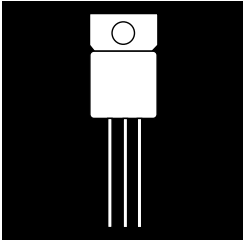


# ISOLATED HERMETIC TO-257AA FIXED VOLTAGE NEGATIVE REGULATORS



**Three Terminal, Fixed Voltage, 1.5 Amp Precision Negative Regulators In Hermetic JEDEC TO-257AA Package and D<sup>2</sup> Pac**

## FEATURES

- Isolated Hermetic Package, JEDEC TO-257AA Outline
- Output Voltages: -5V, -12V, -15V (Other Voltages Available)
- Output Voltages Set Internally To  $\pm 1\%$  or  $\pm 2\%$
- Built-In Thermal Overload Protection
- Short Circuit Current Limiting
- Product Is Available Screened To MIL-STD-883

## DESCRIPTION

These three terminal negative regulators are supplied in a hermetically sealed metal package whose outline is similar to the industry standard TO-220 plastic package. All protective features are designed into the circuit, including thermal shutdown, current limiting and safe-area control. With heat sinking, they can deliver over 1.5 amps of output current. These units feature internally trimmed output voltages to  $\pm 1\%$  or 2% of nominal voltage. Standard voltages are -5V, -12V, and -15V. However, other voltages are available up to -24 volts. These units are ideally suited for Military applications where a hermetically sealed package is required.

## ABSOLUTE MAXIMUM RATINGS @ 25°C

|  |                             |
|--|-----------------------------|
| Input Voltage .....                        | -35 V                       |
| Operating Junction Temperature Range ..... | - 55°C to + 150°C           |
| Storage Temperature Range .....            | - 65°C to + 150°C           |
| Typical Power/Thermal Characteristics:     |                             |
| Rated Power @ 25° C                        | $T_C$ ..... 17.5W           |
|  | $T_A$ ..... 3W              |
| Thermal Resistance                         | $\theta_{JC}$ ..... 4.2°C/W |
|  | $\theta_{JA}$ ..... 42°C/W  |

**3.3**

**Notes:** Product also available in Non-Isolated construction. To order this version, delete "I" from part number.

|          |                 |                     |
|----------|-----------------|---------------------|
| Example: | <u>Isolated</u> | <u>Non-Isolated</u> |
|          | OM79XXIH        | OM79XXH             |

Use letter "A" after part number to designate  $\pm 1\%$  output voltage tolerance.

Example: OM7905AIH

**OM7900IH  
OM7900SR**

**ELECTRICAL CHARACTERISTICS -5 Volt**  $V_{IN} = -10V, I_O = 500mA, -55^{\circ}C \leq T_A \leq 125^{\circ}C$  (unless otherwise specified)

| Parameter                                 | Symbol                                 | Test Conditions                          | Min.    | Max.  | Unit             |
|---|--|--|---------|-------|------------------|
| Output Voltage                            | $V_{OUT}$                              | $T_A = 25^{\circ}C$                      | -4.95   | -5.05 | V                |
|   |  | $V_{IN} = -7.5V$ to $-20V$               | • -4.85 | -5.15 | V                |
| Line Regulation<br>(Note 1)               | $V_{RLINE}$                            | $V_{IN} = -7.5V$ to $-20V$               | •       | 12    | mV               |
|   |  | $V_{IN} = -8.0V$ to $-12V$               | •       | 25    | mV               |
| Load Regulation<br>(Note 1)               | $V_{RLOAD}$                            | $I_O = 5mA$ to 1.5 Amp                   | •       | 5     | mV               |
|   |  | $I_O = 250mA$ to 750 mA                  | •       | 12    | mV               |
| Standby Current Drain                     | $I_{SCD}$                              |  | •       | 20    | mV               |
|   |  |  | •       | 25    | mV               |
| Standby Current Drain<br>Change With Line | $\Delta I_{SCD}$<br>(Line)             | $V_{IN} = -7.0V$ to $-20V$               | •       | 15    | mV               |
|   |  |  | •       | 30    | mV               |
| Standby Current Drain<br>Change With Load | $\Delta I_{SCD}$<br>(Load)             | $I_O = 5mA$ to 1000mA                    | •       | 3.0   | mA               |
|   |  |  | •       | 0.4   | mA               |
| Dropout Voltage                           | $V_{DO}$                               | $\Delta V_{OUT} = 100mV, I_O = 1.0A$     | •       | 2.5   | V                |
| Peak Output Current                       | $I_{O(pk)}$                            | $T_A = 25^{\circ}C$                      | 1.5     | 3.3   | A                |
| Short Circuit Current<br>(Note 2)         | $I_{DS}$                               | $V_{IN} = -35V$                          | •       | 1.2   | A                |
|   |  |  | •       | 2.8   | A                |
| Ripple Rejection                          | $\frac{\Delta V_{IN}}{\Delta V_{OUT}}$ | $f = 120$ Hz, $\Delta V_{IN} = -10V$     | •       | 63    | dB               |
|   |  | (Note 3)                                 | •       | 60    | dB               |
| Output Noise Voltage<br>(Note 3)          | $N_O$                                  | $T_A = 25^{\circ}C, f = 10$ Hz to 100KHz |         | 40    | $\mu V/V$<br>RMS |
| Long Term Stability<br>(Note 3)           | $\frac{\Delta V_{OUT}}{\Delta t}$      | $T_A = 25^{\circ}C, t = 1000$ hrs.       |         | 75    | mV               |

