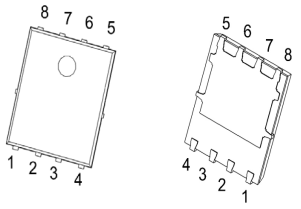
# PDFNWB5x6-8L Plastic-Encapsulate MOSFET

SZCJ

**)4A** P-Channel Power MOSFET

**PDFNWB5x6-8L**




## Key Performance Parameters

| $V_{BR(DSS)}$ | $R_{DS(on)}$TYP | $I_D$ |
|---|---|---|
| -40V | 6.2mΩ@-10V | -90A |
| | 8.1mΩ@-4.5V | |

## DESCRIPTION

The P-Channel enhancement mode power field effect transistors is using advanced trench technology and design to provide excellent RDS(on). It can be used in a wide variety of applications.

## FEATURES

- Good stability and uniformity with high EAS
- High density cell design for ultra low $R_{DS(ON)}$

## APPLICATIONS

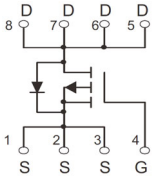
- Backlighting
- Power Management Functions
- DC-DC Converters

## MARKING




XXXXX = 8R5P04A
Solid dot = Pin1 indicator.
YY = Code.

## EQUIVALENT CIRCUIT




**ABSOLUTE MAXIMUM RATINGS ( $T_J$=25℃ unless otherwise specified )**

| Parameter | | Symbol | Value | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | -40 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±25 | V |
| Continuous Drain Current | $T_C$ =25℃ | $I_D$ | -90 | A |
| | $T_C$ =100℃ | | -57 | |
| Pulsed Drain Current | | $I_{DM}$①② | -360 | A |
| Continuous Drain Current | $T_A$ =25℃ | $I_D$ | -11.8 | A |
| | $T_A$ =75℃ | | -9.2 | |
| Avalanche Current | | $I_{AS}$③ | -26 | A |
| Single Pulsed Avalanche Energy | | $E_{AS}$③ | 169 | mJ |
| Power Dissipation | | $P_D$① | 125 | W |
| Operating Junction and Storage Temperature Range | | $T_J$,$T_{stg}$ | -55~+150 | ℃ |

**Thermal Characteristics**

| Parameter | Symbol | Value | | Unit |
|---|---|---|---|---|
| | | Typ | Max | |
| Thermal Resistance from Junction to Case | $R_{\theta JC}$ | 0.65 | 1.0 | ℃/W |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$⑥ | 41 | 62.5 | ℃/W |

# Typical Characteristics

## ELECTRICAL CHARACTERISTICS ($T_J$=25℃ unless otherwise specified)

### Static Characteristics

| Parameter | Symbol | Test Condition | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | | Min | Typ | Max | |
| Drain-source breakdown voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=-250μA | | -40 | - | - | V |
| Zero gate voltage drain current | $I_{DSS}$ | $V_{DS}$=-40V, $V_{GS}$=0V | $T_J$=25℃ | - | - | -1.0 | μA |
| | | | $T_J$=125℃ | - | - | -100 | |
| Gate-body leakage current | $I_{GSS}$ | $V_{GS}$=±25V, $V_{DS}$=0V | | - | - | ±100 | nA |
| Gate-threshold voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$, $I_D$=-250μA | | -1.0 | -1.6 | -2.5 | V |
| Static drain-source on-sate resistance | $R_{DS(on)}$④ | $V_{GS}$=-10V, $I_D$=-20A | $T_J$=25℃ | - | 6.2 | 8.3 | mΩ |
| | | | $T_J$=125℃ | - | 9.7 | 13.0 | |
| | | $V_{GS}$=-4.5V, $I_D$=-15A | | - | 8.1 | 11.0 | |
| Forward transconductance | $g_{FS}$ | $V_{DS}$=-5V, $I_D$=-20A | | - | 75 | - | S |

