

## 30V P-Channel Enhancement Mode MOSFET

### Description

The PECN30P03D6 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ . This device is suitable for use as a load switch or in PWM applications.

### General Features

- ◆  $V_{DS} = -30V$   $I_D = -30A$   
 $R_{DS(ON)}(Typ.) = 9.5m\Omega$  @  $V_{GS} = -10V$   
 $R_{DS(ON)}(Typ.) = 13m\Omega$  @  $V_{GS} = -4.5V$
- ◆ High power and current handing capability
- ◆ Lead free product is acquired
- ◆ Surface mount package
- ◆ 150 °C operating temperature
- ◆ 100% UIS tested

### Application

- ◆ PWM applications
- ◆ Load switch
- ◆ Uninterruptible power supply

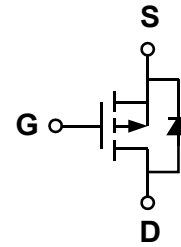
### Package

- ◆ PDFN5\*6-8L-A

*100% UIS TESTED!*

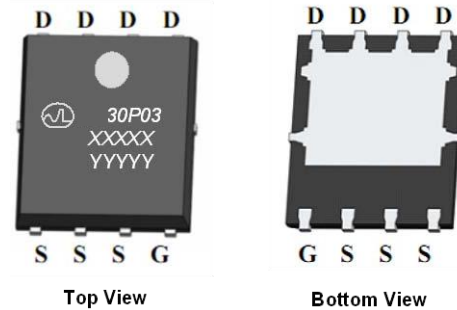
*100%  $\Delta V_{ds}$  TESTED!*

### Schematic diagram



### Marking and pin assignment

PDFN5\*6-8L-A



XXXXX—Wafer Information YYYYY—  
Quality Code

### Ordering Information

| Part Number       | Storage Temperature | Package      | Devices Per Reel |
|-------------------|---------------------|--------------|------------------|
| PECN30P03D<br>6-G | -55°C to +150°C     | PDFN5*6-8L-A | 5000             |

### Absolute Maximum Ratings (TA=25°C unless otherwise noted)

| parameter  | symbol   | limit   | unit |
|--|----------|---------|------|
| Drain-source voltage   | $V_{DS}$ | -30     | V    |
| Gate-source voltage  | $V_{GS}$ | ±20     | V    |
| Continuous Drain Current   | $I_D$    | TC=25°C | 30   |
|  |          | TC=70°C | 24   |
| Pulsed Drain Current   | $I_{DP}$ | 120     | A    |
| Avalanche energy( $T_J=25^\circ C$ , $V_{DD}=30V$ , $V_G=10V$ , $L=0.5mH$ , $R_g=25\Omega$ ) | $E_{AS}$ | 45      | mJ   |
| Power Dissipation  | $P_D$    | TC=25°C | 31   |
|  |          | TC=70°C | 15   |
| Operating junction Temperature range   | $T_J$    | -55—150 | °C   |

