



**WANSEMI**  
万芯半导体

**WP8830K**

# **Enhancement Mode N-Channel Power MOSFET**

TSSOP8/NMOS/20V/ $\pm 12$ V/0.8V/10A/10m $\Omega$

Rev1.1

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## 20V, 10mΩ, 10A, N-Channel MOSFET

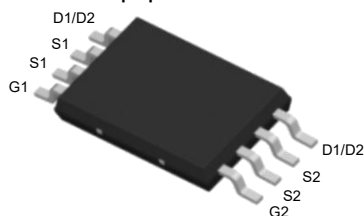
### 1.Features

- ◆ High Power and current handing capability
- ◆ Lead free product is acquired
- ◆ Surface Mount Package

| V <sub>DS</sub> Typ. | R <sub>DS(on)</sub> Typ. | I <sub>D</sub> Max. |
|----------------------|--------------------------|---------------------|
| 20V                  | 10mΩ @ 4.5V              | 10A                 |
|                      | 13.5mΩ @ 2.5V            |                     |

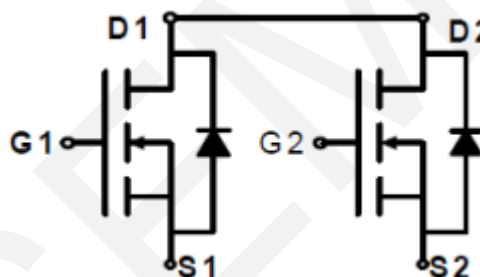
### 2.Applications

- ◆ Battery Protection
- ◆ Battery Powered Systems
- ◆ Power Management in Notebook Computer
- ◆ Portable Equipment



Pin Description

TSSOP8



Schematic Diagram

### 3.Package Marking and Ordering Information

| Part no. | Marking | Package | PCS/Reel | PCS/CTN. |
|----------|---------|---------|----------|----------|
| WP8830K  | 8830    | TSSOP8  | 5,000    | 80,000   |

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

| Parameter                                        | Symbol                            | Maximum     | Units |
|--------------------------------------------------|-----------------------------------|-------------|-------|
| Drain to Source Voltage                          | V <sub>DSS</sub>                  | 20          | V     |
| Gate to Source Voltage                           | V <sub>GSS</sub>                  | ± 12        | V     |
| Drain Current-Continuous                         | I <sub>D</sub>                    | 10          | A     |
| Drain Current (Pulse)                            | I <sub>DM</sub>                   | 40          | A     |
| Maximum Power Dissipation                        | P <sub>D</sub>                    | 1.5         | W     |
| Operating Junction and Storage Temperature Range | T <sub>j</sub> , T <sub>stg</sub> | -55 to +150 | °C    |

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 Resistance Ratings (Note 2)

| Parameter                  | Symbol          | Value | Unit                 |
|----------------------------|-----------------|-------|----------------------|
| Maximum Junction-to-Ambien | $R_{\theta JA}$ | 64    | $^{\circ}\text{C/W}$ |

