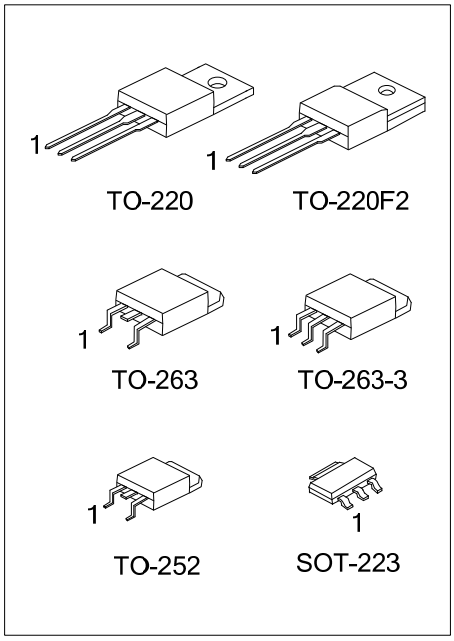
LM317A

LINEAR INTEGRATED CIRCUIT

MEDIUM CURRENT 1.2V TO 37V ADJUSTABLE VOLTAGE REGULATOR



■ DESCRIPTION

The UTC **LM317A** is an adjustable 3-terminal positive voltage regulator, designed to supply 1.5A of output current with voltage adjustable from 1.2V ~ 37V.

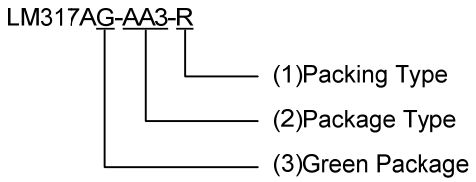
■ FEATURES

* Output voltage adjustable from 1.2V ~ 37V
* Output current in excess of 1.5A
* Internal thermal overload protection
* Internal short circuit current limiting
* Output transistor safe area compensation

■ ORDERING INFORMATION

Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
LM317AL-AA3-R	LM317AG-AA3-R	SOT-223	ADJ	O	I	Tape Reel
LM317AL-TA3-T	LM317AG-TA3-T	TO-220	ADJ	O	I	Tube
LM317AL-TF2-T	LM317AG-TF2-T	TO-220F2	ADJ	O	I	Tube
LM317AL-TN3-R	LM317AG-TN3-R	TO-252	ADJ	O	I	Tape Reel
LM317AL-TQ2-R	LM317AG-TQ2-R	TO-263	ADJ	O	I	Tape Reel
LM317AL-TQ2-T	LM317AG-TQ2-T	TO-263	ADJ	O	I	Tube
LM317AL-TQ3-R	LM317AG-TQ3-R	TO-263-3	ADJ	O	I	Tape Reel
LM317AL-TQ3-T	LM317AG-TQ3-T	TO-263-3	ADJ	O	I	Tube

Note: Pin Assignment: I: V_{IN} O: V_{OUT}

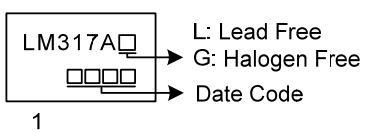
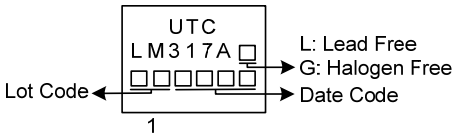


(1) R: Tape Reel, T: Tube

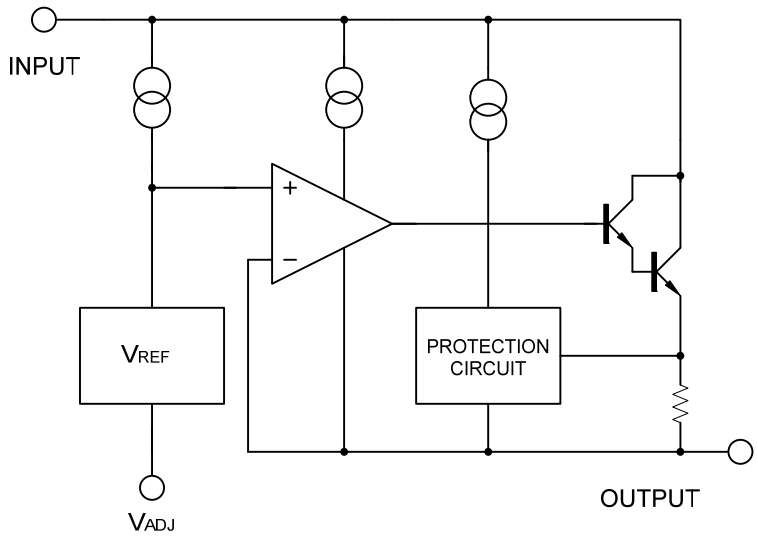
(2) AA3: SOT-223, TA3: TO-220, TF2: TO-220F2
TN3: TO-252, TQ2: TO-263, TQ3: TO-263-3

