# PJM50P40DN
## P-Channel Enhancement Mode Power MOSFET

### Product Summary

- $V_{DS}$= -40V,$I_D$= -50A
- $R_{DS(on)}$< 11.5mΩ @$V_{GS}$= -10V
- $R_{DS(on)}$< 17.5mΩ @$V_{GS}$= -4.5V

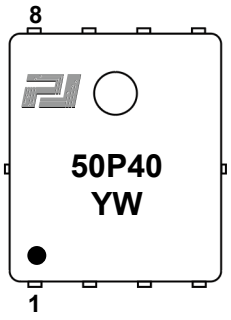
### Features

- Advanced Trench Technology
- 100% Avalanche Tested
- RoHS Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3

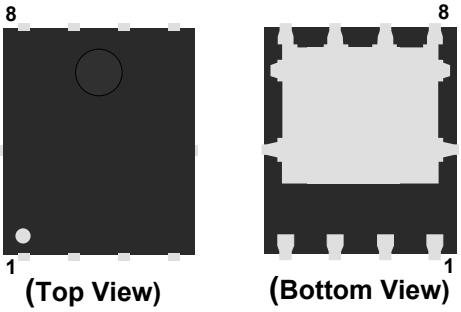
### Application

- Battery Protection
- Load Switch
- Uninterruptible power supply

### Marking Code

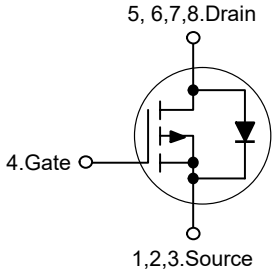



### PDFN5x6-8L




| Pin | Description |
|---|---|
| 1,2,3 | Source |
| 4 | Gate |
| 5,6,7,8 | Drain |

### Schematic Diagram




### Absolute Maximum Ratings

Ratings at 25℃ case temperature unless otherwise specified.

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $-V_{DS}$ | 40 | V |
| Gate-Source Voltage | $V_{GS}$ | ±20 | V |
| Drain Current-Continuous | $-I_D$ | 50 | A |
| Drain Current-Pulsed Note1 | $-I_{DM}$ | 160 | A |
| Maximum Power Dissipation | $P_D$ | 52 | W |
| Single Pulse Avalanche Energy Note2 | $E_{AS}$ | 90 | mJ |
| Junction Temperature | $T_J$ | 150 | °C |
| Storage Temperature Range | $T_{STG}$ | -55 to +150 | °C |

### Thermal Characteristics

| | | | |
|---|---|---|---|
| Thermal Resistance, Junction-to-Case | $R_{\theta JC}$ | 2.4 | °C/W |

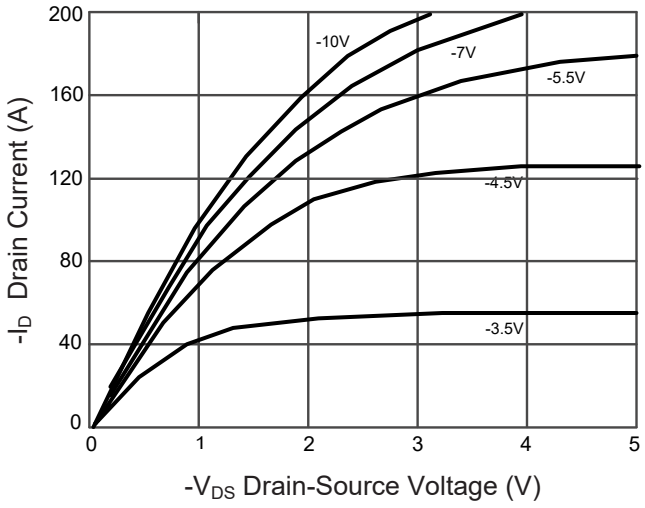
## Electrical Characteristics

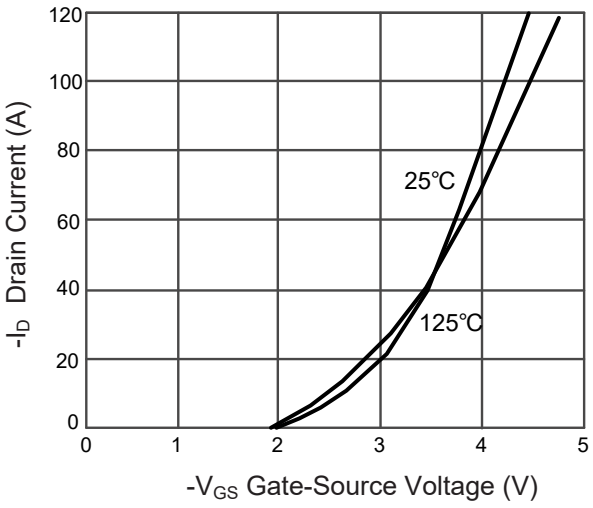
($T_J$=25℃ unless otherwise specified)

