SemTron Microtech Corporation

# SMC8810

## 20V N-Channel Enhancement Mode MOSFET

N-Channel Enhancement Mode MOSFET

## DESCRIPTION

The SMC8810 is the Dual N-Channel logic enhancement mode power field effect transistor which is produced using high cell density. advanced trench technology to provide excellent $R_{DS(ON)}$.

This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application , and low in-line power loss are needed in small outline surface mount package. It is ESD protected.

*SMC8810W-TRG ROHS Compliant This is Halogen Free*

## FEATURE

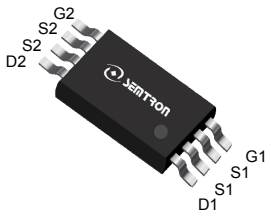
- ***20V/7.0A, $R_{DS(ON)}$ =11.5mΩ(typ.)@$V_{GS}$ =4.5V***
- ***20V/7.0A, $R_{DS(ON)}$ =12.0mΩ(typ.)@$V_{GS}$ =4.0V***
- ***20V/6.5A, $R_{DS(ON)}$ =12.5mΩ(typ.)@$V_{GS}$ =3.2V***
- ***20V/6.5A, $R_{DS(ON)}$ =14mΩ (typ.) @$V_{GS}$ =2.5V***
- ***ESD protection 2KV***
- Super high density cell design for extremely low $R_{DS(ON)}$
- Exceptional on-resistance and Maximum DC current capability

## APPLICATIONS

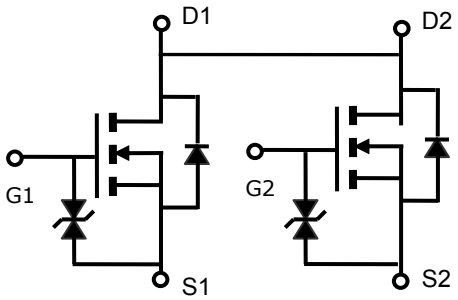
- Load Switch
- Portable Equipment
- Battery Powered System

Green Product

## PIN CONFIGURATION




TSSOP-8
Top View




## PART NUMBER INFORMATION

| SMC 8810 W - TR G<br>a b c d e | **a : Company name.**<br>**b : Product Serial number.**<br>**c : Package code**<br>**d : Handling code**<br>**e : Green produce code** |
|---|---|

## ■ORDERING INFORMATION

| Part Number | Package Code | Handling Code | Shipping |
|---|---|---|---|
| SMC8810W-TRG | W : TSSOP-8 | TR : Tape&Reel | 3K/Reel |

※ Year Code : 0 ~ 9, 2010 : 0
※ Week Code : A(1~2) ~ Z(53~54)
※ TSSOP-8 : Only available in tape and reel packaging.

## ■ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25℃ Unless otherwise noted )

| Symbol | Parameter | | Typical | Unit |
|---|---|---|---|---|
| $V_{DSS}$ | Drain-Source Voltage | | 20 | V |
| $V_{GSS}$ | Gate-Source Voltage | | ±12 | V |
| $I_D$ | Continuous Drain Current ($T_C$=25°C) [A] | $V_{GS}$=4.5V | 7.0 | A |
| | Continuous Drain Current ($T_C$=70°C) | | 5.6 | A |
| $I_{DM}$ | Pulsed Drain Current[B] | | 30 | A |
| $P_D$ | Power Dissipation | $T_A$=25°C<br>$T_A$=70°C | 1.5<br>1.0 | W |
| $T_J$ | Operation Junction Temperature | | -55 to150 | °C |
| $T_{STG}$ | Storage Temperature Range | | -55 to150 | °C |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

## ■THERMAL DATA

| Symbol | Parameter | | Typ | Max | Unit |
|---|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance-Junction to Ambient[A] | Steady-State | - | 120 | °C/W |
| $R_{\theta JL}$ | Thermal Resistance Junction to Lead[A] | Steady-State | - | 75 | °C/W |

