



LM317

LINEAR INTEGRATED CIRCUIT

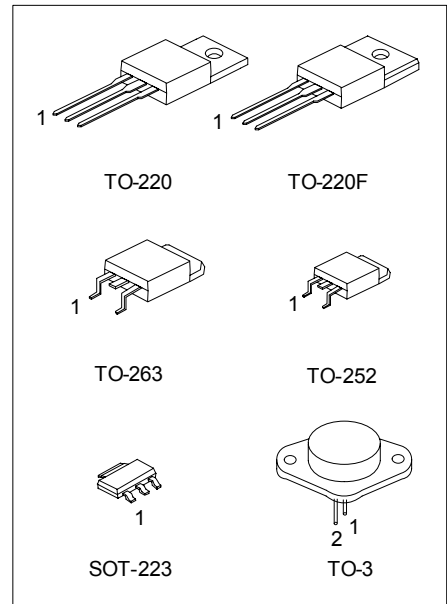
HIGH CURRENT 1.3V TO 37V ADJUSTABLE VOLTAGE REGULATOR

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



*Pb-free plating product number: LM317K

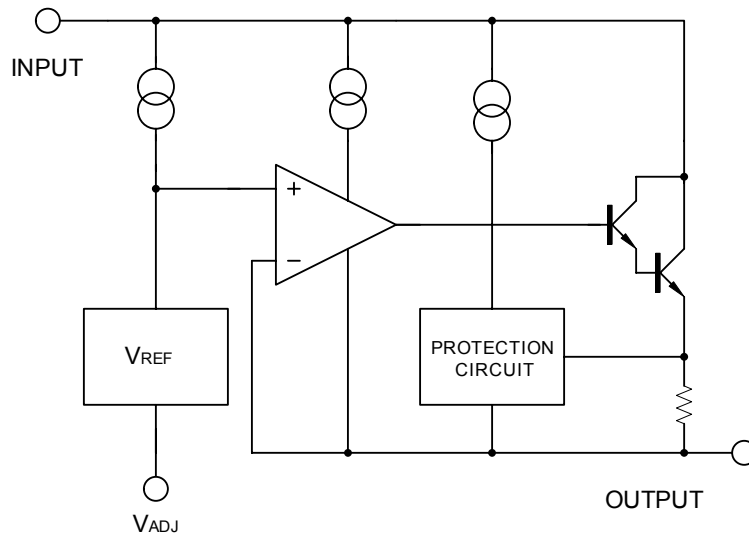
ORDERING INFORMATION

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

<p>LM317K-AA3-R</p> <p>(1)Packing Type (2)Package Type (3)Lead Plating</p>	<p>(1) R: Tape Reel, T: Tube, Y: Tray (2) AA3: SOT-223, TA3: TO-220, TF3: TO-220F, TN3: TO-252, TQ2: TO-263 (3) K: Lead Free Plating Blank: Pb/Sn</p>
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■ 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}	0 ~ +125	°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	
Thermal Resistance Junction-Case	TO-252	θ_{JC}	12	/W
	TO-220/TO-220F	θ_{JC}	5	/W
	TO-263	θ_{JC}	5	/W
	SOT-223	θ_{JC}	23	/W
	TO-3	θ_{JC}	3	/W
Thermal Resistance Junction-Ambient	TO-252	θ_{JA}	112	/W
	TO-220/TO-220F	θ_{JA}	54	/W
	TO-263	θ_{JA}	64	/W
	SOT-223	θ_{JA}	165	/W
	TO-3	θ_{JA}	35	/W

■ ELECTRICAL CHARACTERISTICS

($V_{IN}-V_{OUT}=5V$, $I_{OUT}=10mA$, $T_a=25^\circ C$, unless otherwise specified.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Line Regulation	$\Delta V_{OUT}/V_{OUT}$	3V $V_{IN}-V_{OUT}$ 40V		0.01	0.04	%/V
Load Regulation	ΔV_{OUT}	10mA I_{OUT} 1A		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	0.3	0.4		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
			$C_{ADJ}=10\mu F$	66	80	

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

APPLICATION CIRCUITS

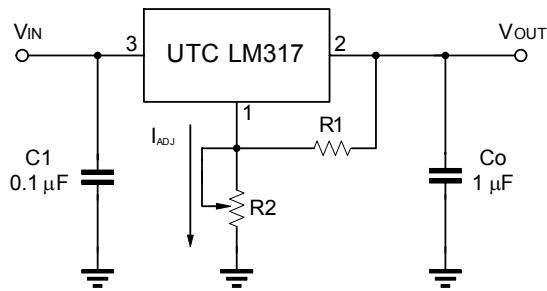


Fig.1 Programmable voltage regulator

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

C 1 is required when regulator is located an appreciated distance from power supply . Co is needed to improve transient response .

