

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---------------|-----------------|-------|
| -40V          | 65mΩ@-10V       | -3A   |
|               | 85mΩ@-4.5V      |       |



**合肥矽普半导体**

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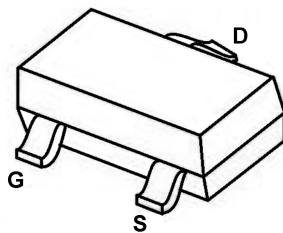
## Feature

- High power and current handling capability
- Surface mount package

## Application

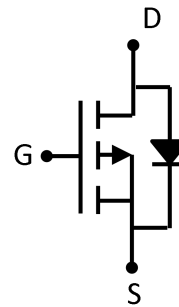
- Battery Switch
- DC/DC Converter

## Package

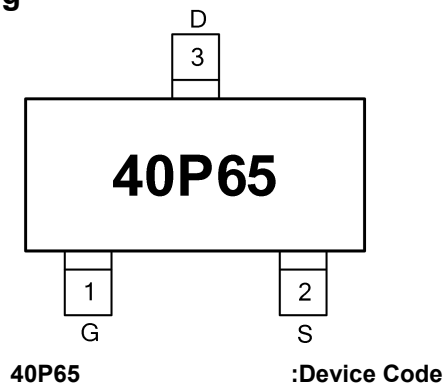


SOT-23-3L

## Circuit diagram



## Marking



## Order Information

| Device    | Package   | Unit/Tape |
|-----------|-----------|-----------|
| SP40P65T1 | SOT-23-3L | 3000      |

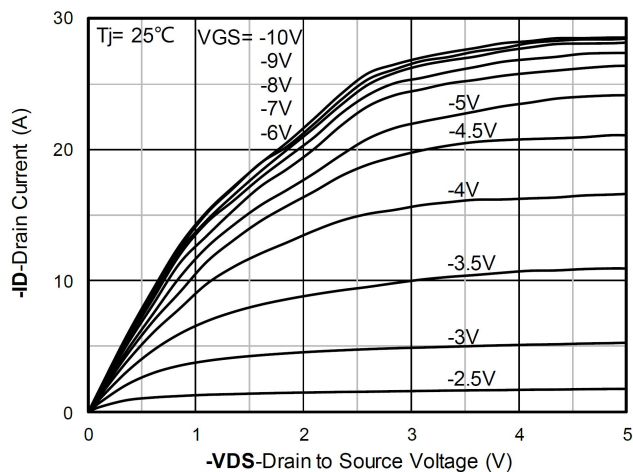
**Absolute maximum ratings (Ta=25°C, unless otherwise noted)**

| Parameter                              | Symbol          | Value      | Unit |
|----------------------------------------|-----------------|------------|------|
| Drain-Source Voltage                   | $V_{DS}$        | -40        | V    |
| Gate-Source Voltage                    | $V_{GS}$        | $\pm 20$   | V    |
| Continuous Drain Current               | $I_D$           | -3         | A    |
| Pulse Drain Current Tested             | $I_{DM}$        | -12        | A    |
| Power Dissipation                      | $P_D$           | 1          | W    |
| Thermal Resistance Junction-to-Ambient | $R_{\theta JA}$ | 125        | °C/W |
| Storage Temperature Range              | $T_{STG}$       | -55 to 150 | °C   |
| Operating Junction Temperature Range   | $T_J$           | -55 to 150 | °C   |

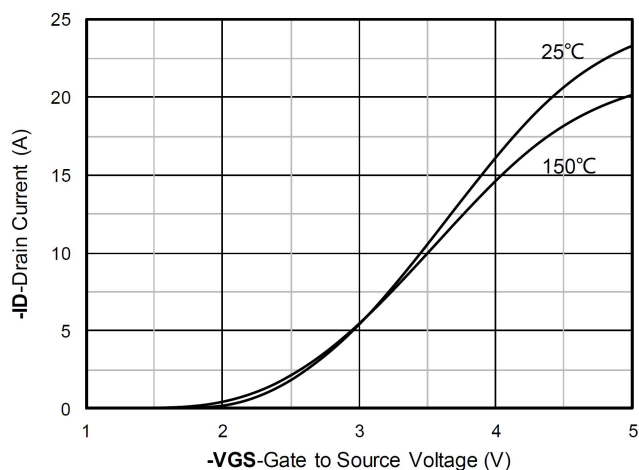
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

