

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$     | $I_D$ |
|---------------|---------------------|-------|
| -20V          | 16m $\Omega$ @-4.5V | -14A  |
|               | 21m $\Omega$ @-2.5V |       |



**合肥矽普半导体**

Siliup Semiconductor Technology Co., Ltd

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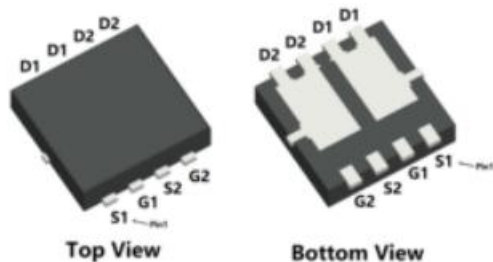
## Feature

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

## Applications

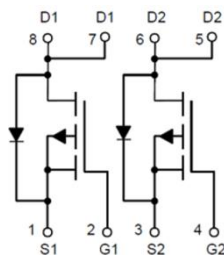
- DC-DC Converters.
- Power Management

## Package

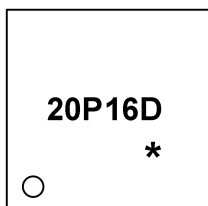


PDFN3X3-8L

## Circuit diagram



## Marking



20P16D  
\*

:Device Code  
:Month Code

## Order Information

| Device     | Package    | Unit/Tape |
|------------|------------|-----------|
| SP20P16DNJ | PDFN3X3-8L | 5000      |

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

| Parameter                                  | Symbol          | Rating     | Unit |
|--------------------------------------------|-----------------|------------|------|
| Drain-Source Voltage                       | $V_{DS}$        | -20        | V    |
| Gate-Source Voltage                        | $V_{GS}$        | $\pm 12$   | V    |
| Continuous Drain Current (Tc=25°C)         | $I_D$           | -14        | A    |
| Continuous Drain Current (Tc=100°C)        | $I_D$           | -9         | A    |
| Pulse Drain Current Tested                 | $I_{DM}$        | -64        | A    |
| Single Pulse Avalanche Energy <sup>1</sup> | $E_{AS}$        | 45         | mJ   |
| Power Dissipation (Tc=25°C)                | $P_D$           | 17         | W    |
| Thermal Resistance Junction-to-Case        | $R_{\theta JC}$ | 7.4        | °C/W |
| Storage Temperature Range                  | $T_{STG}$       | -55 to 150 | °C   |
| Operating Junction Temperature Range       | $T_J$           | -55 to 150 | °C   |

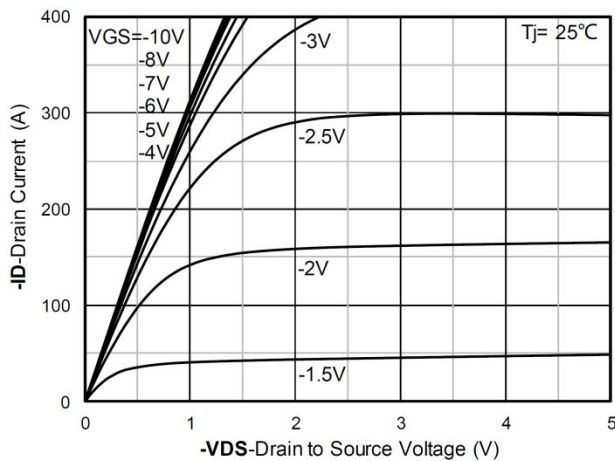
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

