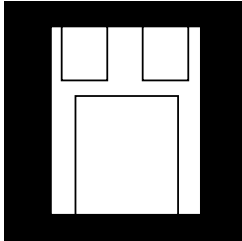


# POWER MOSFET IN HERMETIC SURFACE MOUNT PACKAGE



**100V Thru 1000V, Up To 30 Amp, N-Channel MOSFET In A Surface Mount Package**

## FEATURES

- Surface Mount Hermetic Package
- High Current/Low  $R_{DS(on)}$
- Fast Switching, Low Drive Current
- Ease of Paralleling For Added Power
- Small Size
- Available Screened to MIL-S-19500, TX, TXV, S Levels

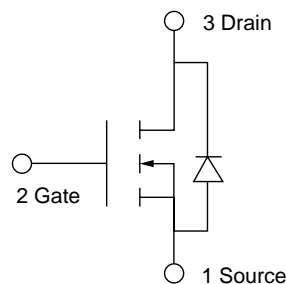
## DESCRIPTION

This series of hermetic surface mount product features the latest advanced MOSFET and packaging technology. They are ideally suited for Military surface mount requirements where small size, high performance and high reliability are required, and in applications such as switching power supplies, motor controls, inverters, choppers, audio amplifiers and high energy pulse circuits.

## MAXIMUM RATINGS AT $T_C = 25^\circ\text{C}$

| PART NUMBER | $V_{DS}$ | $R_{DS(on)}$  | $I_D$ |
|-------------|----------|---------------|-------|
| OM6034NM    | 100V     | .065 $\Omega$ | 35A   |
| OM6035NM    | 200V     | .095 $\Omega$ | 30A   |
| OM6036NM    | 500V     | 0.4 $\Omega$  | 15A   |
| OM6037NM    | 1000V    | 3 $\Omega$    | 5A    |

## SCHEMATIC



3.5

**ELECTRICAL CHARACTERISTICS: (T<sub>C</sub> = 25°C unless otherwise noted)  
STATIC P/N OM6034NM (100V)**

| Parameter   | Min. | Typ. | Max.  | Units | Test Conditions   |
|---|------|------|-------|-------|---|
| BV <sub>DSS</sub><br>Drain-Source Breakdown Voltage                         | 100  |      |       | V     | V <sub>GS</sub> = 0,<br>I <sub>b</sub> = 250 μA                                 |
| V <sub>GS(th)</sub><br>Gate-Threshold Voltage                               | 2.0  |      | 4.0   | V     | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>b</sub> = 250 μA                     |
| I <sub>GSS</sub><br>Gate-Body Leakage (OM6105)                              |      |      | ± 500 | nA    | V <sub>GS</sub> = ± 12.8 V  |
| I <sub>GSS</sub><br>Gate-Body Leakage (OM6005)                              |      |      | ± 100 | nA    | V <sub>GS</sub> = ± 20 V  |
| I <sub>DSS</sub><br>Zero Gate Voltage Drain Current                         |      | 0.1  | 0.25  | mA    | V <sub>DS</sub> = Max. Rat., V <sub>GS</sub> = 0                                |
| Current   |      | 0.2  | 1.0   | mA    | V <sub>DS</sub> = 0.8 Max. Rat., V <sub>GS</sub> = 0,<br>T <sub>C</sub> = 125°C |
| I <sub>D(on)</sub><br>On-State Drain Current <sup>1</sup>                   | 35   |      |       | A     | V <sub>DS</sub> ≥ 2 V <sub>DS(on)</sub> , V <sub>GS</sub> = 10 V                |
| V <sub>DS(on)</sub><br>Static Drain-Source On-State Voltage <sup>1</sup>    |      | 1.1  | 1.3   | V     | V <sub>GS</sub> = 10 V, I <sub>b</sub> = 20 A                                   |
| R <sub>DS(on)</sub><br>Static Drain-Source On-State Resistance <sup>1</sup> |      | 0.55 | 0.65  | Ω     | V <sub>GS</sub> = 10 V, I <sub>b</sub> = 20 A                                   |
| R <sub>DS(on)</sub><br>Static Drain-Source On-State Resistance <sup>1</sup> |      | .09  | 0.11  | Ω     | V <sub>GS</sub> = 10 V, I <sub>b</sub> = 20 A,<br>T <sub>C</sub> = 125°C        |

