

## Description

The GT1003B uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$ , low gate charge. This device is suitable for use in high frequency Synchronous-recification application.

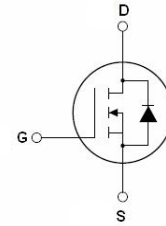
## General Features

|           |                             |       |
|-----------|-----------------------------|-------|
| $V_{DSS}$ | $R_{DS(ON)}$<br>@ 10V (Typ) | $I_D$ |
| 100V      | 115m $\Omega$               | 7 A   |

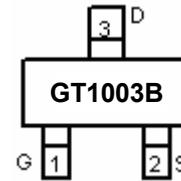
- High density cell design for ultra low  $R_{Dson}$
- Lead free product is acquired
- Excellent package for good heat dissipation
- RoHS Compliant

## Application

- Consumer electronic power supply
- Isolated DC/DC converter
- Motor control



Schematic Diagram



Marking and Pin Assignment



SOT-23

## Ordering Information

| Part Number | Marking | Case   | Packaging    |
|-------------|---------|--------|--------------|
| GT1003B     | GT1003B | SOT-23 | 3000pcs/Reel |

## Absolute Maximum Ratings (TA=25°C unless otherwise noted)

| Parameter  | Symbol         | Limit      | Unit        |
|--|----------------|------------|-------------|
| Drain-Source Voltage                             | $V_{DS}$       | 100        | V           |
| Gate-Source Voltage                              | $V_{GS}$       | $\pm 20$   | V           |
| Drain Current-Continuous                         | $I_D$          | 7          | A           |
| Drain Current-Pulsed (Note 1)                    | $I_{DM}$       | 21         | A           |
| Maximum Power Dissipation                        | $P_D$          | 17         | W           |
| Single pulsed avalanche energy (Note 5)          | $E_{AS}$       | 1.2        | mJ          |
| Operating Junction and Storage Temperature Range | $T_J, T_{STG}$ | -55 To 150 | $^{\circ}C$ |

## Thermal Characteristic

|  |                 |     |               |
|--|-----------------|-----|---------------|
| Thermal Resistance, Junction-to-case             | $R_{\theta JC}$ | 7.4 | $^{\circ}C/W$ |
| Thermal Resistance, Junction-to-Ambient (Note 2) | $R_{\theta JA}$ | 62  | $^{\circ}C/W$ |

## Electrical Characteristics (TA=25°C unless otherwise noted)

| Parameter                       | Symbol     | Condition                 | Min | Typ | Max | Unit    |
|---------------------------------|------------|---------------------------|-----|-----|-----|---------|
| <b>Off Characteristics</b>      |            |                           |     |     |     |         |
| Drain-Source Breakdown Voltage  | $BV_{DSS}$ | $V_{GS}=0V, I_D=250\mu A$ | 100 | 110 | -   | V       |
| Zero Gate Voltage Drain Current | $I_{DSS}$  | $V_{DS}=100V, V_{GS}=0V$  | -   | -   | 1   | $\mu A$ |