(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

SOT-223	TO-220 / TO-220F2 / TO-252 / TO-263 / TO-263-3
	

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Input-Output Voltage Differential	V_{IN}-V_{OUT}	40	V
Power Dissipation	P_D	Internally limited	
Junction Temperature	T_J	+150	°C
Operating Temperature	T_{OPR}	-40 ~ +125	°C
Storage Temperature	T_{STG}	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

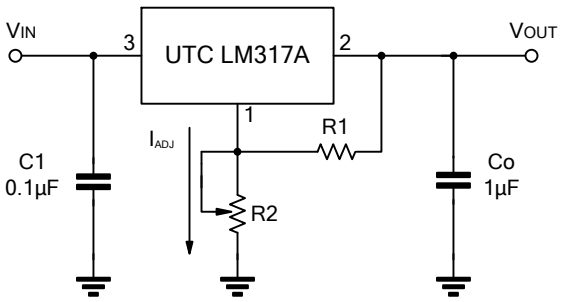
PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-223	θ_{JA}	140	°C/W
	TO-220/TO-220F2		50	°C/W
	TO-252		103	°C/W
	TO-263/TO-263-3		62.5	°C/W
Junction to Case	SOT-223	θ_{JC}	23.5	°C/W
	TO-220/TO-263 TO-263-3		5	°C/W
	TO-220F2		8	°C/W
	TO-252		12	°C/W

■ ELECTRICAL CHARACTERISTICS

(V_{IN}-V_{OUT}=5V, I_{OUT}=0.5A, P_{MAX}=20W, T_A=25°C, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN	TYP	MAX	UNIT
Line Regulation	$\Delta V_{OUT}/V_{OUT}$	$3V \le V_{IN}$-$V_{OUT} \le 40V$, I_{OUT}=100mA			0.01	0.04	%/V
Load Regulation	ΔV_{OUT}	$10mA \le I_{OUT} \le 1.5A$	$V_{OUT} \le 5V$		5	25	mV
			$V_{OUT} \ge 5V$		0.1	0.5	%
Adjustable Pin Current	I_{ADJ}				50	100	μA
Adjustable Pin Current Change	ΔI_{ADJ}	$3V \le V_{IN}$-$V_{OUT} \le 40V$, $10mA \le I_{OUT} \le 500mA$			0.2	5	μA
Reference Voltage	V_{REF}	$3V \le V_{IN}$-$V_{OUT} \le 40V$, $10mA \le I_{OUT} \le 1.5A$, $P_D < P_{MAX}$		1.20	1.25	1.30	V
Temperature Stability		$T_{MIN} \le T_J \le T_{MAX}$			0.7		%/V_{OUT}
Minimum Load Current for Regulation	$I_{L(MIN)}$	V_{IN}-V_{OUT}=40V				4.5	mA
Maximum Output Current	$I_{O(MAX)}$	V_{IN}-V_{OUT}=40V, $P_D \le P_{MAX}$		0.3	0.4		A
		V_{IN}-V_{OUT}=15V, $P_D < P_{MAX}$		1.5	2.2		A
RMS Noise vs. %of V_{OUT}	eN	$10Hz \le f \le 10KHz$			0.003		%/V_{OUT}
Ripple Rejection	RR	V_{OUT}=10V,f=120Hz	C_{ADJ}=0		65		dB
			C_{ADJ}=10μF	66	80		dB

■ APPLICATION CIRCUITS



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.1 Programmable voltage regulator

