

WNM4002

Small Signal N-Channel, 20V, 0.3A, MOSFET

[Http://www.willsemi.com](http://www.willsemi.com)

| $V_{(BR)DSS}$ | $R_{DS(on)}$ Typ. |
|---------------|-------------------|
| 20 V | 1.4Ω @ 4.5V |
| | 2.2Ω @ 2.5V |
| | 3.8Ω @ 1.8V |

Descriptions

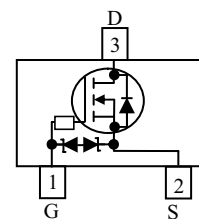
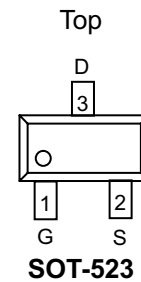
The WNM4002 is the N-Channel enhancement MOS Field Effect Transistor, uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. This device is suitable for use in small signal switch. Standard product WNM4002 is Pb-free.

Features

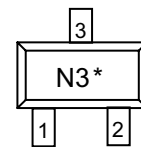
- Trench N-Channel
- Supper high density cell design for extremely low $R_{ds(on)}$
- Exceptional ON resistance and maximum DC current capability
- Small package design with SOT-523

Applications

- Driver: Relays, Solenoids, Lamps, Hammers
- Power supply converters circuit
- Load/Power Switching for potable device



Pin Configuration



N3 = Device Code

* = Month

Marking

Order Information

| Device | Package | Shipping |
|--------------|---------|----------------|
| WNM4002-3/TR | SOT-523 | 3000/Tape&Reel |

Absolute Maximum Ratings

 (T_A=25°C unless otherwise noted)

| Symbol | Parameter | Ratings | Unit |
|------------------|--|---------|------|
| V _{DSS} | Drain-to-Source Voltage | 20 | V |
| V _{GSS} | Gate-to-Source Voltage | ±6.0 | V |
| I _D | Drain Current – Continue Note1 | 0.3 | A |
| | Drain Current – Pulsed (t<300us, Duty<2%) Note1 | 0.6 | A |
| P _D | Power Dissipation – Note1 | 0.25 | W |
| T _J | Operation junction temperature range | 150 | °C |
| T _{SG} | Storage temperature range | -55~150 | °C |

Thermal Resistance Ratings

 (T_A=25°C unless otherwise noted)