**DYNAMIC**

| g <sub>s</sub>                                   | 9.0  | 10 | S (τ) | V <sub>DS</sub> ≥ 2 V <sub>DS(on)</sub> , I <sub>b</sub> = 20 A |
|--|------|----|-------|---|
| C <sub>iss</sub><br>Input Capacitance            | 2700 |    | pF    | V <sub>GS</sub> = 0   |
| C <sub>oss</sub><br>Output Capacitance           | 1300 |    | pF    | V <sub>DS</sub> = 25 V  |
| C <sub>rss</sub><br>Reverse Transfer Capacitance | 470  |    | pF    | f = 1 MHz   |
| t <sub>don</sub><br>Turn-On Delay Time           | 28   |    | ns    | V <sub>DD</sub> = 30 V, I <sub>b</sub> = 20 A                   |
| t <sub>r</sub><br>Rise Time                      | 45   |    | ns    | R <sub>g</sub> = 5.0 Ω, V <sub>GS</sub> = 10 V                  |
| t <sub>eff</sub><br>Turn-Off Delay Time          | 100  |    | ns    |   |
| t <sub>f</sub><br>Fall Time                      | 50   |    | ns    |   |

**BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS**

| I <sub>S</sub>   |     | -40  | A  | Modified MOSPOWER symbol showing the integral P-N Junction rectifier.                       |
|--|-----|------|----|---|
| I <sub>SM</sub><br>Source Current <sup>1</sup><br>(Body Diode) |     | -160 | A  |   |
| V <sub>SD</sub><br>Diode Forward Voltage <sup>1</sup>          |     | -2.5 | V  | T <sub>C</sub> = 25°C, I <sub>S</sub> = 40 A, V <sub>GS</sub> = 0                           |
| t <sub>rr</sub><br>Reverse Recovery Time                       | 400 |      | ns | T <sub>J</sub> = 150°C, I <sub>F</sub> = I <sub>S</sub> ,<br>dI <sub>F</sub> /ds = 100 A/μs |

**1 Pulse Test:** Pulse Width ≤ 300μsec, Duty Cycle ≤ 2%.

**ELECTRICAL CHARACTERISTICS: (T<sub>C</sub> = 25°C unless otherwise noted)  
STATIC P/N OM6035NM (200V)**

| Parameter   | Min. | Typ. | Max.  | Units | Test Conditions   |
|---|------|------|-------|-------|---|
| BV <sub>DSS</sub><br>Drain-Source Breakdown Voltage                         | 200  |      |       | V     | V <sub>GS</sub> = 0,<br>I <sub>b</sub> = 250 μA                                 |
| V <sub>GS(th)</sub><br>Gate-Threshold Voltage                               | 2.0  |      | 4.0   | V     | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>b</sub> = 250 μA                     |
| I <sub>GSS</sub><br>Gate-Body Leakage (OM6106)                              |      |      | ± 500 | nA    | V <sub>GS</sub> = ± 12.8 V  |
| I <sub>GSS</sub><br>Gate-Body Leakage (OM6006)                              |      |      | ± 100 | nA    | V <sub>GS</sub> = ± 20 V  |
| I <sub>DSS</sub><br>Zero Gate Voltage Drain Current                         |      | 0.1  | 0.25  | mA    | V <sub>DS</sub> = Max. Rat., V <sub>GS</sub> = 0                                |
| Current   |      | 0.2  | 1.0   | mA    | V <sub>DS</sub> = 0.8 Max. Rat., V <sub>GS</sub> = 0,<br>T <sub>C</sub> = 125°C |
| I <sub>D(on)</sub><br>On-State Drain Current <sup>1</sup>                   | 30   |      |       | A     | V <sub>DS</sub> ≥ 2 V <sub>DS(on)</sub> , V <sub>GS</sub> = 10 V                |
| V <sub>DS(on)</sub><br>Static Drain-Source On-State Voltage <sup>1</sup>    |      | 1.36 | 1.52  | V     | V <sub>GS</sub> = 10 V, I <sub>b</sub> = 16 A                                   |
| R <sub>DS(on)</sub><br>Static Drain-Source On-State Resistance <sup>1</sup> |      | .085 | .095  | Ω     | V <sub>GS</sub> = 10 V, I <sub>b</sub> = 16 A                                   |
| R <sub>DS(on)</sub><br>Static Drain-Source On-State Resistance <sup>1</sup> |      | 0.14 | 0.17  | Ω     | V <sub>GS</sub> = 10 V, I <sub>b</sub> = 16 A,<br>T <sub>C</sub> = 125°C        |

