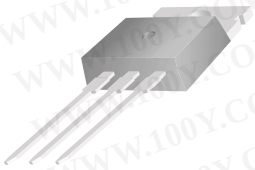
FAIRCHILD SEMICONDUCTOR™

LM317T (KA317) Adjustable Voltage Regulator (Positive)



TO-220

3-TERMINAL POSITIVE ADJUSTABLE REGULATOR

This monolithic integrated circuit is an adjustable 3-terminal positive voltage regulator designed to supply 2.2A typical of load current with an output voltage adjustable over a 1.2 to 37V. It employs internal current limiting, thermal shut-down and safe area compensation.

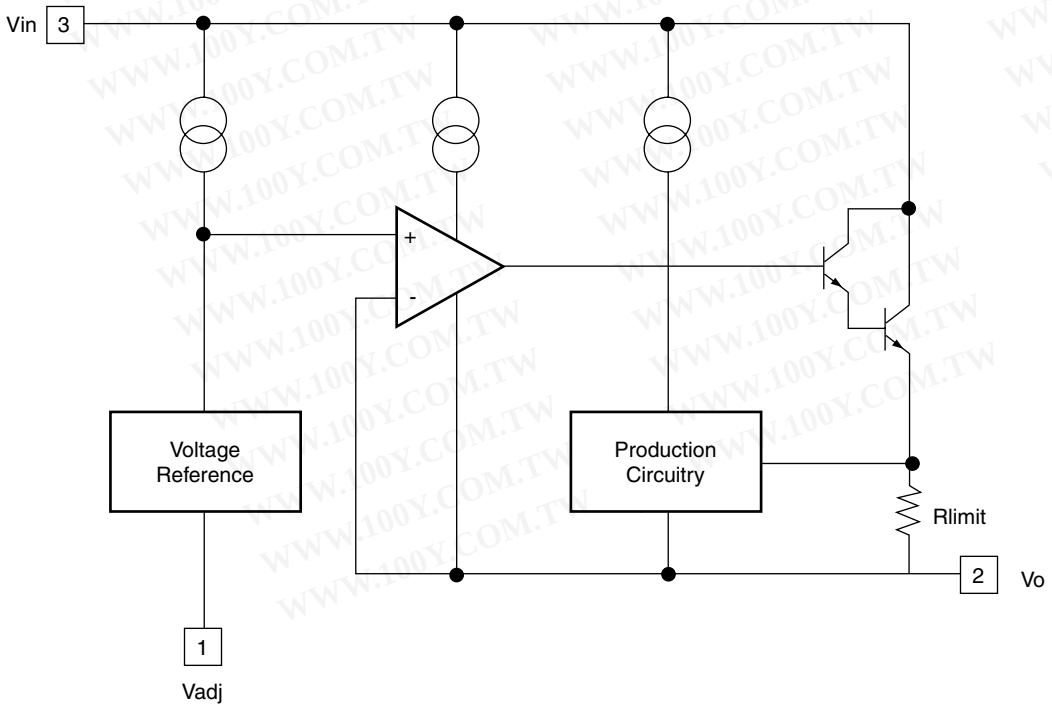
FEATURES

- Output Current 2.2A Typical
- Output Adjustable Between 1. 2V and 37V
- Internal Thermal-Overload Protection
- Internal Short-Circuit Current-Limiting
- Output Transistor Sate-Area Compensation
- TO-220 Package

ORDERING INFORMATION

Device	Package	Operating Temperature
LM317T (KA317)	TO-220	0°C ~ +125°C

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (T_A= +25°C, unless otherwise specified)

Characteristic	Symbol	Value	Unit
Input-Output Voltage Differential	$V_I - V_O$	40	V
Lead Temperature	T_{LEAD}	230	°C
Power Dissipation	P_D	Internally limited	W
Operating Temperature Range	T_{OPR}	0 ~ +125	°C
Storage Temperature Range	T_{STG}	-65 ~ +125	°C
Temperature Coefficient of Output Voltage	V_O/T	0.02	%/°C

