

## Product Summary

|               |                 |       |
|---------------|-----------------|-------|
| $V_{(BR)DSS}$ | $R_{DS(on)TYP}$ | $I_D$ |
| 80V           | 3.5mΩ@10V       | 130A  |



**合肥矽普半导体**

Siliup Semiconductor Technology Co., Ltd

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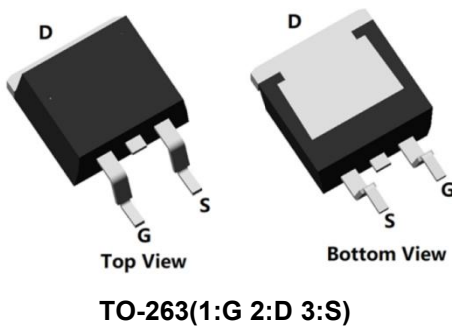
## Feature

- Fast Switching
- Low Gate Charge and Rdson
- Advanced Split Gate Trench Technology
- 100% Single Pulse avalanche energy Test

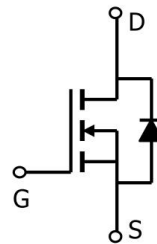
## Applications

- Power switching application
- DC-DC Converter
- Uninterruptible power supply

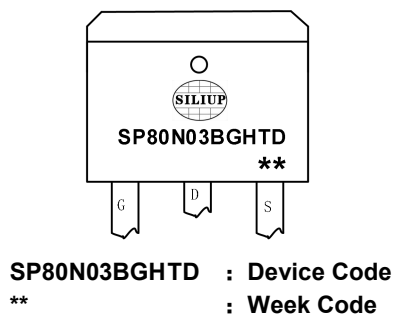
## Package



## Circuit diagram



## Marking



## Order Information

| Device       | Package | Unit/Tape |
|--------------|---------|-----------|
| SP80N03BGHTD | TO-263  | 800       |

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

| Parameter                                  | Symbol          | Rating     | Unit |
|--|-----------------|------------|------|
| Drain-Source Voltage                       | $V_{DS}$        | 80         | V    |
| Gate-Source Voltage                        | $V_{GS}$        | $\pm 20$   | V    |
| Continuous Drain Current (Tc=25°C)         | $I_D$           | 130        | A    |
| Continuous Drain Current (Tc=100°C)        | $I_D$           | 90         | A    |
| Pulse Drain Current Tested                 | $I_{DM}$        | 520        | A    |
| Single Pulse Avalanche Energy <sup>1</sup> | $E_{AS}$        | 576        | mJ   |
| Power Dissipation (Tc=25°C)                | $P_D$           | 160        | W    |
| Thermal Resistance Junction-to-Case        | $R_{\theta JC}$ | 0.78       | °C/W |
| Maximum Junction Temperature               | $T_J$           | -55 to 150 | °C   |
| Storage Temperature Range                  | $T_{STG}$       | -55 to 150 | °C   |

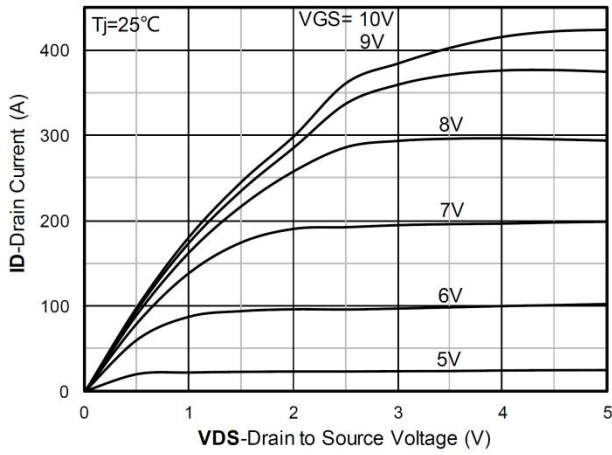
**Electrical characteristics (Ta=25°C, unless otherwise noted)**