**DYNAMIC**

| g <sub>s</sub>                                   | 10.0 | 12.5 | S (τ) | V <sub>DS</sub> ≥ 2 V <sub>DS(on)</sub> , I <sub>b</sub> = 16 A |
|--|------|------|-------|---|
| C <sub>iss</sub><br>Input Capacitance            | 2400 |      | pF    | V <sub>GS</sub> = 0   |
| C <sub>oss</sub><br>Output Capacitance           | 600  |      | pF    | V <sub>DS</sub> = 25 V  |
| C <sub>rss</sub><br>Reverse Transfer Capacitance | 250  |      | pF    | f = 1 MHz   |
| t <sub>don</sub><br>Turn-On Delay Time           | 25   |      | ns    | V <sub>DD</sub> = 75 V, I <sub>b</sub> = 16 A                   |
| t <sub>r</sub><br>Rise Time                      | 60   |      | ns    | R <sub>g</sub> = 5.0 Ω, V <sub>GS</sub> = 10 V                  |
| t <sub>eff</sub><br>Turn-Off Delay Time          | 85   |      | ns    |   |
| t <sub>f</sub><br>Fall Time                      | 38   |      | ns    |   |

**BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS**

| I <sub>S</sub>   |     | -30  | A  | Modified MOSPOWER symbol showing the integral P-N Junction rectifier.                       |
|--|-----|------|----|---|
| I <sub>SM</sub><br>Source Current <sup>1</sup><br>(Body Diode) |     | -120 | A  |   |
| V <sub>SD</sub><br>Diode Forward Voltage <sup>1</sup>          |     | -2   | V  | T <sub>C</sub> = 25°C, I <sub>S</sub> = -30 A, V <sub>GS</sub> = 0                          |
| t <sub>rr</sub><br>Reverse Recovery Time                       | 350 |      | ns | T <sub>J</sub> = 150°C, I <sub>F</sub> = I <sub>S</sub> ,<br>dI <sub>F</sub> /ds = 100 A/μs |

