

POSITIVE ADJUSTABLE VOLTAGE REGULATOR

IP117K / LM117K
IP117AK / LM117AK
IP117HVK / LM117HVK
IP117AHVK / LM117AHVK
IP317K / LM317K
IP317AK / LM317AK
IP317HVK / LM317HVK
IP317AHVK / LM317AHVK



FEATURES

- 1.5A Output Current Guaranteed
- Internal Thermal Overload Protection
- Output Short Circuit Protected
- Hermetic Metal TO3 Package
- Screening Options Available

APPLICATIONS

- Adjustable Power Supplies
- System Power Supplies
- Precision Voltage / Current Regulators

DESCRIPTION

The 117/317 Series regulators are adjustable 3 terminal voltage regulators capable of supplying in excess of 1.5A over an output voltage range of 1.25V to 40V (HV Series, 60V). The regulators are exceptionally easy to apply requiring only 2 external resistors to set the output voltage.

Every effort has been made to make these devices easy to use and difficult to damage. Internal current limiting and power limiting coupled with true thermal limiting prevents damage due to overloads or shorts, even if the regulators are not fastened to a heat sink.

ABSOLUTE MAXIMUM RATINGS (T_C = 25°C unless otherwise stated)

V _I - V _O	Input – Output Voltage Differential	Standard	40V
		HV Series	60V
I _O	Output Current	Internally Limited	
P _D	Power Dissipation	Internally Limited	
T _J	Operating Junction Temperature Range	117 Series	-55 to +150°C
		317 Series	0 to +125°C
T _{stg}	Storage Temperature Range	-65 to +150°C	

THERMAL PROPERTIES

Symbols	Parameters	Min.	Typ.	Max.	Units
R _{θJC}	Thermal Resistance, Junction To Case			3	°C/W

** This datasheet supersedes document 2829

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POSITIVE ADJUSTABLE VOLTAGE REGULATOR

ELECTRICAL CHARACTERISTICS(1)(3) ($T_C = 25^\circ\text{C}$ unless otherwise stated)

LM117, IP117, LM117HV, IP117HV								
Symbols	Parameters	Test Conditions		Min.	Typ	Max.	Units	
V _{REF}	Reference Voltage	I _{OUT} = 10mA			1.200	1.250	1.300	V
		10mA ≤ I _{OUT} ≤ I _{MAX} , P ≤ P _{MAX} , 3V ≤ (V _{IN} -V _{OUT}) ≤ V _{MAX}		•	1.200	1.250	1.300	
$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	Line Regulation (2)	3V ≤ (V _{IN} -V _{OUT}) ≤ V _{MAX} , I _{OUT} = 10mA				0.010	0.020	% / V
				•		0.020	0.050	
$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	Load Regulation (2)(3)	10mA ≤ I _{OUT} ≤ I _{MAX}	V _{OUT} ≤ 5V			5	15	mV
			V _{OUT} ≥ 5V			0.1	0.3	%
			V _{OUT} ≤ 5V	•		20	50	mV
			V _{OUT} ≥ 5V	•		0.3	1.0	%
	Thermal Regulation	V _{IN} = 14.58V, I _{OUT} = 1.5A, P _D = 20W, T _A = 25°C, 20ms Pulse				0.030	0.070	% / W
	Ripple Rejection	V _{OUT} = 10V f = 120Hz	C _{ADJ} = 0			65		dB
			C _{ADJ} = 10μF	•	66	80		
I _{ADJ}	Adjust Pin Current			•		50	100	μA
ΔI _{ADJ}	Adjust Pin Current Change	10mA ≤ I _{OUT} ≤ I _{MAX} , 2.5V ≤ (V _{IN} -V _{OUT}) ≤ V _{MAX}		•		0.2	5	
I _{MIN}	Minimum Load Current	(V _{IN} - V _{OUT}) = 40V		•		3.5	5	mA
		(V _{IN} - V _{OUT}) = 60V (HV Series)		•		3.5	7	
I _{CL}	Current Limit	(V _{IN} - V _{OUT}) ≤ 15V		•	1.5	2.2		A
		(V _{IN} - V _{OUT}) = 40V		•	0.3	0.5		
		(V _{IN} - V _{OUT}) = 60V (HV Series)		•		0.1		
$\frac{\Delta V_{OUT}}{\Delta TEMP}$	Temperature Stability			•		1.0		%
$\frac{\Delta V_{OUT}}{\Delta TIME}$	Long Term Stability	T _A = 125°C, 1000Hrs				0.3	1.0	
e _n	RMS Output Noise (% of V _{OUT})	T _A = 25°C, 10Hz ≤ f ≤ 10KHz				0.001		

Notes

The • denotes the specifications which apply over the full operating temperature range.

