



STL27N15

N-CHANNEL 150V - 0.045 Ω - 27A PowerFLAT™ LOW GATE CHARGE STRIPFET™ MOSFET

TARGET DATA

| TYPE | V _{DSS} | R _{DS(on)} | I _D |
|----------|------------------|---------------------|---------------------|
| STL15N15 | 150 V | <0.060 Ω | 27 A ⁽¹⁾ |

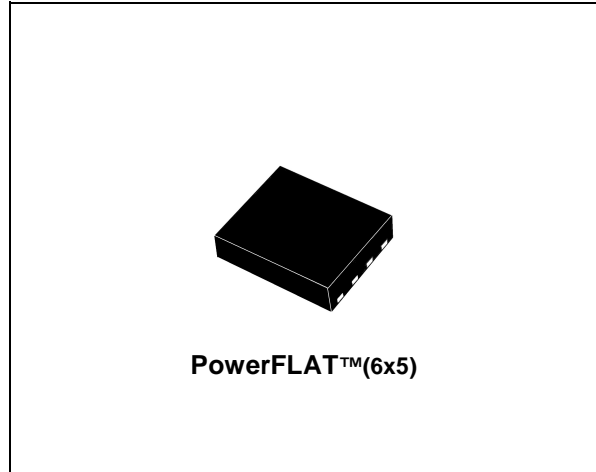
- TYPICAL R_{DS(on)} = 0.045 Ω
- IMPROVED DIE-TO-FOOTPRINT RATIO
- VERY LOW PROFILE PACKAGE (1mm MAX)
- VERY LOW THERMAL RESISTANCE
- VERY LOW GATE CHARGE

DESCRIPTION

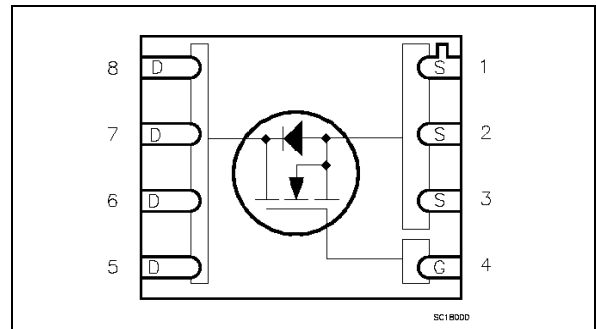
This MOSFET series realized with STMicroelectronics unique "StripFET™" process has specifically been designed to minimize input capacitance and gate charge. It's therefore suitable as primary switch in advanced high efficiency, high frequency isolated DC-DC converter for telecom and computer application. The new PowerFLAT™ package allows a significant reduction in a board space without compromising performance.

APPLICATIONS

- HIGH-EFFICIENCY ISOLATED DC-DC CONVERTERS
- TELECOM AND BATTERY CHARGER ADAPTOR
- SYNCHRONOUS RECTIFICATION



INTERNAL SCHEMATIC DIAGRAM



Ordering Information

| SALES TYPE | MARKING | PACKAGE | PACKAGING |
|------------|---------|-----------|-------------|
| STL27N15 | L27N15 | PowerFLAT | TAPE & REEL |

ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---------------------------------|--|------------|------|
| V _{DS} | Drain-source Voltage (V _{GS} = 0) | 150 | V |
| V _{DGR} | Drain-gate Voltage (R _{GS} = 20 k Ω) | 150 | V |
| V _{GS} | Gate- source Voltage | ± 20 | V |
| I _D | Drain Current (continuous) at T _C = 25°C (Steady State) | 6 | A |
| I _D | Drain Current (continuous) at T _C = 100°C | 4 | A |
| I _{DM} ⁽³⁾ | Drain Current (pulsed) | 24 | A |
| P _{tot} ⁽²⁾ | Total Dissipation at T _C = 25°C (Steady State) | 4 | W |
| P _{tot} ⁽¹⁾ | Total Dissipation at T _C = 25°C | 80 | W |
| | Derating Factor | 0.03 | W/°C |
| dv/dt ⁽⁵⁾ | Peak Diode Recovery voltage slope | TBD | V/ns |
| T _{stg} | Storage Temperature | -55 to 150 | °C |
| T _j | Operating Junction Temperature | | |

