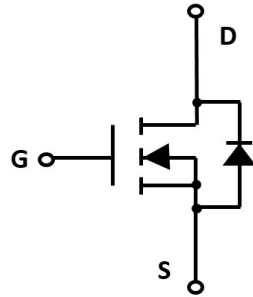
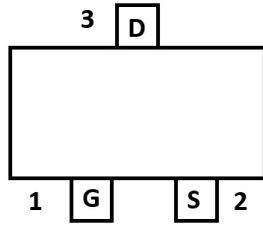
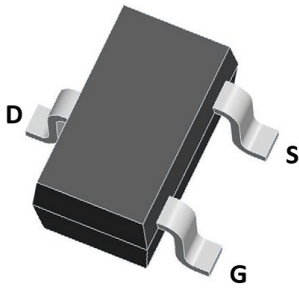


N-Channel Enhancement Mode Field Effect Transistor



SOT-323

Product Summary

- V_{DS} 60V
- I_D 340mA
- $R_{DS(ON)}$ (at $V_{GS}=10V$) <2.5ohm
- $R_{DS(ON)}$ (at $V_{GS}=4.5V$) <3.0ohm

General Description

- Trench Power MV MOSFET technology
- Voltage controlled small signal switch
- Low input Capacitance
- Fast Switching Speed
- Low Input / Output Leakage

Applications

- Battery operated systems
- Solid-state relays
- Direct logic-level interface: TTL/CMOS

■ Absolute Maximum Ratings ($T_A=25^\circ C$ unless otherwise noted)

| Parameter | Symbol | Limit | Unit |
|--|-----------------|---------------------------------|--------------|
| Drain-source Voltage | V_{DS} | 60 | V |
| Gate-source Voltage | V_{GS} | ± 30 | V |
| Drain Current | I_D | $T_A=25^\circ C$ @ Steady State | 340 |
| | | $T_A=70^\circ C$ @ Steady State | 272 |
| Pulsed Drain Current ^A | I_{DM} | 1.5 | A |
| Total Power Dissipation @ $T_A=25^\circ C$ | P_D | 150 | mW |
| Thermal Resistance Junction-to-Ambient @ Steady State ^B | $R_{\theta JA}$ | 833 | $^\circ C/W$ |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55~+150 | $^\circ C$ |

■ Ordering Information

| PREFERRED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|---------|----------------------|-------------------------|----------------------------|---------------|
| 2N7002W | F2 | 7002. | 3000 | 30000 | 120000 | 7" reel |



2N7002W

■ Electrical Characteristics (T_J=25°C unless otherwise noted)

| Parameter | Symbol | Conditions | Min | Typ | Max | Units |
|---------------------------------------|---------------------|--|-----|------|------|-------|
| Static Parameter | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | V _{GS} = 0V, I _D =250μA | 60 | | | V |
| Zero Gate Voltage Drain Current | I _{DSS} | V _{DS} =60V, V _{GS} =0V | | | 1 | μA |
| Gate-Body Leakage Current | I _{GSS1} | V _{GS} = ±30V, V _{DS} =0V | | | ±100 | nA |
| | I _{GSS2} | V _{GS} = ±20V, V _{DS} =0V | | | ±50 | nA |
| Gate Threshold Voltage | V _{GS(th)} | V _{DS} = V _{GS} , I _D =250μA | 1 | 1.6 | 2.5 | V |
| Static Drain-Source On-Resistance | R _{DS(on)} | V _{GS} = 10V, I _D =300mA | | 1.2 | 2.5 | Ω |
| | | V _{GS} = 4.5V, I _D =200mA | | 1.3 | 3.0 | |
| Forward Transconductance | g _{fs} | V _{DS} =10 V, I _D =200mA | 80 | | | ms |
| Diode Forward Voltage | V _{SD} | I _S =300mA, V _{GS} =0V | | | 1.2 | V |
| Maximum Body-Diode Continuous Current | I _S | | | | 340 | mA |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C _{iss} | V _{DS} =30V, V _{GS} =0V, f=1MHZ | | 27.5 | | pF |
| Output Capacitance | C _{oss} | | | 2.75 | | |
| Reverse Transfer Capacitance | C _{rss} | | | 1.9 | | |
| Switching Parameters | | | | | | |
| Total Gate Charge | Q _g | V _{GS} =10V, V _{DS} =30V, I _D =0.3A | | 1.6 | | nC |
| Gate-Source Charge | Q _{gs} | | | 0.47 | | |
| Gate-Drain Charge | Q _{gd} | | | 0.25 | | |
| Reverse Recovery Charge | Q _{rr} | I _F =0.3A, di/dt=-100A/us | | 2.5 | | ns |
| Reverse Recovery Time | t _{rr} | | | 11.5 | | |
| Turn-on Delay Time | t _{D(on)} | V _{GS} =10V, V _{DD} =30V, I _D =300mA, R _{GEN} =6Ω | | 3.3 | | ns |
| Turn-on Rise Time | t _r | | | 19 | | |
| Turn-off Delay Time | t _{D(off)} | | | 9.6 | | |
| Turn-off fall Time | t _f | | | 49 | | |

