

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---------------|-----------------|-------|
| -40V          | 8.6mΩ@-10V      | -40A  |
|               | 13mΩ@-4.5V      |       |



**合肥矽普半导体**

Siliup Semiconductor Technology Co., Ltd

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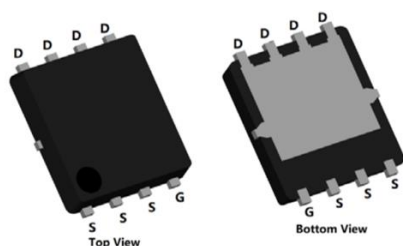
## Feature

- Fast switching speed
- Surface mount package
- ROHS Compliant & Halogen-Free
- 100% Single Pulse avalanche energy Test

## Applications

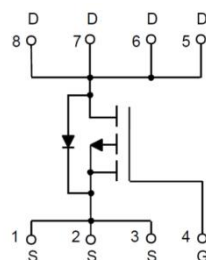
- DC-DC Converters.
- Motor Control.

## Package

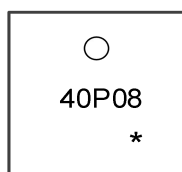


PDFN5X6-8L

## Circuit diagram



## Marking



**40P08**  
\*

:Device Code  
:Month Code

## Order Information

| Device    | Package    | Unit/Tape |
|-----------|------------|-----------|
| SP40P08NK | PDFN5X6-8L | 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    |
| Continuous Drain Current (Tc=100°C)         | $I_D$           | -27        | A    |
| Pulse Drain Current Tested                  | $I_{DM}$        | -160       | A    |
| Single pulsed avalanche energy <sup>1</sup> | $E_{AS}$        | 169        | mJ   |
| Power Dissipation (Tc=25°C)                 | $P_D$           | 75         | W    |
| Thermal Resistance Junction-to-Case         | $R_{\theta JC}$ | 1.67       | °C/W |
| Storage Temperature Range                   | $T_{STG}$       | -55 to 150 | °C   |
| Operating Junction Temperature Range        | $T_J$           | -55 to 150 | °C   |

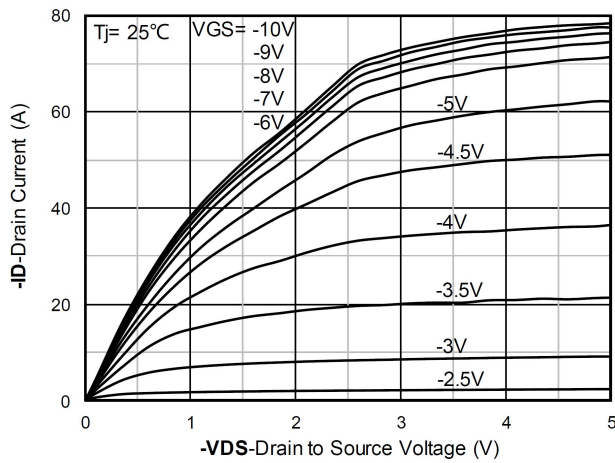
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

| 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                | -1.2 | -1.6 | -2.5 | V    |
| Static Drain-Source On-Resistance     | RDS(ON)           | VGS =-10V, ID =-10A                 | -    | 8.6  | 11   | mΩ   |
|                                       |                   | VGS =-4.5V, ID =-8A                 | -    | 13   | 18   |      |
| Dynamic characteristics               |                   |                                     |      |      |      |      |
| Input Capacitance                     | Ciss              | VDS=-20V , VGS=0V , f=1MHz          | -    | 3800 | -    | pF   |
| Output Capacitance                    | Coss              |                                     | -    | 329  | -    |      |
| Reverse Transfer Capacitance          | Crss              |                                     | -    | 289  | -    |      |
| Total Gate Charge                     | Qg                | VDS=-20V , VGS=-10V , ID=-20A       | -    | 69   | -    | nC   |
| Gate-Source Charge                    | Qgs               |                                     | -    | 11   | -    |      |
| Gate-Drain Charge                     | Qgd               |                                     | -    | 13   | -    |      |
| Switching Characteristics             |                   |                                     |      |      |      |      |
| Turn-On Delay Time                    | Td(on)            | VDD=-20V, VGS=-10V , RG=3Ω, ID=-20A | -    | 11   | -    | nS   |
| Rise Time                             | Tr                |                                     | -    | 81   | -    |      |
| Turn-Off Delay Time                   | Td(off)           |                                     | -    | 95   | -    |      |
| Fall Time                             | Tf                |                                     | -    | 73   | -    |      |
| Diode Characteristics                 |                   |                                     |      |      |      |      |
| Diode Forward Voltage                 | VSD               | VGS=0V , IS=-1A , TJ=25℃            | -    | -    | 1.2  | V    |
| Maximum Body-Diode Continuous Current | IS                |                                     | -    | -    | -40  | A    |
| Reverse recover time                  | Trr               | IS=-20A, di/dt=100A/us, TJ=25℃      | -    | 21   | -    | nS   |
| Reverse recovery charge               | Qrr               |                                     | -    | 12   | -    | nC   |

