



## STD30NE06

### N - CHANNEL 60V - 0.025 $\Omega$ - 30A - DPAK STripFET™ " POWER MOSFET

#### PRELIMINARY DATA

| TYPE      | V <sub>DSS</sub> | R <sub>DS(on)</sub> | I <sub>D</sub> |
|-----------|------------------|---------------------|----------------|
| STD30NE06 | 60 V             | < 0.03 $\Omega$     | 30 A           |

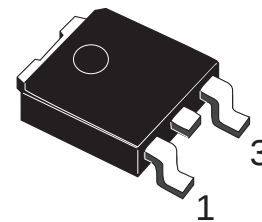
- TYPICAL R<sub>DS(on)</sub> = 0.025  $\Omega$
- EXCEPTIONAL dv/dt CAPABILITY
- 100% AVALANCHE TESTED
- LOW GATE CHARGE 100 °C
- APPLICATION ORIENTED CHARACTERIZATION
- FOR TAPE & REEL AND OTHER PACKAGING OPTIONS CONTACT SALES OFFICES

#### 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.

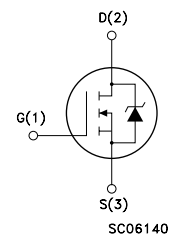
#### APPLICATIONS

- HIGH CURRENT, HIGH SPEED SWITCHING
- SOLENOID AND RELAY DRIVERS
- MOTOR CONTROL, AUDIO AMPLIFIERS
- DC-DC & DC-AC CONVERTERS



**DPAK  
TO-252**  
(Suffix "T4")

#### INTERNAL SCHEMATIC DIAGRAM



#### ABSOLUTE MAXIMUM RATINGS

| Symbol              | Parameter                                              | Value      | Unit |
|---------------------|--------------------------------------------------------|------------|------|
| V <sub>DS</sub>     | Drain-source Voltage (V <sub>GS</sub> = 0)             | 60         | V    |
| V <sub>DGR</sub>    | Drain- gate Voltage (R <sub>GS</sub> = 20 k $\Omega$ ) | 60         | V    |
| V <sub>GS</sub>     | Gate-source Voltage                                    | $\pm 20$   | V    |
| I <sub>D</sub>      | Drain Current (continuous) at T <sub>c</sub> = 25 °C   | 30         | A    |
| I <sub>D</sub>      | Drain Current (continuous) at T <sub>c</sub> = 100 °C  | 21         | A    |
| I <sub>DM</sub> (•) | Drain Current (pulsed)                                 | 120        | A    |
| P <sub>tot</sub>    | Total Dissipation at T <sub>c</sub> = 25 °C            | 55         | W    |
|                     | Derating Factor                                        | 0.37       | W/°C |
| dv/dt               | Peak Diode Recovery voltage slope                      | 7          | V/ns |
| T <sub>stg</sub>    | Storage Temperature                                    | -65 to 175 | °C   |
| T <sub>j</sub>      | Max. Operating Junction Temperature                    | 175        | °C   |

(•) Pulse width limited by safe operating area

(1) I<sub>SD</sub>  $\leq$  20 A, di/dt  $\leq$  300 A/ $\mu$ s, V<sub>DD</sub>  $\leq$  V<sub>(BR)DSS</sub>, T<sub>j</sub>  $\leq$  T<sub>JMAX</sub>

## THERMAL DATA

|                       |                                                |     |      |      |
|-----------------------|------------------------------------------------|-----|------|------|
| R <sub>thj-case</sub> | Thermal Resistance Junction-case               | Max | 2.72 | °C/W |
| R <sub>thj-amb</sub>  | Thermal Resistance Junction-ambient            | Max | 100  | °C/W |
| R <sub>thc-sink</sub> | Thermal Resistance Case-sink                   | Typ | 1.5  | °C/W |
| T <sub>l</sub>        | Maximum Lead Temperature For Soldering Purpose |     | 275  | °C   |

## AVALANCHE CHARACTERISTICS

| Symbol          | Parameter                                                                                                                  | Max Value | Unit |
|-----------------|----------------------------------------------------------------------------------------------------------------------------|-----------|------|
| I <sub>AR</sub> | Avalanche Current, Repetitive or Not-Repetitive (pulse width limited by T <sub>j</sub> max)                                | 30        | A    |
| E <sub>AS</sub> | Single Pulse Avalanche Energy (starting T <sub>j</sub> = 25 °C, I <sub>D</sub> = I <sub>AR</sub> , V <sub>DD</sub> = 25 V) | 100       | mJ   |

ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

OFF

| Symbol               | Parameter                                             | Test Conditions                                                                      | Min. | Typ. | Max.    | Unit     |
|----------------------|-------------------------------------------------------|--------------------------------------------------------------------------------------|------|------|---------|----------|
| V <sub>(BR)DSS</sub> | Drain-source Breakdown Voltage                        | I <sub>D</sub> = 250 µA V <sub>GS</sub> = 0                                          | 60   |      |         | V        |
| I <sub>DSS</sub>     | Zero Gate Voltage Drain Current (V <sub>GS</sub> = 0) | V <sub>DS</sub> = Max Rating<br>V <sub>DS</sub> = Max Rating T <sub>c</sub> = 125 °C |      |      | 1<br>10 | µA<br>µA |
| I <sub>GSS</sub>     | Gate-body Leakage Current (V <sub>DS</sub> = 0)       | V <sub>GS</sub> = ± 20 V                                                             |      |      | ± 100   | nA       |

ON (\*)

| Symbol              | Parameter                         | Test Conditions                                                                         | Min. | Typ.  | Max.  | Unit |
|---------------------|-----------------------------------|-----------------------------------------------------------------------------------------|------|-------|-------|------|
| V <sub>GS(th)</sub> | Gate Threshold Voltage            | V <sub>DS</sub> = V <sub>GS</sub> I <sub>D</sub> = 250 µA                               | 2    | 3     | 4     | V    |
| R <sub>DS(on)</sub> | Static Drain-source On Resistance | V <sub>GS</sub> = 10V I <sub>D</sub> = 15 A                                             |      | 0.025 | 0.030 | Ω    |
| I <sub>D(on)</sub>  | On State Drain Current            | V <sub>DS</sub> > I <sub>D(on)</sub> × R <sub>DS(on)max</sub><br>V <sub>GS</sub> = 10 V | 30   |       |       | A    |

## DYNAMIC

| Symbol                                                   | Parameter                                                               | Test Conditions                                                                     | Min. | Typ.              | Max.              | Unit           |
|----------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------|-------------------|-------------------|----------------|
| g <sub>fs</sub> (*)                                      | Forward Transconductance                                                | V <sub>DS</sub> > I <sub>D(on)</sub> × R <sub>DS(on)max</sub> I <sub>D</sub> = 15 A | 15   | 25                |                   | S              |
| C <sub>iss</sub><br>C <sub>oss</sub><br>C <sub>rss</sub> | Input Capacitance<br>Output Capacitance<br>Reverse Transfer Capacitance | V <sub>DS</sub> = 25 V f = 1 MHz V <sub>GS</sub> = 0                                |      | 2700<br>330<br>68 | 3500<br>450<br>90 | pF<br>pF<br>pF |

**ELECTRICAL CHARACTERISTICS** (continued)**SWITCHING ON**

| Symbol      | Parameter          | Test Conditions                                                   | Min. | Typ. | Max. | Unit |
|-------------|--------------------|-------------------------------------------------------------------|------|------|------|------|
| $t_{d(on)}$ | Turn-on Time       | $V_{DD} = 30\text{ V}$ $I_D = 22\text{ A}$                        |      | 27   | 50   | ns   |
| $t_r$       | Rise Time          | $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$                        |      | 100  | 135  | ns   |
| $Q_g$       | Total Gate Charge  | $V_{DD} = 48\text{ V}$ $I_D = 45\text{ A}$ $V_{GS} = 10\text{ V}$ |      | 60   | 80   | nC   |
| $Q_{gs}$    | Gate-Source Charge |                                                                   |      | 18   |      | nC   |
| $Q_{gd}$    | Gate-Drain Charge  |                                                                   |      | 17   |      | nC   |

**SWITCHING OFF**

| Symbol        | Parameter             | Test Conditions                            | Min. | Typ. | Max. | Unit |
|---------------|-----------------------|--------------------------------------------|------|------|------|------|
| $t_{r(Voff)}$ | Off-voltage Rise Time | $V_{DD} = 48\text{ V}$ $I_D = 45\text{ A}$ |      | 20   | 27   | ns   |
| $t_f$         | Fall Time             | $R_G = 4.7\ \Omega$ $V_{GS} = 10\text{ V}$ |      | 45   | 60   | ns   |
| $t_c$         | Cross-over Time       |                                            |      | 72   | 100  | ns   |