A. Pulse Test: Pulse Width ≤ 300us, Duty cycle ≤ 2%.

B. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch.

■ Typical Performance Characteristics

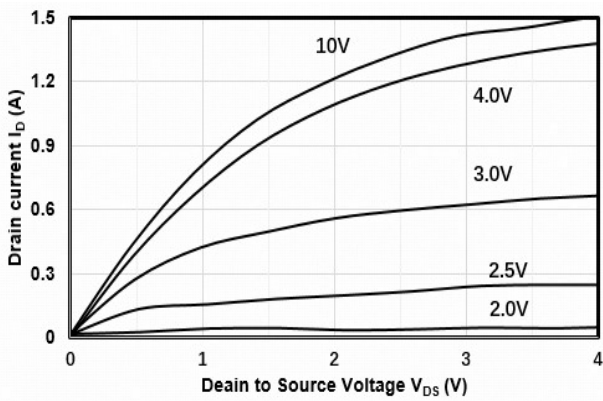


Figure1. Output Characteristics

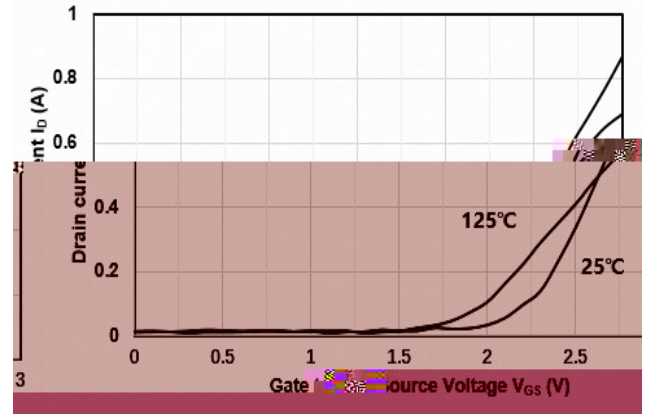


Figure2. Transfer Characteristics

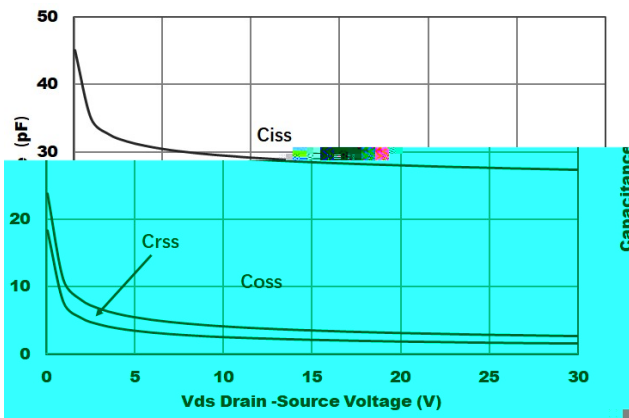


Figure3. Capacitance Characteristics

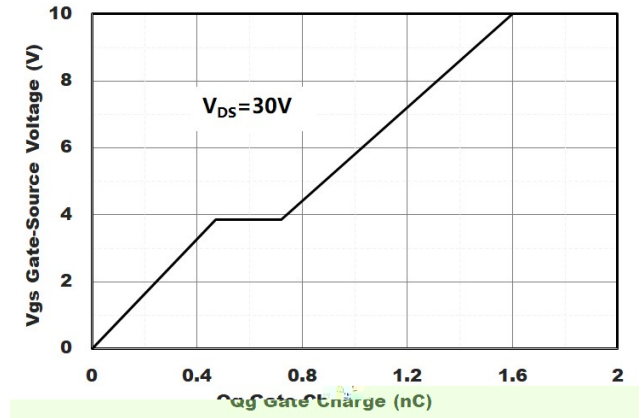


Figure4. Gate Charge

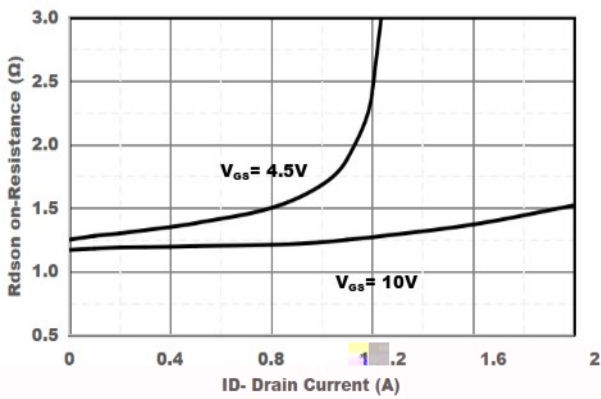


