

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



Please see mechanical  
outlines herein

## 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 .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	
Case 2 . . . . .	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:	
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
<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

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**ELECTRICAL CHARACTERISTICS** -55°C  $T_A$  125°C,  $I_L = 8mA$  (unless otherwise specified)  
**OM1324NTM, OM1324STM, OM1324NKM, OM1324SMM, OM1324NMM**

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Reference Voltage	$V_{REF}$	$V_{DIFF} = 3.0V, T_A = 25^\circ C$ $V_{DIFF} = 3.3V$ $V_{DIFF} = 40V$	1.238 • 1.225 • 1.225	1.262 1.270 1.270	V
Line Regulation (Note 1)	$R_{LINE}$	$3.0V V_{DIFF} 40V, V_{out} = V_{ref}, T_A = 25^\circ C$ $3.3V V_{DIFF} 40V, V_{out} = V_{ref}$	• -4.5 • -9	4.5 9	mV
Load Regulation (Note 1)	$R_{LOAD}$	$V_{DIFF} = 3.0V, 10mA I_L 1.5A, T_A = 25^\circ C$ $V_{DIFF} = 3.3V, 10mA I_L 1.5A$ $V_{DIFF} = 40V, 10mA I_L 300mA, T_A = 25^\circ C$ $V_{DIFF} = 40V, 10mA I_L 195mA$	• -15 • -15 • -15	15 15 15 15	mV
Thermal Regulation	$V_{RTH}$	$V_{in} = 14.6V, I_L = 1.5A$ $P_d = 20 Watts, t = 20 ms, T_A = 25^\circ C$	-5	5	mV
Ripple Rejection (Note 2)	$R_N$	$f = 120 Hz, V_{out} = V_{ref}$ $C_{Adj} = 10 \mu F$	• 66		dB
Adjustment Pin Current	$I_{Adj}$	$V_{DIFF} = 3.0V, T_A = 25^\circ C$ $V_{DIFF} = 3.3V$ $V_{DIFF} = 40V$	• • •	100 100 100	$\mu A$
Adjustment Pin Current Change	$I_{Adj}$	$V_{DIFF} = 3.0V, 10mA I_L 1.5A, T_A = 25^\circ C$ $V_{DIFF} = 3.3V, 10mA I_L 1.5A$ $V_{DIFF} = 40V, 10mA I_L 300mA, T_A = 25^\circ C$ $V_{DIFF} = 40V, 10mA I_L 195mA$ $3.0V V_{DIFF} 40V, T_A = 25^\circ C$ $3.3V V_{DIFF} 40V$	• • • • • •	-5 5 5 5 5 5	$\mu A$
Minimum Load Current	$I_{Lmin}$	$V_{DIFF} = 3.0V, V_{OUT} = 1.4V$ (forced) $V_{DIFF} = 3.3V, V_{OUT} = 1.4V$ (forced) $V_{DIFF} = 40V, V_{OUT} = 1.4V$ (forced)	• • •	5.0 5.0 5.0	mA
Current Limit (Note 2)	$I_{CL}$	$V_{DIFF} = 15V$ $V_{DIFF} = 40V, T_A = 25^\circ C$	• 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.

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PART NUMBER DESIGNATOR		
Standard Military Drawing Number	Omnirel Part Number	Omnirel Package Designation
7703405M 7703405U 7703405T 7703405Y 7703405N 77034052	OM1324SMM OM1324STM OM1324NTM OM1324 NKM OM1324NMM OM1324N2M	SMD-3 TO-257 (Isolated) TO-257 (non-Isolated) TO-3 SMD-1 LCC-20



**ELECTRICAL CHARACTERISTICS** -55°C T<sub>A</sub> 125°C, I<sub>L</sub> = 8mA (unless otherwise specified)  
**OM1324N2M**

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	1.238	1.262	V
		V <sub>DIFF</sub> = 3.3V	• 1.225	1.270	
		V <sub>DIFF</sub> = 40V	• 1.225	1.270	
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	-4.5	4.5	mV
		3.3V V <sub>DIFF</sub> 40V, V <sub>out</sub> = V <sub>ref</sub>	• -9	9	
Load Regulation (Note 1)	R <sub>LOAD</sub>	V <sub>DIFF</sub> = 3.0V, 10mA I <sub>L</sub> 500 mA, T <sub>A</sub> = 25°C	-15	15	mV
		V <sub>DIFF</sub> = 3.3V, 10mA I <sub>L</sub> 500 mA	• -15	15	
		V <sub>DIFF</sub> = 40V, 10mA I <sub>L</sub> 150 mA, T <sub>A</sub> = 25°C	-15	15	
		V <sub>DIFF</sub> = 40V, 10mA I <sub>L</sub> 100 mA	• -15	15	
Thermal Regulation	V <sub>RTH</sub>	V <sub>in</sub> = 14.6V, I <sub>L</sub> = 300 mA P <sub>d</sub> = 4.0 Watts, t = 20 ms, T <sub>A</sub> = 25°C	-2	2	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	I <sub>Adj</sub>	V <sub>DIFF</sub> = 3.0V, 10mA I <sub>L</sub> 500 mA, T <sub>A</sub> = 25°C	-5	5	μA
		V <sub>DIFF</sub> = 3.3V, 10mA I <sub>L</sub> 500 mA	• -5	5	
		V <sub>DIFF</sub> = 40V, 10mA I <sub>L</sub> 150mA, T <sub>A</sub> = 25°C	-5	5	
		V <sub>DIFF</sub> = 40V, 10mA I <sub>L</sub> 100mA	• -5	5	
		3.0V V <sub>DIFF</sub> 40V, T <sub>A</sub> = 25°C 3.3V V <sub>DIFF</sub> 40V	• -5	5	
Minimum Load Current	I <sub>Lmin</sub>	V <sub>DIFF</sub> = 3.0V, V <sub>OUT</sub> = 1.4V (forced)		5.0	mA
		V <sub>DIFF</sub> = 3.3V, V <sub>OUT</sub> = 1.4V (forced)	•	5.0	
		V <sub>DIFF</sub> = 40V, V <sub>OUT</sub> = 1.4V (forced)	•	5.0	
Current Limit (Note 2)	I <sub>CL</sub>	V <sub>DIFF</sub> = 15V	• 0.5	1.65	A
		V <sub>DIFF</sub> = 40V, T <sub>A</sub> = 25°C	0.15	0.65	