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

### 6. Electrical Characteristics at $T_a=25^{\circ}\text{C}$ (Note 3)

| Parameter                           | Symbol        | Test Conditions                                                                           | Min. | Typ. | Max.      | Units            |
|-------------------------------------|---------------|-------------------------------------------------------------------------------------------|------|------|-----------|------------------|
| Drain to Source Breakdown Voltage   | $V_{(BR)DSS}$ | $I_D = 250\mu\text{A}$ , $V_{GS} = 0\text{V}$                                             | 20   | -    | -         | V                |
| Zero-Gate Voltage Drain Current     | $I_{DSS}$     | $V_{DS} = 20\text{V}$ , $V_{GS} = 0\text{V}$                                              | -    | -    | 1         | $\mu\text{A}$    |
| Gate-Body Leakage Current           | $I_{GSS}$     | $V_{GS} = \pm 12\text{V}$ , $V_{DS} = 0\text{V}$                                          | -    | -    | $\pm 100$ | nA               |
| Gate Threshold Voltage              | $V_{GS(th)}$  | $V_{DS}=V_{GS}$ , $I_{DS}=250\mu\text{A}$                                                 | 0.5  | 0.8  | 1.2       | V                |
| Drain to Source On-State Resistance | $R_{DS(on)}$  | $I_D = 6\text{A}$ , $V_{GS} = 4.5\text{V}$                                                | -    | 10   | 13        | $\text{m}\Omega$ |
|                                     |               | $I_D = 5\text{A}$ , $V_{GS} = 2.5\text{V}$                                                | -    | 13.5 | 18        | $\text{m}\Omega$ |
| Input Capacitance                   | $C_{iss}$     | $V_{GS}=0\text{V}$ ,<br>$V_{DS}=10\text{V}$ ,<br>Frequency=1.0MHz                         | -    | 290  | -         | pF               |
| Output Capacitance                  | $C_{oss}$     |                                                                                           | -    | 120  | -         | pF               |
| Reverse Transfer Capacitance        | $C_{rss}$     |                                                                                           | -    | 40   | -         | pF               |
| Turn-ON Delay Time                  | $t_{d(on)}$   | $V_{DS} = 10\text{V}$ , $V_{GS} = 5\text{V}$ ,<br>$R_{GEN} = 3\Omega$ , $R_L = 1.7\Omega$ | -    | 280  | -         | ns               |
| Turn-ON Rise Time                   | $t_r$         |                                                                                           | -    | 972  | -         | ns               |
| Turn-OFF Delay Time                 | $t_{d(off)}$  |                                                                                           | -    | 2.4  | -         | ns               |
| Turn-ON Fall Time                   | $t_f$         |                                                                                           | -    | 2.2  | -         | ns               |
| Total Gate Charge                   | $Q_g$         | $V_{DS} = 10\text{V}$ ,<br>$V_{GS} = 4.5\text{V}$ ,<br>$I_D = 6\text{A}$                  | -    | 5.2  | -         | nC               |
| Gate-Source Charge                  | $Q_{gs}$      |                                                                                           | -    | 2    | -         | nC               |
| Gate-Drain Charge                   | $Q_{gd}$      |                                                                                           | -    | 1.9  | -         | nC               |
| Diode Forward Voltage               | $V_{SD}$      | $I_S = 6\text{A}$ , $V_{GS} = 0\text{V}$                                                  | -    | 0.8  | 1.2       | V                |