|   |               |   |   |      |           |            |
|---|---------------|---|---|------|-----------|------------|
| Gate-Body Leakage Current                 | $I_{GSS}$     | $V_{GS}=\pm 20V, V_{DS}=0V$                           | - | -    | $\pm 100$ | nA         |
| <b>On Characteristics (Note 3)</b>        |               |   |   |      |           |            |
| Gate Threshold Voltage                    | $V_{GS(th)}$  | $V_{DS}=V_{GS}, I_D=250\mu A$                         | 1 | 1.95 | 3         | V          |
| Drain-Source On-State Resistance          | $R_{DS(on)}$  | $V_{GS}=10V, I_D=3.5A$                                | - | 115  | 140       | m $\Omega$ |
| <b>Dynamic Characteristics (Note4)</b>    |               |   |   |      |           |            |
| Input Capacitance                         | $C_{iss}$     | $V_{DS}=50V, V_{GS}=0V,$<br>$F=1.0MHz$                | - | 206  | -         | PF         |
| Output Capacitance                        | $C_{oss}$     |   | - | 28.9 | -         | PF         |
| Reverse Transfer Capacitance              | $C_{rss}$     |   | - | 1.4  | -         | PF         |
| <b>Switching Characteristics (Note 4)</b> |               |   |   |      |           |            |
| Turn-on Delay Time                        | $t_{d(on)}$   | $V_{DD}=50V, I_D=5A$<br>$V_{GS}=10V, R_{GEN}=2\Omega$ | - | 14.7 | -         | ns         |
| Turn-on Rise Time                         | $t_r$         |   | - | 3.5  | -         | ns         |
| Turn-Off Delay Time                       | $t_{d(off)}$  |   | - | 20.9 | -         | ns         |
| Turn-Off Fall Time                        | $t_f$         |   | - | 2.7  | -         | ns         |
| Total Gate Charge                         | $Q_g$         | $V_{DS}=50V, I_D=5A,$<br>$V_{GS}=10V$                 | - | 4.3  | -         | nC         |
| Gate-Source Charge                        | $Q_{gs}$      |   | - | 1.5  | -         | nC         |
| Gate-Drain Charge                         | $Q_{gd}$      |   | - | 1.1  | -         | nC         |
| Gate plateau voltage                      | $V_{plateau}$ |   |   | 5.0  |           | V          |
| <b>Drain-Source Diode Characteristics</b> |               |   |   |      |           |            |
| Diode Forward Current (Note 2)            | $I_S$         | $V_{GS}<V_{th}$                                       | - | -    | 7         | A          |
| Pulsed Source Current                     | $I_{SP}$      | $V_{GS}<V_{th}$                                       |   |      | 21        |            |
| Diode Forward Voltage (Note 3)            | $V_{SD}$      | $V_{GS}=0V, I_S=7A$                                   | - | -    | 1.2       | V          |
| Reverse Recovery Time                     | $t_{rr}$      | $I_F=5A, di_F/dt =$<br>$100A/\mu s$                   |   | 32.1 |           | nS         |
| Reverse Recovery Charge                   | $Q_{rr}$      |   |   | 39.4 |           | $\mu C$    |
| Peak Reverse Recovery Current             | $I_{rrm}$     |   | - | 2.1  | -         | A          |

### Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.
3. Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 2\%$ .
4. Guaranteed by design, not subject to production
5.  $V_{DD}=50V, R_G=50\Omega, L=0.3mH$ , starting  $T_j=25^\circ C$ .

