

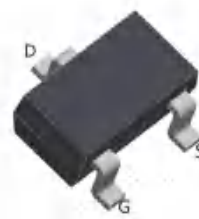


TS2N7002E

Single N-Channel Power MOSFET

| V _{DSS} (V) | R _{DS (ON)} | I _{D(A)} |
|----------------------|----------------------------------|-------------------|
| 60 | 1.9Ω(Typ)@V _{GS} =10V | 0.3 |
| | 2.05Ω(Typ)@V _{GS} =4.5V | |

Pin Description



SOT-23

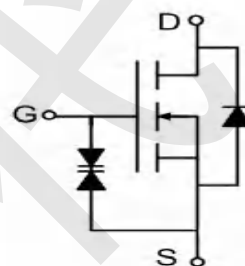
FEATURE:

- The TS2N7002 is the high cell density trench N-channel MOSFETS, which provides excellent R_{DS(ON)} and efficiency for most of the small power switching and load switch applications.

ESD Rating:HBM》2000V

APPLICATIONS:

- Load Switch for Portable Devices
- Power Management



Ordering and Marking Information

| Product ID | Marking | Package | Packaging | Quantity |
|------------|---------|---------|-----------|----------|
| TS2N7002E | | SOT23 | Tape&Reel | 3000 |

Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|------------------|---|----------------------|-------|
| V _{DSS} | Drain-Source Voltage | 60 | V |
| V _{GSS} | Gate-Source Voltage | ±20 | V |
| I _D | Continuous Drain Current(V _{GS} = -4.5V) | T _A =25°C | 0.3 |
| | | T _A =70°C | 0.2 |
| T _J | Maximum Junction Temperature | 150 | °C |
| T _{STG} | Storage Temperature Range | -55 to 150 | °C |
| I _{DM} | Pulsed Drain Current | 20 | A |
| P _D | Maximum Power Dissipation | T _A =25°C | 0.35 |
| | | T _A =70°C | --- |
| E _{AS} | Avalanche Energy, Single Pulsed | --- | mJ |
| R _{θJC} | Thermal Resistance-Junction to Case | --- | °C/W |
| R _{θJA} | Thermal Resistance-Junction to Ambient | 357 | °C/W |



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Electrical Characteristics ($T_A=25^\circ\text{C}$ Unless Otherwise Noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-------------------------------|----------------------------------|---|------|------|-----------|----------|
| Static Characteristics | | | | | | |
| BVDSS | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 60 | --- | --- | V |
| $V_{GS(th)}$ | Gate threshold voltage | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.0 | 1.5 | 2.2 | V |
| RDS(on) | Drain-Source On-state Resistance | $V_{GS}=10V, I_D=0.3A$ | --- | 1.9 | 2.2 | Ω |
| | | $V_{GS}=4.5V, I_D=0.2A$ | --- | 2.05 | 2.87 | Ω |
| IGSS | Gate-source leakage current | $V_{GS}=\pm 20V, V_{DS}=0V$ | --- | --- | ± 100 | μA |
| IDSS | Zero gate voltage drain current | $V_{DS}=60V, V_{GS}=0V, T_J=25^\circ\text{C}$ | --- | --- | 1 | μA |
| | | $T_J=55^\circ\text{C}$ | --- | --- | --- | |
| Dynamic Characteristic | | | | | | |
| Ciss | Input Capacitance | $V_{GS}=0V, V_{DS}=25V,$ Frequency=1.0MHz | --- | 28 | --- | μF |
| Coss | Output Capacitance | | --- | 11 | --- | |
| Crss | Reverse Transfer Capacitance | | --- | 4 | --- | |
| QG | Gate Total Charge | $V_{DS}=10V, V_{GS}=4.5V,$ $I_{DS}=0.3A$ | --- | 1.7 | --- | nC |
| Qgs | Gate-Source charge | | --- | 0.3 | --- | |
| Qgd | Gate-Drain charge | | --- | 0.6 | --- | |
| td(on) | Turn-on delay time | $V_{DD}=10V, V_{GS}=10V,$ $R_G=10\Omega, I_D=0.2A$ | --- | 2 | --- | ns |
| tr | Turn-on Rise Time | | --- | 15 | --- | |
| td(off) | Turn-off Delay Time | | --- | 7 | --- | |
| tf | Turn-off Fall Time | | --- | 20 | --- | |
| RG | Gate Resistance | $V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$ | --- | --- | --- | Ω |
| Diode Characteristics | | | | | | |
| VSD | Diode Forward Voltage | $V_{GS}=0V, I_S=0.3A, T_J=25^\circ\text{C}$ | --- | --- | 1.2 | V |
| trr | Reverse Recovery Time | $I_{SD}=4.1A,$ $dI_{SD}/dt=-100A/\mu s$ | --- | --- | --- | ns |
| Qrr | Reverse Recovery Charge | | --- | --- | --- | nC |



