HUASHUO SEMICONDUCTOR

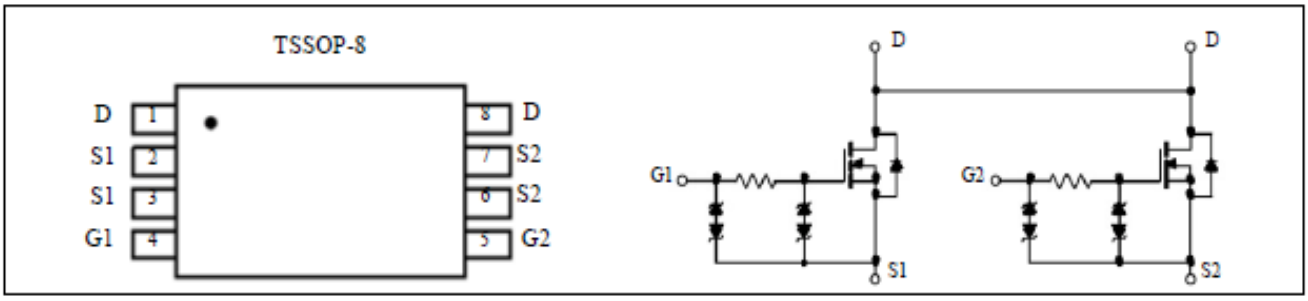
# HSG8810

## Dual N-Channel High Density Trench MOSFET

| PRODUCT SUMMARY | | |
|---|---|---|
| $V_{DSS}$ | $I_D$ | $R_{DS(on)}$ (mΩ) Max |
| 20V | 6.5A | 20 @ $V_{GS}$ = 4.5V |
| | 5.5A | 28 @ $V_{GS}$ = 2.5V |

### FEATURES

- Super high dense cell trench design for low $R_{DS(on)}$.
- Rugged and reliable.
- Battery Switch, ESD Protected 2KV.




## ABSOLUTEMAXIMUMRATINGS($T_A$ = 25 ℃ unless otherwise noted)

| Parameter | | Symbol | Limit | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±12 | V |
| Drain Current-Continuous[a] @ $T_A$ = 25 ℃ | | $I_D$ | 6.5 | A |
| -Pulse[b] | | $I_{DM}$ | 30 | A |
| Drain-Source Diode Forward Current[a] | | $I_S$ | 1.7 | A |
| Maximum Power Dissipation[a] | $T_A$=25 ℃ | $P_D$ | 1.5 | W |
| | $T_A$=75 ℃ | | 0.96 | |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{STG}$ | - 55 to 150 | ℃ |

## THERMALCHARACTERISTICS

| | | | |
|---|---|---|---|
| Thermal Resistance,Junction-to-Ambient[a] | $R_{thJA}$ | 83 | ℃/W |

Note：
a. Surface Mounted on FR4 Board , t ≤ 10sec .
b. Pulse width limited by maximumjunctiontemperature.