Typical Electrical And Thermal Characteristics

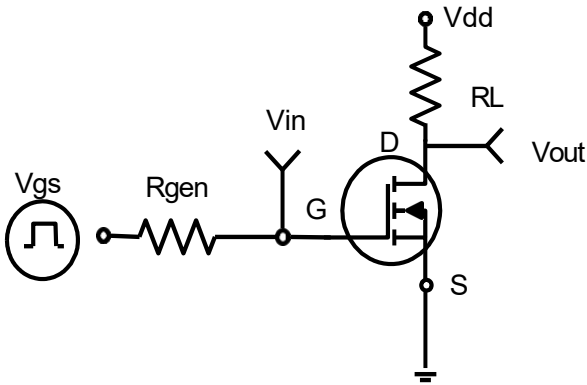


Figure 1. Switching Test Circuit

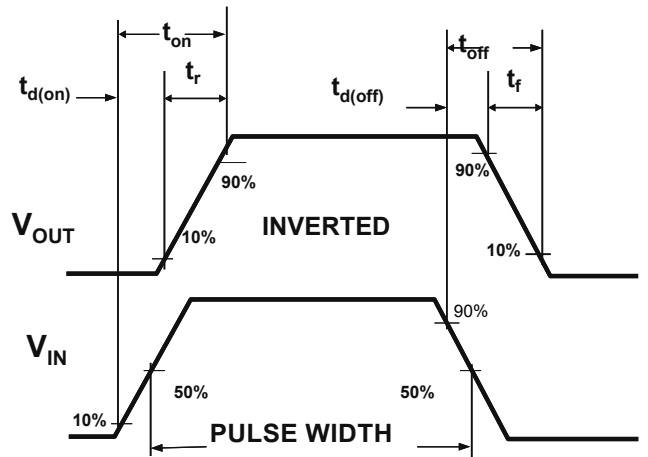


Figure 2. Switching Waveforms

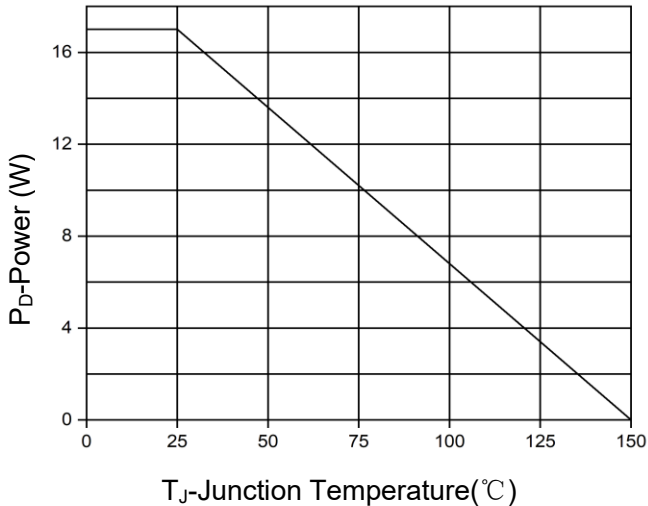


Figure 3. Power Dissipation

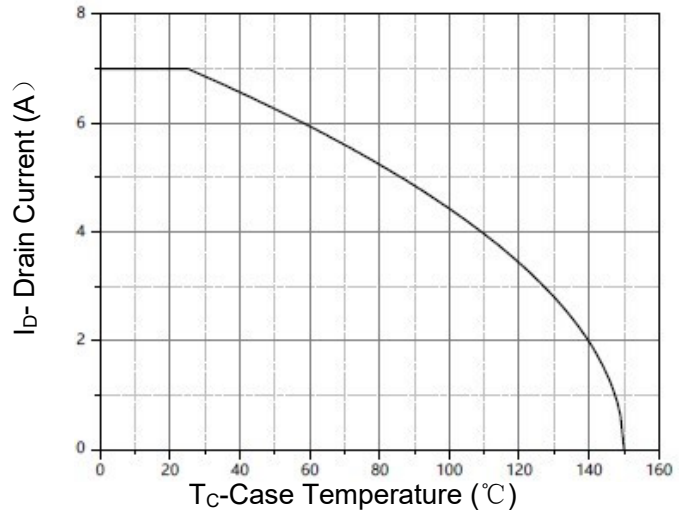


Figure 4. Drain Current

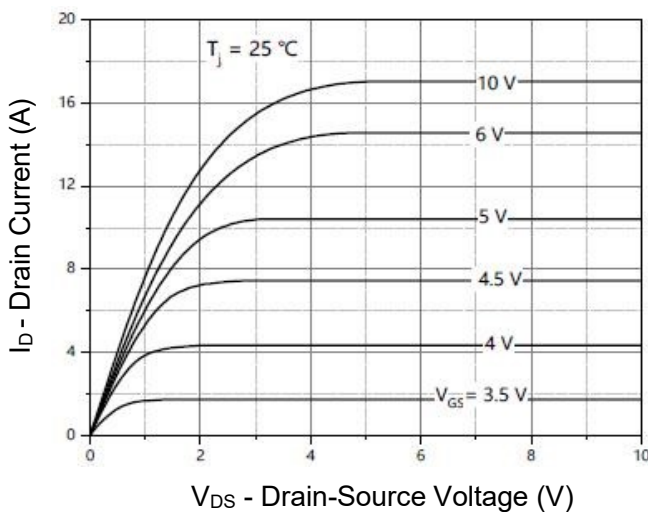


Figure 5. Output characteristics

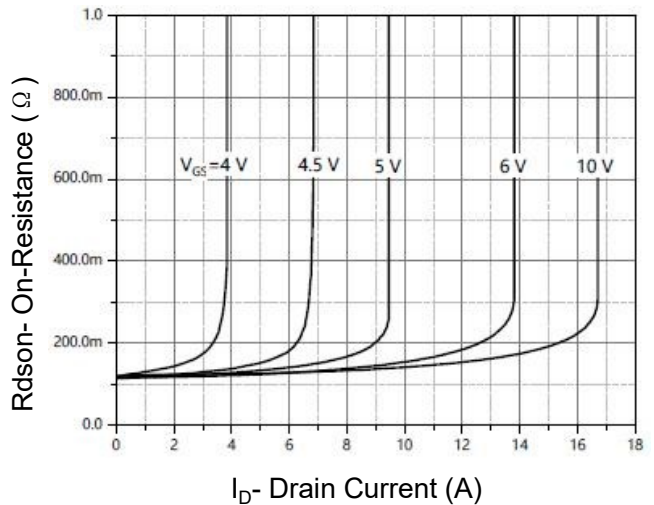


