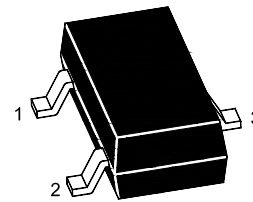
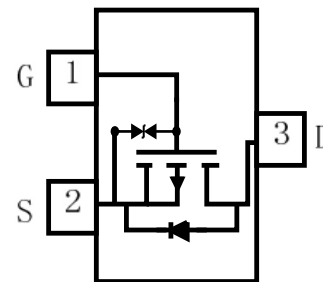


WPM5001
Single P-Channel, -50V, -0.2A, Power MOSFET
[Http://www.sh-willsemi.com](http://www.sh-willsemi.com)

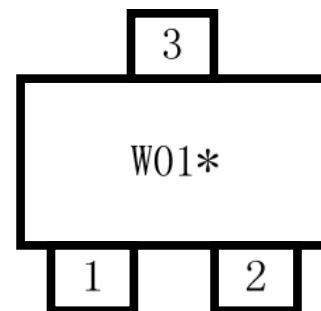
| V _{DS} (V) | Typical R _{ds(on)} () |
|---------------------|---------------------------------|
| -50 | 3.0@ V _{GS} = -10V |
| | 3.5@ V _{GS} = -5V |
| ESD Protected | |


SOT-23
Descriptions

The WPM5001 is P-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, power switch and charging circuit. Standard Product WPM5001 is Pb-free and Halogen-free.


Pin configuration (Top view)
Features

- Trench Technology
- Supper high density cell design
- Excellent ON resistance for higher DC current
- Extremely Low Threshold Voltage
- Small package SOT-23


W=Willsemi
01= Device Code
***= Month (A-Z)**
Marking
Applications

- Driver for Relay, Solenoid, Motor, LED etc.
- DC-DC converter circuit
- Power Switch
- Load Switch
- Charging

Order information

| Device | Package | Shipping |
|--------------|---------|----------------|
| WPM5001-3/TR | SOT-23 | 3000/Reel&Tape |

Absolute Maximum ratings

| Parameter | | Symbol | 10 s | Steady State | Unit |
|--|------------------------|-----------|------------|--------------|------------------|
| Drain-Source Voltage | | V_{DS} | -50 | | V |
| Gate-Source Voltage | | V_{GS} | ± 20 | | |
| Continuous Drain Current ^{a d} | $T_A=25^\circ\text{C}$ | I_D | -0.2 | -0.18 | A |
| | $T_A=70^\circ\text{C}$ | | -0.16 | -0.14 | |
| Maximum Power Dissipation ^{a d} | $T_A=25^\circ\text{C}$ | P_D | 0.4 | 0.37 | W |
| | $T_A=70^\circ\text{C}$ | | 0.29 | 0.23 | |
| Continuous Drain Current ^b | $T_A=25^\circ\text{C}$ | I_D | -0.19 | -0.17 | A |
| | $T_A=70^\circ\text{C}$ | | -0.15 | -0.14 | |
| Maximum Power Dissipation ^b | $T_A=25^\circ\text{C}$ | P_D | 0.4 | 0.3 | W |
| | $T_A=70^\circ\text{C}$ | | 0.26 | 0.22 | |
| Pulsed Drain Current ^c | | I_{DM} | -0.8 | | A |
| Operating Junction Temperature | | T_J | -55 to 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

| Parameter | | Symbol | Typical | Maximum | Unit |
|---|-----------------------|-----------------|---------|---------|--------------------|
| Junction-to-Ambient Thermal Resistance ^a | $t \leq 10 \text{ s}$ | $R_{\theta JA}$ | 240 | 270 | $^\circ\text{C/W}$ |
| | Steady State | | 280 | 335 | |
| Junction-to-Ambient Thermal Resistance ^b | $t \leq 10 \text{ s}$ | $R_{\theta JA}$ | 270 | 300 | |
| | Steady State | | 300 | 350 | |
| Junction-to-Case Thermal Resistance | | $R_{\theta JC}$ | 130 | 180 | |

