

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---------------|-----------------|-------|
| 40V           | 6.3mΩ@10V       | 40A   |
|               | 9.5mΩ@4.5V      |       |



**合肥矽普半导体**

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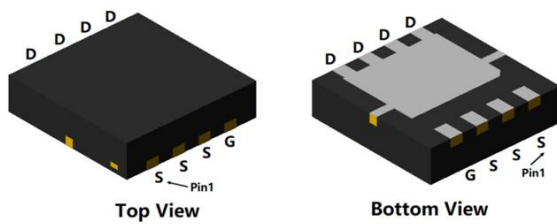
## Feature

- Fast switching speed
- Low On-Resistance
- 100% Single Pulse avalanche energy Test

## Applications

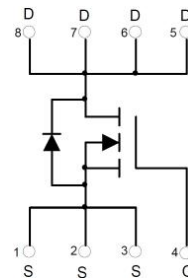
- DC-DC Converters.
- Power Management

## Package

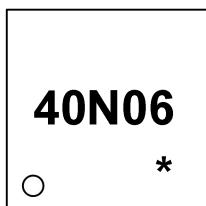


PDFN3X3-8L

## Circuit diagram



## Marking



40N06  
\*

:Device Code  
:Month Code

## Order Information

| Device    | Package    | Unit/Tape |
|-----------|------------|-----------|
| SP40N06NJ | PDFN3X3-8L | 5000      |

**Absolute maximum ratings (Ta=25°C, unless otherwise noted)**

| Parameter                                  | Symbol          | Rating     | Unit |
|--------------------------------------------|-----------------|------------|------|
| Drain-Source Voltage                       | $V_{DS}$        | 40         | V    |
| Gate-Source Voltage                        | $V_{GS}$        | $\pm 20$   | V    |
| Continuous Drain Current (Tc=25°C)         | $I_D$           | 40         | A    |
| Pulse Drain Current Tested                 | $I_{DM}$        | 160        | A    |
| Single Pulse Avalanche Energy <sup>1</sup> | $E_{AS}$        | 72         | mJ   |
| Power Dissipation (Tc=25°C)                | $P_D$           | 40         | W    |
| Thermal Resistance Junction-to-Case        | $R_{\theta JC}$ | 3          | °C/W |
| Storage Temperature Range                  | $T_{STG}$       | -55 to 150 | °C   |
| Operating Junction Temperature Range       | $T_J$           | -55 to 150 | °C   |

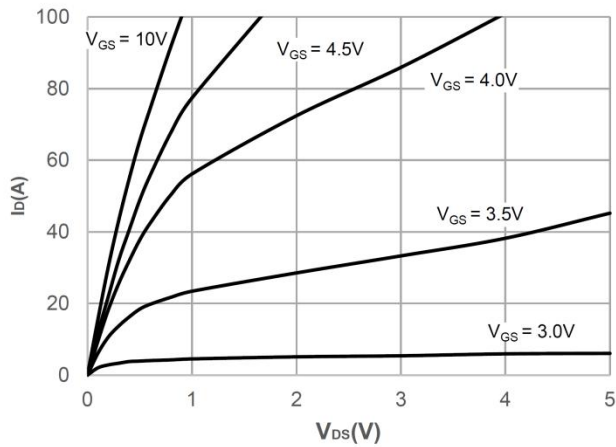
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

