

1.5 AMP POSITIVE ADJUSTABLE VOLTAGE REGULATOR APPROVED TO DESC DRAWING 7703401



Three Terminal, Precision Adjustable Positive Voltage Regulator In Hermetic Style Packages (LM117)

FEATURES

- Similar To Industry Standard LM117
- Approved To DESC Standardized Military Drawing Number 7703401
- 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 0.5 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

LCC-20 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:

LCC-20 17°C/W

TO-257 (Isol) and SMD-3 4.2°C/W

TO-257 (Non-Isol) and SMD-1 3.5°C/W

TO-3 3.0°C/W Maximum

Output Current:

LCC-20 0.5 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

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OM1320NTM, OM1320STM, OM1320NKM, OM1320SMM, OM1320NMM, OM1320N2M

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

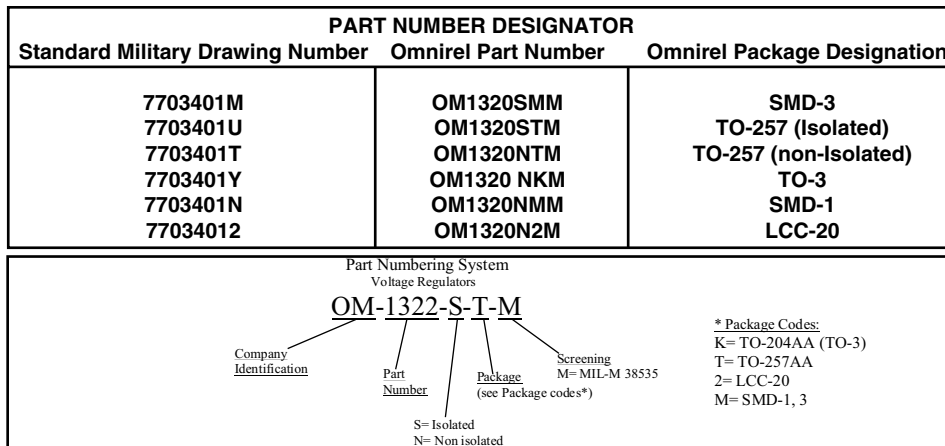
OM1320NTM, OM1320STM, OM1320NKM, OM1320SMM, OM1320NMM

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Reference Voltage	V_{REF}	$V_{DIFF} = 3.0\text{V}$, $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 3.3\text{V}$ $V_{DIFF} = 40\text{V}$	1.20 1.20 1.20	1.30 1.30 1.30	V
Line Regulation (Note 1)	R_{LINE}	$3.0\text{V} \leq V_{DIFF} \leq 40\text{V}$, $V_{OUT} = V_{REF}$, $T_A = 25^{\circ}\text{C}$ $3.3\text{V} \leq V_{DIFF} \leq 40\text{V}$, $V_{OUT} = V_{REF}$	-9 -23	9 23	mV
Load Regulation (Note 1)	R_{LOAD}	$V_{DIFF} = 3.0\text{V}$, $10\text{mA} \leq I_L \leq 1.5\text{A}$, $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 3.3\text{V}$, $10\text{mA} \leq I_L \leq 1.5\text{A}$ $V_{DIFF} = 40\text{V}$, $10\text{mA} \leq I_L \leq 300\text{mA}$, $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 40\text{V}$, $10\text{mA} \leq I_L \leq 195\text{mA}$	-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	$f = 120\text{ Hz}$, $V_{OUT} = V_{REF}$ $C_{Adj} = 10\text{ }\mu\text{F}$	66		dB
Adjustment Pin Current	I_{Adj}	$V_{DIFF} = 3.0\text{V}$, $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 3.3\text{V}$ $V_{DIFF} = 40\text{V}$		100 100 100	μA
Adjustment Pin Current Change	ΔI_{Adj}	$V_{DIFF} = 3.0\text{V}$, $10\text{mA} \leq I_L \leq 1.5\text{A}$, $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 3.3\text{V}$, $10\text{mA} \leq I_L \leq 1.5\text{A}$ $V_{DIFF} = 40\text{V}$, $10\text{mA} \leq I_L \leq 300\text{mA}$, $T_A = 25^{\circ}\text{C}$ $V_{DIFF} = 40\text{V}$, $10\text{mA} \leq I_L \leq 195\text{mA}$ $3.0\text{V} \leq V_{DIFF} \leq 40\text{V}$, $T_A = 25^{\circ}\text{C}$ $3.3\text{V} \leq V_{DIFF} \leq 40\text{V}$	-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)		5.0 5.0 5.0	mA
Current Limit (Note 2)	I_{CL}	$V_{DIFF} = 15\text{V}$ $V_{DIFF} = 40\text{V}$, $T_A = 25^{\circ}\text{C}$	1.5 0.18	3.5 1.5	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.