**SOURCE DRAIN DIODE**

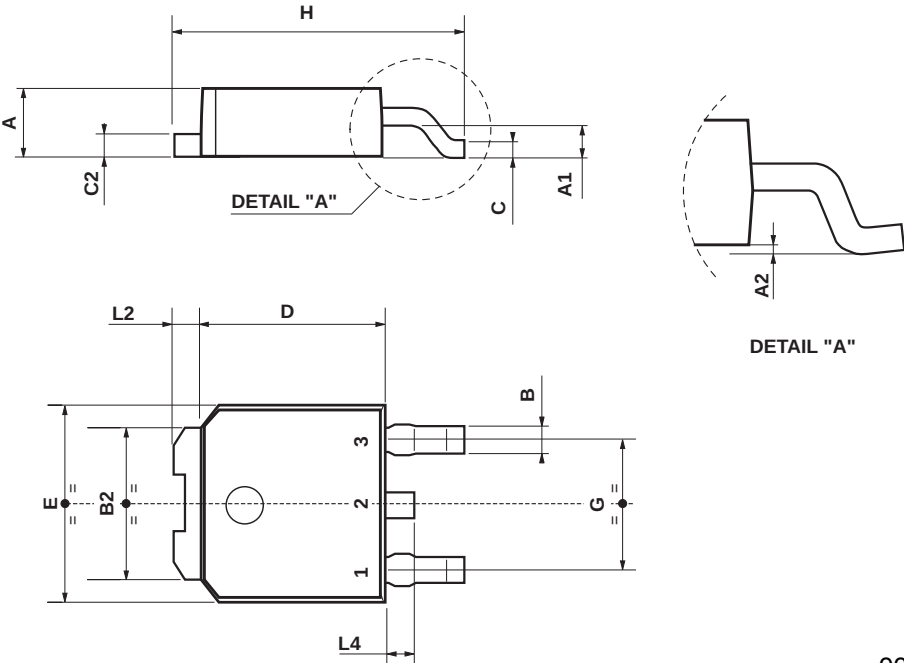
| Symbol             | Parameter                     | Test Conditions                                                                                                       | Min. | Typ. | Max. | Unit          |
|--------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------|------|------|------|---------------|
| $I_{SD}$           | Source-drain Current          |                                                                                                                       |      |      | 30   | A             |
| $I_{SDM}(\bullet)$ | Source-drain Current (pulsed) |                                                                                                                       |      |      | 120  | A             |
| $V_{SD} (*)$       | Forward On Voltage            | $I_{SD} = 45\text{ A}$ $V_{GS} = 0$                                                                                   |      |      | 1.5  | V             |
| $t_{rr}$           | Reverse Recovery Time         | $I_{SD} = 45\text{ A}$ $di/dt = 100\text{ A}/\mu\text{s}$<br>$V_{DD} = 30\text{ V}$ $T_j = 150\text{ }^\circ\text{C}$ |      | 70   |      | ns            |
| $Q_{rr}$           | Reverse Recovery Charge       |                                                                                                                       |      | 210  |      | $\mu\text{C}$ |
| $I_{RRM}$          | Reverse Recovery Current      |                                                                                                                       |      | 6    |      | A             |

(\*) Pulsed: Pulse duration = 300  $\mu\text{s}$ , duty cycle 1.5 %

(\bullet) Pulse width limited by safe operating area

TO-252 (DPAK) MECHANICAL DATA

| DIM. | mm   |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    | 2.2  |      | 2.4  | 0.086 |       | 0.094 |
| A1   | 0.9  |      | 1.1  | 0.035 |       | 0.043 |
| A2   | 0.03 |      | 0.23 | 0.001 |       | 0.009 |
| B    | 0.64 |      | 0.9  | 0.025 |       | 0.035 |
| B2   | 5.2  |      | 5.4  | 0.204 |       | 0.212 |
| C    | 0.45 |      | 0.6  | 0.017 |       | 0.023 |
| C2   | 0.48 |      | 0.6  | 0.019 |       | 0.023 |
| D    | 6    |      | 6.2  | 0.236 |       | 0.244 |
| E    | 6.4  |      | 6.6  | 0.252 |       | 0.260 |
| G    | 4.4  |      | 4.6  | 0.173 |       | 0.181 |
| H    | 9.35 |      | 10.1 | 0.368 |       | 0.397 |
| L2   |      | 0.8  |      |       | 0.031 |       |
| L4   | 0.6  |      | 1    | 0.023 |       | 0.039 |



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