

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---------------|-----------------|-------|
| 30V           | 23mΩ@10V        | 5.8A  |
|               | 28mΩ@4.5V       |       |



**合肥矽普半导体**

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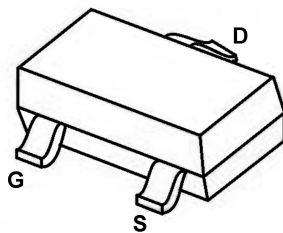
## Feature

- High power and current handling capability
- Surface mount package

## Application

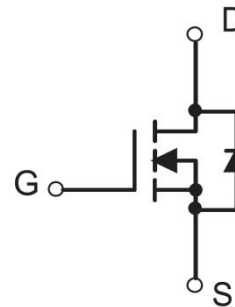
- Battery Switch
- DC/DC Converter

## Package

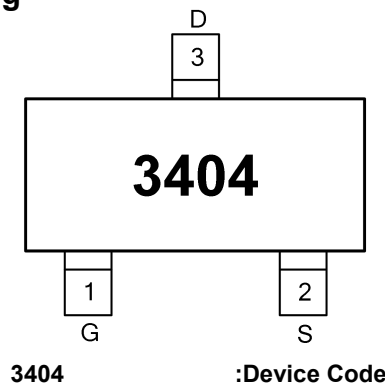


SOT-23-3L

## Circuit diagram



## Marking



## Order Information

| Device   | Package   | Unit/Tape |
|----------|-----------|-----------|
| SP3404T1 | SOT-23-3L | 3000      |

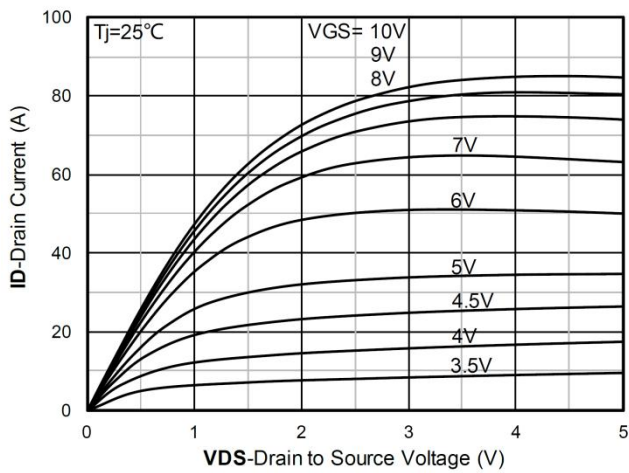
**Absolute maximum ratings (Ta=25°C, unless otherwise noted)**

| Parameter                              | Symbol          | Value      | Unit |
|----------------------------------------|-----------------|------------|------|
| Drain-Source Voltage                   | $V_{DS}$        | 30         | V    |
| Gate-Source Voltage                    | $V_{GS}$        | $\pm 20$   | V    |
| Continuous Drain Current               | $I_D$           | 5.8        | A    |
| Pulse Drain Current Tested             | $I_{DM}$        | 23.2       | A    |
| Power Dissipation                      | $P_D$           | 1.4        | W    |
| Thermal Resistance Junction-to-Ambient | $R_{\theta JA}$ | 89.3       | °C/W |
| Storage Temperature Range              | $T_{STG}$       | -55 to 150 | °C   |
| Operating Junction Temperature Range   | $T_J$           | -55 to 150 | °C   |

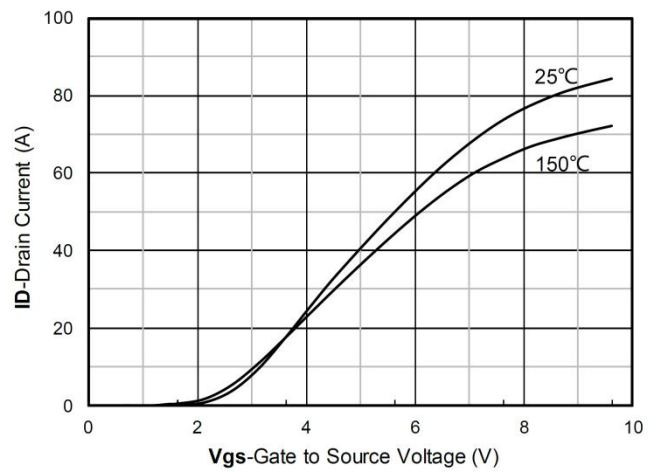
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