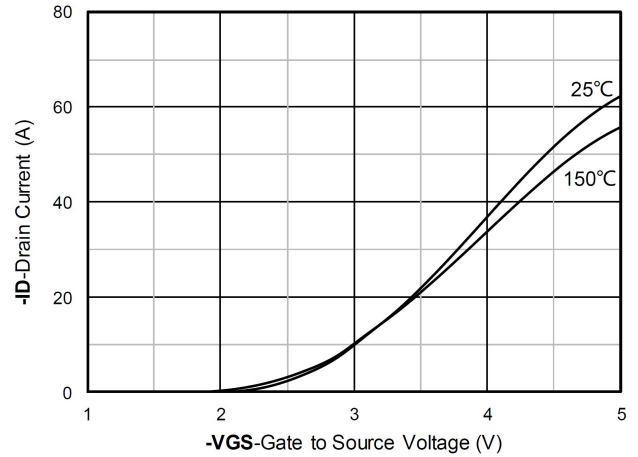
**Note:**

- The EAS Test condition is  $V_{DD}=-20V, V_{GS}=-10V, L=0.5mH, R_g=25\Omega$

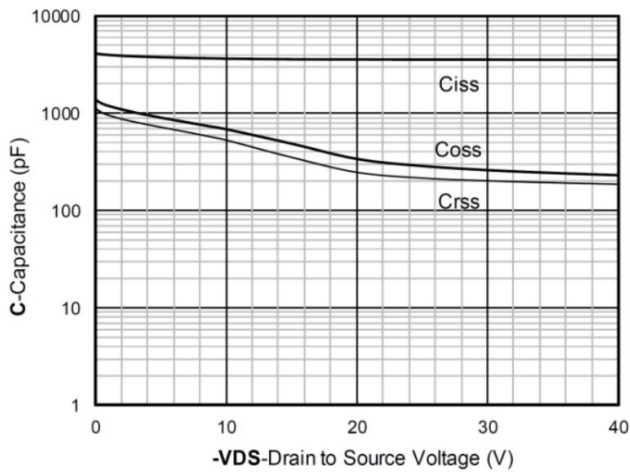
## Typical Characteristics



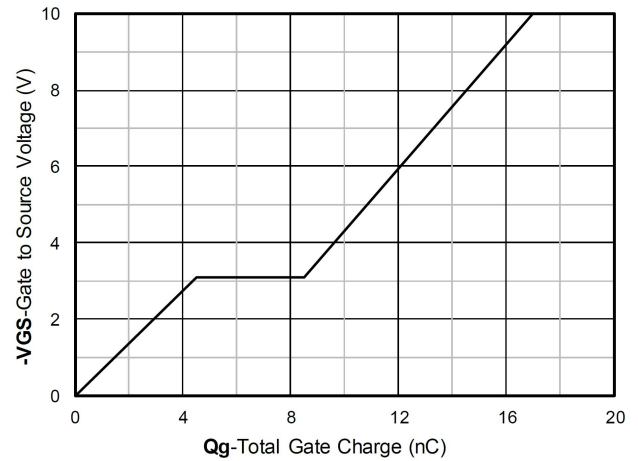
Output Characteristics



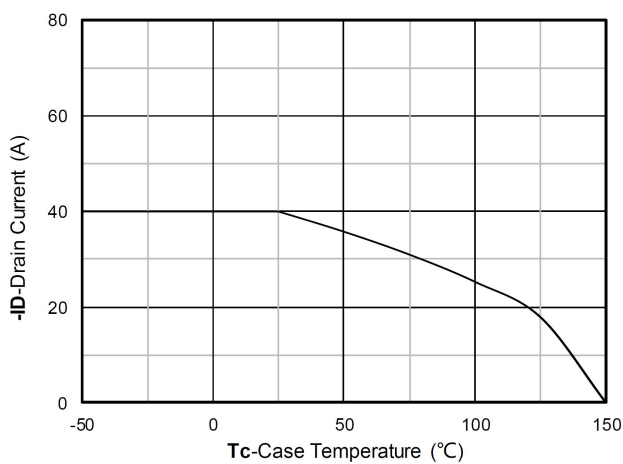
Transfer Characteristics



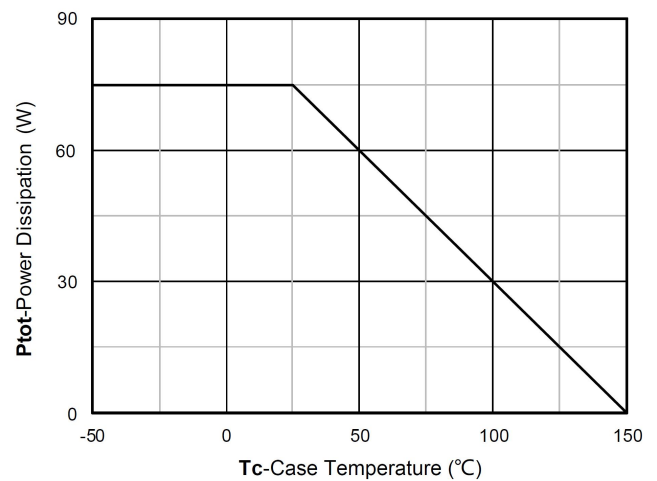
