# STN1810

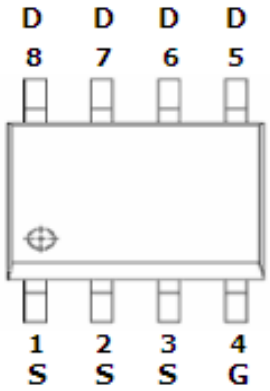
N Channel Enhancement Mode MOSFET

8.0A

## DESCRIPTION

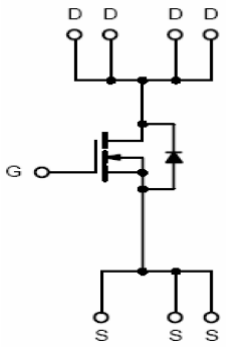
STN1810 is the N-Channel logic enhancement mode power field effect transistor which is produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance and provide superior switching performance. These applications such as notebook computer power management and other battery powered circuits where high-side switching, low in-line power loss and resistance to transients are melded.

## PIN CONFIGURATION
## SOP-8

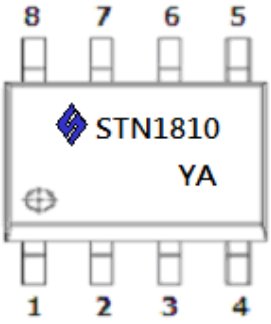



## FEATURE

- 60V/8.0A, $R_{DS(ON)}$ = 140mΩ (Typ.) @$V_{GS}$ = 10V
- 60V/6.5.0A, $R_{DS(ON)}$ = 150mΩ @$V_{GS}$ = 7.0V
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and maximum DC current capability
- SOP-8 package design




## PART MARKING




**Y: Year Code  A: Process Code**

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**ABSOULTE MAXIMUM RATINGS** (Ta = 25℃ Unless otherwise noted )

| Parameter | | Symbol | Typical | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | VDSS | 100 | V |
| Gate-Source Voltage | | VGSS | ±20 | V |
| Continuous Drain Current (TJ=150℃) | TA=25℃<br>TA=70℃ | ID | 8.0<br>6.0 | A |
| Pulsed Drain Current | | IDM | 12 | A |
| Continuous Source Current (Diode Conduction) | | IS | 2.3 | A |
| Power Dissipation | TA=25℃<br>TA=70℃ | PD | 2.8<br>1.8 | W |
| Operation Junction Temperature | | TJ | 150 | ℃ |
| Storgae Temperature Range | | TSTG | -55/150 | ℃ |
| Thermal Resistance-Junction to Ambient | | RθJA | 80 | ℃/W |

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**ELECTRICAL CHARACTERISTICS** ( Ta = 25℃ Unless otherwise noted )

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V,ID=250uA | 100 | | | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,ID=250uA | 1.0 | | 3.0 | V |
| Gate Leakage Current | $I_{GSS}$ | $V_{DS}$=0V,$V_{GS}$=±20V | | | ±100 | nA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=80V,$V_{GS}$=0V | | | 250 | uA |
| | | $V_{DS}$=80V,$V_{GS}$=0V $T_J$=5℃ | | | 5 | |
| On-State Drain Current | $I_{D(on)}$ | $V_{DS}$≧5V,$V_{GS}$=10V | 8 | | | A |
| Drain-source On-Resistance | $R_{DS(on)}$ | $V_{GS}$=10V,$I_D$=10A | | 140 | 155 | mΩ |
| | | $V_{GS}$=7.0V,$I_D$=6.5A | | 150 | 170 | |
| Forward Transconductance | gfs | $V_{DS}$=5V,$I_D$=6.2AV | | 5.6 | | S |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=1A,$V_{GS}$=0V | | | 1.3 | V |
| **Dynamic** | | | | | | |
| Total Gate Charge | $Q_g$ | $V_{DS}$=80V,$V_{GS}$=5V $I_D$≡5A | | 10 | 16 | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 2.5 | | |
| Gate-Drain Charge | $Q_{gd}$ | | | 4.2 | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ =25V,VGS=0V F=1MHz | | 430 | | pF |
| Output Capacitance | $C_{oss}$ | | | 58 | | |
| Reverse TransferCapacitance | $C_{rss}$ | | | 33 | | |
| Turn-On Time | $t_{d(on)}$ | $V_{DD}$=50V,$R_D$=10Ω $V_{DS}$=30V,$R_G$=3.3Ω $I_D$≡5A | | 6.5 | | nS |
| | tr | | | 10 | | |
| Turn-Off Time | $t_{d(off)}$ | | | 13 | | |
| | tf | | | 3.4 | | |