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

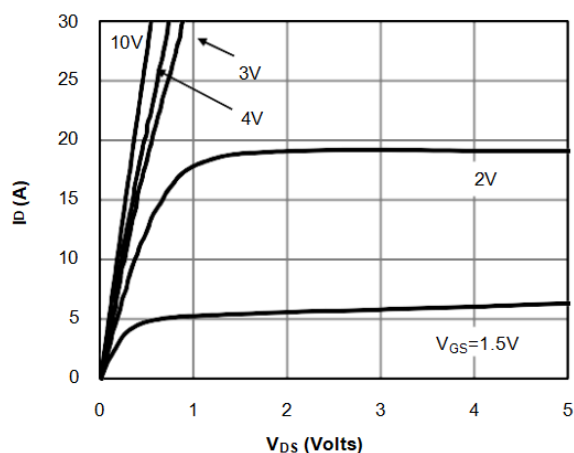


Figure 1 On-Region Characteristics

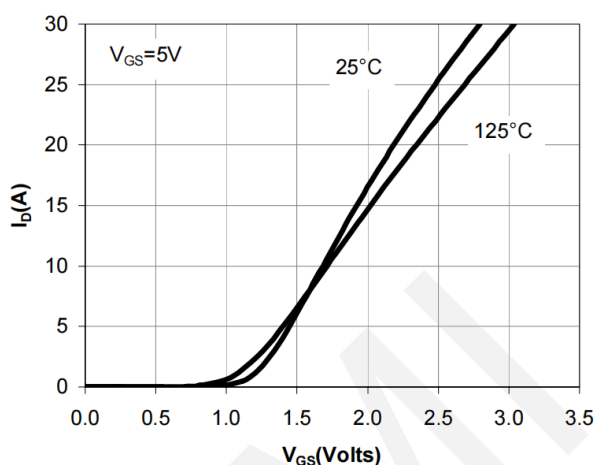


Figure 2 Transfer Characteristics

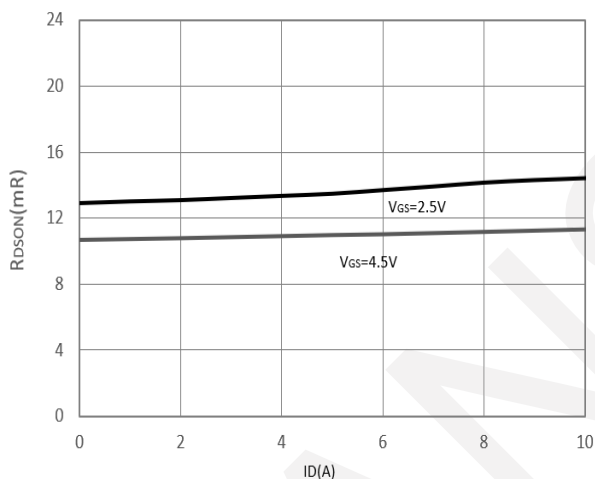


Figure 3 On-Resistance vs. Drain Current and Gate Voltage

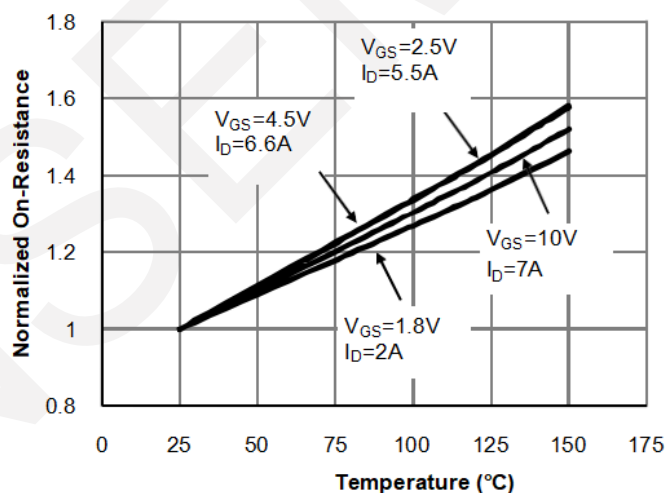


Figure 4 On-Resistance vs. Junction Temperature

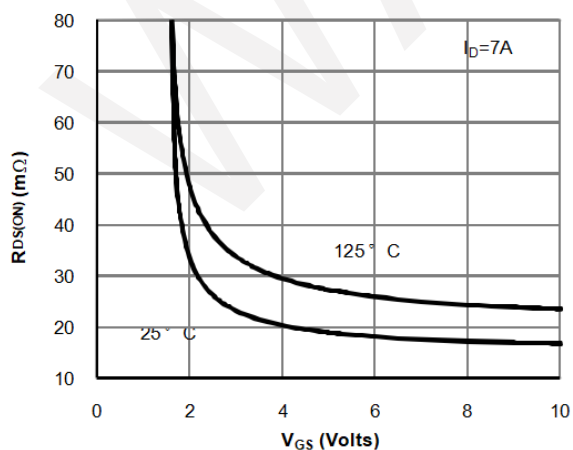


Figure 5 On-Resistance vs. Gate-Source Voltage

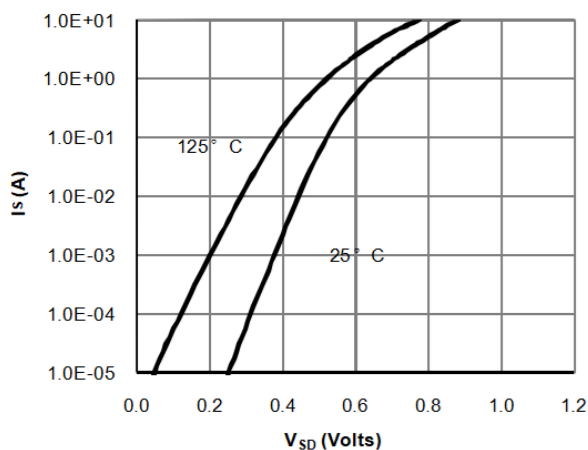


Figure 6 Body-Diode Characteristics

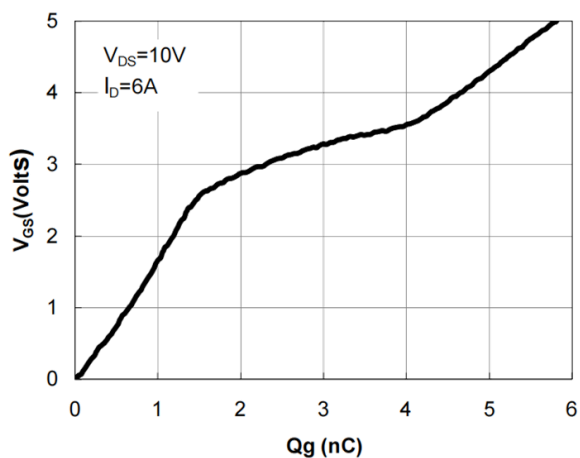


Figure 7 Gate-Charge Characteristics

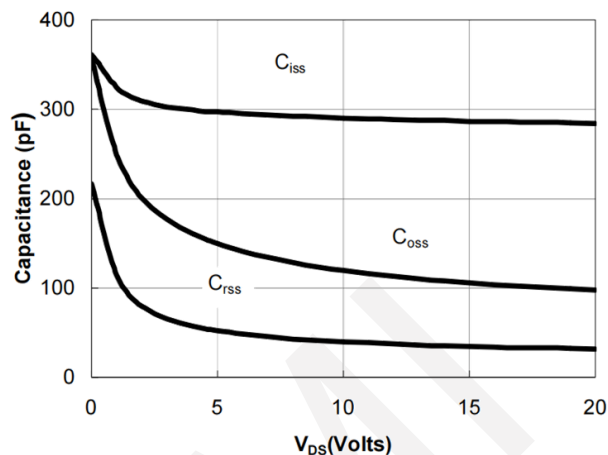


Figure 8 Capacitance Characteristics

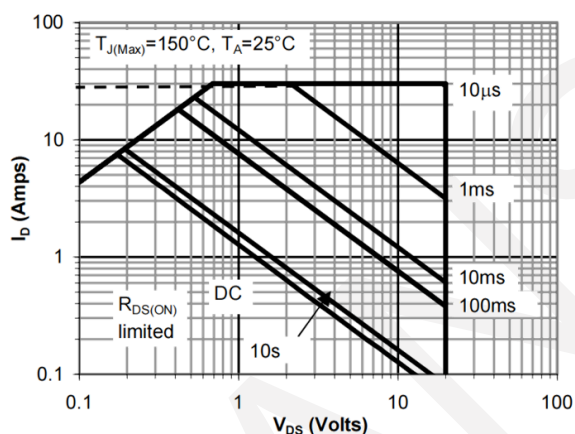


Figure 9 Safe Operating Area

