WANSEMI
万代半导体

*WP8810E*

# Enhancement Mode N-Channel Power MOSFET

**TSSOP8/NMOS/20V/±10V/0.7V/5A/13.5mΩ**

**Rev0.6**

# 20V, 13.5mΩ, 5A, N-Channel Enhancement Mode Power MOSFET

## 1.Features

- High Power and current handing capability
- Lead free product is acquired
- Surface Mount Package
- ESD Rating: HBM 2KV

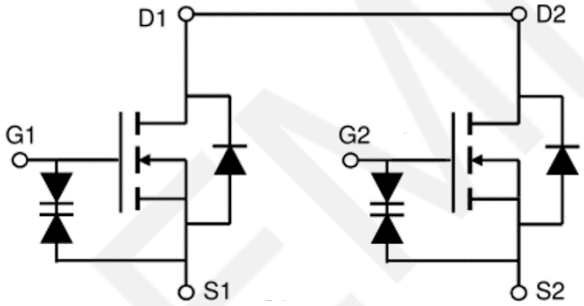
| $V_{DS}$ Typ | $R_{DS(on)}$ Typ. | $I_D$ Max. |
|---|---|---|
| 20V | 13.5mΩ @ 4.5V | 5A |
| | 18mΩ @ 2.5V | |

## 2.Applications

- Battery protection
- Load Switch
- Power management


TSSOP8

Pin Description




Schematic Diagram

## 3.Package Marking and Ordering Information

| Part no. | Marking | Package | PCS/Reel | PCS/CTN. |
|---|---|---|---|---|
| WP8810E | 8810E | TSSOP8 | 5,000 | 80,000 |

## 4.Absolute Max Ratings at Ta=25℃ (Note1)

| Parameter | Symbol | Maximum | Units |
|---|---|---|---|
| Drain to Source Voltage | $V_{DSS}$ | 20 | V |
| Gate to Source Voltage | $V_{GSS}$ | ±10 | V |
| Drain Current-Continuous | $I_D$ | 5 | A |
| Pulsed Drain Current | $I_{DM}$ | 20 | A |
| Power Dissipation | $P_D$ | 0.9 | W |

Note 1: Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

## 5.Thermal Characteristic

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance, Junction to Ambient (Note 2) | $R_{\theta JA}$ | 139 | ℃/W |

Note 2 : When mounted on 1 inch square copper board t ≤ 10sec The value in any given application depends on the user's specific board design.

## 6.Electrical Characteristics at Ta=25℃ (Note 3)

| Parameter | Symbol | Test Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| Drain to Source Breakdown Voltage | $V_{(BR)DSS}$ | $I_D$ = 250μA, $V_{GS}$ = 0V | 20 | 23 | | V |
| Zero-Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 20V, $V_{GS}$ = 0V | | | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±10V, $V_{DS}$ = 0V | | | ±10 | μA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ =$V_{GS}$ , $I_{DS}$ =250μA | 0.4 | 0.7 | 1.0 | V |
| Drain to Source On-State Resistance | $R_{DS(on)}$ | $I_D$ =5A, $V_{GS}$ = 4.5V | | 13.5 | 17 | mΩ |
| | | $I_D$ =3A, $V_{GS}$ = 2.5V | | 18 | 23 | mΩ |
| Diode Forward Voltage | $V_{SD}$ | $I_S$ = 5A, $V_{GS}$ = 0 | | 0.84 | 1.2 | V |
| Input Capacitance | $C_{iss}$ | $V_{GS}$ =0V, $V_{DS}$ =10V, Frequency=1.0MHz | | 545 | | pF |
| Output Capacitance | $C_{oss}$ | | | 103 | | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 90 | | pF |
| Turn-ON Delay Time | $t_{d(on)}$ | $V_{DS}$ = 10V, $V_{GS}$ = 5V, $R_{GEN}$ = 3Ω , $R_L$=1.5Ω | | 0.5 | | ns |
| Turn-ON Rise Time | $t_r$ | | | 1 | | ns |
| Turn-OFF Delay Time | $t_{d(off)}$ | | | 12 | | ns |
| Turn-ON Fall Time | $t_f$ | | | 4 | | ns |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = 10V, $V_{GS}$ = 4.5V, $I_D$ = 5A | | 8 | | nC |
| Gate-Source Charge | $Q_{gs}$ | | | 2.5 | | nC |
| Gate-Drain Charge | $Q_{gd}$ | | | 3 | | nC |