**1 Pulse Test:** Pulse Width ≤ 300μsec, Duty Cycle ≤ 2%.

**ELECTRICAL CHARACTERISTICS:** ( $T_c = 25^\circ\text{C}$  unless otherwise noted)  
**STATIC P/N OM6036NM (500V)**

| Parameter   | Min. | Typ. | Max.      | Units    | Test Conditions  |
|---|------|------|-----------|----------|--|
| $BV_{DSS}$ Drain-Source Breakdown Voltage                         | 500  |      |           | V        | $V_{GS} = 0$ ,<br>$I_b = 250 \mu\text{A}$                                      |
| $V_{GS(th)}$ Gate-Threshold Voltage                               | 2.0  |      | 4.0       | V        | $V_{DS} = V_{GS}$ , $I_b = 250 \mu\text{A}$                                    |
| $I_{GSS}$ Gate-Body Leakage (OM6108)                              |      |      | $\pm 500$ | nA       | $V_{GS} = \pm 12.8 \text{ V}$  |
| $I_{GSS}$ Gate-Body Leakage (OM6008)                              |      |      | $\pm 100$ | nA       | $V_{GS} = \pm 20 \text{ V}$  |
| $I_{DSS}$ Zero Gate Voltage Drain Current                         |      | 0.1  | 0.25      | mA       | $V_{DS} = \text{Max. Rat.}$ , $V_{GS} = 0$                                     |
|   |      | 0.2  | 1.0       | mA       | $V_{DS} = 0.8 \text{ Max. Rat.}$ , $T_c = 125^\circ\text{C}$                   |
| $I_{D(on)}$ On-State Drain Current <sup>1</sup>                   | 13   |      |           | A        | $V_{DS} \geq 2 V_{DS(on)}$ , $V_{GS} = 10 \text{ V}$                           |
| $V_{DS(on)}$ Static Drain-Source On-State Voltage <sup>1</sup>    |      | 2.1  | 2.8       | V        | $V_{GS} = 10 \text{ V}$ , $I_b = 7.0 \text{ A}$                                |
| $R_{DS(on)}$ Static Drain-Source On-State Resistance <sup>1</sup> |      | 0.3  | 0.4       | $\Omega$ | $V_{GS} = 10 \text{ V}$ , $I_b = 7.0 \text{ A}$                                |
| $R_{DS(on)}$ Static Drain-Source On-State Resistance <sup>1</sup> |      | 0.66 | 0.88      | $\Omega$ | $V_{GS} = 10 \text{ V}$ , $I_b = 7.0 \text{ A}$ ,<br>$T_c = 125^\circ\text{C}$ |

**DYNAMIC**

|  | 5.0  | 7.2 | $S(t)$ | Units    | Test Conditions                                       |
|--|------|-----|--------|----------|---|
| $g_{fs}$ Forward Transconductance <sup>1</sup> |      |     |        | S( $t$ ) | $V_{DS} \geq 2 V_{DS(on)}$ , $I_b = 7.0 \text{ A}$    |
| $C_{iss}$ Input Capacitance                    | 2600 |     |        | pF       | $V_{GS} = 0$  |
| $C_{oss}$ Output Capacitance                   | 280  |     |        | pF       | $V_{DS} = 25 \text{ V}$                               |
| $C_{riss}$ Reverse Transfer Capacitance        | 40   |     |        | pF       | $f = 1 \text{ MHz}$                                   |
| $t_{d(on)}$ Turn-On Delay Time                 | 30   |     |        | ns       | $V_{DD} = 210 \text{ V}$ , $I_b \equiv 7.0 \text{ A}$ |
| $t_r$ Rise Time                                | 46   |     |        | ns       | $R_{\theta} = 5.0 \Omega$ , $V_{GS} = 10 \text{ V}$   |
| $t_{d(off)}$ Turn-Off Delay Time               | 75   |     |        | ns       |   |
| $t_f$ Fall Time                                | 31   |     |        | ns       |   |

**BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS**

|   | -13 | -52 | -1.4 | 700 | ns |
|---|-----|-----|------|-----|----|
| $I_S$ Continuous Source Current (Body Diode)      |     |     |      |     |    |
| $I_{SM}$ Source Current <sup>1</sup> (Body Diode) |     |     |      |     |    |
| $V_{SD}$ Diode Forward Voltage <sup>1</sup>       |     |     |      |     |    |
| $t_r$ Reverse Recovery Time                       |     |     |      |     |    |

**1 Pulse Test:** Pulse Width  $\leq 300\mu\text{sec}$ , Duty Cycle  $\leq 2\%$ .

**ELECTRICAL CHARACTERISTICS:** ( $T_c = 25^\circ\text{C}$  unless otherwise noted)  
**STATIC P/N OM6037NM (1000V)**

| Parameter   | Min. | Typ. | Max. | Units    | Test Conditions  |
|---|------|------|------|----------|--|
| $BV_{DSS}$ Drain-Source Breakdown Voltage                         | 1000 |      |      | V        | $V_{GS} = 0$ ,<br>$I_b = 250 \mu\text{A}$                                      |
| $V_{GS(th)}$ Gate-Threshold Voltage                               | 2.0  |      | 4.0  | V        | $V_{DS} = V_{GS}$ , $I_b = 250 \mu\text{A}$                                    |
| $I_{GSS}$ Gate-Body Leakage Forward                               |      |      | 100  | nA       | $V_{GS} = 20 \text{ V}$ , $V_{DS} = 0$   |
| $I_{GSSR}$ Gate-Body Leakage Reverse                              |      |      | -100 | nA       | $V_{GS} = -20 \text{ V}$ , $V_{DS} = 0$  |
| $I_{DSS}$ Zero Gate Voltage                                       |      | 0.25 |      | mA       | $V_{DS} = \text{Max. Rat.}$ , $V_{GS} = 0$                                     |
| Drain Current   |      |      | 1.0  | mA       | $V_{DS} = 0.8 \text{ x Max. Rat.}$ ,   |
|   |      |      |      |          | $T_c = 125^\circ\text{C}$  |
| $I_{D(on)}$ On-State Drain Current                                | 5.0  |      |      | A        | $V_{DS} > I_{D(on)} \times R_{DS(on)}$ ,<br>$V_{GS} = 10 \text{ V}$            |
| $R_{DS(on)}$ Static Drain-Source On-State Resistance <sup>1</sup> |      |      | 3.0  | $\Omega$ | $V_{GS} = 10 \text{ V}$ , $I_b = 2.5 \text{ A}$                                |
| $R_{DS(on)}$ Static Drain-Source On-State Resistance <sup>1</sup> |      |      | 6.0  | $\Omega$ | $V_{GS} = 10 \text{ V}$ , $I_b = 2.5 \text{ A}$ ,<br>$T_c = 100^\circ\text{C}$ |

**DYNAMIC**

|  | 4.0 |  | $S(t)$ | Units    | Test Conditions                                  |
|--|-----|--|--------|----------|--|
| $g_{fs}$ Forward Transconductance <sup>1</sup> |     |  |        | S( $t$ ) | $V_{DS} = 25 V_{DS(on)}$ , $I_b = 2.5 \text{ A}$ |
| $C_{iss}$ Input Capacitance                    |     |  | 2600   | pF       | $V_{GS} = 0$                                     |
| $C_{oss}$ Output Capacitance                   |     |  | 350    | pF       | $V_{DS} = 25 \text{ V}$                          |
| $C_{riss}$ Reverse Transfer Capacitance        |     |  | 150    | pF       | $f = 1 \text{ MHz}$                              |
| $t_{d(on)}$ Turn-On Delay Time                 |     |  | 65     | ns       |  |
| $t_r$ Rise Time                                |     |  | 55     | ns       |  |
| $t_{d(off)}$ Off-Voltage Rise Time             |     |  | 62     | ns       |  |
| $t_f$ Fall Time                                |     |  | 25     | ns       |  |

**BODY-DRAIN DIODE RATINGS AND CHARACTERISTICS**

|   |  |  | 6 | 24 | 2.5 | 1100 | ns |
|---|--|--|---|----|-----|------|----|
| $I_S$ Continuous Source Current (Body Diode)      |  |  |   |    |     |      |    |
| $I_{SM}$ Source Current <sup>2</sup> (Body Diode) |  |  |   |    |     |      |    |
| $V_{SD}$ Diode Forward Voltage <sup>1</sup>       |  |  |   |    |     |      |    |
| $t_r$ Reverse Recovery Time                       |  |  |   |    |     |      |    |

