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

Please see mechanical outlines herein

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

## 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 ± 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°C

Power Dissipation
- Case 2. . . . . 1.1 W
- Case-All Others. . . . . 20 W

Input - Output Voltage Differential . . . . . 50 V
Operating Junction Temperature Range . . . . . - 55°C to + 150°C
Storage Temperature Range . . . . . - 65°C to + 150°C
Lead Temperature (Soldering 10 seconds) . . . . . 300°C
Thermal Resistance, Junction to Case:
- Case 2, LCC-20 . . . . . 17°C/W
- Case U & M, TO-257 (Isol) and SMD-3 . . . . . 4.2°C/W
- Case T&N, TO-257 (Non-Isol) and SMD-1 . . . . . 3.5°C/W
- Case Y, TO-3 . . . . . 3.0°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°C to + 125°C
- Input Voltage Range . . . . . -4.25 to -51.25 VDC

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## ELECTRICAL CHARACTERISTICS -55°C $T_A$ 125°C, $I_L$ = 8mA (unless otherwise specified)

**OM1327NTM, OM1327STM, OM1327NKM, OM1327SMM, OM1327NMM**

| Parameter | Symbol | Test Conditions | | Min. | Max. | Unit |
|---|---|---|---|---|---|---|
| Reference Voltage | $V_{REF}$ | $V_{DIFF}$ = 3.0V, $T_A$ = 25°C | | -1.262 | -1.238 | |
| | | $V_{DIFF}$ = 3.0V | • | -1.28 | -1.22 | V |
| | | $V_{DIFF}$ = 50V, $T_A$ = 25°C | | -1.28 | -1.22 | |
| | | $V_{DIFF}$ = 50V | • | -1.28 | -1.22 | |
| Line Regulation | $R_{LINE}$ | 3.0 V $V_{DIFF}$ 50V, $T_A$ = 25°C | | -6 | 6 | |
| (Note 1) | | | • | -20 | 20 | mV |
| Load Regulation | $R_{LOAD}$ | $V_{DIFF}$ 50V, 8mA $I_L$ 110mA, $T_A$ = 25°C | | -25 | 25 | |
| (Note 1) | | $V_{DIFF}$ = 5V, 8mA $I_L$ 1.5A, $T_A$ = 25°C | | -25 | 25 | mV |
| | | | • | -50 | 50 | |
| Thermal Regulation | $V_{RTH}$ | $V_{in}$ = -14.6V, $I_L$ = 1.5A | | -5 | 5 | mV |
| | | $P_d$ = 20 Watts, t = 10 ms, $T_A$ = 25°C | | | | |
| Ripple Rejection | $R_N$ | f = 120 Hz, $V_{out}$ = $V_{ref}$ | • | 66 | | dB |
| (Note 2) | | $C_{Adj}$ = 10 µF | | | | |
| Adjustment Pin Current | $I_{Adj}$ | $V_{DIFF}$ = 3.0V | • | | 100 | |
| | | $V_{DIFF}$ = 40V | • | | 100 | µA |
| | | $V_{DIFF}$ = 50V | • | | 100 | |
| Adjustment Pin | $^3I_{Adj}$ | $V_{DIFF}$ = 5V, 8mA $I_{out}$ 1.5A | • | -5 | 5 | µA |
| Current Change | | 3V $V_{DIFF}$ 50V, $I_L$ 8mA | • | -6 | 6 | |
| Miminum Load Current | $I_{Lmin}$ | $V_{DIFF}$ = 3.0V, $V_{out}$ = -1.4V (forced) | • | | 3.0 | |
| | | $V_{DIFF}$ = 10V, $V_{out}$ = -1.4V (forced) | • | | 3.0 | mA |
| | | $V_{DIFF}$ = 40V, $V_{out}$ = -1.4V (forced) | • | | 5.0 | |
| | | $V_{DIFF}$ = 50V, $V_{out}$ = -1.4V (forced) | • | | 5.0 | |
| Current Limit | $I_{CL}$ | $V_{DIFF}$ = 5V | • | 1.5 | 3.5 | |
| (Note 2) | | $V_{DIFF}$ = 50V, $T_A$ = 25°C | | 0.2 | 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 | OM1327SMM | SMD-3 |
| 7703408U | OM1327STM | TO-257 (Isolated) |
| 7703408T | OM1327NTM | TO-257 (non-Isolated) |
| 7703408Y | OM1327NKM | TO-3 |
| 7703408N | OM1327NMM | SMD-1 |
| 77034082 | OM1327N2M | LCC-20 |