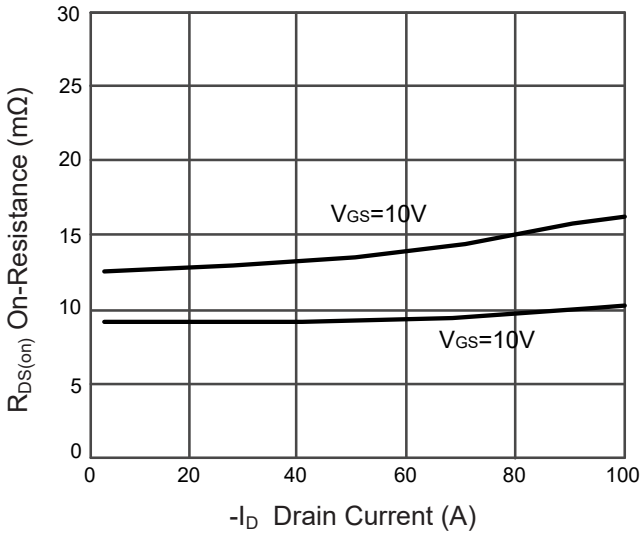
| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $-V_{(BR)DSS}$ | $V_{GS}$=0V,$I_D$=-250μA | 40 | -- | -- | V |
| Zero Gate Voltage Drain Current | $-I_{DSS}$ | $V_{DS}$=-40V,$V_{GS}$=0V | -- | -- | 1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V,$V_{DS}$=0V | -- | -- | ±100 | nA |
| Gate Threshold Voltage Note3 | $-V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=-250μA | 1 | 1.6 | 2.5 | V |
| Drain-Source On-Resistance Note3 | $R_{DS(on)}$ | $V_{GS}$=-10V,$I_D$=-20A | -- | -- | 11.5 | mΩ |
| | | $V_{GS}$=-4.5V,$I_D$=-20A | -- | -- | 17.5 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$=-20V,$V_{GS}$=0V,f=1MHz | -- | 1997 | -- | pF |
| Output Capacitance | $C_{oss}$ | | -- | 258 | -- | pF |
| Reverse Transfer Capacitance | $C_{rss}$ | | -- | 205 | -- | pF |
| Total Gate Charge | $Q_g$ | $V_{DS}$=-20V,$I_D$=-10A , $V_{GS}$=-10V | -- | 35 | -- | nC |
| Gate-Source Charge | $Q_{gs}$ | | -- | 6.2 | -- | nC |
| Gate-Drain Charge | $Q_{gd}$ | | -- | 7.3 | -- | nC |
| **Switching Characteristics** | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=-20V, $I_D$=-10A, $V_{GS}$=-10V, $R_{GEN}$=2.5Ω | -- | 10 | -- | nS |
| Turn-on Rise Time | $t_r$ | | -- | 20 | -- | nS |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 51 | -- | nS |
| Turn-off Fall Time | $t_f$ | | -- | 28 | -- | nS |
| **Source-Drain Diode Characteristics** | | | | | | |
| Diode Forward Voltage Note3 | $-V_{SD}$ | $V_{GS}$=0V,$I_S$=-10A | -- | -- | 1.2 | V |
| Diode Forward Current | $-I_S$ | | -- | -- | 50 | A |

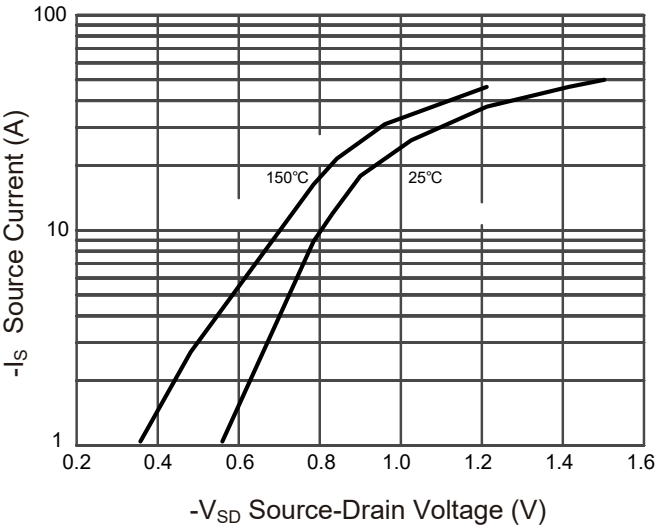
Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. $E_{AS}$ Condition: $T_J$=25℃,$V_{DD}$=-20V,$V_G$=-10V,$R_G$=25Ω,L=0.5mH,$I_{AS}$=-19A.
3. Pulse Test: Pulse width≤300μs, duty cycle≤2%.

