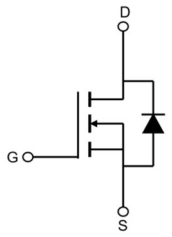
**N-Channel Power MOSFET**

## Features

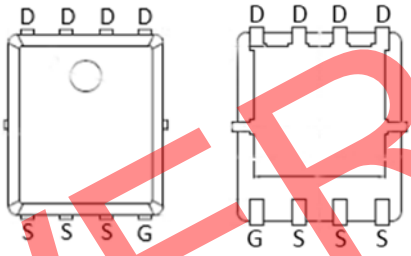
- 40V,80A
  $R_{DS(ON)}$<5.5mΩ @ $V_{GS}$ = 10V
  $R_{DS(ON)}$<10mΩ @ $V_{GS}$ = 4.5V
- Lead free and Green Device Available
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquiredcc




Schematic Diagram

## Application

- Load Switch
- PWM Application
- Power management




PDFN5X6-8L

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## Absolute Maximum Ratings ($T_C$=25℃ unless otherwise specified)

| Symbol | Parameter | | Max. | Units |
|---|---|---|---|---|
| $V_{DSS}$ | Drain-Source Voltage | | 40 | V |
| $V_{GSS}$ | Gate-Source Voltage | | ±20 | V |
| $I_D$ | Continuous Drain Current | $T_C$ = 25℃ | 80 | A |
| | | $T_C$ = 100℃ | 52 | A |
| $I_{DM}$ | Pulsed Drain Current note1 | | 320 | A |
| $E_{AS}$ | Single Pulsed Avalanche Energy note2 | | 104 | mJ |
| $P_D$ | Power Dissipation | $T_C$ = 25℃ | 77 | W |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | | 3.0 | ℃/W |
| $T_J$, $T_{STG}$ | Operating and Storage Temperature Range | | -55 to +175 | ℃ |

## Electrical Characteristics ($T_J$=25℃ unless otherwise specified)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|---|
| **Off Characteristic** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V,$I_D$=250μA | 40 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$ =40V, $V_{GS}$ = 0V, | - | - | 1.0 | μA |
| $I_{GSS}$ | Gate to Body Leakage Current | $V_{DS}$ =0V,$V_{GS}$ = ±20V | - | - | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$= $V_{GS}$, $I_D$=250μA | 1.0 | 1.5 | 2.5 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance note3 | $V_{GS}$ =10V, $I_D$ =30A | - | 4.2 | 5.5 | mΩ |
| | | $V_{GS}$ =4.5V, $I_D$ =20A | - | 6.5 | 10 | |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$ = 20V, $V_{GS}$ =0V, f = 1.0MHz | - | 3042 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 386 | - | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 232 | - | pF |
| $Q_g$ | Total Gate Charge | $V_{DS}$ =20V, $I_D$ =30A, $V_{GS}$ =10V | - | 57 | - | nC |
| $Q_{gs}$ | Gate-Source Charge | | - | 9 | - | nC |
| $Q_{gd}$ | Gate-Drain(“Miller”) Charge | | - | 11 | - | nC |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD}$=20V, $I_D$ =30A, $R_L$=1Ω, $R_{GEN}$=3Ω, $V_{GS}$ =10V | - | 8 | - | ns |
| $t_r$ | Turn-on Rise Time | | - | 18 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 24 | - | ns |
| $t_f$ | Turn-off Fall Time | | - | 14 | - | ns |
| **Drain-Source Diode Characteristics and Maximum Ratings** | | | | | | |
| $I_S$ | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 80 | A |
| $I_{SM}$ | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 320 | A |
| $V_{SD}$ | Drain to Source Diode Forward Voltage | $V_{GS}$ =0V, $I_S$=30A | - | - | 1.2 | V |
| $t_{rr}$ | Body Diode Reverse Recovery Time | $T_J$=25℃, $I_F$=20A,dI/dt=100A/μs | - | 22 | - | ns |
| $Q_{rr}$ | Body Diode Reverse Recovery Charge | | - | 11 | - | nC |

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: $T_J$=25℃, $V_{DD}$=20V, $R_G$=25Ω， L=0.5mH, $I_{AS}$=20.4A

3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%

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**Figure1:** Output Characteristics

