

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---------------|-----------------|-------|
| 60V           | 13mΩ@10V        | 8A    |
|               | 18mΩ@4.5V       |       |



**合肥矽普半导体**

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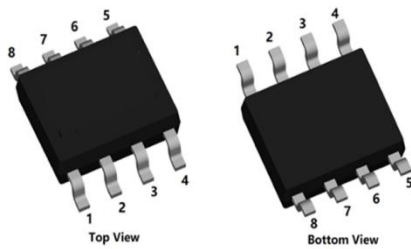
## Feature

- Fast Switching
- Low Gate Charge and Rdson
- 100% Single Pulse avalanche energy Test

## Applications

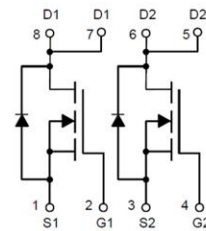
- Power Switching Application
- Hard switched and high frequency circuits
- Uninterruptible Power Supply

## Package

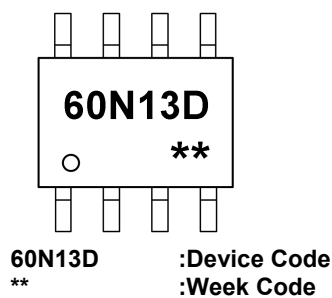


SOP-8L

## Circuit Diagram



## Marking



## Order Information

| Device     | Package | Unit/Tape |
|------------|---------|-----------|
| SP60N13DP8 | SOP-8L  | 4000      |

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

| Parameter                                   | Symbol          | Rating     | Units |
|---------------------------------------------|-----------------|------------|-------|
| Drain-Source Voltage                        | $V_{DS}$        | 60         | V     |
| Gate-Source Voltage                         | $V_{GS}$        | $\pm 20$   | V     |
| Continuous Drain Current                    | $I_D$           | 8          | A     |
| Pulsed Drain Current                        | $I_{DM}$        | 32         | A     |
| Single pulsed avalanche energy <sup>1</sup> | $E_{AS}$        | 30         | mJ    |
| Power Dissipation                           | $P_D$           | 3          | W     |
| Thermal Resistance Junction-to-Ambient      | $R_{\theta JA}$ | 41.7       | °C/W  |
| Storage Temperature Range                   | $T_{STG}$       | -55 to 150 | °C    |
| Operating Junction Temperature Range        | $T_J$           | -55 to 150 | °C    |

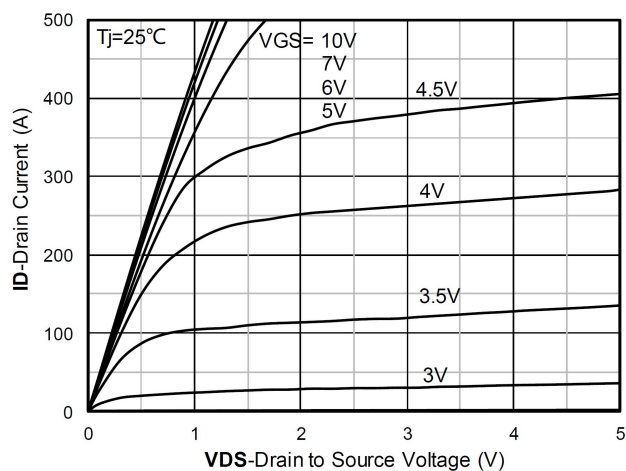
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