| Parameter                          | Symbol              | Conditions                        | Min. | Typ. | Max. | Unit |
|------------------------------------|---------------------|-----------------------------------|------|------|------|------|
| Static Characteristics             |                     |                                   |      |      |      |      |
| Drain-Source Breakdown Voltage     | BV <sub>DSS</sub>   | VGS=0V , ID=250μA                 | 30   | -    | -    | V    |
| Drain-Source Leakage Current       | I <sub>DSS</sub>    | VDS=24V , 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    | 1.5  | 3    | V    |
| Static Drain-Source On-Resistance  | R <sub>DS(ON)</sub> | VGS=10V , ID =4A                  | -    | 23   | 28   | mΩ   |
|                                    |                     | VGS=4.5V , ID =3A                 | -    | 28   | 42   |      |
| Dynamic characteristics            |                     |                                   |      |      |      |      |
| Input Capacitance                  | C <sub>iss</sub>    | VDS=15V , VGS=0V , f=1MHz         | -    | 420  | -    | pF   |
| Output Capacitance                 | C <sub>oss</sub>    |                                   | -    | 60   | -    |      |
| Reverse Transfer Capacitance       | C <sub>rss</sub>    |                                   | -    | 53   | -    |      |
| Total Gate Charge                  | Q <sub>g</sub>      | VDS=15V , VGS=4.5V , ID=3A        | -    | 9    | -    | nC   |
| Gate-Source Charge                 | Q <sub>gs</sub>     |                                   | -    | 1.9  | -    |      |
| Gate-Drain Charge                  | Q <sub>gd</sub>     |                                   | -    | 2.1  | -    |      |
| Switching Characteristics          |                     |                                   |      |      |      |      |
| Turn-On Delay Time                 | t <sub>d(on)</sub>  | VDD=15V VGS=10V , RG=3.3Ω , ID=4A | -    | 5    | -    | nS   |
| Turn-On Rise Time                  | t <sub>r</sub>      |                                   | -    | 11   | -    |      |
| Turn-Off Delay Time                | t <sub>d(off)</sub> |                                   | -    | 14   | -    |      |
| Turn-Off Fall Time                 | t <sub>f</sub>      |                                   | -    | 2.1  | -    |      |
| Source-Drain Diode characteristics |                     |                                   |      |      |      |      |
| Diode Forward Voltage              | V <sub>SD</sub>     | VGS=0V , IS=1A , TJ=25℃           | -    | -    | 1.2  | V    |