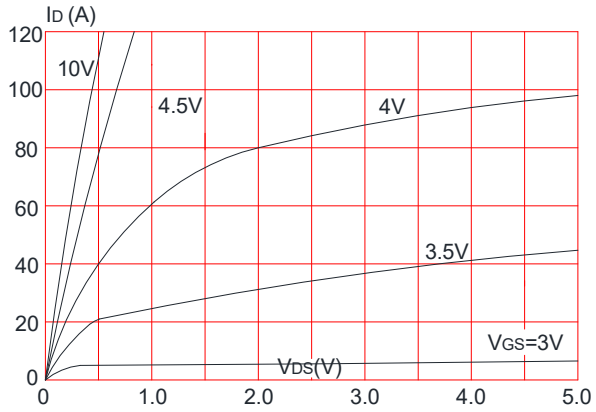



**Figure 2:** Typical Transfer Characteristics

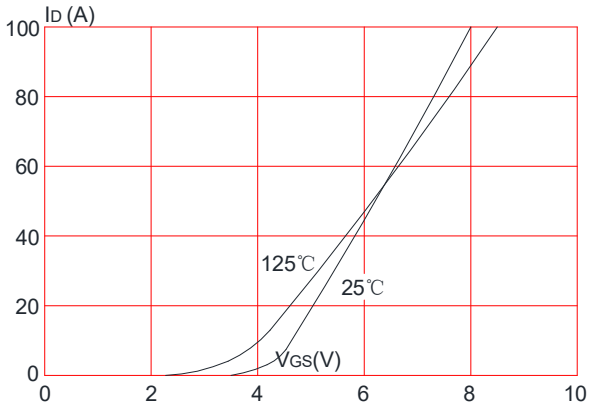



**Figure 3:**On-resistance vs. Drain Current

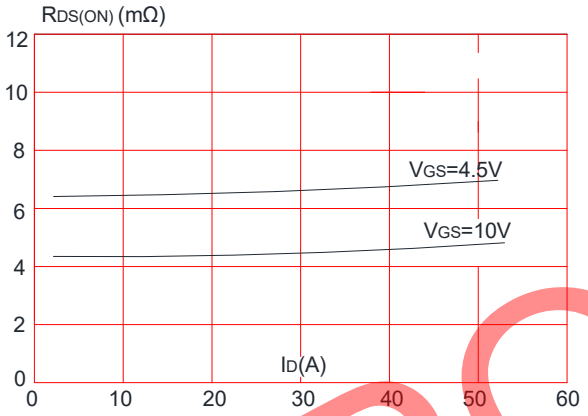



**Figure 4**: Body Diode Characteristics

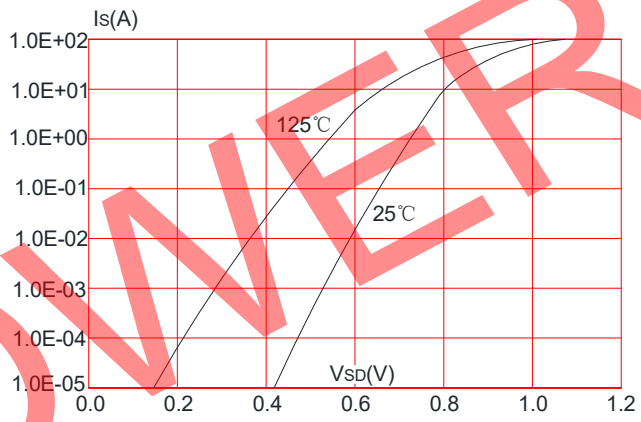



**Figure 5:** Gate Charge Characteristics

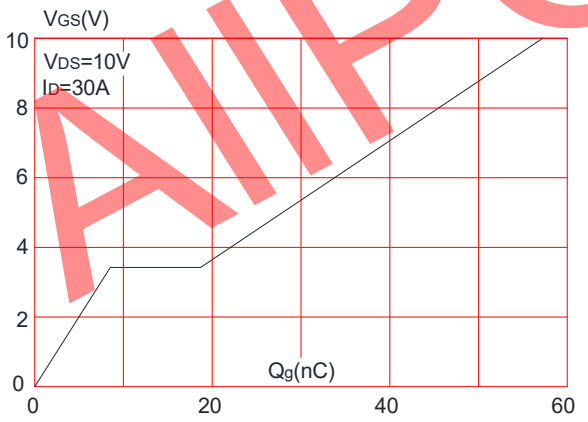
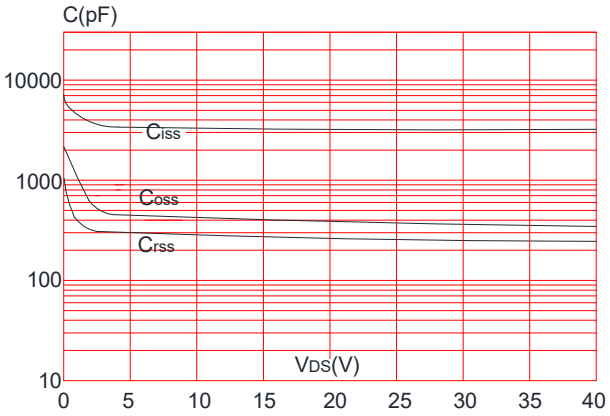



