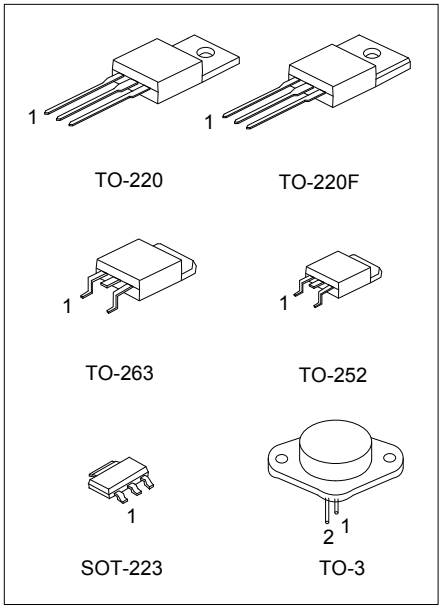
LM317

LINEAR INTEGRATED CIRCUIT

HIGH CURRENT 1.3V TO 37V ADJUSTABLE VOLTAGE REGULATOR



Lead-free: LM317K
Halogen-free: LM317G

■ 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

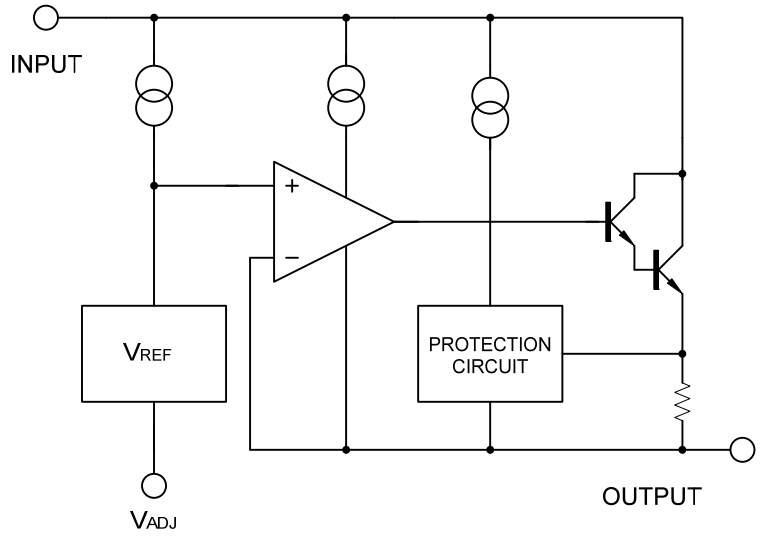
Ordering Number			Package	Pin Assignment			Packing
Normal	Lead Free	Halogen Free		1	2	3	
LM317-AA3-R	LM317K-AA3-R	LM317G-AA3-R	SOT-223	ADJ	O	I	Tape Reel
LM317-TA3-T	LM317K-TA3-T	LM317G-TA3-T	TO-220	ADJ	O	I	Tube
LM317-TF3-T	LM317K-TF3-T	LM317G-TF3-T	TO-220F	ADJ	O	I	Tube
LM317-TN3-R	LM317K-TN3-R	LM317G-TN3-R	TO-252	ADJ	O	I	Tape Reel
LM317-TN3-T	LM317K-TN3-T	LM317G-TN3-T	TO-252	ADJ	O	I	Tube
LM317-TQ2-R	LM317K-TQ2-R	LM317G-TQ2-R	TO-263	ADJ	O	I	Tape Reel
LM317-TQ2-T	LM317K-TQ2-T	LM317G-TQ2-T	TO-263	ADJ	O	I	Tube
LM317-T30-Y	LM317K-T30-Y	LM317G-T30-Y	TO-3	I	ADJ	O	Tray

