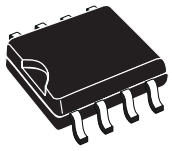
# STS5NF60L

## N - CHANNEL 60V - 0.045Ω - 5A SO-8
## STripFET™ POWER MOSFET

**PRELIMINARY DATA**

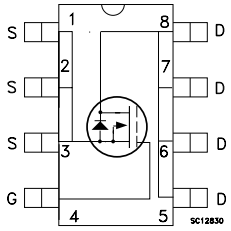
| TYPE | $V_{DSS}$ | $R_{DS(on)}$ | $I_D$ |
|---|---|---|---|
| STS5NF60L | 60 V | < 0.055 Ω | 5 A |

- TYPICAL $R_{DS(on)}$ = 0.045 Ω
- STANDARD OUTLINE FOR EASY AUTOMATED SURFACE MOUNT ASSEMBLY
- LOW THRESHOLD DRIVE



**SO-8**

**INTERNAL SCHEMATIC DIAGRAM**




### DESCRIPTION

This Power MOSFET is the second generation 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

- DC MOTOR DRIVE
- DC-DC CONVERTERS
- BATTERY MANAGMENT IN NOMADIC EQUIPMENT
- POWER MANAGEMENT IN PORTABLE/DESKTOP PCs

### ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{DS}$ | Drain-source Voltage ($V_{GS}$ = 0) | 60 | V |
| $V_{DGR}$ | Drain- gate Voltage ($R_{GS}$ = 20 kΩ) | 60 | V |
| $V_{GS}$ | Gate-source Voltage | ± 20 | V |
| $I_D$ | Drain Current (continuous) at Tc = 25 °C<br>Drain Current (continuous) at $T_c$ = 100 °C | 5<br>3 | A<br>A |
| $I_{DM}$(•) | Drain Current (pulsed) | 20 | A |
| $P_{tot}$ | Total Dissipation at $T_c$ = 25 °C | 2.5 | W |

(•) Pulse width limited by safe operating area

## THERMAL DATA

| | | | |
|---|---|---|---|
| $R_{thj\text{-}amb}$<br>$T_j$<br>$T_{stg}$ | (*)Thermal Resistance Junction-ambient<br>Maximum Operating Junction Temperature<br>Storage Temperature | 50<br>150<br>-55 to 150 | $^oC/W$<br>$^oC$<br>$^oC$ |

**(*)** Mounted on FR-4 board ($t \leq 10sec$)

## ELECTRICAL CHARACTERISTICS ($T_{case}$ = 25 $^oC$ 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 | 60 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current ($V_{GS}$ = 0)<br>Zero Gate Voltage Drain Current ($V_{GS}$ = 0) | $V_{DS}$ = Max Rating<br>$V_{DS}$ = Max Rating $T_c$ = 125 $^oC$ | | | 1<br>10 | µA<br>µA |
| $I_{GSS}$ | Gate-body Leakage Current ($V_{DS}$ = 0) | $V_{GS}$ = ± 20 V | | | ± 100 | nA |

**ON (*)**

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$ $I_D$ = 250 µA | 1 | 1.7 | 2.5 | V |
| $R_{DS(on)}$ | Static Drain-source On Resistance | $V_{GS}$ = 10 V $I_D$ = 2.5 A<br>$V_{GS}$ = 4.5 V $I_D$ = 2.5 A | | 0.045<br>0.05 | 0.055<br>0.065 | Ω<br>Ω |
| $I_{D(on)}$ | On State Drain Current | $V_{DS}$ > $I_{D(on)}$ x $R_{DS(on)max}$<br>$V_{GS}$ = 10 V | 5 | | | A |

**DYNAMIC**

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $g_{fs}$ (*) | Forward Transconductance | $V_{DS}$ > $I_{D(on)}$ x $R_{DS(on)max}$ $I_D$ = 2.5 A | | 7 | | S |
| $C_{iss}$<br>$C_{oss}$<br>$C_{rss}$ | Input Capacitance<br>Output Capacitance<br>Reverse Transfer Capacitance | $V_{DS}$ = 25 V f = 1 MHz $V_{GS}$ = 0 V | | 1250<br>130<br>26 | | pF<br>pF<br>pF |