### Dynamic Characteristics⑤

| | | | | | | |
|---|---|---|---|---|---|---|
| Input capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=-20V, f=1MHz | - | 3053 | - | pF |
| Output capacitance | $C_{oss}$ | | - | 344 | - | |
| Reverse transfer capacitance | $C_{rss}$ | | - | 255 | - | |
| Gate resistance | $R_g$ | f=1MHz | - | 14 | - | Ω |
| Total gate charge | $Q_g$ | $V_{GS}$=-4.5V, $V_{DS}$=-20V, $I_D$=-10A | - | 31.2 | - | nC |
| Gate charge at threshold | $Q_{G(th)}$ | | - | 5.4 | - | |
| Gate-source charge | $Q_{gs}$ | | - | 8.3 | - | |
| Gate-drain charge | $Q_{gd}$ | | - | 12.2 | - | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=-20V, $V_{GS}$=-4.5V, $I_D$=-10A, $R_g$=1Ω | - | 15 | - | ns |
| Turn-on rise time | $t_r$ | | - | 90 | - | |
| Turn-off delay time | $t_{d(off)}$ | | - | 105 | - | |
| Turn-off fall time | $t_f$ | | - | 85 | - | |

### Reverse Diode Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| Drain-source diode forward voltage | $V_{SD}$④ | $V_{GS}$=0V, $I_S$=-10A | - | - | -1.2 | V |
| Continuous drain-source diode forward current | $I_S$① | | - | - | -90 | A |
| Pulsed drain-source diode forward current | $I_{SM}$①② | | - | - | -360 | A |
| Reverse recovery time | $t_{rr}$ | $V_{DD}$=-20V, $I_S$=-10A, di/dt=-500A/μs | - | 34 | - | ns |
| Reverse recovery charge | $Q_{rr}$ | | - | 84 | - | nC |

Notes:

①.$T_C$=25℃ Limited only by maximum temperature allowed.

②.$P_W$ ≤10μs, Duty cycle ≤1%.

③.EAS condition: $V_{DD}$=-20V, $V_{GS}$=-10V, L=0.5mH, $R_g$=25Ω Starting $T_J$=25℃.

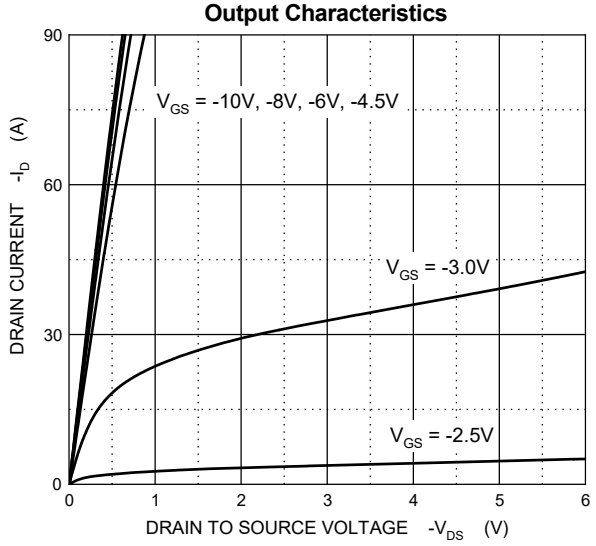
④.Pulse Test : Pulse Width ≤380μs, duty cycle ≤2%.

⑤.Guaranteed by design, not subject to production.

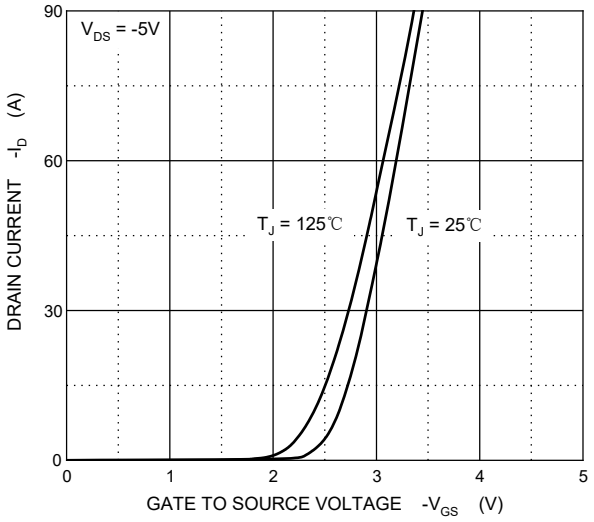
⑥.Device mounted on 1 $in^2$ FR-4 board with 2oz. double-sided Copper, in a still air environment with $T_A$=25℃.

