



# STL35NF3LL

## N-CHANNEL 30V - 0.0055Ω - 35A PowerFLAT™ LOW GATE CHARGE STripFET™ MOSFET

### TARGET DATA

| TYPE       | V <sub>DSS</sub> | R <sub>DS(on)</sub> | I <sub>D</sub> |
|------------|------------------|---------------------|----------------|
| STL35NF3LL | 30 V             | < 0.007 Ω           | 35 A           |

- TYPICAL R<sub>DS(on)</sub> = 0.0055Ω
- IMPROVED DIE-TO-FOOTPRINT RATIO
- VERY LOW PROFILE PACKAGE

### DESCRIPTION

This Power MOSFET is the second generation of STMicroelectronics unique "STripFET™" technology. The resulting transistor shows extremely low on-resistance and minimal gate charge. The new PowerFLAT™ package allows a significant reduction in board space without compromising performance.

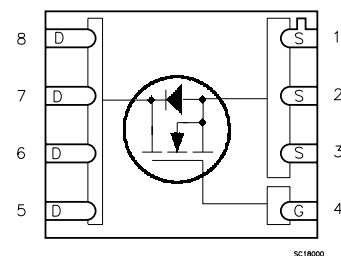
### APPLICATIONS

- DC-DC CONVERTERS
- BATTERY MANAGEMENT IN NOMADIC EQUIPMENT



**PowerFLAT™ (6x5)  
(Chip Scale Package)**

### 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<br>Drain Current (continuous) at T <sub>C</sub> = 100°C | 35<br>22   | A<br>A |
| I <sub>DM</sub> (●) | Drain Current (pulsed)                                                                                      | 140        | A      |
| P <sub>TOT</sub>    | Total Dissipation at T <sub>C</sub> = 25°C                                                                  | 80         | W      |
|                     | Derating Factor                                                                                             | 0.64       | W/°C   |
| dv/dt(1)            | Peak Diode Recovery voltage slope                                                                           | TBD        | V/ns   |
| E <sub>AS</sub> (2) | Single Pulse Avalanche Energy                                                                               | TBD        | J      |
| T <sub>stg</sub>    | Storage Temperature                                                                                         | -55 to 150 | °C     |
| T <sub>j</sub>      | Max. Operating Junction Temperature                                                                         |            |        |

(●) Pulse width limited by safe operating area

(#) Limited by Wire Bonding

(1) I<sub>SD</sub> < 35A, di/dt < 300A/μs, V<sub>DD</sub> < V<sub>(BR)DSS</sub>, T<sub>J</sub> < T<sub>JMAX</sub>

(2) Starting T<sub>j</sub> = 25°C, I<sub>D</sub> = 30A, V<sub>DD</sub> = 27.5V

## STL35NF3LL

### THERMAL DATA

|           |                                         |      |      |
|-----------|-----------------------------------------|------|------|
| Rthj-case | Thermal Resistance Junction-case Max    | 1.56 | °C/W |
| Rthj-amb  | Thermal Resistance Junction-ambient Max | 50   | °C/W |

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

#### OFF

| Symbol        | Parameter                                        | Test Conditions                                                                                   | Min. | Typ. | Max.      | Unit               |
|---------------|--------------------------------------------------|---------------------------------------------------------------------------------------------------|------|------|-----------|--------------------|
| $V_{(BR)DSS}$ | Drain-source Breakdown Voltage                   | $I_D = 250 \mu A$ , $V_{GS} = 0$                                                                  | 30   |      |           | V                  |
| $I_{DSS}$     | Zero Gate Voltage Drain Current ( $V_{GS} = 0$ ) | $V_{DS} = \text{Max Rating}$<br>$V_{DS} = \text{Max Rating}$ , $T_C = 125 \text{ }^\circ\text{C}$ |      |      | 1<br>10   | $\mu A$<br>$\mu A$ |
| $I_{GSS}$     | Gate-body Leakage Current ( $V_{DS} = 0$ )       | $V_{GS} = \pm 15V$                                                                                |      |      | $\pm 100$ | nA                 |

