



LM317

LINEAR INTEGRATED CIRCUIT

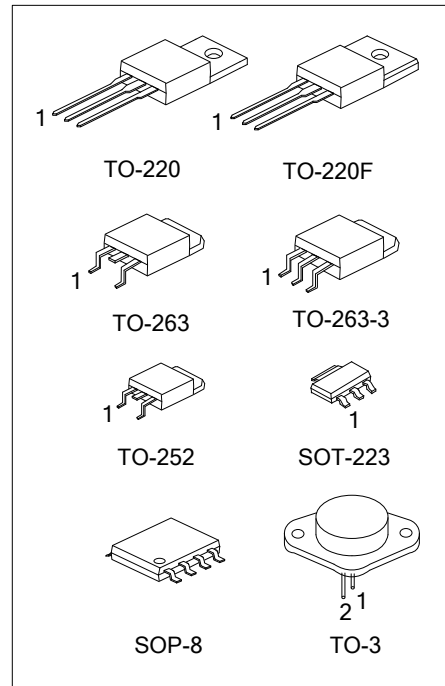
**HIGH CURRENT 1.3V TO 37V
ADJUSTABLE VOLTAGE
REGULATOR**

■ **DESCRIPTION**

The UTC **LM317** is an adjustable 3-terminal positive voltage regulator, designed to supply 1A of output current with voltage adjustable from 1.3V ~ 37V.

■ **FEATURES**

- *Output voltage adjustable from 1.3V ~ 37V
- *Output current in excess of 1A
- *Internal short circuit protection.
- *Internal over temperature protection.
- *Output transistor safe area compensation



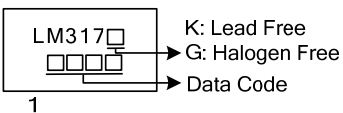
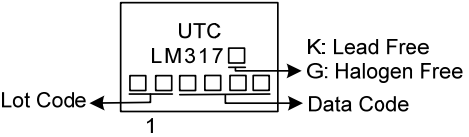
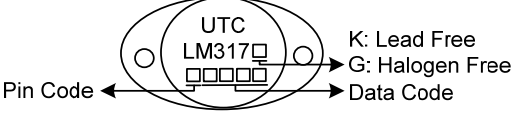
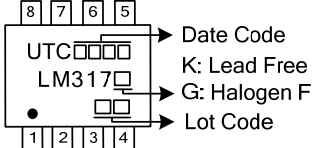
■ **ORDERING INFORMATION**

Ordering Number		Package	Pin Assignment								Packing
Lead Free	Halogen Free		1	2	3	4	5	6	7	8	
LM317K-AA3-R	LM317G-AA3-R	SOT-223	ADJ	O	I	-	-	-	-	-	Tape Reel
LM317K-TA3-T	LM317G-TA3-T	TO-220	ADJ	O	I	-	-	-	-	-	Tube
LM317K-TF3-T	LM317G-TF3-T	TO-220F	ADJ	O	I	-	-	-	-	-	Tube
LM317K-TN3-R	LM317G-TN3-R	TO-252	ADJ	O	I	-	-	-	-	-	Tape Reel
LM317K-TQ2-R	LM317G-TQ2-R	TO-263	ADJ	O	I	-	-	-	-	-	Tape Reel
LM317K-TQ2-T	LM317G-TQ2-T	TO-263	ADJ	O	I	-	-	-	-	-	Tube
LM317K-TQ3-R	LM317G-TQ3-R	TO-263-3	ADJ	O	I	-	-	-	-	-	Tape Reel
LM317K-TQ3-T	LM317G-TQ3-T	TO-263-3	ADJ	O	I	-	-	-	-	-	Tube
LM317K-T30-Y	LM317G-T30-Y	TO-3	I	ADJ	O	-	-	-	-	-	Tray
LM317K-T30-A-Y	LM317G-T30-A-Y	TO-3	ADJ	I	O	-	-	-	-	-	Tray
LM317K-S08-R	LM317G-S08-R	SOP-8	I	O	O	ADJ	NC	O	O	NC	Tape Reel