# Typical Characteristics

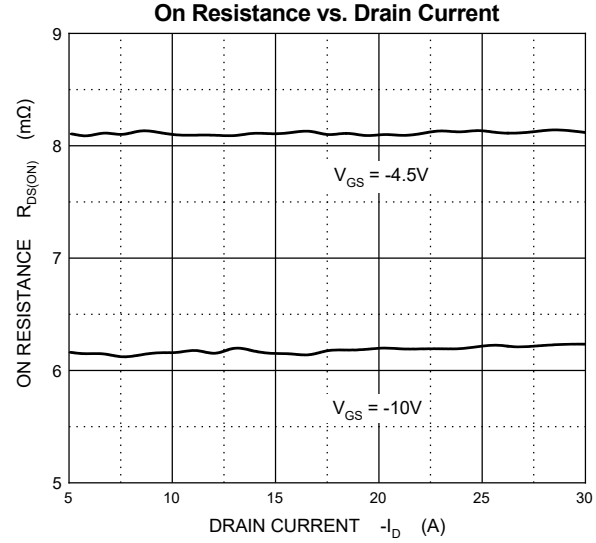
**Output Characteristics**



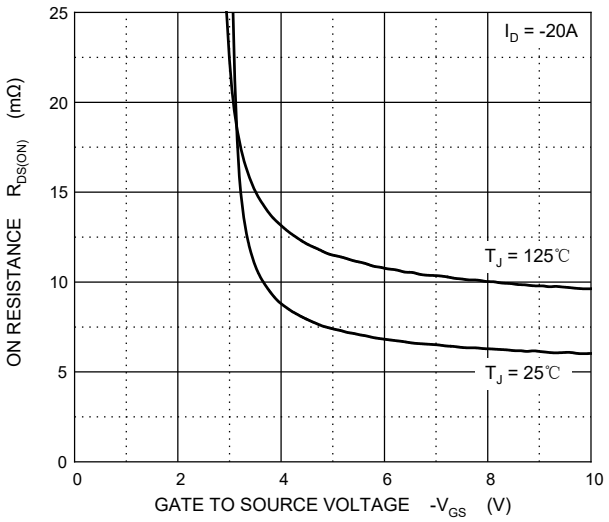

**Transfer Characteristics**



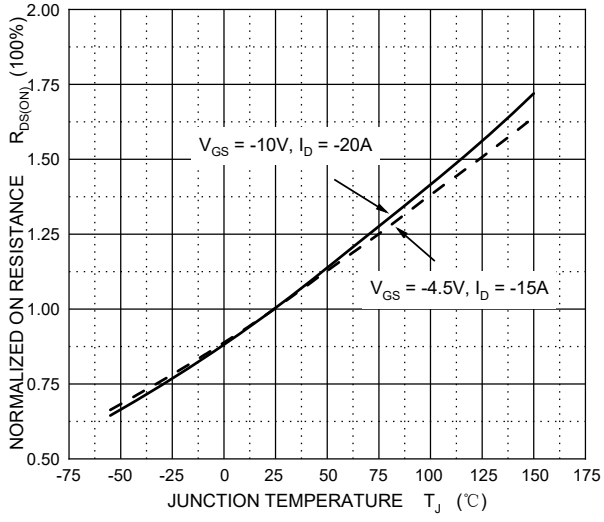

**On Resistance vs. Drain Current**



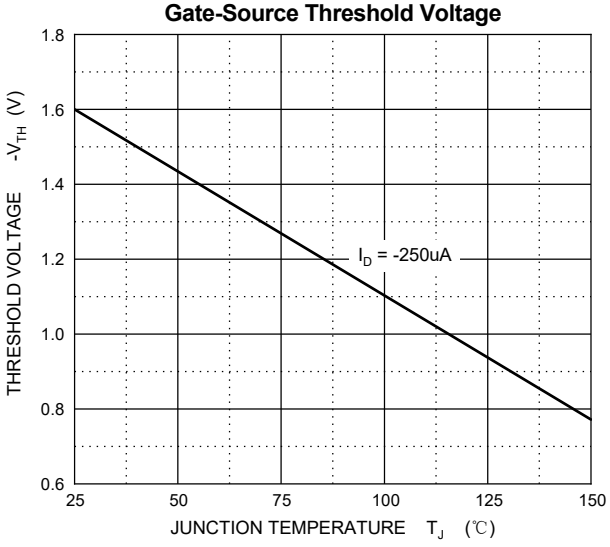

**On Resistance vs. Gate-Source Bias**




**On Resistance vs. Junction Temperature**

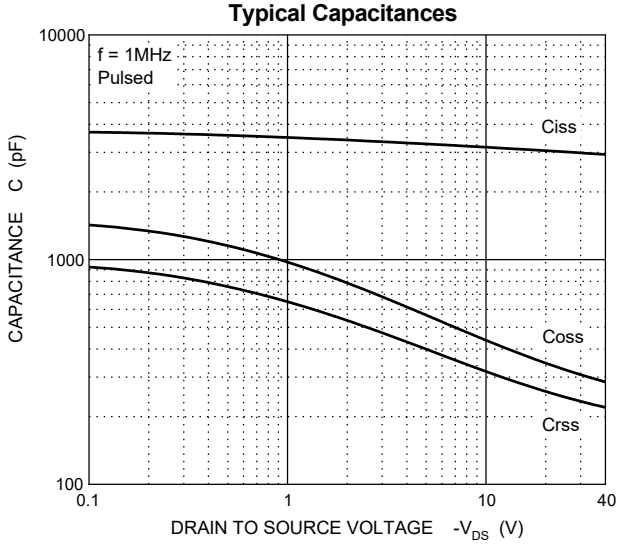



**Gate-Source Threshold Voltage**

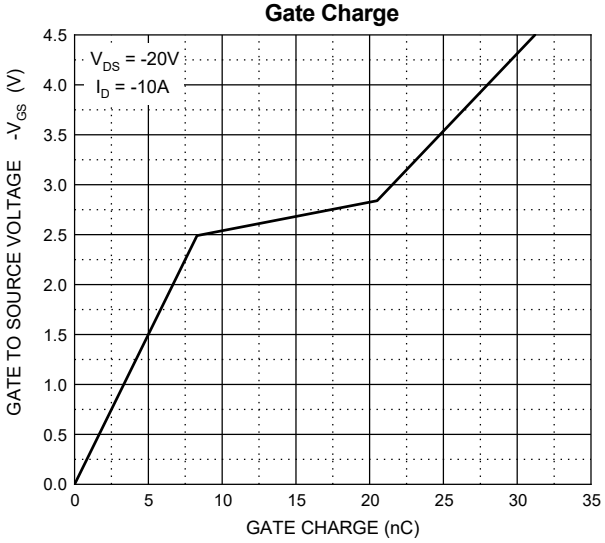