## Electrical Characteristics (TA=25°C unless otherwise noted)

| Parameter                                     | Symbol       | Condition  | Min  | Typ  | Max       | Unit       |
|---|--------------|--|------|------|-----------|------------|
| <b>Static Characteristics</b>                 |              |  |      |      |           |            |
| Drain-source breakdown voltage                | $BV_{DSS}$   | $V_{GS}=0V, I_D=-250\mu A$   | -30  | -    | -         | V          |
| Zero gate voltage drain current               | $I_{DSS}$    | $V_{DS}=-30V, V_{GS}=0V$   | -    | -    | 1         | $\mu A$    |
|   |              | $T_J=85^\circ C$   | -    | -    | 10        |            |
| Gate Leakage Current                          | $I_{GSS}$    | $V_{DS}=0V, V_{GS}=\pm 20V$  | -    | -    | $\pm 100$ | nA         |
| Gate threshold voltage                        | $V_{GS(th)}$ | $V_{DS}=V_{GS}, I_D=-250\mu A$                                       | -1.0 | -1.4 | -2.0      | V          |
| Drain-source on-state resistance <sup>1</sup> | $R_{DS(ON)}$ | $V_{GS}=-10V, I_D=-30A$  | -    | 9.5  | 13        | m $\Omega$ |
|   |              | $V_{GS}=-4.5V, I_D=-20A$   | -    | 13   | 16        |            |
| On Status Drain Current                       | $I_{D(ON)}$  | $V_{DS}=-15V, V_{GS}=-10V$   | 25   | -    | -         | A          |
| <b>Diode Characteristics</b>                  |              |  |      |      |           |            |
| Diode Forward Voltage <sup>1</sup>            | $V_{SD}$     | $I_{SD}=-20A, V_{GS}=0V$   | -    | -0.8 | -1.3      | V          |
| Diode Continuous Forward Current              | $I_S$        |  | -    | -30  | -         | A          |
| Reverse Recovery Time                         | $t_{rr}$     | $I_F=-30A,$<br>$di/dt=-100A/\mu s$                                   | -    | 24   | -         | ns         |
| Reverse Recovery Charge                       | $Q_{rr}$     |  | -    | 16   | -         | nC         |
| <b>Dynamic Characteristics<sup>2</sup></b>    |              |  |      |      |           |            |
| Gate Resistance                               | $R_G$        | $V_{GS}=0V, V_{DS}=0V, f=1MHz$                                       | -    | 0.65 | -         | $\Omega$   |
| Input capacitance                             | $C_{ISS}$    | $V_{GS}=0V, V_{DS}=-15V$<br>$f=1.0MHz$                               | -    | 2000 | -         | pF         |
| Output capacitance                            | $C_{OSS}$    |  | -    | 370  | -         |            |
| Reverse transfer capacitance                  | $C_{RSS}$    |  | -    | 295  | -         |            |
| Turn-on delay time                            | $t_{D(ON)}$  | $V_{GS}=-10V, V_{DD}=-30V,$<br>$R_L=3\Omega, I_D=30A, R_G=2.5\Omega$ | -    | 11   | -         | ns         |
| Turn-on Rise time                             | $t_r$        |  | -    | 9.4  | -         |            |
| Turn-off delay time                           | $t_{D(OFF)}$ |  | -    | 24   | -         |            |
| Turn-off Fall time                            | $t_f$        |  | -    | 12   | -         |            |
| Total gate charge                             | $Q_g$        | $V_{GS}=-10V, I_D=-30A$<br>$V_{DS}=-15V$                             | -    | 30   | -         | nC         |
| Gate-source charge                            | $Q_{gs}$     |  | -    | 4.6  | -         |            |
| Gate-drain charge                             | $Q_{gd}$     |  | -    | 10   | -         |            |

## Thermal Characteristics

| Parameter                                | Symbol       | Typ | Max | Unit         |
|--|--------------|-----|-----|--------------|
| Maximum Junction-to-Ambient <sup>A</sup> | $\leq 10s$   | 29  | 34  | $^\circ C/W$ |
| Maximum Junction-to-Ambient <sup>A</sup> | Steady-State |     |     |              |
| Maximum Junction-to-Lead <sup>B</sup>    | Steady-State | 3.2 | 4   |              |

A: The value of  $R_{qJA}$  is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with  $T_A=25^\circ C$ . The value in any given application depends on the user's specific board design. The current rating is based on the  $t \leq 10s$  thermal resistance rating.

B: The  $R_{qJA}$  is the sum of the thermal impedance from junction to lead  $R_{qJL}$  and lead to ambient.

