

STP36N06
STP36N06FI

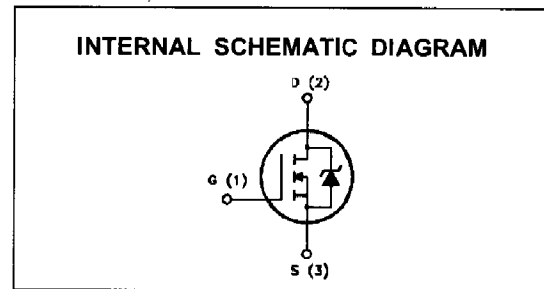
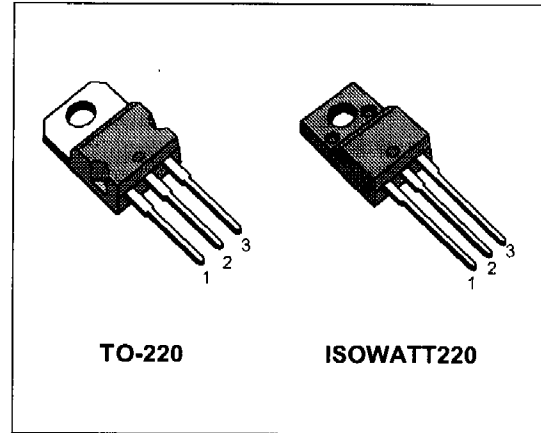
**N - CHANNEL ENHANCEMENT MODE
 POWER MOS TRANSISTOR**

| TYPE | V _{DS} | R _{DS(on)} | I _D |
|------------|-----------------|---------------------|----------------|
| STP36N06 | 60 V | < 0.04 Ω | 36 A |
| STP36N06FI | 60 V | < 0.04 Ω | 21 A |

- TYPICAL R_{DS(on)} = 0.03 Ω
- AVALANCHE RUGGED TECHNOLOGY
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- LOW GATE CHARGE
- HIGH CURRENT CAPABILITY
- 175°C OPERATING TEMPERATURE
- APPLICATION ORIENTED CHARACTERIZATION

APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- SOLENOID AND RELAY DRIVERS
- REGULATORS
- DC-DC & DC-AC CONVERTERS
- MOTOR CONTROL, AUDIO AMPLIFIERS
- AUTOMOTIVE ENVIRONMENT (INJECTION, ABS, AIR-BAG, LAMPDRIVERS, Etc.)

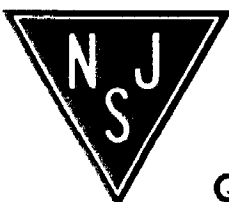


ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | | Unit |
|---------------------|---|------------|------------|------|
| | | STP36N06 | STP36N06FI | |
| 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 T _c = 25 °C | 36 | 21 | A |
| I _D | Drain Current (continuous) at T _c = 100 °C | 25 | 14 | A |
| I _{DM} (•) | Drain Current (pulsed) | 144 | 144 | A |
| P _{tot} | Total Dissipation at T _c = 25 °C | 120 | 40 | W |
| | Derating Factor | 0.8 | 0.27 | W/°C |
| V _{ISO} | Insulation Withstand Voltage (DC) | — | 2000 | V |
| T _{stg} | Storage Temperature | -65 to 175 | | °C |
| T _j | Max. Operating Junction Temperature | 175 | | °C |

(•) Pulse width limited by safe operating area

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STP36N06/FI

THERMAL DATA

| | | | | TO-220 | ISOWATT220 | |
|-----------------------|--|------------------|-----|--------|------------|------|
| R _{thj-case} | Thermal Resistance | Junction-case | Max | 1.25 | 3.75 | °C/W |
| R _{thj-amb} | Thermal Resistance | Junction-ambient | Max | 62.5 | | °C/W |
| R _{thc-sink} | Thermal Resistance | Case-sink | Typ | 0.5 | | °C/W |
| T _l | Maximum Lead Temperature For Soldering Purpose | | | 300 | | °C |

AVALANCHE CHARACTERISTICS

| Symbol | Parameter | Max Value | Unit |
|-----------------|--|-----------|------|
| I _{AR} | Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T _j max, δ < 1%) | 36 | A |
| E _{AS} | Single Pulse Avalanche Energy (starting T _j = 25 °C, I _D = I _{AR} , V _{DD} = 25 V) | 240 | mJ |
| E _{AR} | Repetitive Avalanche Energy (pulse width limited by T _j max, δ < 1%) | 60 | mJ |
| I _{AR} | Avalanche Current, Repetitive or Not-Repetitive (T _c = 100 °C, pulse width limited by T _j max, δ < 1%) | 25 | A |