# Typical Characteristics

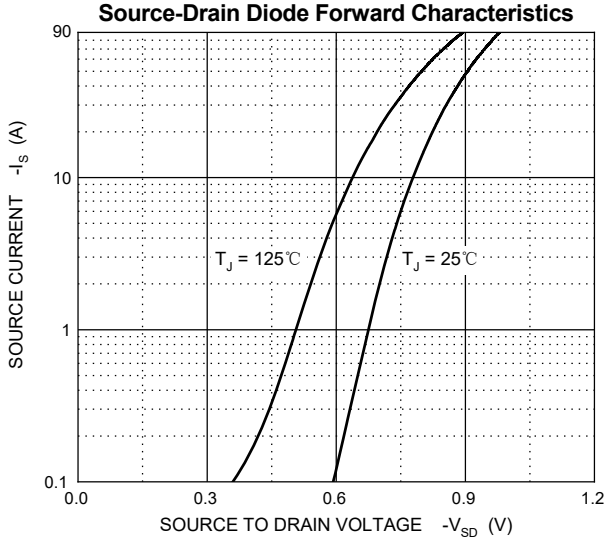
**Typical Capacitances**



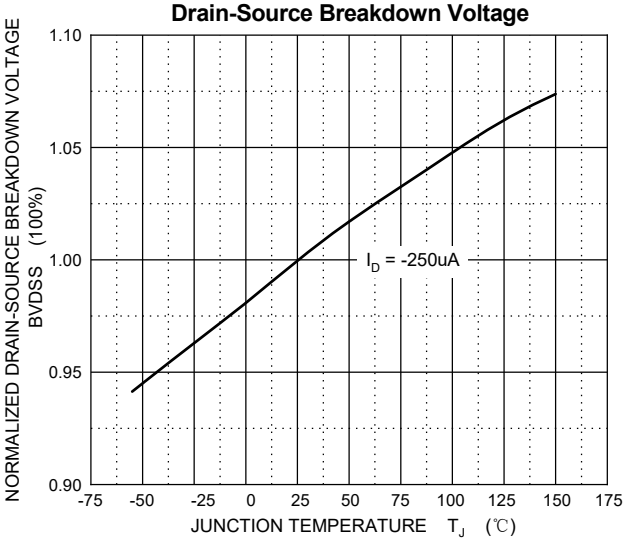

**Gate Charge**



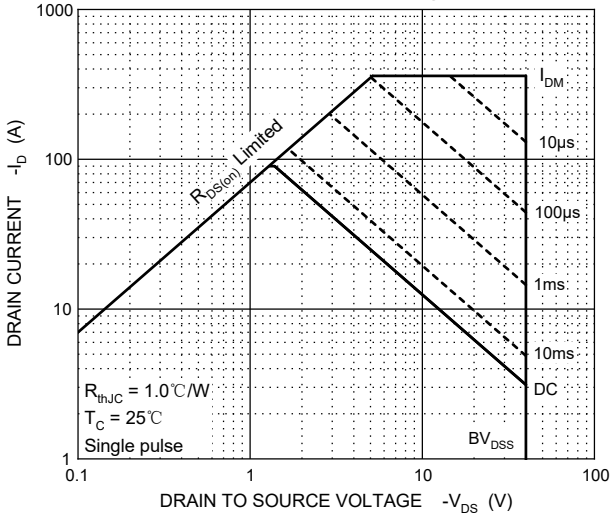

**Source-Drain Diode Forward Characteristics**



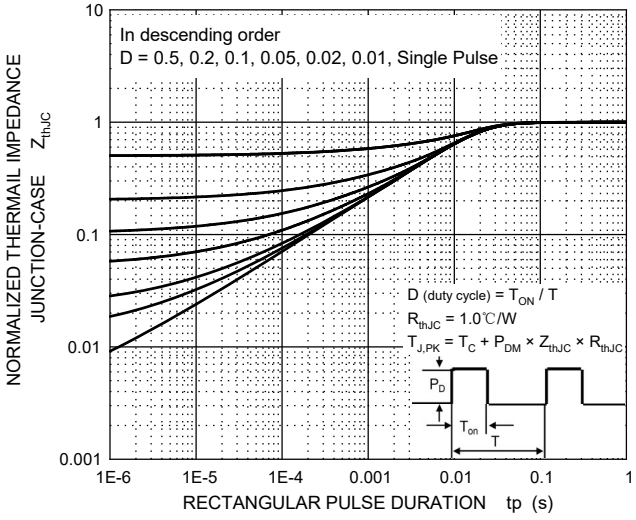

**Drain-Source Breakdown Voltage**




**Maximum Safe Operating Area**

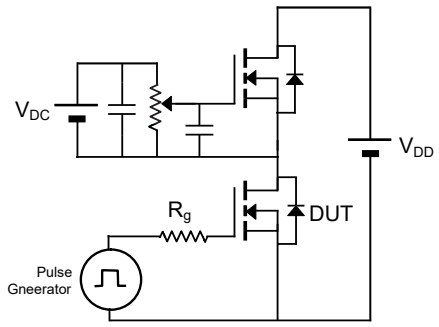


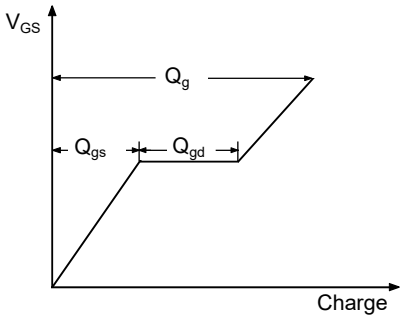

**Transient Thermal Impedance, Junction-Case**



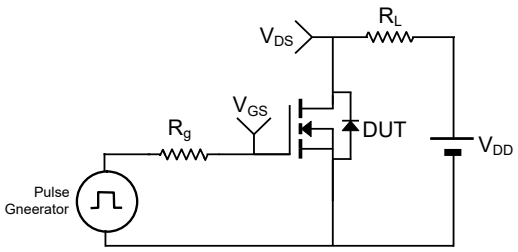