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## TYPICAL CHARACTERICTICS

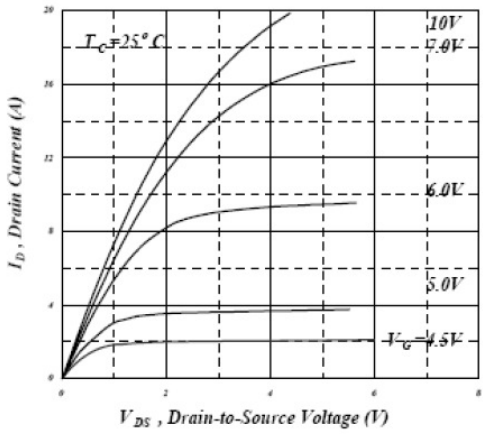


Fig 1. Typical Output Characteristics

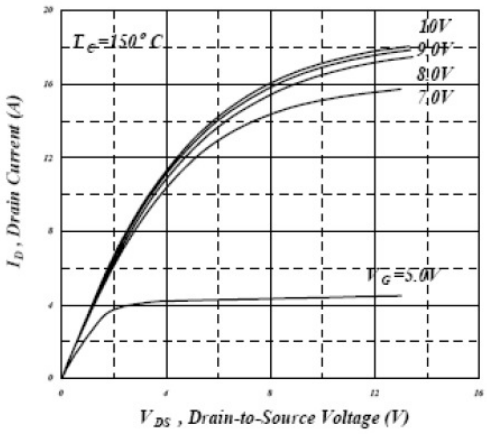


Fig 2. Typical Output Characteristics

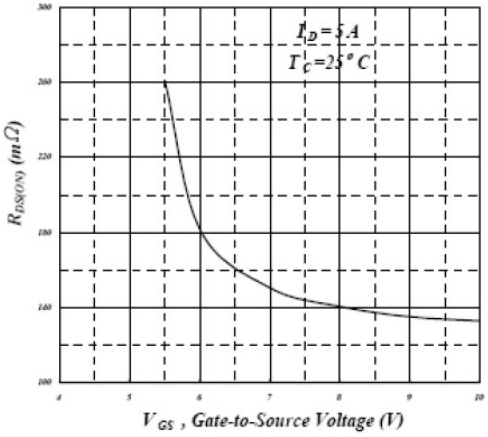


Fig 3. On-Resistance v.s. Gate Voltage

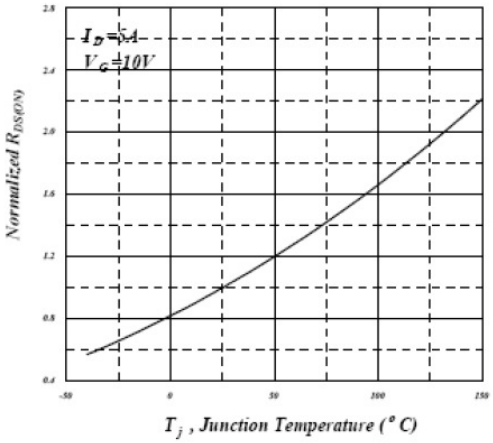


Fig 4. Normalized On-Resistance v.s. Junction Temperature

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**TYPICAL CHARACTERICTICS**

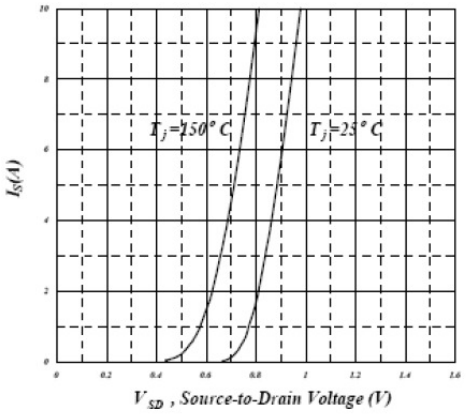


Fig 5. Forward Characteristic of Reverse Diode

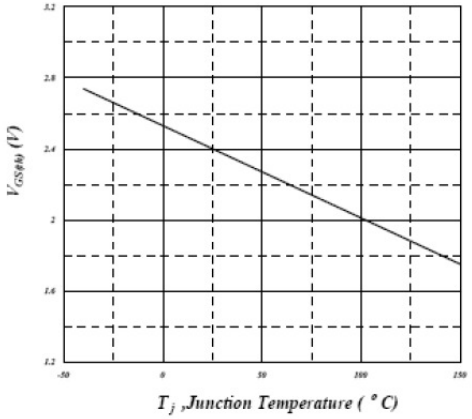


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

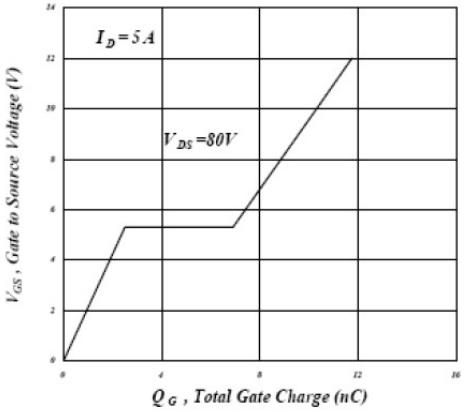


