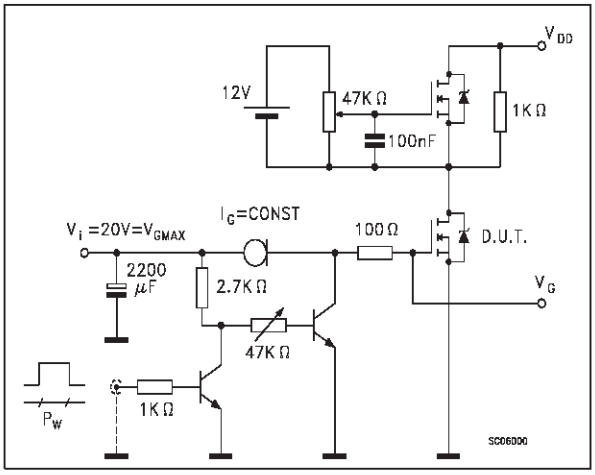
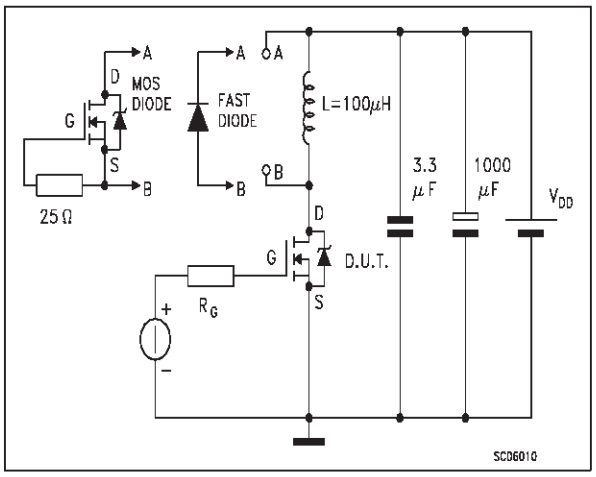
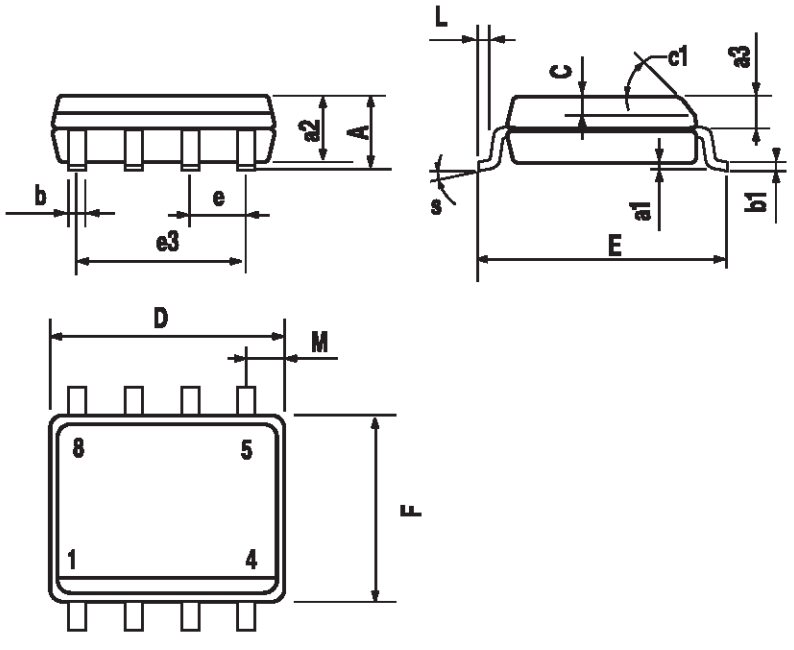



**Fig. 3:** Test Circuit For Diode Recovery Behaviour



## 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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