

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 .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 $+150^\circ\text{C}$

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

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 25 A

Case-All Others. 1.5A

Recommended Operating Conditions:

Output Voltage Range 1.2 to 37 VDC

Ambient Operating Temperature Range (T_A). -55°C to $+125^\circ\text{C}$

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°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°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°C V _{DIFF} = 3.3V, 10mA ≤ I _L ≤ 1.5A V _{DIFF} = 40V, 10mA ≤ I _L ≤ 300mA, T _A = 25°C V _{DIFF} = 40V, 10mA ≤ I _L ≤ 195mA	-15 -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°C	-5	5	mV
Ripple Rejection (Note 2)	R _N	f = 120 Hz, V _{out} = V _{ref} C _{Adj} = 10 μF	• 66		dB
Adjustment Pin Current	I _{Adj}	V _{DIFF} = 3.0V, T _A = 25°C V _{DIFF} = 3.3V V _{DIFF} = 40V		100 100 100	μA
Adjustment Pin Current Change	ΔI _{Adj}	V _{DIFF} = 3.0V, 10mA ≤ I _L ≤ 1.5A, T _A = 25°C V _{DIFF} = 3.3V, 10mA ≤ I _L ≤ 1.5A V _{DIFF} = 40V, 10mA ≤ I _L ≤ 300mA, T _A = 25°C V _{DIFF} = 40V, 10mA ≤ I _L ≤ 195mA 3.0V ≤ V _{DIFF} ≤ 40V, T _A = 25°C 3.3V ≤ V _{DIFF} ≤ 40V	• -5 • -5 • -5 • -5 • -5 • -5	5 5 5 5 5 5	μA
Mimumin 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°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 $-55^{\circ}\text{C} \leq T_A \leq 125^{\circ}\text{C}$, $I_L = 8\text{mA}$ (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 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	μA
Adjustment Pin Current Change	ΔI_{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 5 5	μA
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:

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.

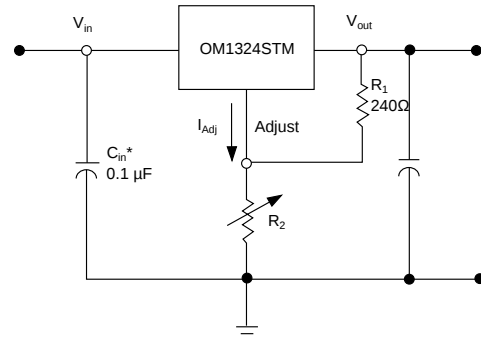
APPLICATION

* C_{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.

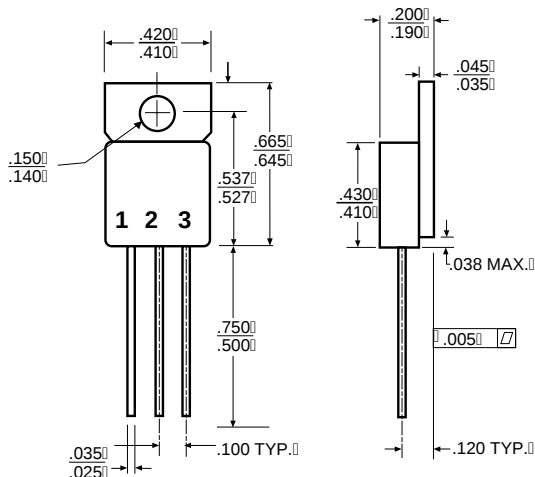
$$V_{out} = 1.25\text{ V} \left(1 + \frac{R_2}{R_1}\right) + I_{Adj} R_2$$

Since I_{Adj} is controlled to less than 100 μA , the error associated with this term is negligible in most applications.



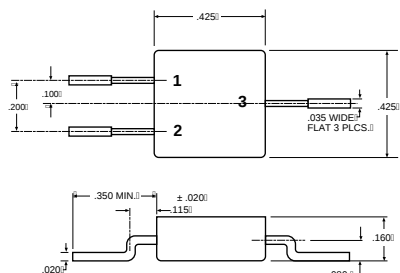
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MECHANICAL OUTLINE

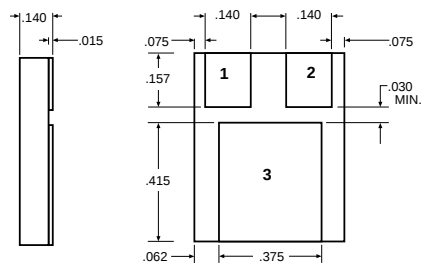


OM1324STM
Isolated
Front View
Pin 1 - Adjust
Pin 2 - Output
Pin 3 - Input
Tab - Isolated

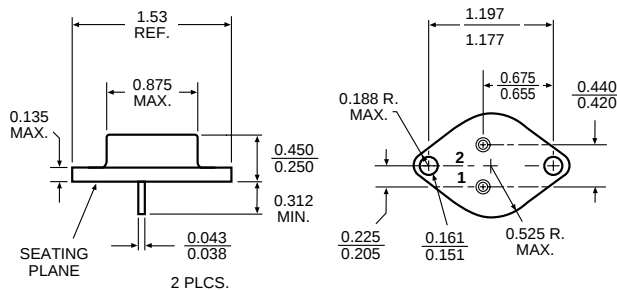
OM1324NTM
Non-Isolated
Front View
Pin 1 - Adjust
Pin 2 - Output
Pin 3 - Input
Tab - Output



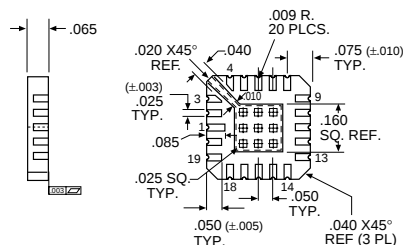
OM1324SMM
Front View
Pin 1 - Adjust
Pin 2 - Input
Pin 3 - Output
Case - Isolated



OM1324NMM
Pin 1 - Adjust
Pin 2 - Input
Pin 3 - Output



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



OM1324N2M

Pin 1	V _{OUT} (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 _{IN}	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 _{OUT}

For additional information please see the mechanical outline section.