- (1) Test conditions unless otherwise stated: $V_{IN} - V_{OUT} = 5\text{V}$, $I_{OUT} = 0.5\text{A}$, $P_{MAX} = 20\text{W}$, $I_{MAX} = 1.5\text{A}$
- (2) Regulation is measured at constant junction temperature, using pulse testing at a low duty cycle. Changes in output voltage due to heating effects are covered under thermal regulation specifications. Load regulation is measured at $\frac{1}{8}$ " below the bottom of the package.
- (3) $V_{MAX} = 40\text{V}$ for LM117, IP117, LM117A, IP117A, LM317, IP317, LM317A, IP317A
 $V_{MAX} = 60\text{V}$ for LM117HV, IP117HV, LM117AHV, IP117AHV, LM317HV, IP317HV, LM317AHV, IP317AHV

POSITIVE ADJUSTABLE VOLTAGE REGULATOR

ELECTRICAL CHARACTERISTICS(1)(3) ($T_C = 25^\circ\text{C}$ unless otherwise stated)

LM317, IP317, LM317HV, IP317HV								
Symbols	Parameters	Test Conditions		Min.	Typ	Max.	Units	
V _{REF}	Reference Voltage	I _{OUT} = 10mA			1.200	1.250	1.300	V
		10mA ≤ I _{OUT} ≤ I _{MAX} , P ≤ P _{MAX} , 3V ≤ (V _{IN} -V _{OUT}) ≤ V _{MAX}		●	1.200	1.250	1.300	
$\frac{\Delta V_{OUT}}{\Delta V_{IN}}$	Line Regulation (2)	3V ≤ (V _{IN} -V _{OUT}) ≤ V _{MAX} , I _{OUT} = 10mA				0.010	0.040	% / V
				●		0.020	0.070	
$\frac{\Delta V_{OUT}}{\Delta I_{OUT}}$	Load Regulation (2)(3)	10mA ≤ I _{OUT} ≤ I _{MAX}	V _{OUT} ≤ 5V			5	25	mV
			V _{OUT} ≥ 5V			0.1	0.5	%
			V _{OUT} ≤ 5V	●		20	70	mV
			V _{OUT} ≥ 5V	●		0.3	1.5	%
	Thermal Regulation	V _{IN} = 14.58V, I _{OUT} = 1.5A, P _D = 20W, T _A = 25°C, 20ms Pulse				0.030	0.070	% / W
	Ripple Rejection	V _{OUT} = 10V f = 120Hz	C _{ADJ} = 0			65		dB
			C _{ADJ} = 10μF	●	66	80		
I _{ADJ}	Adjust Pin Current			●		50	100	μA
ΔI _{ADJ}	Adjust Pin Current Change	10mA ≤ I _{OUT} ≤ I _{MAX} , 2.5V ≤ (V _{IN} -V _{OUT}) ≤ V _{MAX}		●		0.2	5	
I _{MIN}	Minimum Load Current	(V _{IN} - V _{OUT}) = 40V		●		3.5	10	mA
		(V _{IN} - V _{OUT}) = 60V (HV Series)		●		3.5	12	
I _{CL}	Current Limit	(V _{IN} - V _{OUT}) ≤ 15V		●	1.5	2.2		A
		(V _{IN} - V _{OUT}) = 40V		●	0.15	0.4		
		(V _{IN} - V _{OUT}) = 60V (HV Series)		●		0.1		
$\frac{\Delta V_{OUT}}{\Delta TEMP}$	Temperature Stability			●		1.0		%
$\frac{\Delta V_{OUT}}{\Delta TIME}$	Long Term Stability	T _A = 125°C, 1000Hrs				0.3	1.0	
e _n	RMS Output Noise (% of V _{OUT})	T _A = 25°C, 10Hz ≤ f ≤ 10KHz				0.003		

