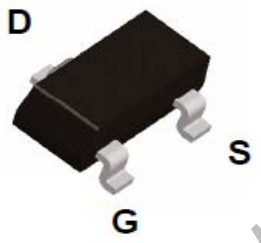
WG1002S

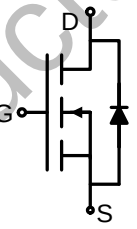
SOT-23

RoHS COMPLIANT




## Features:

- ☐ Low Intrinsic Capacitances.
- ☐ Excellent Switching Characteristics.
- ☐ Extended Safe Operating Area.
- ☐ Unrivalled Gate Charge :Qg= 5.2 nC (Typ.).
- ☐ BVDSS=100V,$I_D$=1.5 A
- ☐ $R_{DS}$(on) : 306mΩ (Max) @$V_G$=10V
- ☐ 100% Avalanche Tested




MARKING: WG1002S **Schematic diagram**

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**Absolute Maximum Ratings ($T_A$=25℃ unless otherwise noted)**

| Symbol | Parameter | Limit | Unit |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage ($V_{GS}$=0V) | 100 | V |
| $V_{GS}$ | Gate-Source Voltage ($V_{DS}$=0V) | ±20 | V |
| $I_D$ | Drain Current-Continuous($T_A$=25℃) | 1.5 | A |
| | Drain Current-Continuous($T_A$=100℃) | 1.0 | A |
| $I_{DM\ (pluse)}$ | Drain Current-Continuous@ Current-Pulsed (Note 1) | 8.8 | A |
| $P_D$ | Maximum Power Dissipation($T_A$=25℃) | 1.3 | W |
| | Maximum Power Dissipation($T_A$=100℃) | 0.52 | W |
| $E_{AS}$ | Avalanche energy (Note 2) | 9 | mJ |
| $T_J$, $T_{STG}$ | Operating Junction and Storage Temperature Range | -55 To 150 | ℃ |

**Thermal Characteristic**

| Symbol | Parameter | Typ | Max | Unit |
|---|---|---|---|---|
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | | 96.5 | ℃/W |

## Electrical Characteristics ($T_J$=25℃ unless otherwise noted)

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **On/Off States** | | | | | | |
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V $I_D$=250μA | 100 | | | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$=100V, $V_{GS}$=0V $T_J$=25℃ | | | 1 | μA |
| | | $V_{DS}$=100V, $V_{GS}$=0V $T_J$=125℃ | | | 100 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{GS}$=±20V, $V_{DS}$=0V | | | ±100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$=$V_{GS}$, $I_D$=250μA | 1 | | 2.5 | V |
| $g_{FS}$ | Forward Transconductance | $V_{DS}$=5V, $I_D$=1.5A | | 3.3 | | S |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance | $V_{GS}$=10V, $I_D$=1.0A $T_J$=25℃ | | | 306 | mΩ |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance | $V_{GS}$=4.5V, $I_D$=1A $T_J$=25℃ | | | 318 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=50V,$V_{GS}$=0V, f=1.0MHz | | 321 | | pF |
| $C_{oss}$ | Output Capacitance | | | 19 | | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 14 | | pF |
| $R_g$ | Gate resistance | $V_{GS}$=0V, $V_{DS}$=0V, f=1.0MHz | | 0.24 | | Ω |
| **Switching Parameters** | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{GS}$=10V, $V_{DS}$=50V, $R_L$=33Ω, $R_{GEN}$=3Ω | | 2 | | nS |
| $t_r$ | Turn-on Rise Time | | | 2 | | nS |
| $t_{d(off)}$ | Turn-Off Delay Time | | | 9 | | nS |
| $t_f$ | Turn-Off Fall Time | | | 3.6 | | nS |
| $Q_g$ | Total Gate Charge | $V_{GS}$=10V, $V_{DS}$=50V, $I_D$=1.5A | | 9 | | nC |
| $Q_{gs}$ | Gate-Source Charge | | | 1.5 | | nC |
| $Q_{gd}$ | Gate-Drain Charge | | | 3 | | nC |
| **Source-Drain Diode Characteristics** | | | | | | |
| $I_{SD}$ | Source-Drain Current (Body Diode) | | | | 1.5 | A |
| $V_{SD}$ | Forward on Voltage (Note 3) | $V_{GS}$=0V, $I_S$=1.5A | | | 1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$=1.5A, dI/dt=100A/μs | | 20 | | ns |
| $Q_{rr}$ | Reverse Recovery Charge | $I_F$=1.5A, dI/dt=100A/μs | | 13 | | nC |

Notes 1.Repetitive Rating: Pulse width limited by maximum junction temperature.
Notes 2.$E_{AS}$ condition: $T_J$=25℃,$V_{DD}$=60V,$V_G$=10V, Rg=25Ω, L=0.5mH.
Notes 3.Repetitive Rating: Pulse width limited by maximum junction temperature.