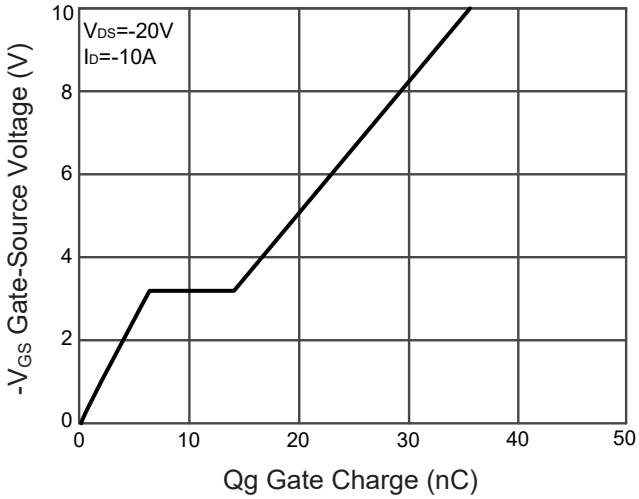
## Typical Characteristic Curves

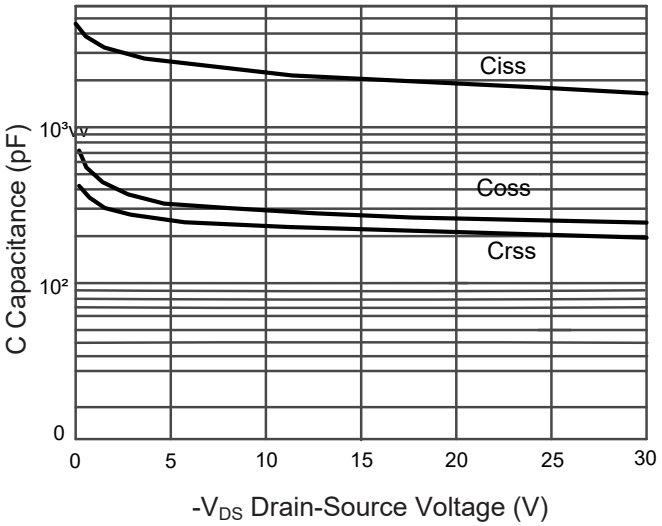


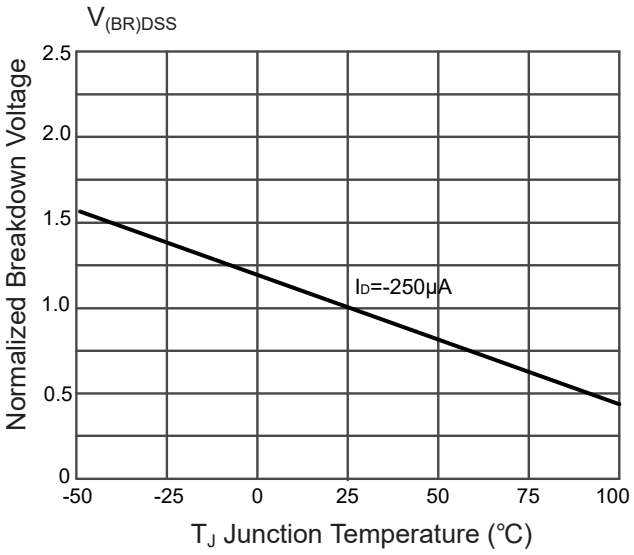



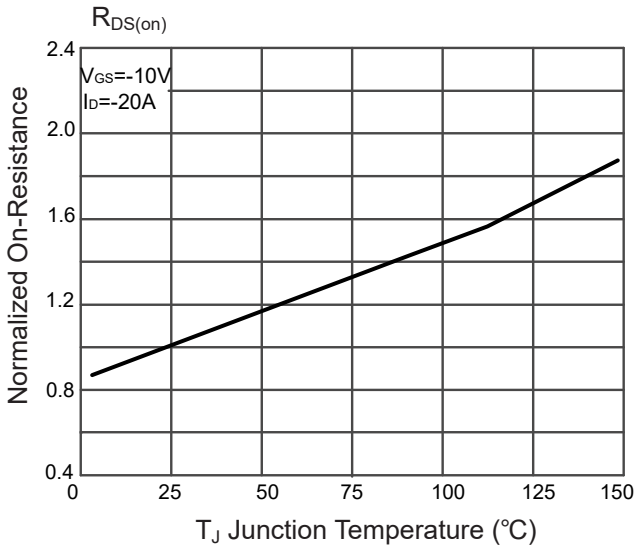



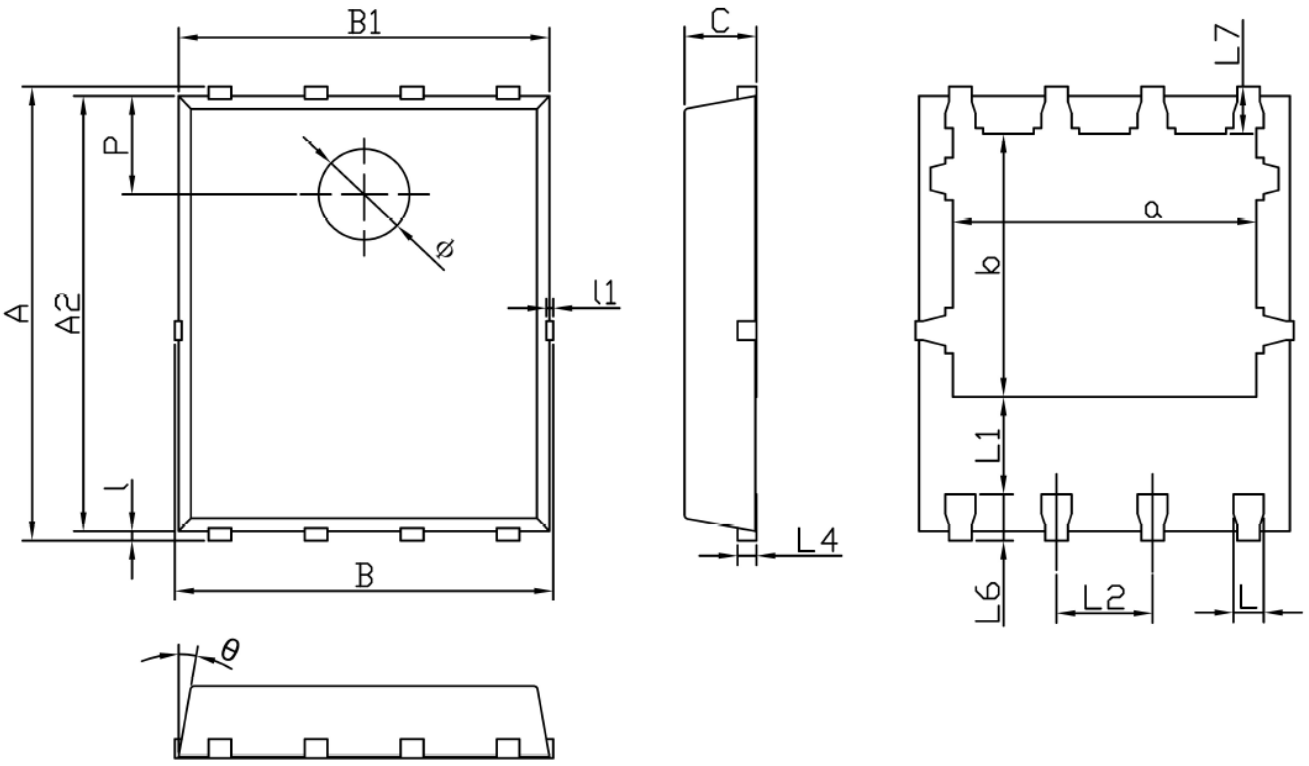




V(BR)DSS
Normalized Breakdown Voltage
2.5
2.0
1.5
1.0
0.5
0
-50
-25
0
25
50
75
100
ID=-250μA
TJ Junction Temperature (℃)


RDS(on)
Normalized On-Resistance
2.4
2.0
1.6
1.2
0.8
0.4
0
25
50
75
100
125
150
VGS=-10V
ID=-20A
TJ Junction Temperature (℃)

## Package Outline

PDFN5x6-8L
Dimensions in mm




| Symbol | Dimensions | | Symbol | Dimensions | |
|---|---|---|---|---|---|
| | Min. | Max. | | Min. | Max. |
| A | 5.90 | 6.10 | L1 | 1.10 | - |
| a | 3.91 | 4.11 | l1 | - | 0.10 |
| A2 | 5.70 | 5.80 | L2 | 1.17 | 1.37 |
| B | 4.90 | 5.10 | L4 | 0.21 | 0.34 |
| b | 3.375 | 3.575 | L6 | 0.51 | 0.71 |
| B1 | 4.80 | 5.00 | L7 | 0.51 | 0.71 |
| C | 0.90 | 1.00 | P | 1.15 | 1.45 |
| L | 0.30 | 0.50 | θ | 8° | 12° |
| l | 0.06 | 0.20 | Φ | 1.10 | 1.30 |