



# LM317L

## LINEAR INTEGRATED CIRCUIT

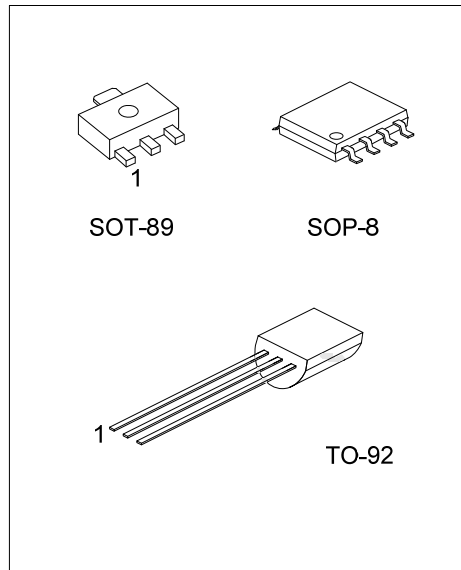
### LOW CURRENT 1.25V TO 37V ADJUSTABLE VOLTAGE REGULATOR

#### DESCRIPTION

The UTC **LM317L** is a monolithic integrated circuit, designed to supply 100mA of output current with voltage adjustable from 1.25V ~ 37V.

#### FEATURES

- \*Output voltage adjustable from 1.25V ~ 37V.
- \*Output current in excess of 100mA
- \*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	4	5	6	7	8	
LM317LK-AB3-R	LM317LG-AB3-R	SOT-89	A	O	I	-	-	-	-	-	Tape Reel
LM317LK-T92-B	LM317LG-T92-B	TO-92	A	O	I	-	-	-	-	-	Tape Box
LM317LK-T92-K	LM317LG-T92-K	TO-92	A	O	I	-	-	-	-	-	Bulk
LM317LK-S08-R	LM317LG-S08-R	SOP-8	I	O	O	A	N	O	O	N	Tape Reel
LM317LK-S08-T	LM317LG-S08-T	SOP-8	I	O	O	A	N	O	O	N	Tube

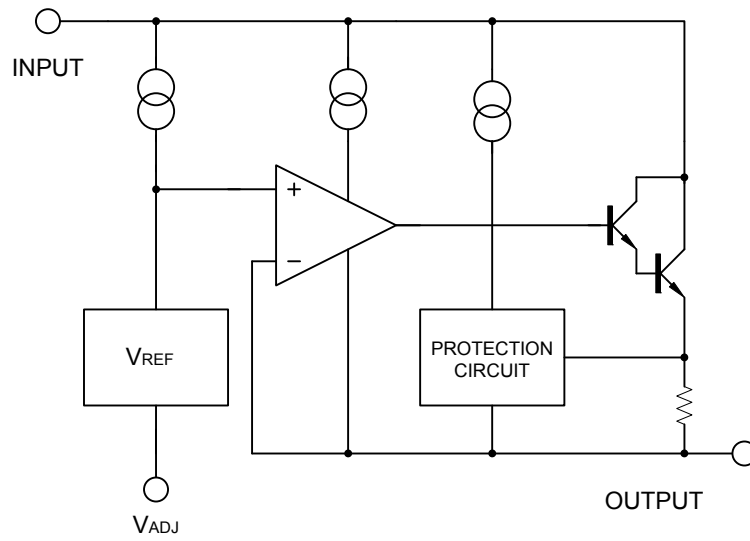
Note: Pin Assignment: A: ADJ I:  $V_{IN}$  O:  $V_{OUT}$  N: No Connection

<p>LM317LG-AB3-R</p>	<p>(1) R: Tape Reel, B: Tape Box, K: Bulk, T: Tube                  (2) AB3: SOT-89, T92: TO-92, S08: SOP-8                  (3) G: Halogen Free and Lead Free, K: Lead Free</p>
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#### MARKING

SOT-89	SOP-8	TO-92

### ■ BLOCK DIAGRAM



### ■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATING	UNIT
Input-Output Differential Voltage	$V_{IN}-V_{OUT}$	40	V
Power Dissipation	$P_D$	Internally Limited	
Junction Temperature	$T_J$	+125	°C
Operating Junction Temperature	$T_{OPR}$	-40 ~ +125	°C
Storage Temperature Range	$T_{STR}$	-40 ~ +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 CHARACTERISTICS

