

产品特性 Features

- ◆ 先进沟槽工艺技术

◆ 超低栅极电荷

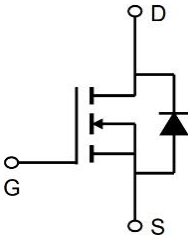
◆ 超低 Ron 高密度单元设计

◆ RoHS 产品
- Advanced Trench Technology

Super Low Gate Charge

High Density Cell Design for Ultra Low Rdson

RoHS Product



应用领域 Applications

- ◆ 负载开关

◆ 脉宽调制器

◆ DC/DC 转换器

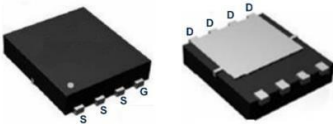
◆ 高频开关
- Load Switching

PWM

DC/DC Converter

High Frequency Switching

关键参数与封装信息 Key Performance and Package Parameters



PDFN3x3

| 产品型号<br>Part No. | 封装<br>Package | 漏极-源极电压<br>Vds | 漏极电流<br>Id | 导通电阻<br>RdS(on) Typ. |
|------------------|---------------|----------------|------------|----------------------|
| XWN305N          | PDFN3x3       | 30V            | 40A        | 5mΩ @VGS=10V         |



## 最大额定值 Maximum Ratings

| 参数<br>Parameter                                                                          | 符号<br>Symbol | 数值<br>Value  | 单位<br>Unit |
|------------------------------------------------------------------------------------------|--------------|--------------|------------|
| 最高漏极-源极直流电压<br>Drain to Source Voltage                                                   | $V_{DS}$     | 30           | V          |
| 最高栅源电压<br>Gate to Source Voltage                                                         | $V_{GS}$     | $\pm 20$     | V          |
| 连续漏极电流<br>Drain Current-Continuous, Limited by $T_{vjmax}$<br>TC = 25°C<br>TC = 100°C    | $I_D$        | 40<br>25     | A          |
| 最大脉冲漏极电流<br>Pulse Drain Current <sup>①</sup><br>$PW \leq 300\mu s, Duty\ Cycle \leq 2\%$ | $I_{Dpuls}$  | 80           | A          |
| 二极管正向电流<br>Diode Forward Current, Limited by $T_{vjmax}$<br>TC = 25°C                    | $I_S/I_{SM}$ | 40/80        | A          |
| 单脉冲雪崩能量<br>Single Pulsed Avalanche Energy <sup>②</sup>                                   | $E_{AS}$     | 42.25        | mJ         |
| 最大耗散功率<br>Maximum Power Dissipation<br>TC = 25°C<br>TC = 100°C                           | $P_D$        | 27.8<br>11.1 | W          |
| 结温<br>Operating Junction Temperature                                                     | $T_J$        | -55...+150   | °C         |
| 存储温度<br>Storage Temperature                                                              | $T_{stg}$    | -55...+150   | °C         |
| 最高焊接温度<br>Maximum Soldering Temperature                                                  |              | 260          | °C         |

① 脉冲宽度由最高结温限制 Pulse width limited by maximum junction temperature

② EAS 测试条件:  $T_J=25^\circ C$ ,  $V_{DD}=25V$ ,  $I_{AR}=13A$ ,  $L=0.5mH$ ,  $R_g=25\Omega$

## 热阻特性 Thermal Resistance

| 参数<br>Parameter                                               | 符号<br>Symbol    | 数值 (最大)<br>Max. Value | 单位<br>Unit |
|---------------------------------------------------------------|-----------------|-----------------------|------------|
| 结到管壳热阻<br>Thermal Resistance Junction to Case                 | $R_{\theta JC}$ | 4.5                   | °C /W      |
| 结到环境热阻<br>Thermal Resistance Junction to Ambient <sup>③</sup> | $R_{\theta JA}$ | 60                    | °C /W      |

③ Device on 40mm x 40mm x 1.5mm epoxy PCB FR4 with 6cm<sup>2</sup> (one layer, 7 $\mu$ m thick) copper area for drain connection.  
PCB is vertical in still air.