## Typical Performance Characteristics

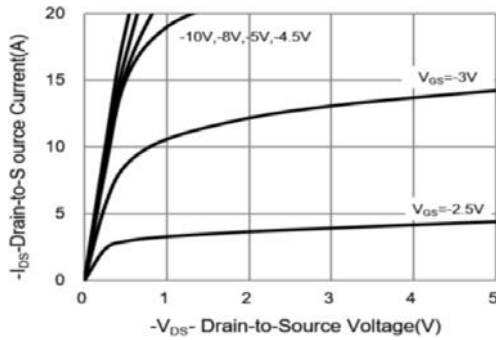


Figure 1: On-Region Characteristics

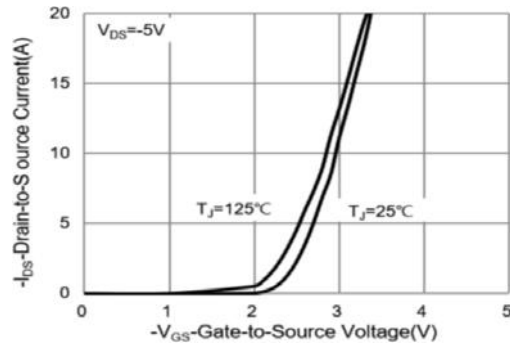


Figure 2: Transfer Characteristics

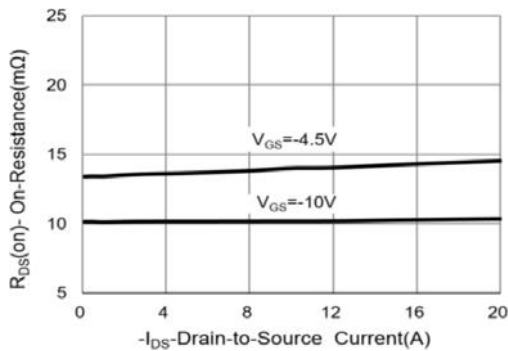


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

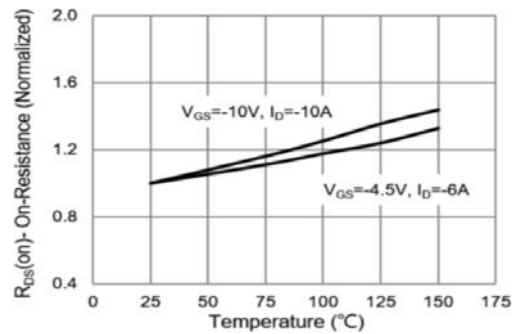


Figure 4: On-Resistance vs. Junction Temperature

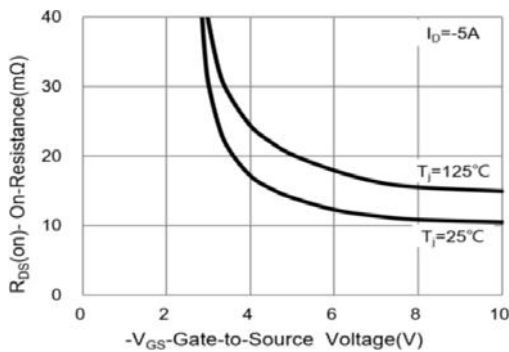


Figure 5: On-Resistance vs. Gate-Source Voltage

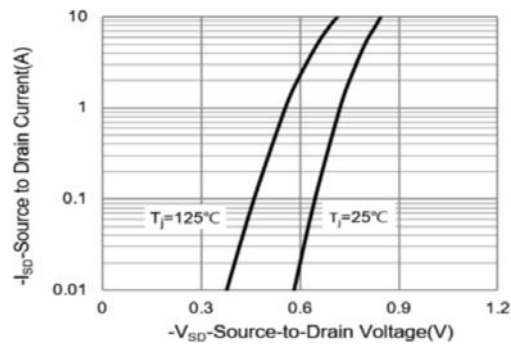
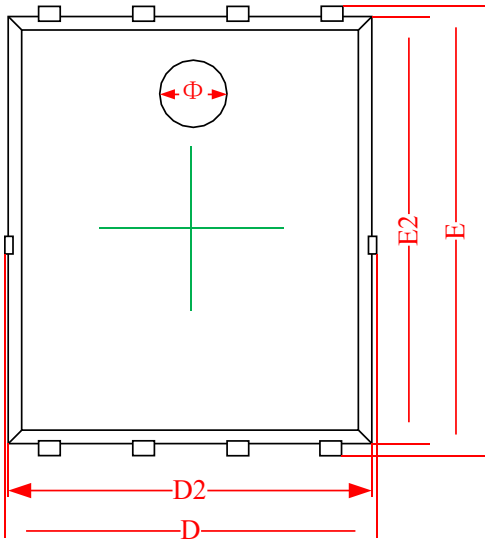