| Characteristics                         | Symbol              | Test Condition   | Min | Typ  | Max  | Unit |
|---|---------------------|--|-----|------|------|------|
| Static Characteristics                  |                     |  |     |      |      |      |
| Drain-Source Breakdown Voltage          | BV <sub>DSS</sub>   | I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V               | 80  | -    | -    | V    |
| Zero Gate Voltage Drain Current         | I <sub>DSS</sub>    | V <sub>DS</sub> = 64V, V <sub>GS</sub> = 0V                | -   | -    | 1    | uA   |
| Gate Leakage Current                    | I <sub>GSS</sub>    | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V               | -   | -    | ±100 | nA   |
| Gate Threshold Voltage                  | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA | 2.0 | 3.0  | 4.0  | V    |
| Drain-Source On-state Resistance        | R <sub>DS(ON)</sub> | V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A                | -   | 3.9  | 4.8  | mΩ   |
| Dynamic Characteristics                 |                     |  |     |      |      |      |
| Input Capacitance                       | C <sub>iss</sub>    | VGS=0V, VDS=40V,F=1MHz                                     | -   | 4360 | -    | pF   |
| Output Capacitance                      | C <sub>oss</sub>    |  | -   | 500  | -    |      |
| Reverse Transfer Capacitance            | C <sub>rss</sub>    |  | -   | 26   | -    |      |
| Total Gate Charge                       | Q <sub>g</sub>      | VDS=40V, VGS=10V, ID=20A                                   | -   | 42   | -    | nC   |
| Gate-Source Charge                      | Q <sub>gs</sub>     |  | -   | 15   | -    |      |
| Gate-Drain Charge                       | Q <sub>gd</sub>     |  | -   | 20   | -    |      |
| Switching Characteristics               |                     |  |     |      |      |      |
| Turn-On Delay Time                      | t <sub>d(on)</sub>  | VDD=40V, ID=20A, VGS=10V, R <sub>G</sub> =3Ω               | -   | 17   | -    | nS   |
| Rise Time                               | t <sub>r</sub>      |  | -   | 39   | -    |      |
| Turn-Off Delay Time                     | t <sub>d(off)</sub> |  | -   | 64   | -    |      |
| Fall Time                               | t <sub>f</sub>      |  | -   | 42   | -    |      |
| Drain-Source Body Diode Characteristics |                     |  |     |      |      |      |
| Source-Drain Diode Forward Voltage      | V <sub>SD</sub>     | VGS=0V , IS=1A , TJ=25℃                                    | -   | -    | 1.2  | V    |
| Maximum Body-Diode Continuous Current   | I <sub>S</sub>      |  | -   | -    | 130  | A    |
| Reverse Recovery Time                   | Trr                 | Is=50 A,di/dt=100 A/μs, TJ=25℃                             | -   | 45   | -    | nS   |
| Reverse Recovery Charge                 | Qrr                 |  | -   | 56   | -    | nC   |