## 电气特性 Electrical Characteristics ( $T_J = 25^\circ\text{C}$ unless otherwise noted)

| 项目<br>Parameter                               | 符号<br>Symbol | 测试条件<br>Conditions                                                            | 数值 Value |      |           | 单位<br>Unit |
|-----------------------------------------------|--------------|-------------------------------------------------------------------------------|----------|------|-----------|------------|
|                                               |              |                                                                               | Min.     | Typ. | Max.      |            |
| 漏-源击穿电压<br>Drain to Source Breakdown Voltage  | $BV_{DSS}$   | $V_{GS}=0V, I_D=250\mu A$                                                     | 30       | -    | -         | V          |
| 零栅压下漏极漏电流<br>Zero Gate Voltage Drain Current  | $I_{DSS}$    | $V_{DS}=30V, V_{GS}=0V$<br>$T_J=25^\circ\text{C}$<br>$T_J=150^\circ\text{C}$  | -        | -    | 1<br>100  | $\mu A$    |
| 栅极漏电流<br>Gate to Source Leakage Current       | $I_{GSS}$    | $V_{DS}=0V, V_{GS}=\pm 20V$                                                   | -        | -    | $\pm 100$ | nA         |
| 阈值电压<br>Gate Threshold Voltage                | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=250\mu A$                                                 | 1        | -    | 2.2       | V          |
| 静态导通电阻<br>Drain to Source On-State Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=10A$                                                         | -        | 5    | 6.5       | $m\Omega$  |
|                                               |              | $V_{GS}=4.5V, I_D=5A$                                                         | -        | 7.4  | 10.4      | $m\Omega$  |
| 正向压降<br>Diode Forward Voltage                 | $V_{SD}$     | $I_S=15A, V_{GS}=0V$                                                          | -        | 0.8  | 1.4       | V          |
| 输入电容<br>Input Capacitance                     | $C_{iss}$    | $V_{DS}=15V$<br>$V_{GS}=0V$<br>$f=1MHz$                                       | -        | 900  | -         | pF         |
| 输出电容<br>Output Capacitance                    | $C_{oss}$    |                                                                               | -        | 428  | -         |            |
| 反向传输电容<br>Reverse Transfer Capacitance        | $C_{rss}$    |                                                                               | -        | 28.1 | -         |            |
| 栅极电荷总量<br>Total Gate Charge                   | $Q_g$        | $V_{DS}=15V$<br>$V_{GS}=10V$<br>$I_{DS}=20A$                                  | -        | 12.9 | -         | nC         |
| 栅极-源极电荷<br>Gate to Source Charge              | $Q_{gs}$     |                                                                               | -        | 2.73 | -         |            |
| 栅极-漏极电荷<br>Gate to Drain Charge               | $Q_{gd}$     |                                                                               | -        | 1.41 | -         |            |
| 开启延迟时间<br>Turn-On Delay Time                  | $t_{d(on)}$  | $T_J=25^\circ\text{C}$<br>$V_{DD}=15V, I_D=20A,$<br>$V_{GS}=10V, R_G=3\Omega$ | -        | 9    | -         | ns         |
| 上升时间<br>Rise Time                             | $t_r$        |                                                                               | -        | 11   | -         |            |
| 关断延迟时间<br>Turn-Off Delay Time                 | $t_{d(off)}$ |                                                                               | -        | 30   | -         |            |
| 下降时间<br>Fall Time                             | $t_f$        |                                                                               | -        | 7    | -         |            |
| 反向恢复时间<br>Reverse Recovery Time               | $t_{rr}$     | $I_F=20A, di/dt=100A/\mu s$                                                   | -        | 17   | -         | ns         |
| 反向恢复电荷<br>Reverse Recovery Charge             | $Q_{rr}$     |                                                                               | -        | 3    | -         | nC         |

