

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
|---------------|-----------------|-------|
| -30V          | 41mΩ@-10V       | -5.5A |
|               | 49mΩ@-4.5V      |       |
|               | 70mΩ@-2.5V      |       |



**合肥矽普半导体**

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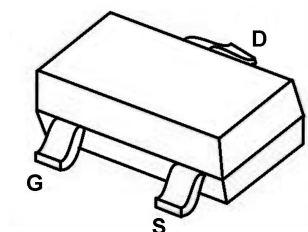
## Feature

- High power and current handling capability
- Surface mount package

## Application

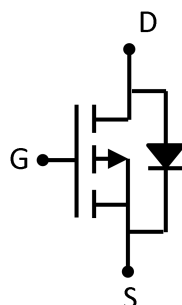
- Battery Switch
- DC/DC Converter

## Package

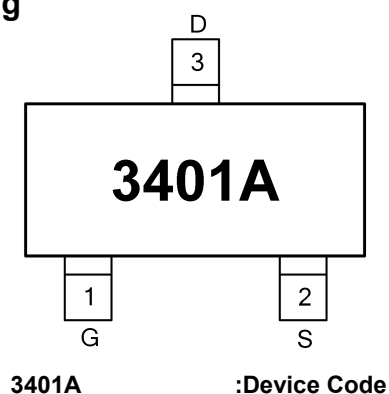


SOT-23-3L

## Circuit diagram



## Marking



## Order Information

| Device    | Package   | Unit/Tape |
|-----------|-----------|-----------|
| SP3401AT1 | SOT-23-3L | 3000      |

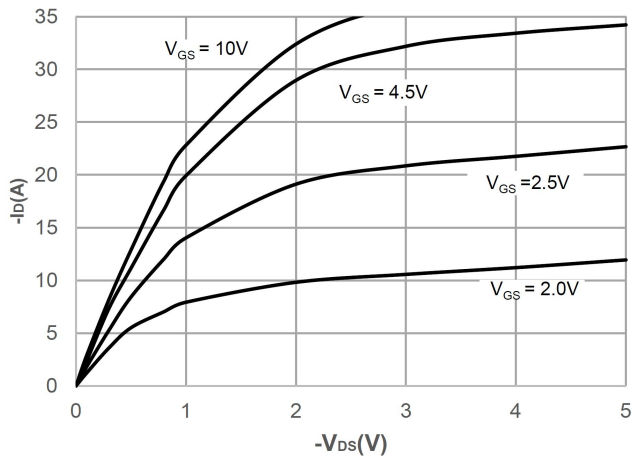
**Absolute maximum ratings (Ta=25°C, unless otherwise noted)**

| Parameter                              | Symbol          | Value      | Unit |
|----------------------------------------|-----------------|------------|------|
| Drain-Source Voltage                   | $V_{DS}$        | -30        | V    |
| Gate-Source Voltage                    | $V_{GS}$        | $\pm 12$   | V    |
| Continuous Drain Current               | $I_D$           | -5.5       | A    |
| Pulse Drain Current Tested             | $I_{DM}$        | -22        | A    |
| Power Dissipation                      | $P_D$           | 1.3        | W    |
| Thermal Resistance Junction-to-Ambient | $R_{\theta JA}$ | 96         | °C/W |
| Storage Temperature Range              | $T_{STG}$       | -55 to 150 | °C   |
| Operating Junction Temperature Range   | $T_J$           | -55 to 150 | °C   |

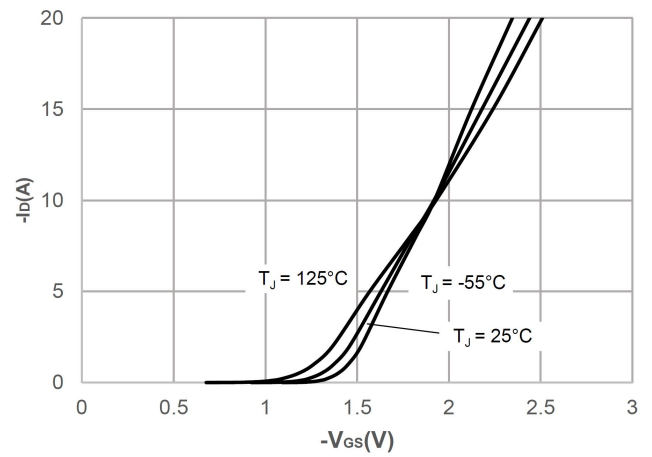
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