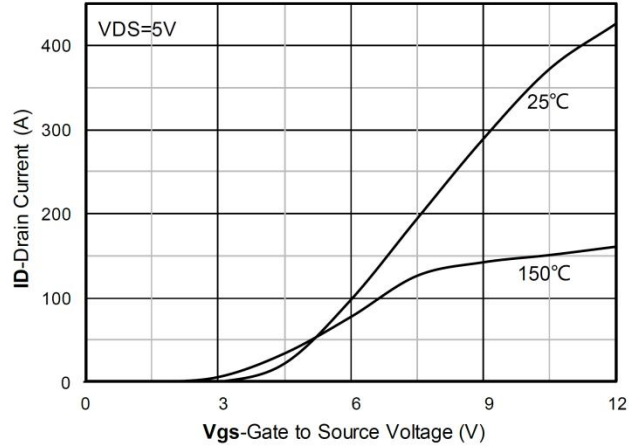
**Note :**

1. The test condition is  $V_{DD}=40V, V_{GS}=10V, L=0.5mH, R_G=25\Omega$

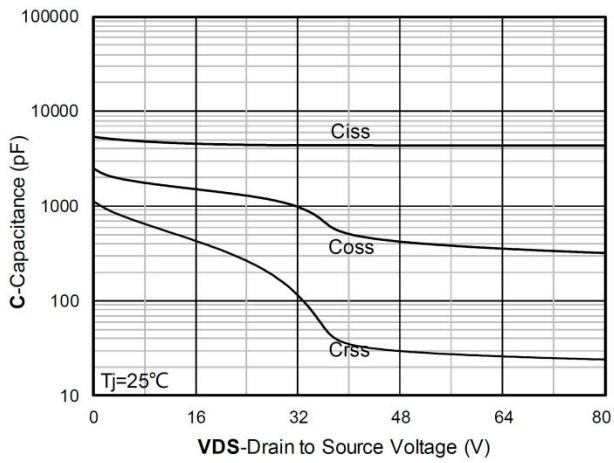
## Typical Characteristics



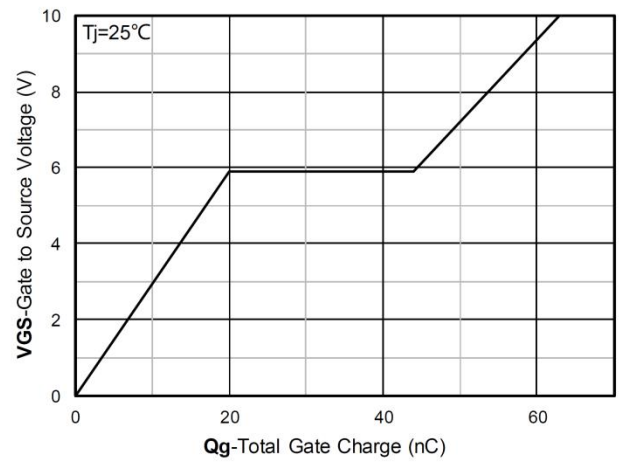
Output Characteristics



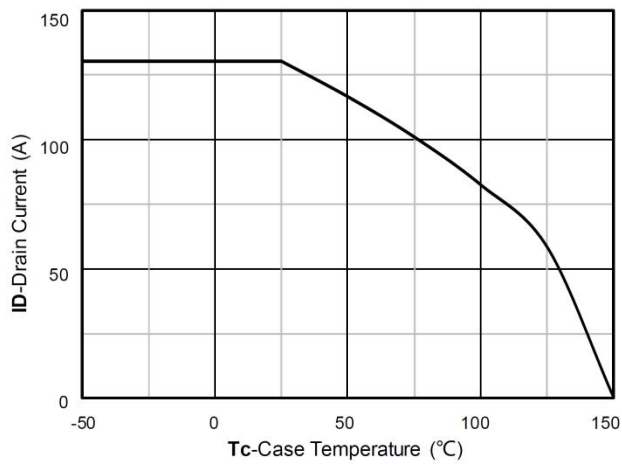
Transfer Characteristics



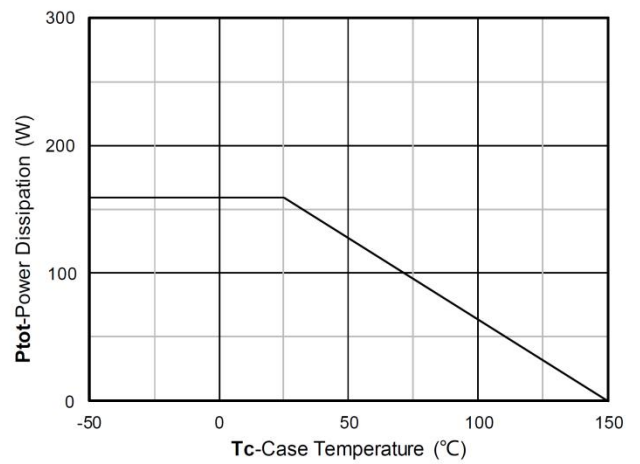
