

N - CHANNEL ENHANCEMENT MODE " SINGLE FEATURE SIZE™ " POWER MOSFET

PRELIMINARY DATA

| TYPE | V _{DSS} | R _{DS(on)} | I _D |
|------------|------------------|---------------------|----------------|
| STB55NE06L | 60 V | < 0.022 Ω | 55A |

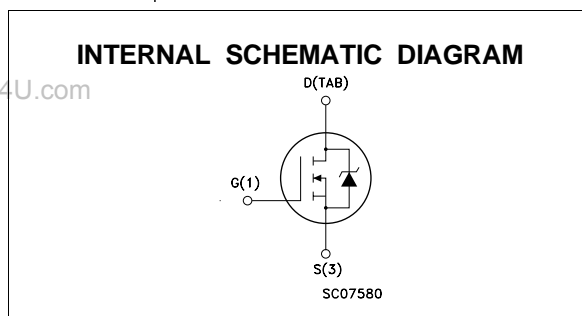
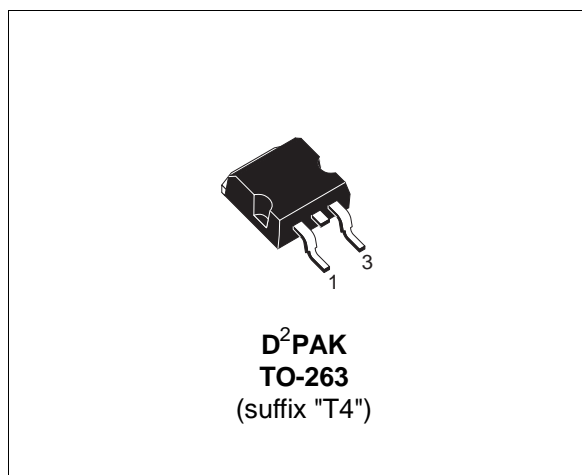
- TYPICAL R_{DS(on)} = 0.018 Ω
- EXCEPTIONAL dv/dt CAPABILITY
- 100% AVALANCHE TESTED
- LOW GATE CHARGE 100 °C
- APPLICATION ORIENTED CHARACTERIZATION
- FOR THROUGH-HOLE VERSION CONTACT SALES OFFICE

DESCRIPTION

This Power Mosfet is the latest development of SGS-THOMSON 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. DataSheet4U.com

APPLICATIONS

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



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 | ± 15 | V |
| I _D | Drain Current (continuous) at T _c = 25 °C | 55 | A |
| I _D | Drain Current (continuous) at T _c = 100 °C | 39 | A |
| I _{DM} (•) | Drain Current (pulsed) | 220 | A |
| P _{tot} | Total Dissipation at T _c = 25 °C | 130 | W |
| | Derating Factor | 0.86 | W/°C |
| dv/dt | Peak Diode Recovery voltage slope | 7 | V/ns |
| T _{stg} | Storage Temperature | -65 to 175 | °C |
| T _j | Max. Operating Junction Temperature | 175 | °C |

(•) Pulse width limited by safe operating area

(1) I_{SD} ≤ 55 A, di/dt ≤ 300 A/μs, V_{DD} ≤ V_{(BR)DSS}, T_j ≤ T_{JMAX}

March 1998

1/5

STB55NE06L**THERMAL DATA**

| | | | | |
|-----------------------|--|-----|------|------|
| R _{thj-case} | Thermal Resistance Junction-case | Max | 1.15 | °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%) | 55 | A |
| E _{AS} | Single Pulse Avalanche Energy (starting T _j = 25 °C, I _D = I _{AR} , V _{DD} = 15 V) | 250 | 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 | 60 | | | 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} = ± 15 V | | | ± 100 | nA |

ON (*)

DataSheet4U.com

DataSheet4U.com

| 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} = 5 V I _D = 27.5 A V _{GS} = 10 V I _D = 27.5 A | | 0.022 0.019 | 0.028 0.022 | Ω |
| I _{D(on)} | On State Drain Current | V _{DS} > I _{D(on)} × R _{DS(on)max} V _{GS} = 10 V | 55 | | | 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 = 27.5 A | 20 | 30 | | S |
| C _{iss} | Input Capacitance | V _{DS} = 25 V f = 1 MHz V _{GS} = 0 | | 2800 | 3750 | pF |
| C _{oss} | Output Capacitance | | | 375 | 500 | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 100 | 140 | pF |

ELECTRICAL CHARACTERISTICS (continued)**SWITCHING ON**

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|-------------|--------------------|--|------|------|------|------|
| $t_{d(on)}$ | Turn-on Time | $V_{DD} = 30\text{ V}$ $I_D = 27.5\text{ A}$ | | 40 | 55 | ns |
| t_r | Rise Time | $R_G = 4.7\ \Omega$ $V_{GS} = 5\text{ V}$ | | 100 | 140 | ns |
| Q_g | Total Gate Charge | $V_{DD} = 48\text{ V}$ $I_D = 55\text{ A}$ $V_{GS} = 5\text{ V}$ | | 40 | 55 | nC |
| Q_{gs} | Gate-Source Charge | | | 13 | | nC |
| Q_{gd} | Gate-Drain Charge | | | 20 | | nC |