| Parameter                          | Symbol              | Conditions                           | Min. | Typ. | Max. | Unit |
|------------------------------------|---------------------|--------------------------------------|------|------|------|------|
| Static Characteristics             |                     |                                      |      |      |      |      |
| Drain-Source Breakdown Voltage     | BV <sub>DSS</sub>   | VGS=0V , ID=-250μA                   | -40  | -    | -    | V    |
| Drain-Source Leakage Current       | I <sub>DSS</sub>    | VDS=-32V , VGS=0V                    | -    | -    | -1   | uA   |
| Gate-Source Leakage Current        | I <sub>GSS</sub>    | VGS=±20V , VDS=0V                    | -    | -    | ±100 | nA   |
| Gate Threshold Voltage             | VGS(th)             | VDS=VGS , ID=-250μA                  | -1.0 | -1.5 | -2.5 | V    |
| Static Drain-Source On-Resistance  | R <sub>DS(ON)</sub> | VGS=-10V , ID =-3A                   | -    | 65   | 85   | mΩ   |
|                                    |                     | VGS=-4.5V , ID =-2A                  | -    | 85   | 110  |      |
| Dynamic characteristics            |                     |                                      |      |      |      |      |
| Input Capacitance                  | C <sub>iss</sub>    | VDS=-15V , VGS=0V , f=1MHz           | -    | 520  | -    | pF   |
| Output Capacitance                 | C <sub>oss</sub>    |                                      | -    | 52   | -    |      |
| Reverse Transfer Capacitance       | C <sub>rss</sub>    |                                      | -    | 41   | -    |      |
| Total Gate Charge                  | Q <sub>g</sub>      | VDS=-20V , VGS=-10V , ID=-3A         | -    | 9    | -    | nC   |
| Gate-Source Charge                 | Q <sub>gs</sub>     |                                      | -    | 1    | -    |      |
| Gate-Drain Charge                  | Q <sub>gd</sub>     |                                      | -    | 2.5  | -    |      |
| Switching Characteristics          |                     |                                      |      |      |      |      |
| Turn-On Delay Time                 | t <sub>d(on)</sub>  | VDD=-20V VGS=-10V , RG=3.3Ω , ID=-3A | -    | 4.2  | -    | nS   |
| Turn-On Rise Time                  | t <sub>r</sub>      |                                      | -    | 6    | -    |      |
| Turn-Off Delay Time                | t <sub>d(off)</sub> |                                      | -    | 26.8 | -    |      |
| Turn-Off Fall Time                 | t <sub>f</sub>      |                                      | -    | 20.6 | -    |      |
| Source-Drain Diode characteristics |                     |                                      |      |      |      |      |
| Diode Forward Voltage              | V <sub>SD</sub>     | VGS=0V , IS=-1A , TJ=25℃             | -    | -    | -1.2 | V    |