## ■ELECTRICAL CHARACTERISTICS($T_J$ = 25℃ Unless otherwise noted )

| Symbol | Parameter | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Parameters** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V,$I_D$=250μA | 20 | | | V |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$,$I_D$=250μA | 0.6 | 0.7 | 1.0 | V |
| $I_{GSS}$ | Gate Leakage Current | $V_{DS}$=0V,$V_{GS}$=±10V | | | ±10 | μA |
| $I_{DSS}$ | Zero Gate Voltage, Drain-Source Leakage Current | $V_{DS}$=16V,$V_{GS}$=0V<br>$T_J$=25°C | | | 1 | μA |
| | | $V_{DS}$=16V,$V_{GS}$=0V<br>$T_J$=75°C | | | 5 | |
| $R_{DS(ON)}$ | Drain-source On-Resistance[B] | $V_{GS}$=4.5V,$I_D$=7.0A<br>$V_{GS}$=4.0V,$I_D$=7.0A<br>$V_{GS}$=3.2V,$I_D$=6.5A<br>$V_{GS}$=2.5V,$I_D$=5.5A<br>$V_{GS}$=1.8V,$I_D$=5.0A | | 11.5<br>12<br>12.5<br>14<br>21 | 13.5<br>14<br>14.5<br>16<br>24 | mΩ |
| $G_{fs}$ | Forward Transconductance | $V_{DS}$=5V,$I_D$=6.5A | | 27 | | S |
| **Source-Drain Doide** | | | | | | |
| $V_{SD}$ | Diode Forward Voltage | $I_S$=1.0A,$V_{GS}$=0V | | 0.85 | 1.0 | V |
| $I_S$ | Continuous Source Current[AD] | | | | 6.5 | A |
| **Dynamic Parameters** | | | | | | |
| $Q_g$ (4.5V) | Total Gate Charge | $V_{DS}$=10V<br>$V_{GS}$=4.5V<br>$I_D$≡7.0A | | 11 | | nC |
| $Q_{gs}$ | Gate-Source Charge | | | 4.5 | | |
| $Q_{gd}$ | Gate-Drain Charge | | | 3.1 | | |
| $R_g$ | Gate Resistance | $V_{GS}$=0V,$V_{DS}$=0V,F=1MHz | | 1.2 | | Ω |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=10V<br>$V_{GS}$=0V<br>f=1MHz | | 1185 | | pF |
| $C_{oss}$ | Output Capacitance | | | 298 | | |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 158 | | |
| $t_{d(on)}$ | Turn-On Time | $V_{Ds}$=10V<br>$I_D$=7A<br>$V_{GEN}$=4.5V<br>$R_G$=3.3Ω | | 6.6 | | nS |
| $t_r$ | | | | 13 | | |
| $t_{d(off)}$ | Turn-Off Time | | | 54 | | |
| $t_f$ | | | | 17 | | |

Note:

A. The value of $R_{\theta JA}$ is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_C$=25°C.

B. The data tested by pulsed , pulse width ≦ 300uS , duty cycle ≦ 2%

C. The EAS data shows Max. rating . The test condition is $V_{DD}$=-25V,$V_{GS}$=-10V,L=0.1mH.

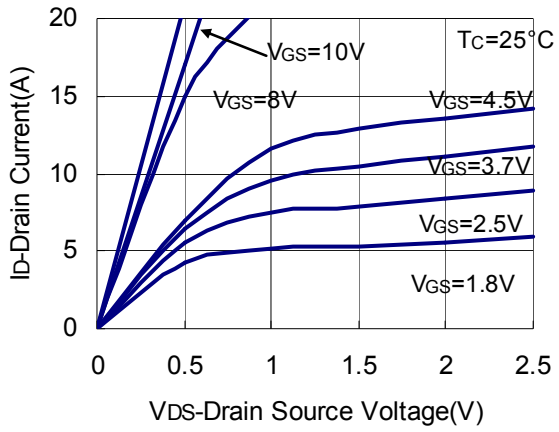
D. The data is theoretically the same as $I_D$ and $I_{DM}$ , in real applications , should be limited by total power dissipation.