a Surface mounted on FR-4 Board using 1 square inch pad size, 1oz copper

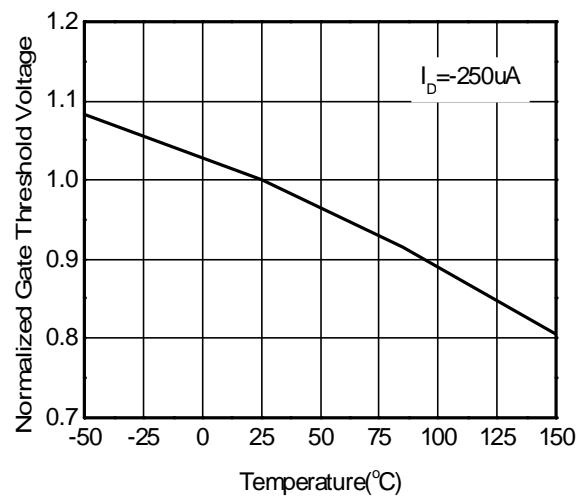
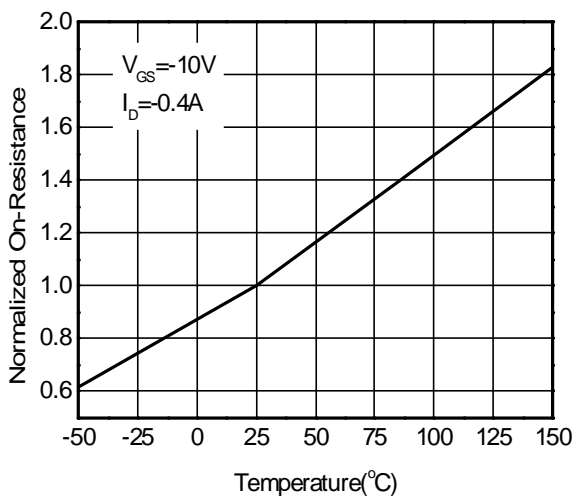
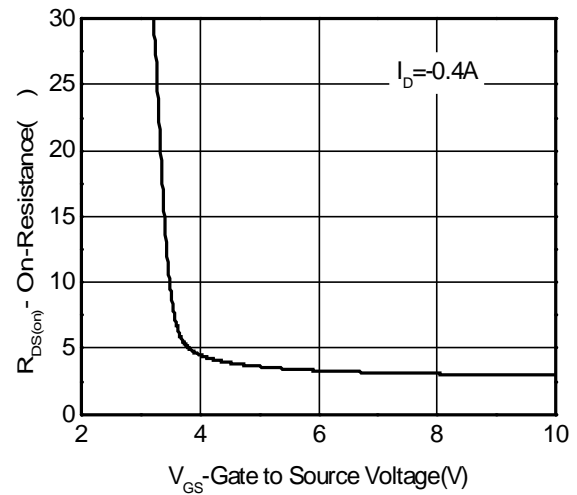
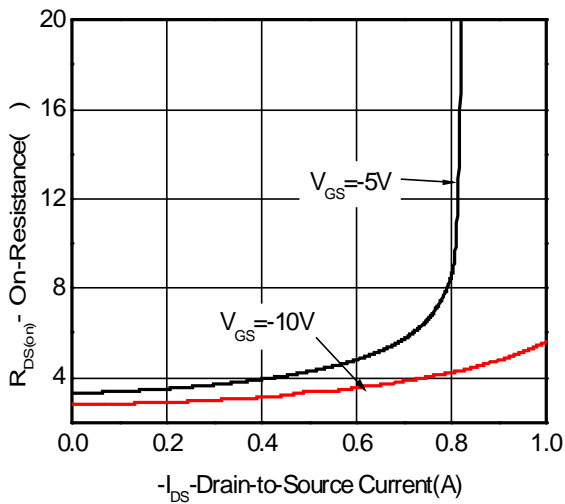
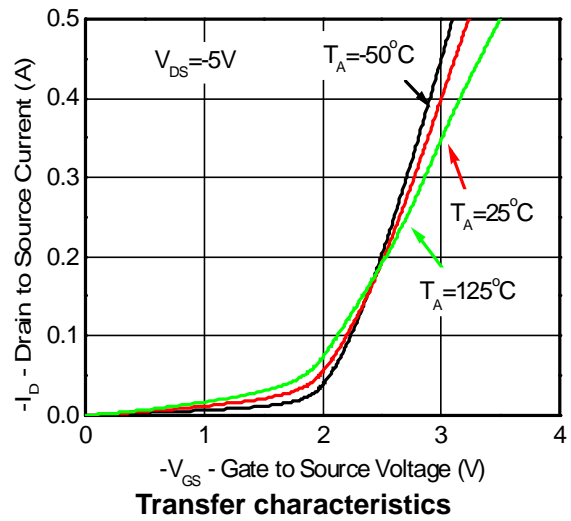
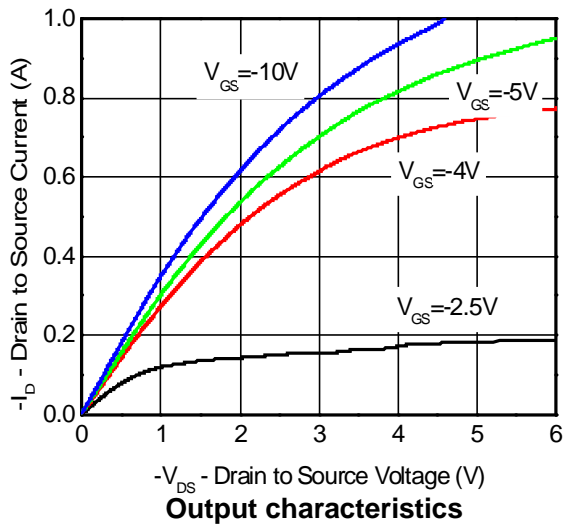
b Surface mounted on FR-4 board using minimum pad size, 1oz copper