Note: 1. Pin Assignment: I: V_{IN} O: V_{OUT}
2. Pin 3 on TO-3 is case

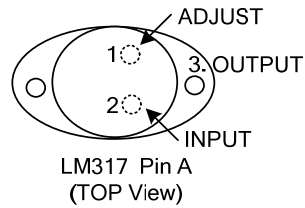
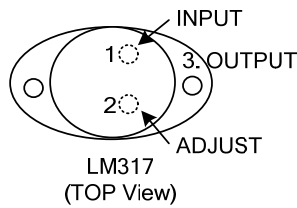
<p>LM317G-T30-Y-R</p>	<p>(1) R: Tape Reel, T: Tube, Y: Tray (2) refer to Pin Assignment (3) AA3: SOT-223, TA3: TO-220, TF3: TO-220F, TN3: TO-252, TQ2: TO-263, TQ3: TO-263-3 T30: TO-3, S08: SOP-8 (4) G: Halogen Free and Lead Free, K: Lead Free</p>
-----------------------	--

MARKING

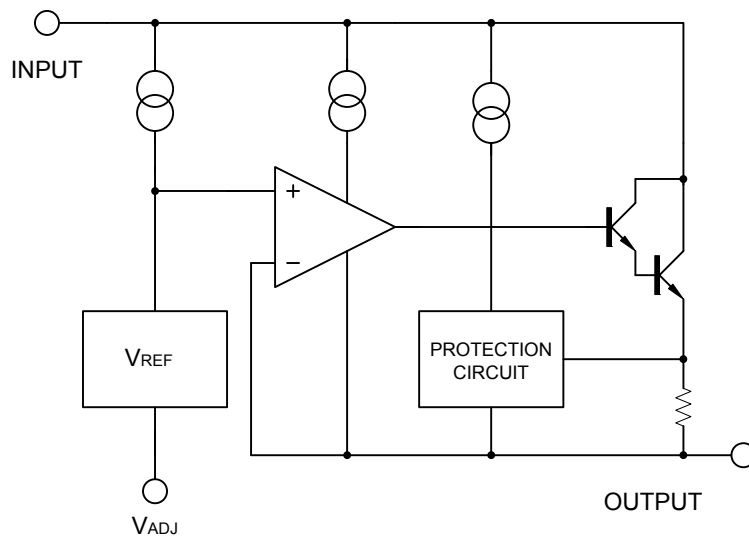
PACKAGE	MARKING
SOT-223	 <p>K: Lead Free G: Halogen Free Data Code</p>
TO-220 TO-220F TO-252 TO-263 TO-263-3	 <p>UTC LM317 Lot Code K: Lead Free G: Halogen Free Data Code</p>
TO-3	 <p>UTC LM317 Pin Code K: Lead Free G: Halogen Free Data Code</p>
SOP-8	 <p>UTC LM317 Date Code K: Lead Free G: Halogen F Lot Code</p>

PIN CONFIGURATION

For TO-3



BLOCK DIAGRAM



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

PARAMETER	SYMBOL	RATINGS	UNIT
Input - Output Voltage Difference	V _{IN} -V _{OUT}	40	V
Power Dissipation	P _D	Internal limited	
Junction Temperature	T _J	+125	°C
Operating Temperature	T _{OPR}	-40 ~ +85	°C
Storage Temperature	T _{STG}	-40 ~ +150	°C

Note: Absolute maximum ratings are stress ratings only and functional device operation is not implied. The device could be damaged beyond Absolute maximum ratings.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT	
Junction-to-Ambient	θ _{JA}	TO-252	112	°C/W
		TO-220/TO-220F	65	
		TO-263/TO-263-3		
		SOT-223	165	
		TO-3	35	
		SOP-8	190	
Junction-to-Case	θ _{JC}	TO-252	12	°C/W
		TO-220/TO-263	5	
		TO-263-3		
		TO-220F	7.8	
		SOT-223	23	
		TO-3	3	
		SOP-8	45	