| Parameter                             | Symbol            | Conditions                      | Min. | Typ. | Max. | Unit |
|---------------------------------------|-------------------|---------------------------------|------|------|------|------|
| Static Characteristics                |                   |                                 |      |      |      |      |
| Drain-Source Breakdown Voltage        | BV <sub>DSS</sub> | VGS=0V , ID=250uA               | 60   | -    | -    | V    |
| Drain-Source Leakage Current          | IDSS              | VDS=48V , VGS=0V                | -    | -    | 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                 | -    | 13   | 18   | mΩ   |
|                                       |                   | VGS=4.5V , ID=6A                | -    | 18   | 26   |      |
| Dynamic characteristics               |                   |                                 |      |      |      |      |
| Input Capacitance                     | Ciss              | VDS=30V , VGS=0V , f=1MHz       | -    | 2403 | -    | pF   |
| Output Capacitance                    | Coss              |                                 | -    | 130  | -    |      |
| Reverse Transfer Capacitance          | Crss              |                                 | -    | 116  | -    |      |
| Total Gate Charge                     | Qg                | VDS=30V , VGS=10V , ID=5A       | -    | 39   | -    | nC   |
| Gate-Source Charge                    | Qgs               |                                 | -    | 5.6  | -    |      |
| Gate-Drain Charge                     | Qgd               |                                 | -    | 9.5  | -    |      |
| Switching Characteristics             |                   |                                 |      |      |      |      |
| Turn-On Delay Time                    | Td(on)            | VDD=30V, VGS=10V , RG=3Ω, ID=5A | -    | 7.8  | -    | nS   |
| Rise Time                             | Tr                |                                 | -    | 48   | -    |      |
| Turn-Off Delay Time                   | Td(off)           |                                 | -    | 28   | -    |      |
| Fall Time                             | Tf                |                                 | -    | 30   | -    |      |
| Diode Characteristics                 |                   |                                 |      |      |      |      |
| Diode Forward Voltage                 | VSD               | VGS=0V , IS=1A                  | -    | -    | 1.2  | V    |
| Maximum Body-Diode Continuous Current | IS                |                                 | -    | -    | 8    | A    |
| Reverse Recovery Time                 | Trr               | IS=5A, di/dt=100A/us, TJ=25°C   | -    | 19   | -    | nS   |
| Reverse Recovery Charge               | Qrr               |                                 | -    | 84   | -    | nC   |

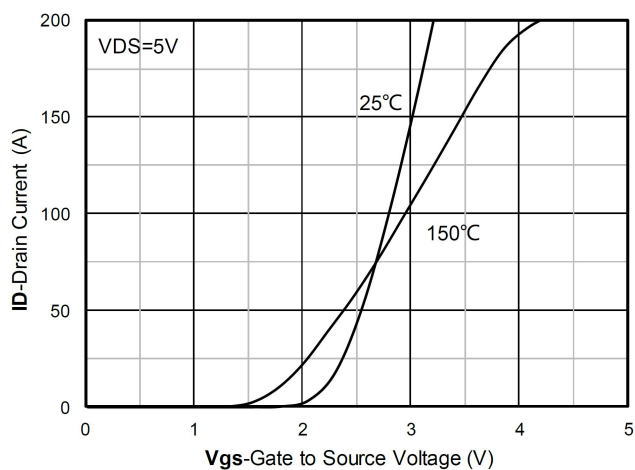
**Note:**

- The EAS Test condition is  $V_{DD}=30V$ ,  $V_{GS}=10V$ ,  $L=0.5mH$ ,  $R_g=25\Omega$

