

# 1.5 AMP NEGATIVE ADJUSTABLE VOLTAGE REGULATOR APPROVED TO DESC DRAWING 7703404



**Three Terminal, Precision Adjustable  
 Negative Voltage Regulator In Hermetic  
 Style Packages (LM137HV)**

## FEATURES

- Similar To Industry Standard LM137HV
- Approved To DESC Standardized Military Drawing Number 7703404
- Built In Thermal Overload Protection
- Short Circuit Current Limiting
- Available In Six Package Styles

## DESCRIPTION

These three terminal negative 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 -47 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 . . . . . 50 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

Recommended Operating Conditions:

Output Voltage Range . . . . .	-1.2 to -47 VDC
Ambient Operating Temperature Range ( $T_A$ ). . . . .	- 55°C to + 125°C
Input Voltage Range . . . . .	-4.25 to -51.25 VDC

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**ELECTRICAL CHARACTERISTICS** -55°C T<sub>A</sub> 125°C, I<sub>L</sub> = 8mA (unless otherwise specified)  
**OM1323NTM, OM1323STM, OM1323NKM, OM1323SMM, OM1323NMM**

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	-1.275	-1.225	V
		V <sub>DIFF</sub>   = 3.0V	-1.30	-1.20	
		V <sub>DIFF</sub>   = 50V, T <sub>A</sub> = 25°C	-1.275	-1.225	
		V <sub>DIFF</sub>   = 50V	-1.30	-1.20	
Line Regulation (Note 1)	R <sub>LINE</sub>	3.0 V  V <sub>DIFF</sub>   40V, T <sub>A</sub> = 25°C	-10 -25	10 25	mV
Load Regulation (Note 1)	R <sub>LOAD</sub>	V <sub>DIFF</sub>   = 5.0V, 8mA I <sub>L</sub> 110mA T <sub>A</sub> = 25°C	-25	25	mV
		V <sub>DIFF</sub>   = 5V, 8mA I <sub>L</sub> 1.5A, T <sub>A</sub> = 25°C	-25 -45	25 45	
Thermal Regulation	V <sub>RTH</sub>	V <sub>in</sub> = -14.6V, I <sub>L</sub> = 1.5A P <sub>d</sub> = 20 Watts, t = 10 ms, T <sub>A</sub> = 25°C	-5	5	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		100	μA
		V <sub>DIFF</sub>   = 40V		100	
		V <sub>DIFF</sub>   = 50V		100	
Adjustment Pin Current Change	I <sub>Adj</sub>	V <sub>DIFF</sub>   = 5V, 8mA I <sub>L</sub> 1.5A	-5	5	μA
		3 V  V <sub>DIFF</sub>   50V	-6	6	
Minimum Load Current	I <sub>Lmin</sub>	V <sub>DIFF</sub>   = 3.0V, V <sub>out</sub> = -1.4V (forced)		3.0	mA
		V <sub>DIFF</sub>   = 10V, V <sub>out</sub> = -1.4V (forced)		3.0	
		V <sub>DIFF</sub>   = 40V, V <sub>out</sub> = -1.4V (forced)		5.0	
		V <sub>DIFF</sub>   = 50V, V <sub>out</sub> = -1.4V (forced)		5.0	
Current Limit (Note 2)	I <sub>CL</sub>	V <sub>DIFF</sub>   = 5V	1.5	3.5	A
		V <sub>DIFF</sub>   = 50V, T <sub>A</sub> = 25°C	0.2	1.0	

**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.

PART NUMBER DESIGNATOR		
Standard Military Drawing Number	Omnirel Part Number	Omnirel Package Designation
7703404M 7703404U 7703404T 7703404Y 7703404N 77034042	OM1323SMM OM1323STM OM1323NTM OM1323NKM OM1323NMM OM1323N2M	SMD-3 TO-257 (Isolated) TO-257 (non-Isolated) TO-3 SMD-1 LCC-20

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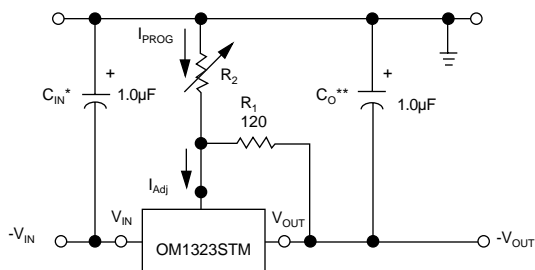