# TEST CIRCUIT AND WAVEFOMRS

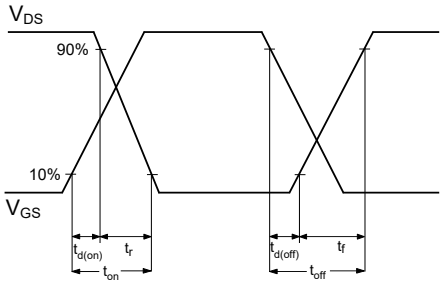
## Gate Charge



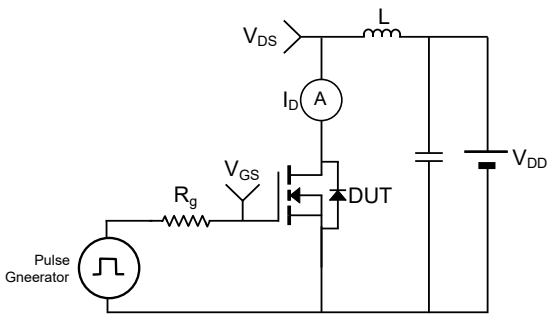



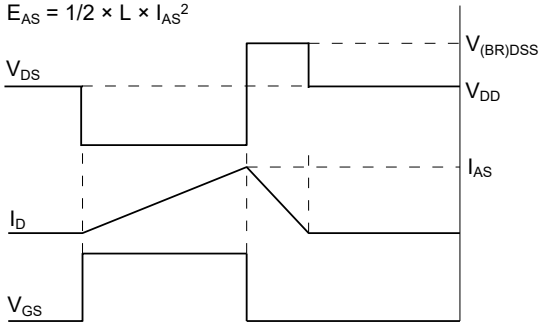

## Resistive Load Switching Time



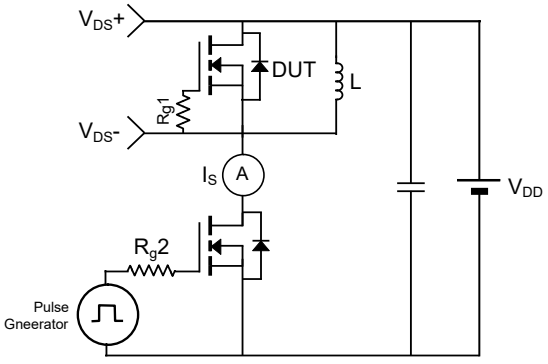



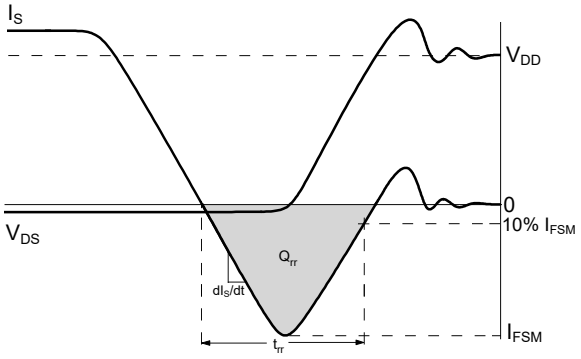

## Un-clamped Inductive Load Switching



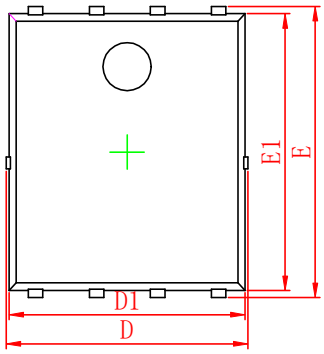




## Drain-Source Body Diode Reverse Recovery

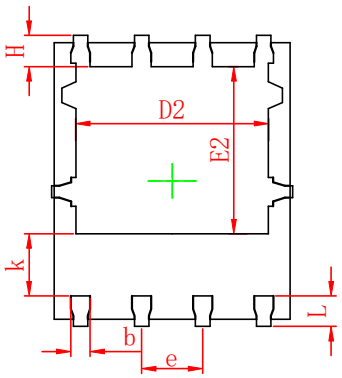