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

Figure 1: Output Characteristics

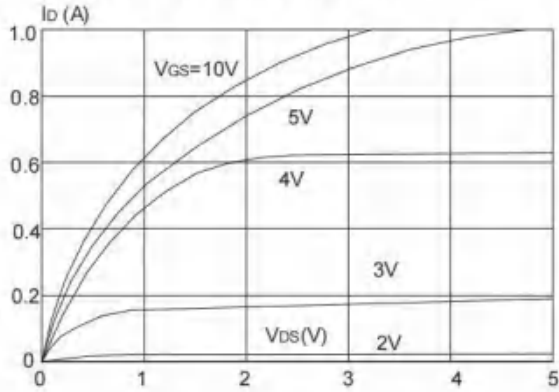


Figure 2: Typical Transfer Characteristics

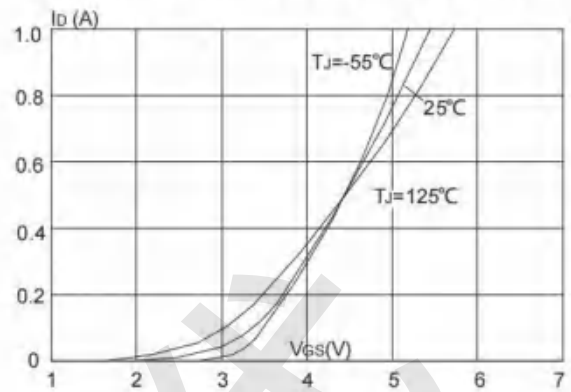


Figure 3: On-resistance vs. Drain Current

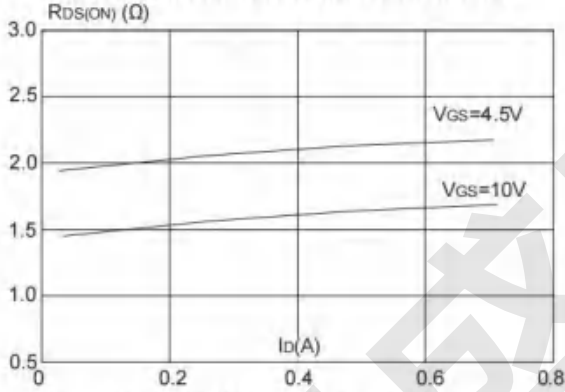


Figure 4: Body Diode Characteristics

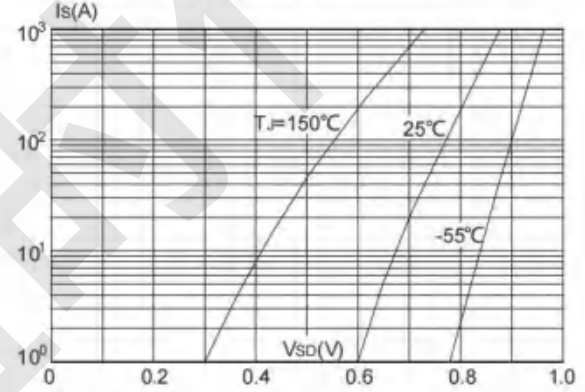


Figure 5: Gate Charge Characteristics

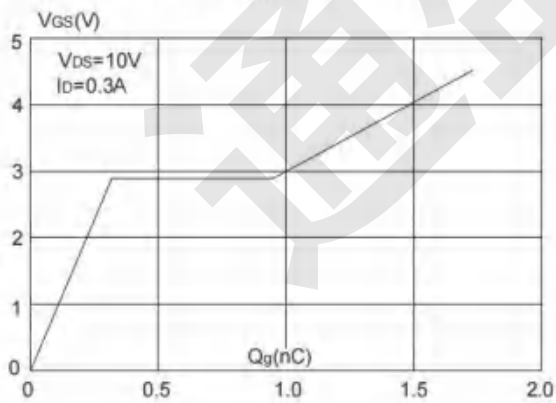
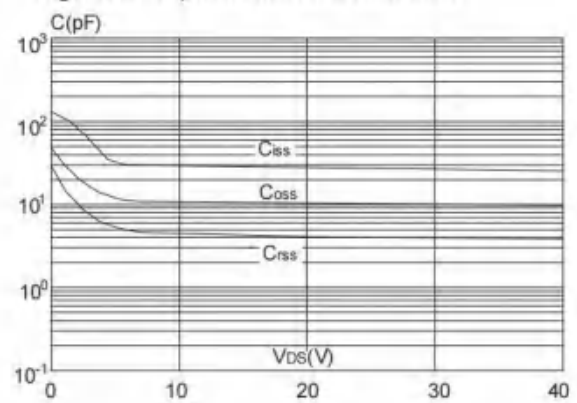


Figure 6: Capacitance Characteristics





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Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