3.3



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OM1320NTM, OM1320STM, OM1320NKM, OM1320SMM, OM1320NMM, OM1320N2M,

ELECTRICAL CHARACTERISTICS $-55^{\circ}\text{C} \leq T_A \leq 125^{\circ}\text{C}$, $I_L = 8\text{mA}$ (unless otherwise specified)
OM1321N2M

Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Reference Voltage	V_{REF}	$V_{\text{DIFF}} = 3.0\text{V}$, $T_A = 25^{\circ}\text{C}$ $V_{\text{DIFF}} = 3.3\text{V}$ $V_{\text{DIFF}} = 40\text{V}$	1.20 1.20 1.20	1.30 1.30 1.30	V
Line Regulation (Note 1)	R_{LINE}	$3.0\text{V} \leq V_{\text{DIFF}} \leq 40\text{V}$, $V_{\text{out}} = V_{\text{ref}}$, $T_A = 25^{\circ}\text{C}$ $3.3\text{V} \leq V_{\text{DIFF}} \leq 40\text{V}$, $V_{\text{out}} = V_{\text{ref}}$	-9 -23	9 23	mV
Load Regulation (Note 1)	R_{LOAD}	$V_{\text{DIFF}} = 3.0\text{V}$, $10\text{mA} \leq I_L \leq .5\text{A}$, $T_A = 25^{\circ}\text{C}$ $V_{\text{DIFF}} = 3.3\text{V}$, $10\text{mA} \leq I_L \leq .5\text{A}$ $V_{\text{DIFF}} = 40\text{V}$, $10\text{mA} \leq I_L \leq 150\text{mA}$, $T_A = 25^{\circ}\text{C}$ $V_{\text{DIFF}} = 40\text{V}$, $10\text{mA} \leq I_L \leq 100\text{mA}$	-15 -15 -15 -15	15 15 15 15	mV
Thermal Regulation	V_{RTH}	$V_{\text{in}} = 14.6\text{V}$, $I_L = 300\text{mA}$ $P_d = 4\text{ Watts}$, $t = 20\text{ ms}$, $T_A = 25^{\circ}\text{C}$	-16	16	mV
Ripple Rejection (Note 2)	R_N	$f = 120\text{ Hz}$, $V_{\text{out}} = V_{\text{ref}}$ $C_{\text{Adj}} = 10\text{ }\mu\text{F}$	66		dB
Adjustment Pin Current	I_{Adj}	$V_{\text{DIFF}} = 3.0\text{V}$, $T_A = 25^{\circ}\text{C}$ $V_{\text{DIFF}} = 3.3\text{V}$ $V_{\text{DIFF}} = 40\text{V}$		100 100 100	μA
Adjustment Pin Current Change	ΔI_{Adj}	$V_{\text{DIFF}} = 3.0\text{V}$, $10\text{mA} \leq I_L \leq .5\text{A}$, $T_A = 25^{\circ}\text{C}$ $V_{\text{DIFF}} = 3.3\text{V}$, $10\text{mA} \leq I_L \leq .5\text{A}$ $V_{\text{DIFF}} = 40\text{V}$, $10\text{mA} \leq I_L \leq 150\text{mA}$, $T_A = 25^{\circ}\text{C}$ $V_{\text{DIFF}} = 40\text{V}$, $10\text{mA} \leq I_L \leq 100\text{mA}$ $3.0\text{V} \leq V_{\text{DIFF}} \leq 40\text{V}$, $T_A = 25^{\circ}\text{C}$ $3.3\text{V} \leq V_{\text{DIFF}} \leq 40\text{V}$	-5 -5 -5 -5 -5 -5	5 5 5 5 5 5	μA
Minimum Load Current	I_{Lmin}	$V_{\text{DIFF}} = 3.0\text{V}$, $V_{\text{OUT}} = 1.4\text{V}$ (forced) $V_{\text{DIFF}} = 3.3\text{V}$, $V_{\text{OUT}} = 1.4\text{V}$ (forced) $V_{\text{DIFF}} = 40\text{V}$, $V_{\text{OUT}} = 1.4\text{V}$ (forced)		5.0 5.0 5.0	mA
Current Limit (Note 2)	I_{CL}	$V_{\text{DIFF}} = 15\text{V}$ $V_{\text{DIFF}} = 40\text{V}$, $T_A = 25^{\circ}\text{C}$	.5 0.15	1.65 0.065	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.