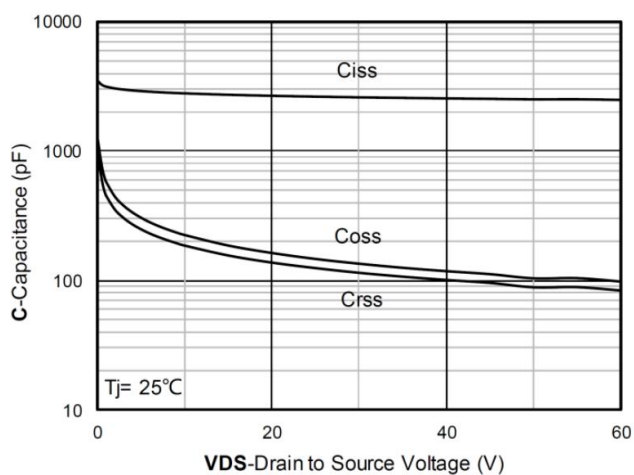
## Typical Characteristics



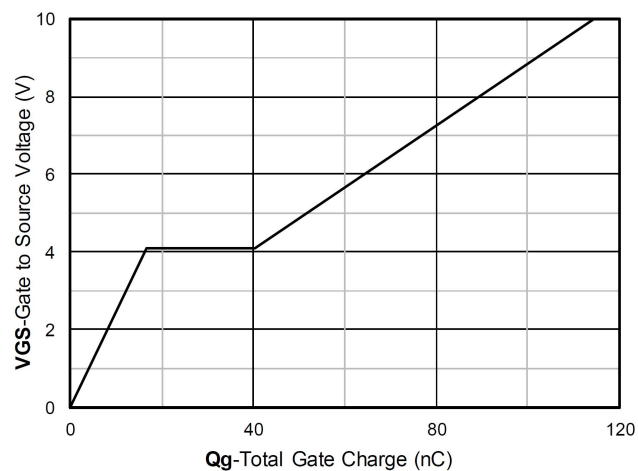
Output Characteristics



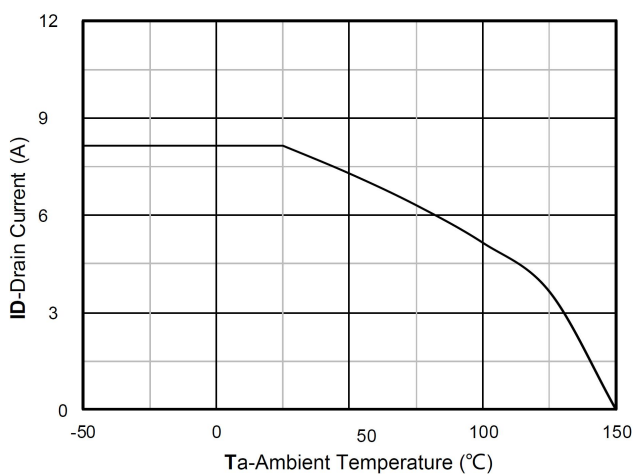
Transfer Characteristics



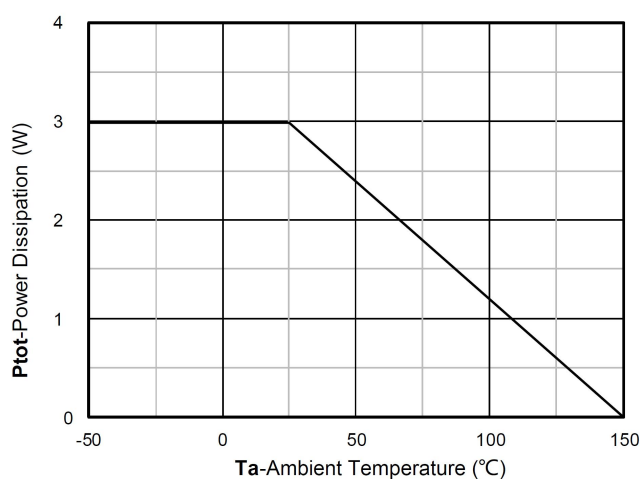
Capacitance Characteristics



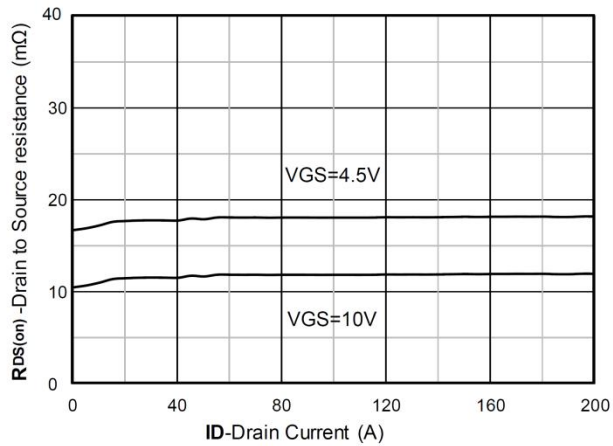
