



LM317L

LINEAR INTEGRATED CIRCUIT

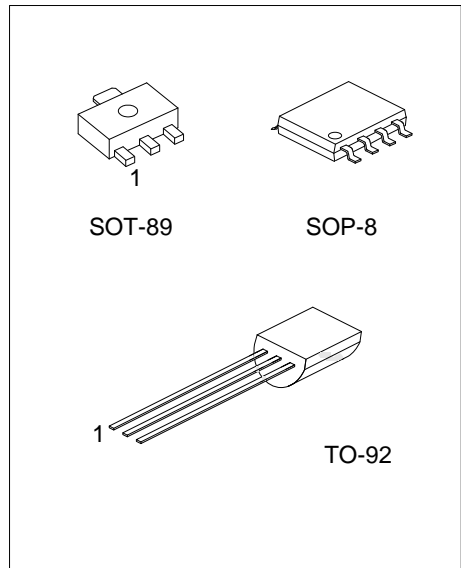
LOW CURRENT 1.25V TO 37V ADJUSTABLE VOLTAGE REGULATOR

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

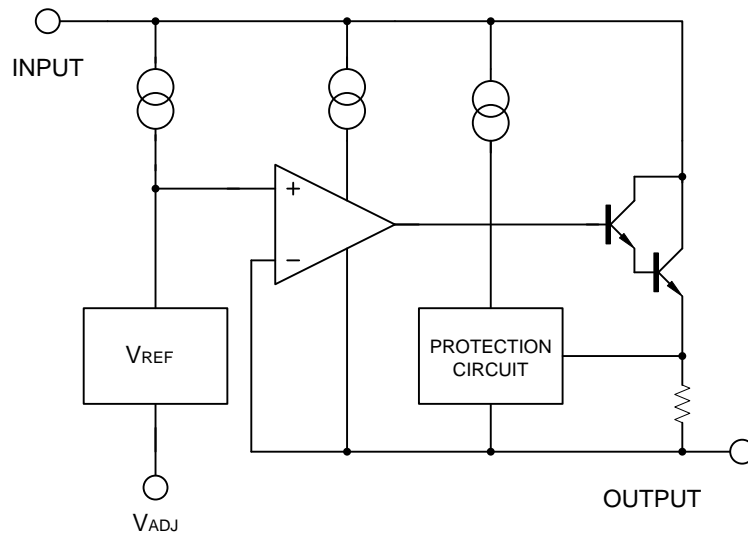
Note: Pin Assignment: A: ADJ I: V_{IN} O: V_{OUT} N: No Connection

<p>LM317LG-AB3-R</p> <p>(1) Packing Type (2) Package Type (3) Green Package</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
<p>→ Date Code → K: Lead Free → G: Halogen Free</p>	<p>→ Date Code → K: Lead Free → G: Halogen Free → Lot Code</p>	<p>→ K: Lead Free → G: Halogen Free → Date Code</p>

■ 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	ΔV_{OUT}	$5mA \leq I_{OUT} \leq 100mA$		5	25	mV
				0.1	0.5	%
Adjustable Pin Current	I_{ADJ}			50	100	μA
Adjustable Pin Current Change	ΔI_{ADJ}	$3V \leq V_{IN}-V_{OUT} \leq 40V$, $5mA \leq I_{OUT} \leq 100mA$, $P_D < 625mW$		0.2	5	μA
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

