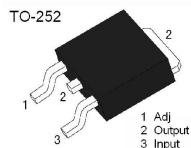


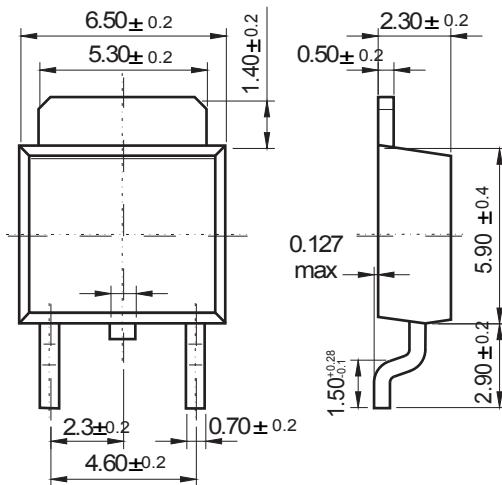
Features

- Output Voltage Range : 1.2V to 37V
- Output Current in excess of 1.5A
- Internal Thermal Overload Protection
- Internal Short Circuit Current Limiting
- Output Transistor Safe Operating Area Compensation



TO-252

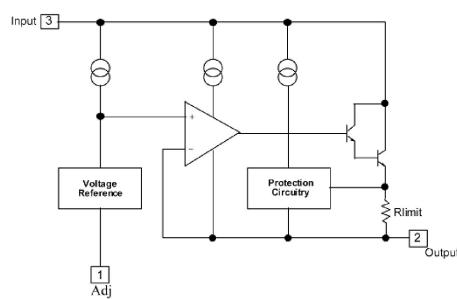
Unit: mm



The LM317 are monolithic integrated circuit in TO-252 package intended for use as positive adjustable voltage regulators. They are designed to supply more than 1.5A of load current with an output voltage adjustable over a 1.2 to 37V range.

The nominal output voltage is selected by means of only a resistive divider, making the device exceptionally easy to use and eliminating the stocking of many fixed regulators.

Internal Block Diagram



LM317

Electrical Characteristics

($V_i - V_o = 5$ V, $I_o = 0.5$ A, $T_A = 25^\circ\text{C}$, unless otherwise specified)

Parameter	Symbol	Conditions	Value			Unit
			Min	Typ	Max	
Line Regulation (Note2)	$\Delta V_{\text{OUT}}/V_{\text{OUT}}$	$3V \leq V_i - V_o \leq 40V, T_A = 25^\circ\text{C}$		0.01	0.04	%V
		$3V \leq V_i - V_o \leq 40V$		0.002	0.07	
Load Regulation (Note2)	ΔV_{OUT}	$10\text{mA} \leq I_o \leq 1.5\text{A}$	$V_o < 5\text{V}$	18	25	mV%/ V_o
			$V_o \geq 5\text{V}$	0.4	0.5	
		$10\text{mA} \leq I_o \leq 1.5\text{A}$	$V_o < 5\text{V}$	40	70	mV%/ V_o
			$V_o \geq 5\text{V}$	0.8	1.5	
Adjustment Pin Current	I_{ADJ}	$T_j = 25^\circ\text{C}$		50	100	μA
Adjustment Pin Current	ΔI_{ADJ}	$3V \leq V_i - V_o \leq 40V$ $10\text{mA} \leq I_o \leq 1.5\text{A}$ $P_D \leq 20\text{W}$		2.0	5.0	μA
Reference Voltage	V_{REF}	$3V \leq V_i - V_o \leq 40V$ $10\text{mA} \leq I_o \leq 1.5\text{A}$, $P_D \leq 20\text{W}$	1.20	1.25	1.30	V
Minimum Load Current	$I_{\text{L}(\text{Min})}$	$V_i - V_o = 40V$		3.5	10	mA
Maximum Output Current	$I_{\text{O}(\text{Max})}$	$V_i - V_o = 40V, P_D \leq 20\text{W}$	0.2	0.3		A
Maximum Load Current	eN	$10\text{Hz} \leq f \leq 10\text{kHz}$		0.003	0.01	% / V_o
RMS Noise, % of V_{OUT}	RR	$V_o = 10\text{V}, f = 120\text{Hz}$ (Note3)	C_{ADJ}	65		dB
			$C_{\text{ADJ}} = 10\mu\text{F}$	66	80	

Note 2: Load and line regulation are specified at constant junction temperature. Change in V_o due to heating effects must be taken into account separately. Pulse testing with low duty is used. ($P_{\text{MAX}} = 20\text{S}$)

Note 3: C_{ADJ} , when used, is connected between the adjustment pin and ground.

Thermal resistances

Parameter	Symbol	Conditions	Value	Unit
Junction to ambient	$R\theta_{JA}$		112	$^\circ\text{C/W}$
Junction to case	$R\theta_{JC}$		12	$^\circ\text{C/W}$

LM317

Typical Application

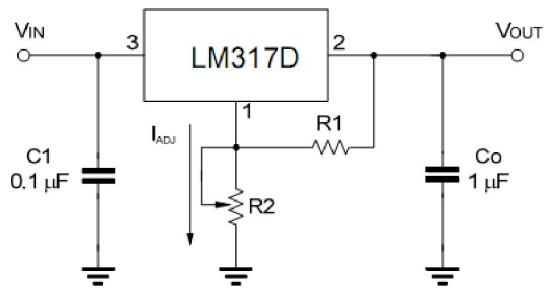


Fig.1 Programmable voltage regulator

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

C_i is required when regulator is located an appreciable distance from power supply filter. C_o is not needed for stability, however, it does improve transient response.

