

## WPMD3002

### Dual P-Channel, -30V, -4.9A, Power MOSFET

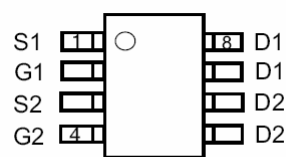
| V <sub>DS</sub> (V) | R <sub>ds(on)</sub> (Ω)       |
|---------------------|-------------------------------|
| -30                 | 0.049@ V <sub>GS</sub> =-10V  |
|                     | 0.070@ V <sub>GS</sub> =-4.5V |



SOP-8L

### Descriptions

The WPMD3002 is the Dual P-Channel logic mode power field effect transistors are produced using high cell density, DMOS trench technology. This high density process is especially tailored to minimize on-state resistance. These devices are particularly suited for low voltage application, notebook computer power management and other battery powered circuits where high-side switching.

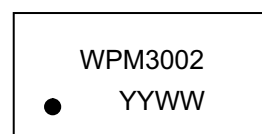


(Top View)

Pin configuration (Top view)

### Features

- Super high density cell design for extremely low R<sub>DS(ON)</sub>
- Exceptional on-resistance and maximum DC current capability
- SOP-8L package design



WPM3002 = Device Code  
 YY = Year  
 WW = Week

### Marking

### Applications

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC
- LCD Display inverter

### Order information

| Device        | Package | Shipping       |
|---------------|---------|----------------|
| WPMD3002-8/TR | SOP-8L  | 2500/Reel&Tape |

**Absolute Maximum ratings**

| Parameter                              |                        | Symbol    | 10 S       | Steady State | Unit             |
|--|------------------------|-----------|------------|--------------|------------------|
| Drain-Source Voltage                   |                        | $V_{DS}$  | -30        |              | V                |
| Gate-Source Voltage                    |                        | $V_{GS}$  | $\pm 20$   |              |                  |
| Continuous Drain Current <sup>a</sup>  | $T_A=25^\circ\text{C}$ | $I_D$     | -4.9       | -3.8         | A                |
|  | $T_A=70^\circ\text{C}$ |           | -3.9       | -3.0         |                  |
| Maximum Power Dissipation <sup>a</sup> | $T_A=25^\circ\text{C}$ | $P_D$     | 1.9        | 1.1          | W                |
|  | $T_A=70^\circ\text{C}$ |           | 1.2        | 0.7          |                  |
| Continuous Drain Current <sup>b</sup>  | $T_A=25^\circ\text{C}$ | $I_D$     | -4.5       | -3.6         | A                |
|  | $T_A=70^\circ\text{C}$ |           | -3.6       | -2.9         |                  |
| Maximum Power Dissipation <sup>b</sup> | $T_A=25^\circ\text{C}$ | $P_D$     | 1.6        | 1.0          | W                |
|  | $T_A=70^\circ\text{C}$ |           | 1.0        | 0.6          |                  |
| Pulsed Drain Current <sup>c</sup>      |                        | $I_{DM}$  | -30        |              | 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**

| Single Operation                                    |                      |                 |         |         |                    |
|---|----------------------|-----------------|---------|---------|--------------------|
| Parameter   |                      | Symbol          | Typical | Maximum | Unit               |
| Junction-to-Ambient Thermal Resistance <sup>a</sup> | $t \leq 10\text{ s}$ | $R_{\theta JA}$ | 56      | 65      | $^\circ\text{C/W}$ |
|   | Steady State         |                 | 87      | 105     |                    |
| Junction-to-Ambient Thermal Resistance <sup>b</sup> | $t \leq 10\text{ s}$ | $R_{\theta JA}$ | 64      | 76      |                    |
|   | Steady State         |                 | 96      | 115     |                    |
| Junction-to-Case Thermal Resistance                 |                      | $R_{\theta JC}$ | 32      | 40      |                    |
| Dual Operation                                      |                      |                 |         |         |                    |
| Junction-to-Ambient Thermal Resistance <sup>a</sup> | $t \leq 10\text{ s}$ | $R_{\theta JA}$ | 61      | 70      | $^\circ\text{C/W}$ |
|   | Steady State         |                 | 92      | 112     |                    |
| Junction-to-Ambient Thermal Resistance <sup>b</sup> | $t \leq 10\text{ s}$ | $R_{\theta JA}$ | 69      | 82      |                    |
|   | Steady State         |                 | 102     | 120     |                    |
| Junction-to-Case Thermal Resistance                 |                      | $R_{\theta JC}$ | 36      | 45      |                    |

