

1.5 AMP POSITIVE ADJUSTABLE VOLTAGE REGULATOR APPROVED TO DESC DRAWING 7703402



Three Terminal, Precision Adjustable Positive Voltage Regulator In Hermetic Style Packages (LM117HV)

FEATURES

- Similar To Industry Standard LM117HV
- Approved To DESC Standardized Military Drawing Number 7703402
- Built In Thermal Overload Protection
- Short Circuit Current Limiting
- Available In Six Package Styles

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 57 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.	1.5 A

Recommended Operating Conditions:

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 $-55^{\circ}\text{C} \leq T_A \leq 125^{\circ}\text{C}$, $I_L = 8\text{mA}$ (unless otherwise specified)**OM1321NTM, OM1321STM, OM1321NKM, OM1321SMM, OM1321NMM**

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Reference Voltage	V_{REF}	$V_{DIFF} = 3.0\text{V}$, $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 3.3\text{V}$ • $V_{DIFF} = 40\text{V}$ • $V_{DIFF} = 60\text{V}$ •	1.20 1.20 1.20 1.20	1.30 1.30 1.30 1.30	V
Line Regulation (Note 1)	R_{LINE}	$3.0\text{V} \leq V_{DIFF} \leq 40\text{V}$, $V_{out} = V_{ref}$, $T_A = 25^{\circ}\text{C}$ $3.3\text{V} \leq V_{DIFF} \leq 40\text{V}$, $V_{out} = V_{ref}$ • $40\text{V} \leq V_{DIFF} \leq 60\text{V}$, $V_{out} = V_{ref}$, $T_A = 25^{\circ}\text{C}$ $40\text{V} \leq V_{DIFF} \leq 60\text{V}$, $V_{out} = V_{ref}$ •	-9 -23 -5 -10	9 23 5 10	mV
Load Regulation (Note 1)	R_{LOAD}	$V_{DIFF} = 3.0\text{V}$, $10\text{mA} \leq I_L \leq 1.5\text{A}$, $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 3.3\text{V}$, $10\text{mA} \leq I_L \leq 1.5\text{A}$ • $V_{DIFF} = 40\text{V}$, $10\text{mA} \leq I_L \leq 300\text{mA}$, $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 40\text{V}$, $10\text{mA} \leq I_L \leq 195\text{mA}$ • $V_{DIFF} = 60\text{V}$, $10\text{mA} \leq I_L \leq 30\text{mA}$ •	-15 -15 -15 -15 -15	15 15 15 15 15	mV
Thermal Regulation	V_{RTH}	$V_{in} = 14.6\text{V}$, $I_L = 1.5\text{A}$ $P_d = 20\text{ Watts}$, $t = 20\text{ ms}$, $T_A = 25^{\circ}\text{C}$	-16	16	mV
Ripple Rejection (Note 2)	R_N	$f = 120\text{ Hz}$, $V_{out} = V_{ref}$ • $C_{adj} = 10\text{ }\mu\text{F}$, $I_{out} = 100\text{ mA}$	66		dB
Adjustment Pin Current	I_{Adj}	$V_{DIFF} = 3.0\text{V}$, $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 3.3\text{V}$ • $V_{DIFF} = 40\text{V}$ • $V_{DIFF} = 60\text{V}$ •		100 100 100 100	μA
Adjustment Pin Current Change	ΔI_{Adj}	$V_{DIFF} = 3.0\text{V}$, $10\text{mA} \leq I_L \leq 1.5\text{A}$, $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 3.3\text{V}$, $10\text{mA} \leq I_L \leq 1.5\text{A}$ • $V_{DIFF} = 40\text{V}$, $10\text{mA} \leq I_L \leq 300\text{mA}$, $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 40\text{V}$, $10\text{mA} \leq I_L \leq 195\text{mA}$ • $3.0\text{V} \leq V_{DIFF} \leq 40\text{V}$, $T_A = 25^{\circ}\text{C}$ $3.3\text{V} \leq V_{DIFF} \leq 40\text{V}$ • $3.3\text{V} \leq V_{DIFF} \leq 60\text{V}$ •	-5 -5 -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) • $V_{DIFF} = 60\text{V}$, $V_{out} = 1.4\text{V}$ (forced) •		5.0 5.0 5.0 7.0	mA
Current Limit (Note 2)	I_{CL}	$V_{DIFF} = 5\text{V}$ • $V_{DIFF} = 40\text{V}$, $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 60\text{V}$, $T_A = 25^{\circ}\text{C}$	1.5 0.3 0.05	3.5 1.5 0.50	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.