■ ELECTRICAL CHARACTERISTICS

(V_{IN}-V_{OUT}=5V, I_{OUT}=10mA, T_A=25°C, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
Line Regulation	ΔV _{OUT} /V _{OUT}	3V ≅ V _{IN} -V _{OUT} ≅ 40V		0.01	0.04	%/V	
Load Regulation	ΔV _{OUT}	10mA ≅ I _{OUT} ≅ 1A		V _{OUT} ≅ 5V	5	25	mV
				V _{OUT} ≅ 5V	0.1	0.5	%
Adjustable Pin Current	I _{ADJ}			50	100	μA	
Adjustable Pin Current Change	ΔI _{ADJ}	3V ≅ V _{IN} -V _{OUT} ≅ 40V, 10mA ≅ I _{OUT} ≅ 1A, P _D ≅ 20W		0.2	5	μA	
Reference Voltage	V _{REF}	3V ≅ V _{IN} -V _{OUT} ≅ 40V, 10mA ≅ I _{OUT} ≅ 1A, P _D ≅ 20W	1.20	1.25	1.30	V	
Temperature Stability		T _{MIN} ≅ T _J ≅ T _{MAX}		0.7		%/V _{OUT}	
Minimum Load Current for Regulation	I _{L(MIN)}	V _{IN} -V _{OUT} =40V		3.5	10	mA	
Maximum Output Current	I _{O(MAX)}	V _{IN} -V _{OUT} =40V, P _D ≅ 20W	0.2	0.3		A	
RMS Noise vs. % of V _{OUT}	eN	10Hz ≅ f ≅ 10KHz		0.003		%/V _{OUT}	
Ripple Rejection	RR	V _{OUT} =10V, f=120Hz		C _{ADJ} =0	65	dB	
				C _{ADJ} =10μF	66		80

Note: C_{ADJ} is connected between Adjust pin and Ground.

APPLICATION CIRCUITS

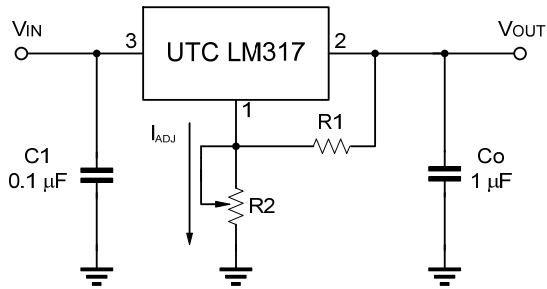


Fig.1 Programmable voltage regulator

$$V_{OUT} = 1.25V * (1 + R2/R1) + I_{ADJ} * R2$$

C1 is required when regulator is located an appreciated distance from power supply. Co is needed to improve transient response.

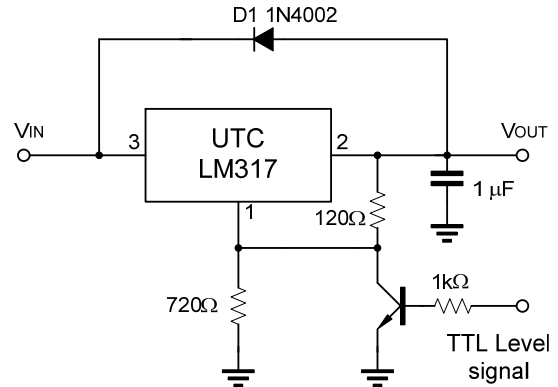


Fig.2 Regulator with On-off control

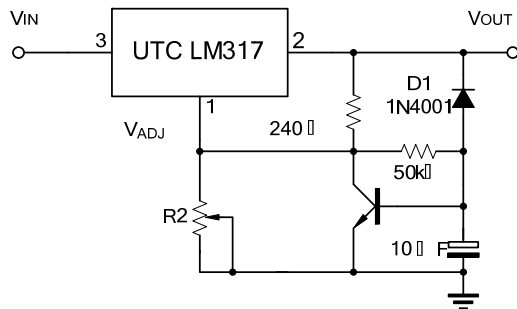
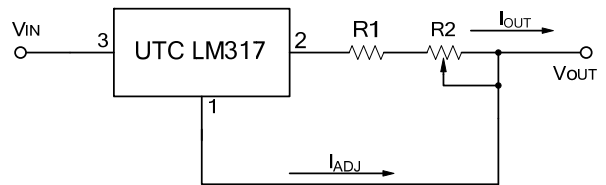