Fig 7. Gate Charge Characteristics

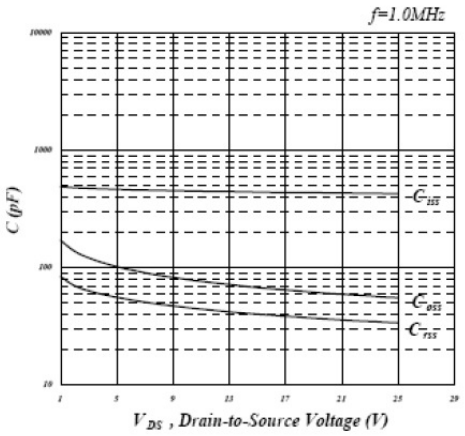


Fig 8. Typical Capacitance Characteristics

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## TYPICAL CHARACTERICTICS

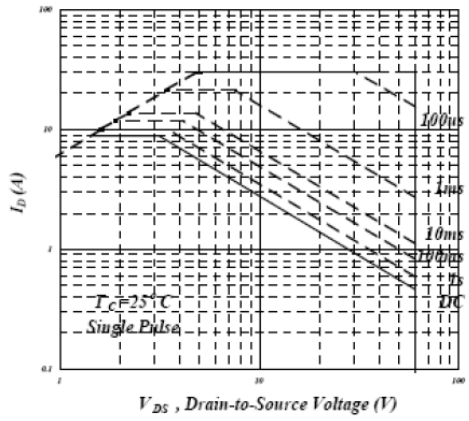


Fig 9. Maximum Safe Operating Area

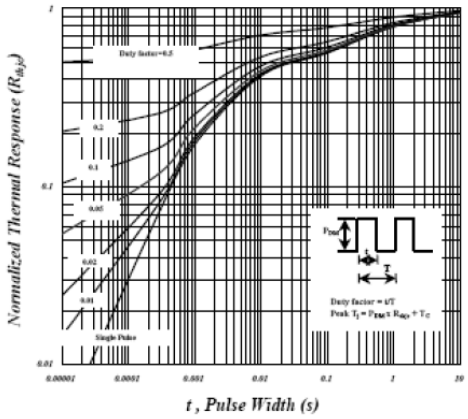


Fig 10. Effective Transient Thermal Impedance

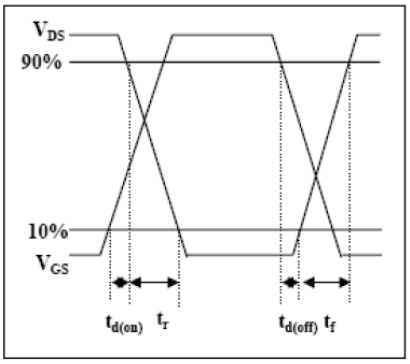


Fig 11. Switching Time Waveform

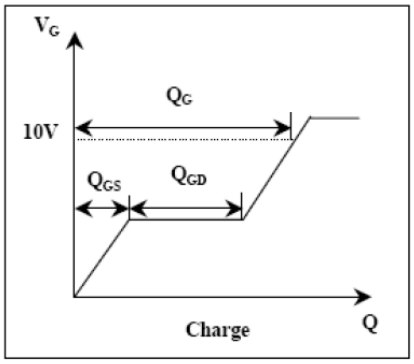


Fig 12. Gate Charge Waveform

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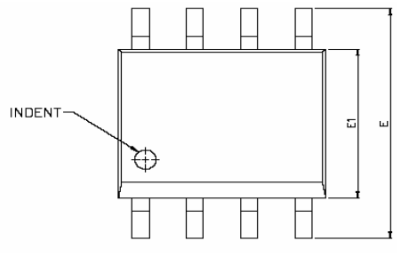
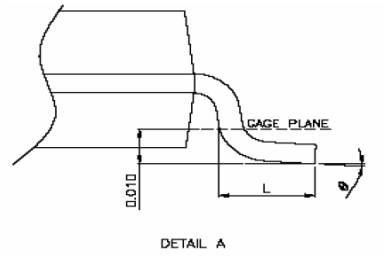
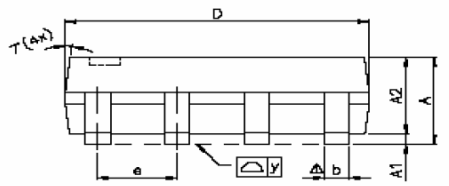
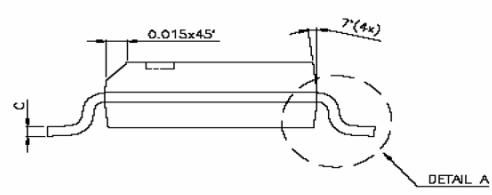
**PACKAGE OUTLINE SOP-8P**




| SYMBOLS | DIMENSIONS IN MILLIMETERS | | | DIMENSIONS IN INCHES | | |
|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 1.47 | 1.60 | 1.73 | 0.058 | 0.063 | 0.068 |
| A1 | 0.10 | —— | 0.25 | 0.004 | —— | 0.010 |
| A2 | —— | 1.45 | —— | —— | 0.057 | —— |
| b | 0.33 | 0.41 | 0.51 | 0.013 | 0.016 | 0.020 |
| C | 0.19 | 0.20 | 0.25 | 0.0075 | 0.008 | 0.0098 |
| D | 4.80 | 4.85 | 4.95 | 0.189 | 0.191 | 0.195 |
| E | 5.80 | 6.00 | 6.20 | 0.228 | 0.236 | 0.244 |
| E1 | 3.80 | 3.90 | 4.00 | 0.150 | 0.154 | 0.157 |
| e | —— | 1.27 | —— | —— | 0.050 | —— |
| L | 0.38 | 0.71 | 1.27 | 0.015 | 0.028 | 0.050 |
| ② y | —— | —— | 0.076 | —— | —— | 0.003 |
| θ | 0° | —— | 8° | 0° | —— | 8° |

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