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PART NUMBER DESIGNATOR		
Standard Military Drawing Number	Omnirel Part Number	Omnirel Package Designation
7703402M 7703402U 7703402T 7703402Y 7703402N 7703402Z	OM1321SMM OM1321STM OM1321NTM OM1321 NKM OM1321NMM OM1321N2M	SMD-3 TO-257 (Isolated) TO-257 (non-Isolated) TO-3 SMD-1 LCC-20



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

OM1321N2M

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 V _{DIFF} = 60V	1.20 1.20 1.20 1.20	1.30 1.30 1.30 1.30	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} 40V ≤ V _{DIFF} ≤ 60V, V _{out} = V _{ref} , T _A = 25°C 40V ≤ V _{DIFF} ≤ 60V, V _{out} = V _{ref}	-9 -23 -5 -10	9 23 5 10	mV
Load Regulation (Note 1)	R _{LOAD}	V _{DIFF} = 3.0V, 10mA ≤ I _L ≤ 500 mA, T _A = 25°C V _{DIFF} = 3.3V, 10mA ≤ I _L ≤ 500 mA V _{DIFF} = 40V, 10mA ≤ I _L ≤ 150 mA, T _A = 25°C V _{DIFF} = 40V, 10mA ≤ I _L ≤ 100 mA V _{DIFF} = 60V, 10mA ≤ I _L ≤ 20 mA	-15 -15 -15 -15 -15	15 15 15 15 15	mV
Thermal Regulation	V _{RTH}	V _{in} = 14.6V, I _L = 300 mA P _d = 4.0 Watts, t = 20 ms, T _A = 25°C	-3.1	3.1	mV
Ripple Rejection (Note 2)	R _N	f = 120 Hz, V _{out} = V _{ref} C _{Adj} = 10 μF, I _{out} = 100 mA	66		dB
Adjustment Pin Current	I _{Adj}	V _{DIFF} = 3.0V, T _A = 25°C V _{DIFF} = 3.3V V _{DIFF} = 40V V _{DIFF} = 60V		100 100 100 100	μA
Adjustment Pin Current Change	ΔI _{Adj}	V _{DIFF} = 3.0V, 10mA ≤ I _L ≤ 500 mA, T _A = 25°C V _{DIFF} = 3.3V, 10mA ≤ I _L ≤ 500 mA V _{DIFF} = 40V, 10mA ≤ I _L ≤ 150 mA, T _A = 25°C V _{DIFF} = 40V, 10mA ≤ I _L ≤ 100 mA 3.0V ≤ V _{DIFF} ≤ 40V, T _A = 25°C 3.3V ≤ V _{DIFF} ≤ 40V 3.3V ≤ V _{DIFF} ≤ 60V	-5 -5 -5 -5 -5 -5 -5	5 5 5 5 5 5 5	μA
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) V _{DIFF} = 60V, V _{out} = 1.4V (forced)		5.0 5.0 5.0 7.0	mA
Current Limit (Note 2)	I _{CL}	V _{DIFF} = 5V V _{DIFF} = 40V, T _A = 25°C V _{DIFF} = 60V, T _A = 25°C	0.5 0.15 0.02	1.65 0.65 0.28	A

Notes: Please see previous page.

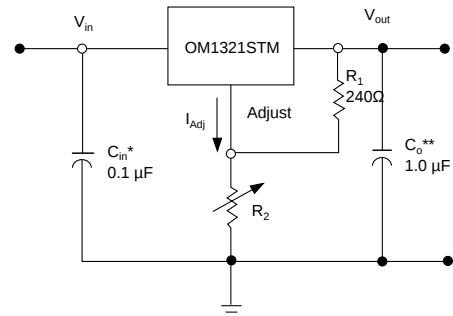
STANDARD APPLICATION

* 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.