Note 3: Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## 7.Typical electrical and thermal characteristics

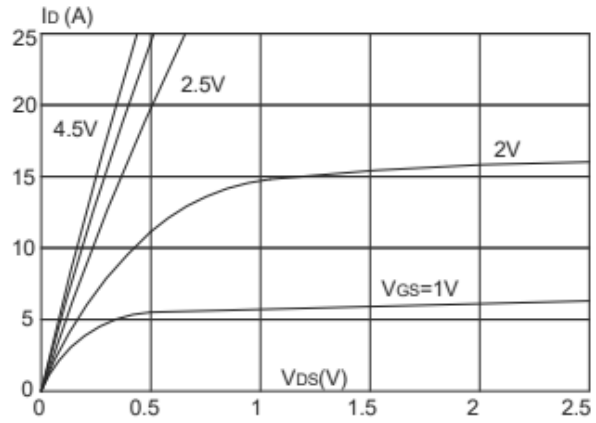



Figure 1 On-Region Characteristics

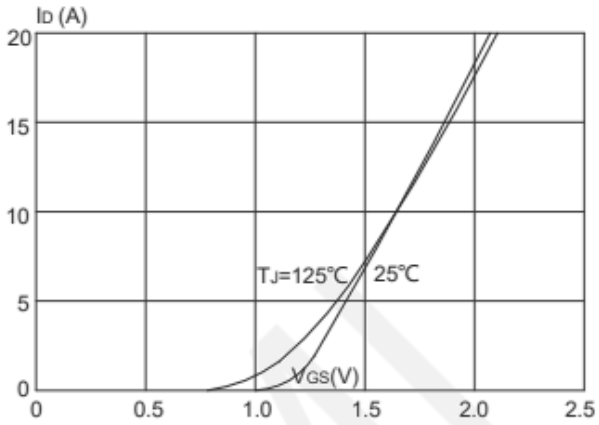



Figure 2 Transfer Characteristics

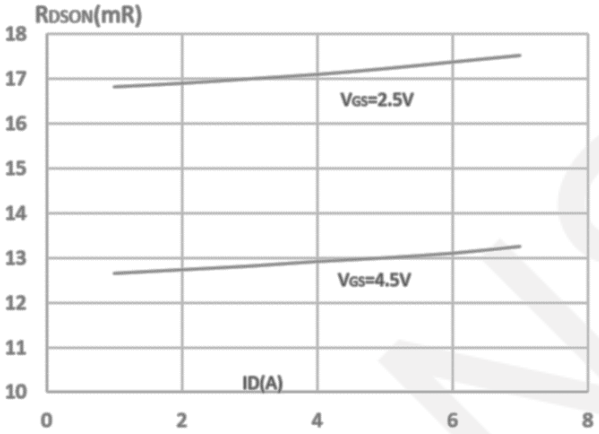



Figure 3 On-Resistance vs. Drain Current and Gate Voltage

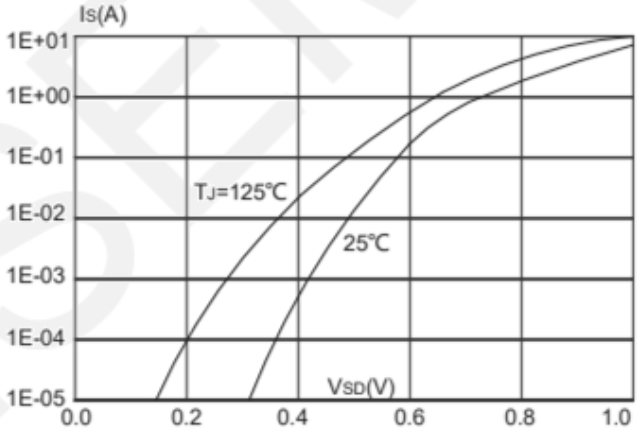



Figure 4 Body Diode Characteristics

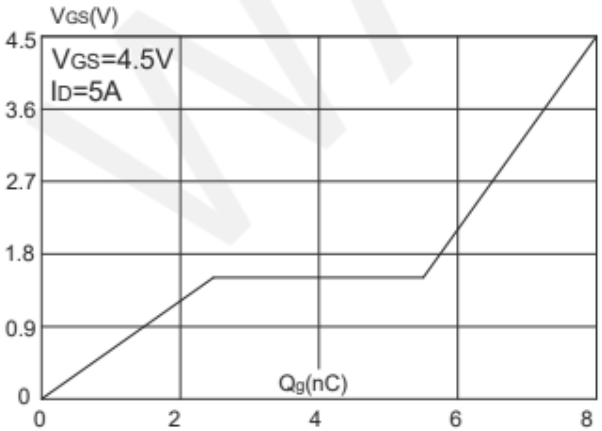



Figure 5 Gate Charge Characteristics