**1 Pulse Test:** Pulse Width  $\leq 300\mu\text{sec}$ , Duty Cycle  $\leq 1.5\%$ .

# OM6034NM-OM6037NM

## ABSOLUTE MAXIMUM RATINGS: ( $T_C = 25^\circ\text{C}$ unless otherwise noted)

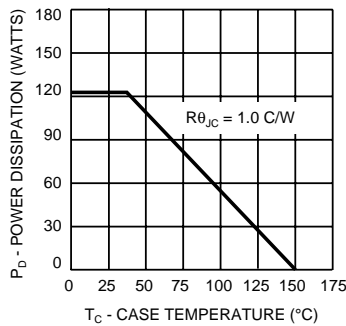
| Parameter                                   | OM6034                              | OM6035   | OM6036   | OM6037   | Units               |
|---|-------------------------------------|----------|----------|----------|---------------------|
| $V_{DS}$                                    | 100                                 | 200      | 500      | 1000     | V                   |
| $V_{DGR}$                                   | 100                                 | 200      | 500      | 1000     | V                   |
| $I_D @ T_C = 25^\circ\text{C}$              | 30                                  | 25       | 11       | 4        | A                   |
| $V_{GS}$                                    | $\pm 20$                            | $\pm 20$ | $\pm 20$ | $\pm 20$ | V                   |
| $V_{GSM}$                                   |                                     |          |          |          |                     |
| Gate-Source Voltage                         |                                     |          |          |          |                     |
| Non-Repetitive ( $t_b \leq 50\mu\text{s}$ ) | $\pm 40$                            | $\pm 40$ | $\pm 40$ | $\pm 40$ | V                   |
| $I_{DM}$                                    | 105                                 | 60       | 65       | 17       | A                   |
| $P_D @ T_C = 25^\circ\text{C}$              | 100                                 | 100      | 100      | 100      | W                   |
| $P_D @ T_C = 100^\circ\text{C}$             | 35                                  | 35       | 35       | 35       | W                   |
| Junction to Case                            | Linear Derating Factor <sup>1</sup> | 1.0      | 1.0      | 1.0      | W/ $^\circ\text{C}$ |
| Junction to Ambient                         | Linear Derating Factor              | .025     | .025     | .025     | W/ $^\circ\text{C}$ |
| $T_J$                                       | Operating and                       | -55 to   | -55 to   | -55 to   | -55 to              |
| $T_{stg}$                                   | Storage Temperature Range           | 150      | 150      | 150      | 150                 |
| Lead Temperature                            | (At case for 5 seconds)             | 225      | 225      | 225      | 225                 |
|   |                                     |          |          |          | $^\circ\text{C}$    |

<sup>1</sup> Pulse Test: Pulse Width  $\leq 300\mu\text{sec}$ , Duty Cycle  $\leq 2\%$ .

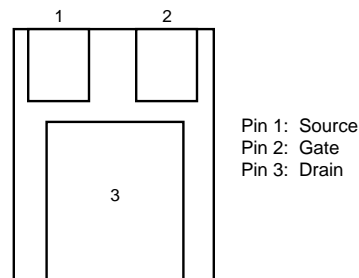
## THERMAL RESISTANCE (MAXIMUM) at $T_A = 25^\circ\text{C}$

|                 |                     |     |                                       |
|-----------------|---------------------|-----|---------------------------------------|
| $R_{\theta JC}$ | Junction-to-Case    | 1.0 | $^\circ\text{C/W}$                    |
| $R_{\theta JA}$ | Junction-to-Ambient | 40  | $^\circ\text{C/W}$ Free Air Operation |

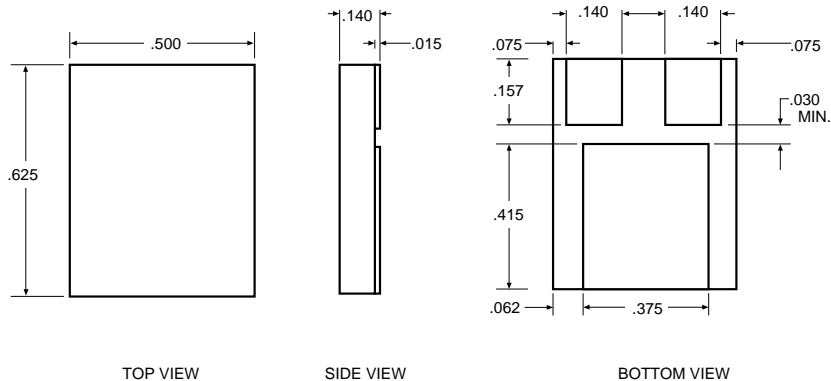
### POWER DERATING



### PIN CONNECTION



### MECHANICAL OUTLINE



3.5