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	SOT-89	180	°C/W
	SOP-8	175	°C/W
	TO-92	190	°C/W
Junction to Case	SOT-89	50	°C/W
	SOP-8	27	°C/W
	TO-92	83	°C/W

### ■ ELECTRICAL CHARACTERISTICS

( $V_{IN}-V_{OUT}=5V$ ,  $I_{OUT}=40mA$ ,  $T_a=25^{\circ}C$ , unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Line Regulation	$\Delta V_{OUT}/V_{OUT}$	$3V \leq V_{IN}-V_{OUT} \leq 40V$ , $I_{LOAD} < 20mA$		0.01	0.04	%/V
Load Regulation	$\Delta V_{OUT}$	$5mA \leq I_{OUT} \leq 100mA$		5	25	mV
				0.1	0.5	%
Adjustable Pin Current	$I_{ADJ}$			50	100	$\mu A$
Adjustable Pin Current Change	$\Delta I_{ADJ}$	$3V \leq V_{IN}-V_{OUT} \leq 40V$ , $5mA \leq I_{OUT} \leq 100mA$ , $P_D < 625mW$		0.2	5	$\mu A$
Reference Voltage	$V_{REF}$	$3V \leq V_{IN}-V_{OUT} \leq 40V$ , $5mA \leq I_{OUT} \leq 100mA$ , $P_D < 625mW$	1.20	1.25	1.30	V
Temperature Stability		$T_{MIN} \leq T_J \leq T_{MAX}$		0.7		%/ $V_{OUT}$
Minimum Load Current for Regulation	$I_{L(MIN)}$	$V_{IN}-V_{OUT}=40V$		3.5	10	mA
Maximum Output Current	$I_{O(MAX)}$	$V_{IN}-V_{OUT} \leq 40V$ , $P_D < 625mW$		15		mA
RMS Noise vs. %of $V_{OUT}$	eN	$10Hz \leq f \leq 10KHz$		0.003	0.01	%/ $V_{OUT}$
Ripple Rejection	RR	$V_{OUT}=10V, f=120Hz$ ,		65		dB
			$C_{ADJ}=10\mu F$	66	80	dB

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

## APPLICATION CIRCUITS

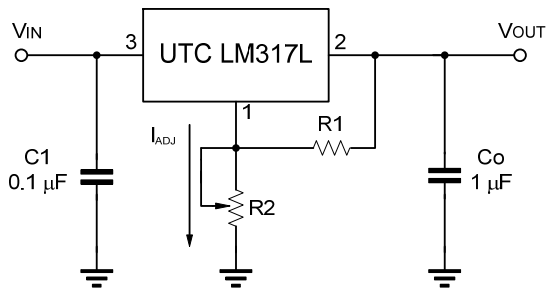


Fig.1 Programmable voltage regulator

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

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

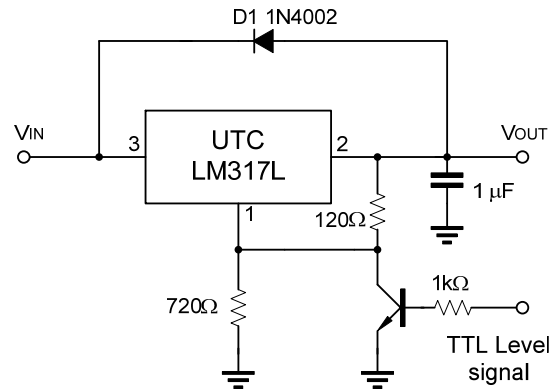


Fig.2 Regulator with On-off control

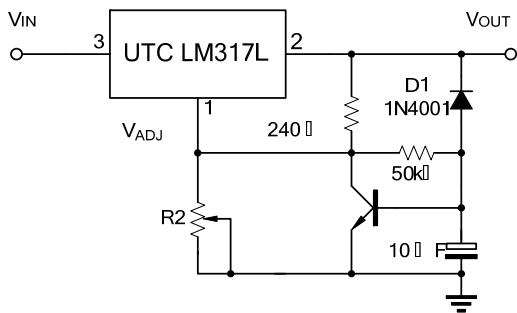
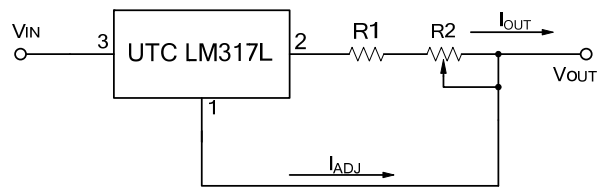


