## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---|---|---|
| 80V | 9.0mΩ@10V | 60A |

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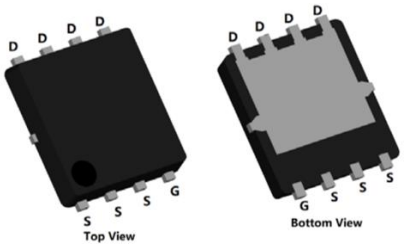
## Feature

- Fast Switching
- Low Gate Charge and Rdson
- Advanced Split Gate Trench Technology
- 100% Single Pulse avalanche energy Test

## Applications

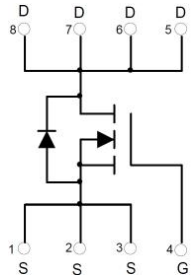
- Power switching application
- DC-DC Converter
- Uninterruptible power supply

## Package




**PDFN5X6-8L**

## Circuit diagram




## Marking


**SP80N09GHNK** :Device Code
**** :Week Code

## Order Information

| Device | Package | Unit/Tape |
|---|---|---|
| SP80N09GHNK | PDFN5X6-8L | 5000 |

## Absolute maximum ratings (Ta=25℃,unless otherwise noted)

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | 80 | V |
| Gate-Source Voltage | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current (Tc=25°C) | $I_D$ | 60 | A |
| Continuous Drain Current (Tc=100°C) | $I_D$ | 40 | A |
| Pulse Drain Current Tested | $I_{DM}$ | 240 | A |
| Single Pulse Avalanche Energy[1] | $E_{AS}$ | 78 | mJ |
| Power Dissipation (Tc=25°C) | $P_D$ | 71.4 | W |
| Thermal Resistance Junction-to-Case | $R_{\theta JC}$ | 1.75 | °C/W |
| Maximum Junction Temperature | $T_J$ | -55 to 150 | °C |
| Storage Temperature Range | $T_{STG}$ | -55 to 150 | °C |

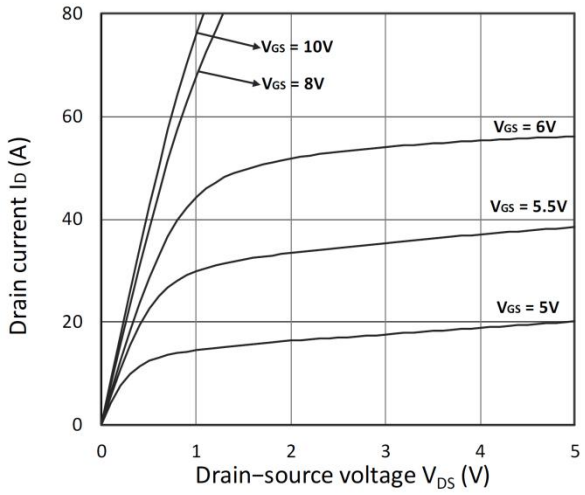
## Electrical characteristics (Ta=25℃, unless otherwise noted)

| Characteristics | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **Static Characteristics** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $I_D$ = 250μA, $V_{GS}$ = 0V | 80 | - | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 64V, $V_{GS}$ = 0V | - | - | 1 | uA |
| Gate Leakage Current | $I_{GSS}$ | $V_{GS}$ = ±20V, $V_{DS}$ = 0V | - | - | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 2.0 | 3.0 | 4.0 | V |
| Drain-Source On-state Resistance | $R_{DS(ON)}$ | $V_{GS}$ = 10V, $I_D$ = 20A | - | 9.0 | 12.5 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| Input Capacitance | $C_{iss}$ | VGS=0V, VDS=40V,F=1MHz | - | 936 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 332 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 20 | - | |
| Total Gate Charge | $Q_g$ | VDS=40V, VGS=10V, ID=20A | - | 16 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 4.8 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 4.4 | - | |
| **Switching Characteristics** | | | | | | |
| Turn-On Delay Time | $t_{d(on)}$ | VDD=40V, ID=20A, VGS=10V, $R_G$=3Ω | - | 8.0 | - | nS |
| Rise Time | $t_r$ | | - | 5.6 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 14 | - | |
| Fall Time | $t_f$ | | - | 4.8 | - | |
| **Drain-Source Body Diode Characteristics** | | | | | | |
| Source-Drain Diode Forward Voltage | $V_{SD}$ | VGS=0V , IS=1A , TJ=25℃ | - | - | 1.2 | V |
| Maximum Body-Diode Continuous Current | $I_S$ | | - | - | 60 | A |
| Reverse Recovery Time | Trr | $I_S$=20 A,di/dt=100 A/μs, $T_J$=25℃ | - | 35 | - | nS |
| Reverse Recovery Charge | Qrr | | - | 27.8 | - | nC |

