

1.5 AMP NEGATIVE ADJUSTABLE VOLTAGE REGULATOR APPROVED TO DESC DRAWING 7703406



**Three Terminal, Precision Adjustable
 Negative Voltage Regulator In Hermetic
 Style Packages (LM137A)**

FEATURES

- Similar To Industry Standard LM137A
- Approved To DESC Standardized Military Drawing Number 7703406
- 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 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 -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°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 25 A
Case-All Others.	1.5A
<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

3.3

OM1325NTM, OM1325STM, OM1325NKM, OM1325SMM, OM1325NMM, OM1325N2M

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

OM1325NTM, OM1325STM, OM1325NKM, OM1325SMM, OM1325NMM

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Reference Voltage	V_{REF}	$V_{DIFF} = 3.0\text{V}$, $T_A = 25^\circ\text{C}$	-1.262	-1.238	V
		$V_{DIFF} = 3.0\text{V}$ •	-1.280	-1.220	
		$V_{DIFF} = 40\text{V}$ •	-1.280	-1.220	
Line Regulation (Note 1)	R_{LINE}	3.0 V V_{DIFF} 40V, $T_A = 25^\circ\text{C}$	-4.5	4.5	mV
		3.0V V_{DIFF} 40V •	-13.8	13.8	
Load Regulation (Note 1)	R_{LOAD}	$V_{DIFF} = 5\text{V}$, 8mA I_L 1.5A •	-25	25	mV
		$V_{DIFF} = 12\text{V}$, 8mA I_L 1.5A, $T_A = 25^\circ\text{C}$	-25	25	
		$V_{DIFF} = 40\text{V}$, 8mA I_L 1.5A, $T_A = 25^\circ\text{C}$	-25	25	
		$V_{DIFF} = 40\text{V}$, 8mA I_L 1.5A •	-50	50	
Thermal Regulation	V_{RTH}	$V_{in} = -14.6\text{V}$, $I_L = 1.5\text{A}$ $P_d = 20$ Watts, $t = 10$ ms, $T_A = 25^\circ\text{C}$	-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}	$V_{DIFF} = 3.0\text{V}$ •		100	μA
		$V_{DIFF} = 40\text{V}$ •		100	
Adjustment Pin Current Change	$^3I_{Adj}$ (line)	3V V_{DIFF} 40V •	-5	5	μA
	$^3I_{Adj}$ (load)	$V_{DIFF} = 5\text{V}$, 8mA I_L 1.5A •	-5	5	μA
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	
Current Limit (Note 2)	I_{CL}	$V_{DIFF} = 5\text{V}$ •	1.5	3.5	A
		$V_{DIFF} = 40\text{V}$, $T_A = 25^\circ\text{C}$	0.24	1.2	

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
7703406M	OM1325SMM	SMD-3
7703406U	OM1325STM	TO-257 (Isolated)
7703406T	OM1325NTM	TO-257 (non-Isolated)
7703406Y	OM1325NKM	TO-3
7703406N	OM1325NMM	SMD-1
77034062	OM1325N2M	LCC-20

OM1325NTM, OM1325STM, OM1325NKM, OM1325SMM, OM1325NMM, OM1325N2M

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

OM1325N2M

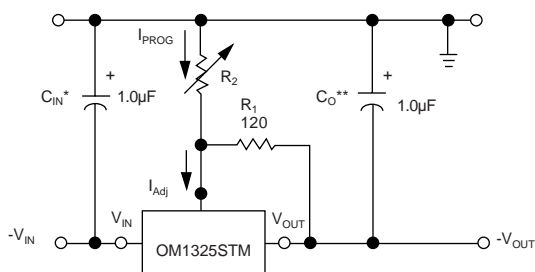
Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Reference Voltage	V_{REF}	$V_{DIFF} = 3.0\text{V}, T_A = 25^\circ\text{C}$	-1.262	-1.238	V
		$V_{DIFF} = 3.0\text{V}$ •	-1.280	-1.220	
		$V_{DIFF} = 40\text{V}$ •	-1.280	-1.220	
Line Regulation (Note 1)	R_{LINE}	$3.0\text{V } V_{DIFF} \text{ 40V}, T_A = 25^\circ\text{C}$	-4.5	4.5	mV
		$3.0\text{V } V_{DIFF} \text{ 40V}$ •	-13.8	13.8	
Load Regulation (Note 1)	R_{LOAD}	$V_{DIFF} = 5\text{V}, 8\text{mA } I_L \text{ 200 mA}$ •	-25	25	mV
		$V_{DIFF} = 15\text{V}, 8\text{mA } I_L \text{ 200mA}, AT_A = 25^\circ\text{C}$	-25	25	
		$V_{DIFF} \text{ 40V}, 8\text{mA } I_L \text{ 150 mA}, AT_A = 25^\circ\text{C}$	-25	25	
		$V_{DIFF} = 40\text{V}, 8\text{mA } I_L \text{ 50 mA}$ •	-50	50	
Thermal Regulation	V_{RTH}	$V_{in} = -16.25\text{V}, I_L = 330\text{ mA}$ $P_d = 5\text{ Watts}, t = 10\text{ ms}, T_A = 25^\circ\text{C}$	-5	5	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}	$V_{DIFF} = 3.0\text{V}$ •		100	μA
		$V_{DIFF} = 40\text{V}$ •		100	
Adjustment Pin Current Change	$^3I_{Adj}$ (line)	$3\text{V } V_{DIFF} \text{ 40V}$ •	-5	5	μA
	$^3I_{Adj}$ (load)	$V_{DIFF} = 5\text{V}, 8\text{mA } I_L \text{ 500 mA}$ •	-5	5	μA
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	
Current Limit (Note 2)	I_{CL}	$V_{DIFF} \text{ 5V}$ •	0.5	1.8	A
		$V_{DIFF} = 40\text{V}, T_A = 25^\circ\text{C}$	0.15	0.65	