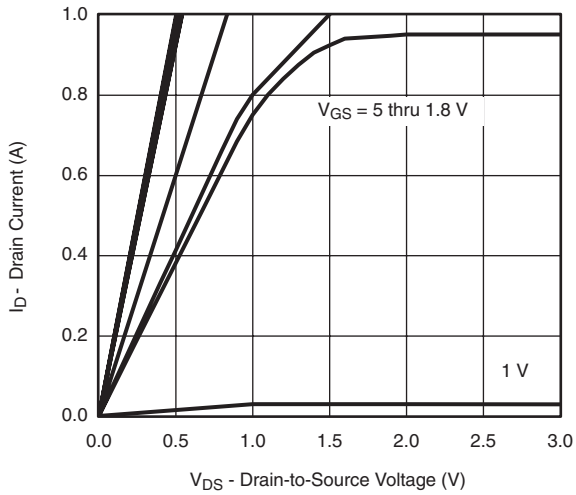
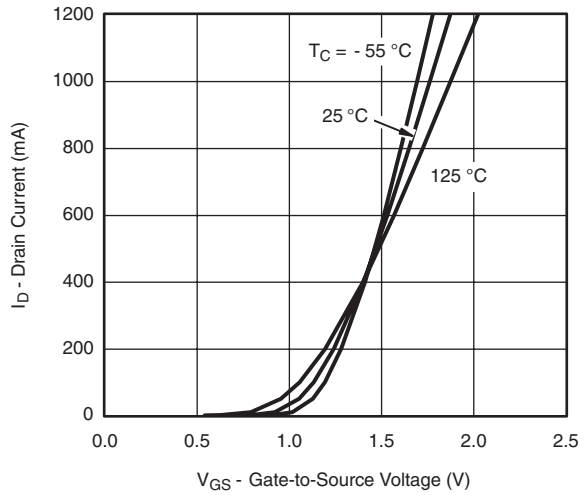
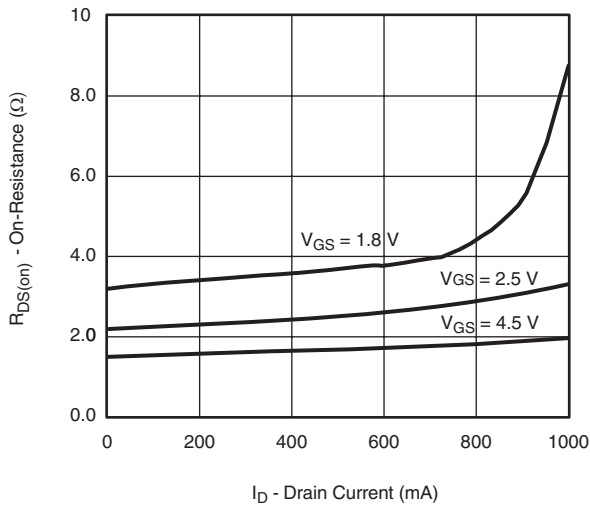
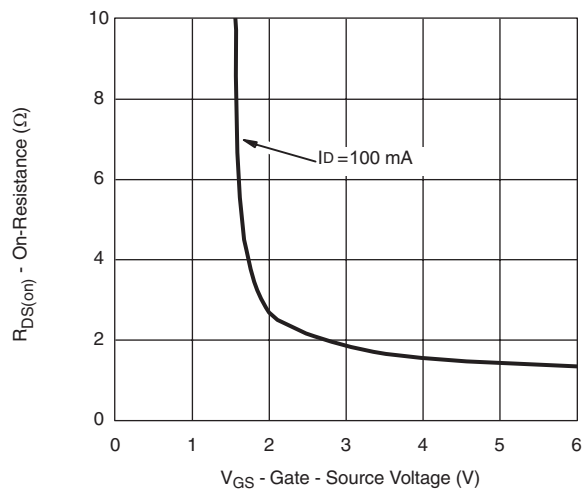
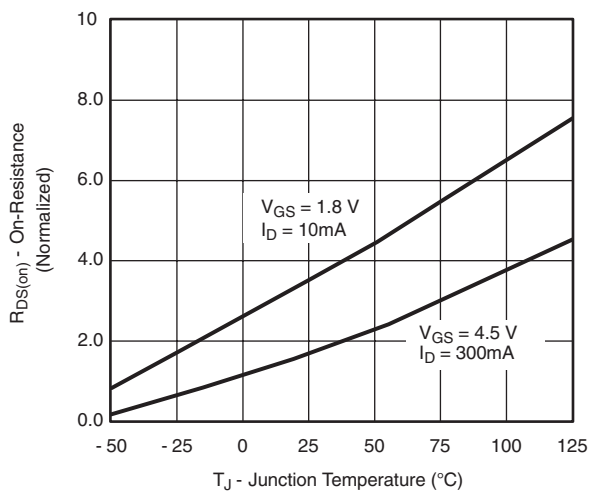
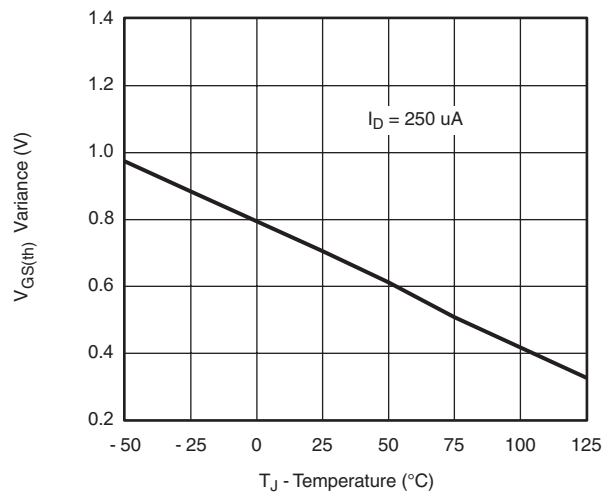
| Symbol | Parameter | Typ. | Max. | Unit |
|------------------|--|------|------|------|
| R _{θJA} | Thermal Resistance, Junction to Ambient – Note1 | 500 | 620 | °C/W |