| 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=±12V , VDS=0V                    | -    | -    | ±100 | nA   |
| Gate Threshold Voltage             | V <sub>GS(th)</sub> | VDS=VGS , ID=-250μA                  | -0.6 | -0.9 | -1.3 | V    |
| Static Drain-Source On-Resistance  | R <sub>DS(ON)</sub> | VGS=-10V , ID =-4.2A                 | -    | 41   | 55   | mΩ   |
|                                    |                     | VGS=-4.5V , ID =-4A                  | -    | 49   | 65   |      |
|                                    |                     | VGS=-2.5V , ID =-2A                  | -    | 70   | 85   |      |
| Dynamic characteristics            |                     |                                      |      |      |      |      |
| Input Capacitance                  | C <sub>iss</sub>    | VDS=-15V , VGS=0V , f=1MHz           | -    | 880  | -    | pF   |
| Output Capacitance                 | C <sub>oss</sub>    |                                      | -    | 105  | -    |      |
| Reverse Transfer Capacitance       | C <sub>rss</sub>    |                                      | -    | 60   | -    |      |
| Total Gate Charge                  | Q <sub>g</sub>      | VDS=-15V , VGS=-4.5V , ID=-4.2A      | -    | 8.5  | -    | nC   |
| Gate-Source Charge                 | Q <sub>gs</sub>     |                                      | -    | 1.8  | -    |      |
| Gate-Drain Charge                  | Q <sub>gd</sub>     |                                      | -    | 2.7  | -    |      |
| Switching Characteristics          |                     |                                      |      |      |      |      |
| Turn-On Delay Time                 | t <sub>d(on)</sub>  | VDD=-15V VGS=-10V , RG=6Ω , ID=-4.2A | -    | 6.3  | -    | nS   |
| Turn-On Rise Time                  | t <sub>r</sub>      |                                      | -    | 3.2  | -    |      |
| Turn-Off Delay Time                | t <sub>d(off)</sub> |                                      | -    | 38.2 | -    |      |
| Turn-Off Fall Time                 | t <sub>f</sub>      |                                      | -    | 12   | -    |      |
| Source-Drain Diode characteristics |                     |                                      |      |      |      |      |
| Diode Forward Voltage              | V <sub>SD</sub>     | VGS=0V , IS=-1A , TJ=25℃             | -    | -    | -1.2 | V    |