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## Typical Electrical And Thermal Characteristics (Curves)

**Figure 1. Output Characteristics**

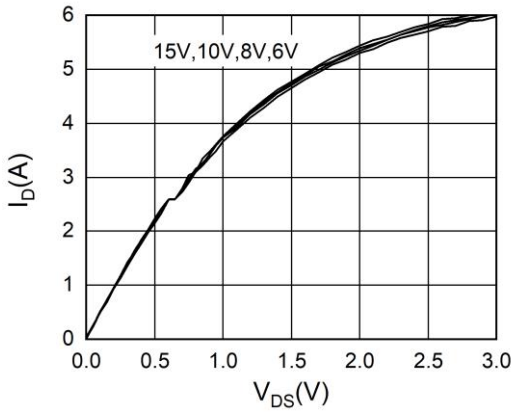



**Figure 2. Transfer Characteristics**

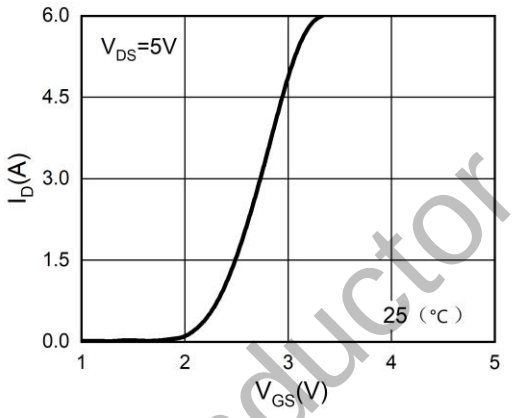



**Figure 3. Power Dissipation**

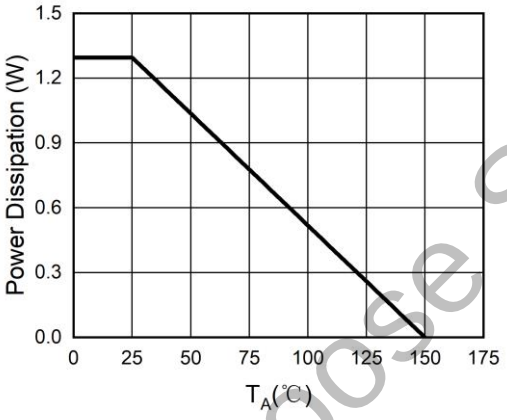



**Figure 4. Drain Current**

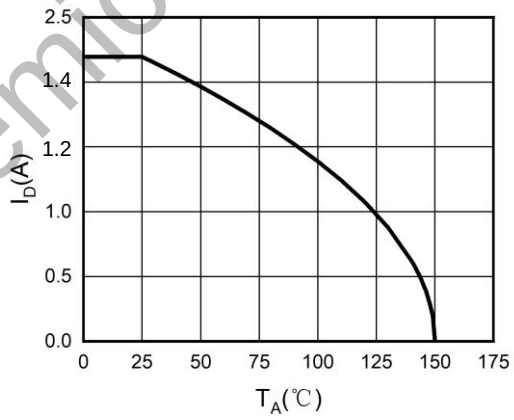



**Figure 5. $BV_{DSS}$ vs Junction Temperature**

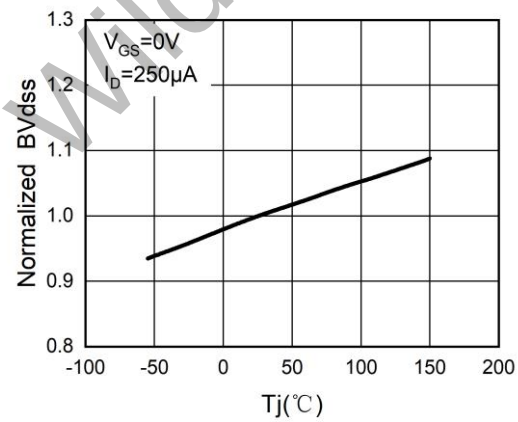
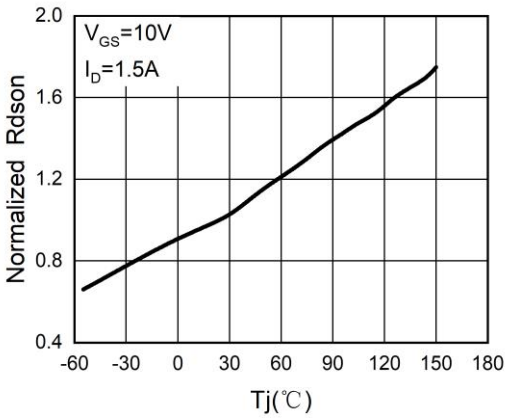