Capacitance Characteristics



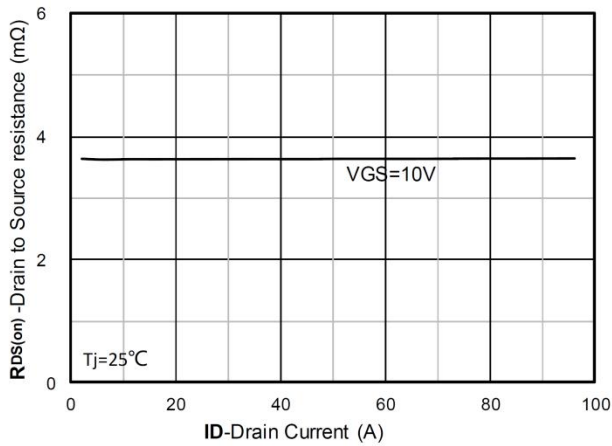
Gate Charge



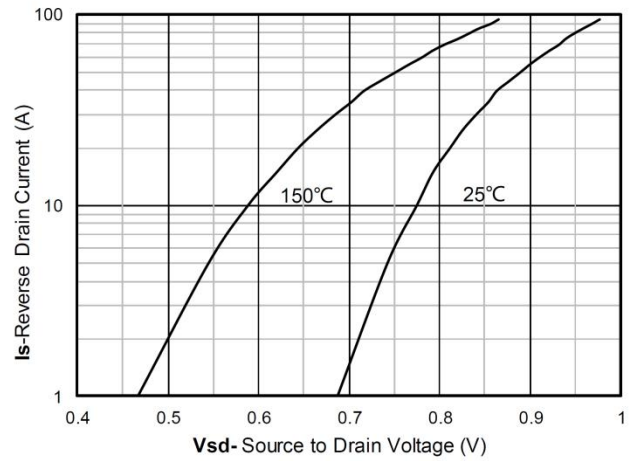
Current dissipation



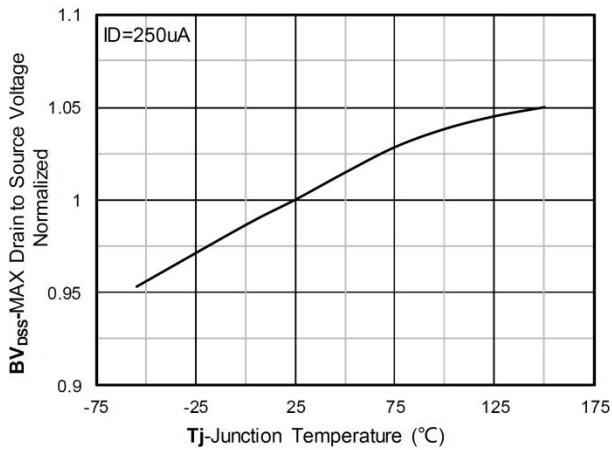
Power dissipation



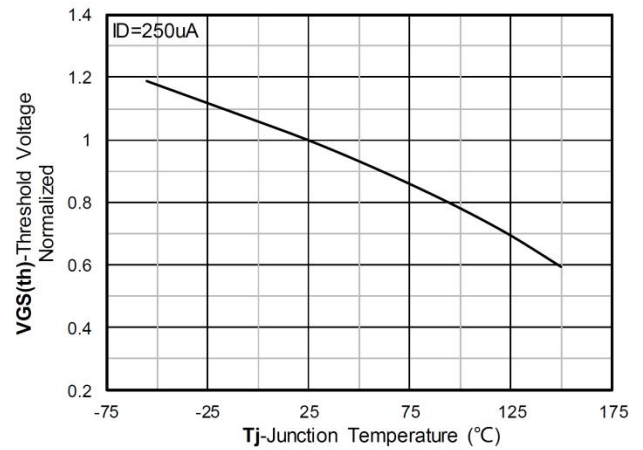
RDS(on) VS Drain Current



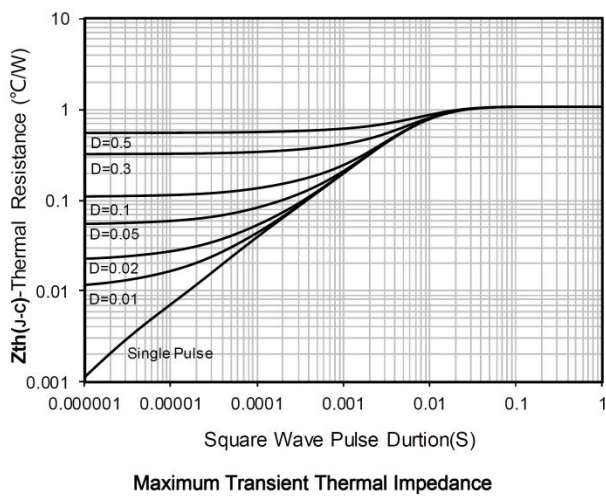
Forward characteristics of reverse diode