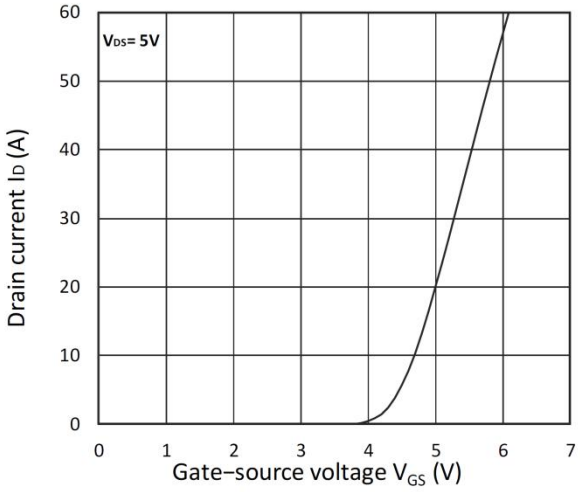
**Note :**

1. The test condition is VDD=40V,VGS=10V,L=0.5mH,RG=25Ω

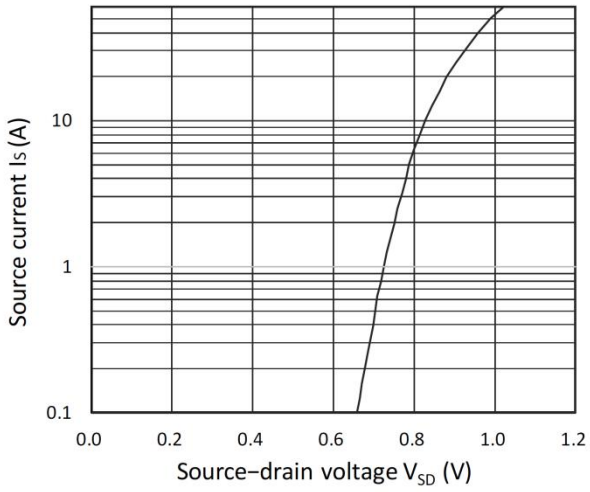
## Typical Characteristics



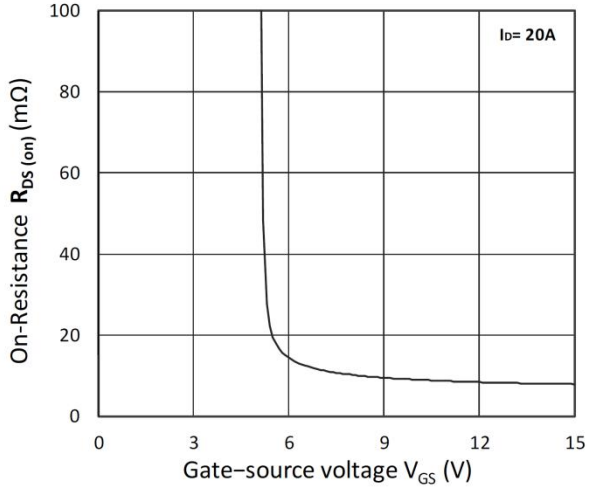

Output Characteristics



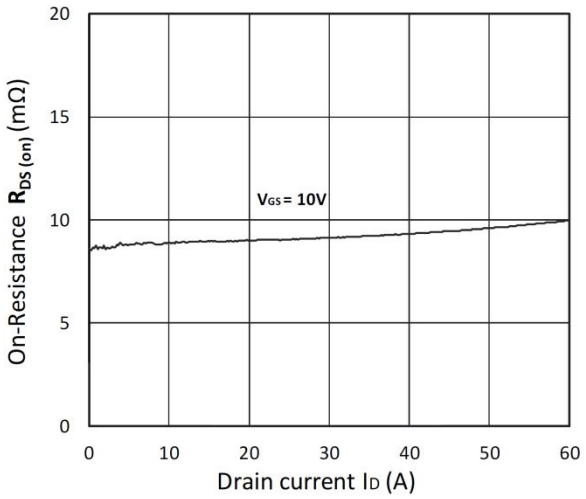

Transfer Characteristics



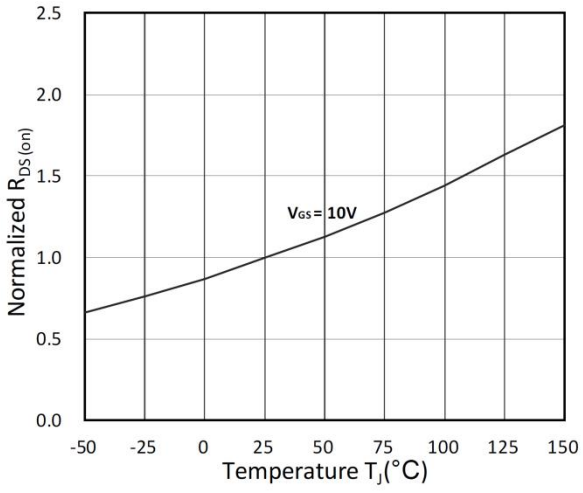

Forward Characteristics of Reverse



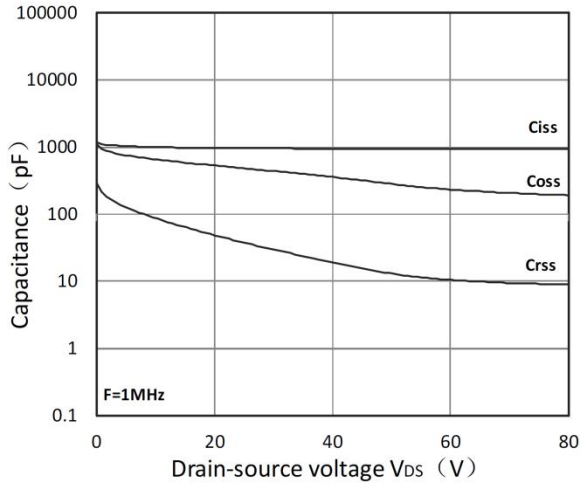

$R_{DS(ON)}$ vs. $V_{GS}$



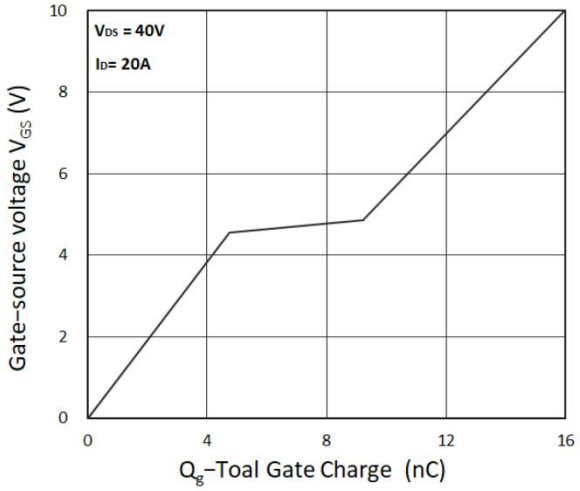

$R_{DS(ON)}$ vs. $I_D$



