



## STL35NF10

### N-CHANNEL 100V - 0.025Ω - 35A PowerFLAT™ LOW GATE CHARGE STripFET™ MOSFET

PRELIMINARY DATA

| TYPE      | V <sub>DSS</sub> | R <sub>DS(on)</sub> | I <sub>D</sub> |
|-----------|------------------|---------------------|----------------|
| STL35NF10 | 100 V            | < 0.030 Ω           | 35 A           |

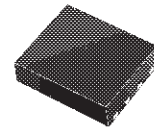
- TYPICAL R<sub>DS(on)</sub> = 0.025Ω
- IMPROVED DIE-TO-FOOTPRINT RATIO
- VERY LOW PROFILE PACKAGE

#### 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.

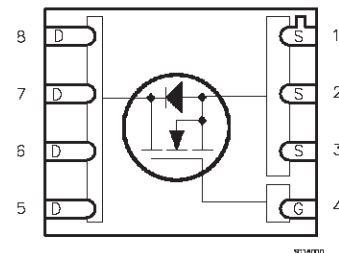
#### APPLICATIONS

- HIGH EFFICIENCY ISOLATED DC/DC CONVERTERS



**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)                                                                  | 100        | V      |
| V <sub>DGR</sub>    | Drain-gate Voltage (R <sub>GS</sub> = 20 kΩ)                                                                | 100        | V      |
| V <sub>GS</sub>     | Gate- source Voltage                                                                                        | ± 20       | 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   |
| E <sub>AS</sub> (1) | Single Pulse Avalanche Energy                                                                               | 135        | mJ     |
| T <sub>stg</sub>    | Storage Temperature                                                                                         | -65 to 150 | °C     |
| T <sub>j</sub>      | Max. Operating Junction Temperature                                                                         | -55 to 150 | °C     |

(●) Pulse width limited by safe operating area

(1) Starting T<sub>j</sub> = 25°C, I<sub>D</sub> = 35A, V<sub>DD</sub> = 50V

## STL35NF10

### 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 Condition s                                                                      | Min. | Typ. | Max.    | Unit     |
|----------------------|-------------------------------------------------------|---------------------------------------------------------------------------------------|------|------|---------|----------|
| V <sub>(BR)DSS</sub> | Drain-source Breakdown Voltage                        | I <sub>D</sub> = 250 µA, V <sub>GS</sub> = 0                                          | 100  |      |         | 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> = ± 20V                                                               |      |      | ±100    | nA       |

#### ON (1)

| Symbol              | Parameter                         | Test Condition s                                           | Min. | Typ.  | Max.  | Unit |
|---------------------|-----------------------------------|------------------------------------------------------------|------|-------|-------|------|
| V <sub>GS(th)</sub> | Gate Threshold Voltage            | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA | 2    | 2.8   | 4     | V    |
| R <sub>DS(on)</sub> | Static Drain-source On Resistance | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 17.5 A            |      | 0.025 | 0.030 | Ω    |

#### DYNAMIC

| Symbol              | Parameter                    | Test Condition s                                       | Min. | Typ. | Max. | Unit |
|---------------------|------------------------------|--------------------------------------------------------|------|------|------|------|
| g <sub>fs</sub> (1) | Forward Transconductance     | V <sub>DS</sub> = 20 V, I <sub>D</sub> = 15 A          |      | 18   |      | S    |
| C <sub>iss</sub>    | Input Capacitance            | V <sub>DS</sub> = 25 V, f = 1 MHz, V <sub>GS</sub> = 0 |      | 1780 |      | pF   |
| C <sub>oss</sub>    | Output Capacitance           |                                                        |      | 265  |      | pF   |
| C <sub>rss</sub>    | Reverse Transfer Capacitance |                                                        |      | 162  |      | pF   |

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

| Symbol      | Parameter          | Test Conditions                                                            | Min. | Typ. | Max. | Unit |
|-------------|--------------------|----------------------------------------------------------------------------|------|------|------|------|
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD} = 50\text{ V}$ , $I_D = 17.5\text{ A}$                             |      | 28   |      | ns   |
| $t_r$       | Rise Time          | $R_G = 4.7\Omega$ , $V_{GS} = 10\text{ V}$<br>(see test circuit, Figure 1) |      | 63   |      | ns   |
| $Q_g$       | Total Gate Charge  | $V_{DD} = 80\text{ V}$ , $I_D = 35\text{ A}$ ,                             |      | 60   | 80   | nC   |
| $Q_{gs}$    | Gate-Source Charge | $V_{GS} = 10\text{ V}$                                                     |      | 10   |      | nC   |
| $Q_{gd}$    | Gate-Drain Charge  | (see test circuit, Figure 2)                                               |      | 23   |      | nC   |