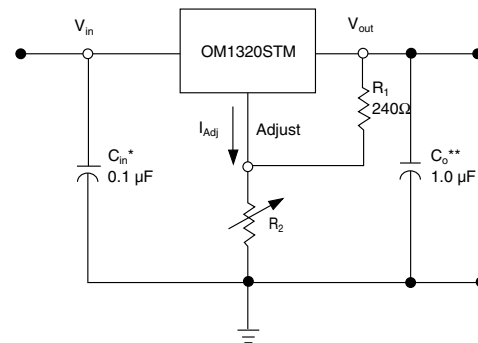
STANDARD APPLICATION

* 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.

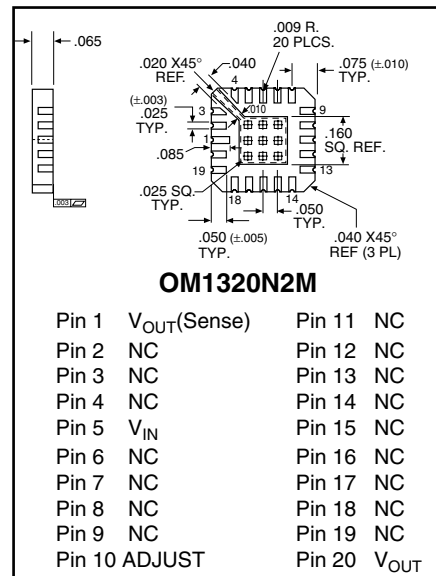
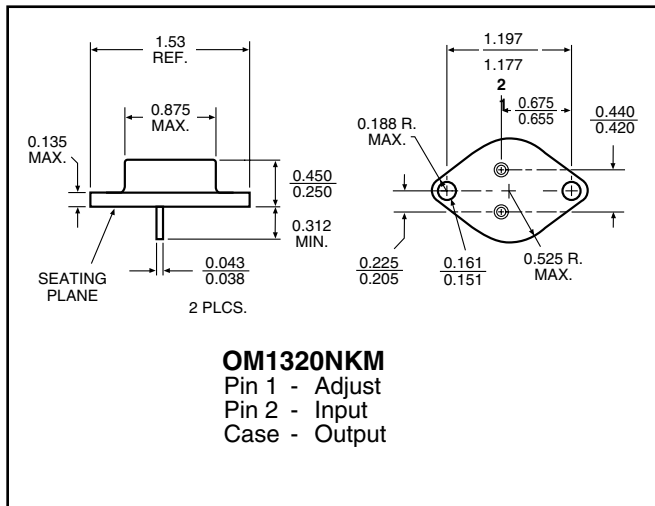
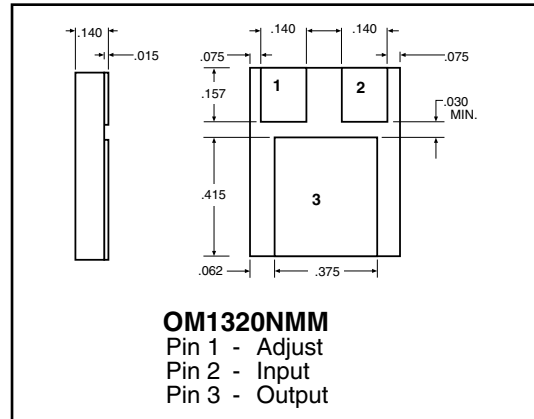
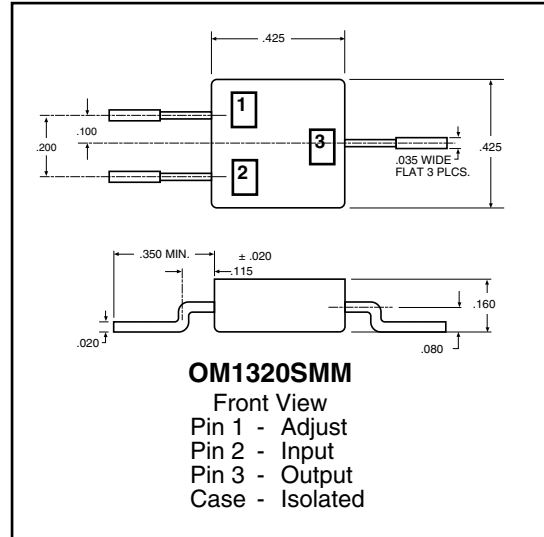
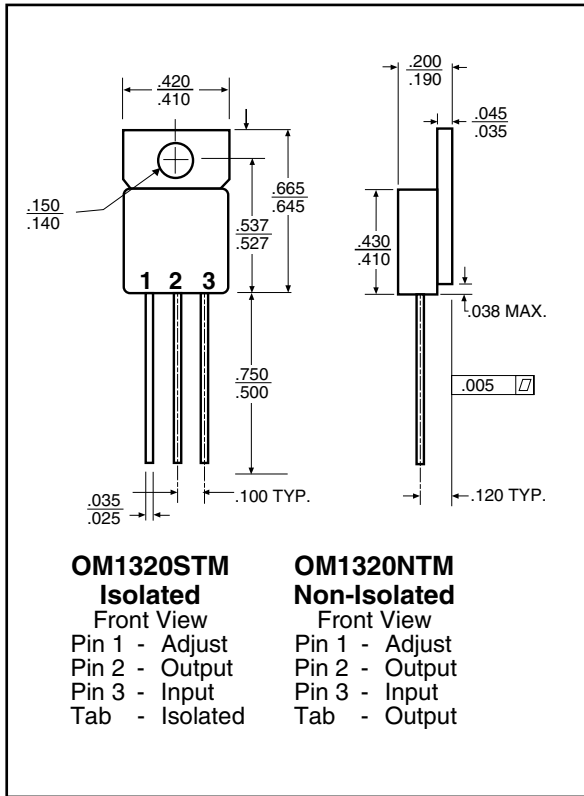
$$V_{\text{out}} = 1.25\text{ V} \left(1 + \frac{R_2}{R_1}\right) + I_{\text{Adj}} R_2$$

Since I_{Adj} is controlled to less than $100\text{ }\mu\text{A}$, the error associated with this term is negligible in most applications.



OM1320NTM, OM1320STM, OM1320NKM, OM1320SMM, OM1320NMM, OM1320N2M,

MECHANICAL OUTLINE



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For additional information please see the mechanical outline section.