

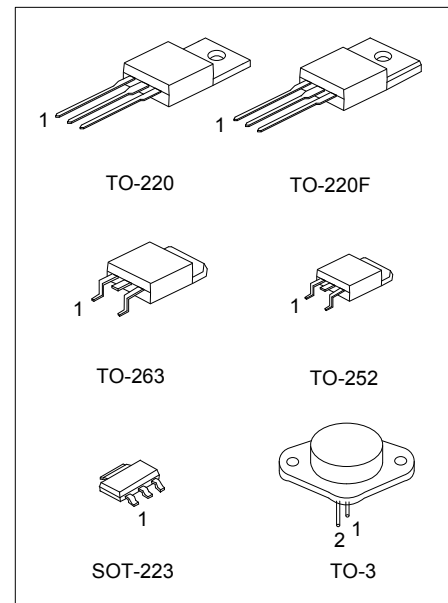
HIGH CURRENT 1.3V TO 37V ADJUSTABLE VOLTAGE REGULATOR

■ DESCRIPTION

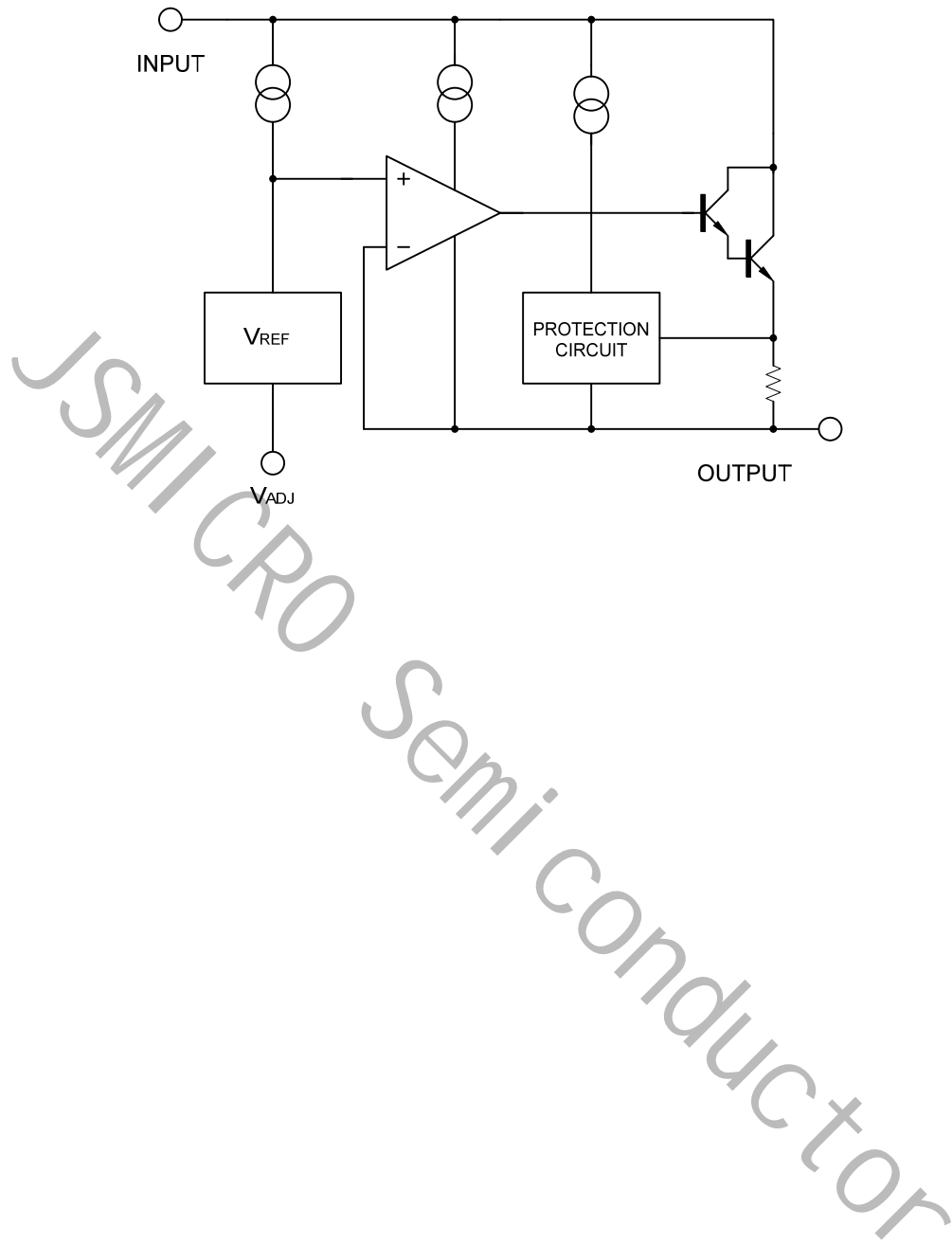
The **LM317** is an adjustable 3-terminal positive voltage regulator, designed to supply 1A of output current with voltage adjustable from 1.3V ~ 37V.