| Parameter                         | Symbol            | Conditions                        | Min. | Typ. | Max. | Unit |
|-----------------------------------|-------------------|-----------------------------------|------|------|------|------|
| Static Characteristics            |                   |                                   |      |      |      |      |
| Drain-Source Breakdown Voltage    | BV <sub>DSS</sub> | VGS=0V , ID=-250uA                | -20  | -    | -    | V    |
| Drain-Source Leakage Current      | IDSS              | VDS=-16V , VGS=0V , TJ=25℃        | -    | -    | -1   | uA   |
| Gate-Source Leakage Current       | IGSS              | VGS=±12V , VDS=0V                 | -    | -    | ±100 | nA   |
| Gate Threshold Voltage            | VGS(th)           | VGS=VDS , ID =-250uA              | -0.4 | -0.7 | -1.0 | V    |
| Static Drain-Source On-Resistance | RDS(ON)           | VGS=-4.5V, ID=-6A                 | -    | 16   | 20   | mΩ   |
|                                   |                   | VGS=-2.5V, ID=-5A                 | -    | 21   | 28   |      |
| Dynamic characteristics           |                   |                                   |      |      |      |      |
| Input Capacitance                 | Ciss              | VDS=-6V , VGS=0V , f=1MHz         | -    | 1275 | -    | pF   |
| Output Capacitance                | Coss              |                                   | -    | 255  | -    |      |
| Reverse Transfer Capacitance      | Crss              |                                   | -    | 236  | -    |      |
| Total Gate Charge                 | Qg                | VDS=-6V , VGS=-4.5V , ID=-5A      | -    | 14   | -    | nC   |
| Gate-Source Charge                | Qgs               |                                   | -    | 2.3  | -    |      |
| Gate-Drain Charge                 | Qgd               |                                   | -    | 3.6  | -    |      |
| Switching Characteristics         |                   |                                   |      |      |      |      |
| Turn-On Delay Time                | Td(on)            | VDD=-6V VGS=-4.5V , RG=1Ω, ID=-4A | -    | 26   | -    | nS   |
| Rise Time                         | Tr                |                                   | -    | 24   | -    |      |
| Turn-Off Delay Time               | Td(off)           |                                   | -    | 45   | -    |      |
| Fall Time                         | Tf                |                                   | -    | 20   | -    |      |
| Diode Characteristics             |                   |                                   |      |      |      |      |
| Diode Forward Voltage             | VSD               | VGS=0V , IS=-1A , TJ=25℃          | -    | -    | -1.2 | V    |