The products and product specifications contained herein are subject to change without notice to improve performance characteristics. Consult us, or our representatives before use, to confirm that the information in this datasheet is up to date

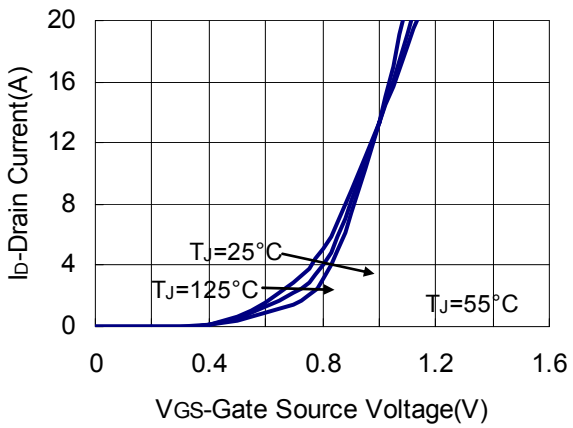
We assume no responsibility for any infringement of patents, patent rights, or other rights arising from the use of any information and circuitry in this datasheet.

## TYPICAL CHARACTERISTICS (25℃ Unless Note)

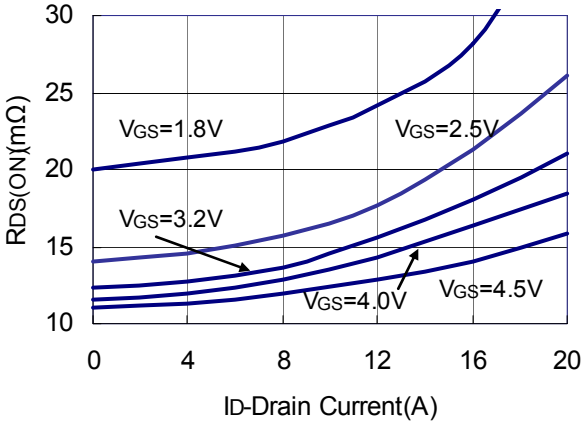
**Output Characteristics**



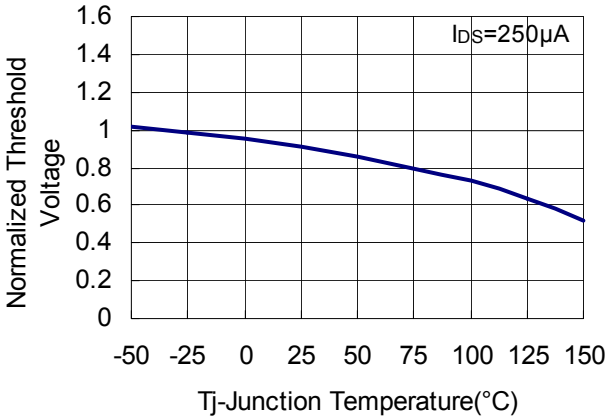