**Figure 6:** Capacitance Characteristics




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**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature

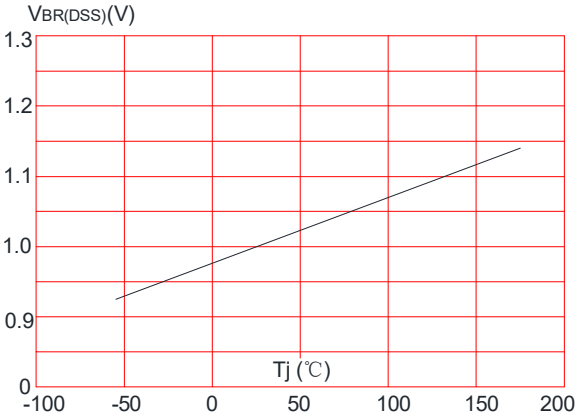



**Figure 8:** Normalized on Resistance vs. Junction Temperature

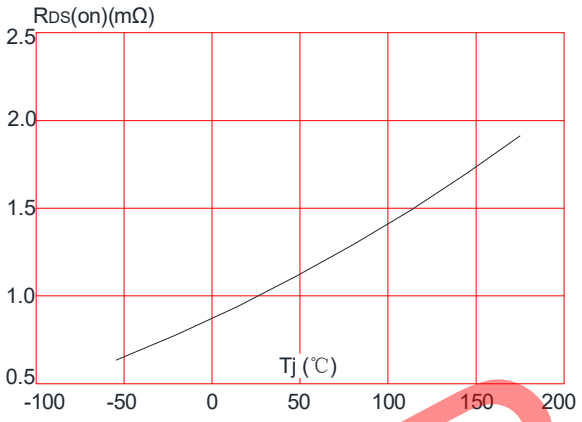



**Figure 9:** Maximum Safe Operating Area

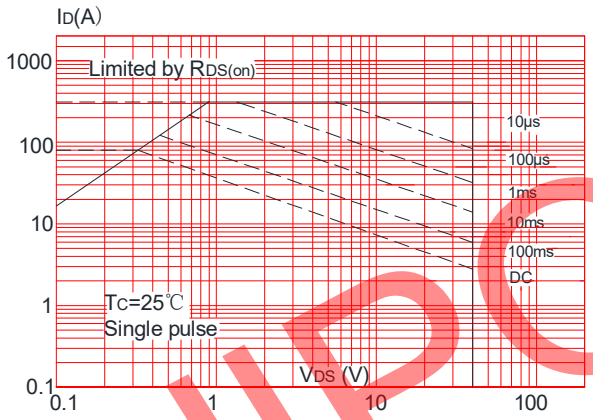



**Figure 10:** Maximum Continuous Drain Current vs. Case Temperature

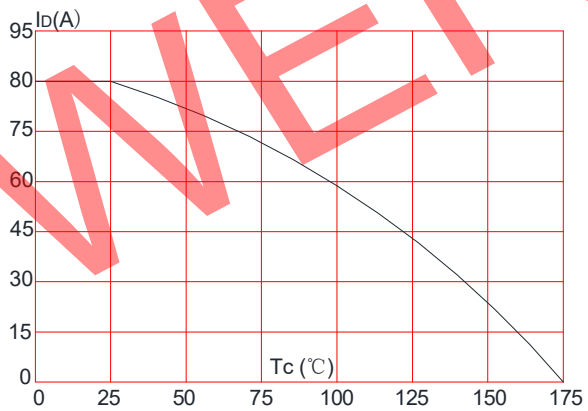
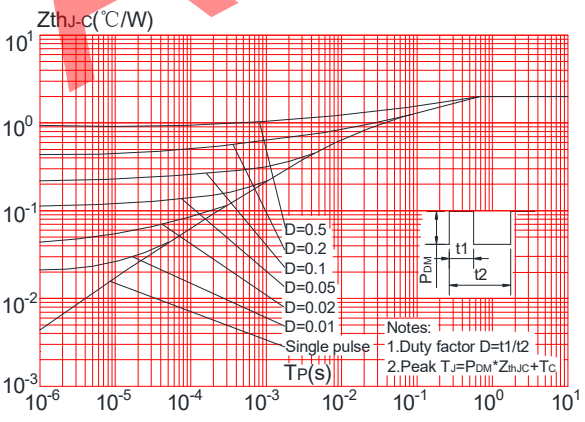



