

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

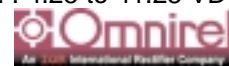
DESCRIPTION

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
<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, $I_L = 8\text{mA}$ (unless otherwise specified)
OM1321NTM, OM1321STM, OM1321NKM, OM1321SMM, OM1321NMM

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

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
7703402M	OM1321SMM	SMD-3
7703402U	OM1321STM	TO-257 (Isolated)
7703402T	OM1321NTM	TO-257 (non-Isolated)
7703402Y	OM1321 NKM	TO-3
7703402N	OM1321NMM	SMD-1
7703402Z	OM1321N2M	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	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	I _{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	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.

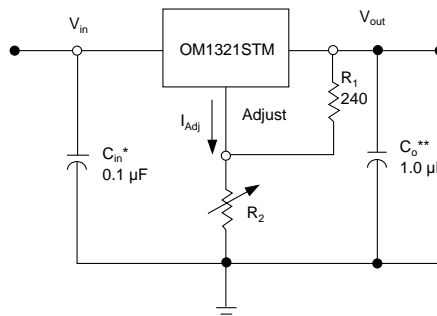
STANDARD APPLICATION

* 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.

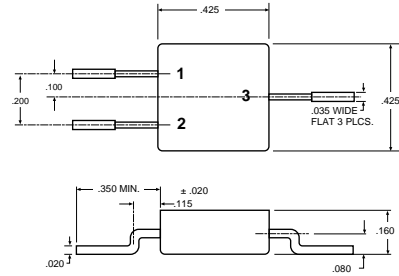
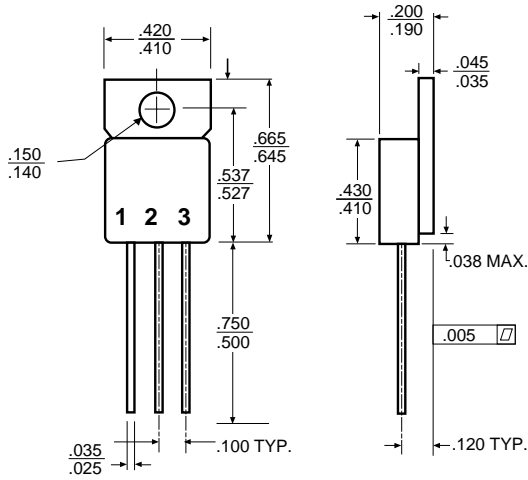
$$V_{out} = 1.25 V \left(1 + \frac{R_2}{R_1} \right) + I_{Adj} R_2$$

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

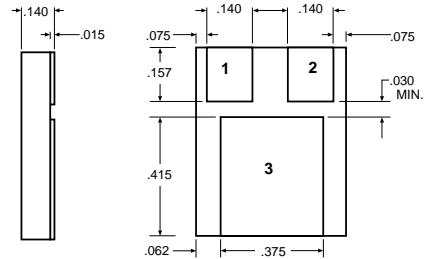
Front View
Pin 1 - Adjust
Pin 2 - Input
Pin 3 - Output
Tab - Isolated

OM1321STM

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

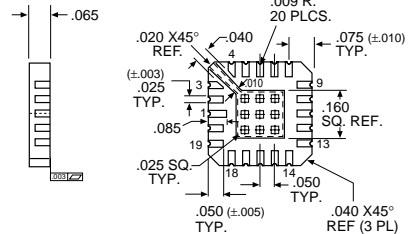
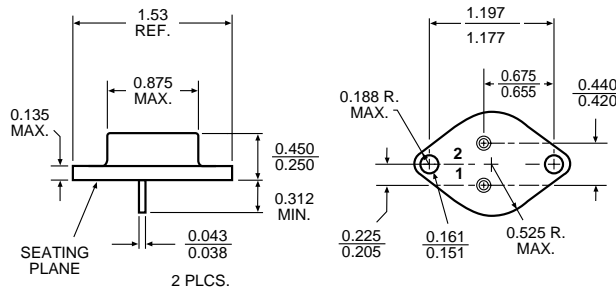
OM1321NTM

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



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}

OM1321NKM

Pin 1 - Adjust
Pin 2 - Input
Case - Output

For additional information please see the mechanical outline section.