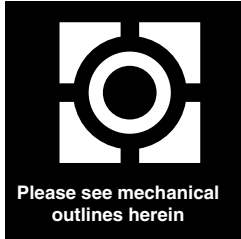


# 1.5 AMP POSITIVE ADJUSTABLE VOLTAGE REGULATOR APPROVED TO DESC DRAWING 7703405



## Three Terminal, Precision Adjustable Positive Voltage Regulator In Hermetic Style Packages (LM117A)

### FEATURES

- Similar To Industry Standard LM117A
- Approved To DESC Standardized Military Drawing Number 7703405
- 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 positive 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 0.5 Amps. The unit also features output voltages that can be fixed from 1.2 Volts to 37 Volts using external resistors.

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

Power Dissipation	
LCC-20 . . . . .	1.1 W
Case-All Others . . . . .	20 W
Input - Output Voltage Differential . . . . .	40 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:	
LCC-20 . . . . .	17°C/W
TO-257 (Isol) and SMD-3 . . . . .	4.2°C/W
TO-257 (Non-Isol) and SMD-1 . . . . .	3.5°C/W
Case Y, TO-3 . . . . .	3.0°C/W
Maximum Output Current:	
LCC-20 . . . . .	0.5 A
Case-All Others . . . . .	1.5A
<u>Recommended Operating Conditions:</u>	
Output Voltage Range . . . . .	1.2 to 37 VDC
Ambient Operating Temperature Range ( $T_A$ ) . . . . .	- 55°C to + 125°C
Input Voltage Range . . . . .	4.25 to 41.25 VDC

**3.3**

**OM1324NTM, OM1324STM, OM1324NKM, OM1324SMM, OM1324NMM, OM1324N2M**

**ELECTRICAL CHARACTERISTICS** -55°C ≤ T<sub>A</sub> ≤ 125°C, I<sub>L</sub> = 8mA (unless otherwise specified)  
**OM1324NTM, OM1324STM, OM1324NKM, OM1324SMM, OM1324NMM**

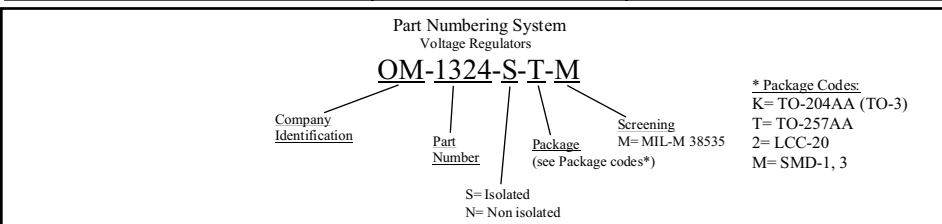
Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Reference Voltage	V <sub>REF</sub>	V <sub>DIFF</sub> = 3.0V, T <sub>A</sub> = 25°C V <sub>DIFF</sub> = 3.3V V <sub>DIFF</sub> = 40V	1.238 1.225 1.225	1.262 1.270 1.270	V
Line Regulation (Note 1)	R <sub>LINE</sub>	3.0V ≤ V <sub>DIFF</sub> ≤ 40V, V <sub>out</sub> = V <sub>ref</sub> , T <sub>A</sub> = 25°C 3.3V ≤ V <sub>DIFF</sub> ≤ 40V, V <sub>out</sub> = V <sub>ref</sub>	-4.5 -9	4.5 9	mV
Load Regulation (Note 1)	R <sub>LOAD</sub>	V <sub>DIFF</sub> = 3.0V, 10mA ≤ I <sub>L</sub> ≤ 1.5A, T <sub>A</sub> = 25°C V <sub>DIFF</sub> = 3.3V, 10mA ≤ I <sub>L</sub> ≤ 1.5A V <sub>DIFF</sub> = 40V, 10mA ≤ I <sub>L</sub> ≤ 300mA, T <sub>A</sub> = 25°C V <sub>DIFF</sub> = 40V, 10mA ≤ I <sub>L</sub> ≤ 195mA	-15 -15 -15	15 15 15	mV
Thermal Regulation	V <sub>RTH</sub>	V <sub>in</sub> = 14.6V, I <sub>L</sub> = 1.5A P <sub>d</sub> = 20 Watts, t = 20 ms, T <sub>A</sub> = 25°C	-5	5	mV
Ripple Rejection (Note 2)	R <sub>N</sub>	f = 120 Hz, V <sub>out</sub> = V <sub>ref</sub> C <sub>Adj</sub> = 10 μF	66		dB
Adjustment Pin Current	I <sub>Adj</sub>	V <sub>DIFF</sub> = 3.0V, T <sub>A</sub> = 25°C V <sub>DIFF</sub> = 3.3V V <sub>DIFF</sub> = 40V		100 100 100	μA
Adjustment Pin Current Change	ΔI <sub>Adj</sub>	V <sub>DIFF</sub> = 3.0V, 10mA ≤ I <sub>L</sub> ≤ 1.5A, T <sub>A</sub> = 25°C V <sub>DIFF</sub> = 3.3V, 10mA ≤ I <sub>L</sub> ≤ 1.5A V <sub>DIFF</sub> = 40V, 10mA ≤ I <sub>L</sub> ≤ 300mA, T <sub>A</sub> = 25°C V <sub>DIFF</sub> = 40V, 10mA ≤ I <sub>L</sub> ≤ 195mA 3.0V ≤ V <sub>DIFF</sub> ≤ 40V, T <sub>A</sub> = 25°C 3.3V ≤ V <sub>DIFF</sub> ≤ 40V	-5 -5 -5 -5 -5	5 5 5 5 5	μA
Minimum Load Current	I <sub>Lmin</sub>	V <sub>DIFF</sub> = 3.0V, V <sub>OUT</sub> = 1.4V (forced) V <sub>DIFF</sub> = 3.3V, V <sub>OUT</sub> = 1.4V (forced) V <sub>DIFF</sub> = 40V, V <sub>OUT</sub> = 1.4V (forced)		5.0 5.0 5.0	mA
Current Limit (Note 2)	I <sub>CL</sub>	V <sub>DIFF</sub> = 15V V <sub>DIFF</sub> = 40V, T <sub>A</sub> = 25°C	1.5 0.18	3.5 1.5	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.