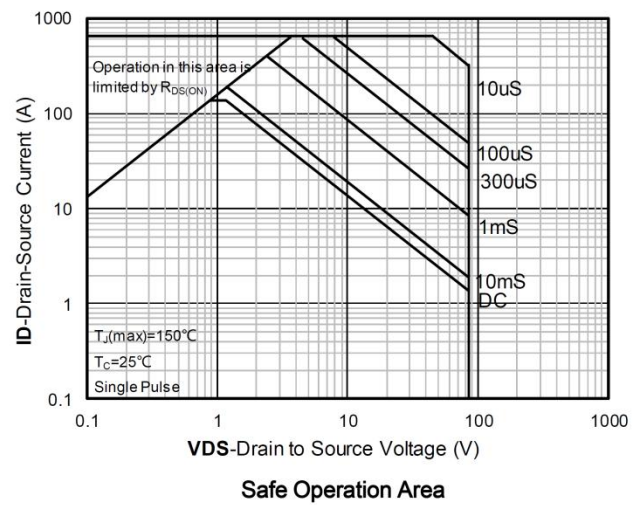
Normalized breakdown voltage



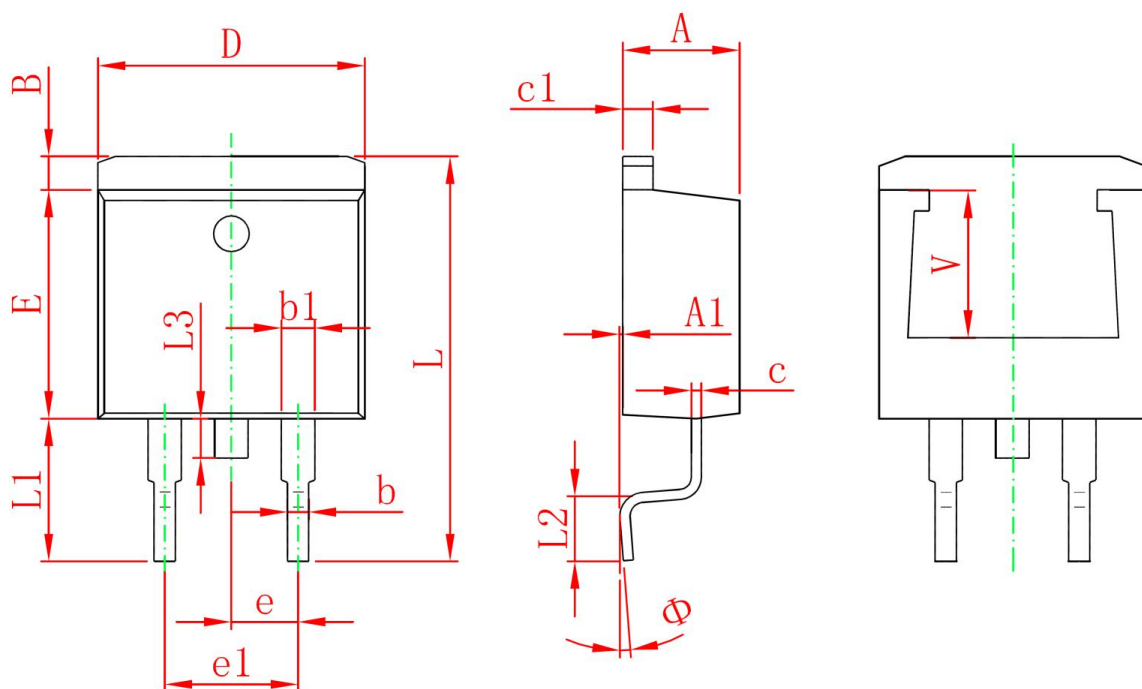
Normalized Threshold voltage



Maximum Transient Thermal Impedance



Safe Operation Area

**TO-263 Package Information**


| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min.                      | Max.   | Min.                 | Max.  |
| A      | 4.470                     | 4.670  | 0.176                | 0.184 |
| A1     | 0.000                     | 0.150  | 0.000                | 0.006 |
| B      | 1.120                     | 1.420  | 0.044                | 0.056 |
| b      | 0.710                     | 0.910  | 0.028                | 0.036 |
| b1     | 1.170                     | 1.370  | 0.046                | 0.054 |
| c      | 0.310                     | 0.530  | 0.012                | 0.021 |
| c1     | 1.170                     | 1.370  | 0.046                | 0.054 |
| D      | 10.010                    | 10.310 | 0.394                | 0.406 |
| E      | 8.500                     | 8.900  | 0.335                | 0.350 |
| e      | 2.540 TYP.                |        | 0.100 TYP.           |       |
| e1     | 4.980                     | 5.180  | 0.196                | 0.204 |
| L      | 14.940                    | 15.500 | 0.588                | 0.610 |
| L1     | 4.950                     | 5.450  | 0.195                | 0.215 |
| L2     | 2.340                     | 2.740  | 0.092                | 0.108 |
| L3     | 1.300                     | 1.700  | 0.051                | 0.067 |
| $\Phi$ | 0°                        | 8°     | 0°                   | 8°    |
| V      | 5.600 REF.                |        | 0.220 REF.           |       |