Fig.3 Soft Start Application



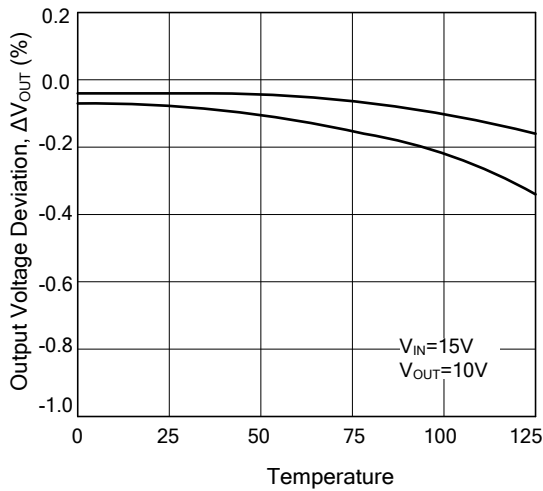
$$I_{O(MAX)} = \left( \frac{V_{REF}}{R1} \right) + I_{ADJ} = \frac{1.25V}{R1}$$

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

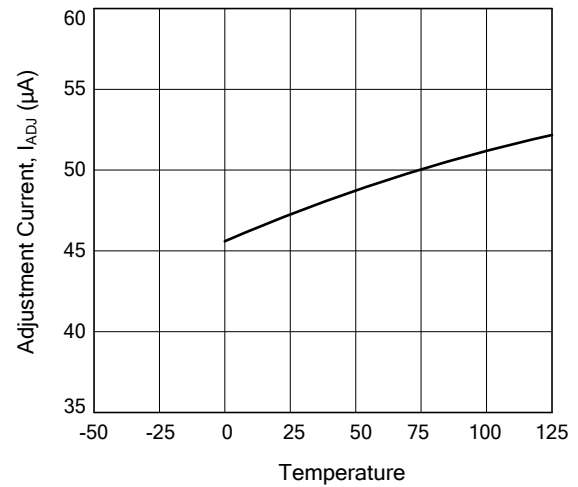
Fig.4 Constant Current Application

## TYPICAL CHARACTERISTICS

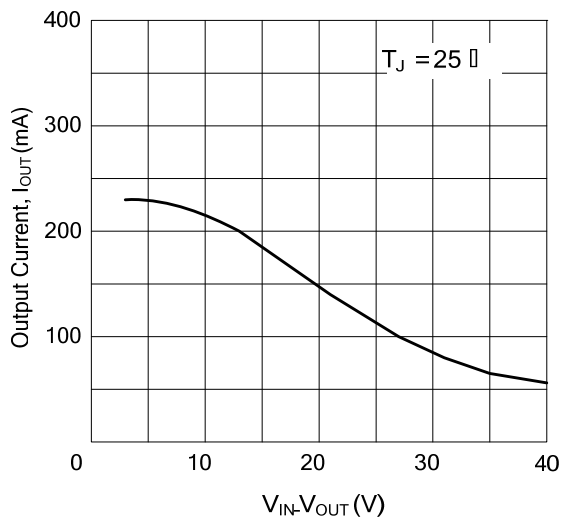
Load Regulation vs. temperature



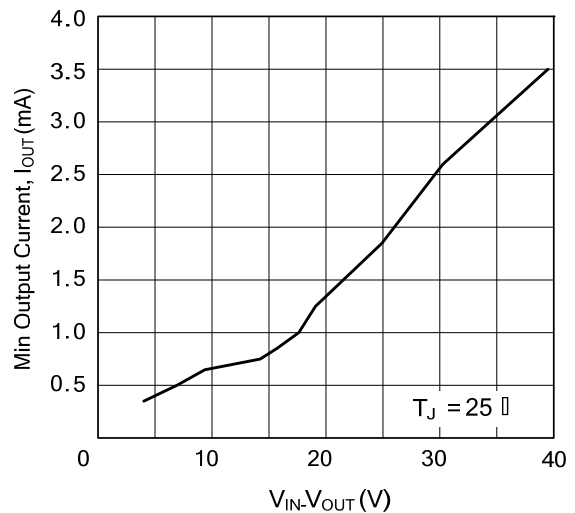
Adjustment Current vs. Temperature



Current Limit



Minimum Operating Current



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