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Case




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## Test Circuit

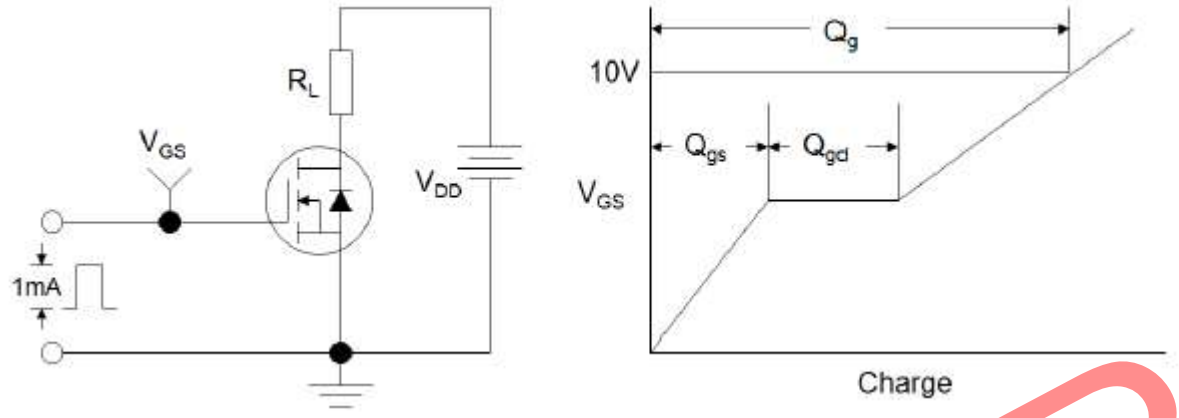



**Figure1:Gate Charge Test Circuit & Waveform**

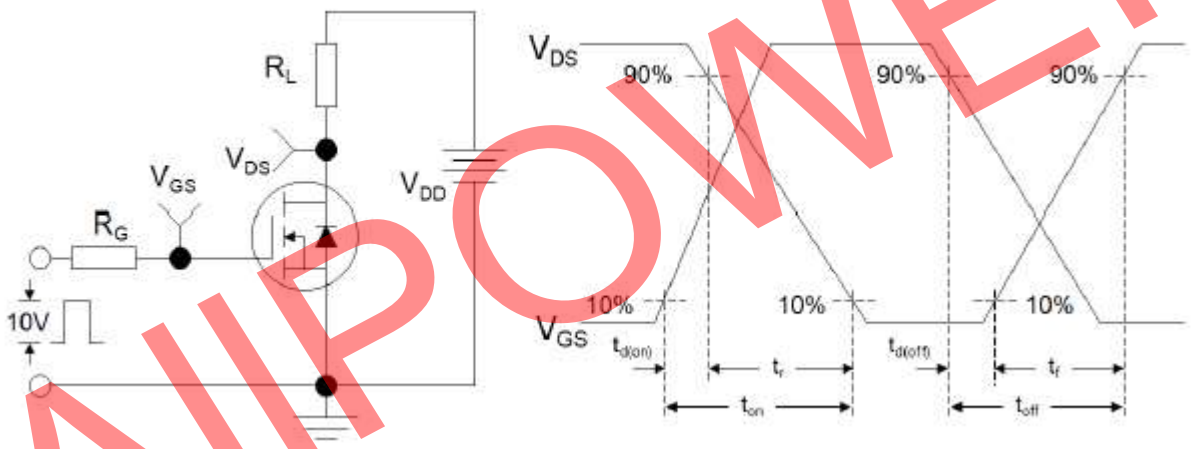



**Figure 2: Resistive Switching Test Circuit & Waveforms**

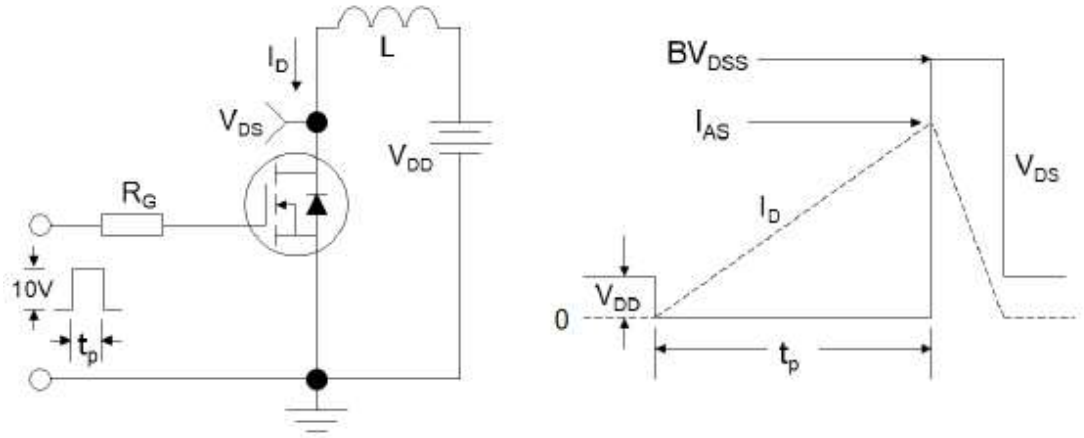
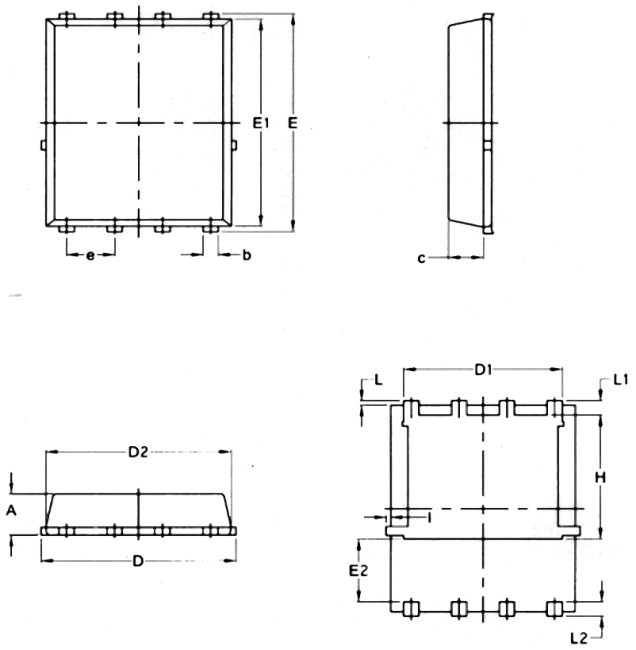



**Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms**

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## Package Mechanical Data




PDFN5X6-8L

| SYMBOL | COMMON | | | |
|---|---|---|---|---|
| | MM | | INCH | |
| | MIN. | MAX. | MIN. | MAX. |
| A | 1.03 | 1.17 | 0.0406 | 0.0461 |
| b | 0.34 | 0.48 | 0.0134 | 0.0189 |
| c | 0.824 | 0.970 | 0.0324 | 0.0382 |
| D | 4.80 | 5.40 | 0.1890 | 0.2126 |
| D1 | 4.11 | 4.31 | 0.1618 | 0.1697 |
| D2 | 4.80 | 5.00 | 0.1890 | 0.1969 |
| E | 5.95 | 6.15 | 0.2343 | 0.2421 |
| E1 | 5.65 | 5.85 | 0.2224 | 0.2303 |
| E2 | 1.60 | — | 0.0630 | — |
| e | 1.27 BSC | | 0.05 BSC | |
| L | 0.05 | 0.25 | 0.0020 | 0.0098 |
| L1 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| L2 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| H | 3.30 | 3.50 | 0.1299 | 0.1378 |
| I | — | 0.18 | — | 0.0070 |

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