Fig.3 Soft Start Application



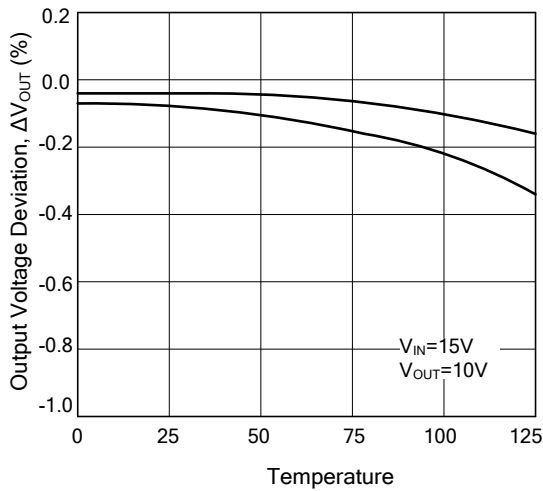
$$I_{O(MAX)} = \left(\frac{V_{REF}}{R1} \right) + I_{ADJ} = \frac{1.25V}{R1}$$

$$I_{O(MIN)} = \left(\frac{V_{REF}}{R1+R2} \right) + I_{ADJ} = \frac{1.25V}{R1+R2}$$

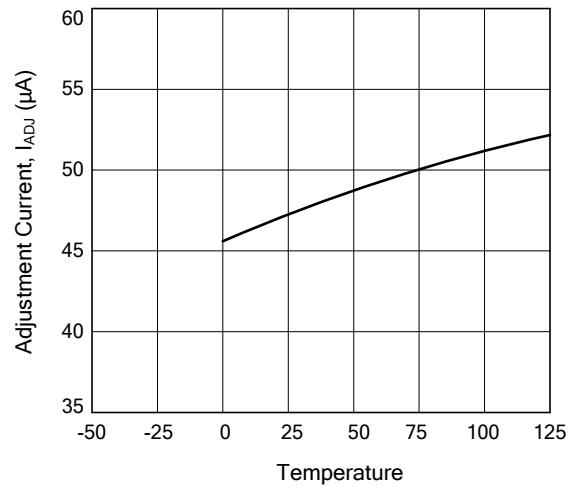
Fig.4 Constant Current Application

TYPICAL CHARACTERISTICS

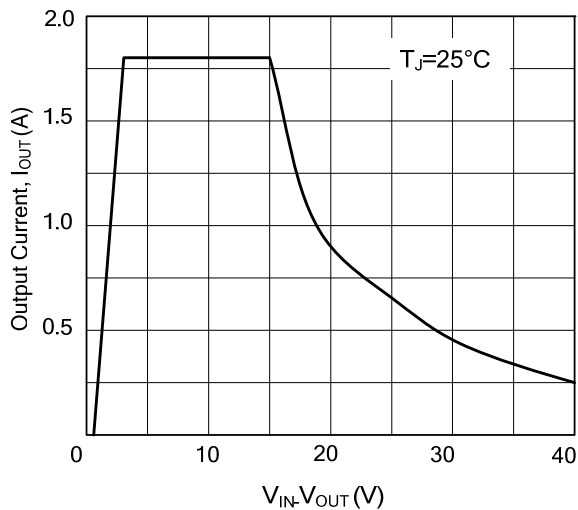
Load Regulation vs. temperature



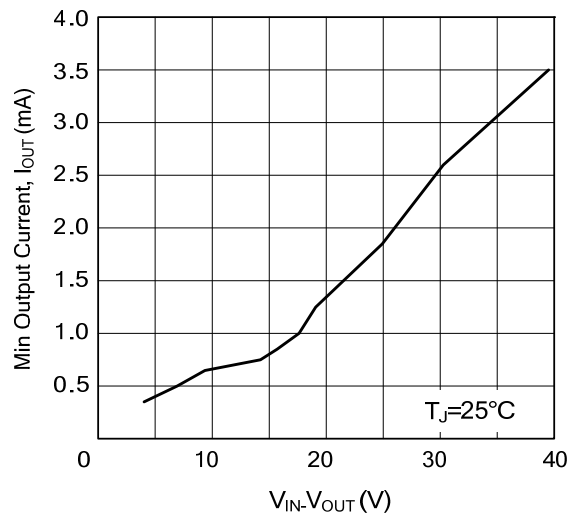
Adjustment Current vs. Temperature



Current Limit



Minimum Operating Current



UTC assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all UTC products described or contained herein. UTC products are not designed for use in life support appliances, devices or systems where malfunction of these products can be reasonably expected to result in personal injury. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice.