

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

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. 1.5 A

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

3.5

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.

3.5

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.

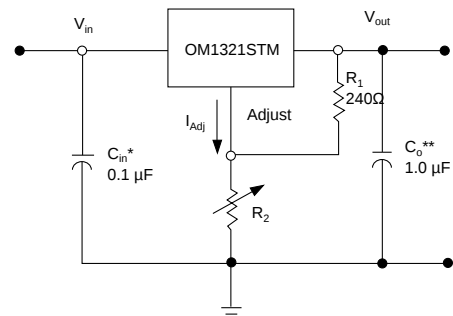
STANDARD APPLICATION

* 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.

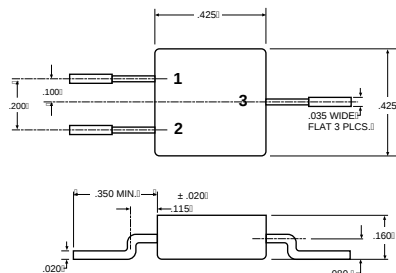
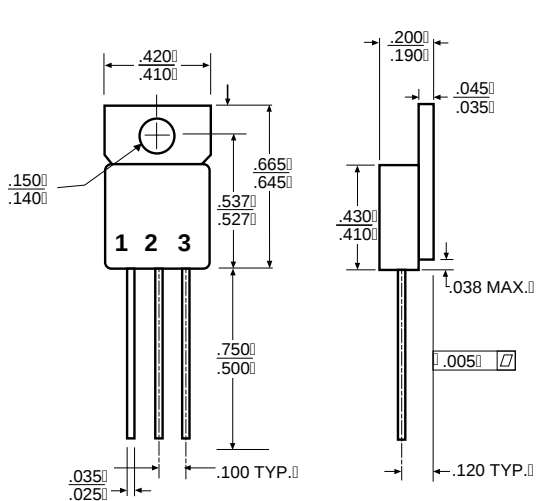
$$V_{out} = 1.25 V \left(1 + \frac{R_2}{R_1} \right) + I_{Adj} R_2$$

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



3.5

MECHANICAL OUTLINE



OM1321SMM

Front View

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

OM1321STM

Isolated

Front View

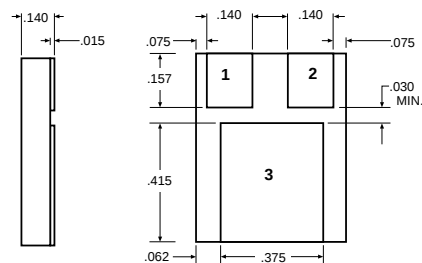
Pin 1 - Adjust
Pin 2 - Output
Pin 3 - Input
Tab - Isolated

OM1321NTM

Non-Isolated

Front View

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

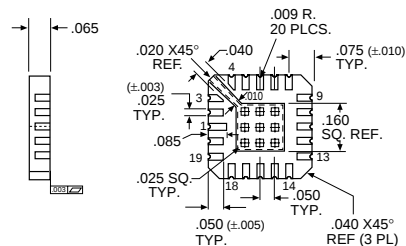
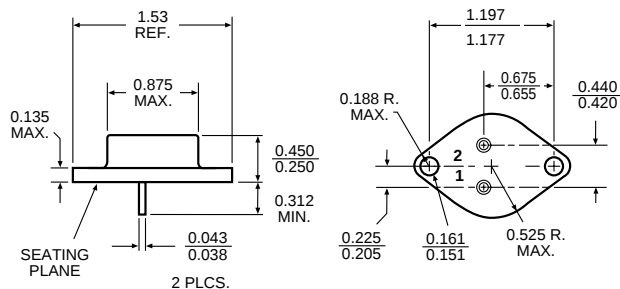


OM1321NMM

Pin 1 - Adjust

Pin 2 - Input

Pin 3 - Output



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} (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}

3.5

OM1321NKM

Pin 1 - Adjust

Pin 2 - Input

Case - Output

For additional information please see the mechanical outline section.