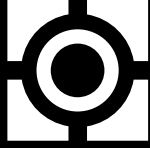


# 1.5 AMP NEGATIVE ADJUSTABLE VOLTAGE REGULATOR APPROVED TO DESC DRAWING 7703408



**Three Terminal, Precision Adjustable  
Negative Voltage Regulator In Hermetic  
Style Packages (LM137AHV)**

Please see mechanical outlines herein

## FEATURES

- Similar To Industry Standard LM137AHV
- Approved To DESC Standardized Military Drawing Number 7703408
- Built In Thermal Overload Protection
- Short Circuit Current Limiting
- Available In Six Package Styles
- Maximum Output Voltage Tolerance Is Guaranteed to  $\pm 1\%$

## DESCRIPTION

These three terminal negative regulators are supplied in hermetically sealed packages. All protective features are designed into the circuit, including thermal shutdown, current-limiting, and safe-area control. With heat sinking, these devices can deliver up to 1.5 amps of output current. The LCC-20 device is limited to .5 amps. The unit also features output voltages that can be fixed from -1.2 volts to -47 volts using external resistors.

## ABSOLUTE MAXIMUM RATINGS $T_c @ 25^\circ\text{C}$

Power Dissipation

|                       |       |
|-----------------------|-------|
| Case 2. ....          | 1.1 W |
| Case-All Others. .... | 20 W  |

Input - Output Voltage Differential ..... 50 V

Operating Junction Temperature Range .....  $-55^\circ\text{C}$  to  $+150^\circ\text{C}$

Storage Temperature Range .....  $-65^\circ\text{C}$  to  $+150^\circ\text{C}$

Lead Temperature (Soldering 10 seconds) .....  $300^\circ\text{C}$

Thermal Resistance, Junction to Case:

|                                             |                       |
|---------------------------------------------|-----------------------|
| Case 2, LCC-20 .....                        | $17^\circ\text{C/W}$  |
| Case U & M, TO-257 (Isol) and SMD-3 .....   | $4.2^\circ\text{C/W}$ |
| Case T&N, TO-257 (Non-Isol) and SMD-1 ..... | $3.5^\circ\text{C/W}$ |
| Case Y, TO-3 .....                          | $3.0^\circ\text{C/W}$ |

Maximum Output Current:

|                       |      |
|-----------------------|------|
| Case 2 .....          | .5 A |
| Case-All Others. .... | 1.5A |

Recommended Operating Conditions:

|                                                     |                                             |
|-----------------------------------------------------|---------------------------------------------|
| Output Voltage Range .....                          | -1.2 to -47 VDC                             |
| Ambient Operating Temperature Range ( $T_A$ ) ..... | $-55^\circ\text{C}$ to $+125^\circ\text{C}$ |
| Input Voltage Range .....                           | -4.25 to -51.25 VDC                         |

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**ELECTRICAL CHARACTERISTICS** -55°C ≤ T<sub>A</sub> ≤ 125°C, I<sub>L</sub> = 8mA (unless otherwise specified)  
**OM1327NTM, OM1327STM, OM1327NKM, OM1327SMM, OM1327NMM**