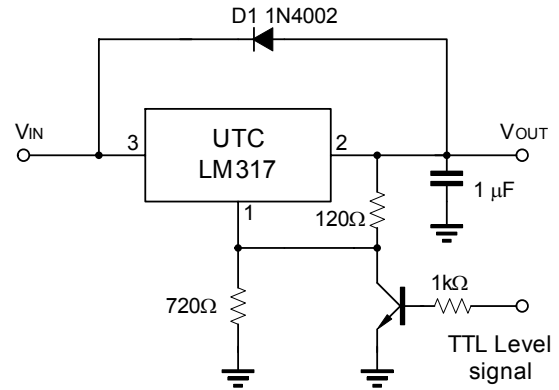


Fig.2 Regulator with On-off control

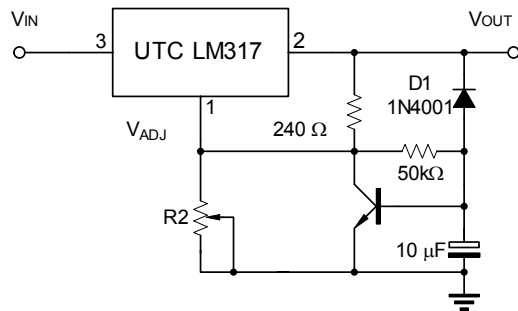
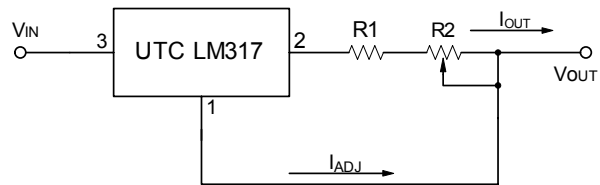


Fig.3 Soft Start Application



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

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

$$5mA < I_{OUT} < 100mA$$

Fig.4 Constant Current Application

TYPICAL CHARACTERISTICS

Fig.1 Load Regulation vs . temperature

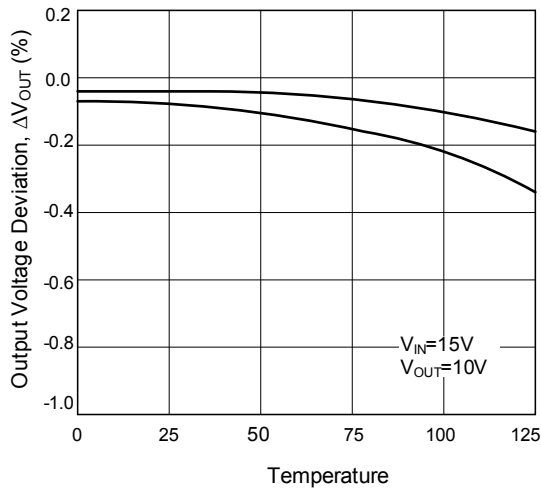


Fig.2 Adjustment Current vs . Temperature

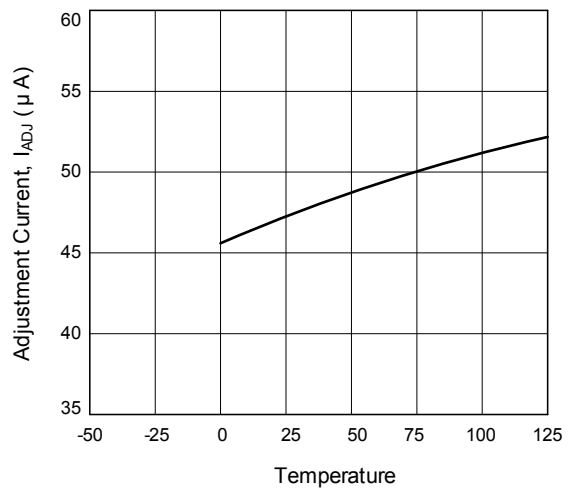


Fig. 3 Current Limit

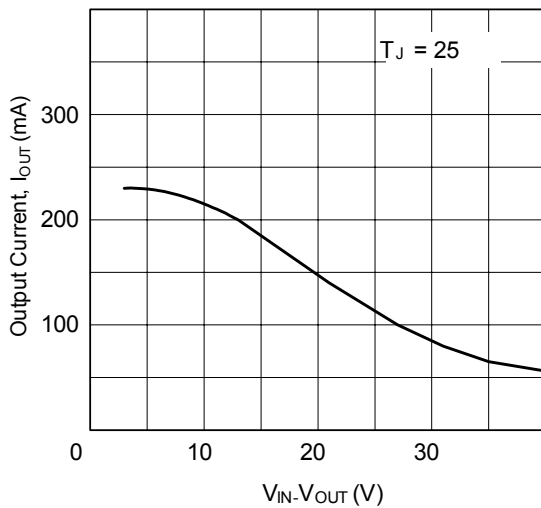
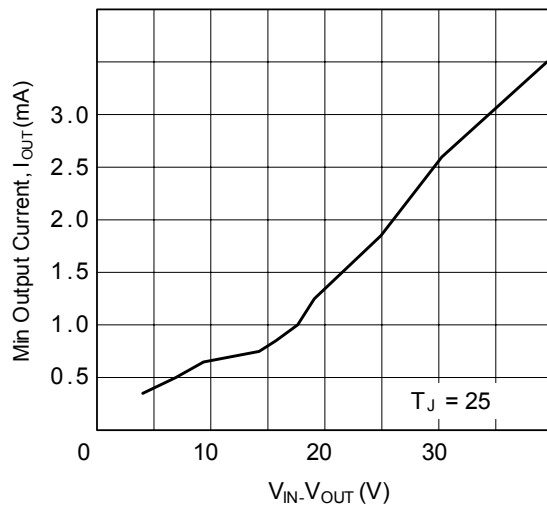


Fig. 4 Minimum Operating Current



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