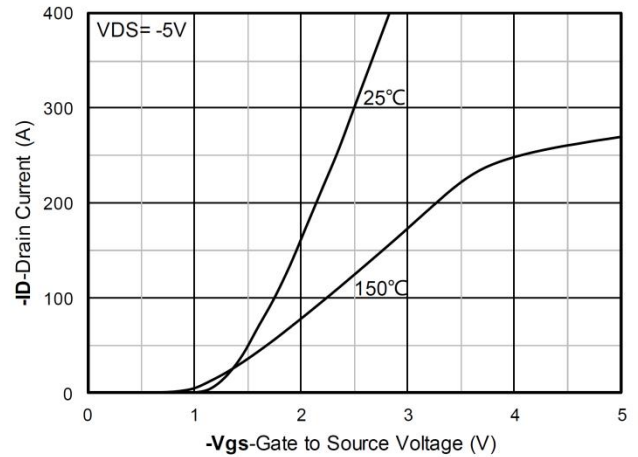
**Note:**

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

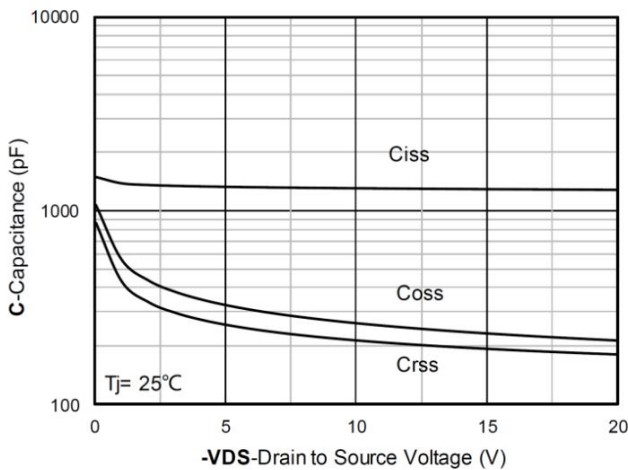
## Typical Characteristics



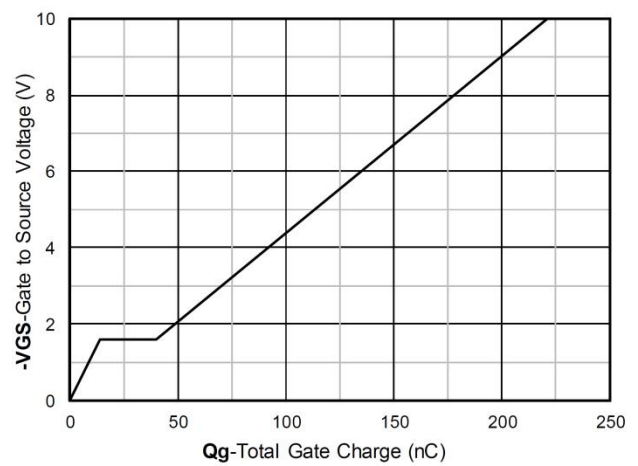
Output Characteristics



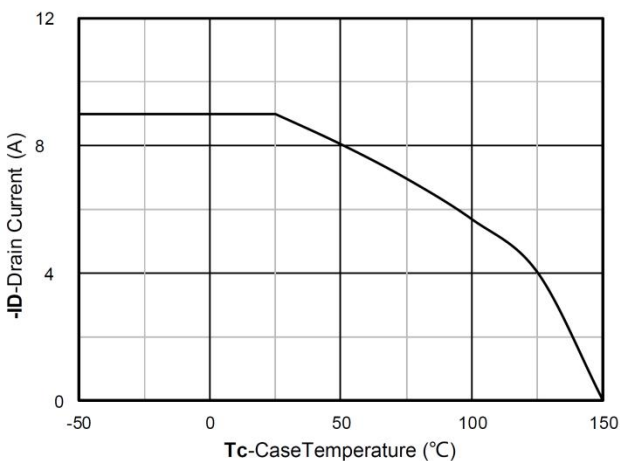
Transfer Characteristics



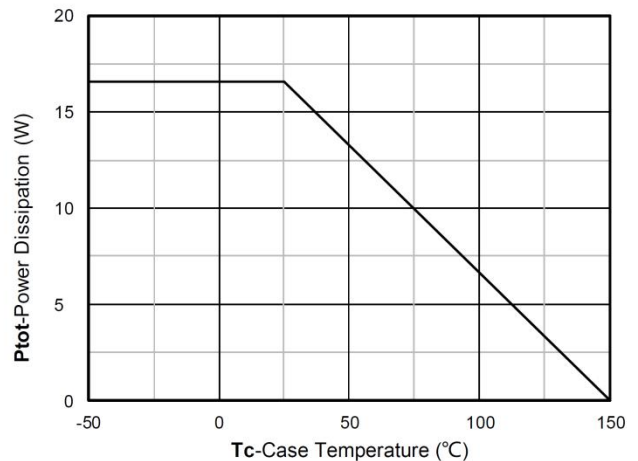
Capacitance Characteristics



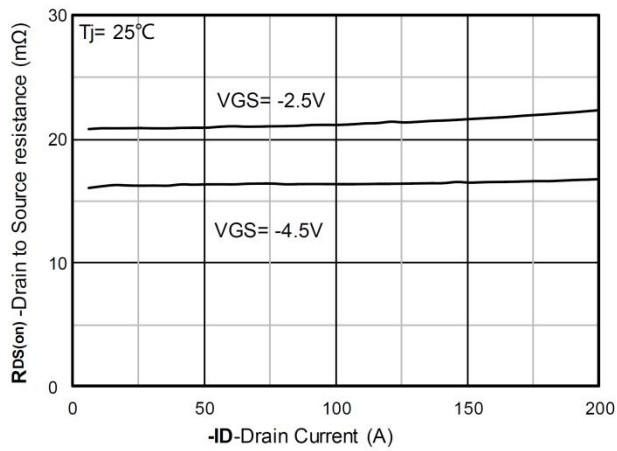
Gate Charge



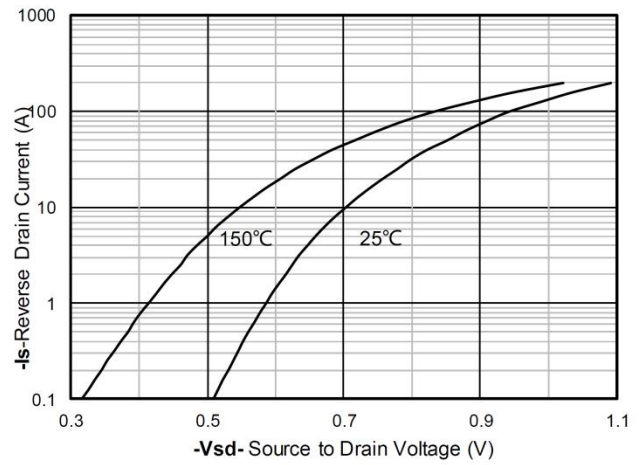
Current dissipation



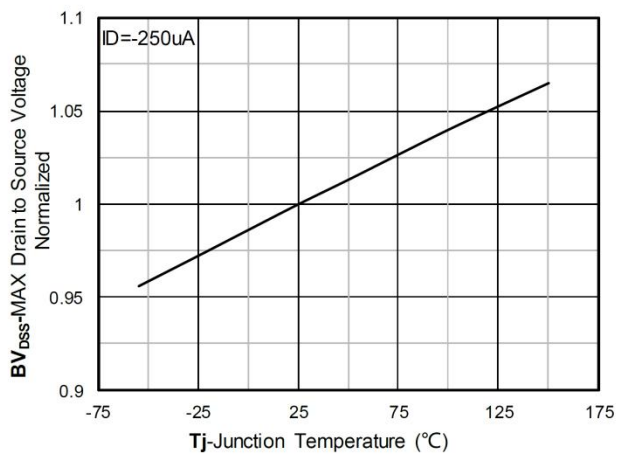
Power dissipation



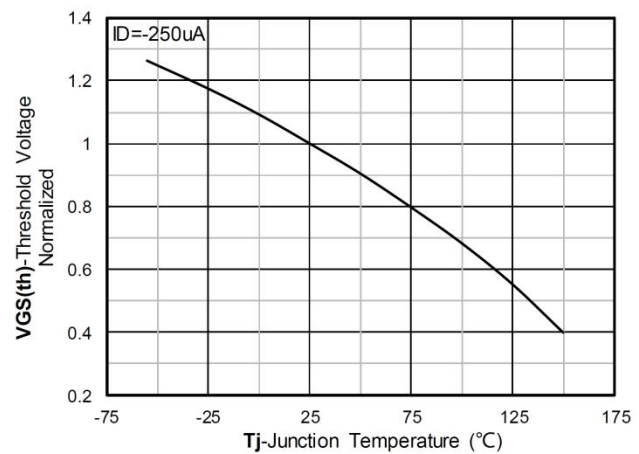
$R_{DS(on)}$  VS Drain Current



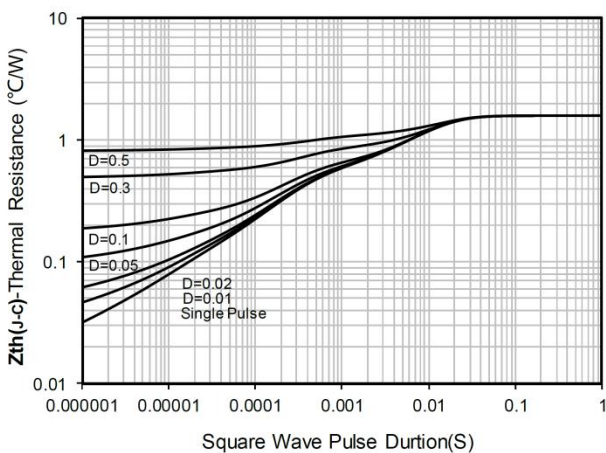
Forward characteristics of reverse diode