Capacitance Characteristics



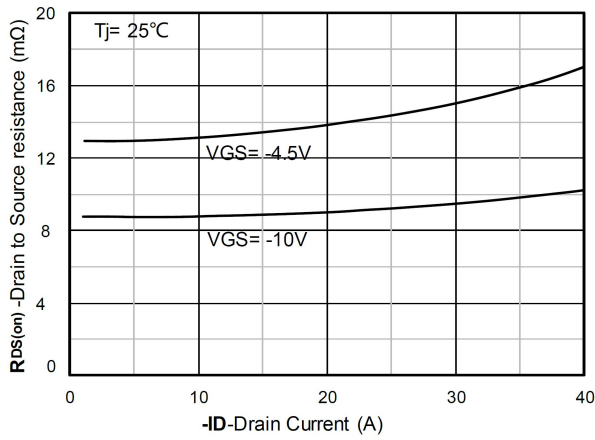
Gate Charge



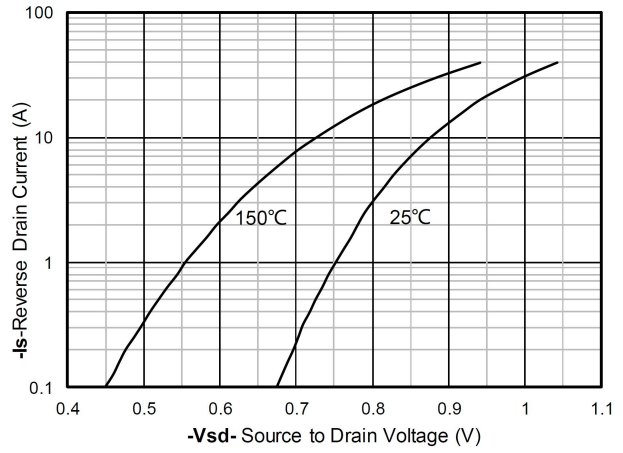
Current dissipation



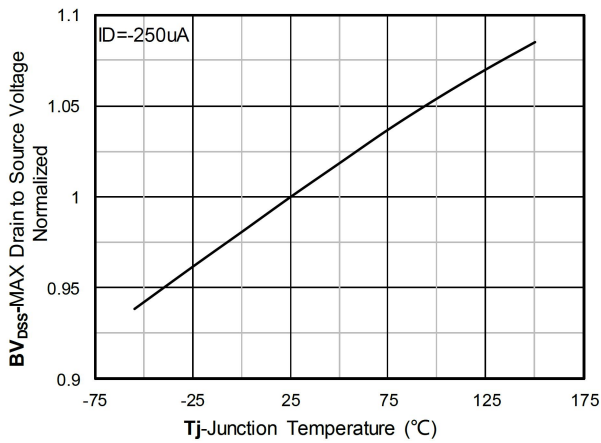
Power dissipation



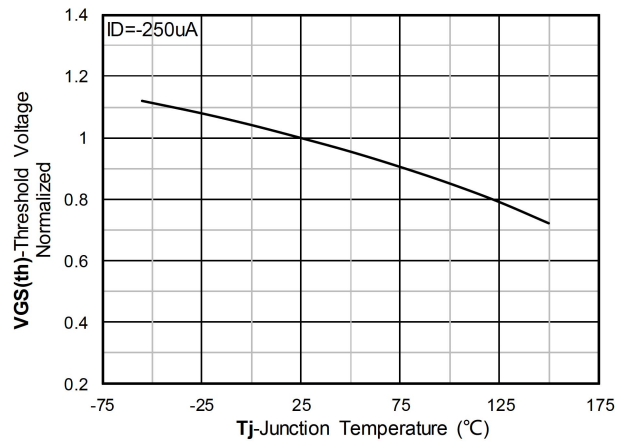
$R_{DS(on)}$  VS Drain Current



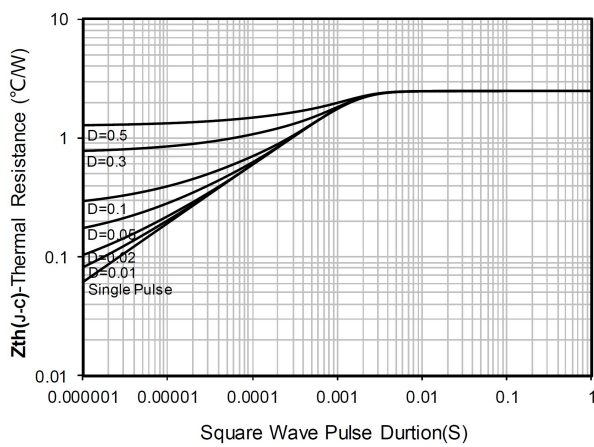
Forward characteristics of reverse diode