SWITCHING OFF

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|---------------|-----------------------|--|------|------|------|------|
| $t_{r(Voff)}$ | Off-voltage Rise Time | $V_{DD} = 48\text{ V}$ $I_D = 55\text{ A}$ | | 25 | 35 | ns |
| t_f | Fall Time | $R_G = 4.7\ \Omega$ $V_{GS} = 5\text{ V}$ | | 40 | 55 | ns |
| t_c | Cross-over Time | | | 65 | 90 | ns |

SOURCE DRAIN DIODE

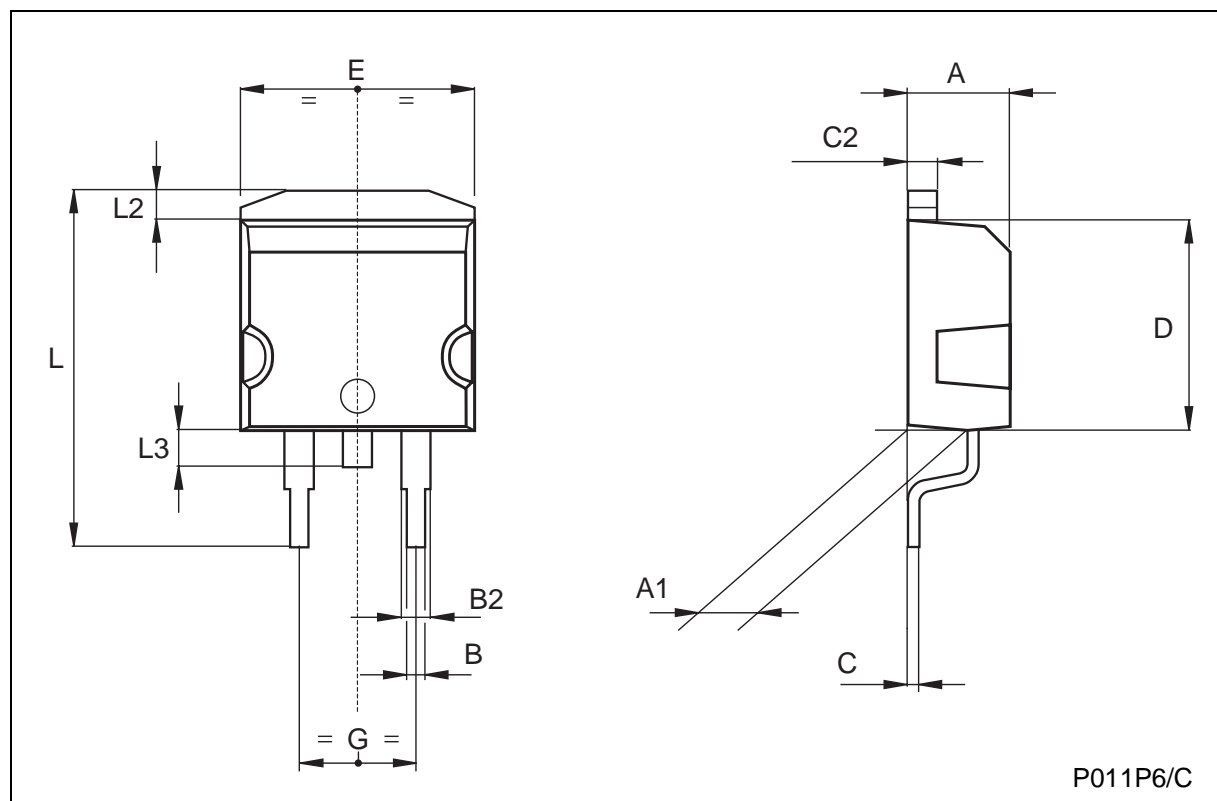
| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit |
|--------------------|-------------------------------|---|------|------|------|---------------|
| I_{SD} | Source-drain Current | | | | 55 | A |
| $I_{SDM}(\bullet)$ | Source-drain Current (pulsed) | | | | 220 | A |
| $V_{SD} (*)$ | Forward On Voltage | $I_{SD} = 55\text{ A}$ $V_{GS} = 0$ | | | 1.5 | V |
| t_{rr} | Reverse Recovery Time | $I_{SD} = 55\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$ $V_{DD} = 30\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$ | | 65 | | ns |
| Q_{rr} | Reverse Recovery Charge | | | 180 | | μC |
| I_{RRM} | Reverse Recovery Current | | | 5.5 | | A |

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

(\bullet) Pulse width limited by safe operating area

STB55NE06L**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, SGS-THOMSON Microelectronics 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 SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1998 SGS-THOMSON Microelectronics - Printed in Italy - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES

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



...