**ELECTRICAL CHARACTERISTICS -12 Volt**  $V_{IN} = -19V, I_O = 500mA, -55^{\circ}C \leq T_A \leq 125^{\circ}C$  (unless otherwise specified)

| Parameter                                 | Symbol                                 | Test Conditions                          | Min.     | Max.   | Unit             |
|---|--|--|----------|--------|------------------|
| Output Voltage                            | $V_{OUT}$                              | $T_A = 25^{\circ}C$                      | -11.88   | -12.12 | V                |
|   |  | $V_{IN} = -14.5V$ to $-27V$              | • -11.64 | -12.36 | V                |
| Line Regulation<br>(Note 1)               | $V_{RLINE}$                            | $V_{IN} = -14.5V$ to $-27V$              | •        | 20     | mV               |
|   |  | $V_{IN} = -16V$ to $-22V$                | •        | 50     | mV               |
| Load Regulation<br>(Note 1)               | $V_{RLOAD}$                            | $I_O = 5mA$ to 1.5 Amp                   | •        | 10     | mV               |
|   |  | $I_O = 250mA$ to 750 mA                  | •        | 30     | mV               |
| Standby Current Drain                     | $I_{SCD}$                              |  | •        | 32     | mV               |
|   |  |  | •        | 60     | mV               |
| Standby Current Drain<br>Change With Line | $\Delta I_{SCD}$<br>(Line)             | $V_{IN} = -14.5V$ to $-27V$              | •        | 16     | mV               |
|   |  |  | •        | 30     | mV               |
| Standby Current Drain<br>Change With Load | $\Delta I_{SCD}$<br>(Load)             | $I_O = 5mA$ to 1000mA                    | •        | 4.0    | mA               |
|   |  |  | •        | 0.8    | mA               |
| Dropout Voltage                           | $V_{DO}$                               | $\Delta V_{OUT} = 100mV, I_O = 1.0A$     | •        | 1.8    | V                |
| Peak Output Current                       | $I_{O(pk)}$                            | $T_A = 25^{\circ}C, I_O = 5mA$ to 1A     | 1.5      | 3.3    | A                |
| Short Circuit Current<br>(Note 2)         | $I_{DS}$                               | $V_{IN} = -35V$                          | •        | 1.2    | A                |
|   |  |  | •        | 2.8    | A                |
| Ripple Rejection                          | $\frac{\Delta V_{IN}}{\Delta V_{OUT}}$ | $f = 120$ Hz, $\Delta V_{IN} = -10V$     | •        | 56     | dB               |
|   |  | (Note 3)                                 | •        | 53     | dB               |
| Output Noise Voltage<br>(Note 3)          | $N_O$                                  | $T_A = 25^{\circ}C, f = 10$ Hz to 100KHz |          | 40     | $\mu V/V$<br>RMS |
| Long Term Stability<br>(Note 3)           | $\frac{\Delta V_{OUT}}{\Delta t}$      | $T_A = 25^{\circ}C, t = 1000$ hrs.       |          | 120    | mV               |

**Notes:**

- Load and Line Regulation are specified at a constant junction temperature. Pulse testing with low duty cycle is used. Changes in output voltage due to heating effects must be taken into account separately.
  - Short Circuit protection is only assured up to  $V_{IN} = -35V$ .
  - If not tested, shall be guaranteed to the specified limits.
- The • denotes the specifications which apply over the full operating temperature range.