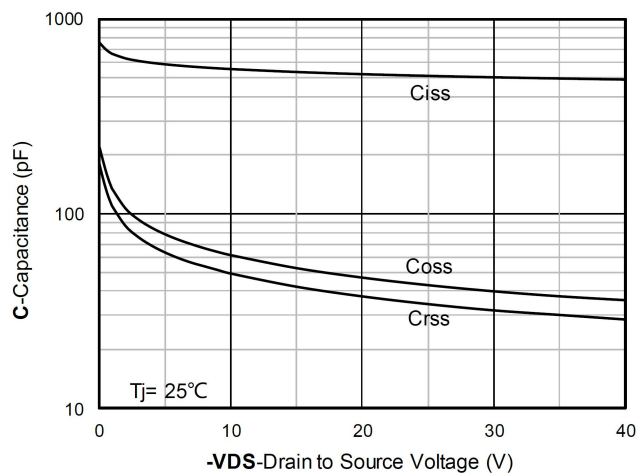
## Typical Characteristics



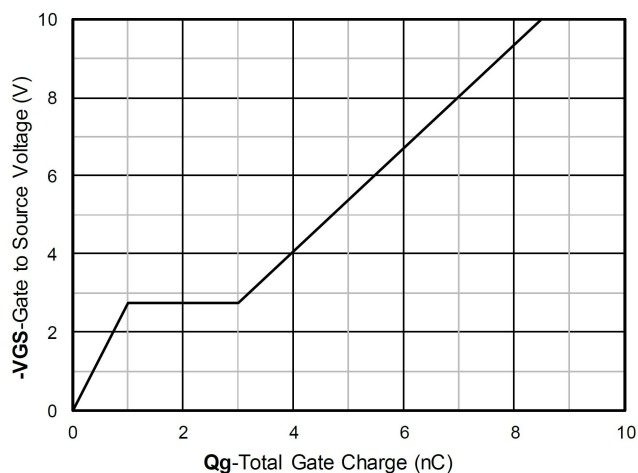
Output Characteristics



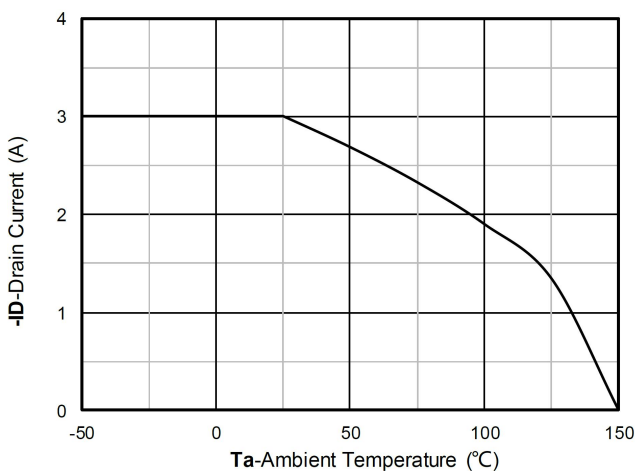
Transfer Characteristics



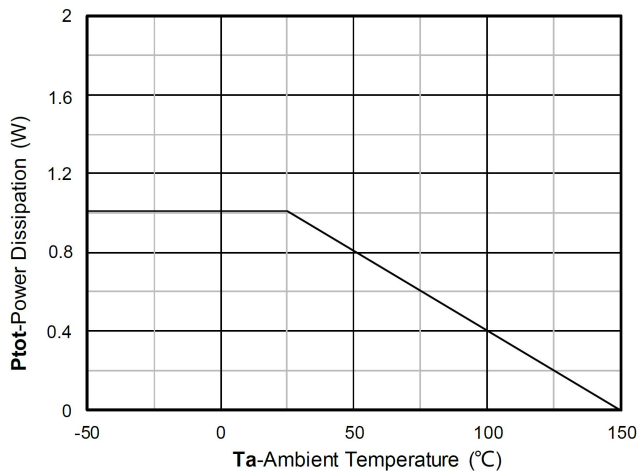
Capacitance Characteristics



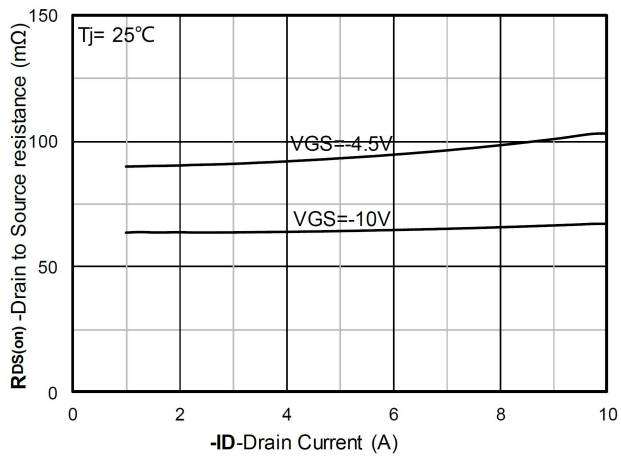
