



STS3DNF30L

N - CHANNEL 30V - 0.055Ω - 3.5A - SO-8 PowerMESH™ MOSFET

PRELIMINARY DATA

| TYPE | V _{DSS} | R _{DS(on)} | I _D |
|------------|------------------|---------------------|----------------|
| STS3DNF30L | 30 V | < 0.065 Ω | 3.5 A |

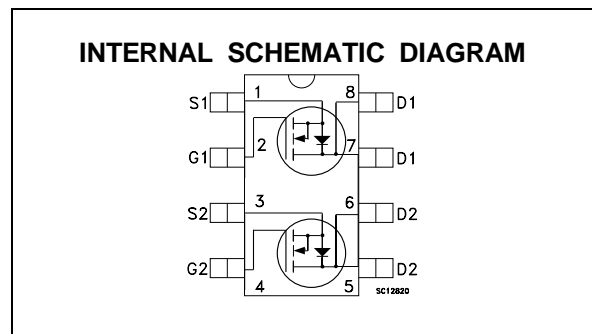
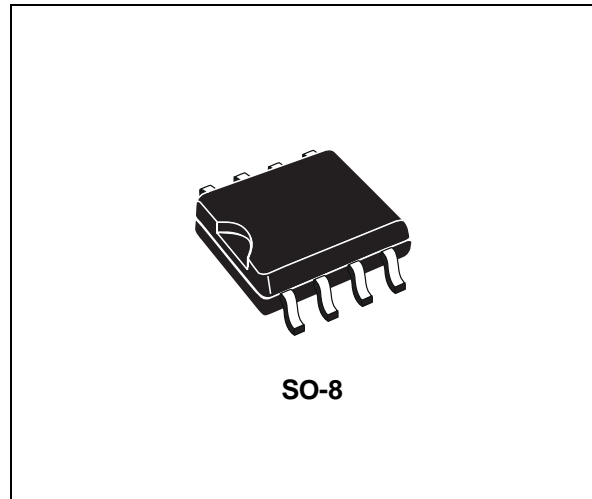
- TYPICAL R_{DS(on)} = 0.055 Ω
- STANDARD OUTLINE FOR EASY AUTOMATED SURFAC MOUNT ASSEMBLY
- LOW THRESHOLD DRIVE

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 MANAGEMENT IN NOMADIC EQUIPMENT
- POWER MANAGEMENT IN PORTABLE/DESKTOP PCs



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 | ± 20 | V |
| I _D | Drain Current (continuous) at T _c = 25 °C Single Operation | 3.5 | A |
| | Drain Current (continuous) at T _c = 100 °C Single Operation | 2.2 | A |
| I _{DM} (●) | Drain Current (pulsed) | 14 | A |
| P _{tot} | Total Dissipation at T _c = 25 °C Dual Operation | 2 | W |
| | Total Dissipation at T _c = 25 °C Single Operation | 1.6 | W |

(●) Pulse width limited by safe operating area

STS3DNF30L

THERMAL DATA

| | | | |
|----------------------|---|------------|------|
| R _{thj-amb} | *Thermal Resistance Junction-ambient Single Operation Max | 78 | °C/W |
| T _J | Thermal Resistance Junction-ambient Dual Operation Max | 62.5 | °C/W |
| T _{stg} | Maximum Lead Temperature For Soldering Purpose | 150 | °C |
| | Storage Temperature | -55 to 150 | °C |

(*) Mounted on FR-4 board (t ≤ 10 sec)

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 | 30 | | | 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-Source 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 = 1.75 A V _{GS} = 4.5 V I _D = 1.75 A | | 0.055 0.06 | 0.065 0.09 | Ω Ω |
| I _{D(on)} | On State Drain Current | V _{DS} > I _{D(on)} × R _{DS(on)max} V _{GS} = 10 V | 3.5 | | | A |

DYNAMIC

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---------------------|------------------------------|--|------|------|------|------|
| g _{fs} (*) | Forward Transconductance | V _{DS} > I _{D(on)} × R _{DS(on)max} I _D = 6 A | | 6 | | S |
| C _{iss} | Input Capacitance | V _{DS} = 25 V f = 1 MHz V _{GS} = 0 | | 420 | 550 | pF |
| C _{oss} | Output Capacitance | | | 62 | 80 | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 20 | 30 | pF |

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-------------|--------------------|---|------|------|------|------|
| $t_{d(on)}$ | Turn-on Time | $V_{DD} = 15\text{ V}$ | | 13 | 17 | ns |
| t_r | Rise Time | $R_G = 4.7\ \Omega$ $I_D = 2\text{ A}$ $V_{GS} = 4.5\text{ V}$ | | 30 | 40 | ns |
| Q_g | Total Gate Charge | $V_{DD} = 24\text{ V}$ $I_D = 4\text{ A}$ $V_{GS} = 4.5\text{ V}$ | | 8 | 11 | nC |
| Q_{gs} | Gate-Source Charge | | | 3.2 | | nC |
| Q_{gd} | Gate-Drain Charge | | | 2.6 | | nC |

