

WNM4153

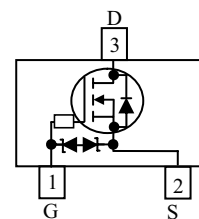
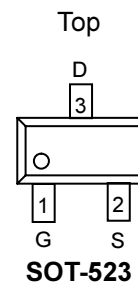
N-Channel, 20V, 0.88A, Small Signal MOSFET

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

| V _{DS} (V) | R _{DS(on)} (Ω) |
|---------------------|-------------------------------|
| 20 | 0.220 @ V _{GS} =4.5V |
| | 0.260 @ V _{GS} =2.5V |
| | 0.320 @ V _{GS} =1.8V |

Descriptions

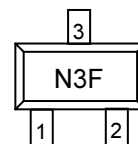
The WNM4153 is the N-Channel enhancement MOS Field Effect Transistor, uses advanced trench technology and design to provide excellent R_{DS(ON)} with low gate charge. This device is suitable for use in DC-DC conversion applications. Standard Product WNM4153 is Pb-free.



Pin Configuration

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



N3 = Device Code

F = Month

Marking

Applications

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

Order Information

| Device | Package | Shipping |
|--------------|---------|----------------|
| WNM4153-3/TR | SOT-523 | 3000/Tape&Reel |

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

| Parameter | | Symbol | 10 S | Steady State | Unit |
|--|------------------------|-----------|------------|--------------|------------------|
| Drain-Source Voltage | | V_{DS} | +20 | | V |
| Gate-Source Voltage | | V_{GS} | ± 6 | | |
| Continuous Drain Current ^a | $T_A=25^\circ\text{C}$ | I_D | 0.88 | 0.80 | A |
| | $T_A=70^\circ\text{C}$ | | 0.71 | 0.64 | |
| Maximum Power Dissipation ^a | $T_A=25^\circ\text{C}$ | P_D | 0.37 | 0.30 | W |
| | $T_A=70^\circ\text{C}$ | | 0.23 | 0.19 | |
| Continuous Drain Current ^b | $T_A=25^\circ\text{C}$ | I_D | 0.76 | 0.69 | A |
| | $T_A=70^\circ\text{C}$ | | 0.60 | 0.55 | |
| Maximum Power Dissipation ^b | $T_A=25^\circ\text{C}$ | P_D | 0.27 | 0.22 | W |
| | $T_A=70^\circ\text{C}$ | | 0.17 | 0.14 | |
| Pulsed Drain Current ^c | | I_{DM} | 1.4 | | A |
| Operating Junction Temperature | | T_J | 150 | | $^\circ\text{C}$ |
| Lead Temperature | | T_L | 260 | | $^\circ\text{C}$ |
| Storage Temperature Range | | T_{stg} | -55 to 150 | | $^\circ\text{C}$ |

Thermal Resistance Ratings ($T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameter | | Symbol | Typical | Maximum | Unit |
|---|---------------|-----------------|---------|---------|--------------------|
| Junction-to-Ambient Thermal Resistance ^a | $t \leq 10$ s | $R_{\theta JA}$ | 285 | 335 | $^\circ\text{C/W}$ |
| | Steady State | | 340 | 405 | |
| Junction-to-Ambient Thermal Resistance ^b | $t \leq 10$ s | $R_{\theta JA}$ | 385 | 450 | |
| | Steady State | | 455 | 545 | |
| Junction-to-Case Thermal Resistance | | $R_{\theta JC}$ | 260 | 300 | |