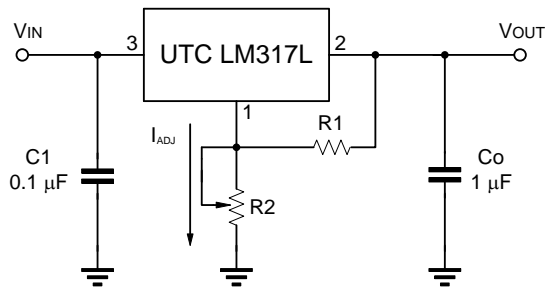


Fig.1 Programmable voltage regulator

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

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

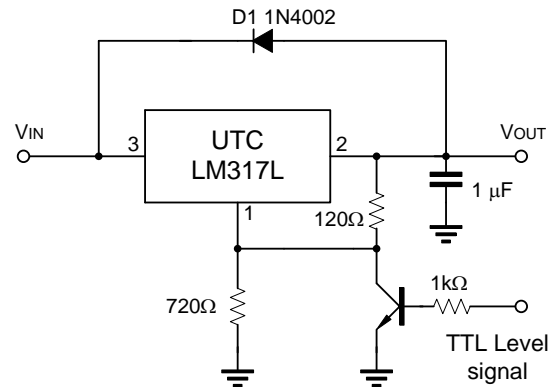


Fig.2 Regulator with On-off control

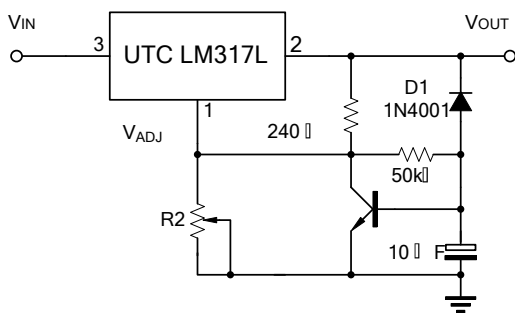
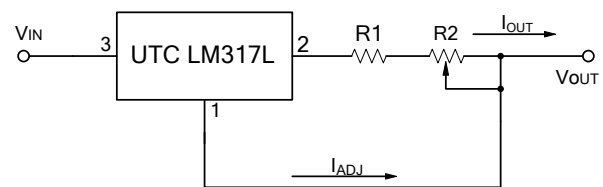


Fig.3 Soft Start Application



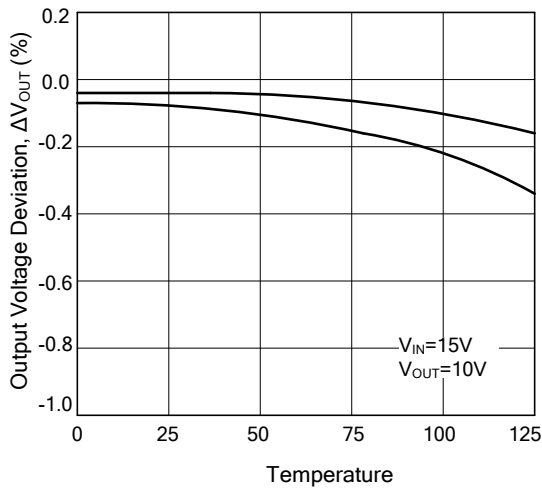
$$I_{O(MAX)} = \left(\frac{V_{REF}}{R1} \right) + I_{ADJ} = \frac{1.25V}{R1}$$

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

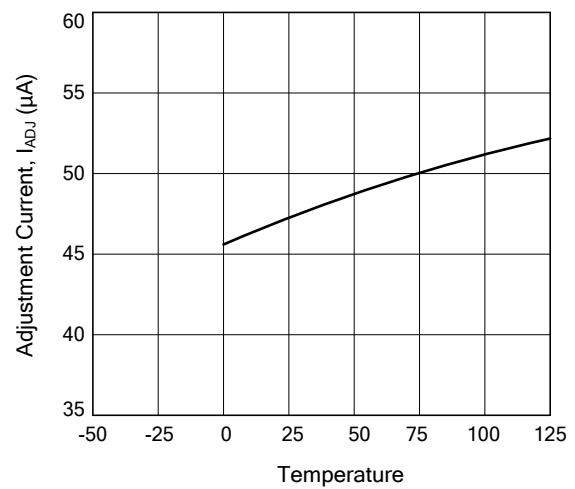
Fig.4 Constant Current Application

■ TYPICAL CHARACTERISTICS

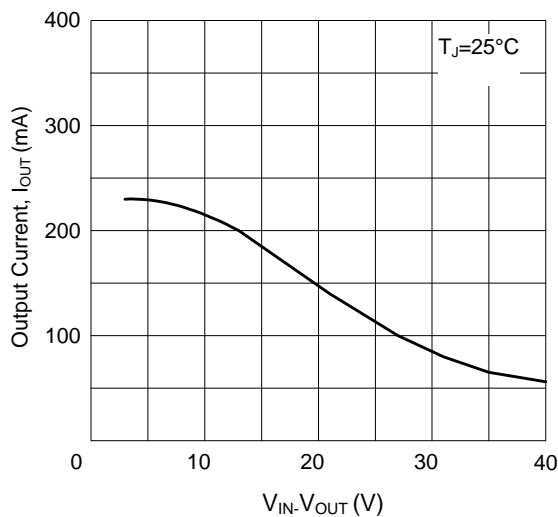
Load Regulation vs. temperature



Adjustment Current vs. Temperature



Current Limit



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