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.

3.3

TYPICAL APPLICATION



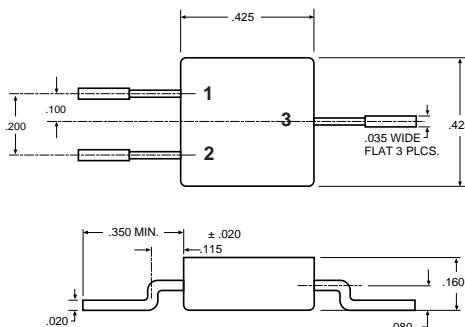
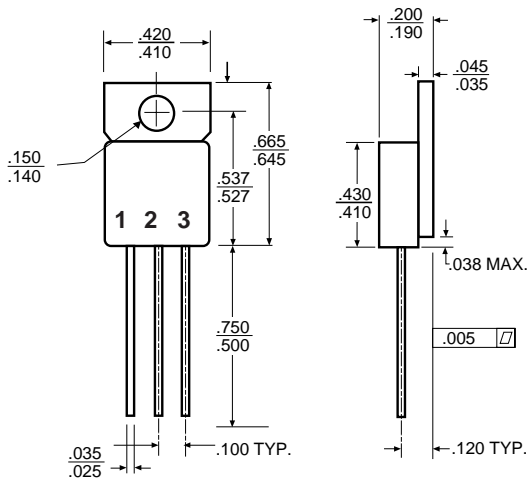
* C_{in} is required if regulator is located more than 4 inches from power supply filter. A 1 μF solid tantalum or 10 μF aluminum electrolytic is recommended.

** C_o is necessary for stability. A 1 μF solid tantalum or 10 μF aluminum electrolytic is recommended.

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

OM1325NTM, OM1325STM, OM1325NKM, OM1325SMM, OM1325NMM, OM1325N2M

MECHANICAL OUTLINE



OM1325SMM

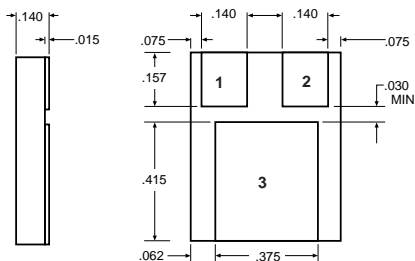
Front View
 Pin 1 - Adjust
 Pin 2 - Output
 Pin 3 - Input
 Case - Isolated

OM1325STM

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

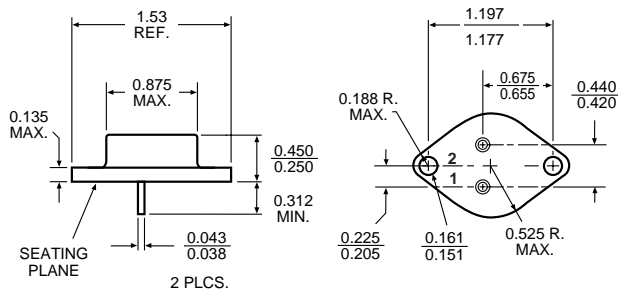
OM1325NTM

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



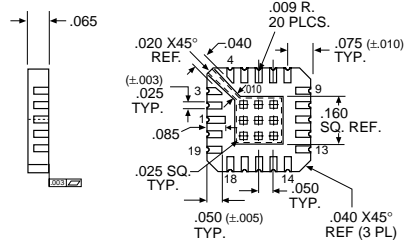
OM1325NMM

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



OM1325NKM

Pin 1 - Adjust
 Pin 2 - Output
 Case - Input



OM1325N2M

Pin 1	V _{OUT}	Pin 11	V _{IN}
Pin 2	V _{OUT} (Sense)	Pin 12	NC
Pin 3	NC	Pin 13	NC
Pin 4	NC	Pin 14	NC
Pin 5	NC	Pin 15	NC
Pin 6	NC	Pin 16	ADJUST
Pin 7	NC	Pin 17	NC
Pin 8	NC	Pin 18	NC
Pin 9	NC	Pin 19	NC
Pin 10	NC	Pin 20	NC

For additional information please see the mechanical outline section.