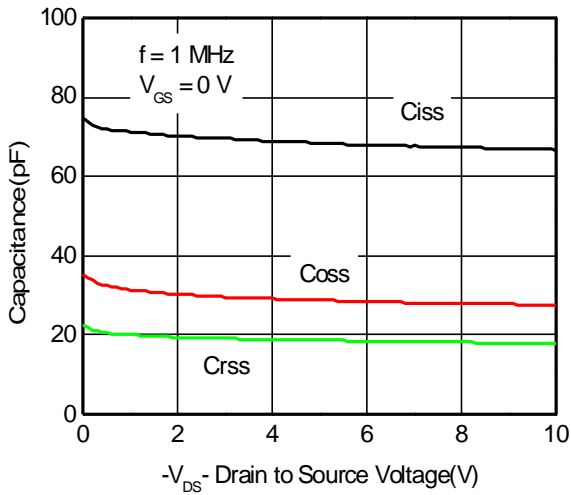
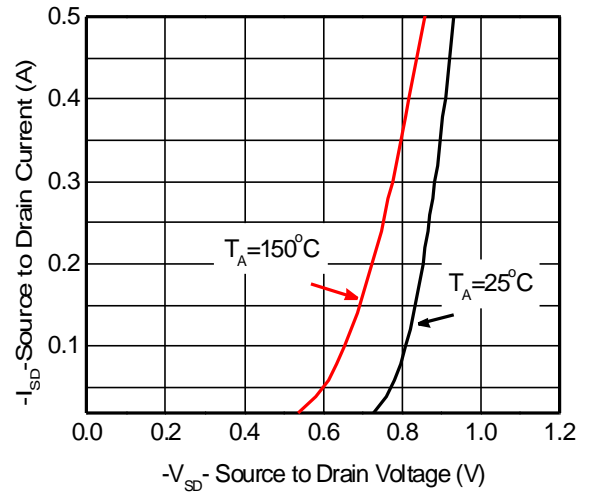
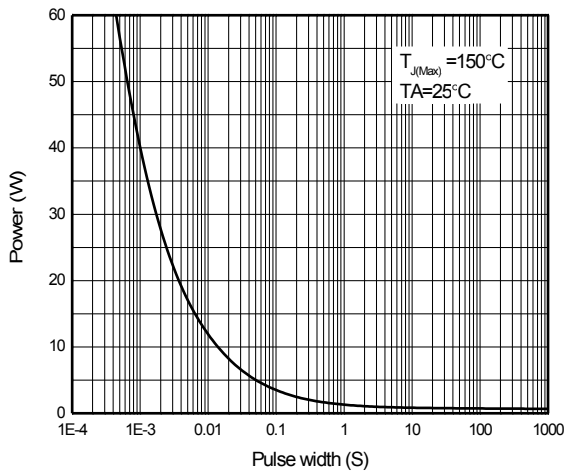
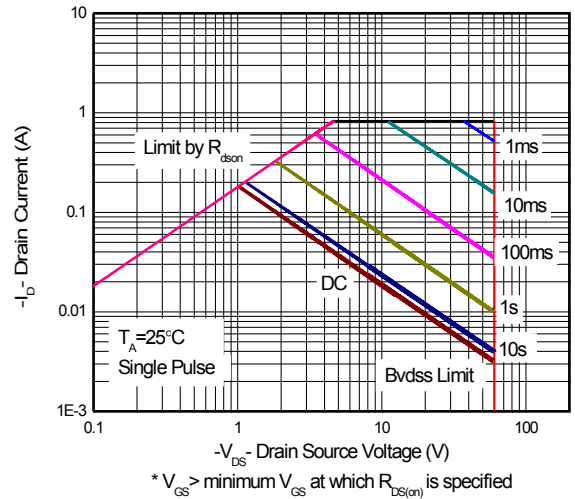
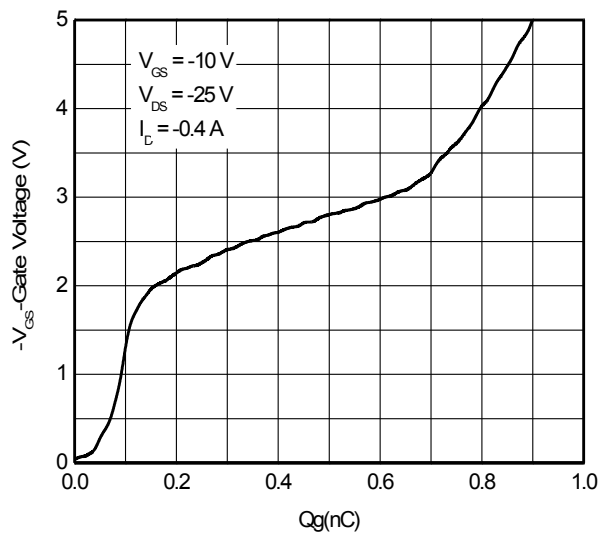
c Pulse width < 380 μs , Duty Cycle < 2%