Gate Charge



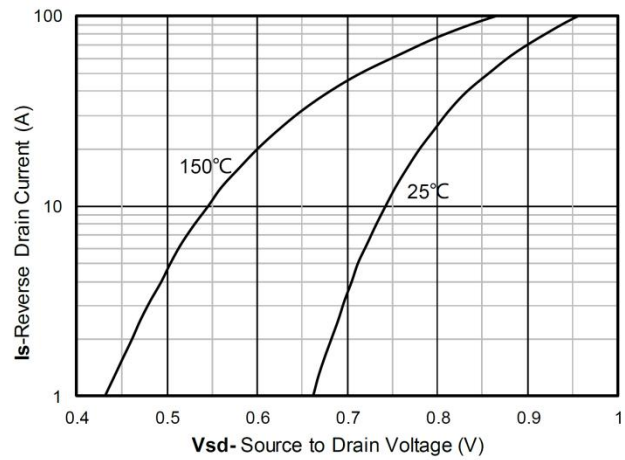
Current dissipation



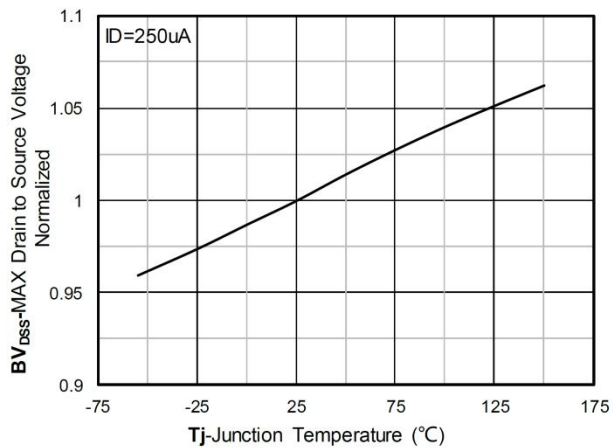
Power dissipation



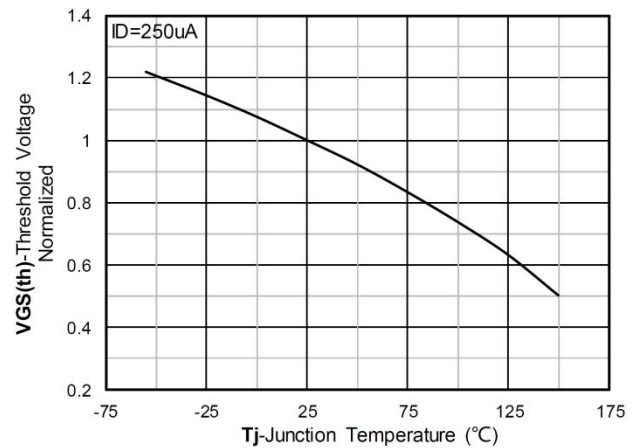
RDS(on) VS Drain Current



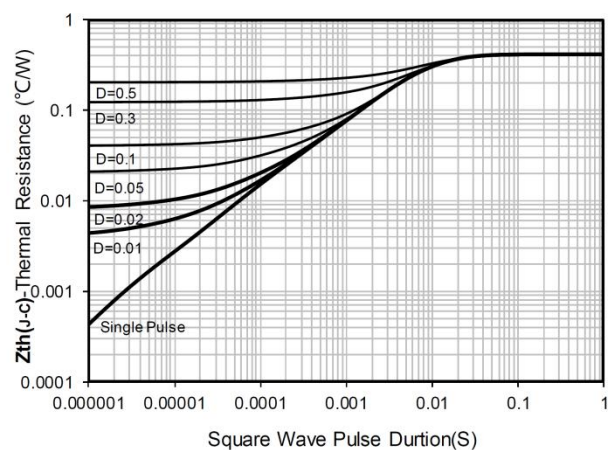
Forward characteristics of reverse diode