Figure 6: Body-Diode Characteristics

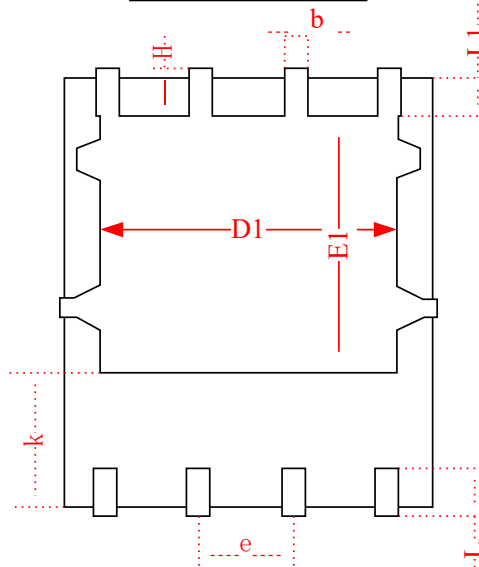
## Package Information

- PDFN5\*6-8L-A

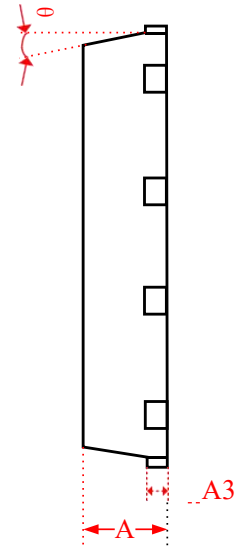
**Top View**



**Bottom View**



**Side View**



| SYMBOLS | DIMENSIONS IN MILLIMETERS |       |       | DIMENSIONS IN INCHES |       |       |
|---------|---------------------------|-------|-------|----------------------|-------|-------|
|         | MIN                       | NOM   | MAX   | MIN                  | NOM   | MAX   |
| A       | 0.870                     | 0.900 | 0.930 | 0.034                | 0.035 | 0.036 |
| A3      | 0.152REF.                 |       |       | 0.006REF.            |       |       |
| D       | 4.944                     | 5.020 | 5.096 | 0.195                | 0.198 | 0.201 |
| E       | 5.974                     | 6.050 | 6.126 | 0.235                | 0.238 | 0.241 |
| D1      | 3.910                     | 4.010 | 4.110 | 0.154                | 0.158 | 0.162 |
| E1      | 3.375                     | 3.475 | 3.575 | 0.133                | 0.137 | 0.141 |
| D2      | 4.870                     | 4.900 | 4.930 | 0.192                | 0.193 | 0.194 |
| E2      | 5.720                     | 5.750 | 5.780 | 0.226                | 0.227 | 0.228 |
| k       | 1.190                     | 1.290 | 1.390 | 0.047                | 0.051 | 0.055 |
| b       | 0.350                     | 0.380 | 0.410 | 0.014                | 0.015 | 0.016 |
| e       | 1.270TYP.                 |       |       | 0.050TYP.            |       |       |
| L       | 0.559                     | 0.635 | 0.711 | 0.022                | 0.025 | 0.028 |
| L1      | 0.424                     | 0.500 | 0.576 | 0.017                | 0.020 | 0.023 |
| H       | 0.574                     | 0.650 | 0.726 | 0.023                | 0.026 | 0.029 |
| θ       | 10°                       | 11°   | 12°   | 10°                  | 11°   | 12°   |
| Φ       | 1.150                     | 1.200 | 1.250 | 0.045                | 0.047 | 0.049 |