
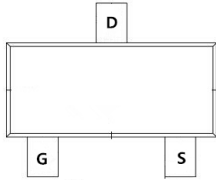
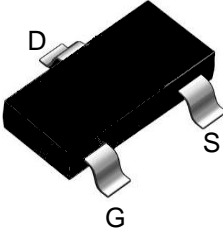
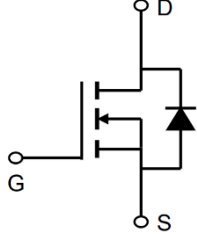


TM03N10AI

N-Channel Enhancement Mosfet

| | |
|--|---|
| <p>General Description</p> <ul style="list-style-type: none"> • Low $R_{DS(ON)}$ • RoHS and Halogen-Free Compliant <p>Applications</p> <ul style="list-style-type: none"> • Load switch • PWM | <p>General Features</p> <p>$V_{DS} = 100V$ $I_D = 3A$</p> <p>$R_{DS(ON)} = 200m\Omega$(typ.) @ $V_{GS} = 10V$</p> <p>100% UIS Tested 100% R_g Tested</p>  |
|--|---|

I: SOT-23

Marking: 1002 OR MA4

Absolute Maximum Ratings

| Symbol | Parameter | Rating | Units |
|--------------------------|--|------------|------------|
| V_{DS} | Drain-Source Voltage | 100 | V |
| V_{GS} | Gate-Source Voltage | ± 20 | V |
| $I_D @ T_A = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 3 | A |
| $I_D @ T_A = 70^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 1.7 | A |
| I_{DM} | Pulsed Drain Current ² | 8.8 | A |
| $P_D @ T_A = 25^\circ C$ | Total Power Dissipation ³ | 1 | W |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| T_J | Operating Junction Temperature Range | -55 to 150 | $^\circ C$ |

Thermal Data

| Symbol | Parameter | Typ. | Max. | Unit |
|-----------------|--|------|------|--------------|
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient ¹ | --- | 125 | $^\circ C/W$ |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case ¹ | --- | 80 | $^\circ C/W$ |



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Electrical Characteristics (T_J=25°C unless otherwise specified)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|----------------------------|---|------|------|------|------|
| Static Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | V_{(BR)DSS} | V _{GS} = 0 V, I _D = 250μA | 100 | - | - | V |
| Gate Leakage Current | I_{GSS} | V _{GS} = ±20V, V _{DS} = 0V | - | - | ±100 | nA |
| Drain Cut-off Current | I_{DSS} | V _{DS} = 100V, V _{GS} = 0V | - | - | 1 | μA |
| Gate Threshold Voltage | V_{GS(th)} | V _{GS} = V _{DS} , I _D = 250μA | 1.1 | 1.5 | 2.5 | V |
| Drain-Source on-state Resistance ³ | R_{DS(on)} | V _{GS} = 10V, I _D = 2A | - | 200 | 220 | mΩ |
| | | V _{GS} = 4.5V, I _D = 1.5A | - | 230 | 280 | |
| Dynamic Characteristics⁴ | | | | | | |
| Input Capacitance | C_{iss} | V _{GS} = 0V, V _{DS} = 50V, f = 1MHz | - | 440 | - | pF |
| Output Capacitance | C_{oss} | | - | 14 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 10 | - | |
| Switching Characteristics⁴ | | | | | | |
| Total gate charge | Q_g | V _{GS} = 10V, V _{DS} = 50V, I _D = 2A | - | 5.3 | - | nC |
| Gate-source charge | Q_{gs} | | - | 1.4 | - | |
| Gate-drain charge | Q_{gd} | | - | 1.8 | - | |
| Turn-on Time | t_{d(on)} | V _{GS} = 10V, V _{DD} = 50V, R _G = 1Ω, I _D = 2A | - | 14 | - | ns |
| Rise time | t_r | | - | 54 | - | |
| Turn-off Time | t_{d(off)} | | - | 18 | - | |
| Fall time | t_f | | - | 11 | - | |
| Source-Drain Diode characteristics | | | | | | |
| Body Diode Voltage ³ | V_{SD} | I _S = 1A, V _{GS} = 0V | - | - | 1.2 | V |
| Continuous Source Current | I_S | | - | - | 2 | A |

Notes:

1. Repetitive rating, pulse width limited by junction temperature T_{J(MAX)}=150°C.
2. The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
3. Pulse Test: Pulse width≤300μs, duty cycle≤2%.
4. This value is guaranteed by design hence it is not included in the production test.