SWITCHING OFF

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---------------|-----------------------|---|------|------|------|------|
| $t_{r(voff)}$ | Off-voltage Rise Time | $V_{DD} = 24\text{ V}$ | | 5 | 7 | ns |
| t_f | Fall Time | $R_G = 4.7\ \Omega$ $I_D = 4\text{ A}$ $V_{GS} = 4.5\text{ V}$ | | 9 | 12 | ns |
| t_c | Cross-over Time | | | 20 | 26 | ns |

SOURCE DRAIN DIODE

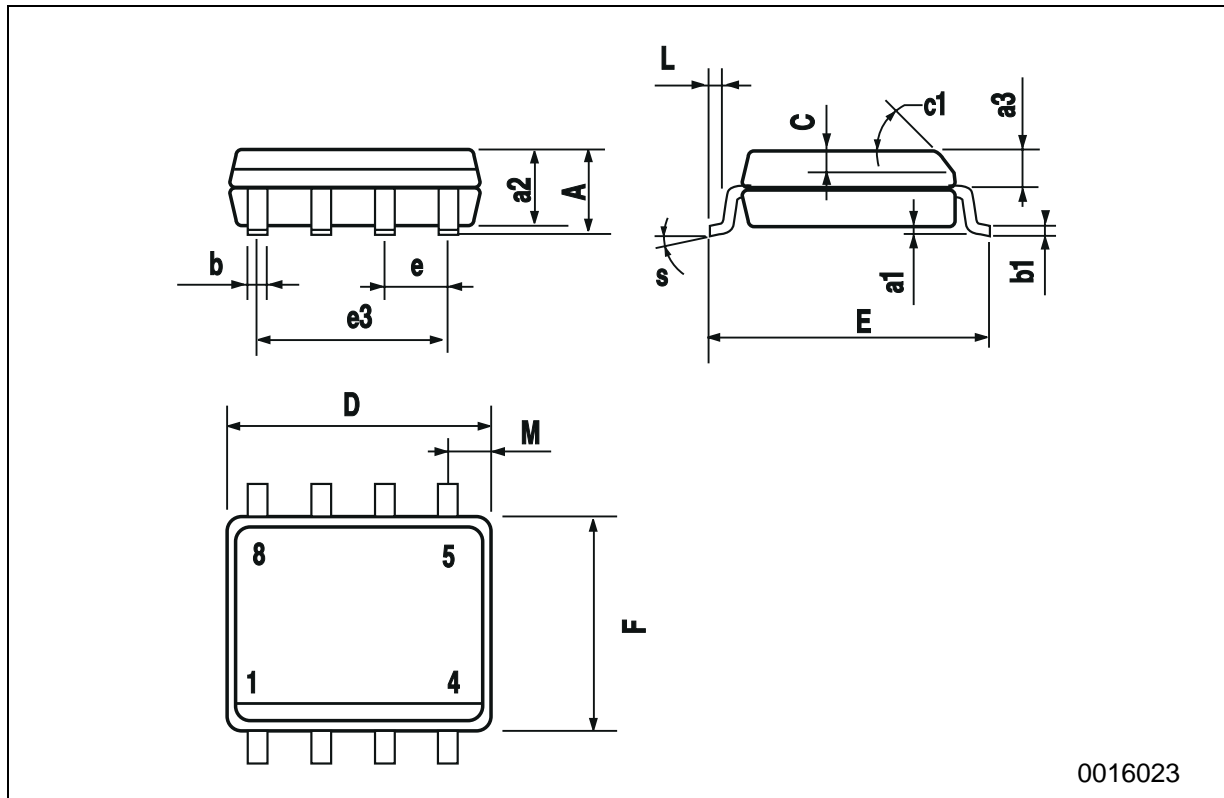
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------------|-------------------------------|--|------|-------|------|---------------|
| I_{SD} | Source-drain Current | | | | 3.5 | A |
| $I_{SDM}(\bullet)$ | Source-drain Current (pulsed) | | | | 14 | A |
| $V_{SD} (*)$ | Forward On Voltage | $I_{SD} = 3.5\text{ A}$ $V_{GS} = 0$ | | | 1.2 | V |
| t_{rr} | Reverse Recovery Time | $I_{SD} = 4\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 15\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$ | | 23 | | ns |
| Q_{rr} | Reverse Recovery Charge | | | 0.134 | | μC |
| I_{RRM} | Reverse Recovery Current | | | 1.2 | | A |

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

(\bullet) 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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