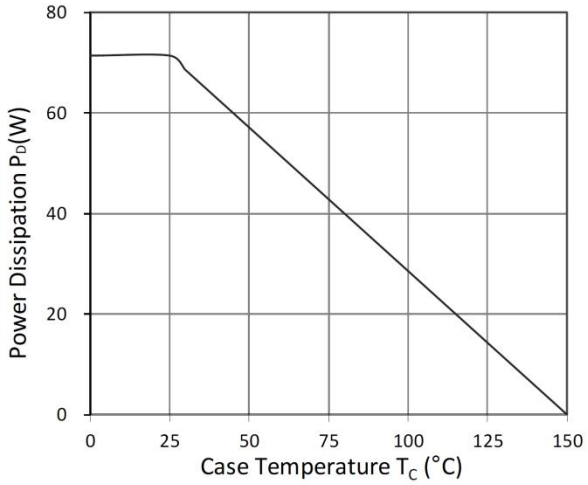

Normalized $R_{DS(on)}$ vs. Temperature



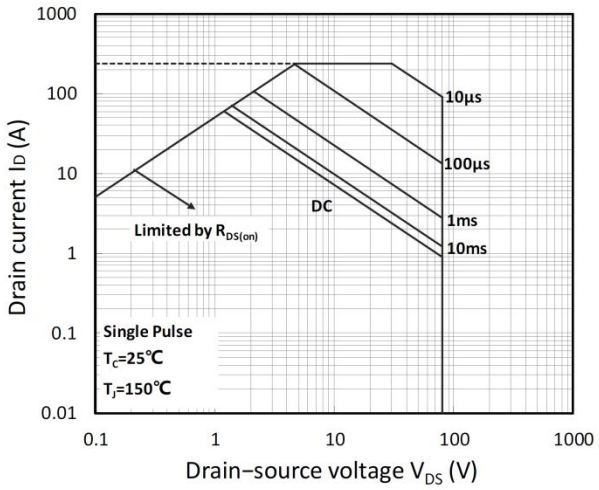

Capacitance Characteristics



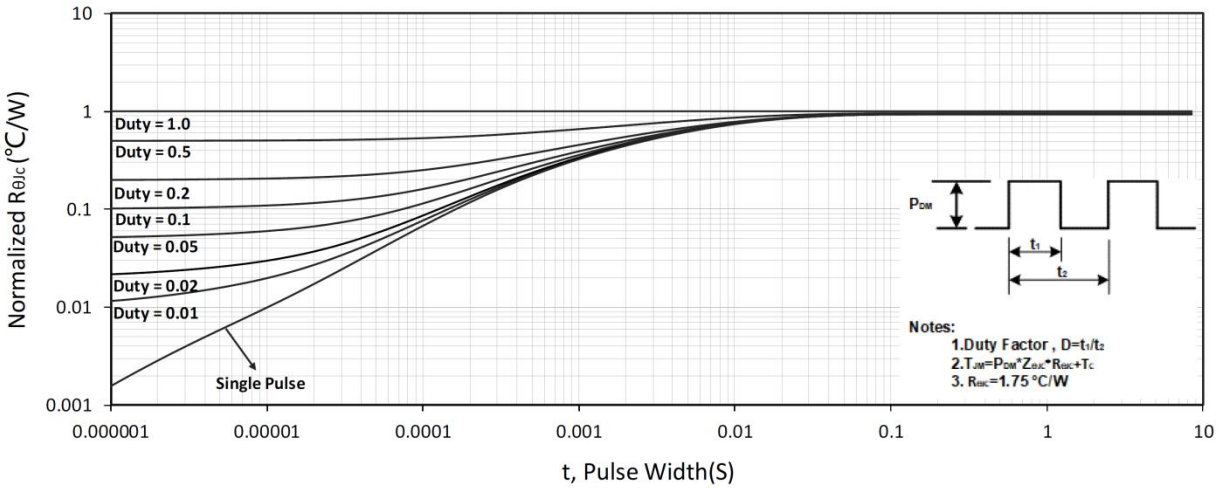

Gate Charge Characteristics




Power Dissipation

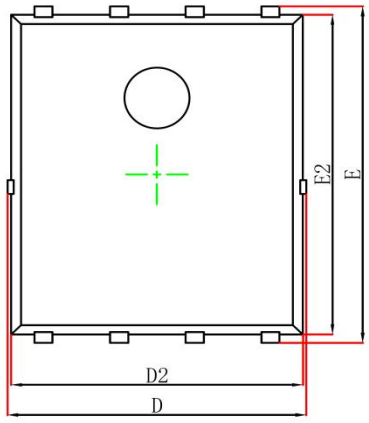



Safe Operating Area

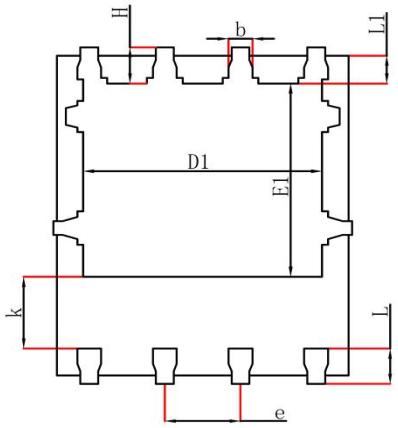



Normalized Maximum Transient Thermal Impedance

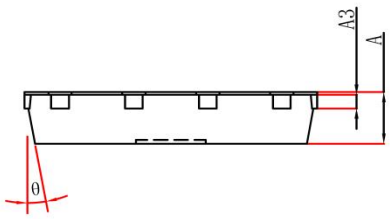
## PDFN5X6-8L Package Information




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 | 0.900 | 1.000 | 0.035 | 0.039 |
| A3 | 0.254REF. | | 0.010REF. | |
| D | 4.944 | 5.096 | 0.195 | 0.201 |
| E | 5.974 | 6.126 | 0.235 | 0.241 |
| D1 | 3.910 | 4.110 | 0.154 | 0.162 |
| E1 | 3.375 | 3.575 | 0.133 | 0.141 |
| D2 | 4.824 | 4.976 | 0.190 | 0.196 |
| E2 | 5.674 | 5.826 | 0.223 | 0.229 |
| k | 1.190 | 1.390 | 0.047 | 0.055 |
| b | 0.350 | 0.450 | 0.014 | 0.018 |
| e | 1.270TYP. | | 0.050TYP. | |
| L | 0.559 | 0.711 | 0.022 | 0.028 |
| L1 | 0.424 | 0.576 | 0.017 | 0.023 |
| H | 0.574 | 0.726 | 0.023 | 0.029 |
| θ | 10° | 12° | 10° | 12° |