| Parameter                        | Symbol            | Test Conditions                                                                                                                                                                               | Min.                              | Max.                              | Unit |
|----------------------------------|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-----------------------------------|------|
| Reference Voltage                | V <sub>REF</sub>  | $ V_{DIFF}  = 3.0V, T_A = 25^{\circ}C$<br>$ V_{DIFF}  = 3.0V$<br>$ V_{DIFF}  = 50V, T_A = 25^{\circ}C$<br>$ V_{DIFF}  = 50V$                                                                  | -1.262<br>-1.28<br>-1.28<br>-1.28 | -1.238<br>-1.22<br>-1.22<br>-1.22 | V    |
| Line Regulation<br>(Note 1)      | R <sub>LINE</sub> | $3.0V \leq  V_{DIFF}  \leq 50V, T_A = 25^{\circ}C$                                                                                                                                            | -6<br>-20                         | 6<br>20                           | mV   |
| Load Regulation<br>(Note 1)      | R <sub>LOAD</sub> | $ V_{DIFF}  = 50V, 8mA \leq I_L \leq 110mA, T_A = 25^{\circ}C$<br>$ V_{DIFF}  = 5V, 8mA \leq I_L \leq 1.5A, T_A = 25^{\circ}C$                                                                | -25<br>-25<br>-50                 | 25<br>25<br>50                    | mV   |
| Thermal Regulation               | V <sub>RTH</sub>  | V <sub>in</sub> = -14.6V, I <sub>L</sub> = 1.5A<br>P <sub>d</sub> = 20 Watts, t = 10 ms, T <sub>A</sub> = 25°C                                                                                | -5                                | 5                                 | mV   |
| Ripple Rejection<br>(Note 2)     | R <sub>N</sub>    | f = 120 Hz, V <sub>out</sub> = V <sub>ref</sub><br>C <sub>Adj</sub> = 10 μF                                                                                                                   | 66                                |                                   | dB   |
| Adjustment Pin Current           | I <sub>Adj</sub>  | $ V_{DIFF}  = 3.0V$<br>$ V_{DIFF}  = 40V$<br>$ V_{DIFF}  = 50V$                                                                                                                               |                                   | 100<br>100<br>100                 | μA   |
| Adjustment Pin<br>Current Change | ΔI <sub>Adj</sub> | $ V_{DIFF}  = 5V, 8mA \leq I_{out} \leq 1.5A$<br>$3V \leq  V_{DIFF}  \leq 50V, I_L \leq 8mA$                                                                                                  | -5<br>-6                          | 5<br>6                            | μA   |
| Mimumum Load Current             | I <sub>Lmin</sub> | $ V_{DIFF}  = 3.0V, V_{out} = -1.4V$ (forced)<br>$ V_{DIFF}  = 10V, V_{out} = -1.4V$ (forced)<br>$ V_{DIFF}  = 40V, V_{out} = -1.4V$ (forced)<br>$ V_{DIFF}  = 50V, V_{out} = -1.4V$ (forced) |                                   | 3.0<br>3.0<br>5.0<br>5.0          | mA   |
| Current Limit<br>(Note 2)        | I <sub>CL</sub>   | $ V_{DIFF}  = 5V$<br>$ V_{DIFF}  = 50V, T_A = 25^{\circ}C$                                                                                                                                    | 1.5<br>0.2                        | 3.5<br>1.0                        | A    |

- Notes:**
1. 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.
  2. If not tested, shall be guaranteed to the specified limits.
  3. The • denotes the specifications which apply over the full operating temperature range.

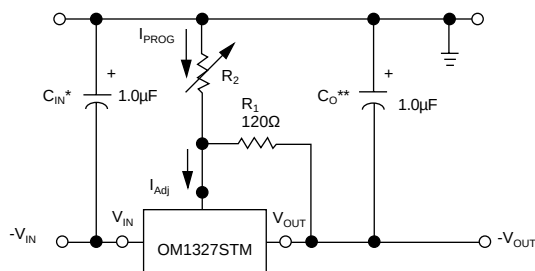
| PART NUMBER DESIGNATOR                                               |                                                                            |                                                                                |
|----------------------------------------------------------------------|----------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Standard Military Drawing Number                                     | Omnirel Part Number                                                        | Omnirel Package Designation                                                    |
| 7703408M<br>7703408U<br>7703408T<br>7703408Y<br>7703408N<br>77034082 | OM1327SMM<br>OM1327STM<br>OM1327NTM<br>OM1327NKM<br>OM1327NMM<br>OM1327N2M | SMD-3<br>TO-257 (Isolated)<br>TO-257 (non-Isolated)<br>TO-3<br>SMD-1<br>LCC-20 |

**ELECTRICAL CHARACTERISTICS**  $-55^{\circ}\text{C} \leq T_A \leq 125^{\circ}\text{C}$ ,  $I_L = 8\text{mA}$  (unless otherwise specified)**OM1327N2M**