**Drain-Source On Resistance**



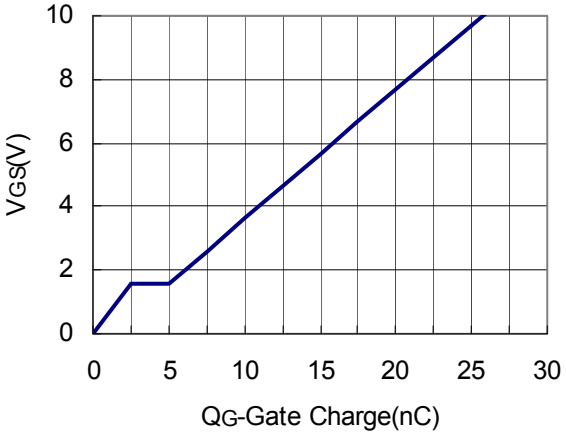

**Transfer Characteristics**



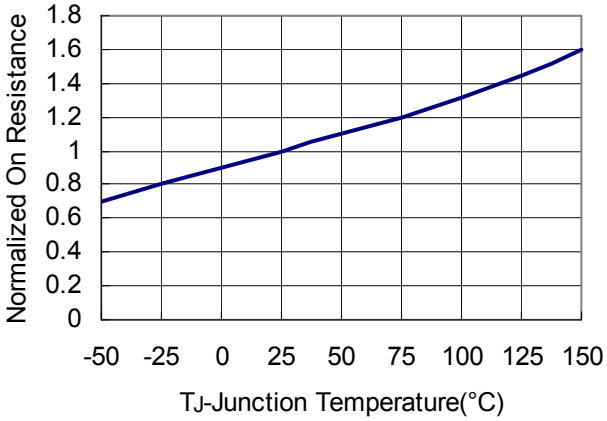

**Gate Threshold Voltage**




**Gate Charge**

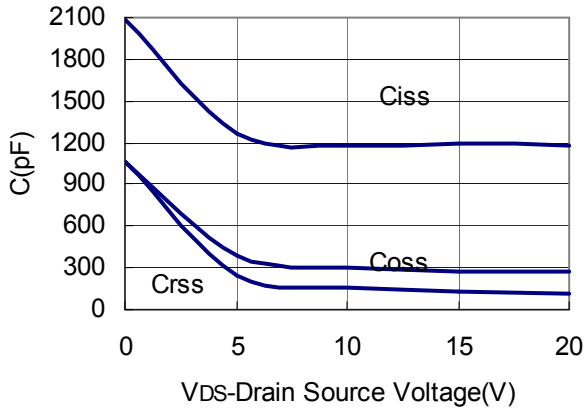



**Drain Source On Resistance**

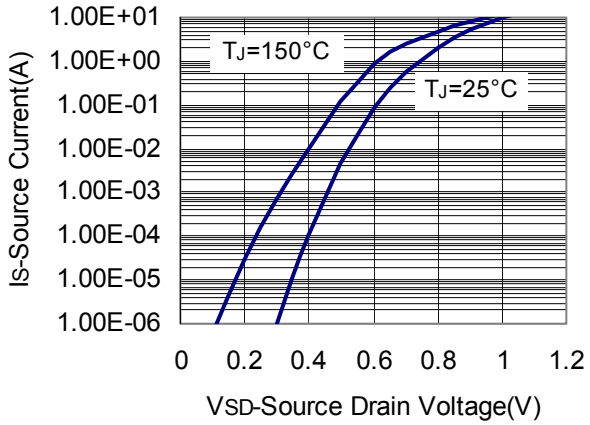


## TYPICAL CHARACTERISTICS (25℃ Unless Note)

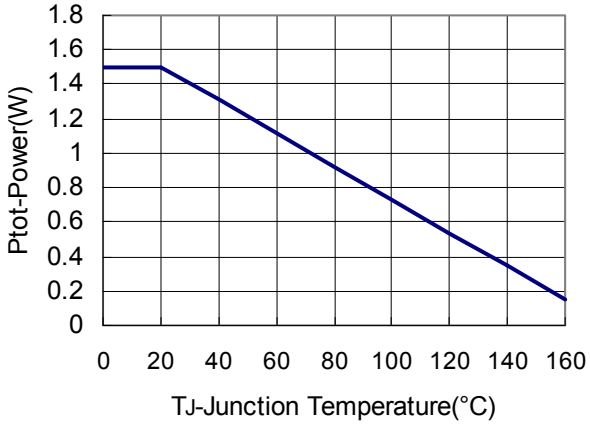
**Capacitance**



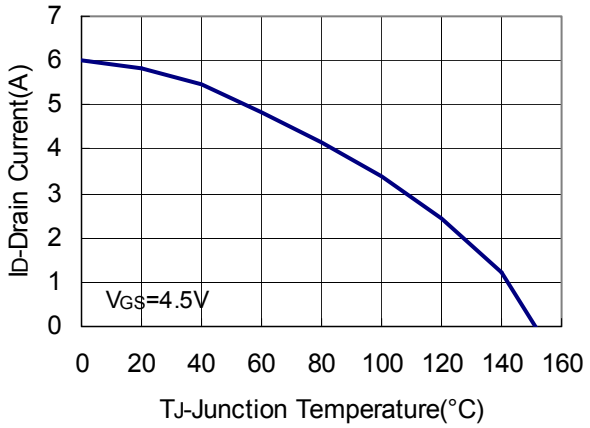

**Source Drain Diode Forward**



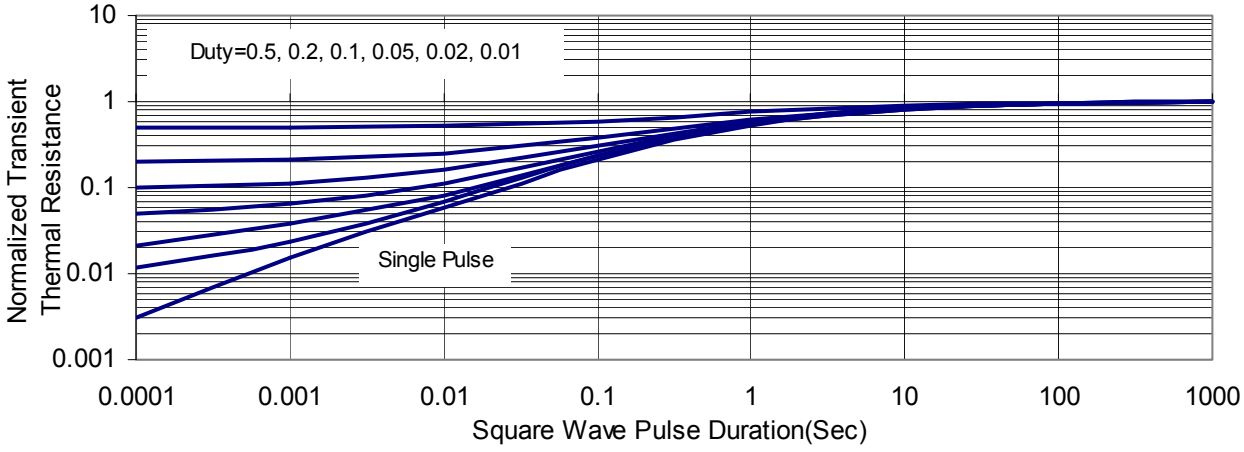

**Power Dissipation**



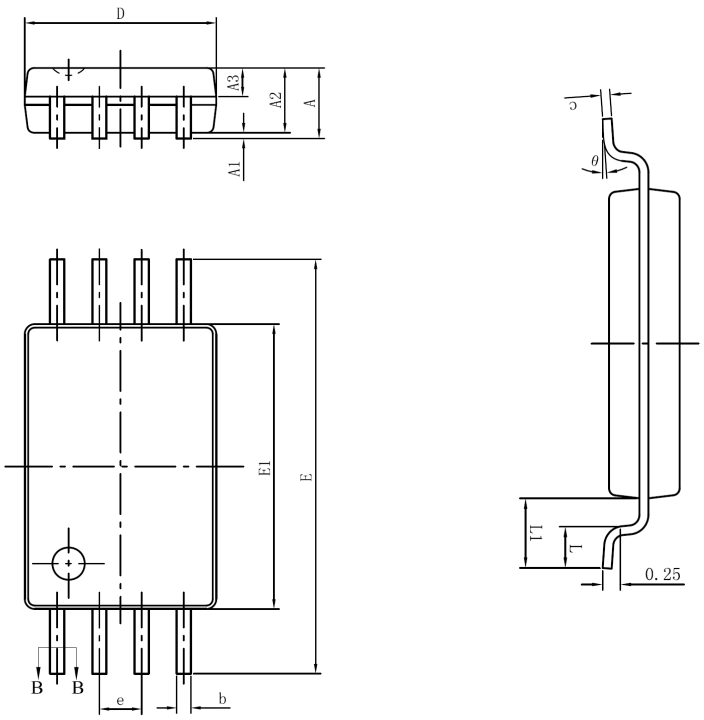

**Drain Current**




**Thermal Transient Impedance**



## TSSOP-8 PACKAGE DIMENSIONS




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| | | | | |
| A | - | 1.200 | - | 0.047 |
| A1 | 0.050 | 0.150 | 0.002 | 0.006 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| A3 | 0.390 | 0.490 | 0.015 | 0.019 |
| b | 0.210 | 0.300 | 0.008 | 0.012 |
| b1 | 0.200 | 0.250 | 0.008 | 0.010 |
| c | 0.130 | 0.190 | 0.005 | 0.007 |
| c1 | 0.120 | 0.140 | 0.005 | 0.006 |
| D | 2.900 | 3.100 | 0.114 | 0.122 |
| E | 6.200 | 6.600 | 0.244 | 0.260 |
| E1 | 4.300 | 4.500 | 0.169 | 0.177 |
| e | 0.650 BSC | | 0.026 BSC | |
| L | 0.450 | 0.750 | 0.018 | 0.030 |
| θ | 0° | 8° | 0° | 8° |