**ELECTRICAL CHARACTERISTICS -15 Volt**  $V_{IN} = -23V, I_O = 500mA, -55^{\circ}C \leq T_A \leq 125^{\circ}C$  (unless otherwise specified)

| Parameter                                 | Symbol                                 | Test Conditions                            | Min.     | Max.   | Unit             |
|---|--|--|----------|--------|------------------|
| Output Voltage                            | $V_{OUT}$                              | $T_A = 25^{\circ}C$                        | -14.85   | -15.15 | V                |
|   |  | $V_{IN} = -17.5V$ to $-30V$                | • -14.55 | -15.45 | V                |
| Line Regulation<br>(Note 1)               | $V_{RLINE}$                            | $V_{IN} = -17.5V$ to $-30V$                | •        | 25     | mV               |
|   |  |  | •        | 50     | mV               |
|   |  | $V_{IN} = -20V$ to $-26V$                  | •        | 15     | mV               |
| Load Regulation<br>(Note 1)               | $V_{RLOAD}$                            | $I_O = 5mA$ to $1.5$ Amp                   | •        | 35     | mV               |
|   |  |  | •        | 75     | mV               |
|   |  | $I_O = 250mA$ to $750$ mA                  | •        | 21     | mV               |
| Standby Current Drain                     | $I_{SCD}$                              |  | •        | 6.0    | mA               |
|   |  |  | •        | 6.5    | mA               |
| Standby Current Drain<br>Change With Line | $\Delta I_{SCD}$<br>(Line)             | $V_{IN} = -17.5V$ to $-30V$                | •        | 0.8    | mA               |
| Standby Current Drain<br>Change With Load | $\Delta I_{SCD}$<br>(Load)             | $I_O = 5mA$ to $1000mA$                    | •        | 0.5    | mA               |
| Dropout Voltage                           | $V_{DO}$                               | $\Delta V_{OUT} = 100mV, I_O = 1.0A$       | •        | 2.5    | V                |
| Peak Output Current                       | $I_O$ (pk)                             | $T_A = 25^{\circ}C$                        | 1.5      | 3.3    | A                |
| Short Circuit Current<br>(Note 2)         | $I_{OS}$                               | $V_{IN} = -35V$                            | •        | 1.2    | A                |
|   |  |  | •        | 2.8    | A                |
| Ripple Rejection                          | $\frac{\Delta V_{IN}}{\Delta V_{OUT}}$ | $f = 120$ Hz, $\Delta V_{IN} = -10V$       | •        | 53     | dB               |
|   |  | (Note 3)                                   | •        | 50     | dB               |
| Output Noise Voltage<br>(Note 3)          | $N_O$                                  | $T_A = 25^{\circ}C, f = 10$ Hz to $100KHz$ |          | 40     | $\mu V/V$<br>RMS |
| Long Term Stability<br>(Note 3)           | $\frac{\Delta V_{OUT}}{\Delta t}$      | $T_A = 25^{\circ}C, t = 1000$ hrs.         |          | 150    | mV               |

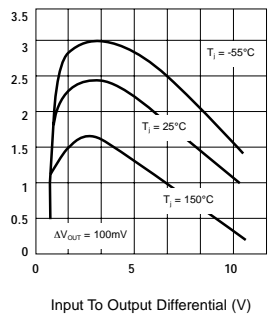
**Notes:**

- Load and Line Regulation are specified at a constant junction temperature. Pulse testing with low duty cycle is used. Changes in output voltage due to heating effects must be taken into account separately.
- Short Circuit protection is only assured up to  $V_{IN} = -35V$ .
- If not tested, shall be guaranteed to the specified limits.

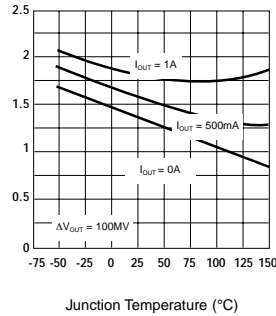
The • denotes the specifications which apply over the full operating temperature range.

**TYPICAL PERFORMANCE CHARACTERISTICS**

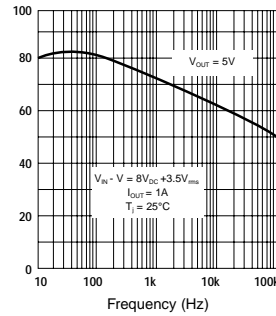
**PEAK OUTPUT CURRENT**



**DROPOUT VOLTAGE**



**RIPPLE REJECTION**

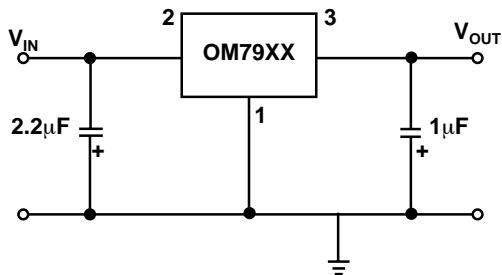


## TYPICAL APPLICATIONS

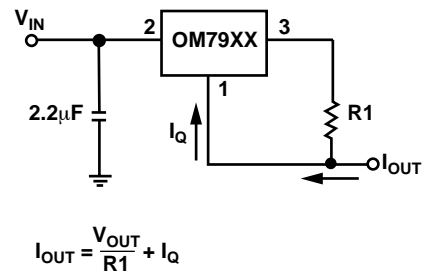
Input bypass capacitors are recommended for stable operation of the OM7900 series of regulators over the input voltage and output current ranges. Output bypass capacitors will improve the transient response of the regulator.