| Parameter                         | Symbol            | Conditions                      | Min. | Typ. | Max. | Unit |
|-----------------------------------|-------------------|---------------------------------|------|------|------|------|
| Static Characteristics            |                   |                                 |      |      |      |      |
| Drain-Source Breakdown Voltage    | BV <sub>DSS</sub> | VGS=0V , ID=250uA               | 40   | -    | -    | V    |
| Drain-Source Leakage Current      | IDSS              | VDS=32V , VGS=0V , TJ=25℃       | -    | -    | 1    | uA   |
| Gate-Source Leakage Current       | IGSS              | VGS=±20V , VDS=0V               | -    | -    | ±100 | nA   |
| Gate Threshold Voltage            | VGS(th)           | VGS=VDS , ID =250uA             | 1.0  | 1.5  | 2.5  | V    |
| Static Drain-Source On-Resistance | RDS(ON)           | VGS=10V, ID=8A                  | -    | 6.3  | 8.5  | mΩ   |
|                                   |                   | VGS=4.5V, ID=4A                 | -    | 9.5  | 12   | mΩ   |
| Dynamic characteristics           |                   |                                 |      |      |      |      |
| Input Capacitance                 | Ciss              | VDS=20V , VGS=0V , f=1MHz       | -    | 1733 | -    | pF   |
| Output Capacitance                | Coss              |                                 | -    | 283  | -    |      |
| Reverse Transfer Capacitance      | Crss              |                                 | -    | 141  | -    |      |
| Switching Characteristics         |                   |                                 |      |      |      |      |
| Total Gate Charge                 | Qg                | VDS=20V , VGS=20V , ID=10A      | -    | 8.3  | -    | nC   |
| Gate-Source Charge                | Qgs               |                                 | -    | 2.4  | -    |      |
| Gate-Drain Charge                 | Qgd               |                                 | -    | 3.4  | -    |      |
| Turn-On Delay Time                | Td(on)            | VDD=20V, VGS=10V , RG=3Ω, ID=2A | -    | 3.5  | -    | nS   |
| Rise Time                         | Tr                |                                 | -    | 3.7  | -    |      |
| Turn-Off Delay Time               | Td(off)           |                                 | -    | 17.1 | -    |      |
| Fall Time                         | Tf                |                                 | -    | 6.4  | -    |      |
| Diode Characteristics             |                   |                                 |      |      |      |      |
| Diode Forward Voltage             | VSD               | VGS=0V , IS=1A , TJ=25℃         | -    | -    | 1.2  | V    |
| Diode Continuous Current          | IS                |                                 | -    | -    | 40   | A    |
| Reverse recover time              | Trr               | IS=20A, di/dt=100A/us, Tj=25℃   | -    | 15   | -    | nS   |
| Reverse recovery charge           | Qrr               |                                 | -    | 3    | -    | nC   |