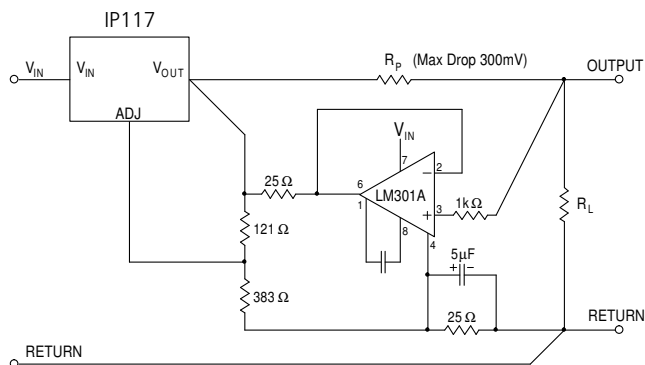
Notes

The • denotes the specifications which apply over the full operating temperature range.

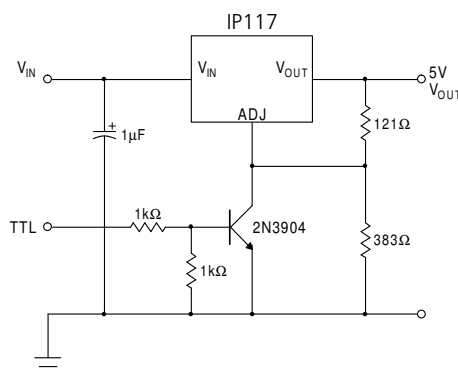
- (1) Test conditions unless otherwise stated: $V_{IN} - V_{OUT} = 5\text{V}$, $I_{OUT} = 0.5\text{A}$, $P_{MAX} = 20\text{W}$, $I_{MAX} = 1.5\text{A}$
- (2) Regulation is measured at constant junction temperature, using pulse testing at a low duty cycle. Changes in output voltage due to heating effects are covered under thermal regulation specifications. Load regulation is measured at $\frac{1}{8}$ " below the bottom of the package.
- (3) $V_{MAX} = 40\text{V}$ for LM117, IP117, LM117A, IP117A, LM317, IP317, LM317A, IP317A
 $V_{MAX} = 60\text{V}$ for LM117HV, IP117HV, LM117AHV, IP117AHV, LM317HV, IP317HV, LM317AHV, IP317AHV

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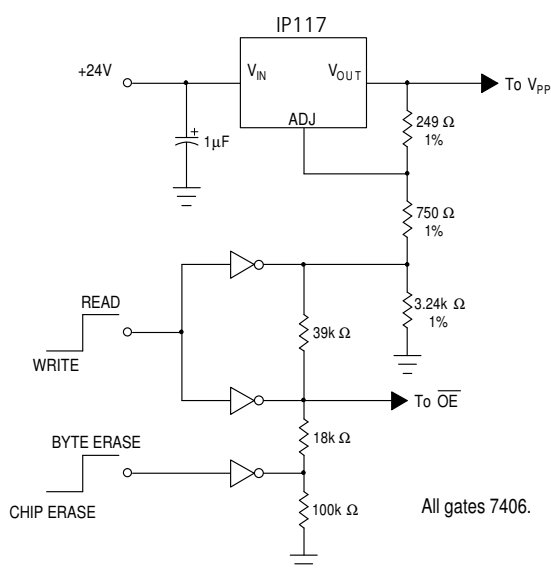
APPLICATIONS INFORMATION