**3.3**

PART NUMBER DESIGNATOR		
Standard Military Drawing Number	Omnirel Part Number	Omnirel Package Designation
7703405M 7703405U 7703405T 7703405Y 7703405N 7703405Z	OM1324SMM OM1324STM OM1324NTM OM1324 NKM OM1324NMM OM1324N2M	SMD-3 TO-257 (Isolated) TO-257 (non-Isolated) TO-3 SMD-1 LCC-20



## OM1324NTM, OM1324STM, OM1324NKM, OM1324SMM, OM1324NMM, OM1324N2M

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

#### OM1324N2M

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Reference Voltage	$V_{REF}$	$V_{DIFF} = 3.0\text{V}$ , $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 3.3\text{V}$ $V_{DIFF} = 40\text{V}$	1.238 • 1.225 • 1.225	1.262 1.270 1.270	V
Line Regulation (Note 1)	$R_{LINE}$	$3.0\text{V} \leq V_{DIFF} \leq 40\text{V}$ , $V_{out} = V_{ref}$ , $T_A = 25^{\circ}\text{C}$ $3.3\text{V} \leq V_{DIFF} \leq 40\text{V}$ , $V_{out} = V_{ref}$	-4.5 • -9	4.5 9	mV
Load Regulation (Note 1)	$R_{LOAD}$	$V_{DIFF} = 3.0\text{V}$ , $10\text{mA} \leq I_L \leq 500\text{mA}$ , $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 3.3\text{V}$ , $10\text{mA} \leq I_L \leq 500\text{mA}$ $V_{DIFF} = 40\text{V}$ , $10\text{mA} \leq I_L \leq 150\text{mA}$ , $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 40\text{V}$ , $10\text{mA} \leq I_L \leq 100\text{mA}$	-15 • -15 -15 • -15	15 15 15	mV
Thermal Regulation	$V_{RTH}$	$V_{in} = 14.6\text{V}$ , $I_L = 300\text{mA}$ $P_d = 4.0\text{ Watts}$ , $t = 20\text{ ms}$ , $T_A = 25^{\circ}\text{C}$	-2	2	mV
Ripple Rejection (Note 2)	$R_N$	$f = 120\text{ Hz}$ , $V_{out} = V_{ref}$ $C_{Adj} = 10\text{ }\mu\text{F}$	• 66		dB
Adjustment Pin Current	$I_{Adj}$	$V_{DIFF} = 3.0\text{V}$ , $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 3.3\text{V}$ $V_{DIFF} = 40\text{V}$		100 100 100	$\mu\text{A}$
Adjustment Pin Current Change	$\Delta I_{Adj}$	$V_{DIFF} = 3.0\text{V}$ , $10\text{mA} \leq I_L \leq 500\text{mA}$ , $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 3.3\text{V}$ , $10\text{mA} \leq I_L \leq 500\text{mA}$ $V_{DIFF} = 40\text{V}$ , $10\text{mA} \leq I_L \leq 150\text{mA}$ , $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 40\text{V}$ , $10\text{mA} \leq I_L \leq 100\text{mA}$ $3.0\text{V} \leq V_{DIFF} \leq 40\text{V}$ , $T_A = 25^{\circ}\text{C}$ $3.3\text{V} \leq V_{DIFF} \leq 40\text{V}$	-5 • -5 -5 • -5 -5 • -5	5 5 5 5	$\mu\text{A}$
Minimum Load Current	$I_{Lmin}$	$V_{DIFF} = 3.0\text{V}$ , $V_{OUT} = 1.4\text{V}$ (forced) $V_{DIFF} = 3.3\text{V}$ , $V_{OUT} = 1.4\text{V}$ (forced) $V_{DIFF} = 40\text{V}$ , $V_{OUT} = 1.4\text{V}$ (forced)		5.0 • 5.0 • 5.0	mA
Current Limit (Note 2)	$I_{CL}$	$V_{DIFF} = 15\text{V}$ $V_{DIFF} = 40\text{V}$ , $T_A = 25^{\circ}\text{C}$	• 0.5 0.15	1.65 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.
- If not tested, shall be guaranteed to the specified limits.
- The • denotes the specifications which apply over the full operating temperature range.