■ 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



■ 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	θ _{JA}	TO-252	112	°C/W
		TO-220/TO-220F	54	
		TO-263	64	
		SOT-223	165	
		TO-3	35	
Junction-to-Case	θ _{JC}	TO-252	12	°C/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	ΔV _{OUT} /V _{OUT}	3V ≦ V _{IN-V_{OUT}} ≦ 40V		0.01	0.04	%/V	
Load Regulation	ΔV _{OUT}	10mA ≦ I _{OUT} ≦ 1A		V _{OUT} ≦ 5V	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	0.2	0.3		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} =10μF	66		80

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

■ APPLICATION CIRCUITS

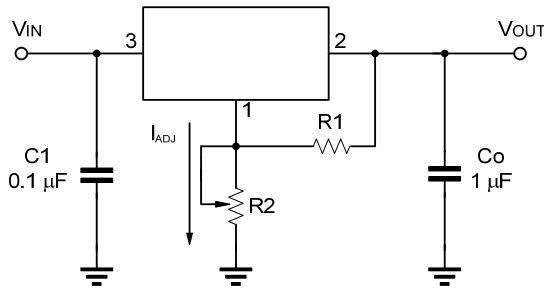


Fig.1 Programmable voltage regulator

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

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

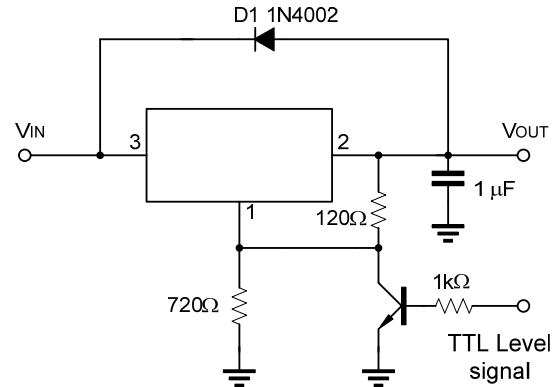


Fig.2 Regulator with On-off control

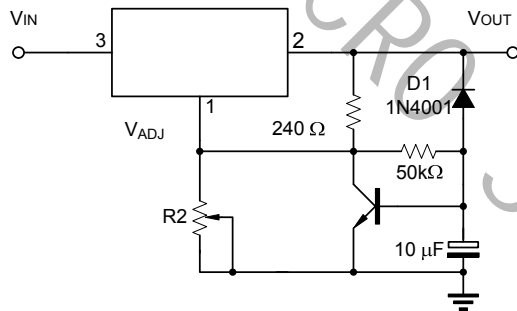
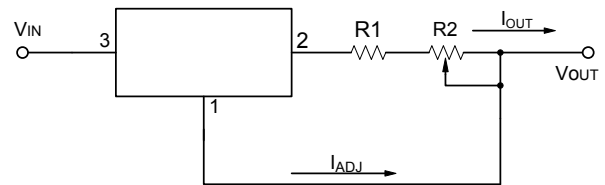


Fig.3 Soft Start Application



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

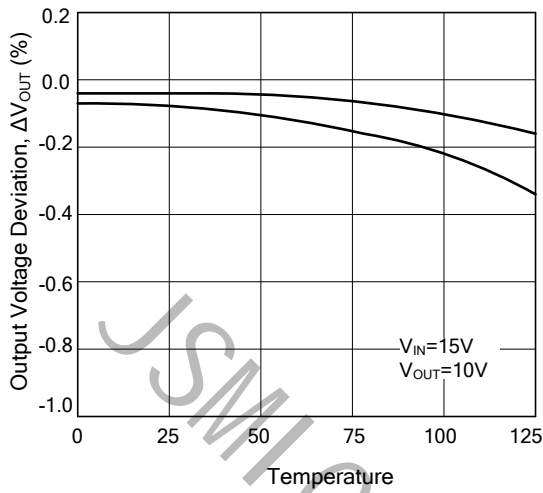
$$I_{O(MIN)} = \left(\frac{V_{REF}}{R1+R2} \right) + I_{ADJ} = \frac{1.25V}{R1+R2}$$

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

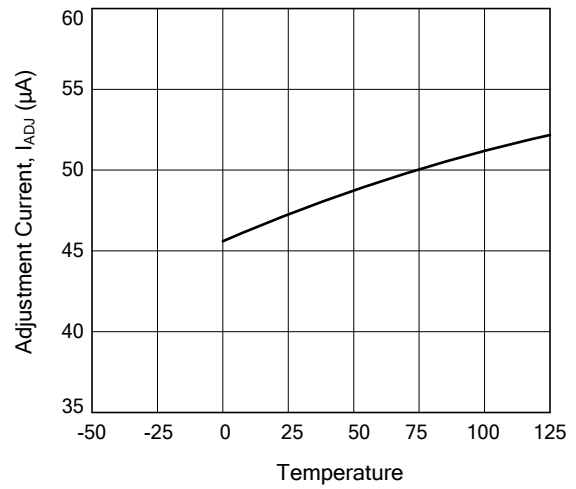
Fig.4 Constant Current Application

■ TYPICAL CHARACTERISTICS

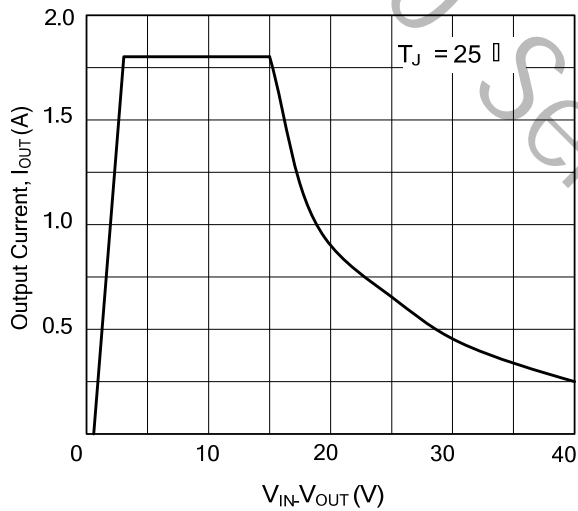
Load Regulation vs. temperature



Adjustment Current vs. Temperature



Current Limit



Minimum Operating Current