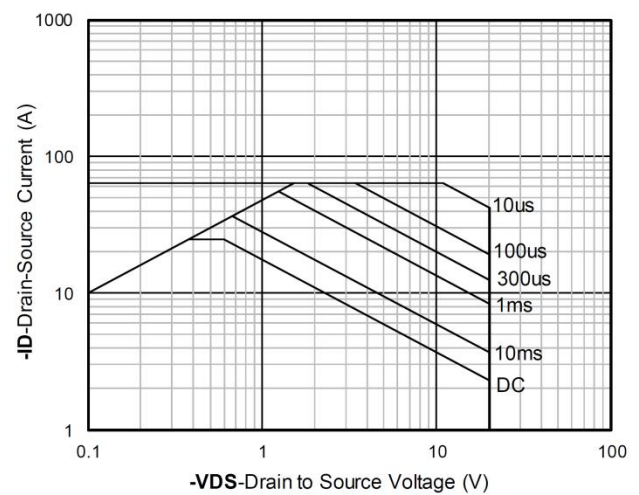
Normalized breakdown voltage



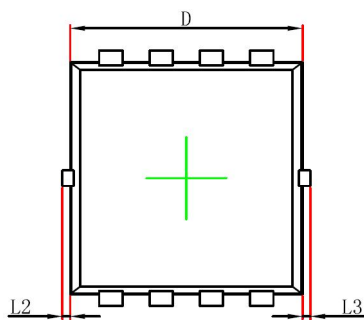
Normalized Threshold voltage



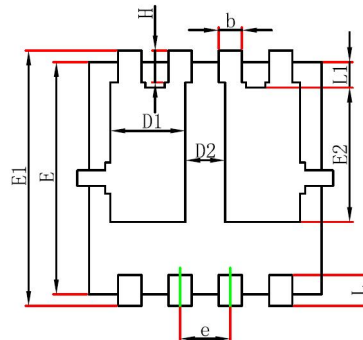
Maximum Transient Thermal Impedance



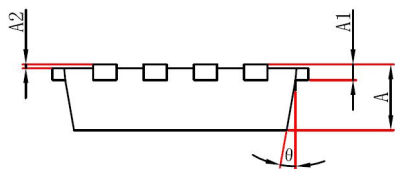
Safe Operation Area

**PDFN3X3-8L 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      | 0.650                     | 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     | 0.935                     | 1.135 | 0.037                | 0.045 |
| D2     | 0.280                     | 0.480 | 0.011                | 0.019 |
| 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 |
| θ      | 9°                        | 13°   | 9°                   | 13°   |