Figure5. Drain-Source on Resistance

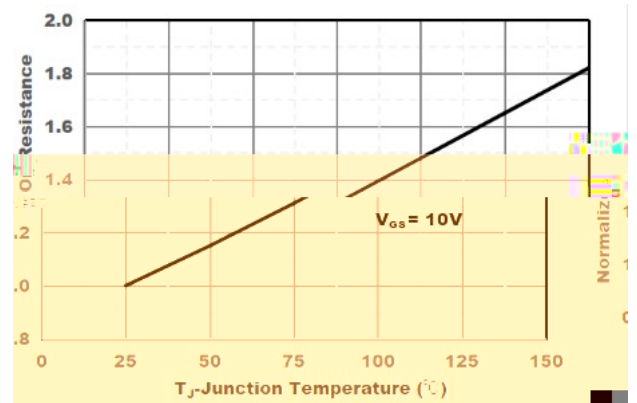


Figure6. Drain-Source on Resistance

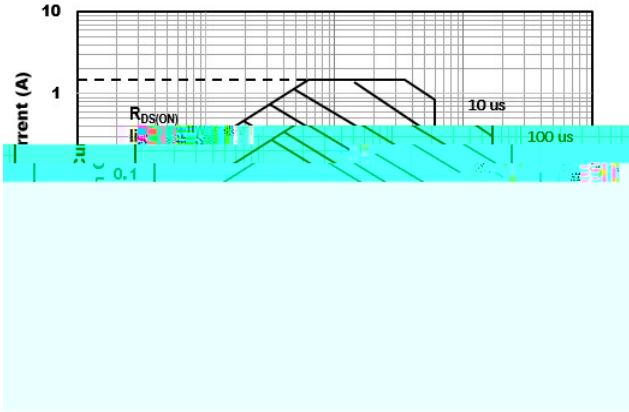


Figure7. Safe Operation Area

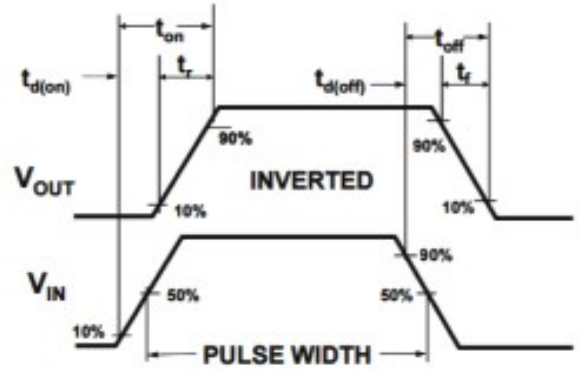
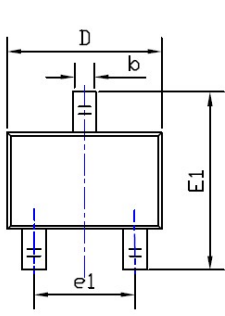


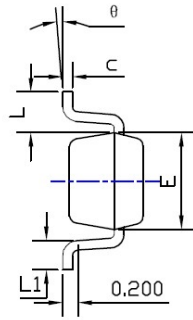
Figure8. Switching wave



■ SOT-323 Package Information

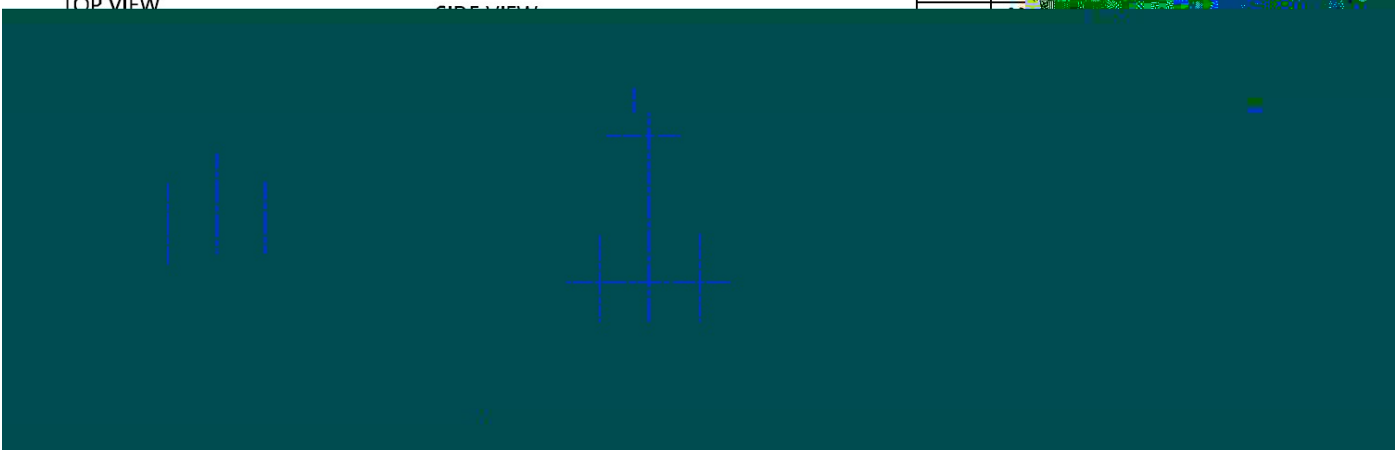


TOP VIEW



SIDE VIEW

| SYMBOL | DIMENSIONS | | | | | |
|--------|------------|-------|-------|------------|-------|-------|
| | INCHES | | | Millimeter | | |
| | MIN. | NDM. | MAX. | MIN. | NDM. | MAX. |
| A | 0.035 | --- | 0.043 | 0.900 | --- | 1.100 |
| A1 | 0.000 | --- | 0.004 | 0.000 | --- | 0.100 |
| A2 | 0.035 | 0.037 | 0.039 | 0.900 | 0.950 | 1.000 |
| b | 0.006 | 0.012 | 0.016 | 0.150 | 0.300 | 0.400 |
| c | 0.004 | --- | 0.010 | 0.100 | --- | 0.250 |
| D | 0.071 | 0.079 | 0.087 | 1.800 | 2.000 | 2.200 |





2N7002W

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