

# 1.5 AMP HIGH VOLTAGE POSITIVE ADJUSTABLE REGULATOR



**Three Terminal, High Voltage, Precision  
Adjustable Positive Voltage Regulator In  
Hermetic JEDEC TO-257AA**

## FEATURES

- Similar To Industry Standard LT117AHV
- Adjustable Output Voltage
- Built In Thermal Overload Protection
- Short Circuit Current Limiting
- Available In Isolated and Non-Isolated Package
- Maximum Output Voltage Tolerance Is Guaranteed To  $\pm 1\%$
- Available Hi-Rel Screened

## DESCRIPTION

This three terminal positive regulator is supplied in a hermetically sealed metal package whose outline is similar to the industry standard TO-220 plastic package. 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 unit also features output voltages that can be fixed from 1.2 volts to 57 volts using external resistors.

## ABSOLUTE MAXIMUM RATINGS @ 25°C

Power Dissipation ( $P_d$ ) (Internally Limited) . . . . .	20 W
Input - Output Voltage Differential . . . . .	60 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:	
$\theta_{JC}$ (Isolated) . . . . .	4.2°C/W
$\theta_{JC}$ (Non-Isolated) . . . . .	3.5°C/W
$\theta_{JA}$ . . . . .	42°C/W
Maximum Output Current . . . . .	1.5 A

**3.3**

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

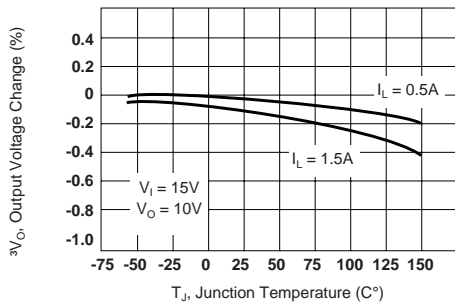
Parameter	Symbol	Test Conditions	Min.	Max.	Unit
Reference Voltage	$V_{REF}$	$V_{DIFF} = 3.0\text{V}$ , $T_A = 25^\circ\text{C}$	1.238	1.262	V
		$V_{DIFF} = 3.3\text{V}$	• 1.225	1.270	
		$V_{DIFF} = 40\text{V}$	• 1.225	1.270	
		$V_{DIFF} = 60\text{V}$	• 1.225	1.270	
Line Regulation (Note 1)	$R_{LINE}$	3.0V $V_{DIFF}$ 40V, $V_{OUT} = V_{ref}$ , $T_A = 25^\circ\text{C}$	• -4.5	4.5	mV
		3.3V $V_{DIFF}$ 40V, $V_{OUT} = V_{ref}$	• -9	9	
		40V $V_{DIFF}$ 60V, $V_{OUT} = V_{ref}$ , $T_A = 25^\circ\text{C}$	• -5	5	
		40V $V_{DIFF}$ 60V, $V_{OUT} = V_{ref}$	• -10	10	
Load Regulation (Note 1)	$R_{LOAD}$	$V_{DIFF} = 3.0\text{V}$ , 10mA $I_L$ 1.5A, $T_A = 25^\circ\text{C}$	• -15	15	mV
		$V_{DIFF} = 3.3\text{V}$ , 10mA $I_L$ 1.5A	• -15	15	
		$V_{DIFF} = 40\text{V}$ , 10mA $I_L$ 300mA, $T_A = 25^\circ\text{C}$	• -15	15	
		$V_{DIFF} = 40\text{V}$ , 10mA $I_L$ 195mA	• -15	15	
		$V_{DIFF} = 60\text{V}$ , 10mA $I_L$ 30mA	• -15	15	
Thermal Regulation	$V_{RTH}$	$V_{IN} = 14.6\text{V}$ , $I_L = 1.5\text{A}$ $P_d = 20$ Watts, $t = 20$ ms, $T_A = 25^\circ\text{C}$	-5	5	mV
Ripple Rejection (Note 2)	$R_N$	$f = 120$ Hz, $V_{OUT} = V_{ref}$ $C_{Adj} = 10$ $\mu\text{F}$ , $I_{OUT} = 100$ mA	• 66		dB
Adjustment Pin Current	$I_{Adj}$	$V_{DIFF} = 3.0\text{V}$ , $T_A = 25^\circ\text{C}$		100	$\mu\text{A}$
		$V_{DIFF} = 3.3\text{V}$	•	100	
		$V_{DIFF} = 40\text{V}$	•	100	
		$V_{DIFF} = 60\text{V}$	•	100	
Adjustment Pin Current Change	$\Delta I_{Adj}$	$V_{DIFF} = 3.0\text{V}$ , 10mA $I_L$ 1.5A, $T_A = 25^\circ\text{C}$	• -5	5	$\mu\text{A}$
		$V_{DIFF} = 3.3\text{V}$ , 10mA $I_L$ 1.5A	• -5	5	
		$V_{DIFF} = 40\text{V}$ , 10mA $I_L$ 300mA, $T_A = 25^\circ\text{C}$	• -5	5	
		$V_{DIFF} = 40\text{V}$ , 10mA $I_L$ 195mA	• -5	5	
		3.0V $V_{DIFF}$ 40V, $T_A = 25^\circ\text{C}$	• -5	5	
		3.3V $V_{DIFF}$ 40V	• -5	5	
		3.3V $V_{DIFF}$ 60V	• -5	5	
Minimum Load Current	$I_{Lmin}$	$V_{DIFF} = 3.0\text{V}$ , $V_{OUT} = 1.4\text{V}$ (forced), $T_A = 25^\circ\text{C}$	•	5	mA
		$V_{DIFF} = 3.3\text{V}$ , $V_{OUT} = 1.4\text{V}$ (forced)	•	5	
		$V_{DIFF} = 40\text{V}$ , $V_{OUT} = 1.4\text{V}$ (forced)	•	5	
		$V_{DIFF} = 60\text{V}$ , $V_{OUT} = 1.4\text{V}$ (forced)	•	7	
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:**