Figure 6. Drain-Source On-state resistance

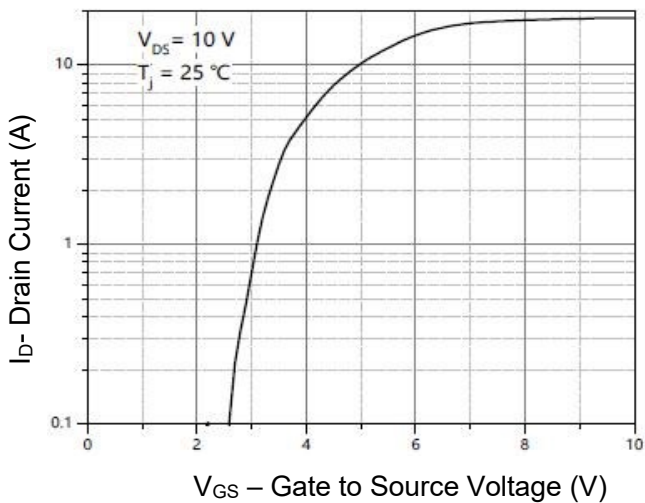


Figure 7. Transfer Characteristics

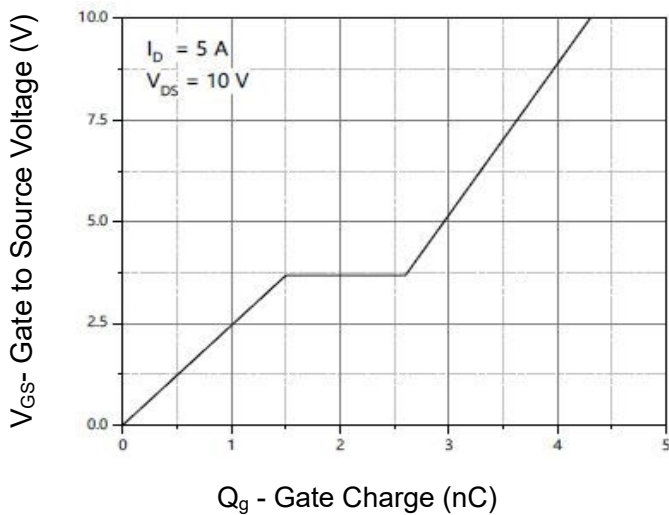


Figure 9. Gate Charge

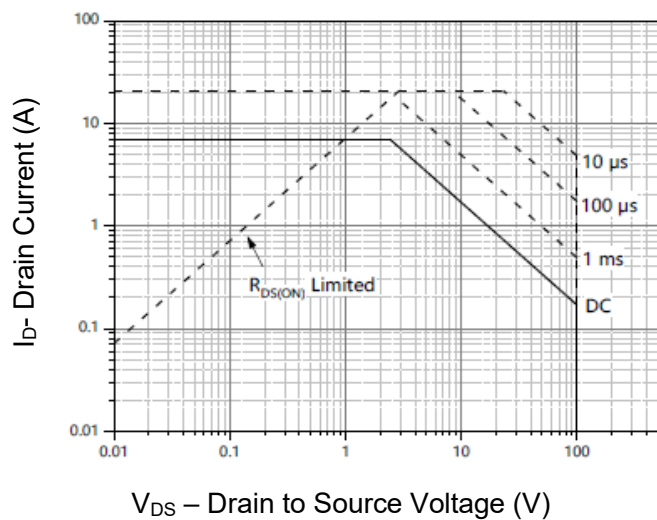


Figure 11. Safe Operation Area

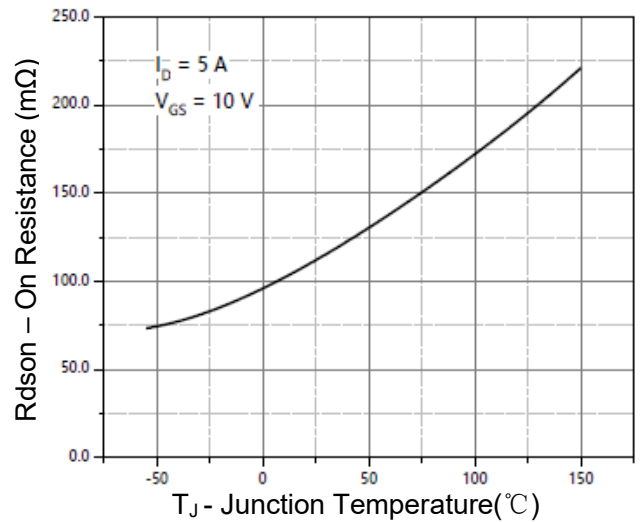


Figure 8. Drain-Source On-State Resistance

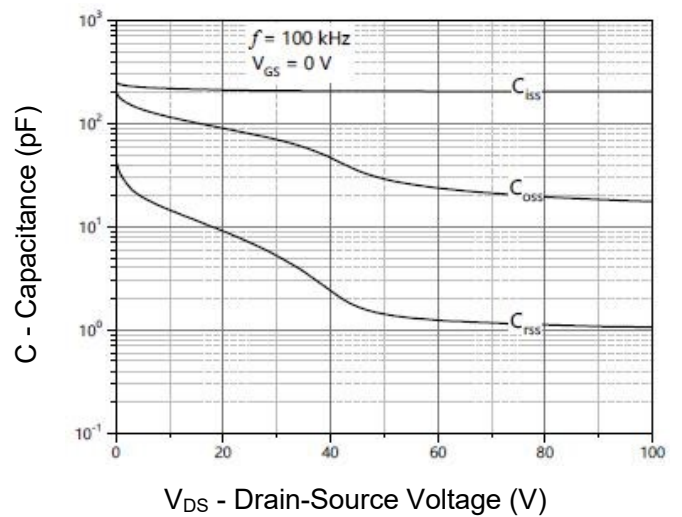


Figure 10. Capacitance vs Vds

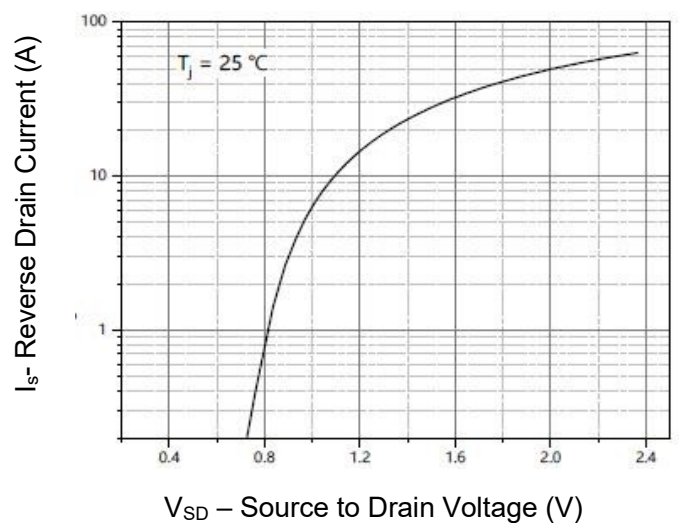


