

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

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. 1.5A

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

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

OM1325NTM, OM1325STM, OM1325NKM, OM1325SMM, OM1325NMM

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Reference Voltage	V _{REF}	$ V_{DIFF} = 3.0V, T_A = 25^\circ C$ $ V_{DIFF} = 3.0V$ $ V_{DIFF} = 40V$	-1.262 -1.280 -1.280	-1.238 -1.220 -1.220	V
Line Regulation (Note 1)	R _{LINE}	$3.0V \leq V_{DIFF} \leq 40V, T_A = 25^\circ C$ $3.0V \leq V_{DIFF} \leq 40V$	-4.5 -13.8	4.5 13.8	mV
Load Regulation (Note 1)	R _{LOAD}	$ V_{DIFF} = 5V, 8mA \leq I_L \leq 1.5A$ $ V_{DIFF} = 12V, 8mA \leq I_L \leq 1.5A, T_A = 25^\circ C$ $ V_{DIFF} = 40V, 8mA \leq I_L \leq 1.5A, T_A = 25^\circ C$ $ V_{DIFF} = 40V, 8mA \leq I_L \leq 1.5A$	-25 -25 -25 -50	25 25 25 50	mV
Thermal Regulation	V _{RTH}	$V_{in} = -14.6V, I_L = 1.5A$ $P_d = 20 \text{ Watts}, t = 10 \text{ ms}, T_A = 25^\circ C$	-5	5	mV
Ripple Rejection (Note 2)	R _N	$f = 120 \text{ Hz}, V_{out} = V_{ref}$ $C_{Adj} = 10 \mu F$	66		dB
Adjustment Pin Current	I _{Adj}	$ V_{DIFF} = 3.0V$ $ V_{DIFF} = 40V$		100 100	 μA
Adjustment Pin Current Change	ΔI_{Adj} (line)	$3V \leq V_{DIFF} \leq 40V$	-5	5	μA
	ΔI_{Adj} (load)	$ V_{DIFF} = 5V, 8mA \leq I_L \leq 1.5A$	-5	5	μA
Minimum Load Current	I _{Lmin}	$ V_{DIFF} = 3.0V, V_{out} = -1.4V \text{ (forced)}$ $ V_{DIFF} = 10V, V_{out} = -1.4V \text{ (forced)}$ $ V_{DIFF} = 40V, V_{out} = -1.4V \text{ (forced)}$		3.0 3.0 5.0	 mA
Current Limit (Note 2)	I _{CL}	$ V_{DIFF} \leq 5V$ $ V_{DIFF} = 40V, T_A = 25^\circ C$	1.5 0.24	3.5 1.2	 A

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

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

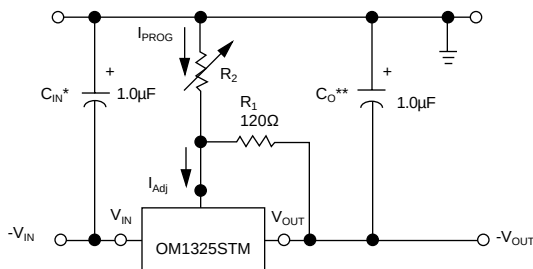
OM1325N2M

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Reference Voltage	V_{REF}	$ V_{DIFF} = 3.0\text{V}$, $T_A = 25^{\circ}\text{C}$ $ V_{DIFF} = 3.0\text{V}$ $ V_{DIFF} = 40\text{V}$	-1.262 -1.280 -1.280	-1.238 -1.220 -1.220	V
Line Regulation (Note 1)	R_{LINE}	$3.0\text{V} \leq V_{DIFF} \leq 40\text{V}$, $T_A = 25^{\circ}\text{C}$ $3.0\text{V} \leq V_{DIFF} \leq 40\text{V}$	-4.5 -13.8	4.5 13.8	mV
Load Regulation (Note 1)	R_{LOAD}	$ V_{DIFF} = 5\text{V}$, $8\text{mA} \leq I_L \leq 200\text{mA}$ $ V_{DIFF} = 15\text{V}$, $8\text{mA} \leq I_L \leq 200\text{mA}$, $A_{T_A} = 25^{\circ}\text{C}$ $ V_{DIFF} = 40\text{V}$, $8\text{mA} \leq I_L \leq 150\text{mA}$, $A_{T_A} = 25^{\circ}\text{C}$ $ V_{DIFF} = 40\text{V}$, $8\text{mA} \leq I_L \leq 50\text{mA}$	-25 -25 -25 -50	25 25 25 50	mV
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	$f = 120\text{Hz}$, $V_{out} = V_{ref}$ $C_{Adj} = 10\mu\text{F}$	66		dB
Adjustment Pin Current	I_{Adj}	$ V_{DIFF} = 3.0\text{V}$ $ V_{DIFF} = 40\text{V}$		100 100	μA
Adjustment Pin Current Change	ΔI_{Adj} (line)	$3\text{V} \leq V_{DIFF} \leq 40\text{V}$	-5	5	μA
	ΔI_{Adj} (load)	$ V_{DIFF} = 5\text{V}$, $8\text{mA} \leq I_L \leq 500\text{mA}$	-5	5	μA
Mimumum Load Current	I_{Lmin}	$ V_{DIFF} = 3.0\text{V}$, $V_{out} = -1.4\text{V}$ (forced) $ V_{DIFF} = 10\text{V}$, $V_{out} = -1.4\text{V}$ (forced) $ V_{DIFF} = 40\text{V}$, $V_{out} = -1.4\text{V}$ (forced)		3.0 3.0 5.0	mA
Current Limit (Note 2)	I_{CL}	$ V_{DIFF} \leq 5\text{V}$ $ V_{DIFF} = 40\text{V}$, $T_A = 25^{\circ}\text{C}$	0.5 0.15	1.8 0.65	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.

TYPICAL APPLICATION



* 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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