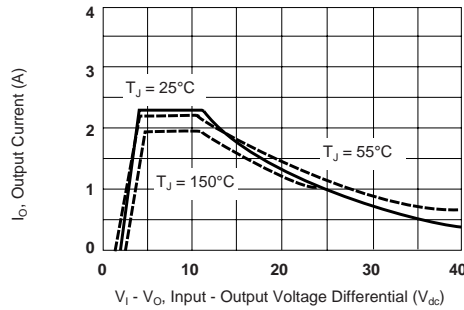
1. Load and Line Regulation are specified at a constant junction temperature. Pulse testing with low duty cycle is used. Changes in output voltage due to heating effects must be taken into account separately.
2. If not tested, shall be guaranteed to the specified limits.
3. The • denotes the specifications which apply over the full operating temperature range.

## TYPICAL APPLICATIONS

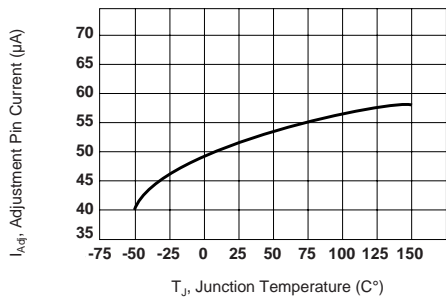
### LOAD REGULATION



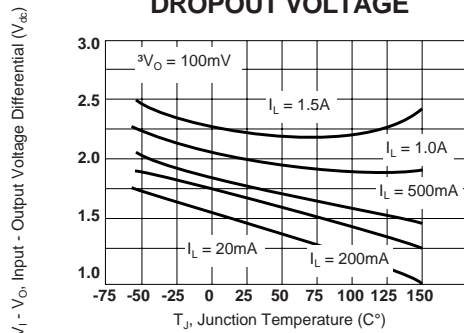
### CURRENT LIMIT



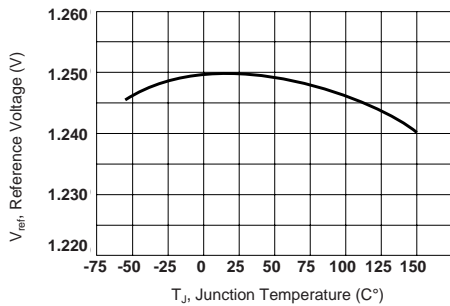
### ADJUSTMENT PIN CURRENT



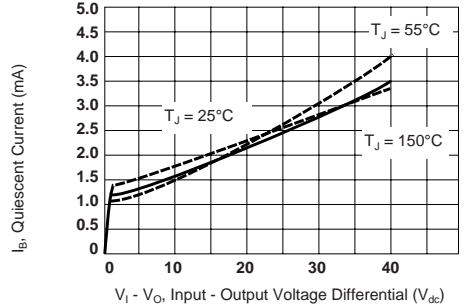
### DROPOUT VOLTAGE



### TEMPERATURE STABILITY



### MINIMUM OPERATING CURRENT



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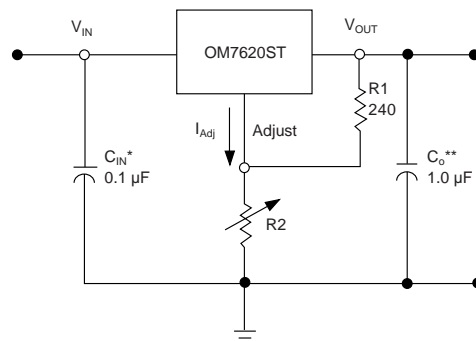
## STANDARD APPLICATION

\*  $C_{IN}$  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.