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

LM317K-AA3-R
(1)Packing Type
(2)Package Type
(3)Lead Plating

(1) R: Tape Reel, T: Tube, Y: Tray
(2) AA3: SOT-223, TA3: TO-220, TF3: TO-220F, TN3: TO-252, TQ2: TO-263, T30: TO-3
(3) G: Halogen Free, K: Lead Free, Blank: Pb/Sn

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (Ta=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:1. 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	TO-252	θ_{JA}	112	℃/W
	TO-220/TO-220F		54	
	TO-263		64	
	SOT-223		165	
	TO-3		35	
Junction-to-Case	TO-252	θ_{JC}	12	℃/W
	TO-220/TO-220F		5	
	TO-263		5	
	SOT-223		23	
	TO-3		3	

■ ELECTRICAL CHARACTERISTICS

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

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Line Regulation	$\Delta V_{OUT}/V_{OUT}$	$3V \leqq V_{IN}$-$V_{OUT} \leqq 40V$			0.01	0.04	%/V
Load Regulation	ΔV_{OUT}	$10mA \leqq I_{OUT} \leqq 1A$	$V_{OUT} \leqq 5V$		5	25	mV
			$V_{OUT} \geqq 5V$		0.1	0.5	%
Adjustable Pin Current	I_{ADJ}				50	100	μA
Adjustable Pin Current Change	ΔI_{ADJ}	$3V \leqq V_{IN}$-$V_{OUT} \leqq 40V$, $10mA \leqq I_{OUT} \leqq 1A$, $P_D \leqq 20W$			0.2	5	μA
Reference Voltage	V_{REF}	$3V \leqq V_{IN}$-$V_{OUT} \leqq 40V$, $10mA \leqq I_{OUT} \leqq 1A$, $P_D \leqq 20W$		1.20	1.25	1.30	V
Temperature Stability		$T_{MIN} \leqq T_J \leqq T_{MAX}$			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, $P_D \leqq 20W$		0.2	0.3		A
RMS Noise vs. %of V_{OUT}	eN	$10H_Z \leqq f \leqq 10KH_Z$			0.003		%/V_{OUT}
Ripple Rejection	RR	V_{OUT}=10V,f=120H_Z	C_{ADJ}=0		65		dB
			C_{ADJ}=10μF	66	80		

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

■ APPLICATION CIRCUITS

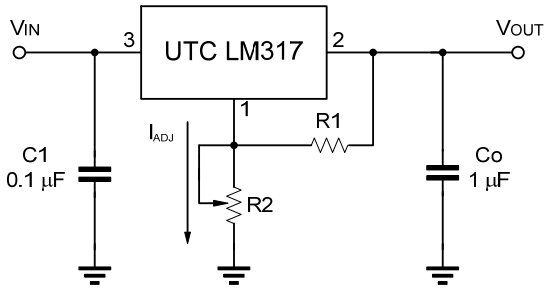


Fig.1 Programmable voltage regulator

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.

