

**STB30N10**

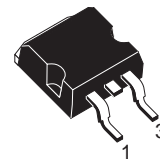
N - CHANNEL 100V - 0.06Ω - 30A - D²PAK POWER MOS TRANSISTOR

| TYPE | V _{DSS} | R _{DS(on)} | I _D |
|----------|------------------|---------------------|----------------|
| STB30N10 | 100 V | < 0.07 Ω | 30 A |

- TYPICAL R_{DS(on)} = 0.06 Ω
- AVALANCHE RUGGED TECHNOLOGY
- 100% AVALANCHE TESTED
- REPETITIVE AVALANCHE DATA AT 100°C
- LOW GATE CHARGE
- VERY HIGH CURRENT CAPABILITY
- APPLICATION ORIENTED CHARACTERIZATION
- SURFACE-MOUNTING D2PAK (TO-263)
POWER PACKAGE IN TUBE (NO SUFFIX)
OR IN TAPE & REEL (SUFFIX "T4")

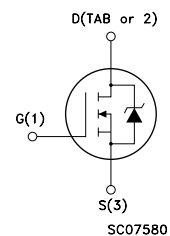
APPLICATIONS

- 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.)



**D2PAK
TO-263**

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---------------------|---|------------|------|
| V _{DS} | Drain-source Voltage (V _{GS} = 0) | 100 | V |
| V _{DGR} | Drain- gate Voltage (R _{GS} = 20 kΩ) | 100 | V |
| V _{GS} | Gate-source Voltage | ± 20 | V |
| I _D | Drain Current (continuous) at T _c = 25 °C | 30 | A |
| I _D | Drain Current (continuous) at T _c = 100 °C | 21 | A |
| I _{DM} (•) | Drain Current (pulsed) | 120 | A |
| P _{tot} | Total Dissipation at T _c = 25 °C | 150 | W |
| | Derating Factor | 1 | W/°C |
| T _{stg} | Storage Temperature | -65 to 175 | °C |
| T _j | Max. Operating Junction Temperature | 175 | °C |

(•) Pulse width limited by safe operating area

STB30N10

THERMAL DATA

| | | | | |
|-----------------------|-------------------------------------|-----|------|------|
| R _{thj-case} | Thermal Resistance Junction-case | Max | 1 | °C/W |
| R _{thj-amb} | Thermal Resistance Junction-ambient | Max | 62.5 | °C/W |
| R _{thj-amb} | Thermal Resistance Case-sink | Typ | 0.5 | °C/W |

AVALANCHE CHARACTERISTICS

| Symbol | Parameter | Max Value | Unit |
|-----------------|--|-----------|------|
| I _{AR} | Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T _j max) | 30 | A |
| E _{AS} | Single Pulse Avalanche Energy (starting T _j = 25 °C, I _D = I _{AR} , V _{DD} = 25 V) | 240 | mJ |

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 x 0.8 T _c = 100 °C | | | 10 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 | 3 | 4 | V |
| R _{DS(on)} | Static Drain-source On Resistance | V _{GS} = 10 V I _D = 15 A | | 0.06 | 0.07 | Ω |
| I _{D(on)} | On State Drain Current | V _{DS} > I _{D(on)} x R _{DS(on)max} V _{GS} = 10 V | 30 | | | 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 = 15 A | 10 | 20 | | S |
| C _{iss} | Input Capacitance | V _{DS} = 25 V f = 1 MHz V _{GS} = 0 | | 2600 | 3600 | pF |
| C _{oss} | Output Capacitance | | | 350 | 500 | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 85 | 110 | pF |

ELECTRICAL CHARACTERISTICS (continued)**SWITCHING ON**

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|----------------|-----------------------|---|------|------|------|------------|
| $t_{d(on)}$ | Turn-on Time | $V_{DD} = 50\text{ V}$ $I_D = 15\text{ A}$ | | 25 | 35 | ns |
| t_r | Rise Time | $R_G = 47\ \Omega$ $V_{GS} = 10\text{ V}$ | | 60 | 90 | ns |
| $(di/dt)_{on}$ | Turn-on Current Slope | $V_{DD} = 80\text{ V}$ $I_D = 30\text{ A}$ $R_G = 47\ \Omega$ $V_{GS} = 10\text{ V}$ | | 480 | | A/ μ s |
| Q_g | Total Gate Charge | $I_D = 30\text{ A}$ $V_{GS} = 10\text{ V}$ $V_{DD} = 80\text{ V}$ | | 80 | 120 | nC |
| Q_{gs} | Gate-Source Charge | | | 13 | | nC |
| Q_{gd} | Gate-Drain Charge | | | 28 | | nC |

SWITCHING OFF

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---------------|-----------------------|--|------|------|------|------|
| $t_{r(voff)}$ | Off-voltage Rise Time | $V_{DD} = 80\text{ V}$ $I_D = 30\text{ A}$ | | 25 | 35 | ns |
| t_f | Fall Time | $R_G = 47\ \Omega$ $V_{GS} = 10\text{ V}$ | | 25 | 35 | ns |
| t_c | Cross-over Time | | | 55 | 75 | ns |