#### ON (1)

| Symbol       | Parameter                         | Test Conditions                                                       | Min. | Typ.            | Max.           | Unit                 |
|--------------|-----------------------------------|-----------------------------------------------------------------------|------|-----------------|----------------|----------------------|
| $V_{GS(th)}$ | Gate Threshold Voltage            | $V_{DS} = V_{GS}$ , $I_D = 250 \mu A$                                 | 1    |                 |                | V                    |
| $R_{DS(on)}$ | Static Drain-source On Resistance | $V_{GS} = 10 V$ , $I_D = 17.5 A$<br>$V_{GS} = 4.5 V$ , $I_D = 17.5 A$ |      | 0.0055<br>0.007 | 0.007<br>0.010 | $\Omega$<br>$\Omega$ |

#### DYNAMIC

| Symbol       | Parameter                    | Test Conditions                                               | Min. | Typ. | Max. | Unit |
|--------------|------------------------------|---------------------------------------------------------------|------|------|------|------|
| $g_{fs} (1)$ | Forward Transconductance     | $V_{DS} > I_{D(on)} \times R_{DS(on)max}$ ,<br>$I_D = 17.5 A$ |      | TBD  |      | S    |
| $C_{iss}$    | Input Capacitance            | $V_{DS} = 25 V$ , $f = 1 \text{ MHz}$ , $V_{GS} = 0$          |      | 2650 |      | pF   |
| $C_{oss}$    | Output Capacitance           |                                                               |      | 900  |      | pF   |
| $C_{rss}$    | Reverse Transfer Capacitance |                                                               |      | 150  |      | pF   |

**ELECTRICAL CHARACTERISTICS (CONTINUED)****SWITCHING ON**

| Symbol      | Parameter          | Test Conditions                                                             | Min. | Typ. | Max. | Unit |
|-------------|--------------------|-----------------------------------------------------------------------------|------|------|------|------|
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD} = 15\text{ V}$ , $I_D = 17.5\text{ A}$                              |      | TBD  |      | ns   |
| $t_r$       | Rise Time          | $R_G = 4.7\Omega$ , $V_{GS} = 4.5\text{ V}$<br>(see test circuit, Figure 3) |      | TBD  |      | ns   |
| $Q_g$       | Total Gate Charge  | $V_{DD} = 15\text{ V}$ , $I_D = 35\text{ A}$ ,                              |      | 80   |      | nC   |
| $Q_{gs}$    | Gate-Source Charge | $V_{GS} = 10\text{ V}$                                                      |      | TBD  |      | nC   |
| $Q_{gd}$    | Gate-Drain Charge  |                                                                             |      | TBD  |      | nC   |

**SWITCHING OFF**

| Symbol       | Parameter           | Test Conditions                                                             | Min. | Typ. | Max. | Unit |
|--------------|---------------------|-----------------------------------------------------------------------------|------|------|------|------|
| $t_{d(off)}$ | Turn-off-Delay Time | $V_{DD} = 15\text{ V}$ , $I_D = 17.5\text{ A}$ ,                            |      | TBD  |      | ns   |
| $t_f$        | Fall Time           | $R_G = 4.7\Omega$ , $V_{GS} = 4.5\text{ V}$<br>(see test circuit, Figure 3) |      | TBD  |      | ns   |

**SOURCE DRAIN DIODE**

| Symbol       | Parameter                     | Test Conditions                                               | Min. | Typ. | Max. | Unit |
|--------------|-------------------------------|---------------------------------------------------------------|------|------|------|------|
| $I_{SD}$     | Source-drain Current          |                                                               |      |      | 35   | A    |
| $I_{SDM(1)}$ | Source-drain Current (pulsed) |                                                               |      |      | 140  | A    |
| $V_{SD(2)}$  | Forward On Voltage            | $I_{SD} = 35\text{ A}$ , $V_{GS} = 0$                         |      |      | 1.2  | V    |
| $t_{rr}$     | Reverse Recovery Time         | $I_{SD} = 35\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ , |      | TBD  |      | ns   |
| $Q_{rr}$     | Reverse Recovery Charge       | $V_{DD} = 30\text{ V}$ , $T_j = 150^\circ\text{C}$            |      | TBD  |      | nC   |
| $I_{RRM}$    | Reverse Recovery Current      | (see test circuit, Figure 5)                                  |      | TBD  |      | A    |

Note: 1. Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %.  
2. Pulse width limited by safe operating area.