| Parameter                        | Symbol           | Test Conditions                                                                                                                                                                                                                                                     | Min.                                       | Max.                                       | Unit          |
|----------------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------|---------------|
| Reference Voltage                | $V_{REF}$        | $ V_{DIFF}  = 3.0\text{V}$ , $T_A = 25^{\circ}\text{C}$<br>$ V_{DIFF}  = 3.0\text{V}$<br>$ V_{DIFF}  = 40\text{V}$ , $T_A = 25^{\circ}\text{C}$<br>$ V_{DIFF}  = 40\text{V}$<br>$ V_{DIFF}  = 50\text{V}$ , $T_A = 25^{\circ}\text{C}$<br>$ V_{DIFF}  = 50\text{V}$ | -1.262<br>-1.28<br>-1.28<br>-1.28<br>-1.28 | -1.235<br>-1.22<br>-1.22<br>-1.22<br>-1.22 | V             |
| Line Regulation<br>(Note 1)      | $R_{LINE}$       | $3.0\text{V} \leq  V_{DIFF}  \leq 50\text{V}$ , $T_A = 25^{\circ}\text{C}$                                                                                                                                                                                          | -10<br>-25                                 | 10<br>25                                   | mV            |
| Load Regulation<br>(Note 1)      | $R_{LOAD}$       | $ V_{DIFF}  = 50\text{V}$ , $8\text{mA} \leq I_L \leq 100\text{mA}$ , $T_A = 25^{\circ}\text{C}$<br>$ V_{DIFF}  = 5\text{V}$ , $8\text{mA} \leq I_L \leq 500\text{mA}$ , $T_A = 25^{\circ}\text{C}$                                                                 | -25<br>-31<br>-50                          | 25<br>31<br>50                             | mV            |
| Thermal Regulation               | $V_{RTH}$        | $V_{in} = -16.25\text{V}$ , $I_L = 330\text{mA}$<br>$P_d = 5\text{ Watts}$ , $t = 10\text{ ms}$ , $T_A = 25^{\circ}\text{C}$                                                                                                                                        | -2                                         | 2                                          | mV            |
| Ripple Rejection<br>(Note 2)     | $R_N$            | $f = 120\text{ Hz}$ , $V_{out} = V_{ref}$<br>$C_{Adj} = 10\text{ }\mu\text{F}$                                                                                                                                                                                      | 66                                         |                                            | dB            |
| Adjustment Pin Current           | $I_{Adj}$        | $ V_{DIFF}  = 3.0\text{V}$<br>$ V_{DIFF}  = 40\text{V}$<br>$ V_{DIFF}  = 50\text{V}$                                                                                                                                                                                |                                            | 100<br>100<br>100                          | $\mu\text{A}$ |
| Adjustment Pin<br>Current Change | $\Delta I_{Adj}$ | $ V_{DIFF}  = 5\text{V}$ , $8\text{mA} \leq I_{out} \leq 200\text{ mA}$<br>$3\text{V} \leq  V_{DIFF}  \leq 50\text{V}$ , $I_L \leq 8\text{mA}$                                                                                                                      | -5<br>-6                                   | 5<br>6                                     | $\mu\text{A}$ |
| Minimum Load Current             | $I_{Lmin}$       | $ V_{DIFF}  = 3.0\text{V}$ , $V_{out} = -1.4\text{V}$ (forced)<br>$ V_{DIFF}  = 10\text{V}$ , $V_{out} = -1.4\text{V}$ (forced)<br>$ V_{DIFF}  = 40\text{V}$ , $V_{out} = -1.4\text{V}$ (forced)<br>$ V_{DIFF}  = 50\text{V}$ , $V_{out} = -1.4\text{V}$ (forced)   |                                            | 3.0<br>3.0<br>5.0<br>5.0                   | mA            |
| Current Limit<br>(Note 2)        | $I_{CL}$         | $ V_{DIFF}  = 5\text{V}$<br>$ V_{DIFF}  = 50\text{V}$ , $T_A = 25^{\circ}\text{C}$                                                                                                                                                                                  | 0.5<br>0.1                                 | 1.8<br>0.65                                | A             |

**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.

**TYPICAL APPLICATION**

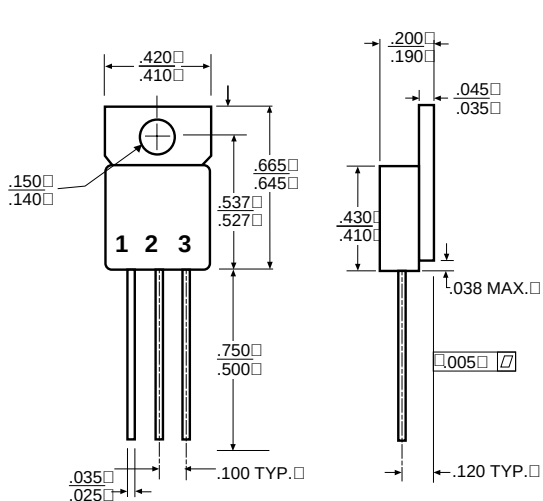
\*  $C_{in}$  is required if regulator is located more than 4 inches from power supply filter. A  $1\text{ }\mu\text{F}$  solid tantalum or  $10\text{ }\mu\text{F}$  aluminum electrolytic is recommended.