a Surface mounted on FR4 Board using 1 square inch pad size, 1oz copper

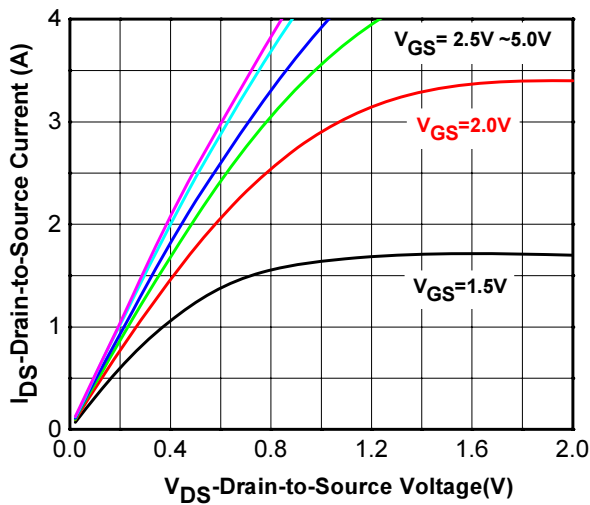
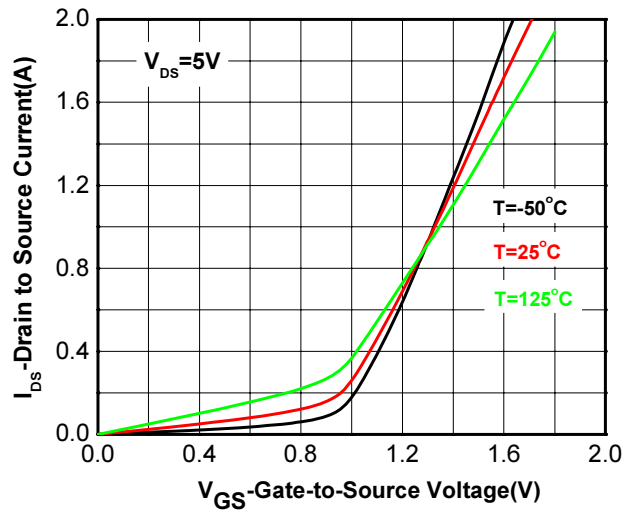
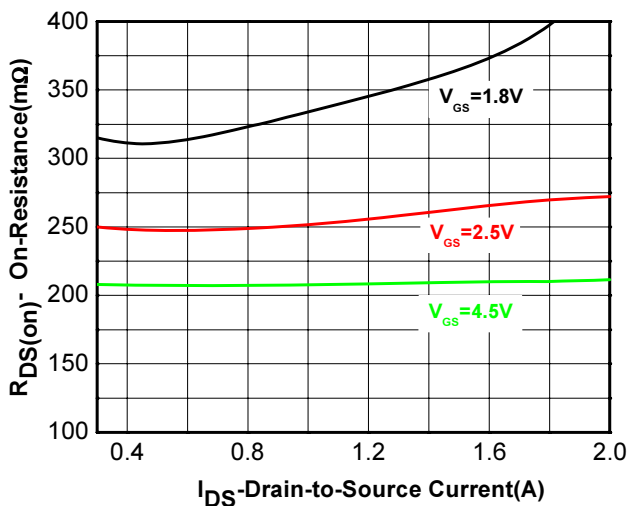
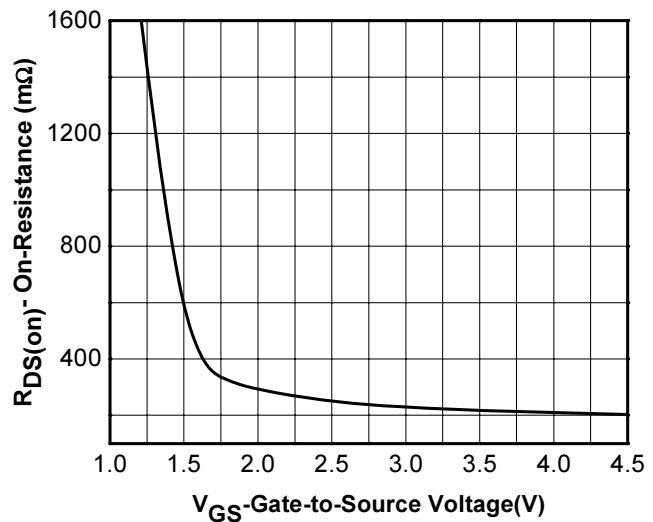
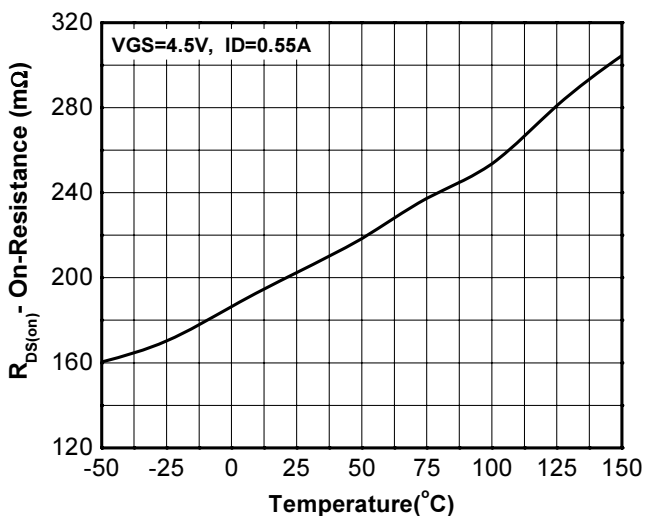
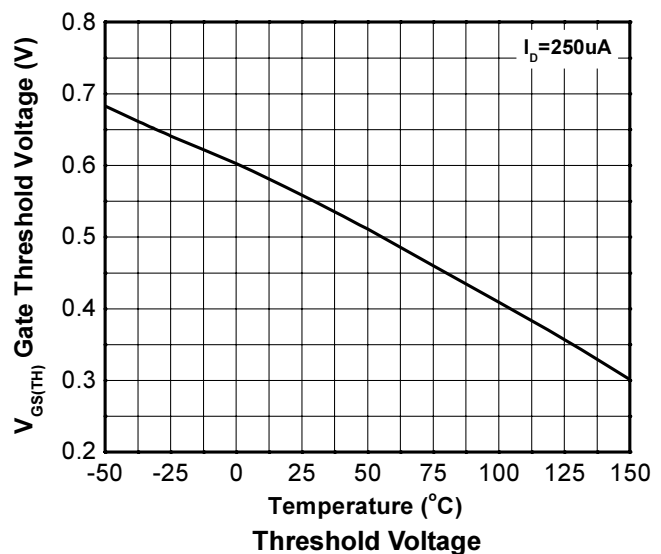
b Surface mounted on FR4 board using minimum pad size, 1oz copper