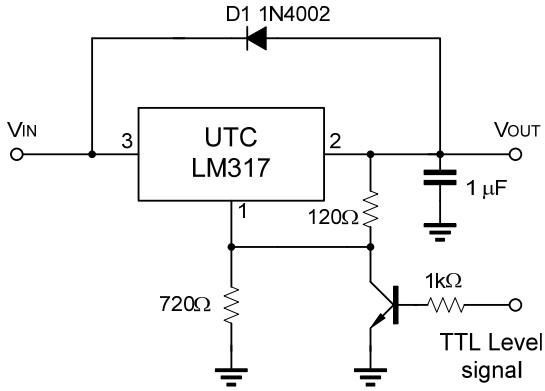


Fig.2 Regulator with On-off control

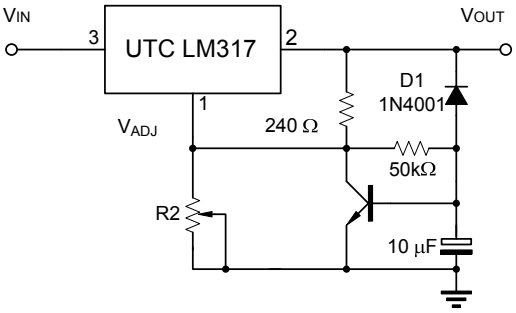
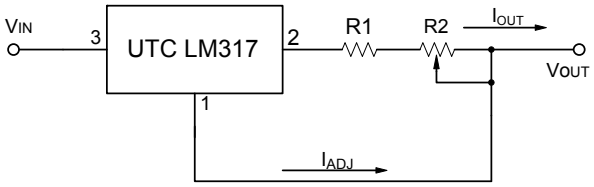


Fig.3 Soft Start Application



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

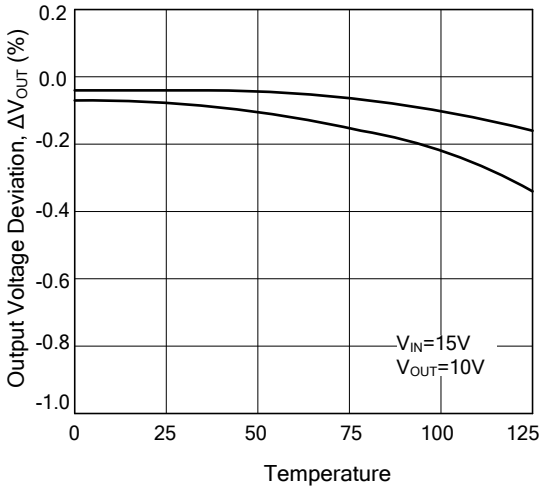
$I_{O(MIN)}=(\frac{V_{REF}}{R1+R2})+I_{ADJ}=\frac{1.25V}{R1+R2}$

5mA<I_{OUT}<100mA

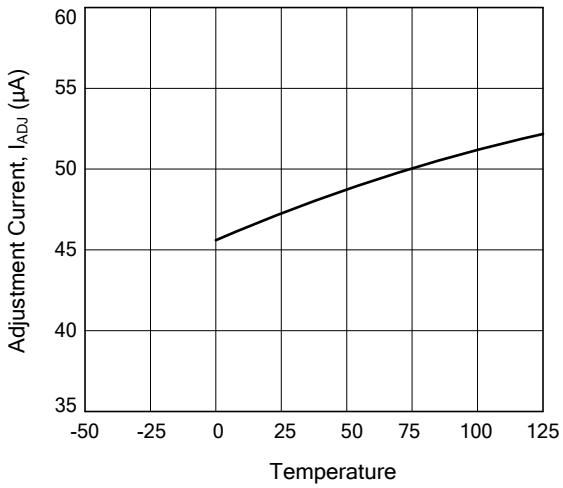
Fig.4 Constant Current Application

■ TYPICAL CHARACTERISTICS

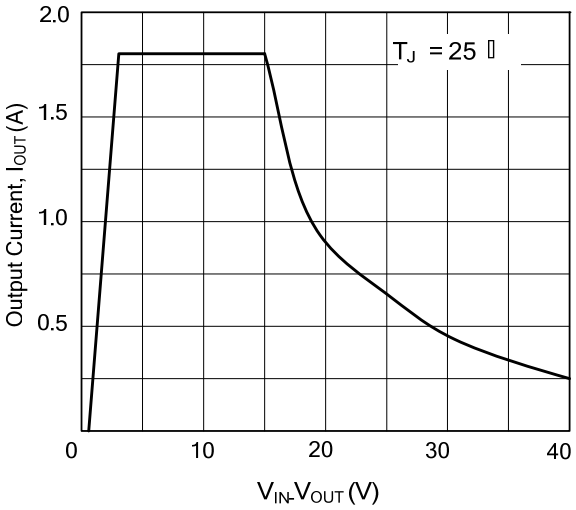
Load Regulation vs. temperature



Adjustment Current vs. Temperature



Current Limit



Minimum Operating Current