## 特征曲线 Characteristic Curve

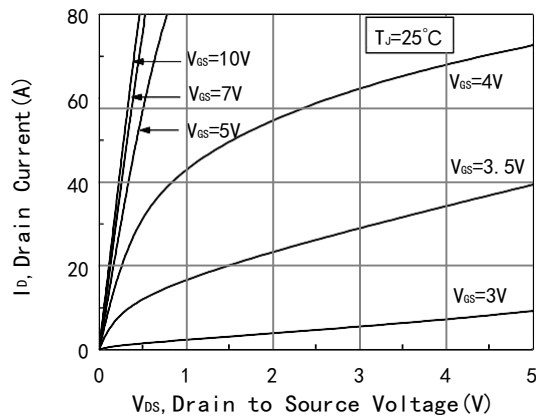


Figure 1. Typical Output Characteristics

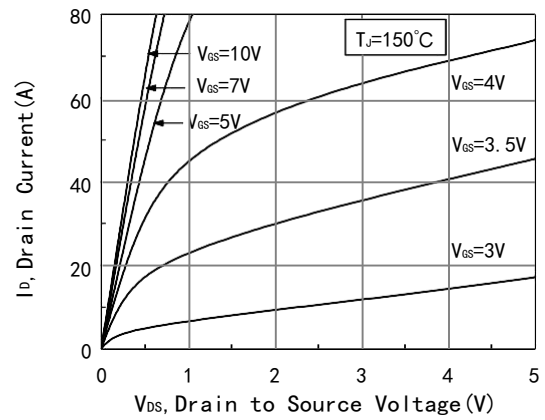


Figure 2. Typical Output Characteristics

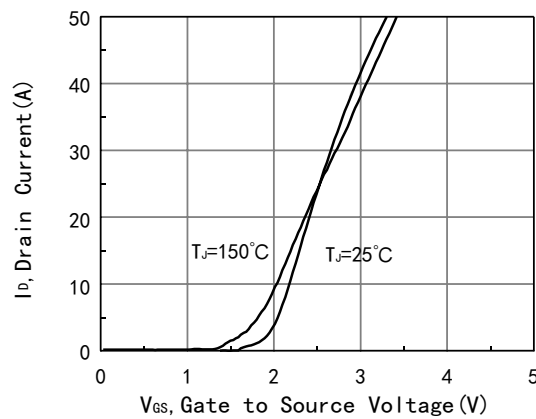


Figure 3. Typical Transfer Characteristics

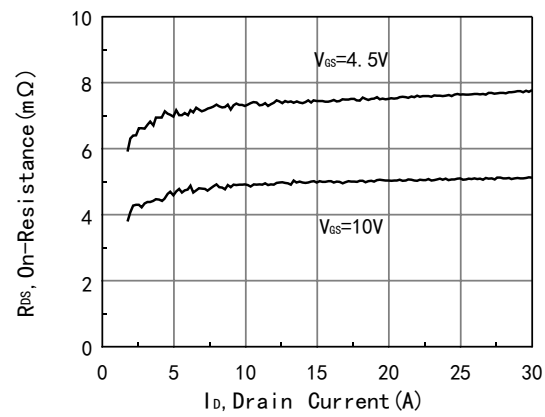


Figure 4.  $R_{DS(on)}$  vs.  $I_D$

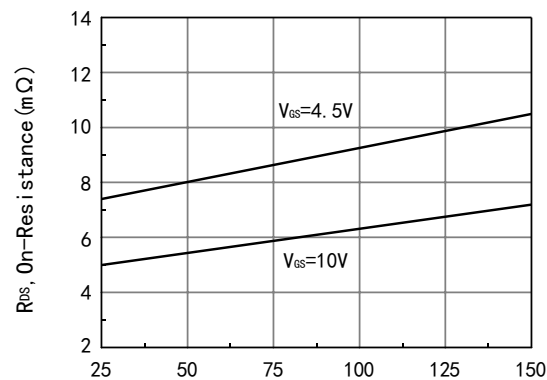


Figure 5.  $R_{DS(on)}$  vs.  $T_J$

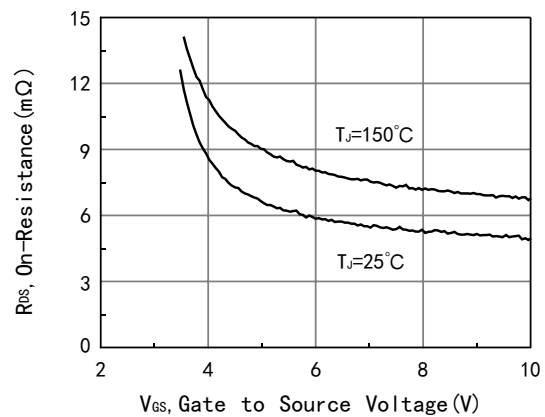


Figure 6.  $R_{DS(on)}$  vs.  $V_{GS}$

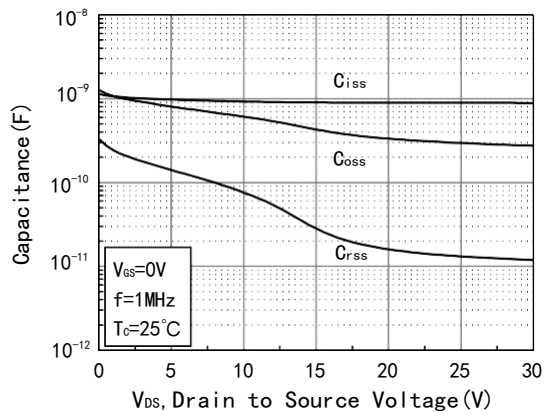


Figure 7. Capacitance vs. Vds

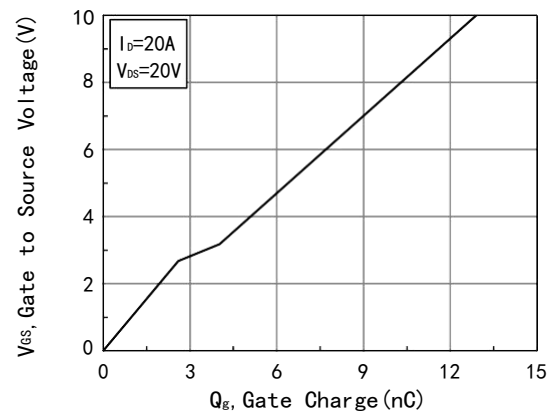


Figure 8. Gate Charge Characteristic

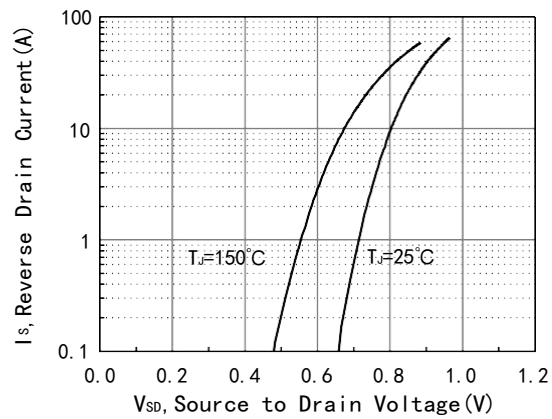


Figure 9. Diode Forward Characteristic