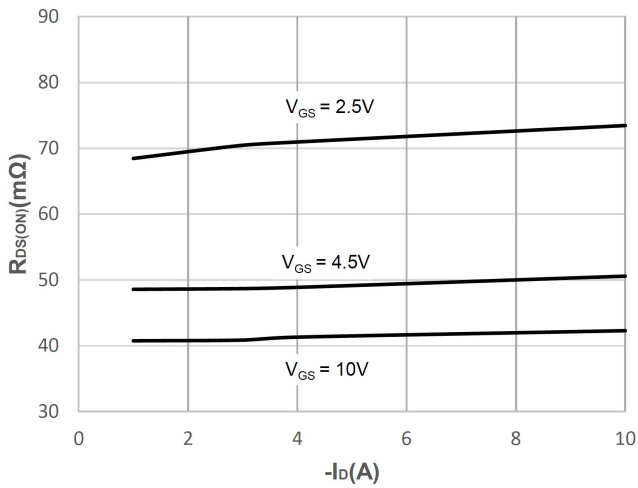
## Typical Characteristics



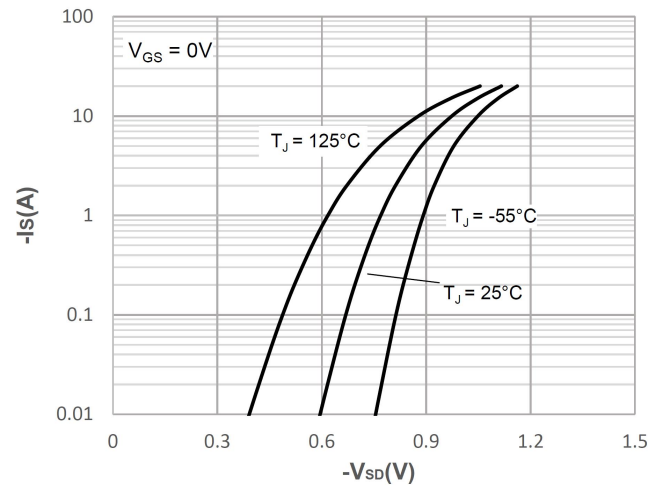
Output Characteristics



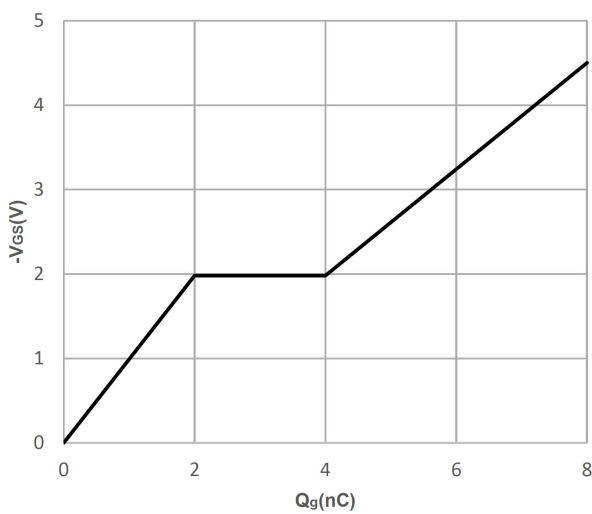
Typical Transfer Characteristics



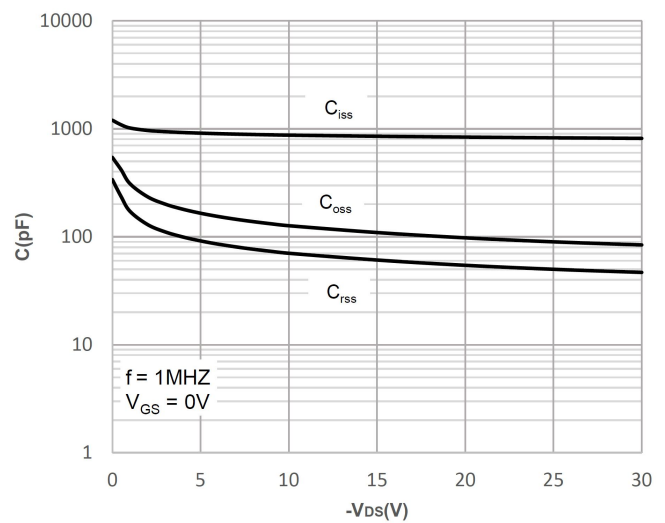
On-resistance vs. Drain Current



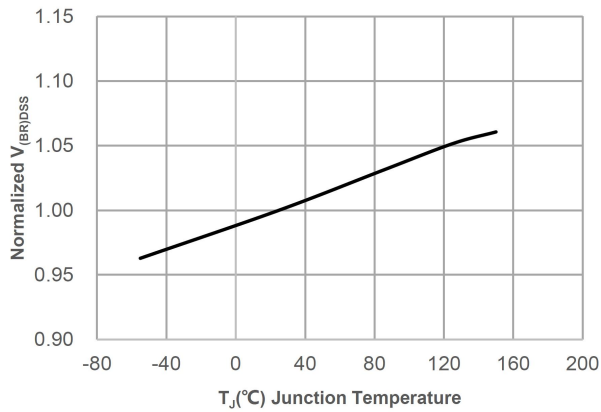
Body Diode Characteristics