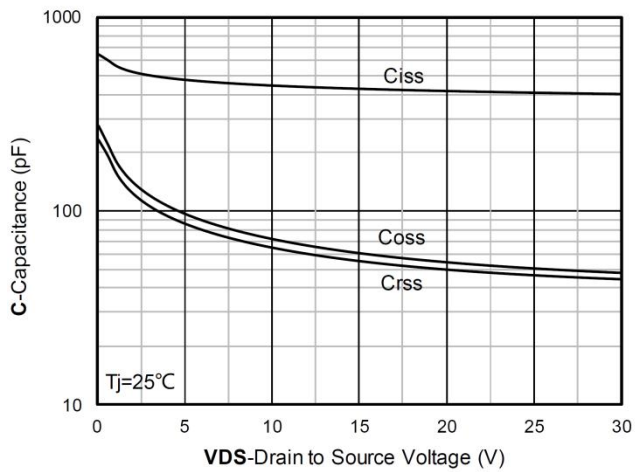
## Typical Characteristics



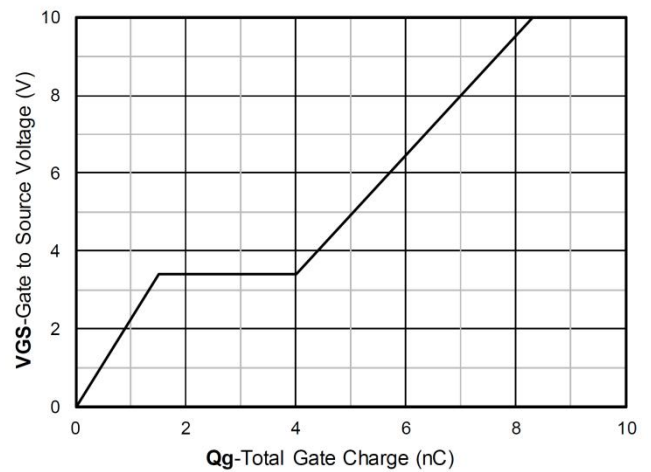
Output Characteristics



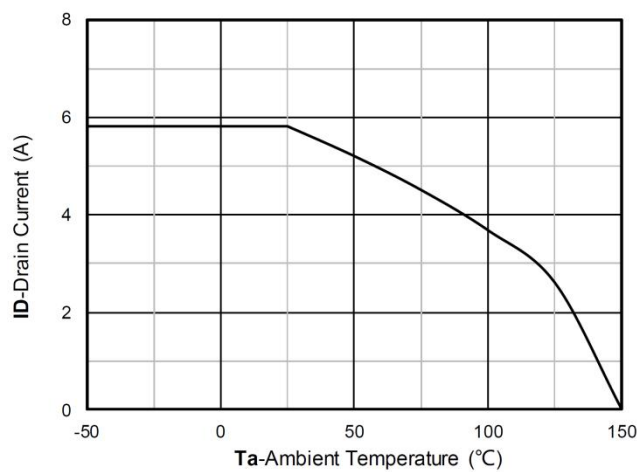
Transfer Characteristics



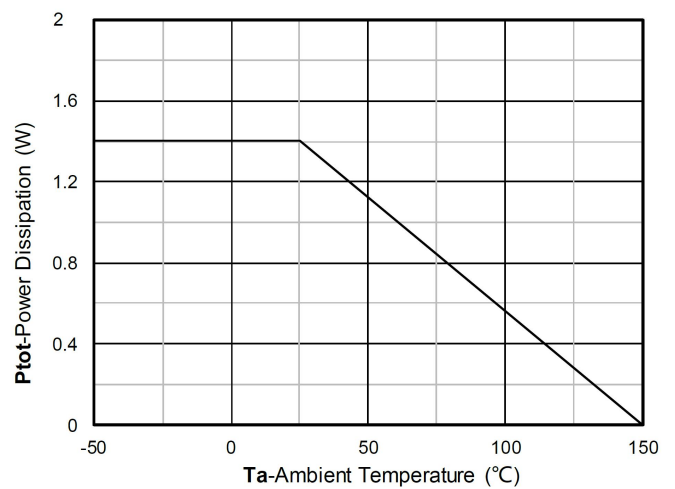
Capacitance Characteristics



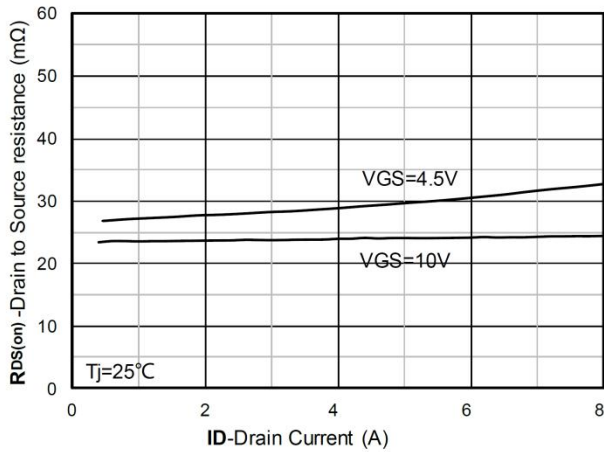
