

TMG05N10M

N-Channel Enhancement Mosfet

General Description

- Low $R_{DS(ON)}$
- RoHS and Halogen-Free Compliant

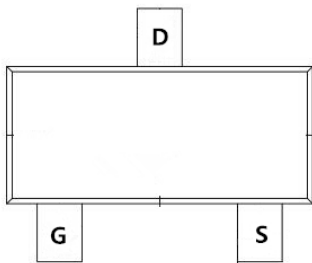
Applications

- Load switch
- PWM

General Features

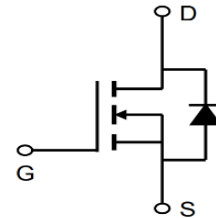
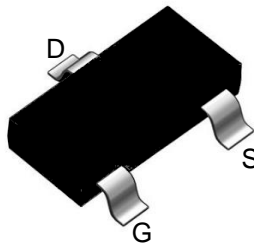
$V_{DS} = 100V$ $I_D = 5.2A$
 $R_{DS(ON)} = 95m\Omega$ (typ.) @ $V_{GS} = 10V$

100% UIS Tested
 100% R_g Tested



Marking: 1005S

MI:SOT-23-3L



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

| 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, $V_{GS} @ 10V^1$ | 5.2 | A |
| $I_D @ T_A=70^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V^1$ | 2.2 | A |
| I_{DM} | Pulsed Drain Current ² | 11 | 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 | $^\circ C/W$ |

Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise specified

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|------|------|-----------|------------|
| Off Characteristic | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS} = 0V, I_D = 250\mu A$ | 100 | 110 | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = 100V, V_{GS} = 0V$ | - | - | 1 | μA |
| I_{GSS} | Gate to Body Leakage Current | $V_{DS} = 0V, V_{GS} = \pm 20V$ | - | - | ± 100 | nA |
| On Characteristics ^{note3} | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 1.0 | 2.0 | 3.0 | V |
| $R_{DS(on)}$ | Static Drain-Source On-Resistance ^{note2} | $V_{GS} = 10V, I_D = 3A$ | - | 95 | 140 | m Ω |
| Dynamic Characteristics ^{note4} | | | | | | |
| C_{iss} | Input Capacitance | $V_{DS} = 50V, V_{GS} = 0V,$ $f = 1.0MHz$ | - | 196 | - | pF |
| C_{oss} | Output Capacitance | | - | 25.9 | - | pF |
| C_{riss} | Reverse Transfer Capacitance | | - | 21.4 | - | pF |
| Q_g | Total Gate Charge | $V_{DS} = 50V, I_D = 3A,$ $V_{GS} = 10V$ | - | 4.3 | - | nC |
| Q_{gs} | Gate-Source Charge | | - | 3.5 | - | nC |
| Q_{gd} | Gate-Drain("Miller") Charge | | - | 3.1 | - | nC |
| Switching Characteristics ^{note4} | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD} = 50V, I_{DS}=3A$ $R_G = 2\Omega, V_{GEN} = 10V$ | - | 14.7 | - | ns |
| t_r | Turn-On Rise Time | | - | 3.5 | - | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | - | 20.9 | - | ns |
| t_f | Turn-Off Fall Time | | - | 2.7 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I_S | Maximum Continuous Drain to Source Diode Forward Current ^{note2} | | - | - | 5.2 | A |
| I_{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 12 | A |
| V_{SD} | Drain to Source Diode Forward Voltage ^{note3} | $V_{GS} = 0V, I_S = 3A$ | - | - | 1.3 | V |
| t_{rr} | Body Diode Reverse Recovery Time | $V_{GS} = 0V, I_F = 3A,$ $di/dt = 100A/\mu s$ | - | 32.1 | - | ns |
| Q_{rr} | Body Diode Reverse Recovery Time Charge | | - | 39.4 | - | nC |
| I_{rrm} | Peak Reverse Recovery Current | | - | 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. $V_{DD}=50$ V, $R_G=50$ Ω , $L=0.3$ mH, starting $T_J=25$ $^\circ\text{C}$