## ELECTRICALCHARACTERISTICS ($T_A$ = 25 ℃ unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ[c] | Max | Unit |
|---|---|---|---|---|---|---|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$ = 0V , $I_D$ = 250uA | 20 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 20V , $V_{GS}$ = 0V | | | 1 | uA |
| Gate-Body Leakage | $I_{GSS}$ | $V_{GS}$ = ±12V, $V_{DS}$ = 0V | | | ±10 | μA |
| ON CHARACTERISTICS[b] | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$ , $I_D$ = 250uA | 0.6 | 0.8 | 1.0 | V |
| Drain-Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}$ =4.5V , $I_D$ = 6.5A | | 17 | 20 | mΩ |
| | | $V_{GS}$ = 2.5V , $I_D$ = 5.5A | | 22 | 28 | |
| DRAIN-SOURCE DIODE CHARACTERISTICS[b] | | | | | | |
| Diode Forward Voltage | $V_{SD}$ | $V_{GS}$ = 0V , $I_S$ = 1.5A | | | 1.2 | V |
| DYNAMIC CHARACTERISTICS[c] | | | | | | |
| Input Capacitance | $C_{ISS}$ | $V_{DS}$ = 10V , $V_{GS}$ = 0V f = 1.0MHz | | 318 | | pF |
| Output Capacitance | $C_{OSS}$ | | | 103 | | pF |
| Reverse Transfer Capacitance | $C_{RSS}$ | | | 22 | | pF |
| SWITCHING CHARACTERISTICS[c] | | | | | | |
| Turn-On Delay Time | $t_{D(ON)}$ | $V_{DD}$ = 10V , $I_D$ = 2A $V_{GEN}$ = 4.5V $R_L$ = 5 Ω $R_{GEN}$ = 6 Ω | | 304 | | ns |
| Rise Time | $t_r$ | | | 720 | | ns |
| Turn-Off Delay Time | $t_{D(OFF)}$ | | | 3480 | | ns |
| Fall Time | $t_f$ | | | 2140 | | ns |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = 12V , $I_D$ = 6A $V_{GS}$ = 4.5V | | 4.6 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 2.7 | | nC |
| Gate-Drain Charge | $Q_{gd}$ | | | 1.6 | | nC |

Note：

b. Pulse Test：Pulse width ≤ 300us , Duty Cycle ≤ 2% .

c. Guaranteed by design , not subject to productiontesting .