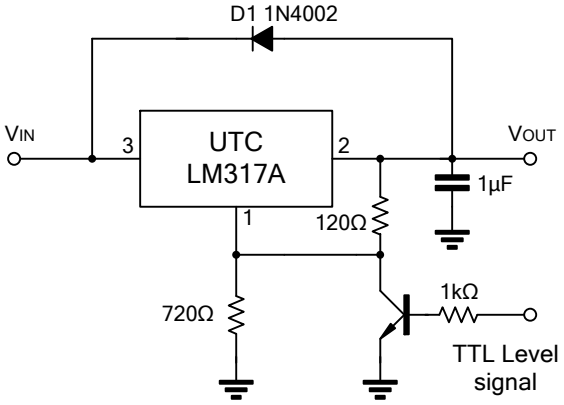


Fig.2 Regulator with On-off control

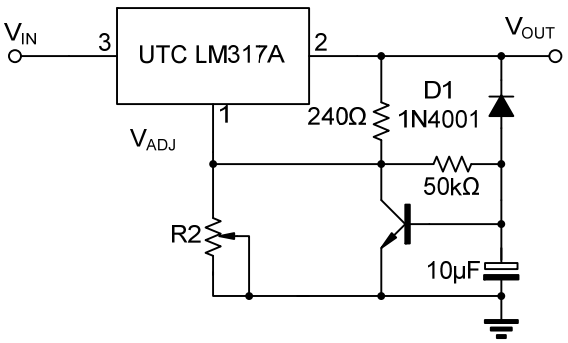
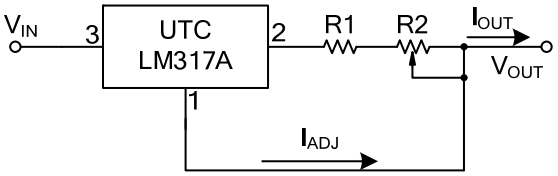


Fig.3 Soft Start Application



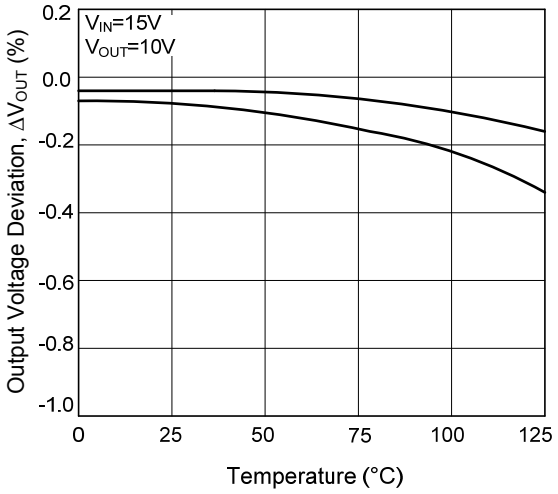
$$I_{O(MAX)} = (\frac{V_{REF}}{R1}) + I_{ADJ} = \frac{1.25V}{R1}$$

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

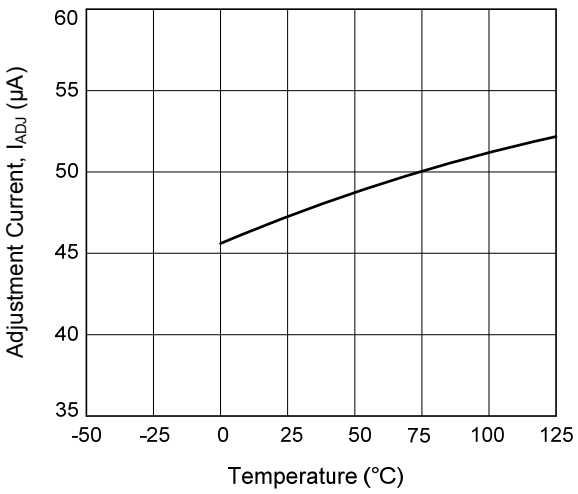
Fig.4 Constant Current Application

■ TYPICAL CHARACTERISTICS

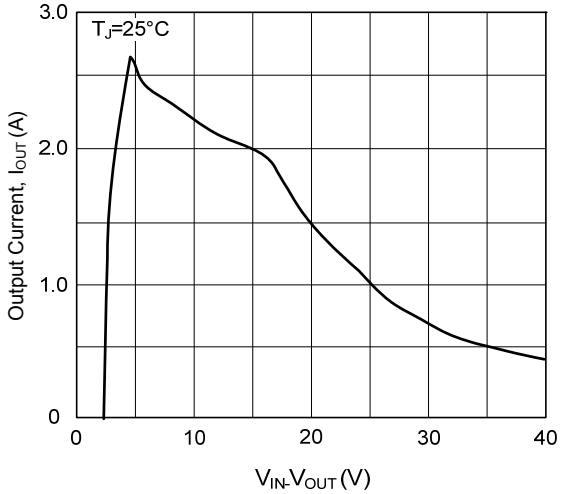
Load Regulation vs. Temperature



Adjustment Current vs. Temperature



Current Limit



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