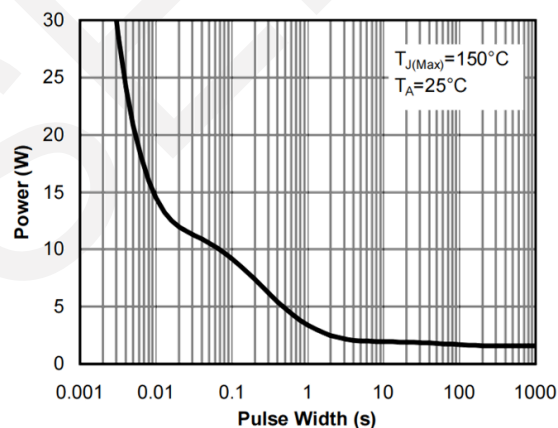


Figure 10 Single Pulse Power Rating Junction-to-Ambient

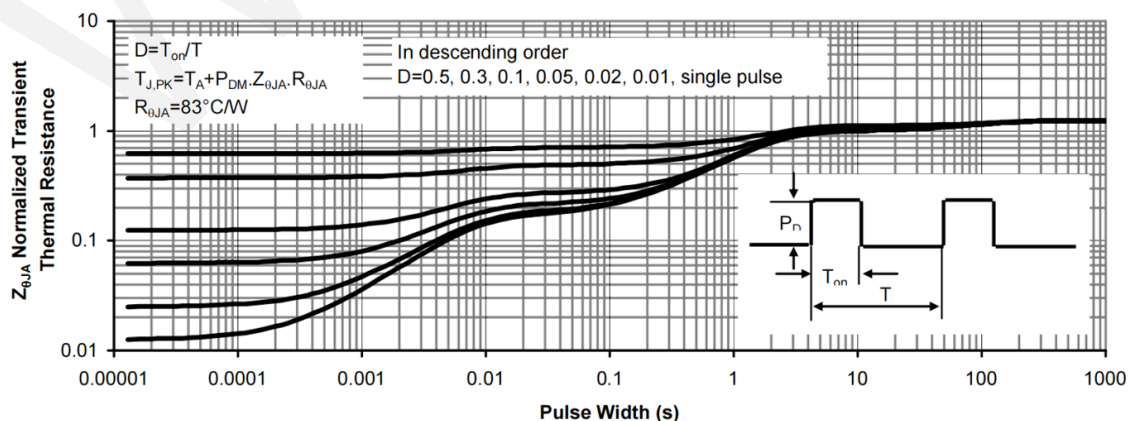
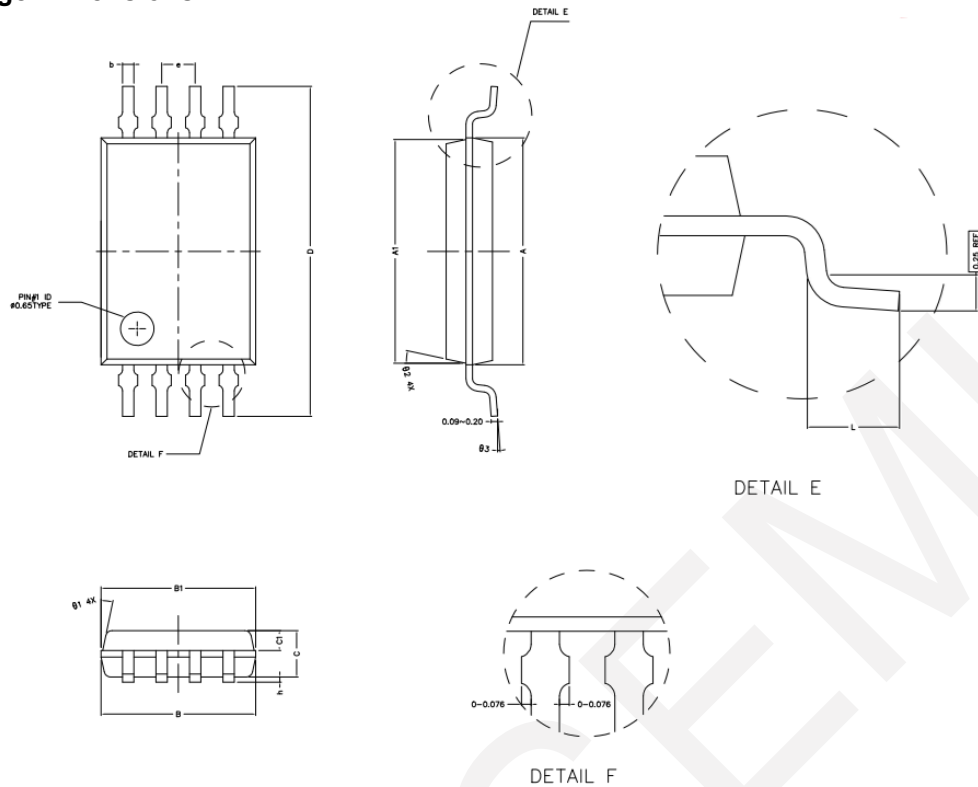


Figure 11 Maximum Transient Thermal Impedance

## 8.Package Dimensions



| COMMON DIMENSIONS<br>(UNITS OF MEASURE IS mm) |           |        |       |
|-----------------------------------------------|-----------|--------|-------|
|                                               | MIN       | NORMAL | MAX   |
| A                                             | 4.300     | 4.400  | 4.500 |
| A1                                            | 4.240     | 4.340  | 4.440 |
| B                                             | 3.050     | 3.150  | 3.250 |
| B1                                            | 2.840     | 2.940  | 3.040 |
| C                                             | 0.850     | 0.900  | 0.950 |
| C1                                            | 0.337     | 0.387  | 0.437 |
| D                                             | 6.250     | 6.400  | 6.550 |
| L                                             | 0.450     | 0.600  | 0.750 |
| b                                             | 0.170     | 0.220  | 0.300 |
| h                                             | 0.050     | 0.100  | 0.150 |
| e                                             | 0.650TYPE |        |       |
| $\theta_1$                                    | 12° TYPE  |        |       |
| $\theta_2$                                    | 12° TYPE  |        |       |
| $\theta_3$                                    | 0° ~ 7°   |        |       |

## **9.Important Notice**

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