Typical Characteristics

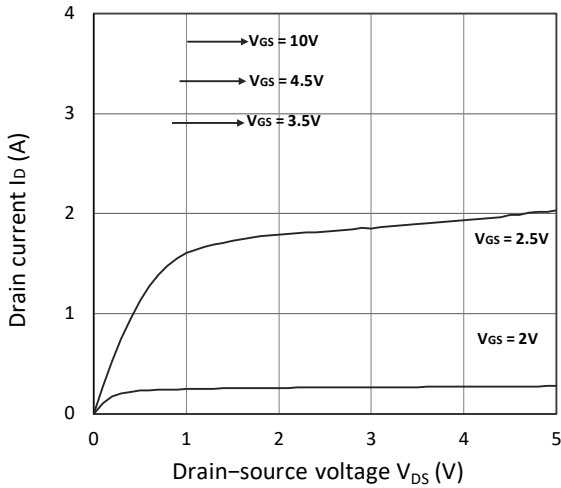


Figure 1. Output Characteristics

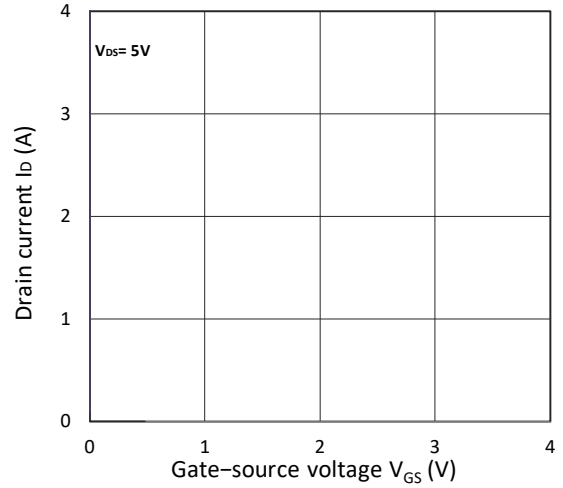


Figure 2. Transfer Characteristics

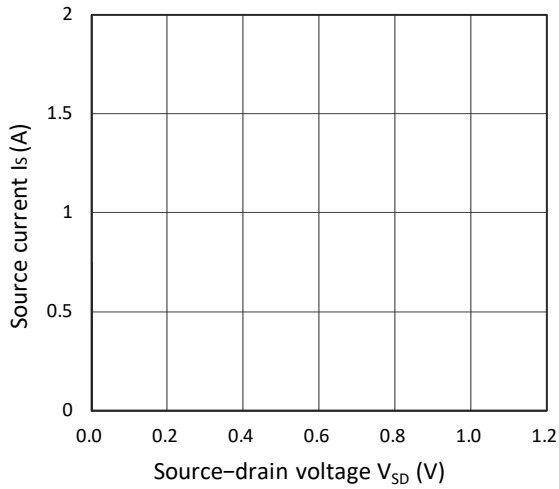


Figure 3. Forward Characteristics of Reverse

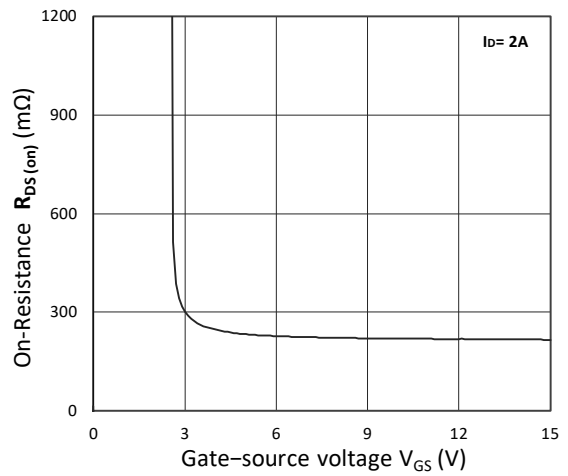


Figure 4. $R_{DS(ON)}$ vs. V_{GS}



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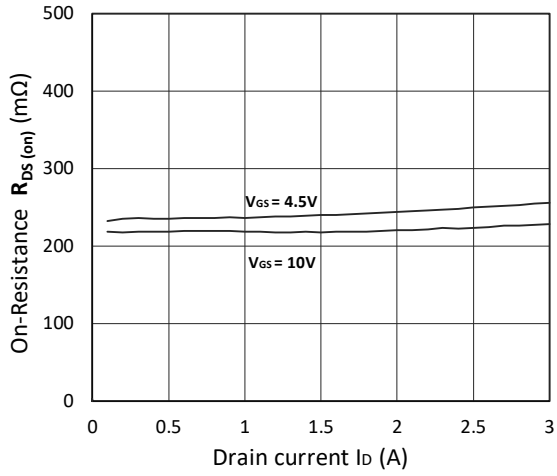