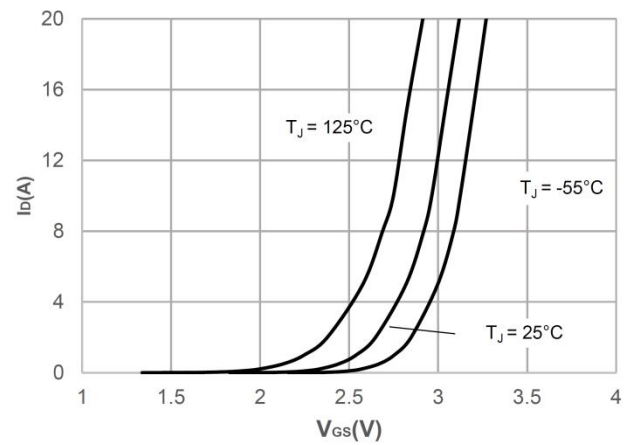
**Note:**

- The EAS test condition is  $V_{DD}=20V, V_G=10V, L=0.1mH, R_g=25\Omega$

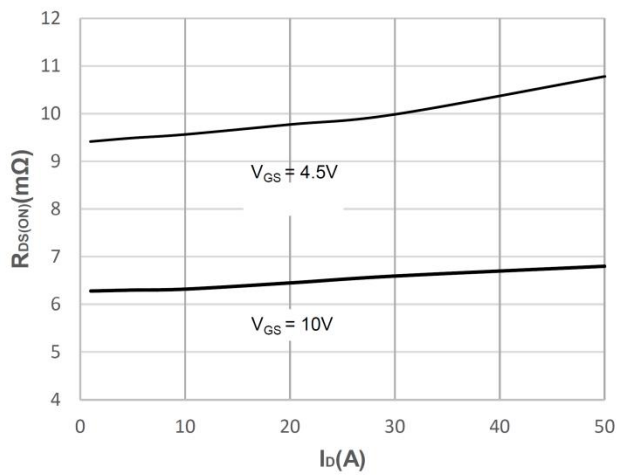
## Typical Characteristics



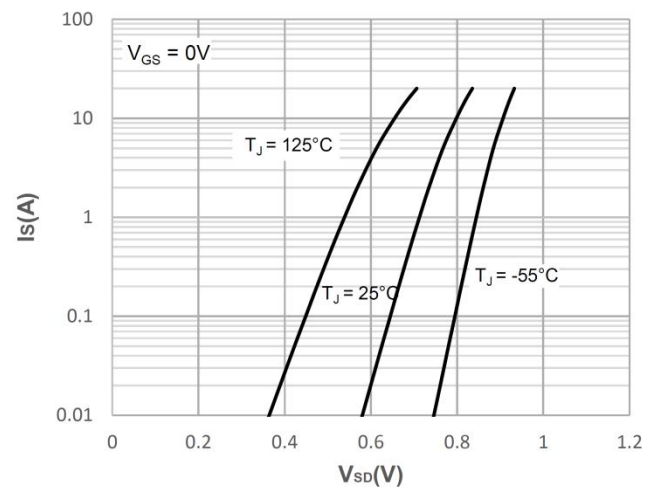
Output Characteristics



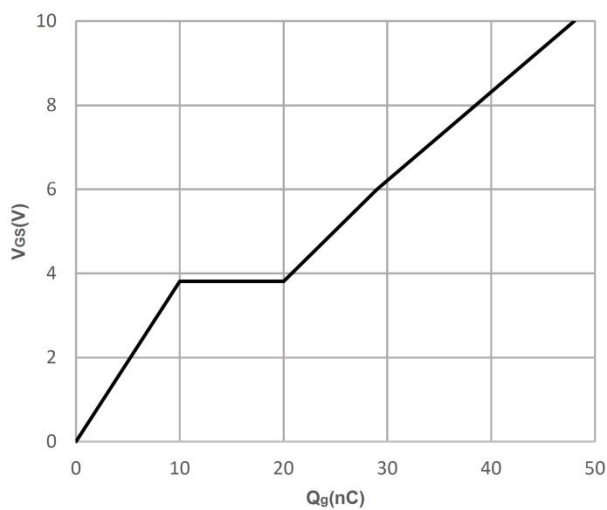
Typical Transfer Characteristics



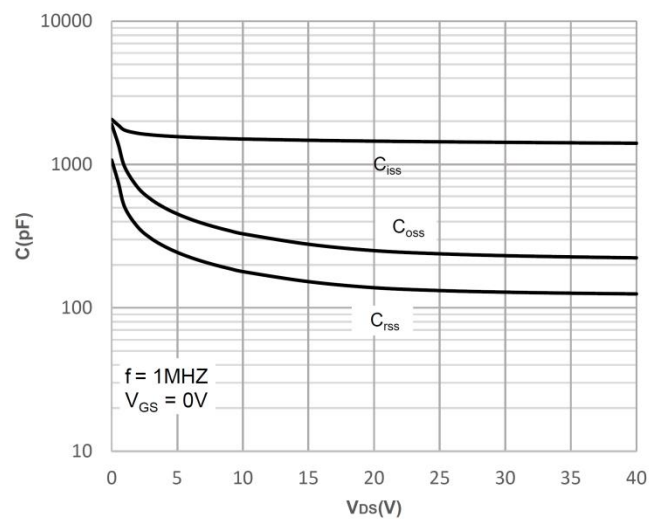
On-resistance vs. Drain Current