TM03N10AI

N-Channel Enhancement Mosfet

Typical Characteristics

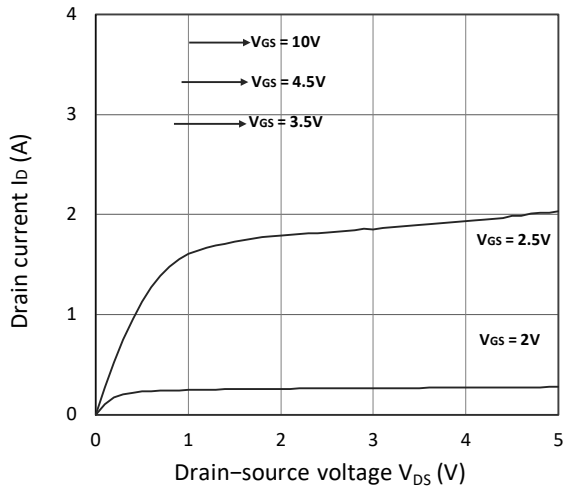


Figure 1. Output Characteristics

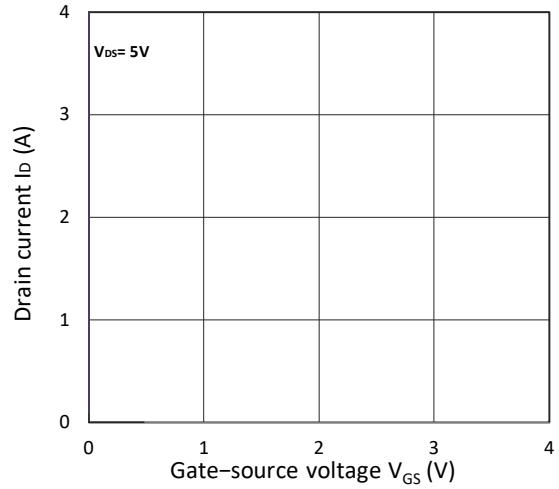


Figure 2. Transfer Characteristics

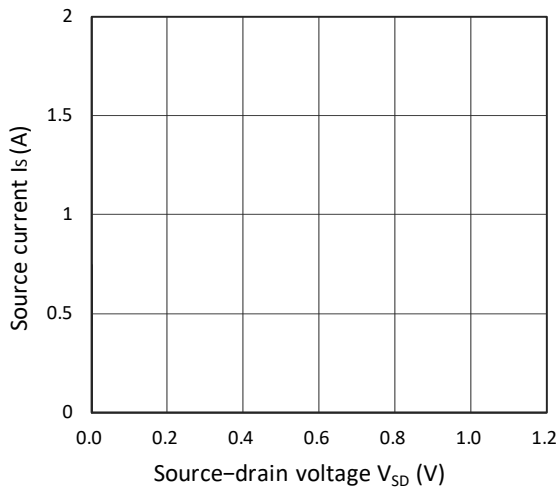


Figure 3. Forward Characteristics of Reverse

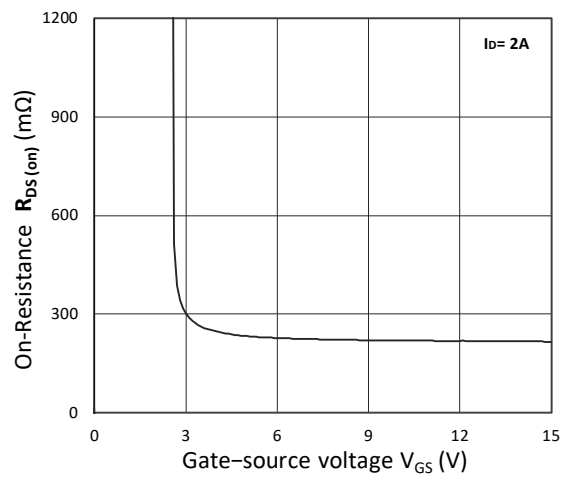


Figure 4. $R_{DS(on)}$ vs. V_{GS}

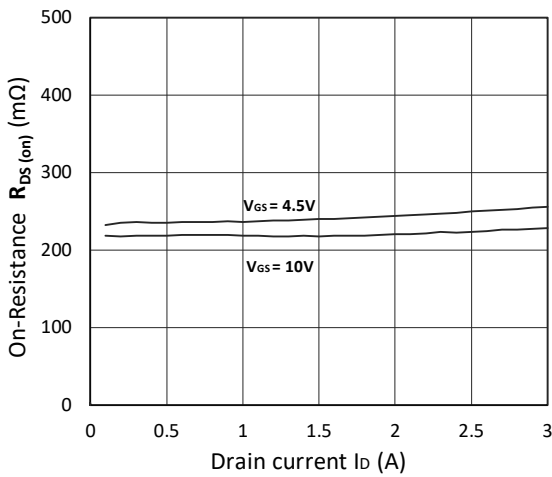


Figure 5. $R_{DS(on)}$ vs. I_D