**SWITCHING OFF**

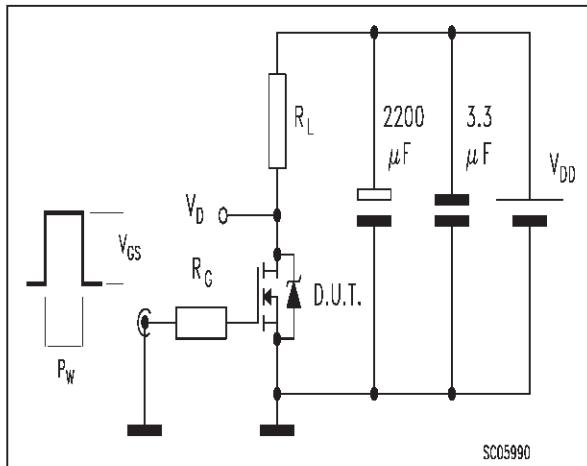
| Symbol       | Parameter           | Test Conditions                                                            | Min. | Typ. | Max. | Unit |
|--------------|---------------------|----------------------------------------------------------------------------|------|------|------|------|
| $t_{d(off)}$ | Turn-off-Delay Time | $V_{DD} = 50\text{ V}$ , $I_D = 17.5\text{ A}$ ,                           |      | 84   |      | ns   |
| $t_f$        | Fall Time           | $R_G = 4.7\Omega$ , $V_{GS} = 10\text{ V}$<br>(see test circuit, Figure 1) |      | 28   |      | ns   |

**SOURCE DRAIN DIODE**

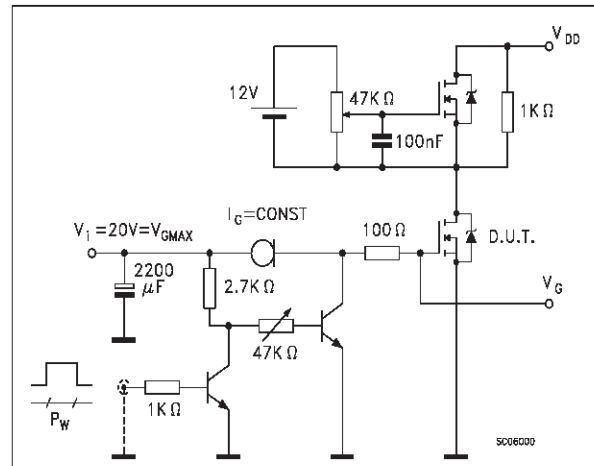
| Symbol        | Parameter                     | Test Conditions                                               | Min. | Typ. | Max. | Unit |
|---------------|-------------------------------|---------------------------------------------------------------|------|------|------|------|
| $I_{SD}$      | Source-drain Current          |                                                               |      |      | 35   | A    |
| $I_{SDM} (1)$ | Source-drain Current (pulsed) |                                                               |      |      | 140  | A    |
| $V_{SD} (2)$  | Forward On Voltage            | $I_{SD} = 18\text{ A}$ , $V_{GS} = 0$                         |      |      | 1.2  | V    |
| $t_{rr}$      | Reverse Recovery Time         | $I_{SD} = 35\text{ A}$ , $di/dt = 100\text{ A}/\mu\text{s}$ , |      | 114  |      | ns   |
| $Q_{rr}$      | Reverse Recovery Charge       | $V_{DD} = 25\text{ V}$ , $T_j = 150^\circ\text{C}$            |      | 456  |      | nC   |
| $I_{RRM}$     | Reverse Recovery Current      | (see test circuit, Figure 3)                                  |      | 8    |      | A    |