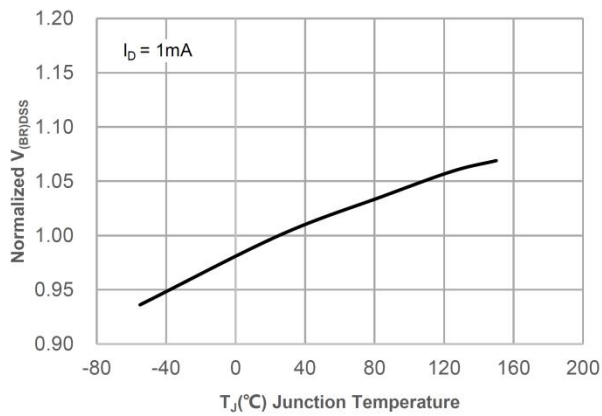
Body Diode Characteristics



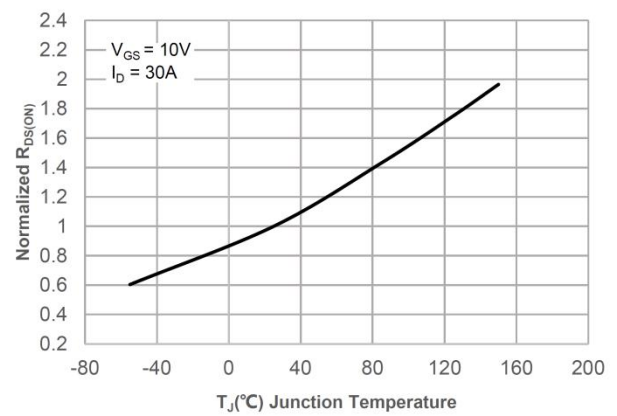
Gate Charge Characteristics



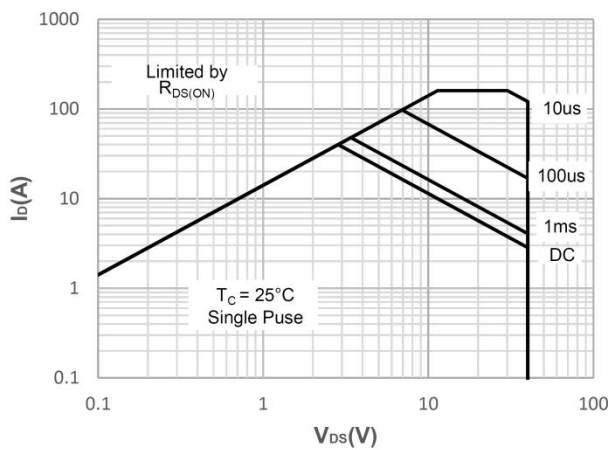
Capacitance Characteristics



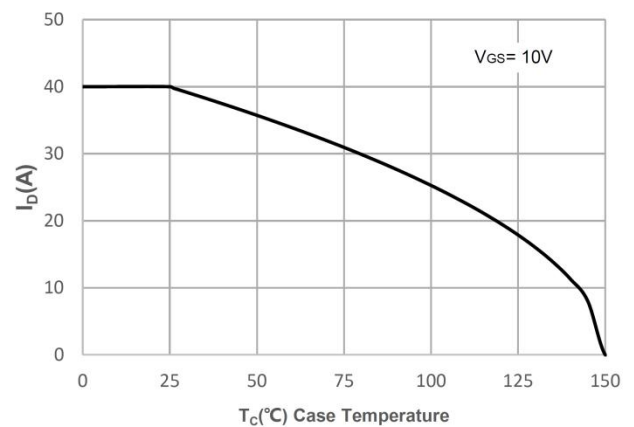
Normalized Breakdown voltage vs. Junction Temperature



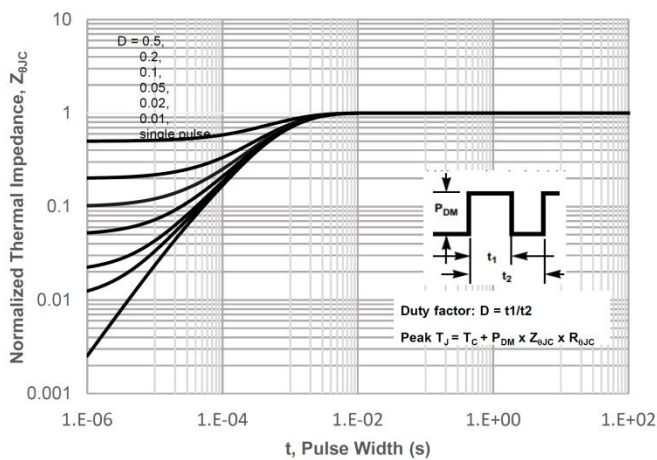
Normalized on Resistance vs. Junction Temperature