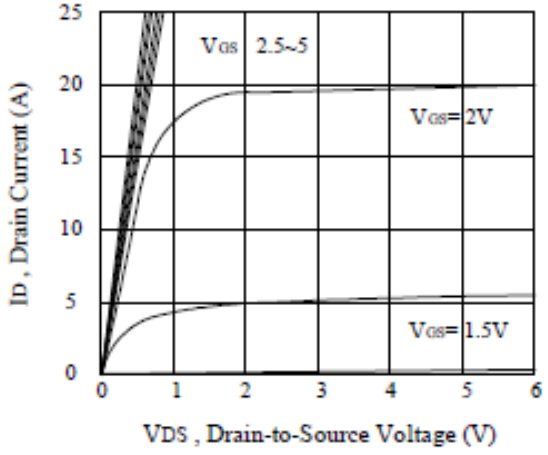



Figure 1. Output Characteristics

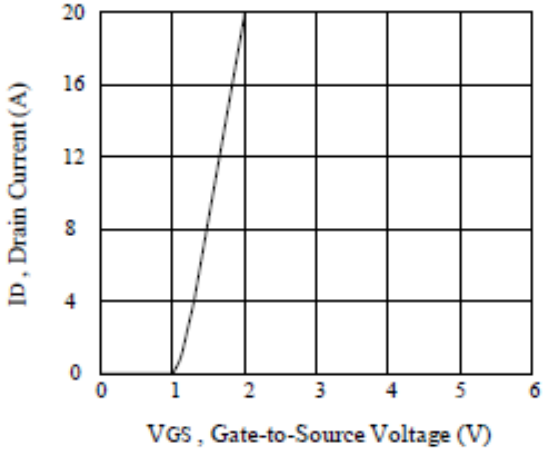



Figure 2. Transfer Characteristics

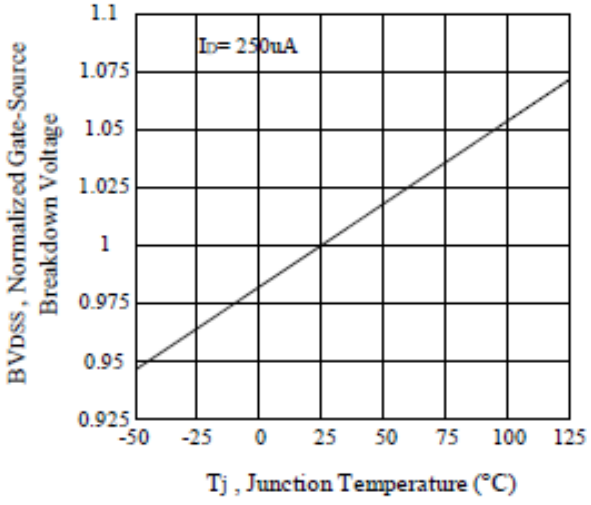



Figure 3. Breakdown Voltage Variation with

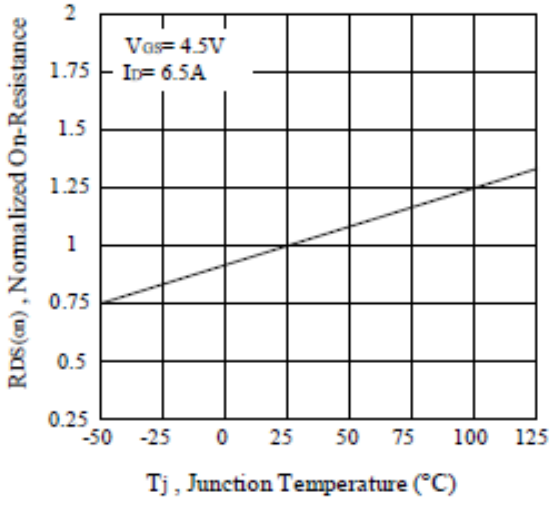



Figure 4. On-Resistance Variation with Temperature

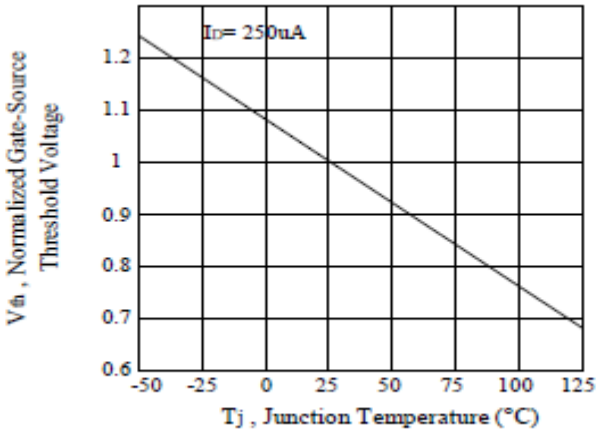



Figure 5. Gate Threshold Variation with Temperature

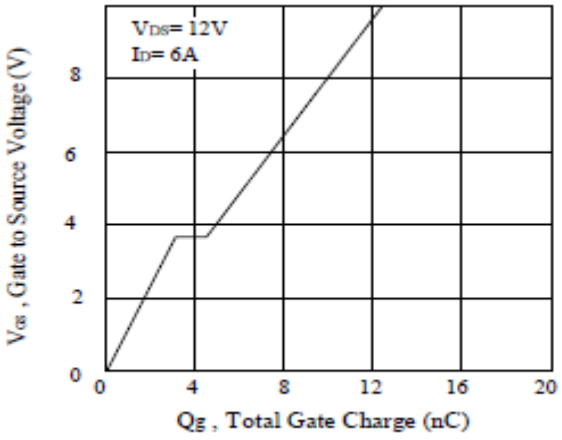
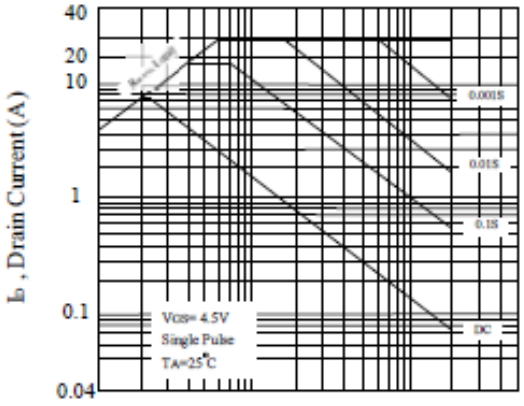
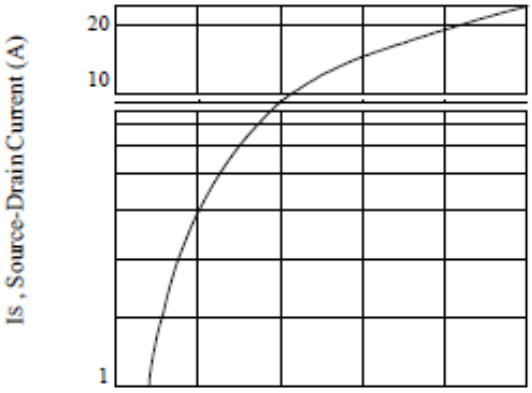