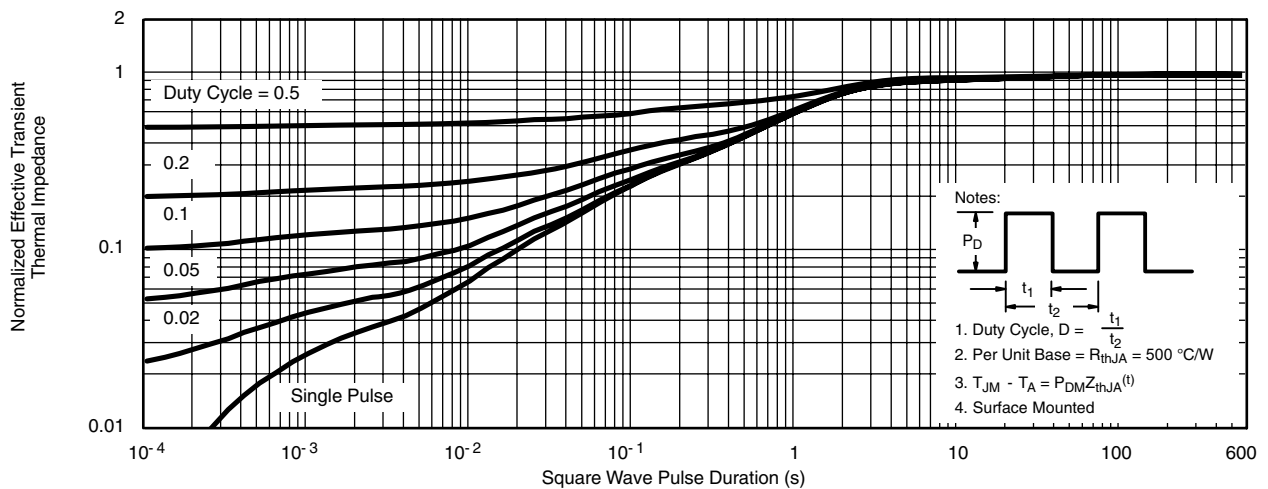
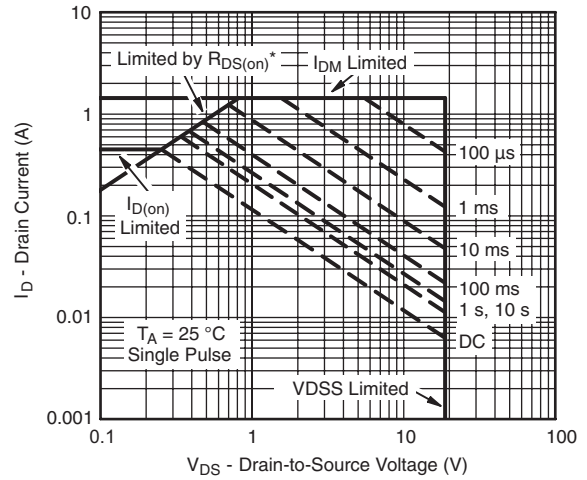
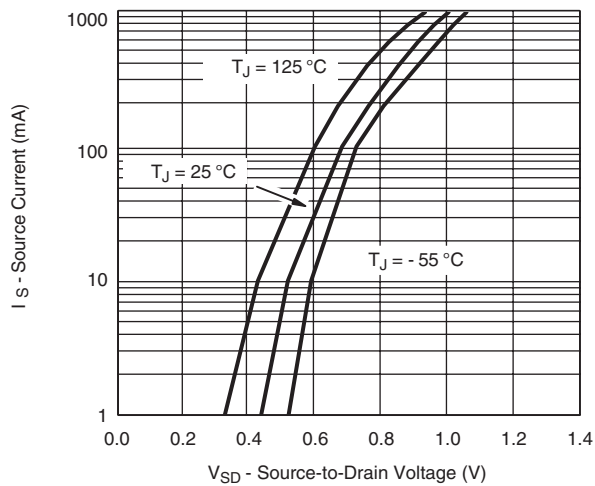
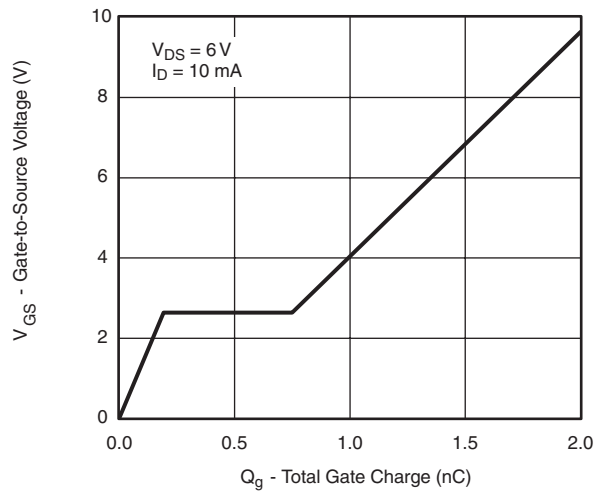
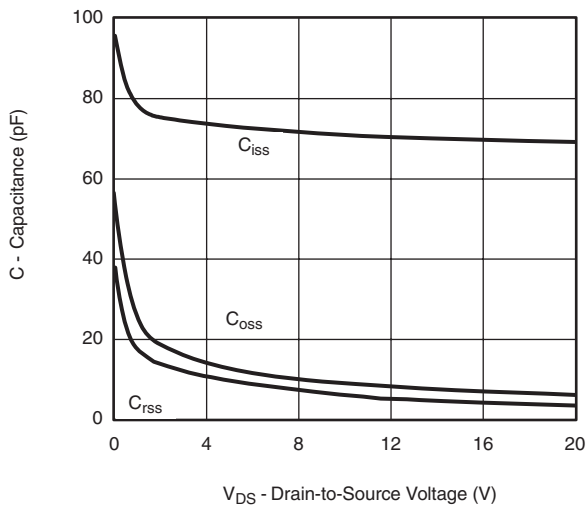
Note1: Surface mounted on a 2 oz copper, 1 in² pad, FR-4 board.