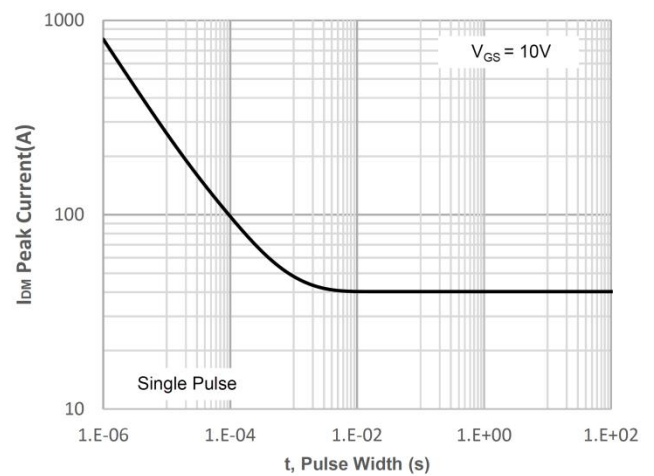
Maximum Safe Operating Area



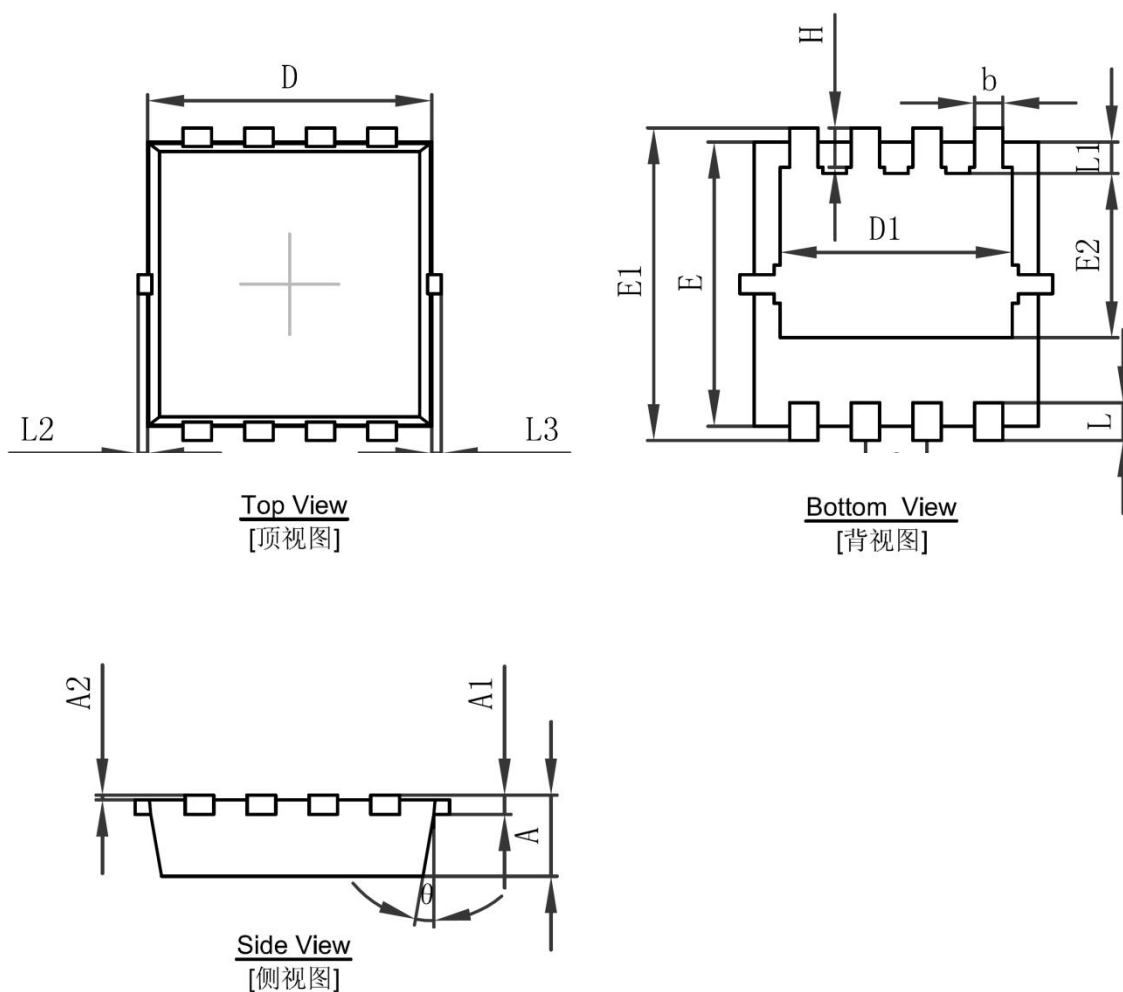
Maximum Continuous Drain Current vs. Case Temperature



Normalized Maximum Transient Thermal Impedance



Peak Current Capacity

**PDFN3X3-8L Package Information**


| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min.                      | Max.  | Min.                 | Max.  |
| A        | 0.650                     | 0.850 | 0.026                | 0.033 |
| A1       | 0.152 REF.                |       | 0.006 REF.           |       |
| A2       | 0~0.05                    |       | 0~0.002              |       |
| D        | 2.900                     | 3.100 | 0.114                | 0.122 |
| D1       | 2.300                     | 2.600 | 0.091                | 0.102 |
| E        | 2.900                     | 3.100 | 0.114                | 0.122 |
| E1       | 3.150                     | 3.450 | 0.124                | 0.136 |
| E2       | 1.535                     | 1.935 | 0.060                | 0.076 |
| b        | 0.200                     | 0.400 | 0.008                | 0.016 |
| e        | 0.550                     | 0.750 | 0.022                | 0.030 |
| L        | 0.300                     | 0.500 | 0.012                | 0.020 |
| L1       | 0.180                     | 0.480 | 0.007                | 0.019 |
| L2       | 0~0.100                   |       | 0~0.004              |       |
| L3       | 0~0.100                   |       | 0~0.004              |       |
| H        | 0.315                     | 0.515 | 0.012                | 0.020 |
| $\theta$ | 9°                        | 13°   | 9°                   | 13°   |