Figure 5. $R_{DS(ON)}$ vs. I_D

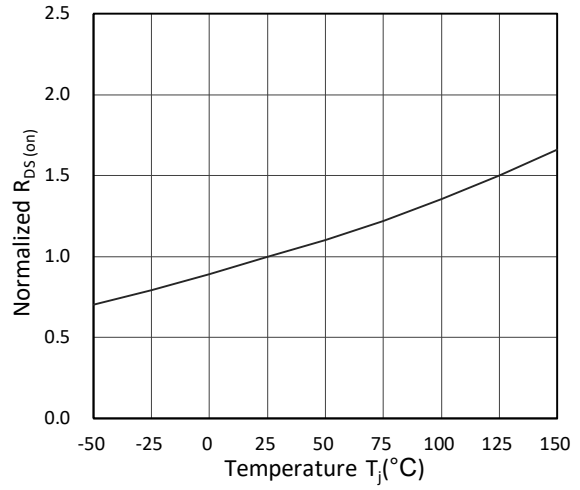


Figure 6. Normalized $R_{DS(ON)}$ vs. Temperature

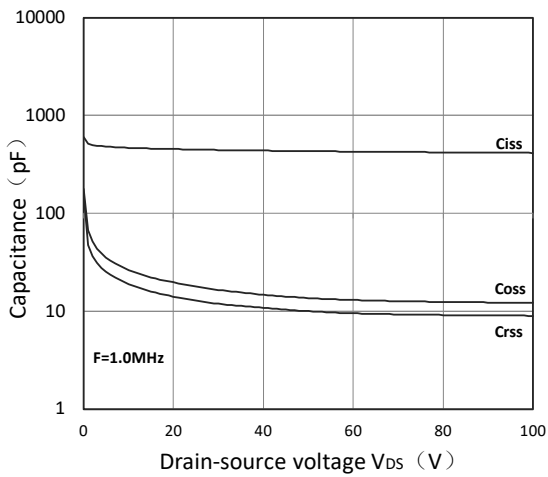


Figure 7. Capacitance Characteristics

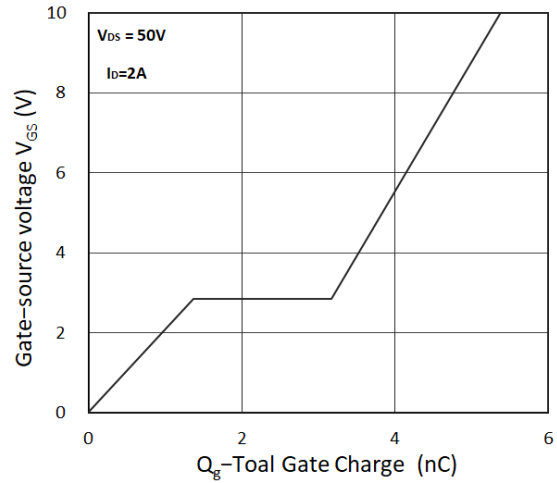
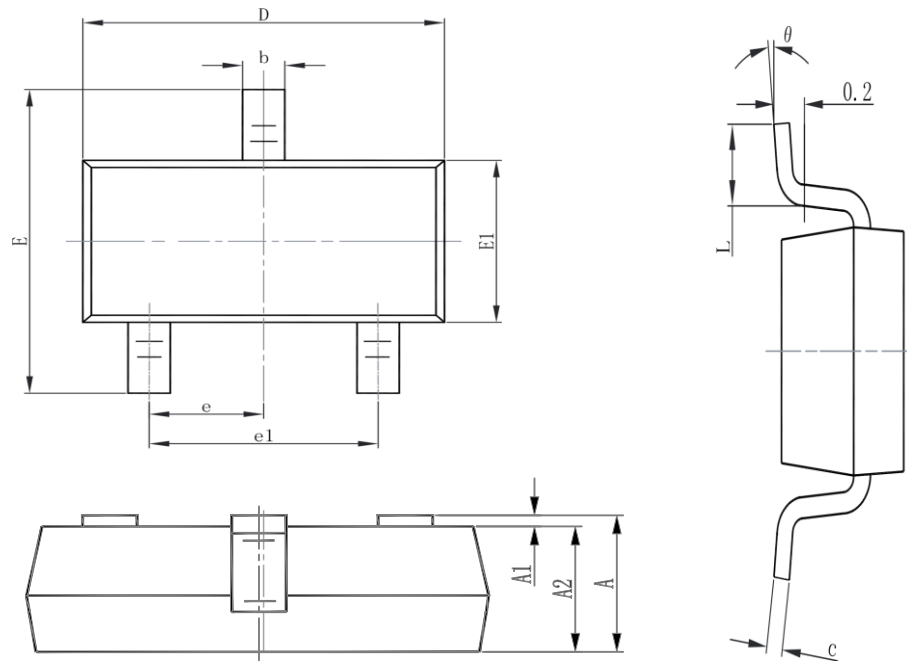


Figure 8. Gate Charge Characteristics

Package Mechanical Data:SOT-23-3L



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 1.050 | 1.250 | 0.041 | 0.049 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.100 | 0.200 | 0.004 | 0.008 |
| D | 2.820 | 3.020 | 0.111 | 0.119 |
| E1 | 1.500 | 1.700 | 0.059 | 0.067 |
| E | 2.650 | 2.950 | 0.104 | 0.116 |
| e | 0.950(BSC) | | 0.037(BSC) | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.300 | 0.600 | 0.012 | 0.024 |
| θ | 0° | 8° | 0° | 8° |