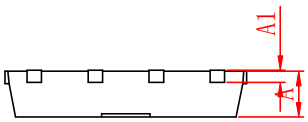
## PDFNWB5×6-8L PACKAGE OUTLINE DIMENSIONS




Top View
[顶视图]




Bottom View
[背视图]

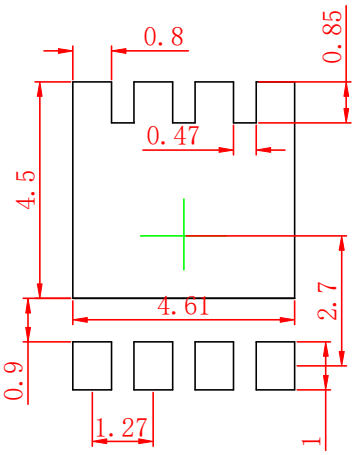



Side View
[侧视图]

| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 0.90 | 1.10 | 0.035 | 0.043 |
| A1 | 0.25 REF. | | 0.010 REF. | |
| D4.90 | | 5.10 | 0.193 0.201 | |
| D14.80 | | 5.00 | 0.189 0.197 | |
| D23.90 | | 4.10 | 0.154 0.161 | |
| E | 5.90 | 6.10 | 0.232 | 0.240 |
| E15.65 | | 5.85 | 0.222 0.230 | |
| E23.35 | | 3.65 | 0.132 0.144 | |