**ELECTRICAL CHARACTERISTICS** -55°C  $T_A$  125°C,  $I_L = 8\text{mA}$  (unless otherwise specified)  
**OM1323N2M**

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Reference Voltage	$V_{REF}$	$ V_{DIFF}  = 3.0\text{V}, T_A = 25^\circ\text{C}$	-1.275	-1.225	V
		$ V_{DIFF}  = 3.0\text{V}$	-1.30	-1.20	
		$ V_{DIFF}  = 40\text{V}, T_A = 25^\circ\text{C}$	-1.275	-1.225	V
		$ V_{DIFF}  = 40\text{V}$	-1.30	-1.20	
		$ V_{DIFF}  = 50\text{V}, T_A = 25^\circ\text{C}$	-1.275	-1.225	
		$ V_{DIFF}  = 50\text{V}$	-1.30	-1.20	
Line Regulation (Note 1)	$R_{LINE}$	3.0 V $ V_{DIFF} $ 40V, $T_A = 25^\circ\text{C}$	-10	10	mV
			-25	25	
Load Regulation (Note 1)	$R_{LOAD}$	$ V_{DIFF}  = 5.0\text{V}, 8\text{mA } I_L 100\text{mA}$ $T_A = 25^\circ\text{C}$	-25	25	mV
		$ V_{DIFF}  = 5\text{V}, 8\text{mA } I_L 500\text{mA}, T_A = 25^\circ\text{C}$	-31	31	
			-50	50	
Thermal Regulation	$V_{RTH}$	$V_{in} = -16.25\text{V}, I_L = 330\text{mA}$ $P_d = 5\text{ Watts}, t = 10\text{ ms}, T_A = 25^\circ\text{C}$	-2	2	mV
Ripple Rejection (Note 2)	$R_N$	$f = 120\text{ Hz}, V_{out} = V_{ref}$ $C_{Adj} = 10\ \mu\text{F}$	66		dB
Adjustment Pin Current	$I_{Adj}$	$ V_{DIFF}  = 3.0\text{V}$		100	$\mu\text{A}$
		$ V_{DIFF}  = 40\text{V}$		100	
		$ V_{DIFF}  = 50\text{V}$		100	
Adjustment Pin Current Change	$I_{Adj}$	$ V_{DIFF}  = 5\text{V}, 8\text{mA } I_L 200\text{mA}$	-5	5	$\mu\text{A}$
		3 V $ V_{DIFF} $ 50V	-6	6	
Minimum Load Current	$I_{Lmin}$	$ V_{DIFF}  = 3.0\text{V}, V_{out} = -1.4\text{V (forced)}$		3.0	mA
		$ V_{DIFF}  = 10\text{V}, V_{out} = -1.4\text{V (forced)}$		3.0	
		$ V_{DIFF}  = 40\text{V}, V_{out} = -1.4\text{V (forced)}$		5.0	
		$ V_{DIFF}  = 50\text{V}, V_{out} = -1.4\text{V (forced)}$		5.0	
Current Limit (Note 2)	$I_{CL}$	$ V_{DIFF} $ 5V	0.5	1.8	A
		$ V_{DIFF}  = 50\text{V}, T_A = 25^\circ\text{C}$	0.1	0.65	

Notes: Please see previous page.

**TYPICAL APPLICATIONS**



\*  $C_{in}$  is required if regulator is located more than 4 inches from power supply filter. A 1  $\mu\text{F}$  solid tantalum or 10  $\mu\text{F}$  aluminum electrolytic is recommended.

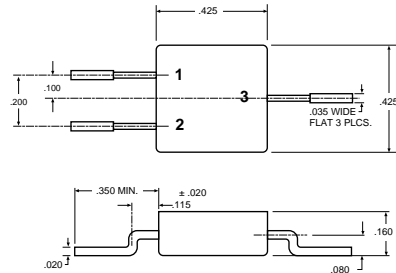
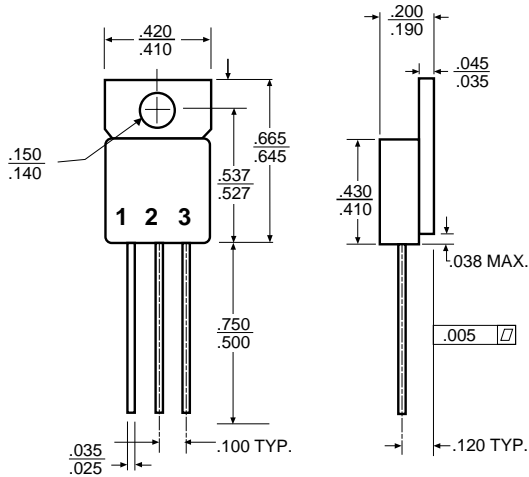
\*\*  $C_o$  is necessary for stability. A 1  $\mu\text{F}$  solid tantalum or 10  $\mu\text{F}$  aluminum electrolytic is recommended.

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

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### MECHANICAL OUTLINE

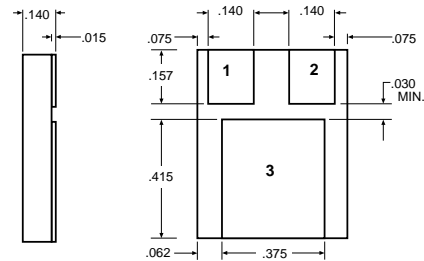


#### OM1323SMM

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

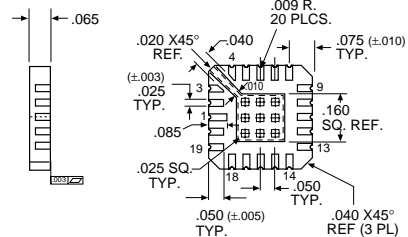
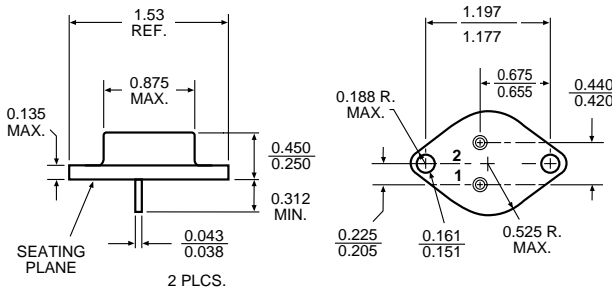
**OM1323STM**  
 Isolated  
 Front View  
 Pin 1 - Adjust  
 Pin 2 - Input  
 Pin 3 - Output  
 Tab - Isolated

**OM1323NTM**  
 Non-Isolated  
 Front View  
 Pin 1 - Adjust  
 Pin 2 - Input  
 Pin 3 - Output  
 Tab - Input



#### OM1323NMM

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



#### OM1323N2M

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

**OM1323NKM**  
 Pin 1 - Adjust  
 Pin 2 - Output  
 Case - Input

For additional information please see the mechanical outline section.