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

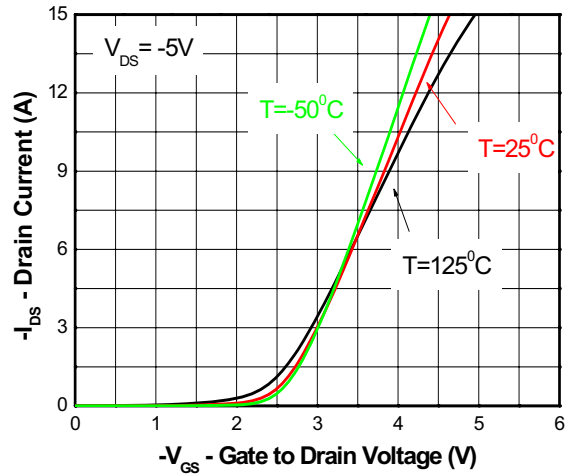
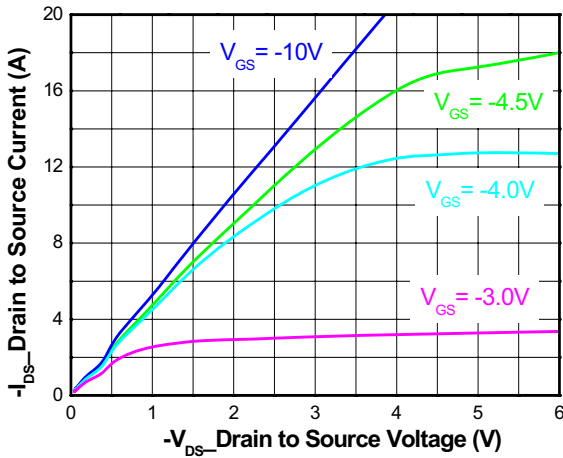
c Repetitive rating, pulse width limited by junction temperature,  $t_p=10\mu\text{s}$ , Duty Cycle=1%