| k1.20 | | 1.50 | 0.047 0.059 | |
| b0.20 | | 0.45 | 0.008 0.018 | |
| e | 1.27 BSC | | 0.050 BSC | |
| L0.55 | | 0.75 | 0.022 0.030 | |
| H0.45 | | 0.75 | 0.018 0.030 | |

Notes：
1 Dimensions exclusive of mold gate burrs.
2 Dimensions exclusive of mold flash and cutting burrs.

## PDFNWB5×6-8L Suggested Pad Layout

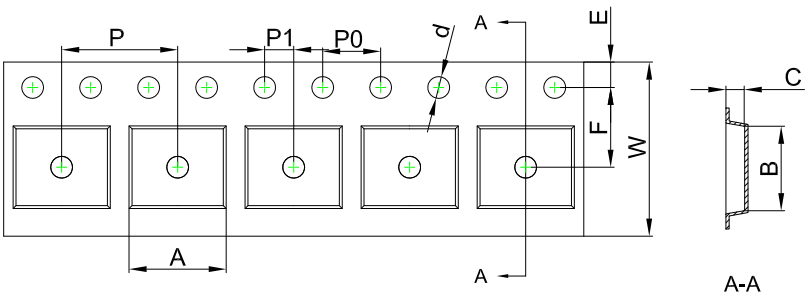



Notes：
1 Controlling dimension：in millimeters.
2 General tolerance:±0.05mm.
3 The pad layout is for referance purpose only.