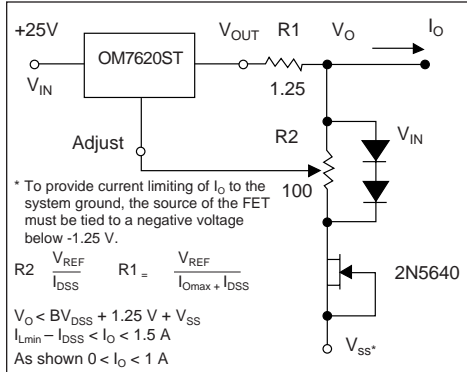
$$V_{OUT} = 1.25 V \left( 1 + \frac{R2}{R1} \right) + I_{Adj} R2$$

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

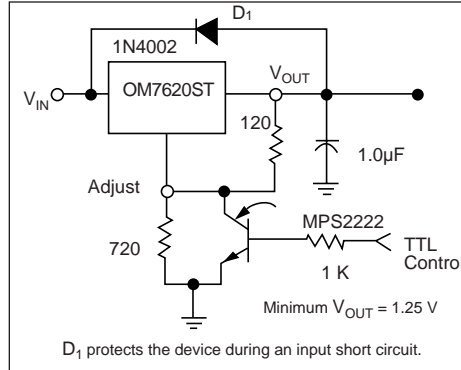


## TYPICAL APPLICATIONS

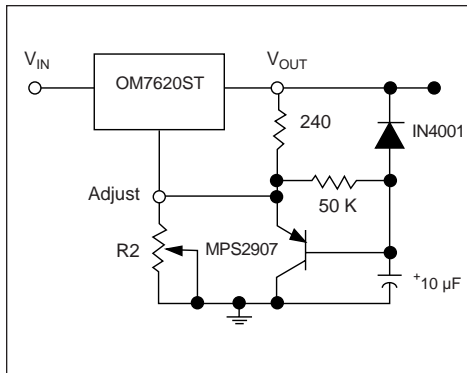
**ADJUSTABLE CURRENT LIMITER**



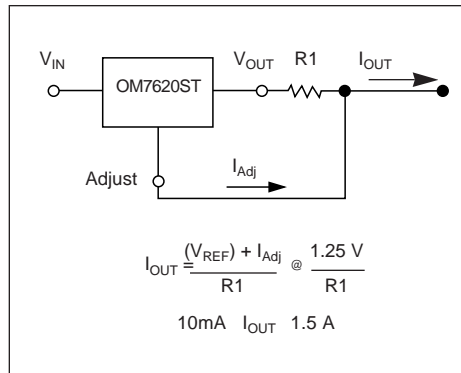
**5 V ELECTRONIC SHUT DOWN REGULATOR**



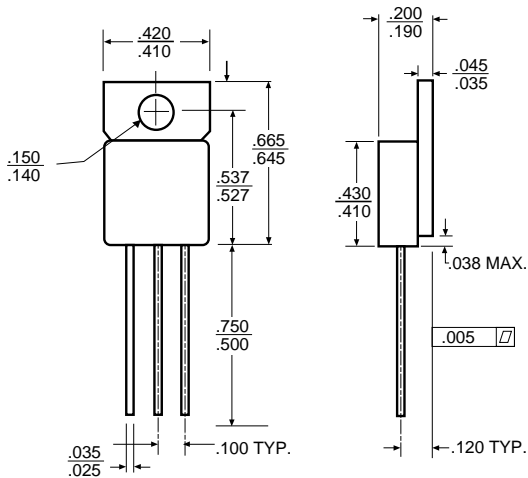
**SLOW TURN-ON CURRENT**



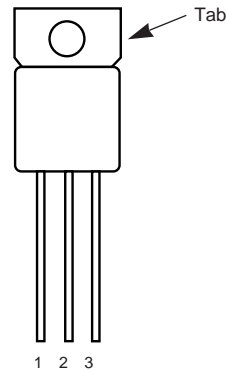
**CURRENT REGULATOR**



**MECHANICAL OUTLINE**



**CONNECTION DIAGRAM**



- |                               |                                   |
|-------------------------------|-----------------------------------|
| <b>Isolated</b><br>Front View | <b>Non-Isolated</b><br>Front View |
| Pin 1 - Adjust                | Pin 1 - Adjust                    |
| Pin 2 - Output                | Pin 2 - Output                    |
| Pin 3 - Input                 | Pin 3 - Input                     |
| Tab - Isolated                | Tab - Output                      |

**NOTES**

- Case is metal/hermetically sealed
- Isolated Tab