Fig. 1: Unclamped Inductive Load Test Circuit

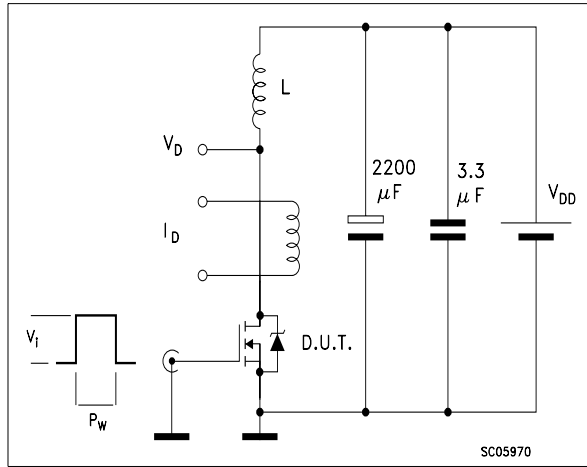


Fig. 2: Unclamped Inductive Waveform

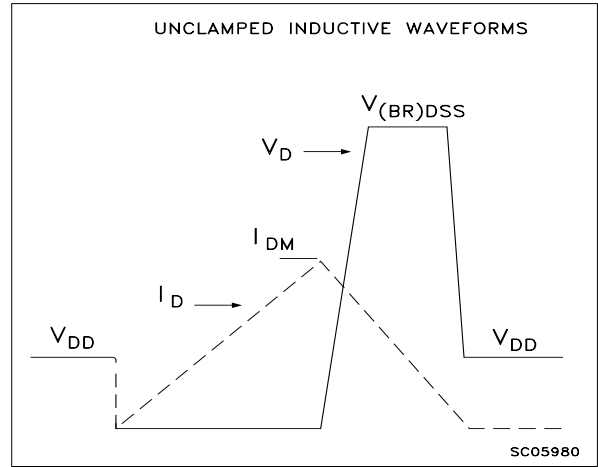


Fig. 3: Switching Times Test Circuit For Resistive Load

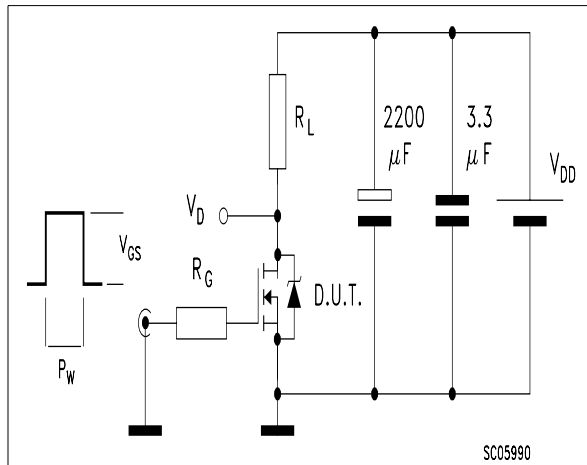


Fig. 4: Gate Charge test Circuit

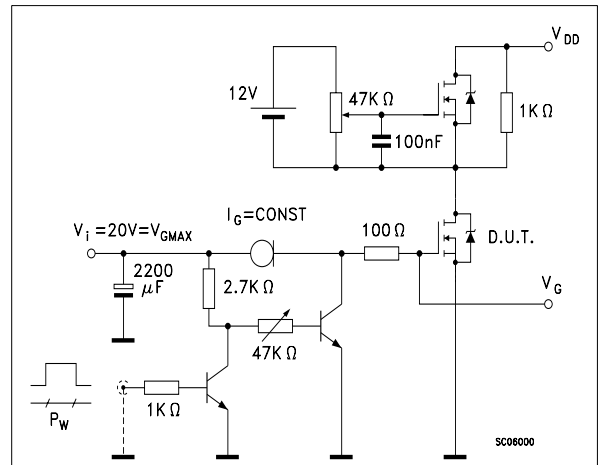
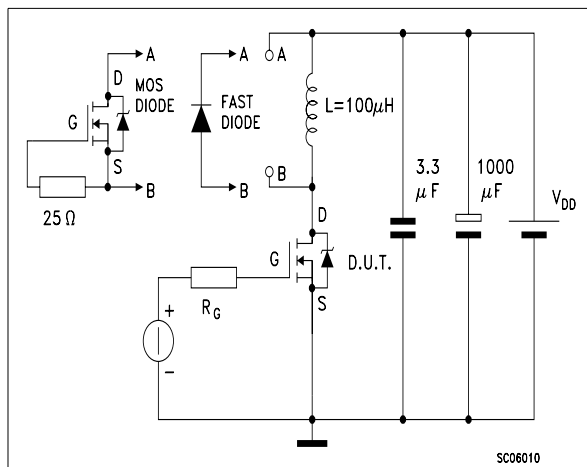
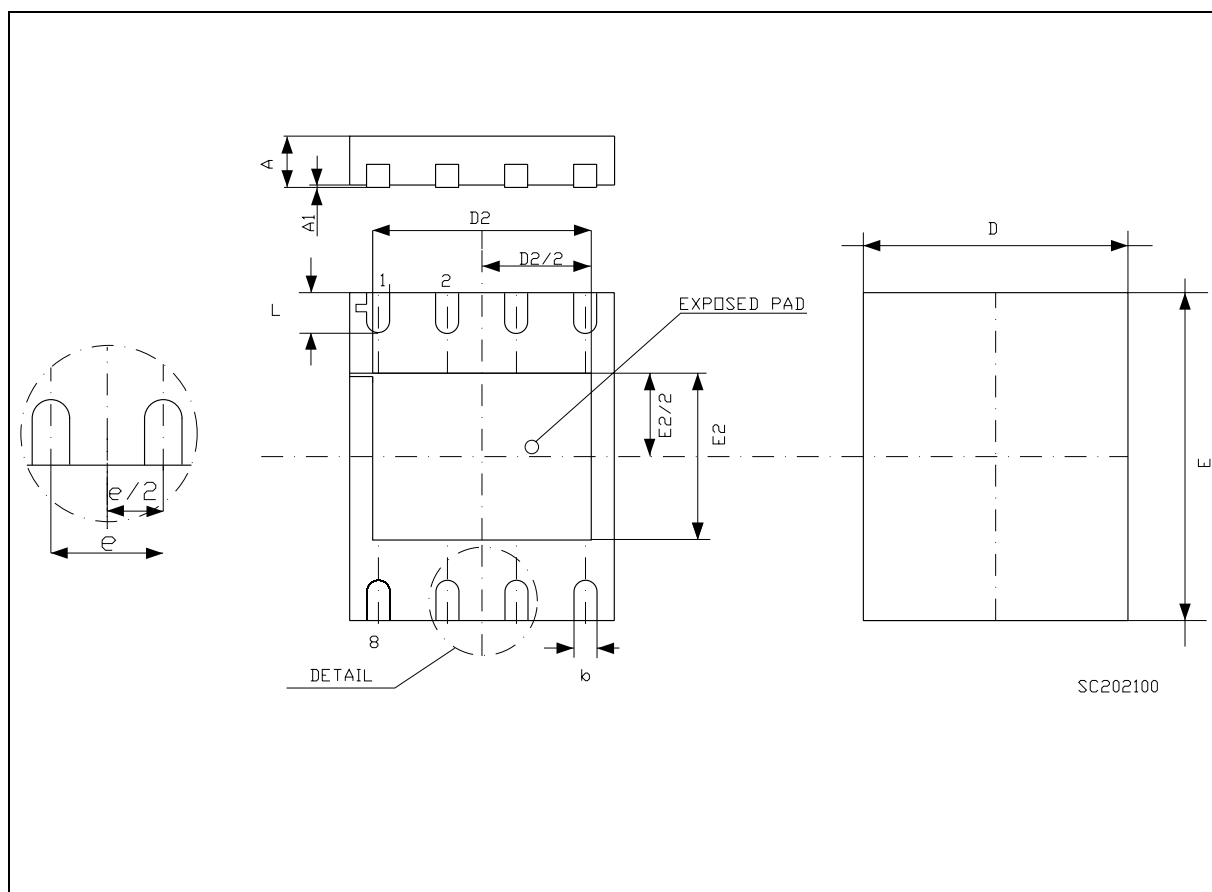


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



**PowerFLAT™(6x5) MECHANICAL DATA**

| DIM. | mm.  |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP  | MAX. | MIN.  | TYP.  | MAX.  |
| A    | 0.80 |      | 1.00 | 0.031 |       | 0.039 |
| A1   |      | 0.08 |      |       | 0.003 |       |
| b    | 0.36 |      | 0.48 | 0.014 |       | 0.018 |
| D    |      | 4.89 |      |       | 0.191 |       |
| D2   | 3.95 |      | 4.05 | 0.154 |       | 0.158 |
| E    |      | 6.00 |      |       | 0.235 |       |
| E2   | 2.95 |      | 3.05 | 0.115 |       | 0.119 |
| e    |      | 1.27 |      |       | 0.049 |       |
| L    | 0.65 |      | 0.85 | 0.025 |       | 0.033 |



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