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 | 60 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current (V _{GS} = 0) | V _{DS} = Max Rating V _{DS} = Max Rating × 0.8 T _c = 125 °C | | | 1 10 | μA 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 | 2 | 2.9 | 4 | V |
| R _{DS(on)} | Static Drain-source On Resistance | V _{GS} = 10V I _D = 18 A | | 0.03 | 0.04 | Ω |
| I _{D(on)} | On State Drain Current | V _{DS} > I _{D(on)} × R _{DS(on)} max V _{GS} = 10 V | 36 | | | 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 = 18 A | 12 | 16 | | S |
| C _{iss} | Input Capacitance | V _{DS} = 25 V f = 1 MHz V _{GS} = 0 | | 1130 | 1500 | pF |
| C _{oss} | Output Capacitance | | | 480 | 650 | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 140 | 200 | pF |

ELECTRICAL CHARACTERISTICS (continued)

SWITCHING ON

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|----------------|-----------------------|---|------|------|------|------------|
| $t_{d(on)}$ | Turn-on Time | $V_{DD} = 25\text{ V}$ $I_D = 18\text{ A}$ $R_G = 50\ \Omega$ $V_{GS} = 10\text{ V}$ (see test circuit, figure 3) | | 45 | 65 | ns |
| t_r | Rise Time | | | 280 | 400 | ns |
| $(di/dt)_{on}$ | Turn-on Current Slope | $V_{DD} = 40\text{ V}$ $I_D = 36\text{ A}$ $R_G = 50\ \Omega$ $V_{GS} = 10\text{ V}$ (see test circuit, figure 5) | | 200 | | A/ μ s |
| Q_g | Total Gate Charge | $V_{DD} = 40\text{ V}$ $I_D = 36\text{ A}$ $V_{GS} = 10\text{ V}$ | | 42 | 60 | nC |
| Q_{gs} | Gate-Source Charge | | | 11 | | nC |
| Q_{gd} | Gate-Drain Charge | | | 21 | | nC |

SWITCHING OFF

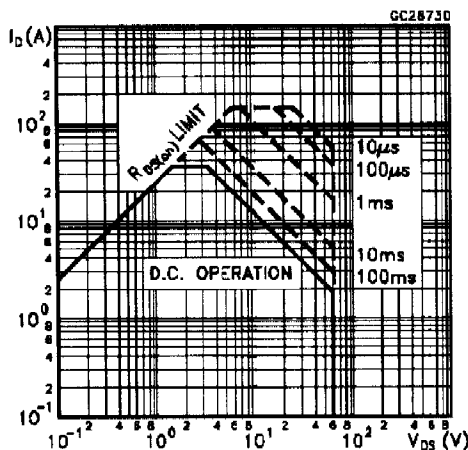
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|----------------|-----------------------|---|------|------|------|------|
| $t_r(V_{off})$ | Off-voltage Rise Time | $V_{DD} = 40\text{ V}$ $I_D = 36\text{ A}$ $R_G = 50\ \Omega$ $V_{GS} = 10\text{ V}$ (see test circuit, figure 5) | | 110 | 160 | ns |
| t_f | Fall Time | | | 105 | 150 | ns |
| t_c | Cross-over Time | | | 220 | 310 | ns |

SOURCE DRAIN DIODE

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------------|-------------------------------|---|------|------|------|---------------|
| I_{SD} | Source-drain Current | | | | 36 | A |
| $I_{SDM}(\bullet)$ | Source-drain Current (pulsed) | | | | 144 | A |
| $V_{SD}(\ast)$ | Forward On Voltage | $I_{SD} = 36\text{ A}$ $V_{GS} = 0$ | | | 1.5 | V |
| t_{rr} | Reverse Recovery Time | $I_{SD} = 36\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 30\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$ (see test circuit, figure 5) | | 90 | | ns |
| Q_{rr} | Reverse Recovery Charge | | | 0.2 | | μC |
| I_{RRM} | Reverse Recovery Current | | | 4.5 | | A |

(*) Pulsed: Pulse duration = 300 μ s, duty cycle 1.5 %
(\bullet) Pulse width limited by safe operating area

Safe Operating Areas For TO-220



Safe Operating Areas For ISOWATT220