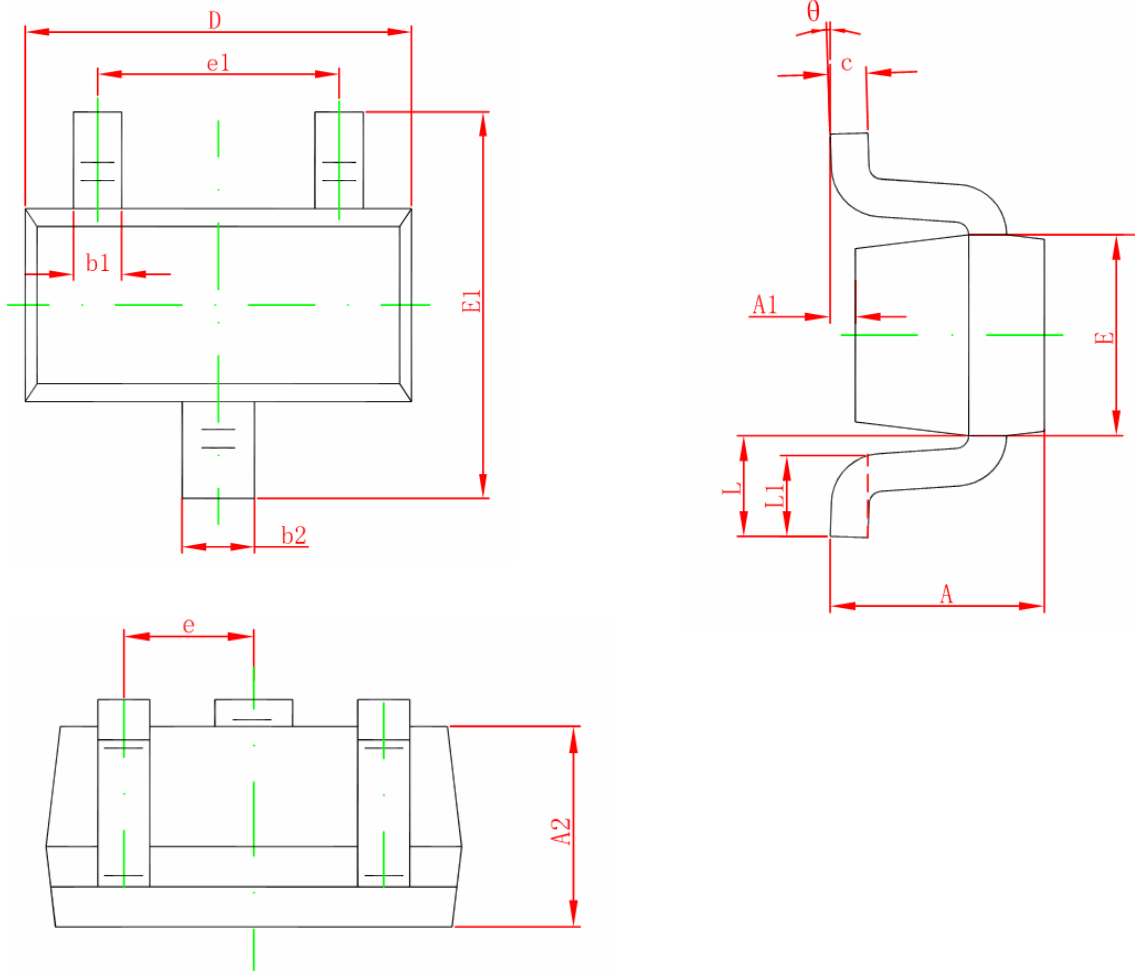
Electronics Characteristics

 (T_A=25°C unless otherwise noted)

| Symbol | Parameter | Test Condition | Min | Typ. | Max | Unit |
|--|---------------------------------|--|------|------|-----|------|
| Off Characteristics | | | | | | |
| V _{(BR)DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V, I _D =250uA | 20 | | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =20V, V _{GS} =0V | | | 1 | uA |
| I _{GSS} | Gate –Source leakage current | V _{DS} =0V, V _{GS} =±5V | | | 5 | uA |
| ON Characteristics | | | | | | |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} = V _{GS} , I _D =250uA | 0.35 | | 1.0 | V |
| R _{DS(on)} | Drain-Source On-Resistance | V _{GS} =4.5V, I _D =0.3A | | | 2.0 | Ω |
| | | V _{GS} =2.5V, I _D =0.1A | | | 3.5 | Ω |
| | | V _{GS} =1.8V, I _D =0.01A | | | 5.0 | Ω |
| g _{FS} | Forward Transconductance | V _{DS} =6V, I _D =0.1A | | 1.0 | | S |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} =6V, V _{GS} =0V, F=100kHz | | 72 | | pF |
| C _{oss} | Output Capacitance | | | 12 | | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 10 | | pF |
| Q _{G(TOT)} | Total Gate Charge | V _{DS} =6V, V _{GS} =4.5V, I _D =0.01A | | 1.1 | | nC |