Figure 6. Gate Charge




VDS , Drain-Source Voltage (V)

Figure 7. Maximum Safe Operating Area




VSD , Body Diode Forward Voltage (V)

Figure 8. Body Diode Forward Voltage Variation with Source Current

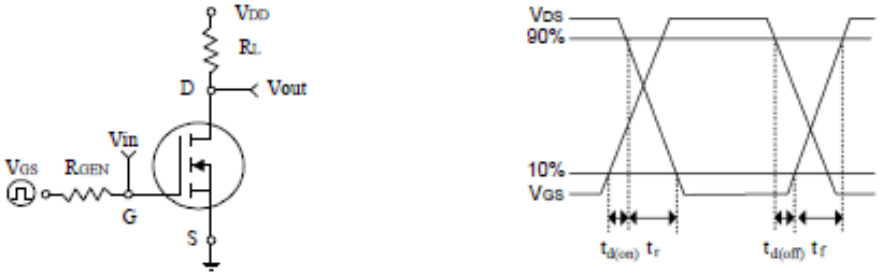
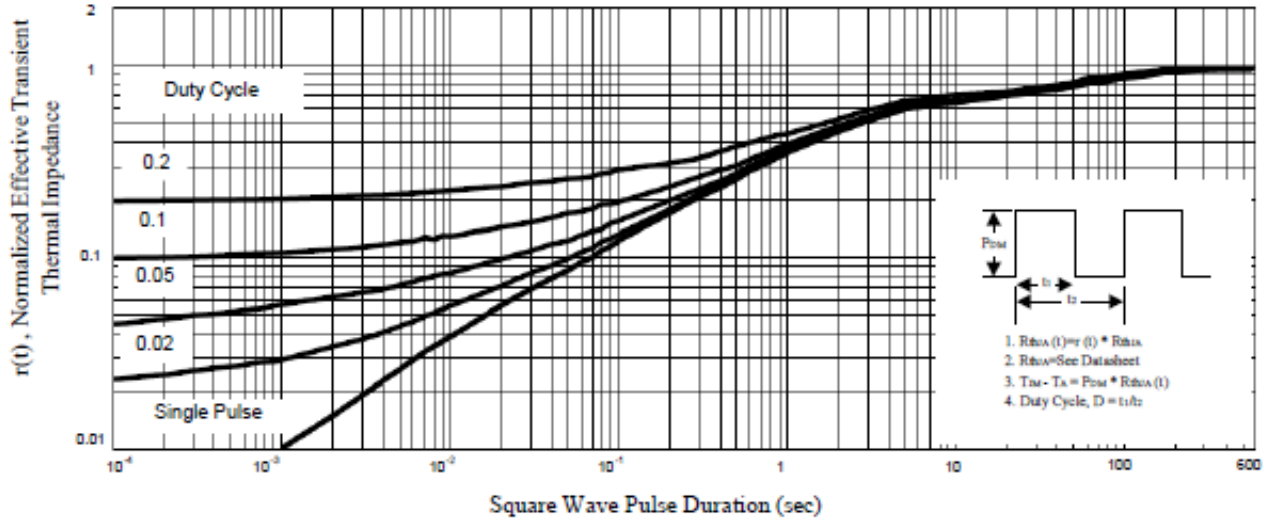



Figure 9. Switching Test Circuit and Switching Waveforms




Square Wave Pulse Duration (sec)

Figure 10. Normalized Thermal Transient Impedance Curve