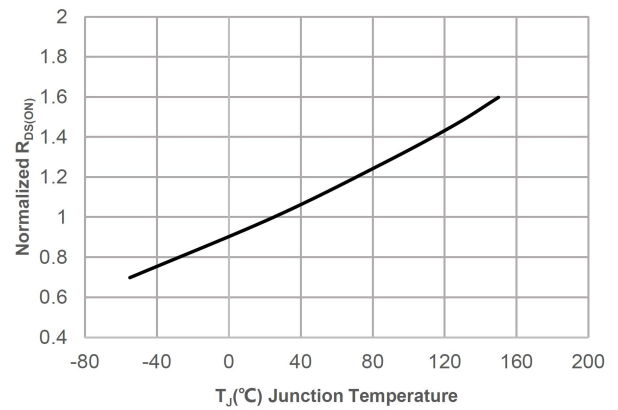
Gate Charge Characteristics



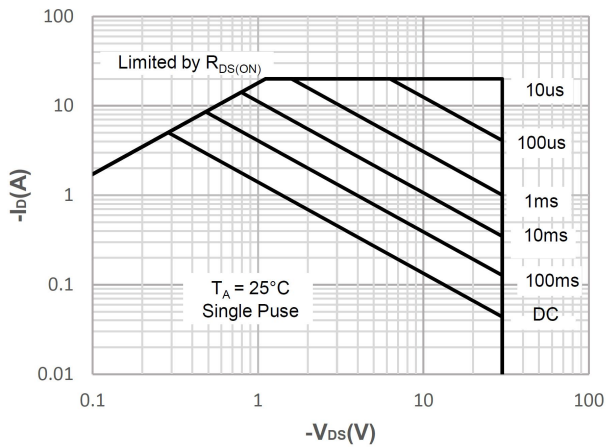
Capacitance Characteristics



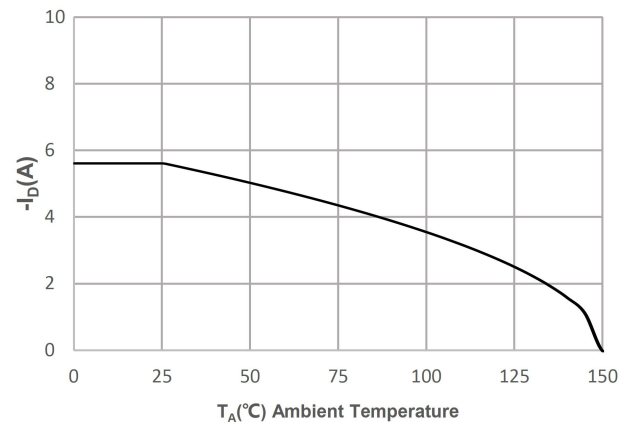
Normalized Breakdown voltage vs. Junction Temperature



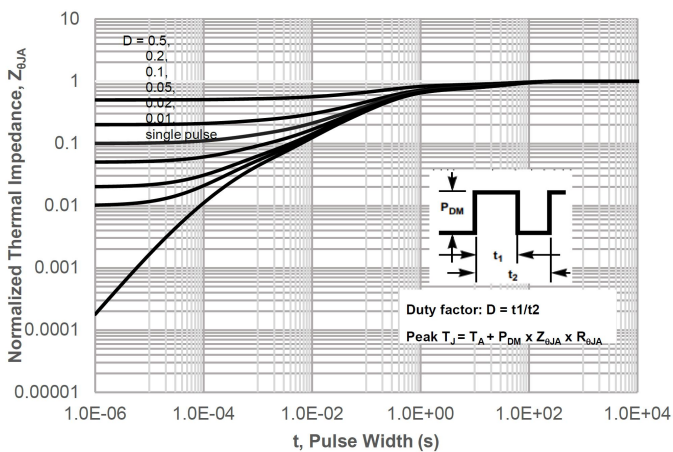
Normalized on Resistance vs. Junction Temperature