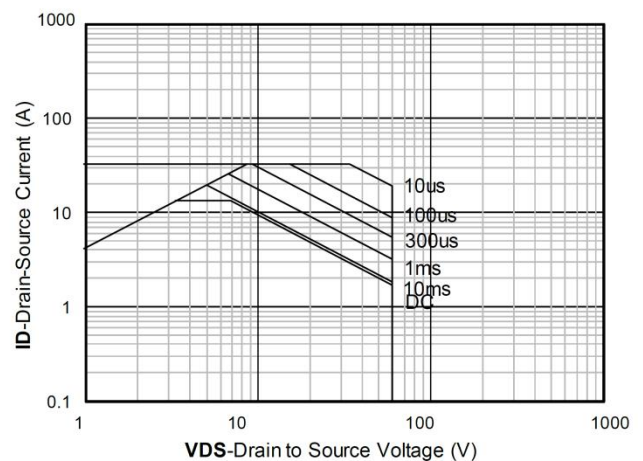
Normalized breakdown voltage



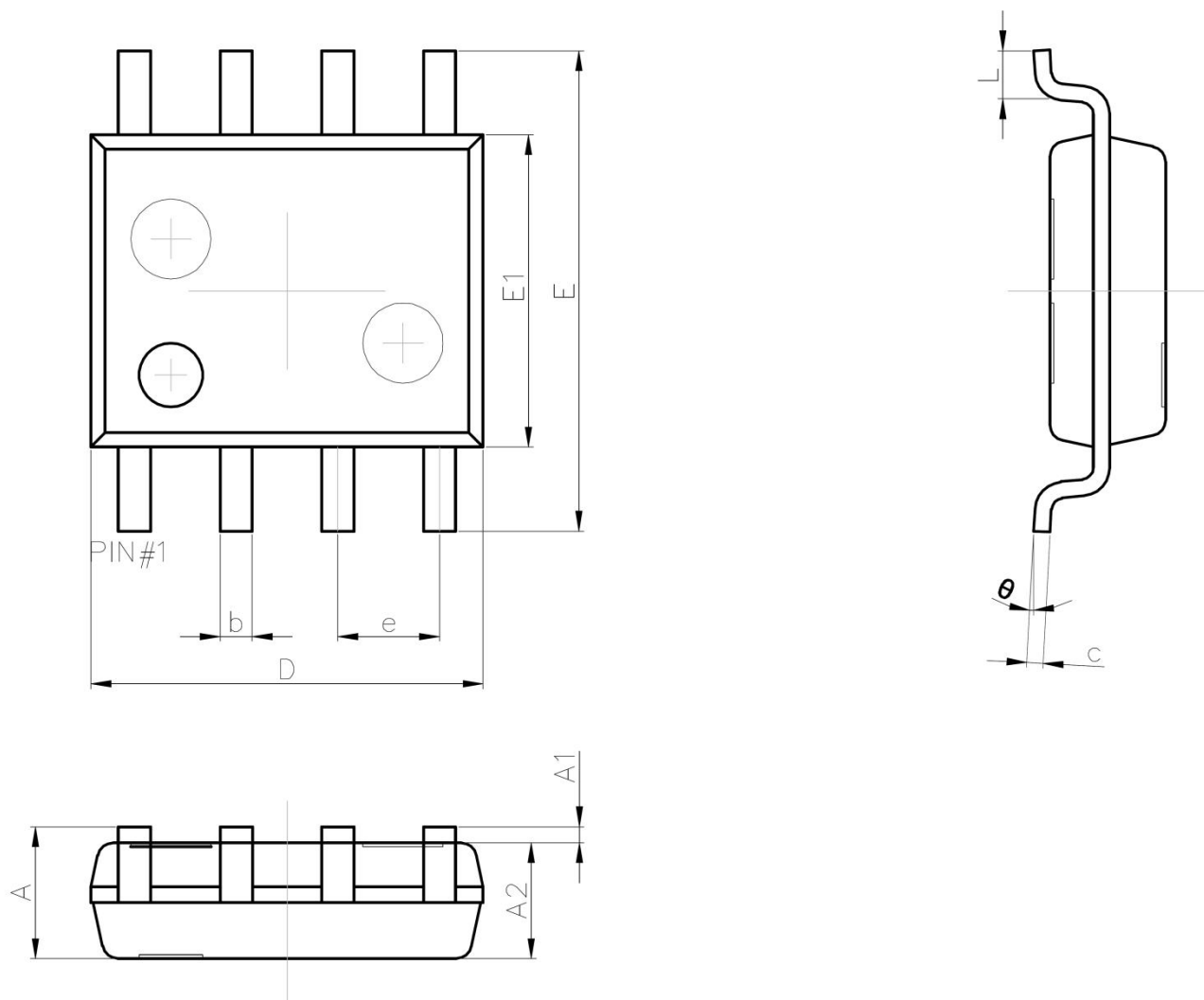
Normalized Threshold voltage



Maximum Transient Thermal Impedance



Safe Operation Area

**SOP-8L Package Information**


| Symbol   | Dimensions In Millimeters |      |
|----------|---------------------------|------|
|          | Min.                      | Max. |
| A        | 1.35                      | 1.75 |
| A1       | 0.10                      | 0.25 |
| A2       | 1.35                      | 1.55 |
| b        | 0.33                      | 0.51 |
| c        | 0.17                      | 0.25 |
| D        | 4.80                      | 5.00 |
| e        | 1.27 REF.                 |      |
| E        | 5.80                      | 6.20 |
| E1       | 3.80                      | 4.00 |
| L        | 0.40                      | 1.27 |
| $\theta$ | 0°                        | 8°   |