STL27N15

THERMAL DATA

| | | | |
|-------------|--|------|------|
| Rthj-F | Thermal Resistance Junction-Foot (Drain) | 1.56 | °C/W |
| Rthj-pcb(2) | Thermal Operating Junction-pcb | 31.2 | °C/W |

ELECTRICAL CHARACTERISTICS (T_{case} = 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 | 100 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current (V _{GS} = 0) | V _{DS} = Max Rating V _{DS} = Max Rating T _C = 125°C | | | 1 10 | μA μA |
| I _{GSS} | Gate-body Leakage Current (V _{DS} = 0) | V _{GS} = ± 20 V | | | ±100 | nA |

ON (6)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---------------------|-----------------------------------|---|------|-------|-------|------|
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} = V _{GS} I _D = 250 μA | 1 | | | V |
| R _{DS(on)} | Static Drain-source On Resistance | V _{GS} = 10 V I _D = 3 A | | 0.045 | 0.060 | Ω |

DYNAMIC

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---------------------|------------------------------|---|------|------|------|------|
| g _{fs} (6) | Forward Transconductance | V _{DS} = 50 V I _D = 5 A | | TBD | | S |
| C _{iss} | Input Capacitance | V _{DS} = 25V, f = 1 MHz, V _{GS} = 0 | | TBD | | pF |
| C _{oss} | Output Capacitance | | | TBD | | pF |
| C _{rss} | Reverse Transfer Capacitance | | | TBD | | pF |

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------|--|---|------|-------------------|------|----------------|
| $t_{d(on)}$ t_r | Turn-on Delay Time Rise Time | $V_{DD} = 50\text{ V}$ $I_D = 3\text{ A}$ $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 3) | | TBD TBD | | ns ns |
| Q_g Q_{gs} Q_{gd} | Total Gate Charge Gate-Source Charge Gate-Drain Charge | $V_{DD} = 50\text{ V}$ $I_D = 6\text{ A}$ $V_{GS} = 10\text{ V}$ | | TBD TBD TBD | 28 | nC nC nC |

SWITCHING OFF

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-----------------------|----------------------------------|---|------|------------|------|----------|
| $t_{d(off)}$ t_f | Turn-off Delay Time Fall Time | $V_{DD} = 50\text{ V}$ $I_D = 3\text{ A}$ $R_G = 4.7\ \Omega$, $V_{GS} = 10\text{ V}$ (Resistive Load, Figure 3) | | TBD TBD | | ns ns |

SOURCE DRAIN DIODE

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-----------------------------------|--|--|------|-------------------|---------|---------------|
| I_{SD} $I_{SDM}^{(3)}$ | Source-drain Current Source-drain Current (pulsed) | | | | 6 24 | A A |
| $V_{SD}^{(6)}$ | Forward On Voltage | $I_{SD} = 3\text{ A}$ $V_{GS} = 0$ | | | 1.2 | V |
| t_{rr} Q_{rr} I_{RRM} | Reverse Recovery Time Reverse Recovery Charge Reverse Recovery Current | $I_{SD} = 6\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 30\text{ V}$ $j = 150^\circ\text{C}$ (see test circuit, Figure 5) | | TBD TBD TBD | | ns nC A |

(1) The value is rated according R_{thj-F} .(2) When Mounted on FR-4 board of 1 inch², 2oz Cu

(3) Pulse width limited by safe operating area.

(5) $I_{SD} \leq 6\text{ A}$, $di/dt \leq 300\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_j \leq T_{JMAX}$.(6) Pulsed: Pulse duration = 300 μs , duty cycle 1.5 %.