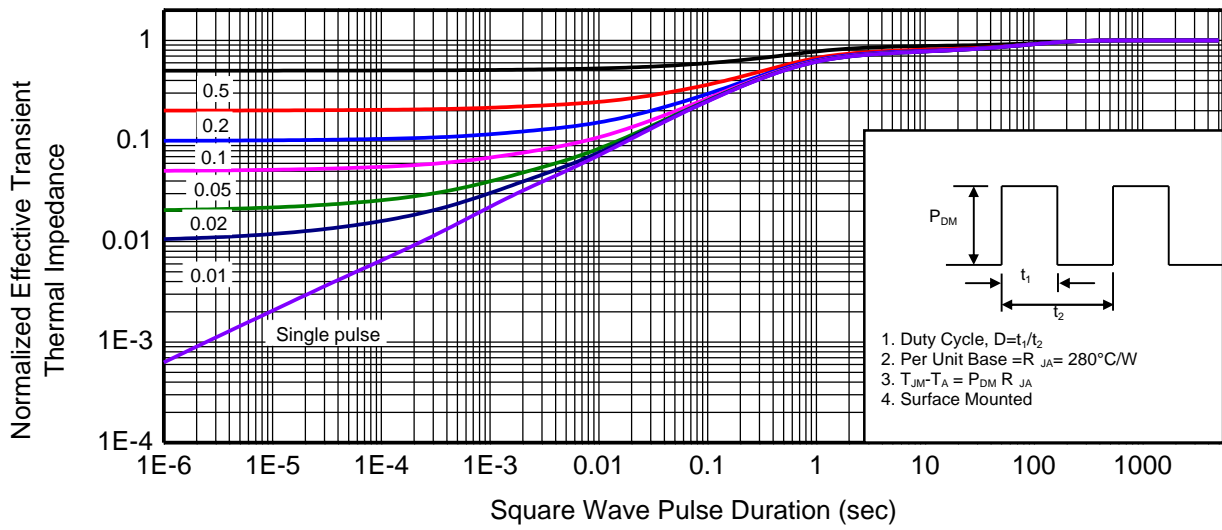
d Maximum junction temperature $T_J=150^\circ\text{C}$.