The bypass capacitors, (2.2μF on the input, 1μF on the output) should be ceramic or solid tantalum which have good high frequency characteristics. If aluminum electrolytics are used, their values should be 10μF or larger. The bypass capacitors should be mounted with the shortest leads, and if possible, directly across the regulator terminals.

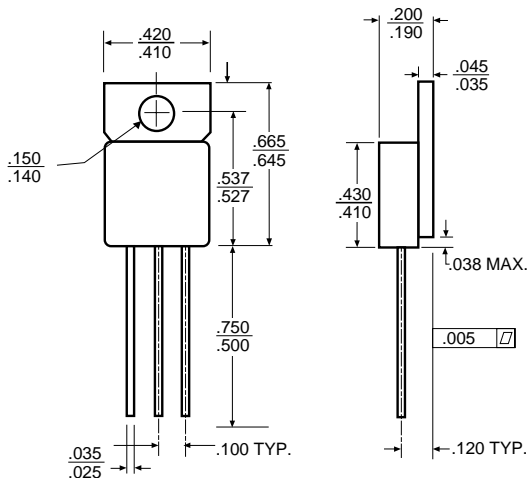
### Fixed Output Regulator



### Basic Current Regulator



### MECHANICAL OUTLINE

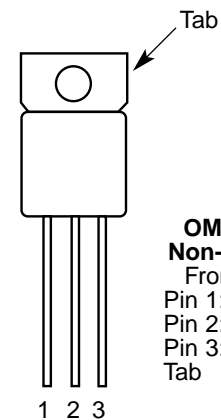


**Note:**

- Case is metal/hermetically sealed
- Isolated Tab
- Outline similar to JEDEC TO-220 outline

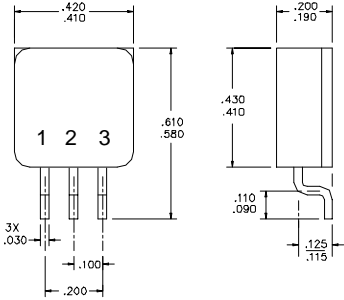
### PIN CONNECTION

**OM79XXIH**  
Isolated  
Front View  
Pin 1: Ground  
Pin 2: Input  
Pin 3: Output  
Tab: Isolated



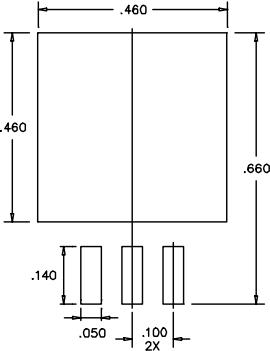
**OM79XXH**  
Non-Isolated  
Front View  
Pin 1: Ground  
Pin 2: Input  
Pin 3: Output  
Tab: Input

**MECHANICAL OUTLINE**



Pin 1: Ground  
Pin 2: Input  
Pin 3: Output  
Case N/C

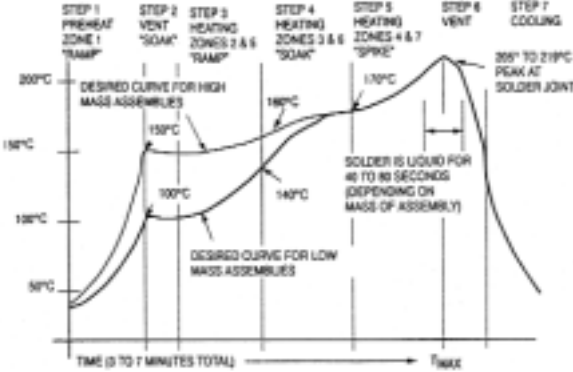
**SOLDERING FOOTPRINT**



**TYPICAL SOLDERING PROFILE**

Figure 1 shows a typical soldering profile for the D<sup>2</sup> and D<sup>3</sup> Packages when soldering a to a printed circuit board. The profile will vary from system to system and solders to solders. Factors that can affect the profile include the type of soldering system used, density and type of components on the board or substrate material being used. This profile shows temperature versus time. The two profiles described are based on a high density and a low density board. The type solder used was 62/36/2 Tin Lead Silver with a melting point between 177-189°C. An convection/infrared soldering reflow system was used. The circuit and solder joints heat up first due to their mass followed by the components which typically run 30 degrees cooler than the solder joints.

**TYPICAL HEATING PROFILE**



Typical Soldering Heating Profile  
Fig 1.

**PART NUMBER DESIGNATOR**