Gate Charge



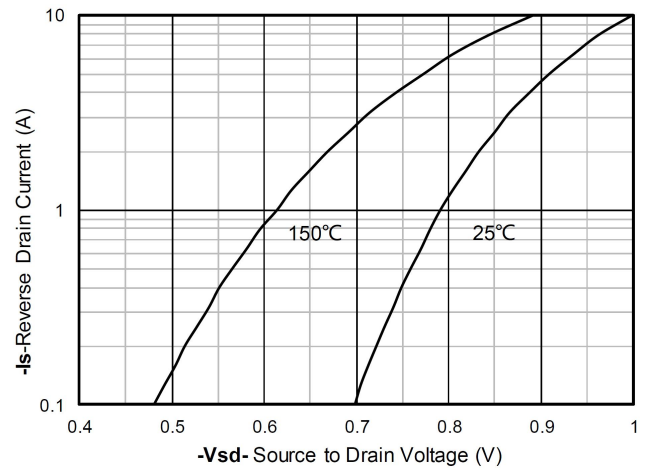
Current dissipation



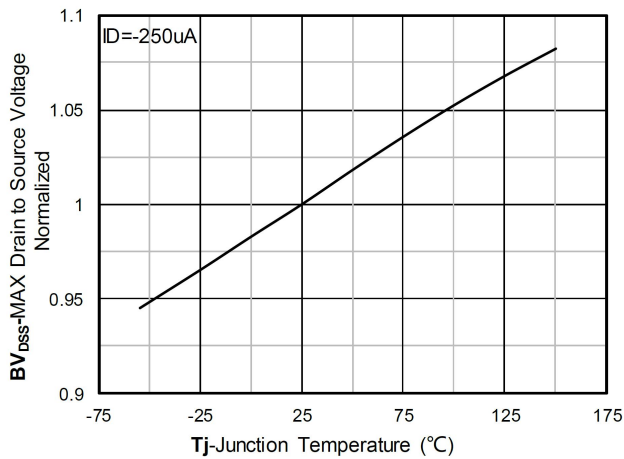
Power dissipation



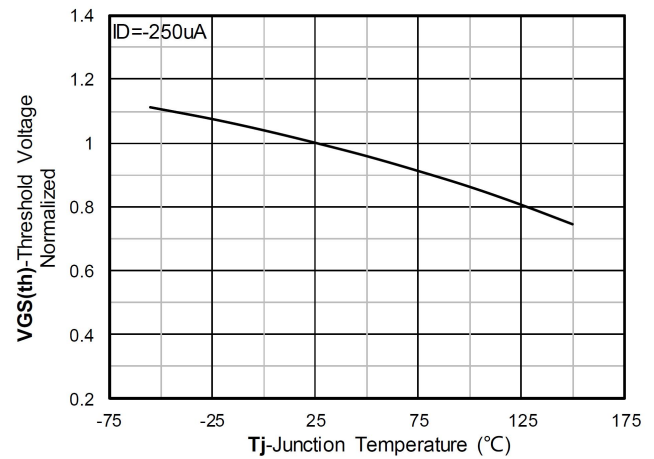
RDS(on) VS Drain Current



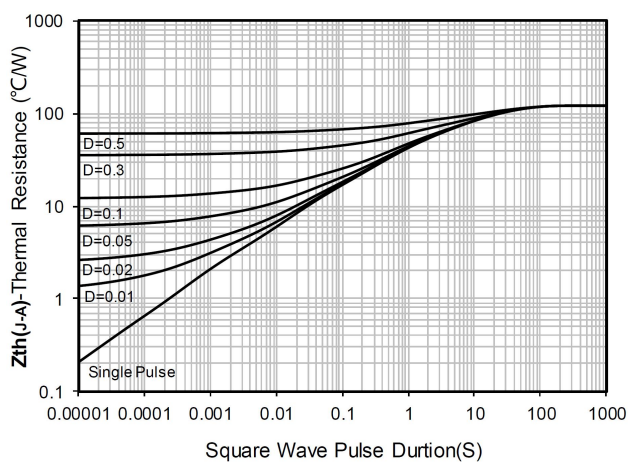
Forward characteristics of reverse diode