NOTICE
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# PDFNWB5×6 Tape and Reel

## PDFNWB5×6-8L Embossed Carrier Tape

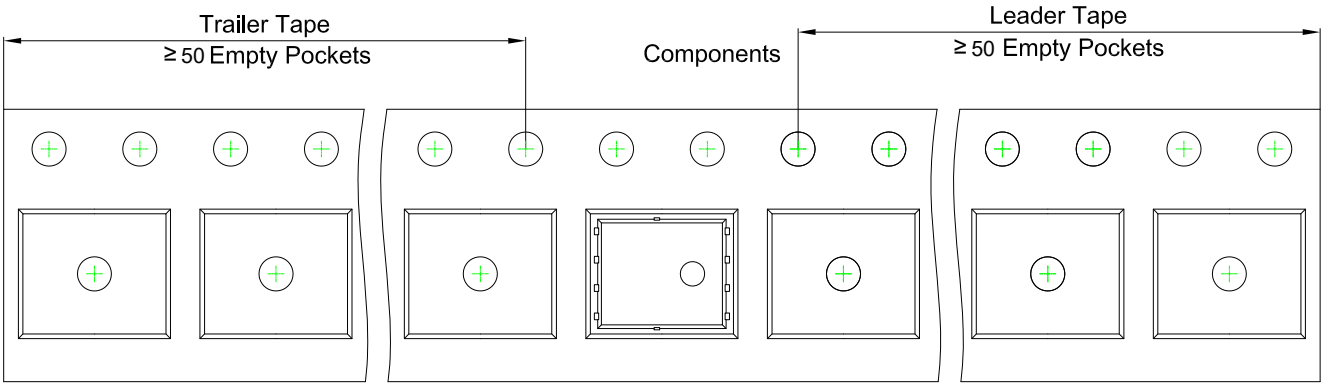



Packaging Description:

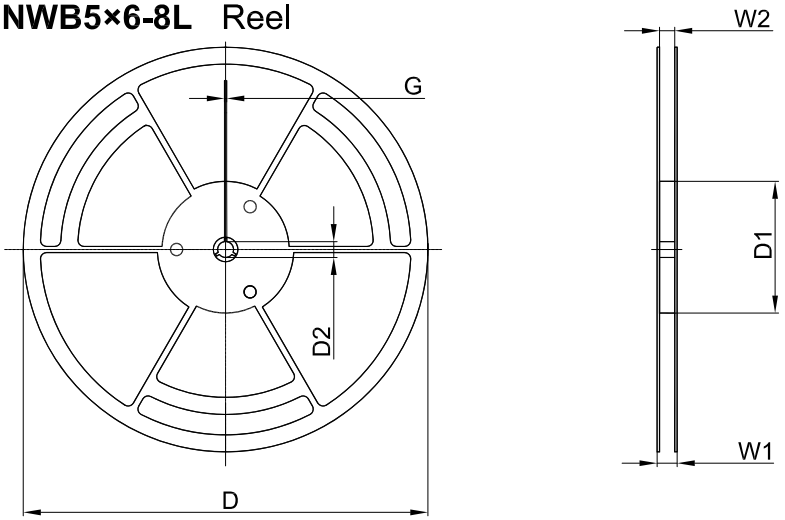
**PDFNWB5×6-8L** parts are shipped in tape. The carrier tape is made from a dissipative (carbon filled) polycarbonate resin. The cover tape is a multilayer film (Heat Activated Adhesive in nature) primarily composed of polyester film, adhesive layer, sealant, and anti-static sprayed agent. These reeled parts in standard option are shipped with 5,000 units per 13" or 33.0 cm diameter reel. The reels are clear in color and is made of polystyrene plastic (anti-static coated).

| Dimensions are in millimeter | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Pkg type | A | B | C | d | E | F | P0 | P | P1 | W |
| **PDFNWB5×6-8L** | 6.30 | 5.30 | 1.10 | Ø1.50 | 1.75 | 5.50 | 4.00 | 8.00 | 2.00 | 12.00 |

## PDFNWB5×6-8L Tape Leader and Trailer




## PDFNWB5×6-8L Reel




| Dimensions are in millimeter | | | | | | |
|---|---|---|---|---|---|---|
| **Reel Option** | **D** | **D1** | **D2** | **G** | **W1** | **W2** |
| 13" Dia | φ330.00 | 100.00 | 13.00 | 1.90 | 17.60 | 12.40 |

| **Reel** | **Reel Size** | **Box** | **Box Size (mm)** | **Carton** | **Carton Size (mm)** |
|---|---|---|---|---|---|
| 5,000 pcs | 13 inch | 10,000 pcs | 360×360×65 | 50,000 pcs | 378×358×382 |