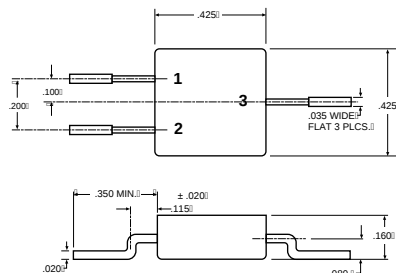
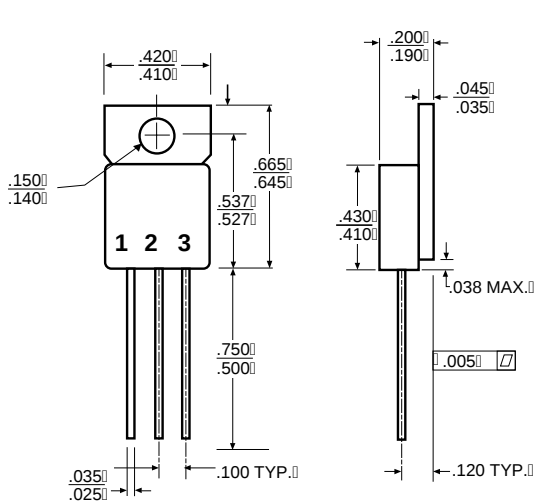
$$V_{out} = 1.25 V \left(1 + \frac{R_2}{R_1} \right) + I_{Adj} R_2$$

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



OM1321SMM

Front View

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

OM1321STM

Isolated

Front View

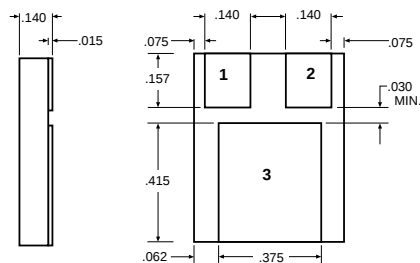
Pin 1 - Adjust
Pin 2 - Output
Pin 3 - Input
Tab - Isolated

OM1321NTM

Non-Isolated

Front View

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

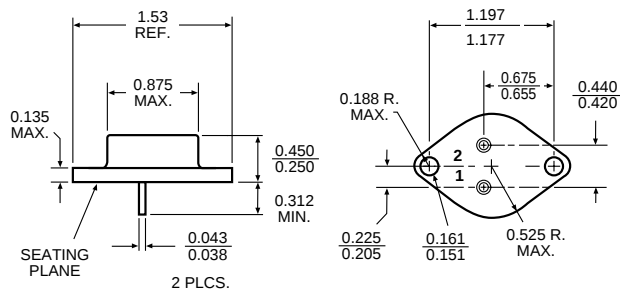


OM1321NMM

Pin 1 - Adjust

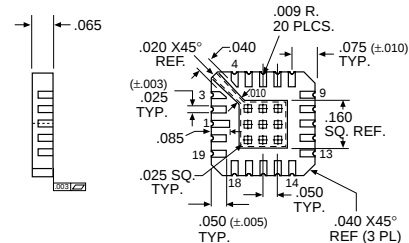
Pin 2 - Input

Pin 3 - Output



OM1321NKM

Pin 1 - Adjust
Pin 2 - Input
Case - Output



OM1321N2M

Pin 1 NC	Pin 11 V_{IN}
Pin 2 NC	Pin 12 V_{OUT}
Pin 3 NC	Pin 13 V_{OUT}
Pin 4 NC	Pin 14 $V_{OUT}(\text{Sense})$
Pin 5 NC	Pin 15 NC
Pin 6 NC	Pin 16 NC
Pin 7 NC	Pin 17 NC
Pin 8 NC	Pin 18 Adjust
Pin 9 NC	Pin 19 NC
Pin 10 NC	Pin 20 V_{IN}