Gate Charge



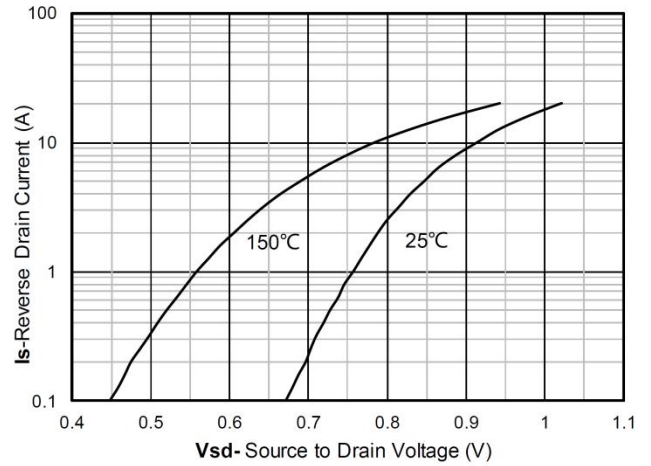
Current dissipation



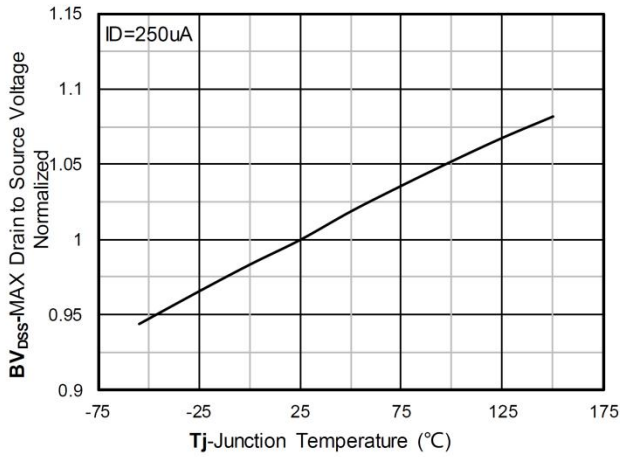
Power dissipation



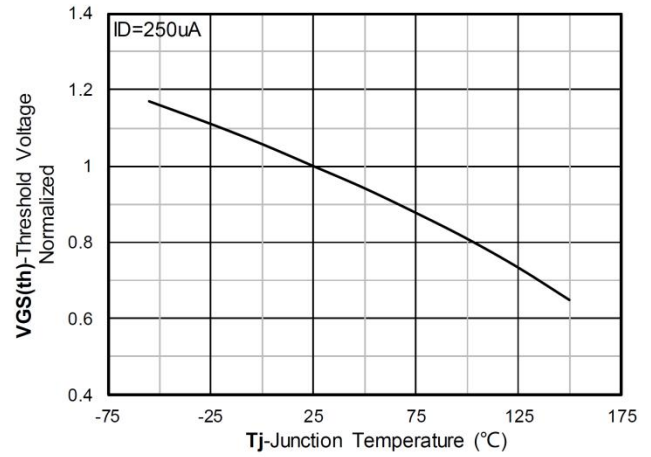
$R_{DS(on)}$  VS Drain Current



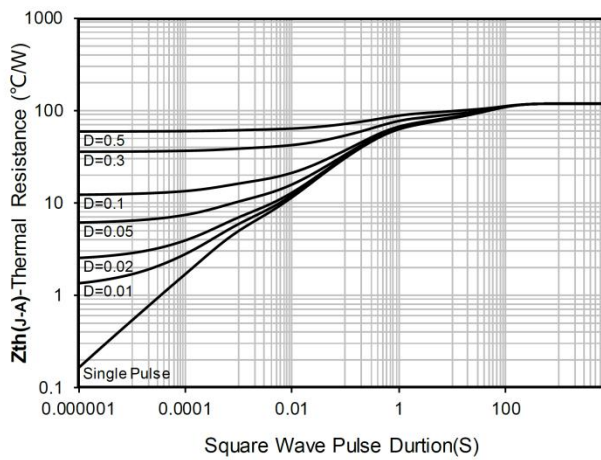
Forward characteristics of reverse diode



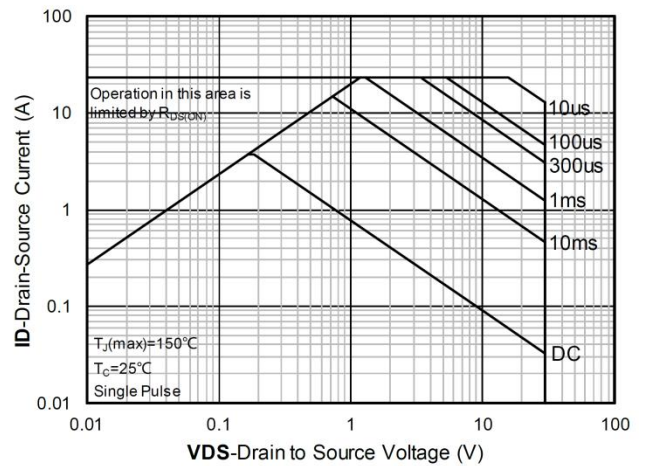
Normalized breakdown voltage



Normalized Threshold voltage

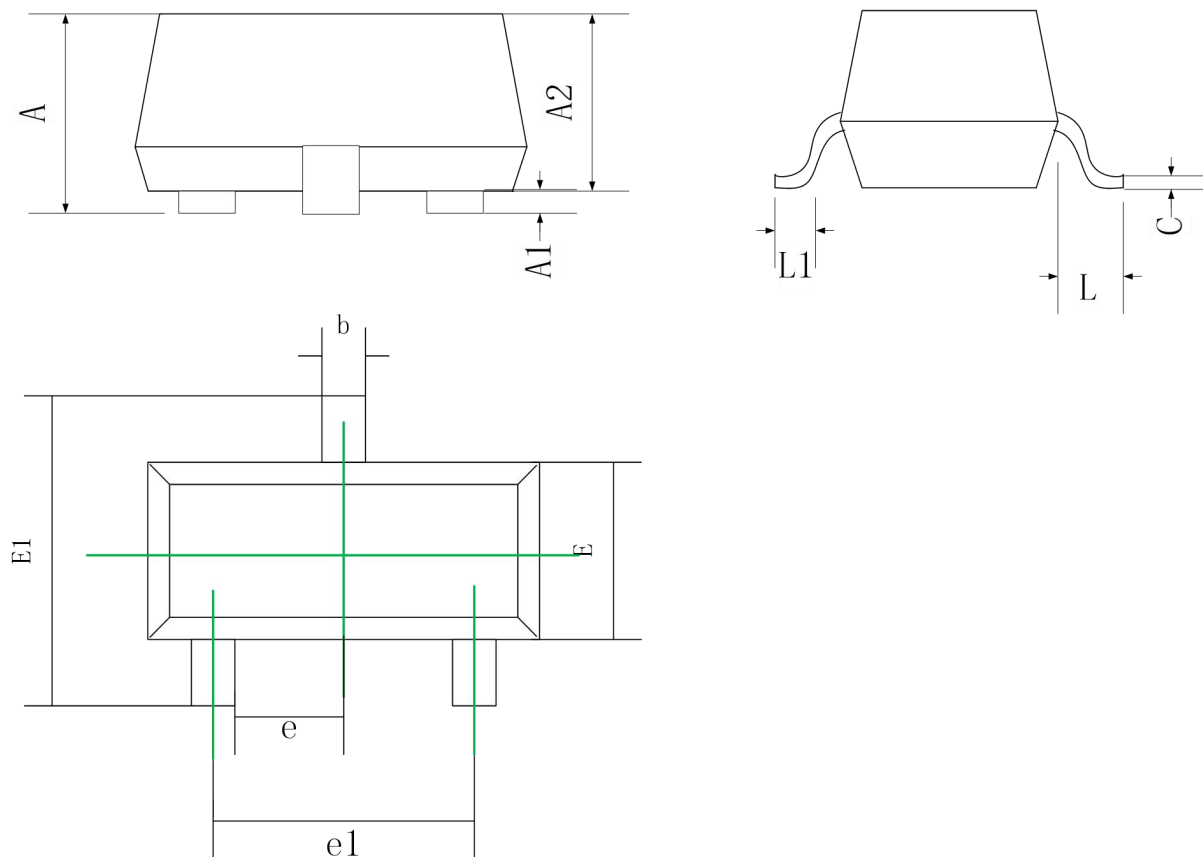


Maximum Transient Thermal Impedance



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°    |