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

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

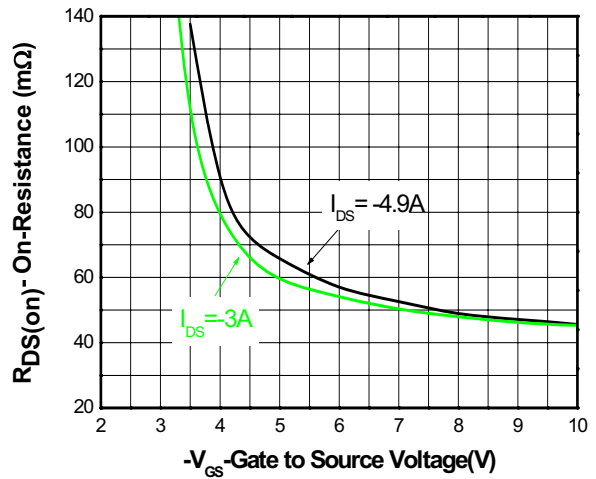
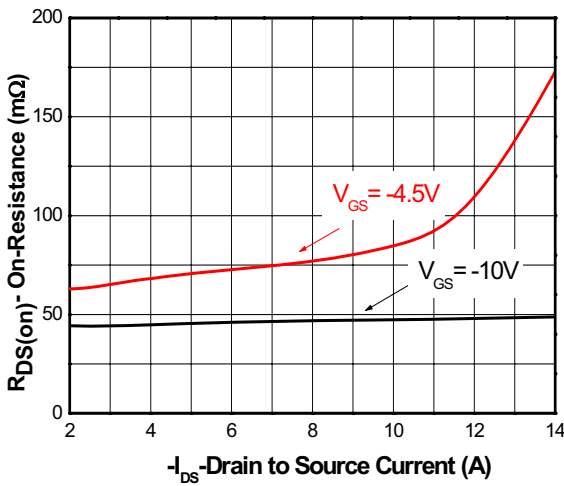
| Parameter  | Symbol       | Test Conditions   | Min   | Typ   | Max       | Unit          |
|--|--------------|---|-------|-------|-----------|---------------|
| <b>OFF CHARACTERISTICS</b>                       |              |   |       |       |           |               |
| Drain-to-Source Breakdown Voltage                | $BV_{DSS}$   | $V_{GS} = 0\text{ V}, I_D = -250\mu\text{A}$                                    | -30   |       |           | V             |
| Zero Gate Voltage Drain Current                  | $I_{DSS}$    | $V_{DS} = -24\text{ V}, V_{GS} = 0\text{ V}$                                    |       |       | -1        | $\mu\text{A}$ |
| Gate-to-source Leakage Current                   | $I_{GSS}$    | $V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$                                 |       |       | $\pm 100$ | nA            |
| <b>ON CHARACTERISTICS</b>                        |              |   |       |       |           |               |
| Gate Threshold Voltage                           | $V_{GS(TH)}$ | $V_{GS} = V_{DS}, I_D = -250\mu\text{A}$  | -1.5  | -1.9  | -2.5      | V             |
| Drain-to-source On-resistance                    | $R_{DS(on)}$ | $V_{GS} = -10\text{ V}, I_D = -4.9\text{ A}$                                    |       | 49    | 60        | m $\Omega$    |
|  |              | $V_{GS} = -10\text{ V}, I_D = -3.0\text{ A}$                                    |       | 49    | 60        |               |
|  |              | $V_{GS} = -4.5\text{ V}, I_D = -4.0\text{ A}$                                   |       | 70    | 90        |               |
|  |              | $V_{GS} = -4.5\text{ V}, I_D = -3.0\text{ A}$                                   |       | 70    | 90        |               |
| Forward Transconductance                         | $g_{FS}$     | $V_{DS} = -15\text{ V}, I_D = -3.0\text{ A}$                                    |       | 5.0   |           | S             |
| <b>CHARGES, CAPACITANCES AND GATE RESISTANCE</b> |              |   |       |       |           |               |
| Input Capacitance                                | $C_{ISS}$    | $V_{GS} = 0\text{ V}, f = 1.0\text{ MHz}, V_{DS} = -15\text{ V}$                |       | 670   |           | pF            |
| Output Capacitance                               | $C_{OSS}$    |   |       | 75    |           |               |
| Reverse Transfer Capacitance                     | $C_{RSS}$    |   |       | 62    |           |               |
| Total Gate Charge                                | $Q_{G(TOT)}$ | $V_{GS} = -10\text{ V}, V_{DS} = -15\text{ V}, I_D = -4.9\text{ A}$             |       | 14.0  |           | nC            |
| Threshold Gate Charge                            | $Q_{G(TH)}$  |   |       | 1.31  |           |               |
| Gate-to-Source Charge                            | $Q_{GS}$     |   |       | 1.80  |           |               |
| Gate-to-Drain Charge                             | $Q_{GD}$     |   |       | 1.60  |           |               |
| <b>SWITCHING CHARACTERISTICS</b>                 |              |   |       |       |           |               |
| Turn-On Delay Time                               | $t_{d(ON)}$  | $V_{GS} = -10\text{ V}, V_{DS} = -15\text{ V}, R_L = 5.0\Omega, R_G = 15\Omega$ |       | 6.8   |           | ns            |
| Rise Time  | $t_r$        |   |       | 3.2   |           |               |
| Turn-Off Delay Time                              | $t_{d(OFF)}$ |   |       | 25.2  |           |               |
| Fall Time  | $t_f$        |   |       | 4.4   |           |               |
| <b>BODY DIODE CHARACTERISTICS</b>                |              |   |       |       |           |               |
| Forward Voltage                                  | $V_{SD}$     | $V_{GS} = 0\text{ V}, I_S = -1.0\text{ A}$                                      | -0.55 | -0.78 | -1.50     | V             |