\*\*  $C_o$  is necessary for stability. A  $1\text{ }\mu\text{F}$  solid tantalum or  $10\text{ }\mu\text{F}$  aluminum electrolytic is recommended.

$$V_{out} = -1.25\text{ V} \left( 1 + \frac{R_2}{R_1} \right)$$

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## MECHANICAL OUTLINE



### OM1327STM

#### Isolated

#### Front View

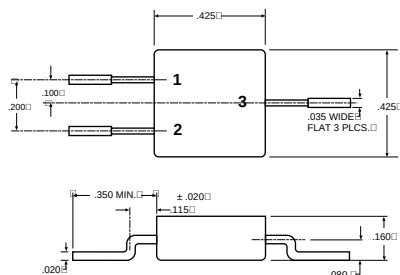
Pin 1 - Adjust  
Pin 2 - Input  
Pin 3 - Output  
Tab - Isolated

### OM1327NTM

#### Non-Isolated

#### Front View

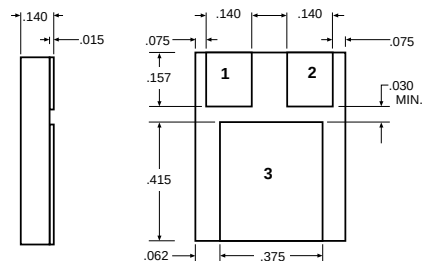
Pin 1 - Adjust  
Pin 2 - Input  
Pin 3 - Output  
Tab - Input



### OM1327SMM

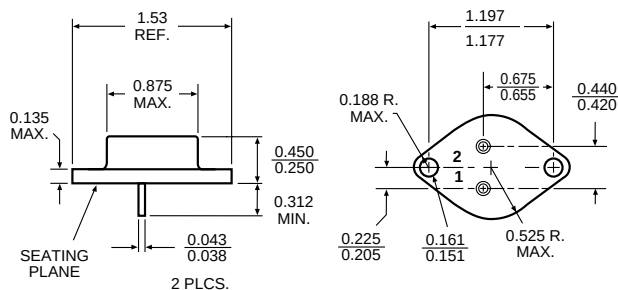
#### Front View

Pin 1 - Adjust  
Pin 2 - Output  
Pin 3 - Input  
Case - Isolated



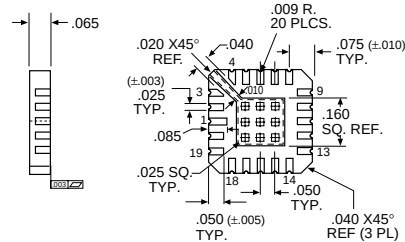
### OM1327NMM

Pin 1 - Adjust  
Pin 2 - Output  
Pin 3 - Input



### OM1327NKM

Pin 1 - Adjust  
Pin 2 - Output  
Case - Input



### OM1327N2M

|        |          |        |           |
|--------|----------|--------|-----------|
| Pin 1  | $V_{IN}$ | Pin 11 | NC        |
| Pin 2  | NC       | Pin 12 | $V_{OUT}$ |
| Pin 3  | NC       | Pin 13 | $V_{OUT}$ |
| Pin 4  | NC       | Pin 14 | NC        |
| Pin 5  | NC       | Pin 15 | NC        |
| Pin 6  | NC       | Pin 16 | NC        |
| Pin 7  | NC       | Pin 17 | NC        |
| Pin 8  | NC       | Pin 18 | NC        |
| Pin 9  | ADJUST   | Pin 19 | NC        |
| Pin 10 | NC       | Pin 20 | $V_{IN}$  |

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For additional information please see the mechanical outline section.