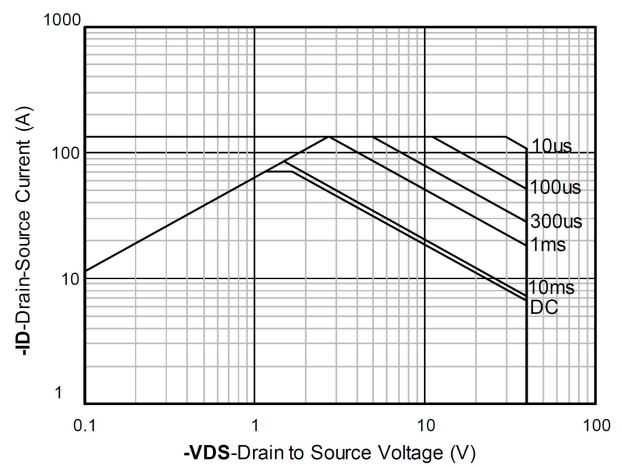
Normalized breakdown voltage



Normalized Threshold voltage

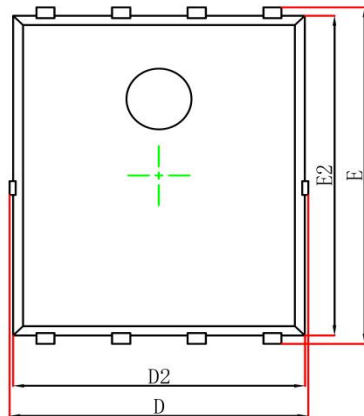


Maximum Transient Thermal Impedance

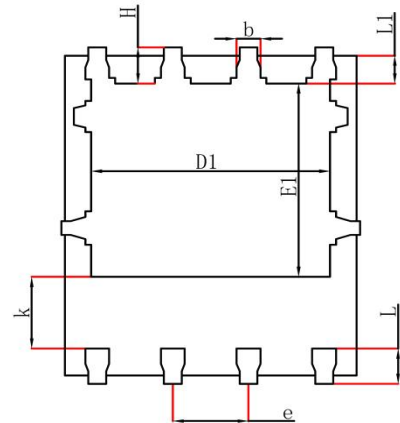


Safe Operation Area

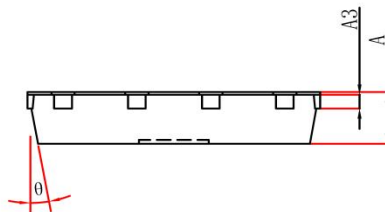
## PDFN5X6-8L Package Information



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°   |