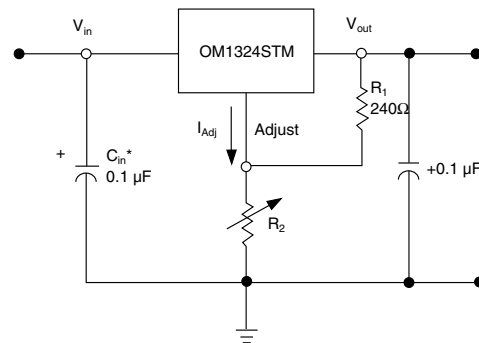
## APPLICATION

\*  $C_{in}$  is required if regulator is located an appreciable distance from power supply filter.

\*\*  $C_o$  is not needed for stability, however it does improve transient response.

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

Since  $I_{Adj}$  is controlled to less than 100  $\mu\text{A}$ , the error associated with this term is negligible in most applications.

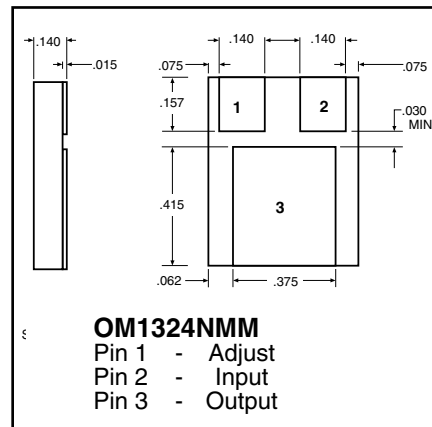
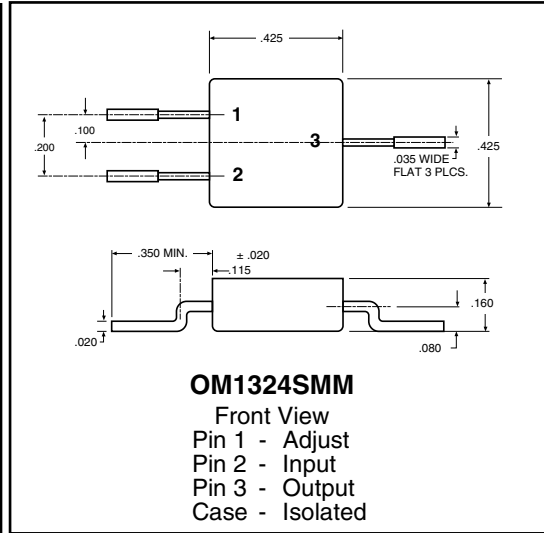
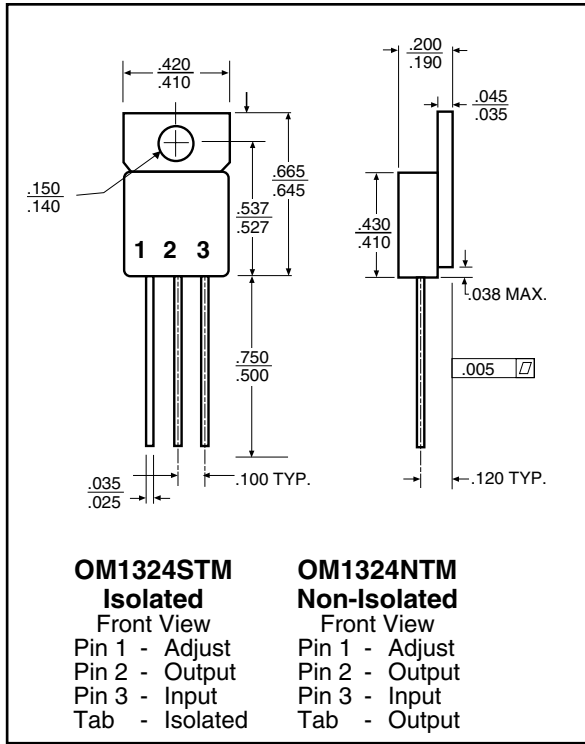


International Rectifier Companies  
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MECHANICAL OUTLINE



3.3