Figure 12. Source- Drain Diode Forward

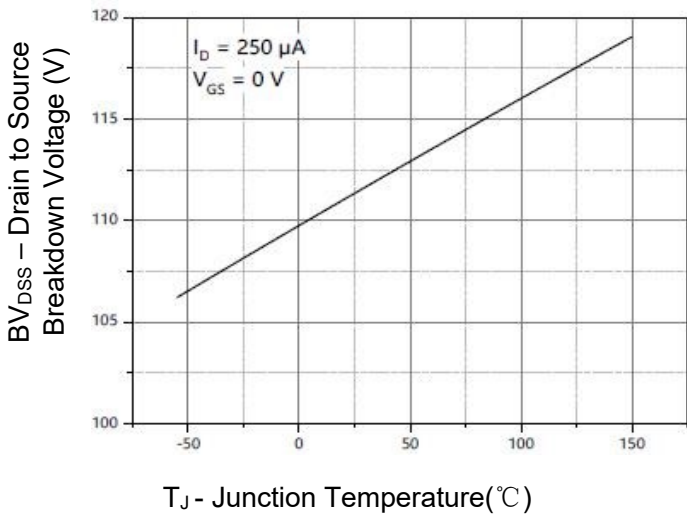
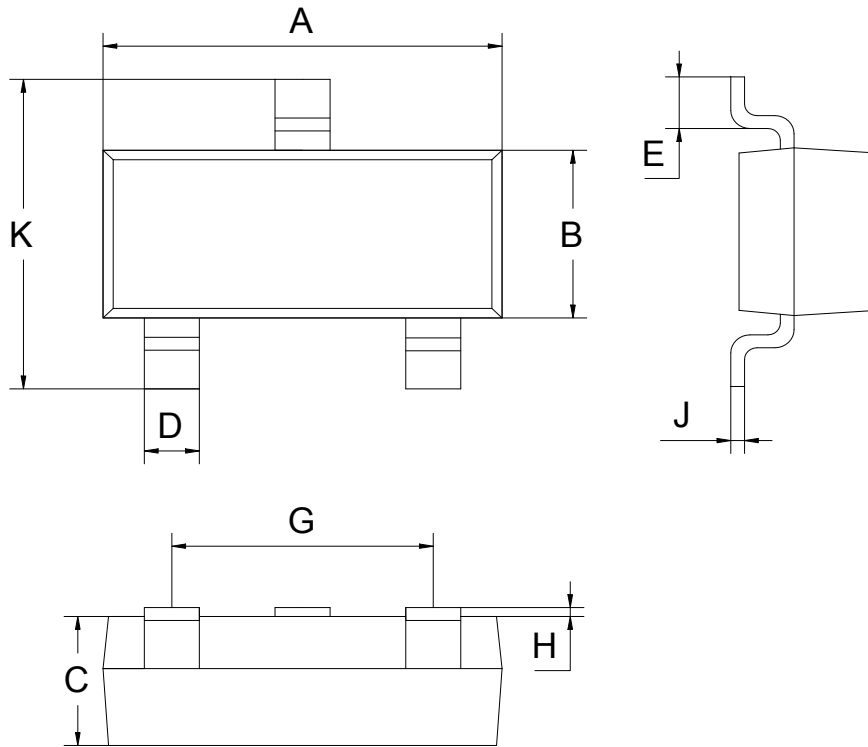


Figure 13. Drain-source breakdown voltage

**SOT-23 Package Information**



| SOT-23               |         |      |      |
|----------------------|---------|------|------|
| Dim                  | MIN     | NOM  | MAX  |
| A                    | 2.80    | 2.90 | 3.00 |
| B                    | 1.20    | 1.30 | 1.40 |
| C                    | 0.90    | 1.00 | 1.10 |
| D                    | 0.39    | 0.40 | 0.45 |
| E                    | 0.20MIN |      |      |
| G                    | 1.90REF |      |      |
| H                    | 0.00    | -    | 0.10 |
| J                    | 0.05    | 0.10 | 0.15 |
| K                    | 2.30    | 2.40 | 2.50 |
| All Dimensions in mm |         |      |      |

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