ELECTRICAL CHARACTERISTICS

($V_I - V_O$ = 5V, I_O = 0.5A, 0°C ≤ T_J ≤ +125°C, I_{MAX} = 1.5A, P_{MAX} = 20W, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Line Regulation	Rline	T_A = +25°C, 3V ≤ $V_I - V_O$ ≤ 40V		0.01	0.04	%/V
		T_A = +25°C, 3V ≤ $V_I - V_O$ ≤ 40V		0.02	0.07	%/V
Load Regulation	Rload	T_A = +25°C, 10mA ≤ I_O ≤ I_{MAX}				
		V_O < 5V		18	25	mV
		V_O ≥ 5V		0.4	0.5	%/V_O
		10mA ≤ I_O ≤ I_{MAX}				
		V_O < 5V		40	70	mV
		V_O ≥ 5V		0.8	1.5	%/V_O
Adjustable Pin Current	I_{ADJ}			46	100	µA
Adjustable Pin Current Change	ΔI_{ADJ}	3V ≤ $V_I - V_O$ ≤ 40V 10mA ≤ I_O ≤ I_{MAX} P ≤ P_{MAX}		2.0	5	µA
Reference Voltage	V_{REF}	3V ≤ $V_{IN} - V_{OUT}$ ≤ 40V 10mA ≤ I_O ≤ I_{MAX} P_D ≤ P_{MAX}	1.20	1.25	1.30	V
Temperature Stability	ST_t			0.7		%/V_O
Minimum Load Current to Maintain Regulation	$L_{(MIN)}$	$V_I - V_O$ = 40V		3.5	12	mA
Maximum Output Current	$I_{O(MAX)}$	$V_I - V_O$ ≤ 15V, P_D ≤ P_{MAX}	1.0	2.2		A
		$V_I - V_O$ ≤ 40V, P_D ≤ P_{MAX}, T_A = 25°C		0.3		
RMS Noise, % of V_{OUT}	e_N	T_A= +25°C, 10Hz ≤ f ≤ 10KHz		0.003	0.01	%/V_O
Ripple Rejection	RR	V_O = 10V, f = 120Hz				dB
		without C_{ADJ}		60		
		C_{ADJ} = 10µF	66	75		
Long-Term Stability, T_J = T_{HIGH}	ST	T_A = +25°C for end point measurements, 1000HR		0.3	1	%
Thermal Resistance Junction to Case	$R_{\theta JC}$			5		°C/W

* Load and line regulation are specified at constant junction temperature. Change in V_D due to heating effects must be taken into account separately. Pulse testing with low duty is used. (P_{MAX} = 20W)

TYPICAL PERFORMANCE CHARACTERISTICS

Fig. 1 Load Regulation

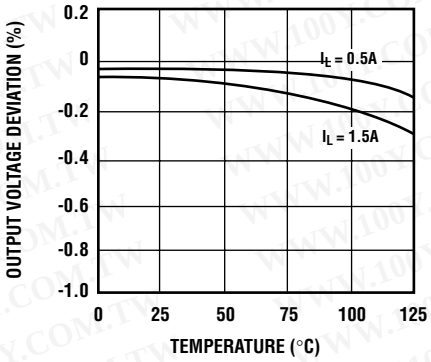


Fig. 2 Adjustment Current

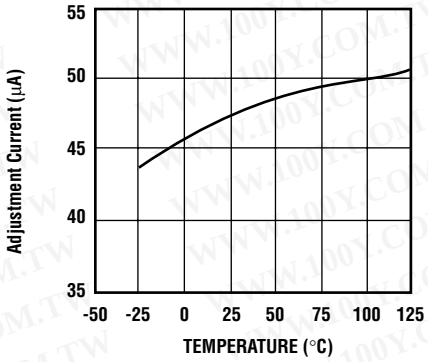


Fig. 3 Dropout Voltage

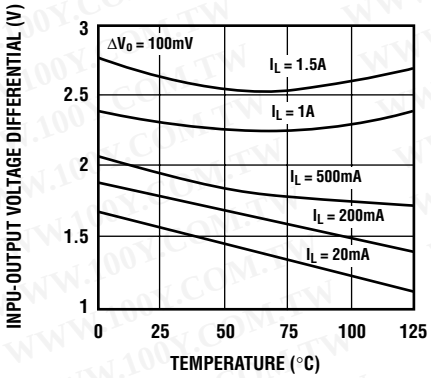
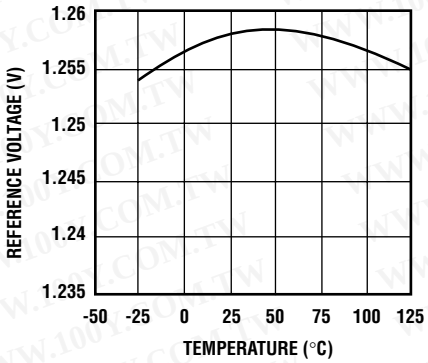
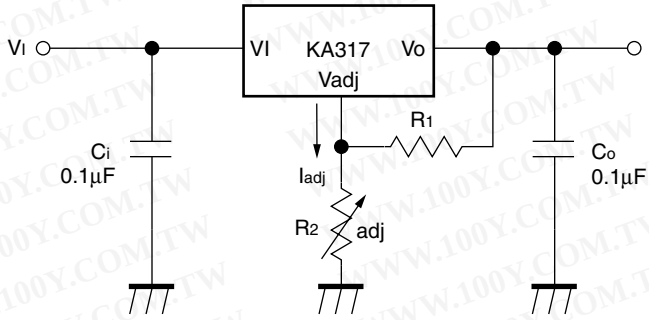