Fig. 1: Unclamped Inductive Load Test Circuit

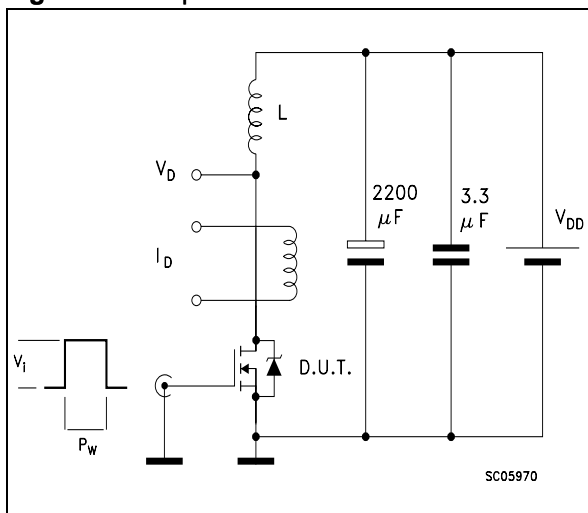


Fig. 2: Unclamped Inductive Waveform

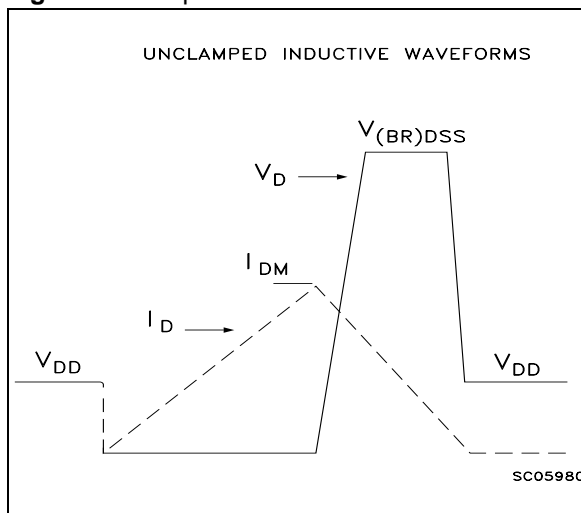


Fig. 3: Switching Times Test Circuits For Resistive Load

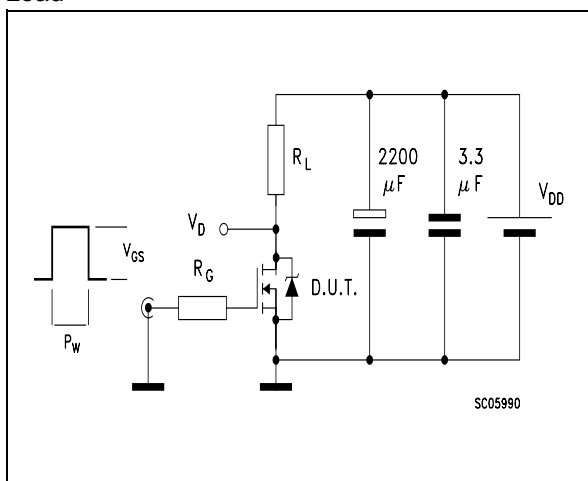


Fig. 4: Gate Charge test Circuit

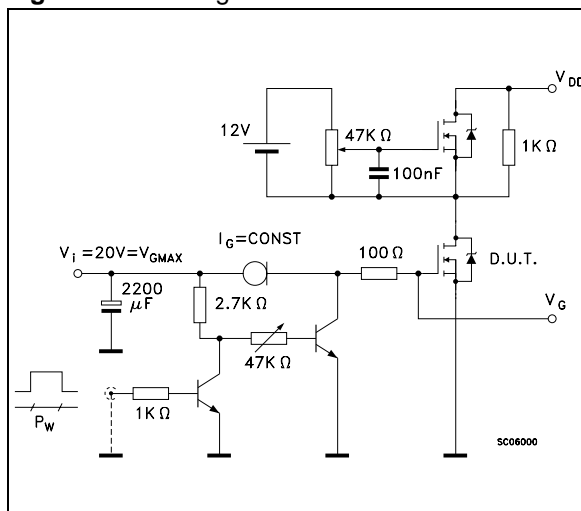
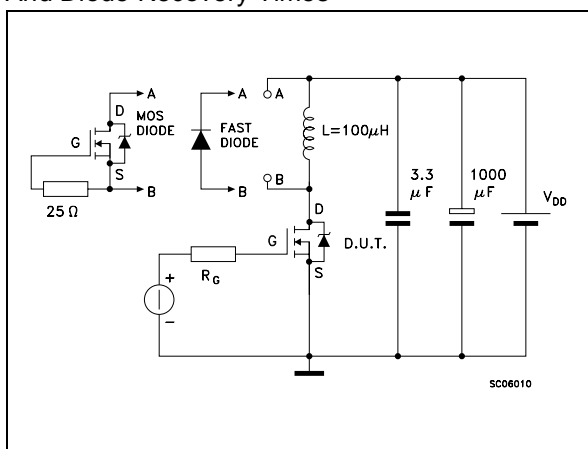
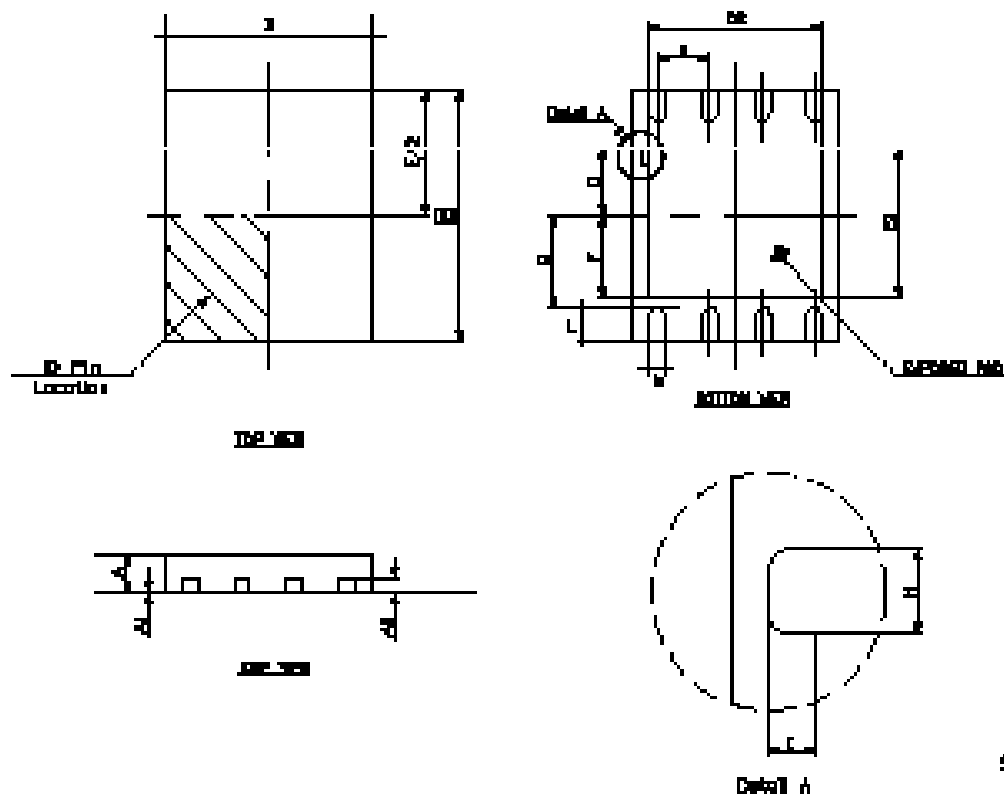


Fig. 5: Test Circuit For Inductive Load Switching And Diode Recovery Times



PowerFLAT™(6x5) MECHANICAL DATA

| DIM. | mm. | | | inch | | |
|------|------|-------|------|-------|--------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 0.80 | | 1.00 | 0.031 | | 0.039 |
| A1 | | 0.02 | | | 0.001 | |
| b | 0.35 | | 0.47 | 0.014 | | 0.018 |
| C | | 1.61 | | | 0.063 | |
| D | | 5.00 | | | 0.197 | |
| D2 | 4.15 | | 4.25 | 0.163 | | 0.167 |
| E | | 6.00 | | | 0.236 | |
| E2 | 3.65 | | 3.65 | 0.140 | | 0.144 |
| e | | 1.27 | | | 0.049 | |
| F | | 1.99 | | | 0.078 | |
| G | | 2.20 | | | 0.086 | |
| H | | 0.40 | | | 0.015 | |
| I | | 0.219 | | | 0.0086 | |
| L | 0.70 | | 0.90 | 0.028 | | 0.035 |



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