SOURCE DRAIN DIODE

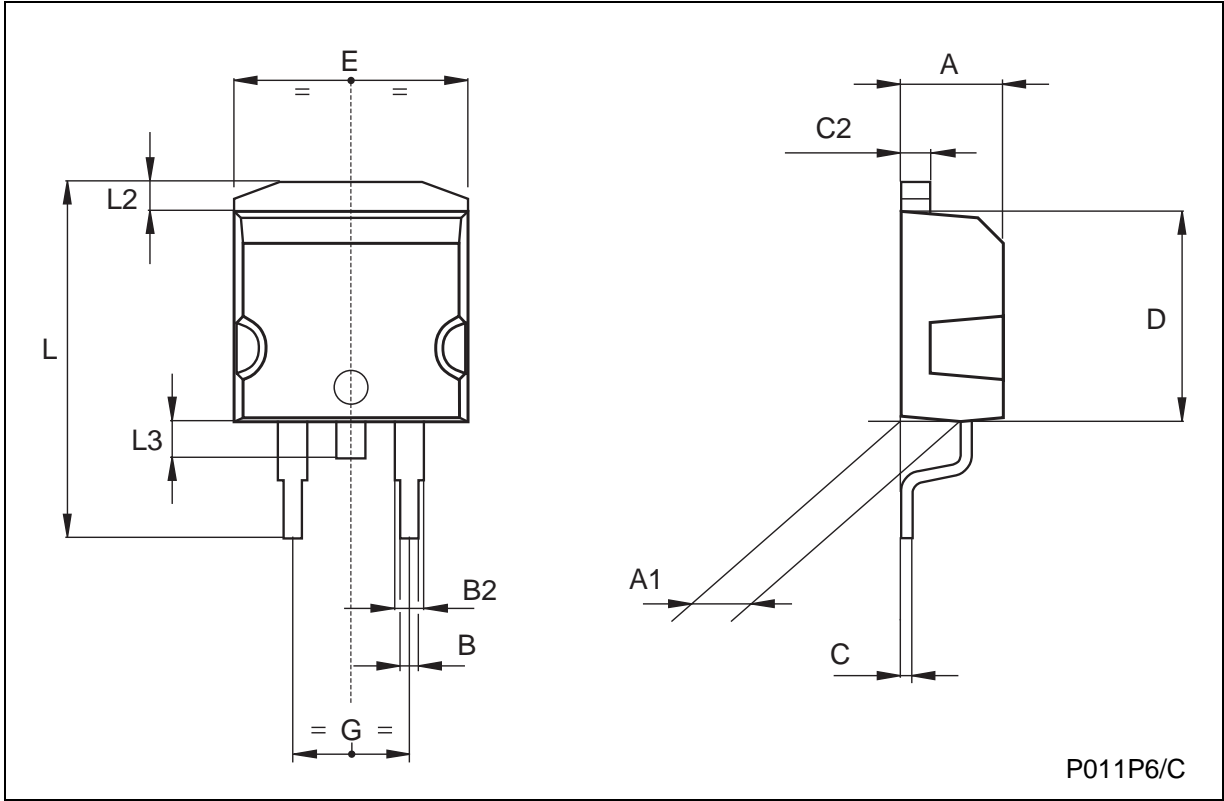
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------------|-------------------------------|---|------|------|------|---------------|
| I_{SD} | Source-drain Current | | | | 30 | A |
| $I_{SDM}(\bullet)$ | Source-drain Current (pulsed) | | | | 120 | A |
| $V_{SD} (*)$ | Forward On Voltage | $I_{SD} = 30\text{ A}$ $V_{GS} = 0$ | | | 1.5 | V |
| t_{rr} | Reverse Recovery Time | $I_{SD} = 30\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 30\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$ | | 175 | | ns |
| Q_{rr} | Reverse Recovery Charge | | | 1.05 | | μC |
| I_{RRM} | Reverse Recovery Current | | | 12 | | A |

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

(\bullet) Pulse width limited by safe operating area

TO-263 (D²PAK) MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|------|------|-------|-------|------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 4.3 | | 4.6 | 0.169 | | 0.181 |
| A1 | 2.49 | | 2.69 | 0.098 | | 0.106 |
| B | 0.7 | | 0.93 | 0.027 | | 0.036 |
| B2 | 1.25 | | 1.4 | 0.049 | | 0.055 |
| C | 0.45 | | 0.6 | 0.017 | | 0.023 |
| C2 | 1.21 | | 1.36 | 0.047 | | 0.053 |
| D | 8.95 | | 9.35 | 0.352 | | 0.368 |
| E | 10 | | 10.28 | 0.393 | | 0.404 |
| G | 4.88 | | 5.28 | 0.192 | | 0.208 |
| L | 15 | | 15.85 | 0.590 | | 0.624 |
| L2 | 1.27 | | 1.4 | 0.050 | | 0.055 |
| L3 | 1.4 | | 1.75 | 0.055 | | 0.068 |



Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specification mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a trademark of STMicroelectronics

© 1998 STMicroelectronics – Printed in Italy – All Rights Reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - France - Germany - Italy - Japan - Korea - Malaysia - Malta - Mexico - Morocco - The Netherlands -
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.

<http://www.st.com>