**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.

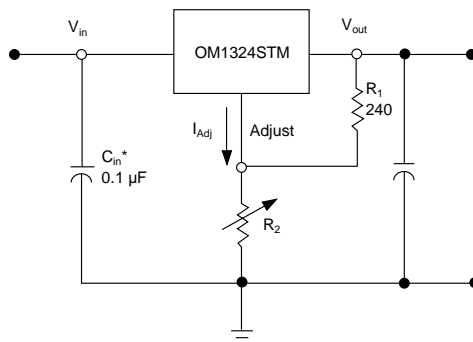
**APPLICATION**

\* C<sub>in</sub> is required if regulator is located an appreciable distance from power supply filter.

\*\* C<sub>o</sub> is not needed for stability, however it does improve transient response.

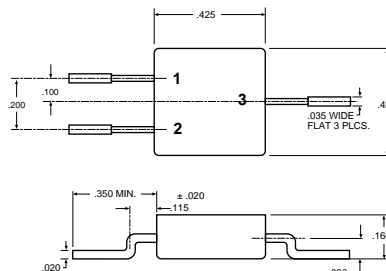
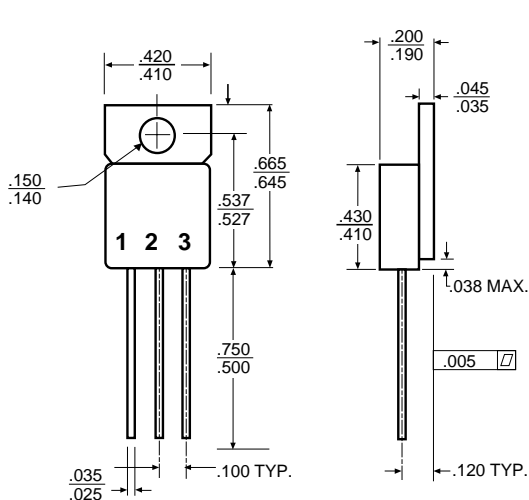
$$V_{out} = 1.25 V \left( 1 + \frac{R_2}{R_1} \right) + I_{Adj} R_2$$

Since I<sub>Adj</sub> is controlled to less than 100 μA, the error associated with this term is negligible in most applications.



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### MECHANICAL OUTLINE

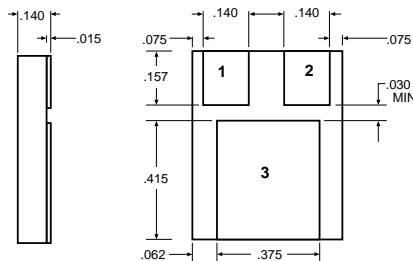


#### OM1324SMM

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

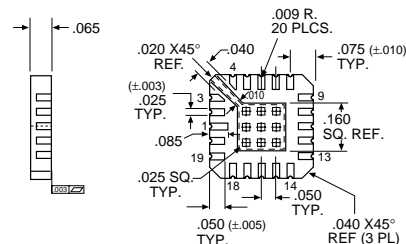
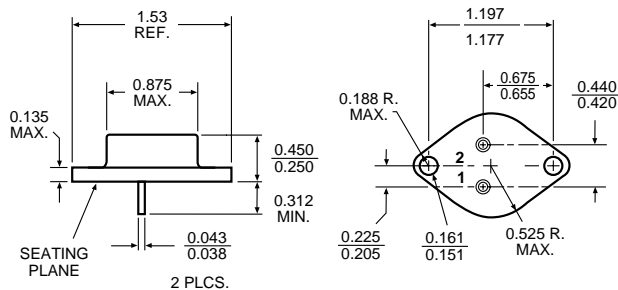
**OM1324STM**  
 Isolated  
 Front View  
 Pin 1 - Adjust  
 Pin 2 - Output  
 Pin 3 - Input  
 Tab - Isolated

**OM1324NTM**  
 Non-Isolated  
 Front View  
 Pin 1 - Adjust  
 Pin 2 - Output  
 Pin 3 - Input  
 Tab - Output



#### OM1324NMM

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



#### OM1324N2M

Pin 1	V <sub>OUT</sub> (Sense)	Pin 11	NC
Pin 2	NC	Pin 12	NC
Pin 3	NC	Pin 13	NC
Pin 4	NC	Pin 14	NC
Pin 5	V <sub>IN</sub>	Pin 15	NC
Pin 6	NC	Pin 16	NC
Pin 7	NC	Pin 17	NC
Pin 8	NC	Pin 18	NC
Pin 9	NC	Pin 19	NC
Pin 10	ADJUST	Pin 20	V <sub>OUT</sub>

**OM1324NKM**  
 Pin 1 - Adjust  
 Pin 2 - Input  
 Case - Output

For additional information please see the mechanical outline section.