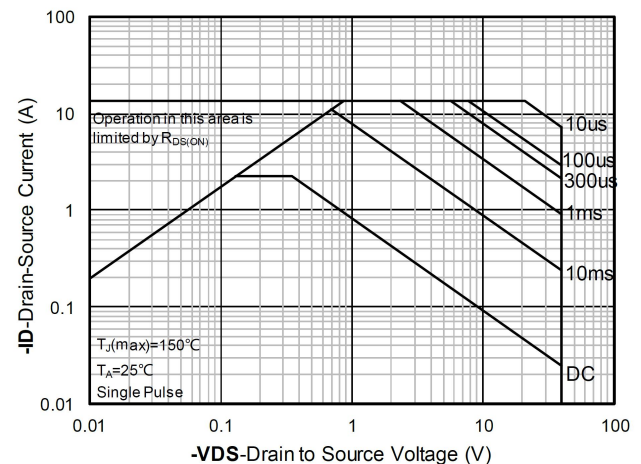
Normalized breakdown voltage



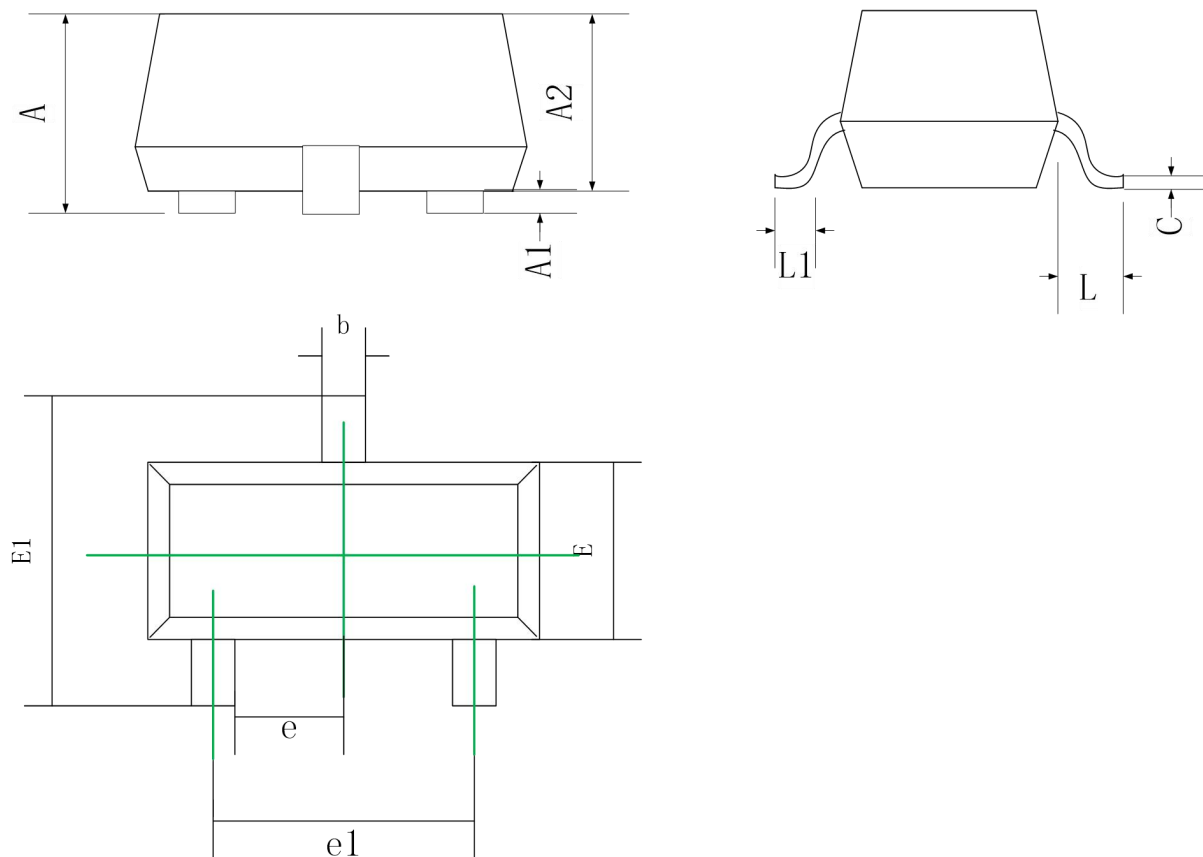
Normalized Threshold voltage



Maximum Transient Thermal Impedance



Safe Operation Area

**SOT-23-3L Package Information**


| Symbol | Dimensions in millimeters |       |
|--------|---------------------------|-------|
|        | Min.                      | Max.  |
| A      | 1.050                     | 1.250 |
| A1     | 0.000                     | 0.100 |
| A2     | 1.050                     | 1.150 |
| b      | 0.300                     | 0.500 |
| c      | 0.100                     | 0.200 |
| D      | 2.820                     | 3.020 |
| E      | 1.500                     | 1.700 |
| E1     | 2.650                     | 2.950 |
| e      | 0.950 Typ.                |       |
| e1     | 1.800                     | 2.000 |
| L      | 0.300                     | 0.600 |
| θ      | 0°                        | 8°    |