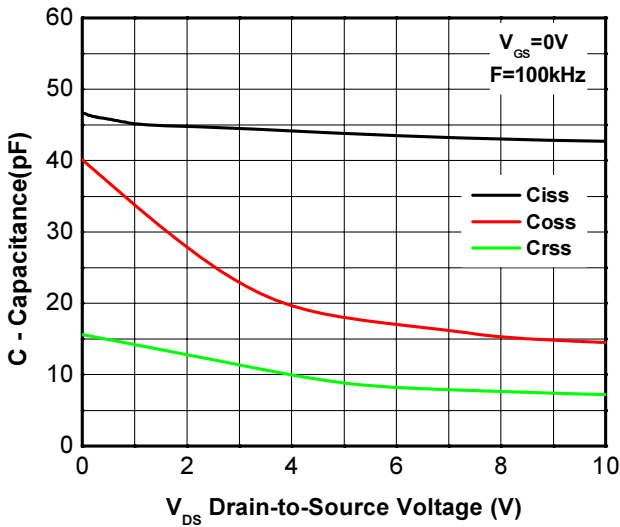
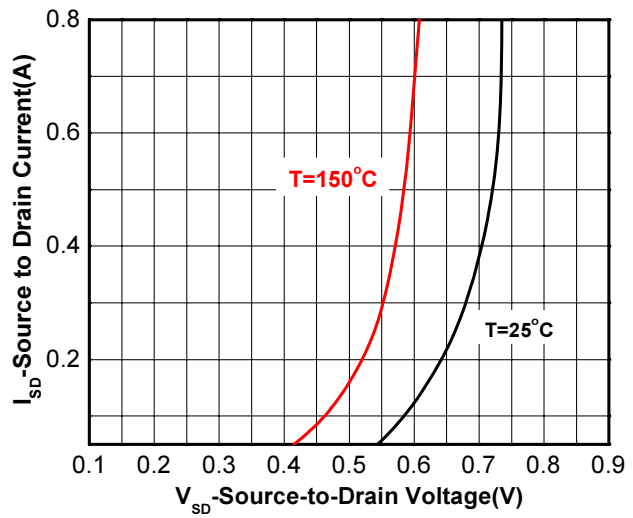
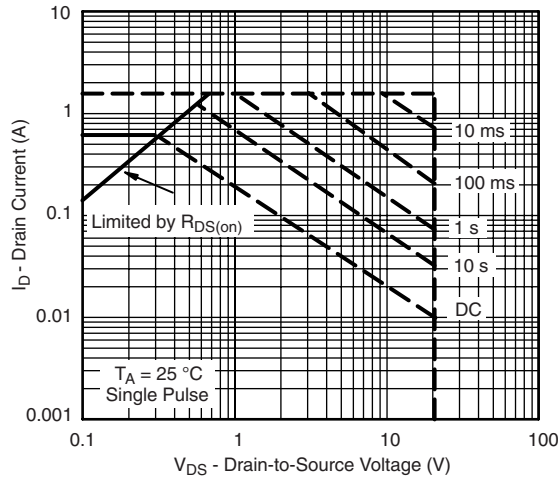
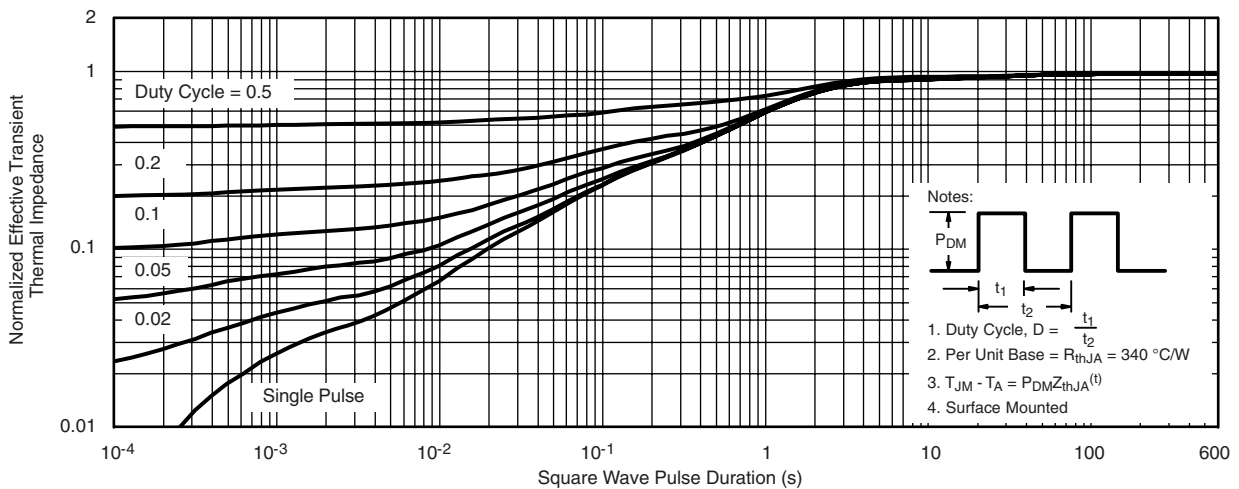
c Repetitive rating, pulse width limited by junction temperature, $t_p=10\mu\text{s}$, Duty Cycle=1%