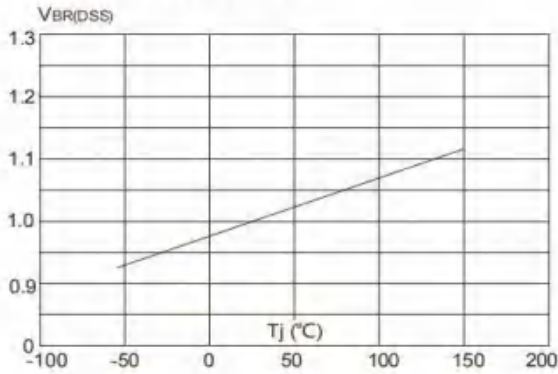


Figure 8: Normalized on Resistance vs. Junction Temperature

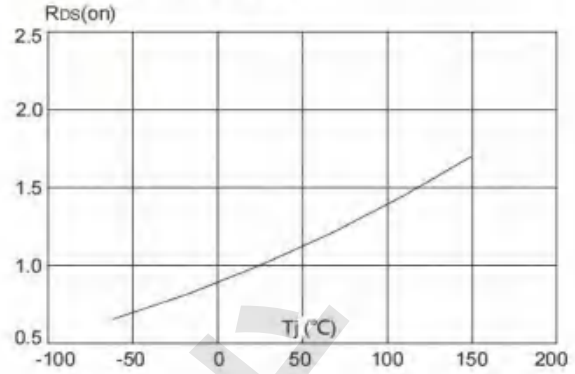


Figure 9: Maximum Safe Operating Area

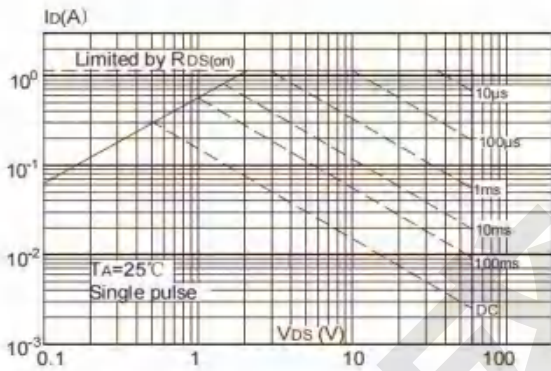


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

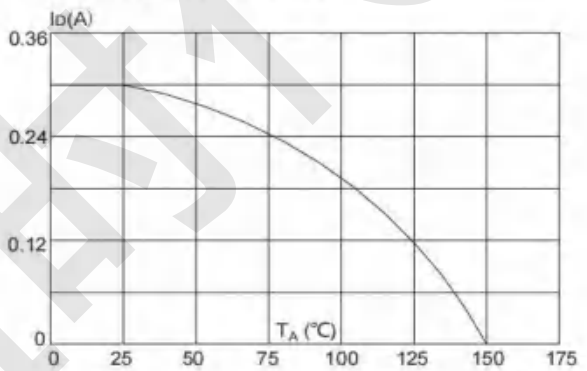
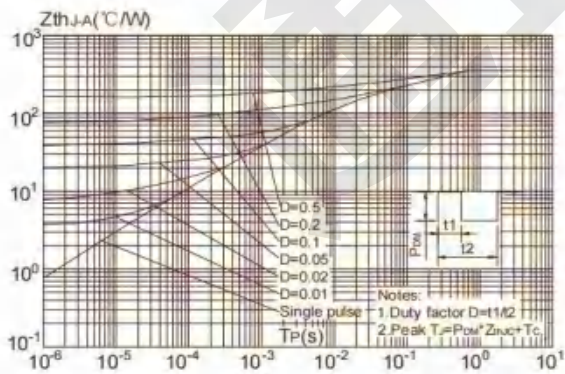
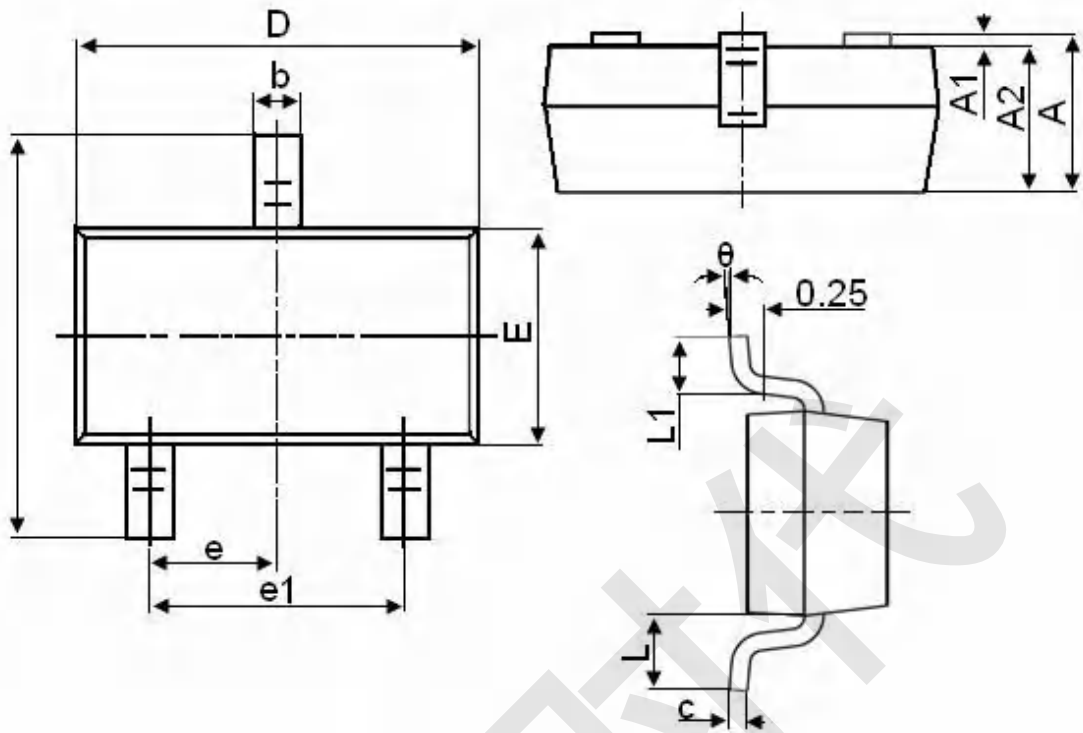


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





| Symbol | Dimensions in Millimeters | |
|----------|---------------------------|-------|
| | MIN. | MAX. |
| A | 0.900 | 1.150 |
| A1 | 0.000 | 0.100 |
| A2 | 0.900 | 1.050 |
| b | 0.300 | 0.500 |
| c | 0.080 | 0.150 |
| D | 2.800 | 3.000 |
| E | 1.200 | 1.400 |
| E1 | 2.250 | 2.550 |
| e | 0.950TYP | |
| e1 | 1.800 | 2.000 |
| L | 0.550REF | |
| L1 | 0.300 | 0.500 |
| θ | 0° | 8° |



TS2N7002E

Single N-Channel Power MOSFET

| Edition | Date | Change |
|---------|---------|-----------------|
| Rve1.0 | 2022/11 | Initial release |

通盛时代