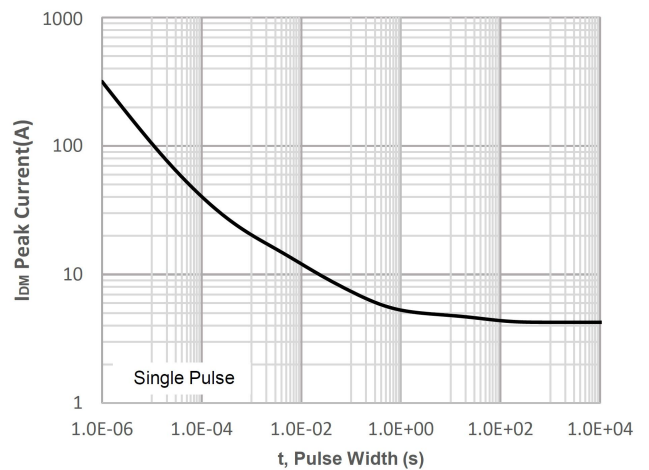
Maximum Safe Operating Area



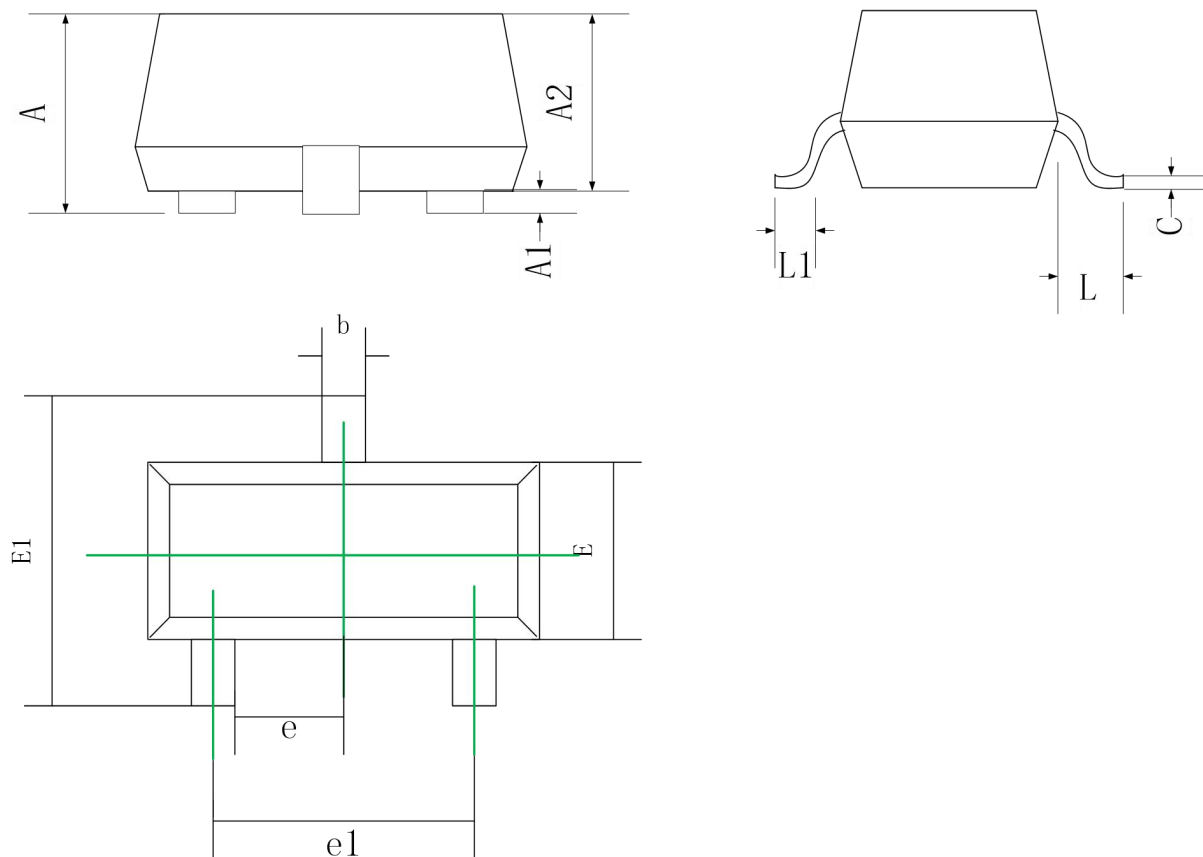
Maximum Continuous Drain Current vs. Ambient Temperature



Normalized Maximum Transient Thermal Impedance



Peak Current Capacity

**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°    |