Electronics Characteristics (Ta=25°C, unless otherwise noted)

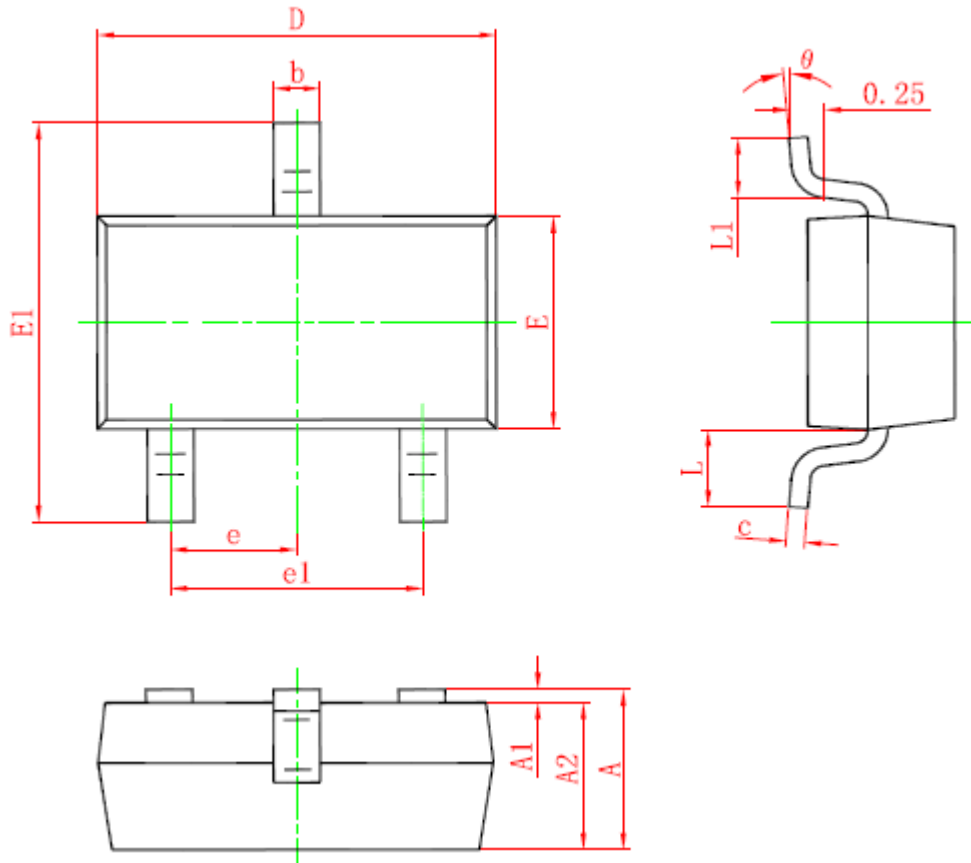
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|--------------|--|------|------|---------|---------------|
| OFF CHARACTERISTICS | | | | | | |
| Drain-to-Source Breakdown Voltage | BV_{DSS} | $V_{GS} = 0\text{ V}, I_D = -250\mu\text{A}$ | -50 | | | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = -50\text{ V}, V_{GS} = 0\text{ V}$ | | | -1 | μA |
| Gate-to-source Leakage Current | I_{GSS} | $V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$ | | | ± 5 | μA |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | $V_{GS} = V_{DS}, I_D = -250\mu\text{A}$ | -0.8 | -1.5 | -2.0 | V |
| Drain-to-source On-resistance ^{b, c} | $R_{DS(on)}$ | $V_{GS} = -10\text{ V}, I_D = -0.4\text{ A}$ | | 3.0 | 8 | |
| | | $V_{GS} = -5\text{ V}, I_D = -0.3\text{ A}$ | | 3.5 | 10 | |
| Forward Trans conductance | g_{fs} | $V_{DS} = -25\text{ V}, I_D = -0.4\text{ A}$ | | 0.4 | | S |
| CAPACITANCES, CHARGES | | | | | | |
| Input Capacitance | C_{ISS} | $V_{GS} = 0\text{ V},$ $f = 1.0\text{ MHz},$ $V_{DS} = -10\text{ V}$ | | 66.7 | | pF |
| Output Capacitance | C_{OSS} | | | 27.4 | | |
| Reverse Transfer Capacitance | C_{RSS} | | | 17.8 | | |