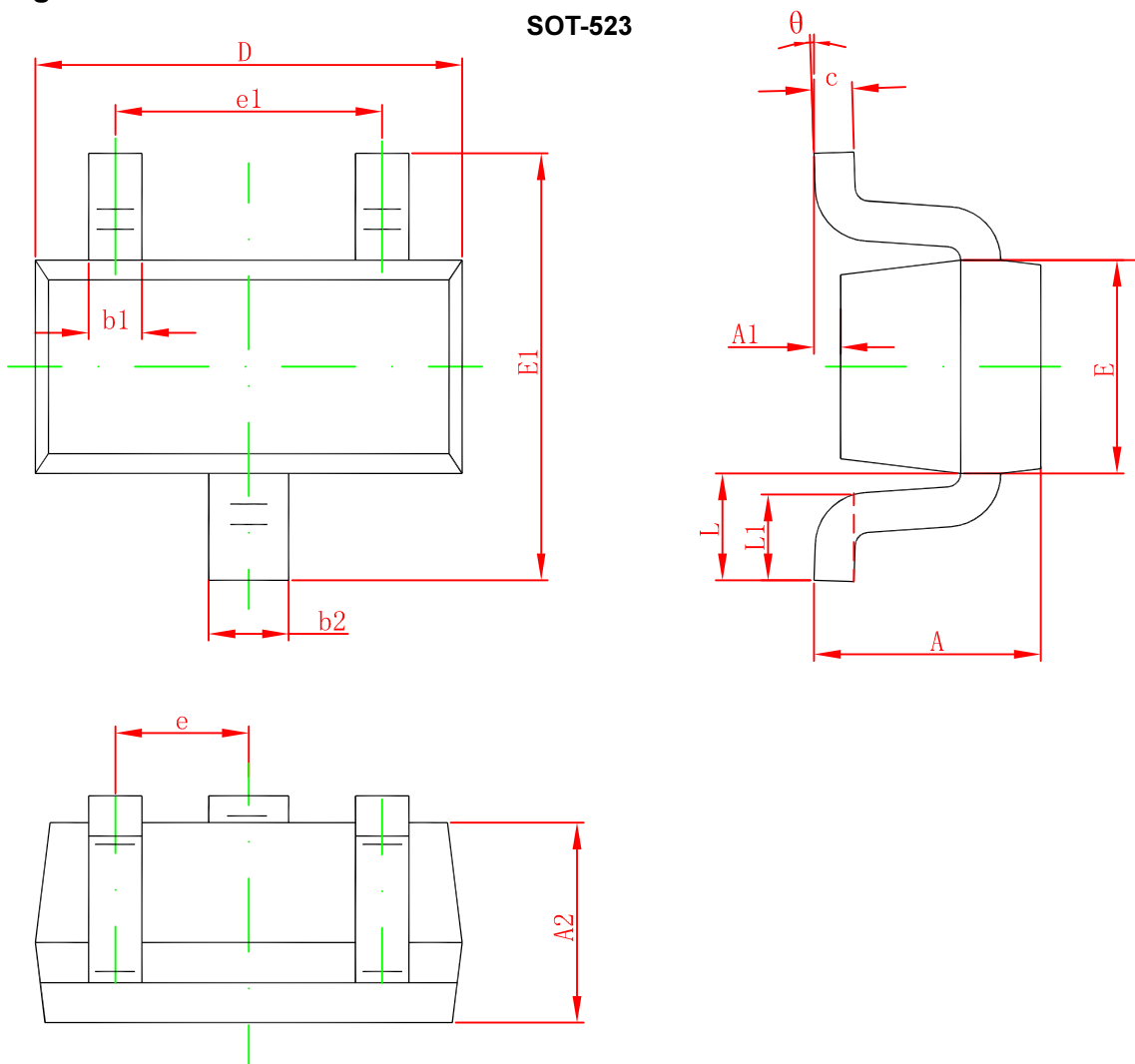
d Repetitive rating, pulse width limited by junction temperature $T_J=150^\circ\text{C}$.