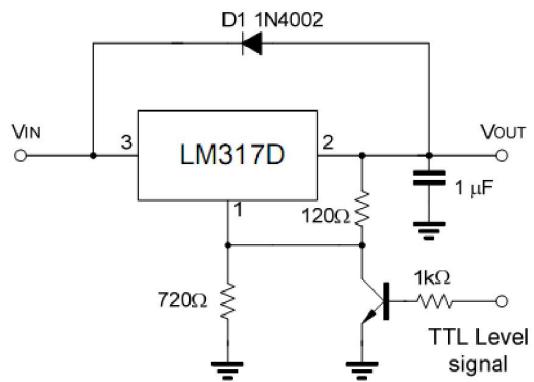


Fig.2 Regulator with On-off control

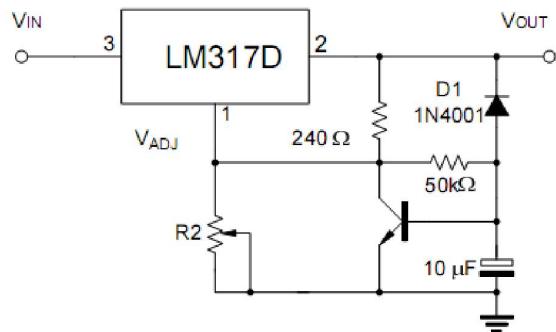


Fig.3 Soft Start Application

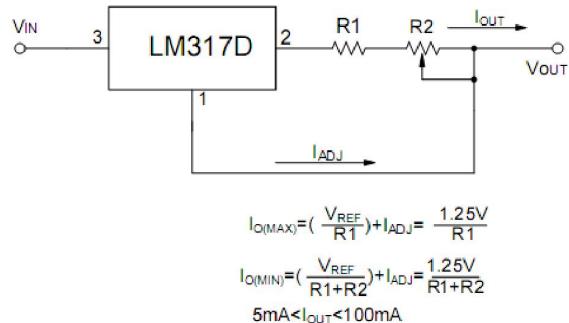


Fig.4 Constant Current Application

RATING AND CHARACTERISTIC CURVES (LM317)

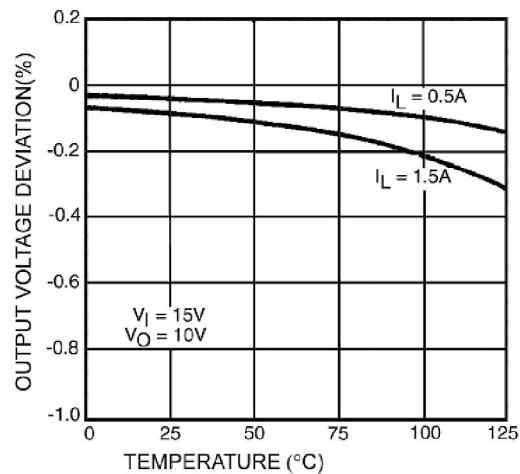


Fig.5 Load Regulation vs. temperature

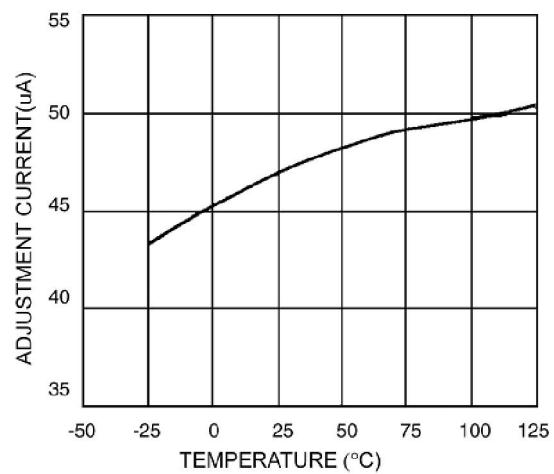


Fig.6 Adjustment Current vs. Temperature

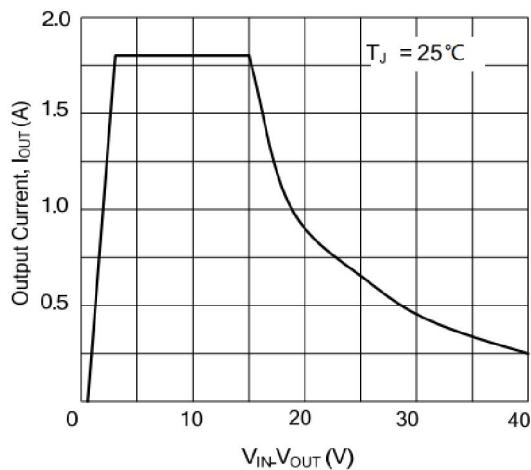


Fig.7 Current limit

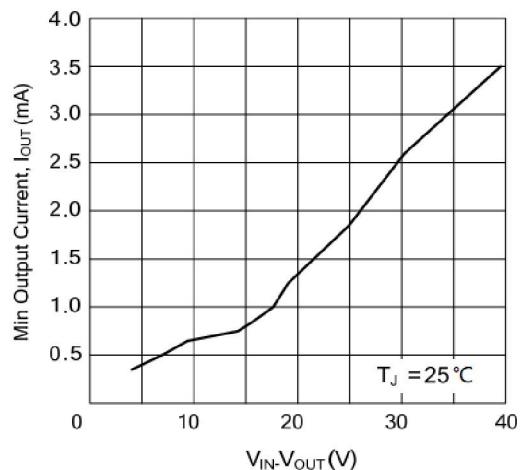


Fig.8 Minimum Operating Current