**ELECTRICAL CHARACTERISTICS** (continued)

SWITCHING ON

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $t_{d(on)}$<br>$t_r$ | Turn-on Time<br>Rise Time | $V_{DD}$ = 15 V $I_D$ = 2.5 A<br>$R_G$ = 4.7 Ω $V_{GS}$ = 4.5 V | | TBD | TBD | ns<br>ns |
| $Q_g$<br>$Q_{gs}$<br>$Q_{gd}$ | Total Gate Charge<br>Gate-Source Charge<br>Gate-Drain Charge | $V_{DD}$ = 48 V $I_D$ = 5 A $V_{GS}$ = 4.5 V | | | 25 | nC<br>nC<br>nC |

SWITCHING OFF

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $t_{r(Voff)}$<br>$t_f$<br>$t_c$ | Off-voltage Rise Time<br>Fall Time<br>Cross-over Time | $V_{DD}$ = 48 V $I_D$ = 5 A<br>$R_G$ = 4.7 Ω $V_{GS}$ = 4.5 V | | TBD | TBD | ns<br>ns<br>ns |

SOURCE DRAIN DIODE

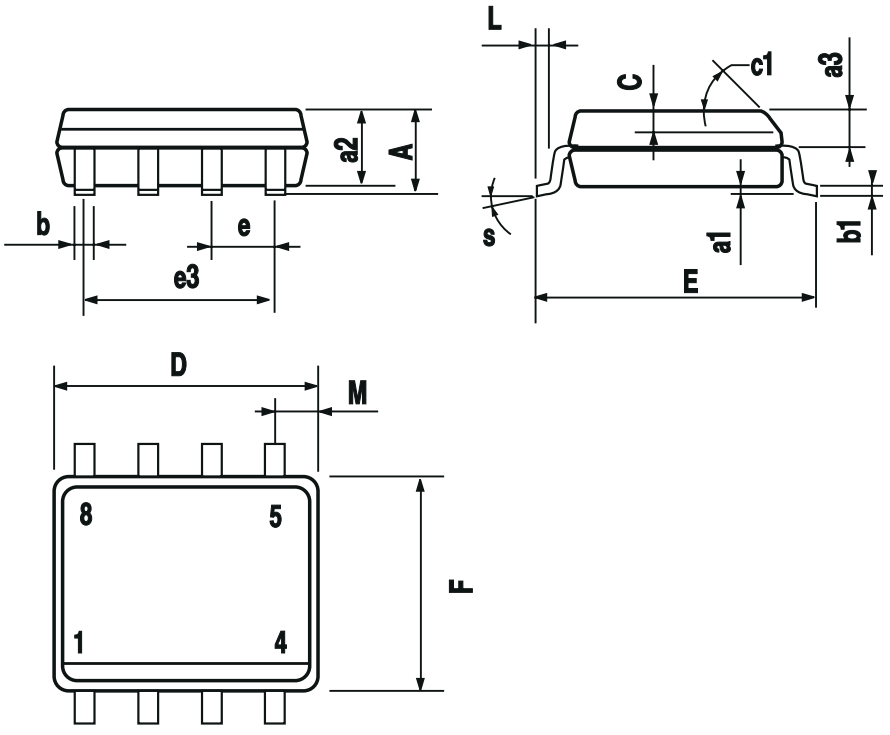
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_{SD}$<br>$I_{SDM}$(•) | Source-drain Current<br>Source-drain Current (pulsed) | | | | 5<br>20 | A<br>A |
| $V_{SD}$ (∗) | Forward On Voltage | $I_{SD}$ = 5 A $V_{GS}$ = 0 | | | 1.2 | V |
| $t_{rr}$<br>$Q_{rr}$<br>$I_{RRM}$ | Reverse Recovery Time<br>Reverse Recovery Charge<br>Reverse Recovery Current | $I_{SD}$ = 5 A di/dt = 100 A/µs<br>$V_r$ = 20 V $T_j$ = 150 °C | | TBD | | ns<br>nC<br>A |

(∗) Pulsed: Pulse duration = 300 µs, duty cycle 1.5 %

(•) Pulse width limited by safe operating area

## 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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