| Total Gate Charge | $Q_{G(TOT)}$ | $V_{GS} = -10\text{ V},$ $V_{DD} = -25\text{ V},$ $I_D = -0.4\text{ A}$ | | 0.89 | | nC |
| Gate-to-Source Charge | Q_{GS} | | | 0.16 | | |
| Gate-to-Drain Charge | Q_{GD} | | | 0.57 | | |
| SWITCHING CHARACTERISTICS | | | | | | |
| Turn-On Delay Time | $t_d(ON)$ | $V_{GS} = -10\text{ V},$ $V_{DD} = -10\text{ V},$ $I_D = 0.4\text{ A},$ $R_G = 6$ | | 7.4 | | ns |
| Rise Time | t_r | | | 4.2 | | |
| Turn-Off Delay Time | $t_d(OFF)$ | | | 11.6 | | |
| Fall Time | t_f | | | 9.0 | | |
| BODY DIODE CHARACTERISTICS | | | | | | |
| Forward Voltage | V_{SD} | $V_{GS} = 0\text{ V}, I_S = -0.25\text{ A}$ | | -0.9 | -1.5 | V |

Typical Characteristics (Ta=25°C, unless otherwise noted)



Capacitance

Body diode forward voltage

Single pulse power

Safe operating power

Gate charge Characteristics



Transient thermal response (Junction-to-Ambient)

Package outline dimensions
SOT-23


| Symbol | Dimensions in millimeters | |
|----------|---------------------------|-------|
| | Min. | Max. |
| A | 0.890 | 1.200 |
| A1 | 0.000 | 0.100 |
| A2 | 0.890 | 1.050 |
| b | 0.300 | 0.510 |
| c | 0.080 | 0.190 |
| D | 2.800 | 3.040 |
| E | 1.200 | 1.400 |
| E1 | 2.200 | 2.600 |
| e | 0.890 | 1.020 |
| e1 | 1.780 | 2.040 |
| L | 0.550 REF. | |
| L1 | 0.300 | 0.500 |
| θ | 0° | 8° |