Fig. 4 Reference Voltage



Typical Application



$$V_o = 1.25V\ (1 + R_2/R_1) + I_{adj}\ R_2$$

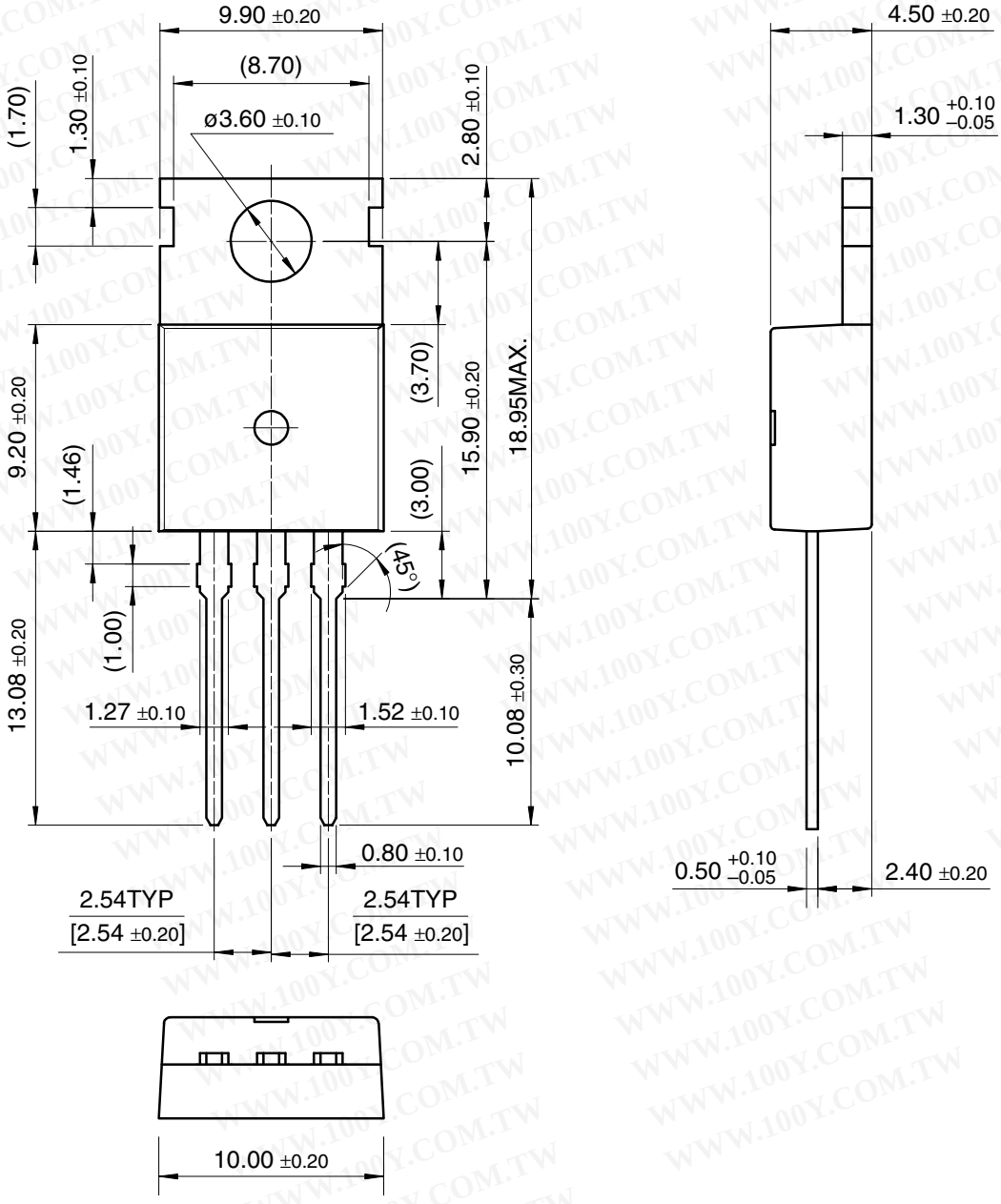
Fig. 5 Programmable Regulator

C_i is required when regulator is located at an appreciable distance from the power supply filter.
C_o improves transient response by reducing AC noise which is present at the output.
Since I ADJ is controlled to less than 100µA, the error associated with this term is negligible in most applications.

TO-220 Package Dimensions

FAIRCHILD SEMICONDUCTOR™

TO-220 (FS PKG CODE AE)



Dimensions in Millimeters

August 1999, Rev B

TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx™
Bottomless™
CoolFET™
CROSSVOLT™
E^2CMOS™
FACT™
FACT Quiet Series™
FAST®
FASTr™
GTO™
HiSeC™
ISOPLANAR™
MICROWIRE™
POP™
PowerTrench®
QFET™
QS™
Quiet Series™
SuperSOT™-3
SuperSOT™-6
SuperSOT™-8
SyncFET™
TinyLogic™
UHC™
VCX™

DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION.

As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.

2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

PRODUCT STATUS DEFINITIONS

Definition of Terms

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.