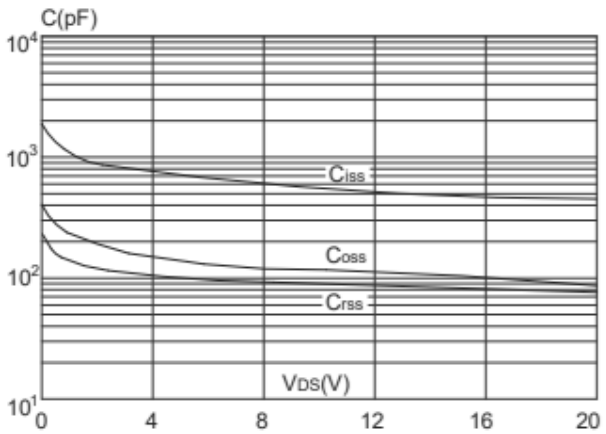



Figure 6 Capacitance Characteristics

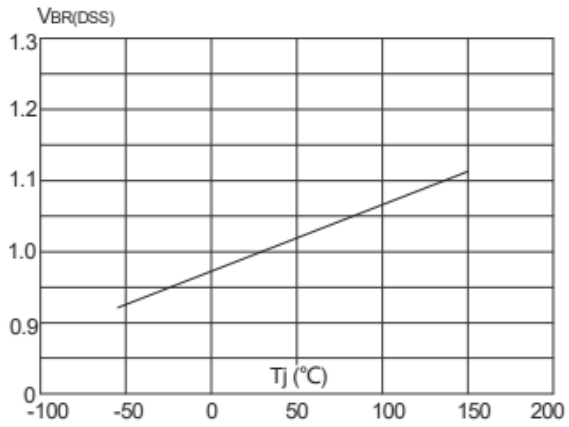



Figure7 Normalized Breakdown Voltage vs. Junction Temperature

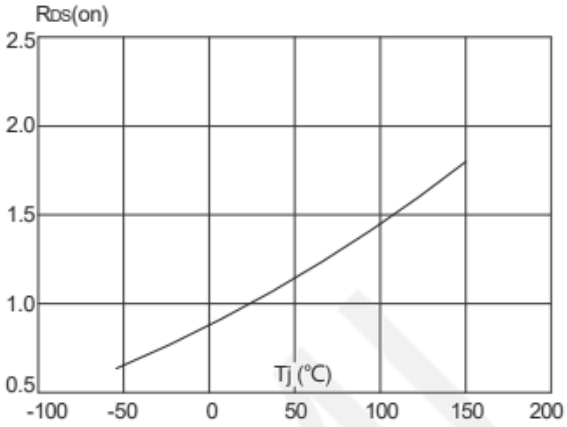



Figure 8 Normalized on Resistance vs. Junction Temperature

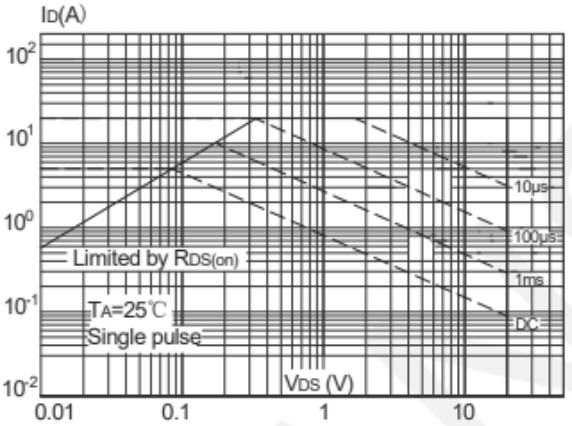



Figure 9 Maximum Forward Biased Safe Operating Area

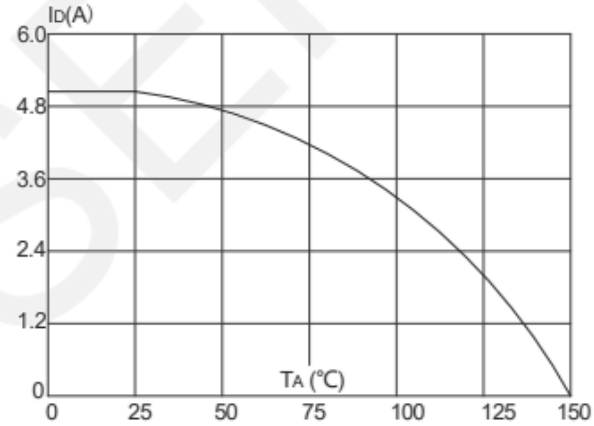



Figure 10 Single Pulse Power Rating Junction-To-Ambient

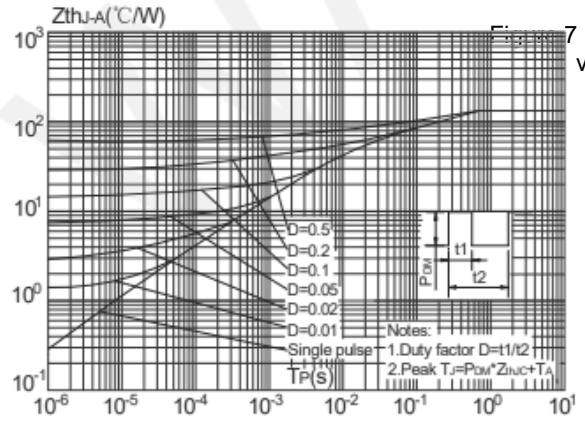