Remote Sensing

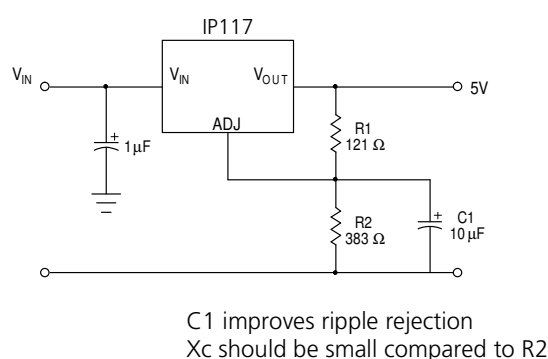


5V Regulator with Shut Down

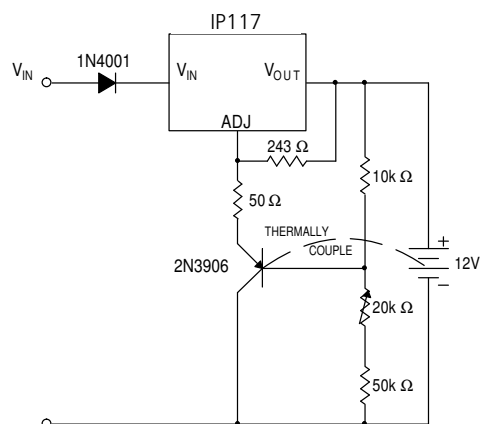


	OE	Vpp
READ	0V	5V
WRITE		
BYTE	5V	21V
CHIP ERASE	12V	21V

2816 EEPROM Supply Programmer for Read / Write Control



Improving Ripple Rejection

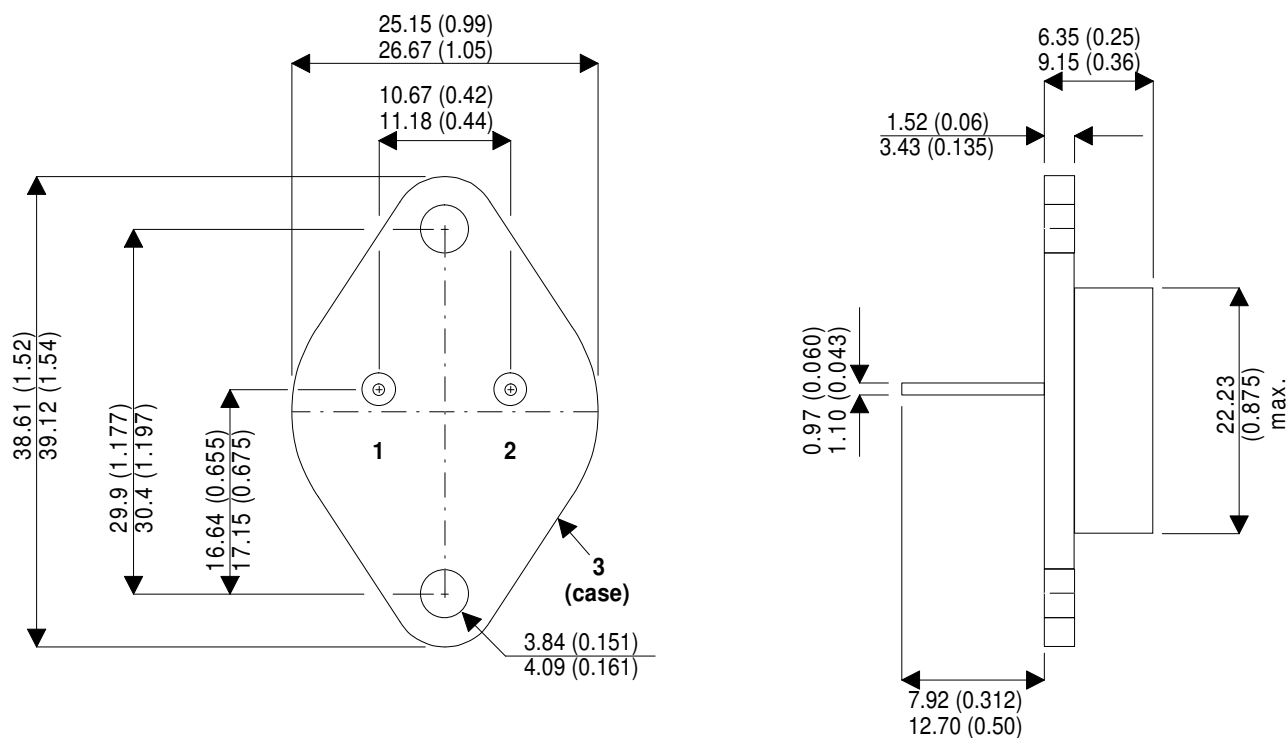


Temperature Compensated Lead-Acid Battery Charger

POSITIVE ADJUSTABLE VOLTAGE REGULATOR

MECHANICAL DATA

Dimensions in mm (inches)



TO3 (TO-204AA)

Pin 1 = ADJ. Pin 2 = V_{IN} Case = V_{OUT}