**Figure 6. $R_{DS(ON)}$ vs Junction Temperature**




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## Typical Electrical And Thermal Characteristics (Curves)

**Figure 7. Gate Charge Waveforms**

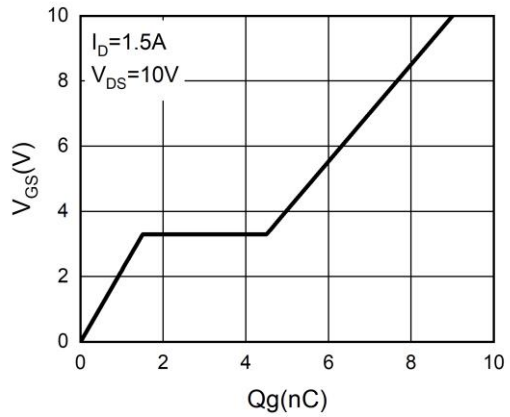



**Figure 8. Capacitance**

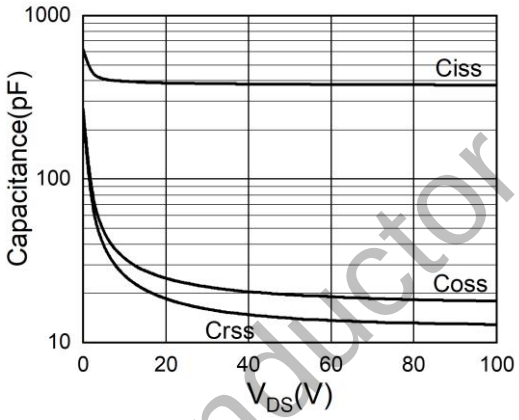



**Figure 9. Body-Diode Characteristics**

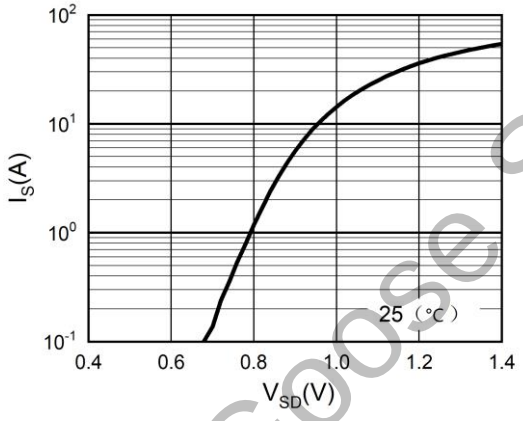
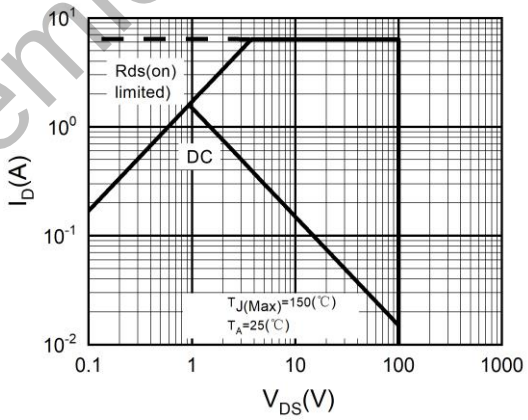