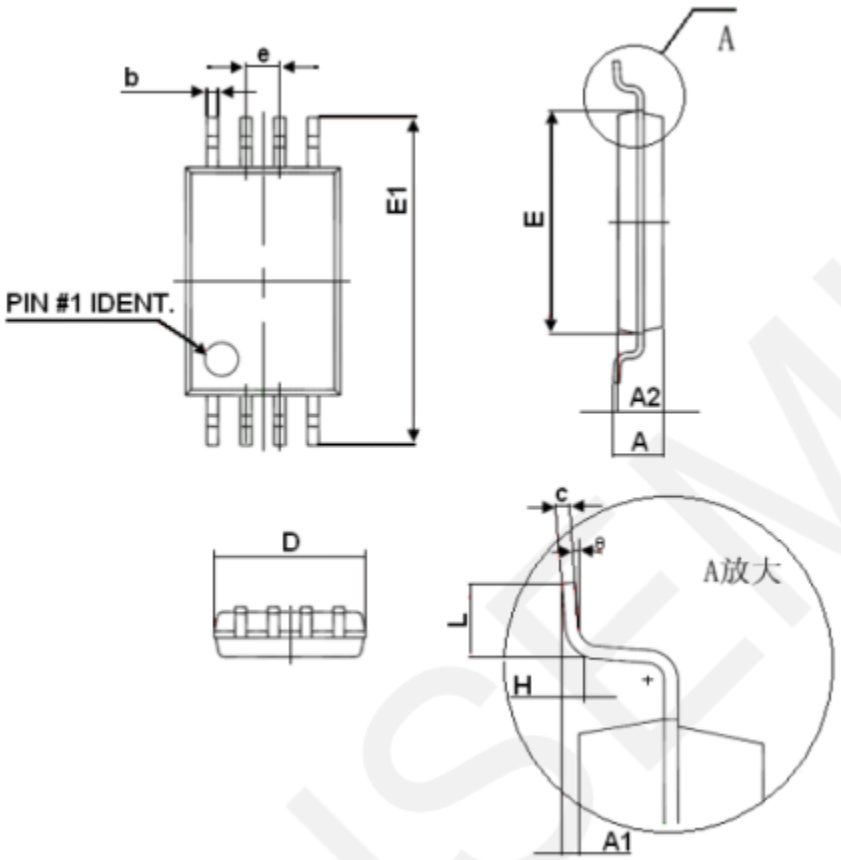



Figure11 Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

**8.Package Dimensions**




| Symbol | Dimensions In Millimeters | |
|---|---|---|
| | Min | Max |
| D | 2.900 | 3.100 |
| E | 4.300 | 4.500 |
| b | 0.190 | 0.300 |
| c | 0.090 | 0.200 |
| E1 | 6.250 | 6.550 |
| A | | 1.100 |
| A2 | 0.800 | 1.000 |
| A1 | 0.020 | 0.150 |
| e | 0.65(BSC) | |
| L | 0.500 | 0.700 |
| H | 0.25(TYP) | |
| Θ | 1° | 7° |

## 9.Important Notice

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