## ELECTRICAL CHARACTERISTICS -55°C $T_A$ 125°C, $I_L$ = 8mA (unless otherwise specified)

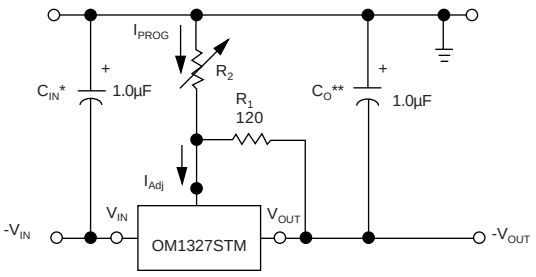
**OM1327N2M**

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

## TYPICAL APPLICATION



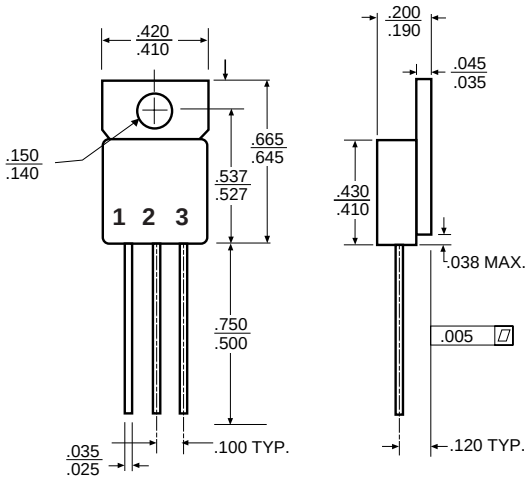

* $C_{in}$ is required if regulator is located more than 4 inches from power supply filter. A 1 µF solid tantalum or 10 µF aluminum electrolytic is recommended.

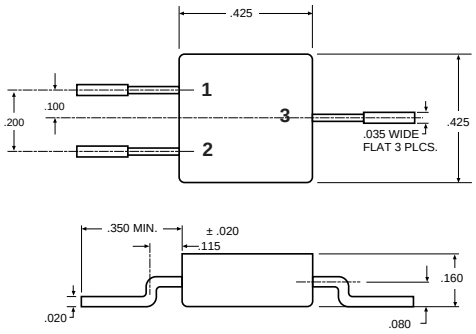
** $C_o$ is necessary for stability. A 1 µF solid tantalum or 10 µF aluminum electrolytic is recommended.

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

3.3

# MECHANICAL OUTLINE

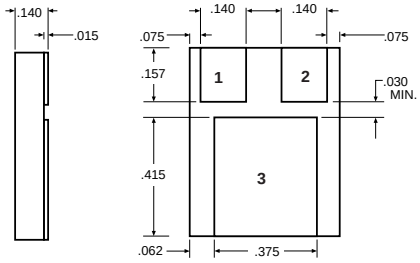


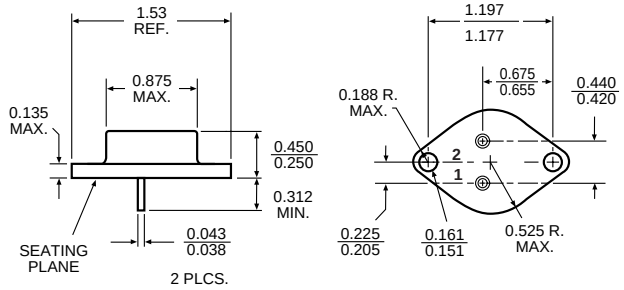

**OM1327SMM**
Front View
Pin 1 - Adjust
Pin 2 - Output
Pin 3 - Input
Case - Isolated

**OM1327STM**
**Isolated**
Front View
Pin 1 - Adjust
Pin 2 - Input
Pin 3 - Output
Tab - Isolated

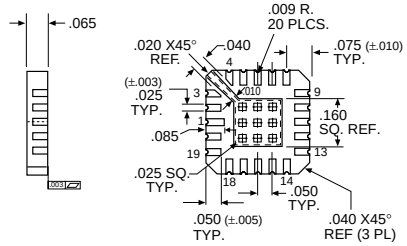
**OM1327NTM**
**Non-Isolated**
Front View
Pin 1 - Adjust
Pin 2 - Input
Pin 3 - Output
Tab - Input




**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 | $V_{IN}$ |

For additional information please see the mechanical outline section.



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