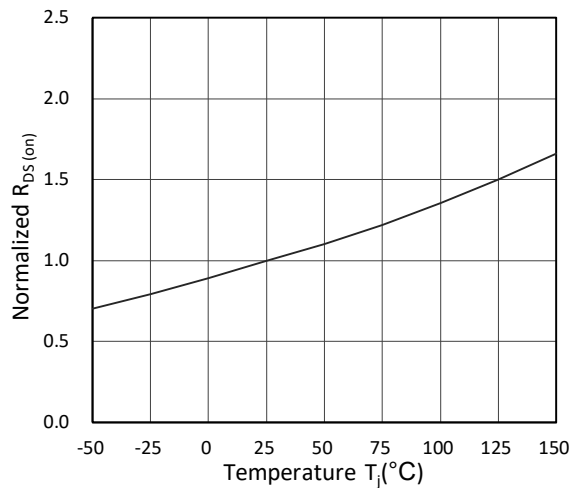


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature



TM03N10AI

N-Channel Enhancement Mosfet

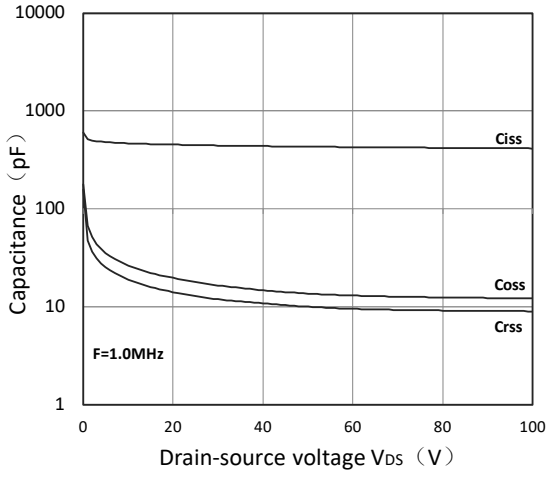


Figure 7. Capacitance Characteristics

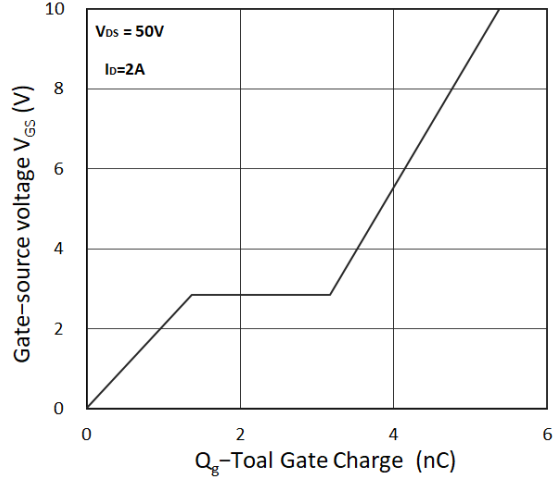
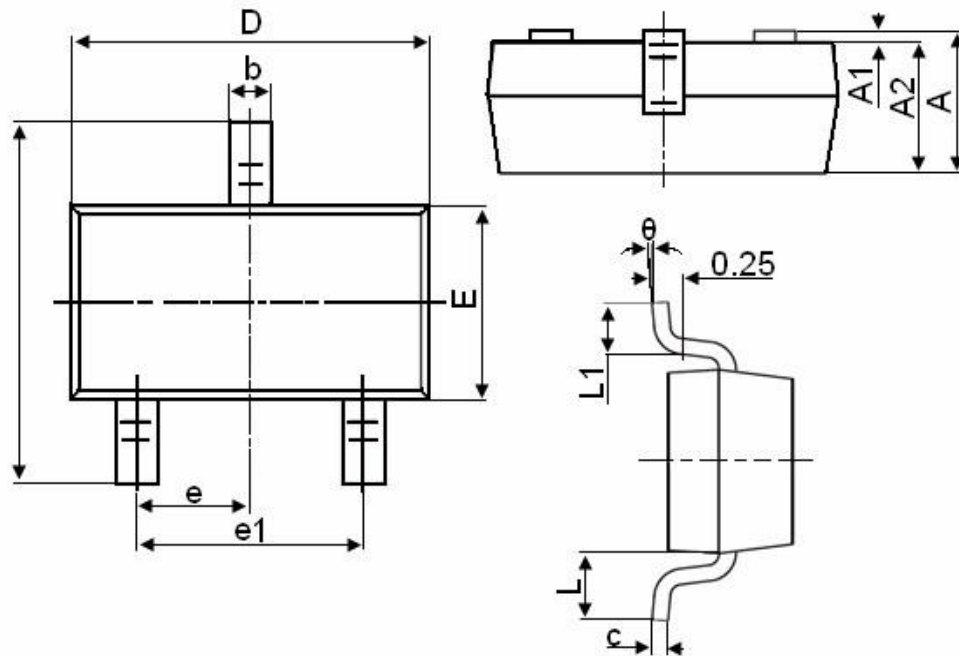


Figure 8. Gate Charge Characteristics

Package Mechanical Data: SOT-23



| 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° |