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



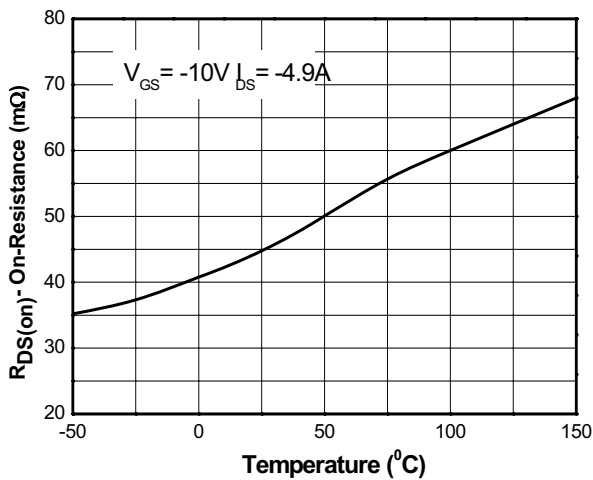
Output characteristics

Transfer characteristics

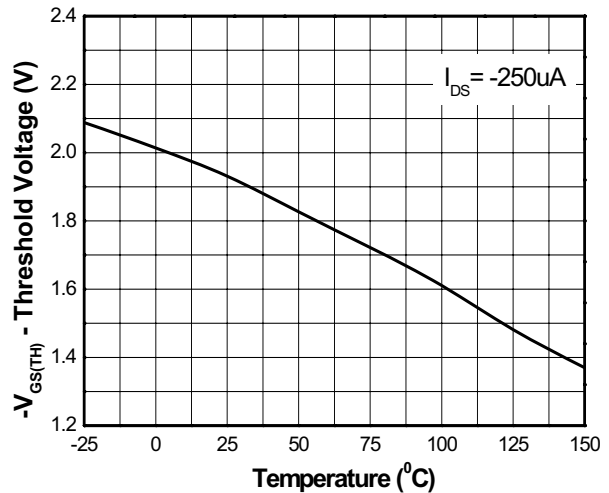


On-Resistance vs. Drain current

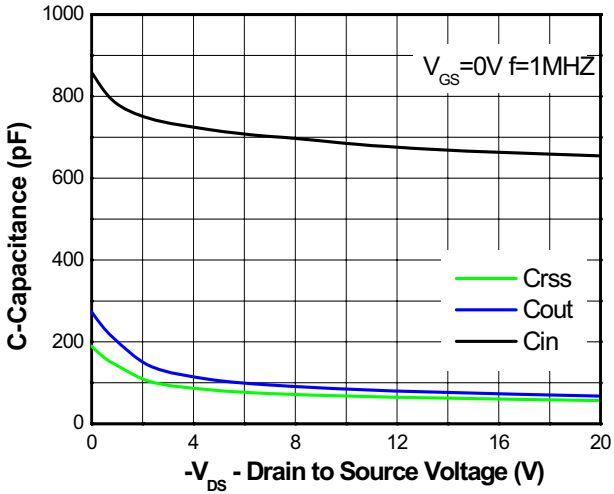
On-Resistance vs. Gate-to-Source voltage