| Q _{GS} | Gate-Source Charge | | | 0.11 | | nC |
| Q _{GD} | Gate-Drain Charge | | | 0.45 | | nC |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn-On Delay Time | V _{DS} =10V, V _{GS} =4.5V, I _D =0.1A, R _G =6Ω | | 22 | | ns |
| t _r | Turn-On Rise Time | | | 80 | | ns |
| t _{d(off)} | Turn-Off Delay Time | | | 700 | | ns |
| t _f | Turn-Off Fall Time | | | 380 | | ns |
| Drain-to-Source Diode Characteristics | | | | | | |
| V _{SD} | Forward Diode Voltage | V _{GS} =0V, I _S =0.15A | | -0.7 | | V |

Typical Performance Graph

Output Characteristics

Transfer Characteristics

On Resistance vs. Drain Current

On Resistance vs. Gate - Source Voltage

On Resistance vs. Junction Temperature

Threshold Voltage



Package Outline Dimension
SOT-523


| Symbol | Dimension in Millimeters | |
|----------|--------------------------|-------|
| | Min. | Max. |
| A | 0.700 | 0.900 |
| A1 | 0.000 | 0.100 |
| A2 | 0.700 | 0.800 |
| b1 | 0.150 | 0.250 |
| b2 | 0.250 | 0.350 |
| c | 0.100 | 0.200 |
| D | 1.500 | 1.700 |
| E | 0.700 | 0.900 |
| E1 | 1.450 | 1.750 |
| e | 0.500 Typ. | |
| e1 | 0.900 | 1.100 |
| L | 0.400 Ref. | |
| L1 | 0.260 | 0.460 |
| θ | 0° | 8 |

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