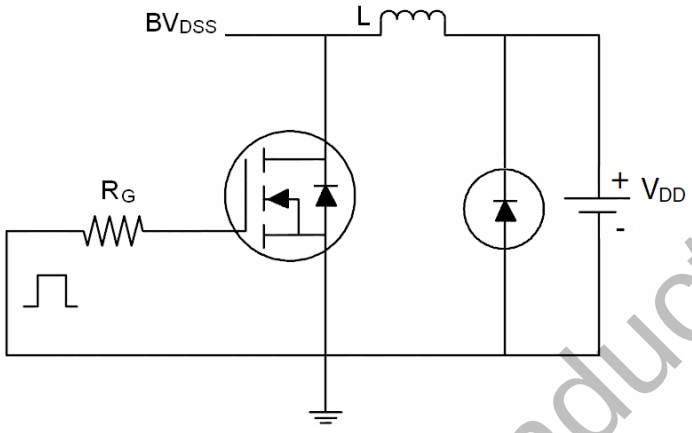

**Figure 10. Maximum Safe Operating Area**



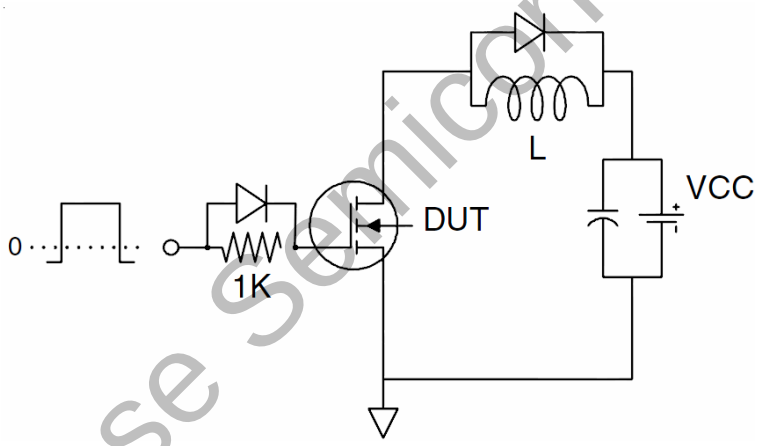

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## Test Circuit

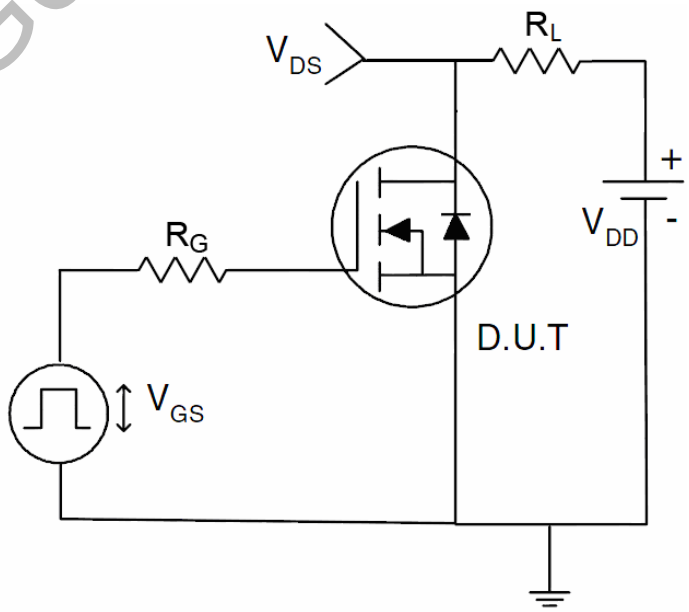
**1）$E_{AS}$ test circuit**




**2）Gate charge test circuit**




**3）Switch Time Test Circuit**

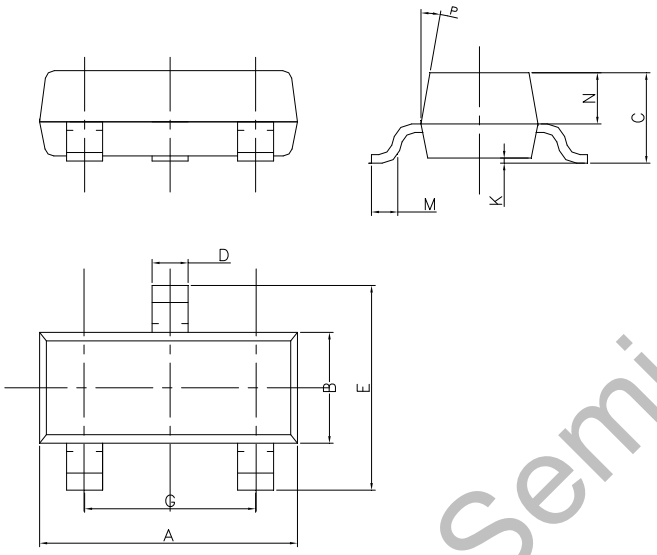



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## Package Dimension

SOT-23

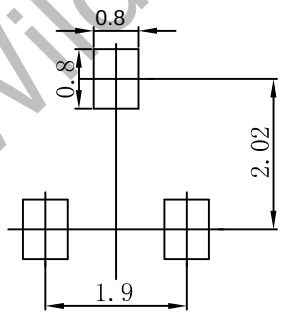
Unit: mm




| DIM | MILLIMETERS |
|---|---|
| A | 2.85~3.04 |
| B | 1.30±0.10 |
| C | 1.00±0.10 |
| D | 0.45±0.05 |
| E | 2.25~2.55 |
| G | 1.90±0.1 |
| K | 0.00−0.10 |
| M | 0.20 MIN |
| N | 0.60±0.10 |
| P | 7±2° |

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### SOT-23 Suggested Pad Layout




Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.