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} =16V, 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 | 0.45 | 0.55 | 1.0 | V |
| R _{DS(on)} | Drain-Source On-Resistance | V _{GS} =4.5V, I _D =0.55A | | 220 | 310 | mΩ |
| | | V _{GS} =2.5V, I _D =0.45A | | 260 | 360 | mΩ |
| | | V _{GS} =1.8V, I _D =0.35A | | 320 | 460 | mΩ |
| g _{FS} | Forward Transconductance | V _{DS} =10V, I _D =0.4A | | 1.0 | | S |
| Dynamic Characteristics | | | | | | |
| C _{iss} | Input Capacitance | V _{DS} =10V, V _{GS} =0V, f=100kHz | | 68 | | pF |
| C _{oss} | Output Capacitance | | | 9.0 | | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 7.5 | | pF |
| Q _{G(TOT)} | Total Gate Charge | V _{DS} =10V, V _{GS} =4.5V, I _D =0.55A | | 1.15 | | nC |
| Q _{G(TH)} | Threshold gate charge | | | 0.06 | | nC |
| Q _{GS} | Gate-Source Charge | | | 0.15 | | nC |
| Q _{GD} | Gate-Drain Charge | | | 0.23 | | nC |
| Switching Characteristics | | | | | | |
| t _{d(on)} | Turn-On Delay Time | V _{DD} =10V, V _{GS} =4.5V, I _D =0.55A, 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 |
| Body Diode Characteristics | | | | | | |
| V _{SD} | Forward Diode Voltage | V _{GS} =0V, I _S =0.35A | 0.5 | 0.7 | 1.5 | V |

Typical Performance Graph

Output Characteristics

Transfer Characteristics

On Resistance vs. Drain Current

On Resistance vs. V_{GS} vs. Temperature

On Resistance vs. Junction Temperature

Threshold Voltage


Capacitance

Body Diode Characteristics

Safe Operation Area, Junction-to-Ambient

Transient thermal response (Junction-to-Ambient)

Package Outline Dimensions
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° |