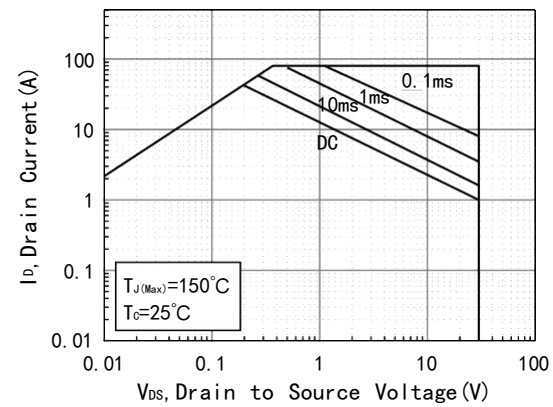


Figure 10. Safe Operating Area

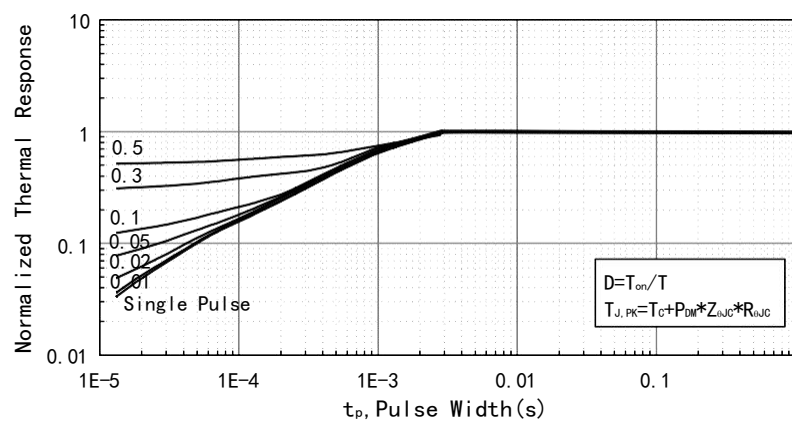
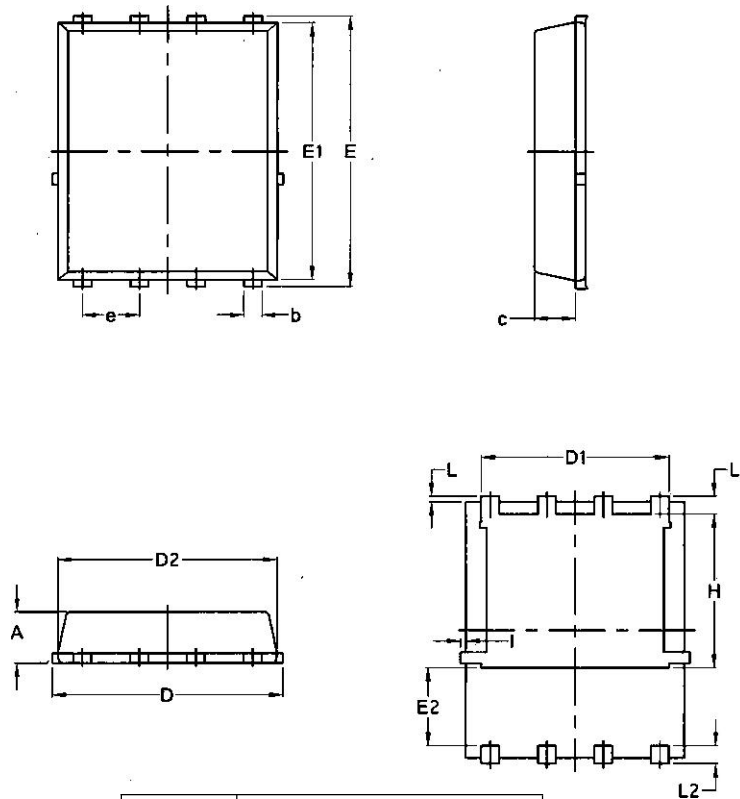


Figure 11. Normalized Maximum Transient Thermal Impedance

## Notes:

Pulse Test: Pulse Width  $\leq 380\mu s$ , Pulse Delay  $\leq 200\mu s$ .

## Package Mechanical Data-PDFN3\*3-Single



| Symbol          | Dimensions (unit: mm) |      |      |
|-----------------|-----------------------|------|------|
|                 | Min                   | Typ  | Max  |
| A               | 0.70                  | 0.75 | 0.80 |
| b               | 0.25                  | 0.30 | 0.35 |
| c               | 0.10                  | 0.15 | 0.25 |
| D               | 3.25                  | 3.35 | 3.45 |
| D1              | 3.00                  | 3.10 | 3.20 |
| D2              | 1.78                  | 1.88 | 1.98 |
| D3              | —                     | 0.13 | —    |
| E               | 3.20                  | 3.30 | 3.40 |
| E1              | 3.00                  | 3.15 | 3.20 |
| E2              | 2.39                  | 2.49 | 2.59 |
| e               | 0.65 BSC              |      |      |
| H               | 0.30                  | 0.39 | 0.50 |
| L               | 0.30                  | 0.40 | 0.50 |
| L1              | —                     | 0.13 | —    |
| K               | 0.30                  | —    | —    |
| θ               | —                     | 10°  | 12°  |
| M               | *                     | *    | 0.15 |
| * Not Specified |                       |      |      |