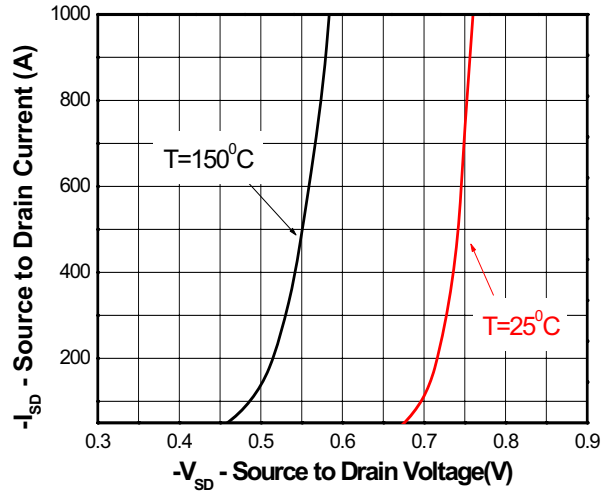
On-Resistance vs. Junction temperature



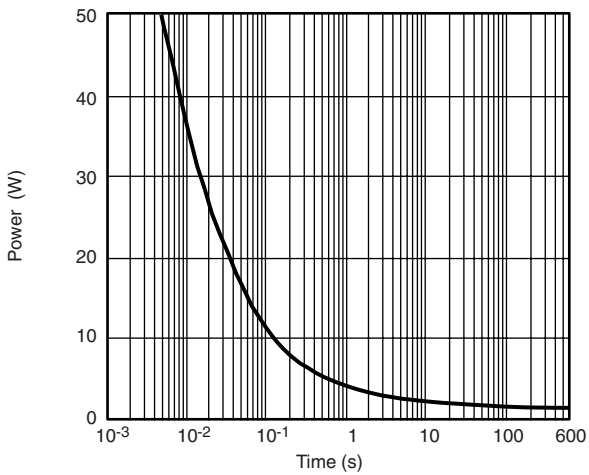
Threshold voltage vs. Temperature



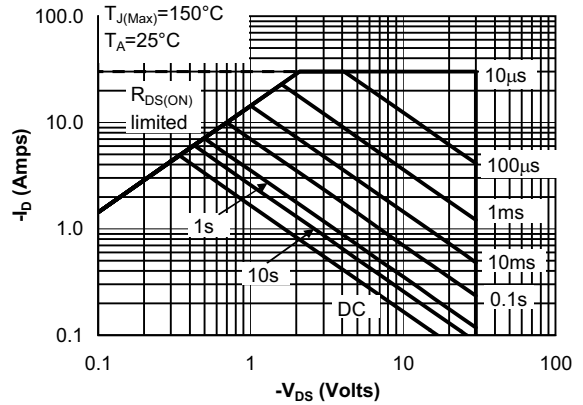
Capacitance



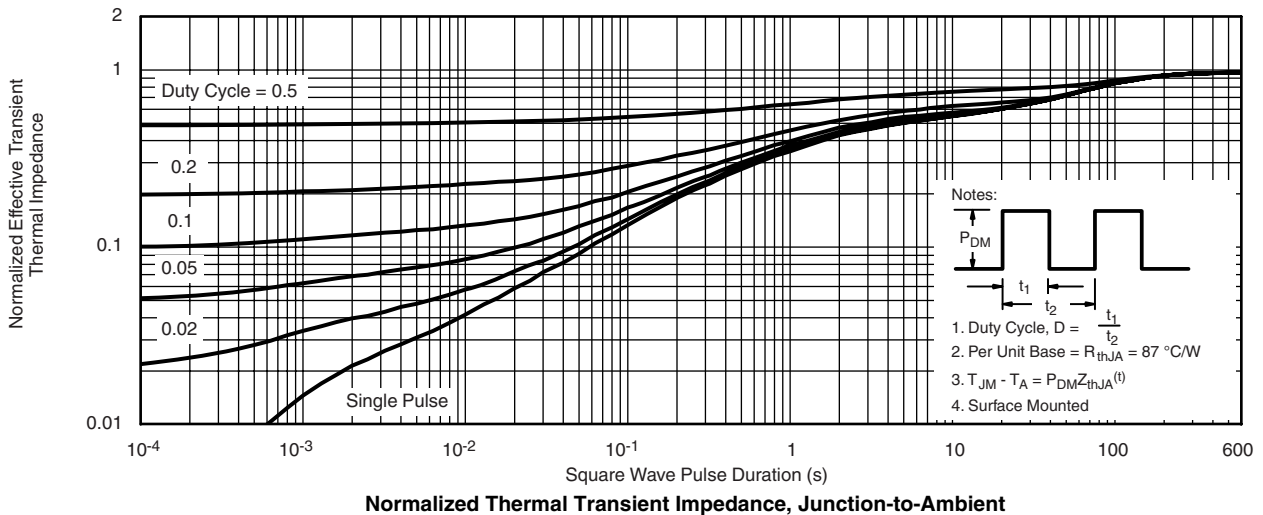
Body diode forward voltage



Single pulse power



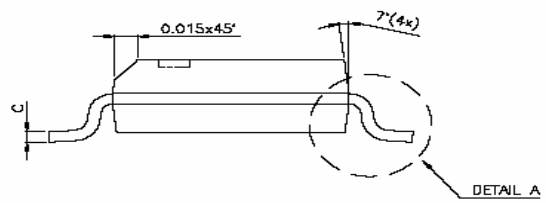
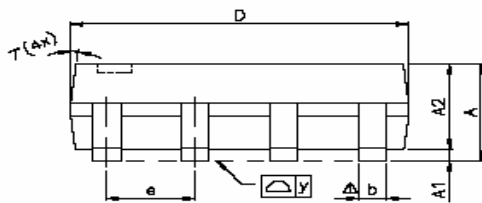
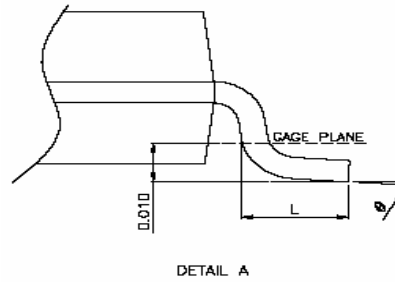
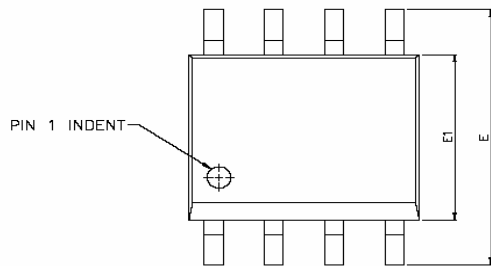
Safe operating power



Normalized Thermal Transient Impedance, Junction-to-Ambient

Package outline dimensions

SOP-8L



| Symbol | Dimensions in millimeter |      |       |
|--------|--------------------------|------|-------|
|        | Min.                     | Typ. | Max.  |
| A      | 1.47                     | 1.60 | 1.73  |
| A1     | 0.10                     |      | 0.25  |
| A2     |                          | 1.45 |       |
| b      | 0.33                     | 0.41 | 0.51  |
| C      | 0.19                     | 0.20 | 0.25  |
| D      | 4.80                     | 4.85 | 4.95  |
| E      | 5.80                     | 6.00 | 6.20  |
| E1     | 3.80                     | 3.90 | 4.00  |
| e      |                          | 1.27 |       |
| L      | 0.38                     | 0.71 | 1.27  |
| y      |                          |      | 0.076 |
| θ      | 0°                       |      | 8°    |