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

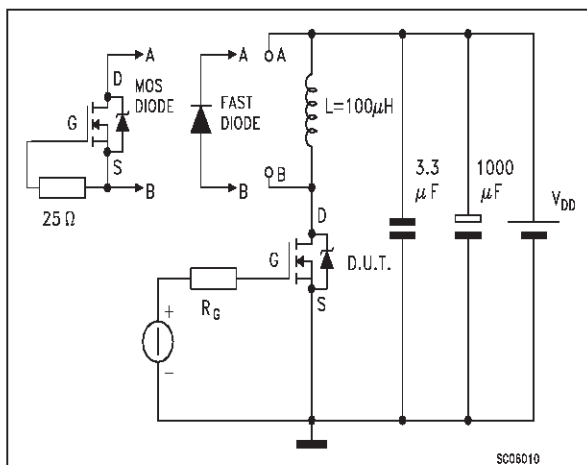
**Fig. 1:** Switching Times Test Circuit For Resistive Load



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

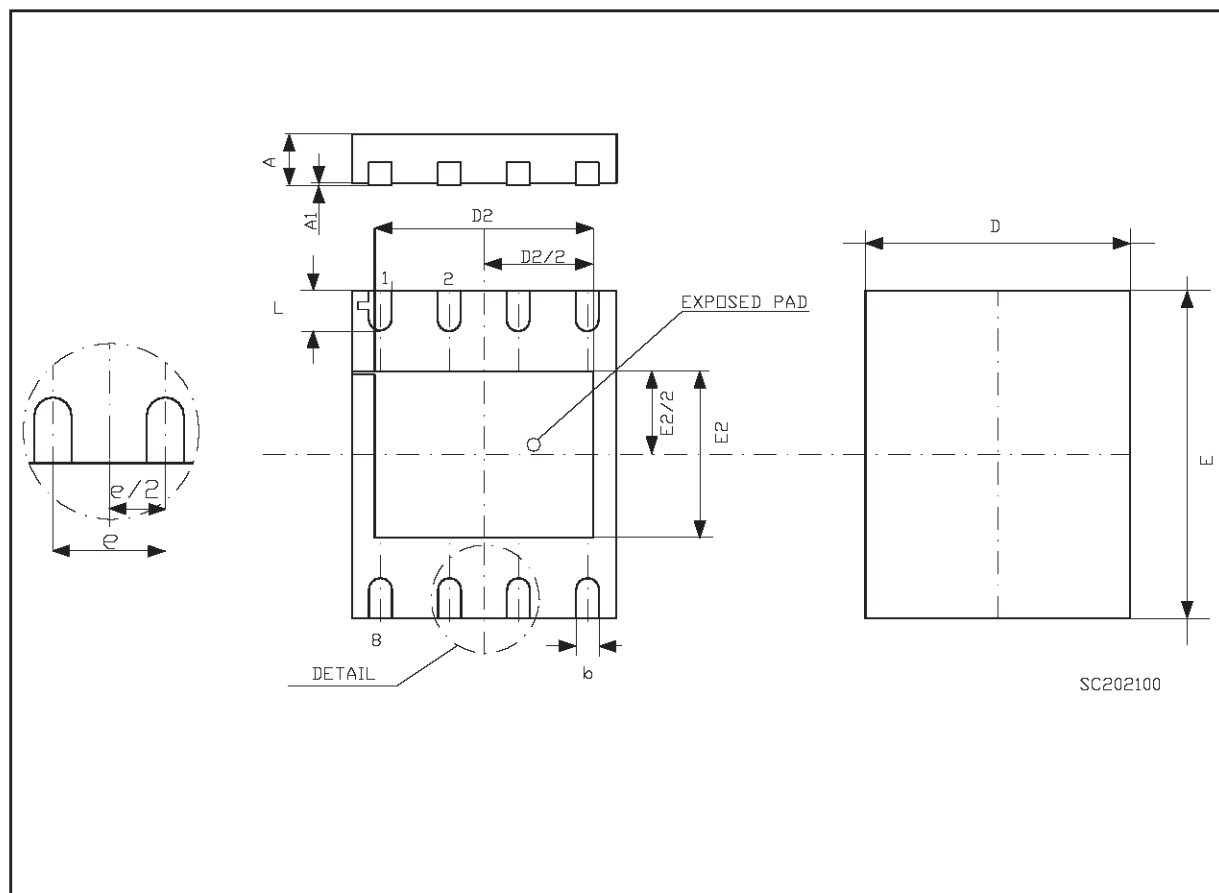


**Fig. 3:** Test Circuit For Diode Recovery Behaviour



**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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