

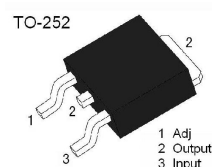
General Description

The LM317 are monolithic integrated circuit in TO-252 packages 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.

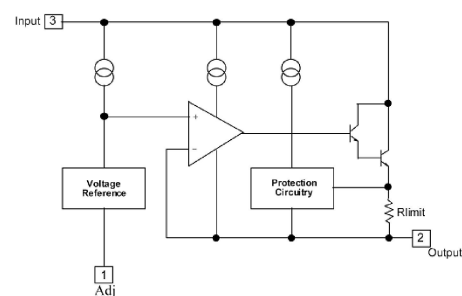
Features

- Output Voltage Range : 1.2 TO 37V
- Output Current in excess of 1.5A
- 0.1% Line and Load Regulation Voltages
- Floating Operation For High
- Complete Series of Protections:
Current Limiting, Thermal Shutdown and SOA Control



LOGO GK XXX CODE

Internal Block Diagram



MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Symbol	Parameter	Value	Unit
V_{i-o}	Input-output Differential Voltage	40	V
I_o	Output Current	Intenrally Limited	
V_o	Out put Voltage	5	V
T_{OP}	Operating Junction Temperature	$0 \sim +125$	$^\circ\text{C}$
T_{STG}	Storage Temperature	$-60 \sim +150$	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS (TA = 25°C unless otherwise noted.)

(Vi - Vo = 5 V, Io = 0.5A, TA = 25°C, unless otherwise specified)

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

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

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 θ_{JA}		112	$^\circ C/W$
Junction to case	R θ_{JC}		12	$^\circ C/W$

Application Circuits

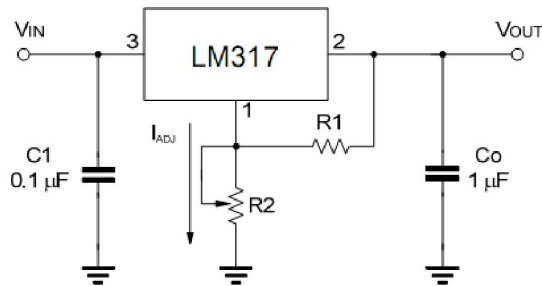


Fig.1 Programmable voltage regulator

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

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.

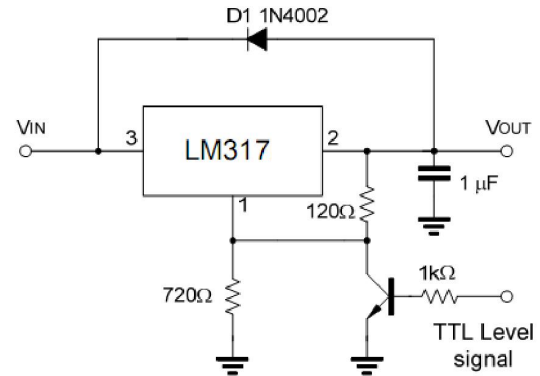


Fig.2 Regulator with On-off control

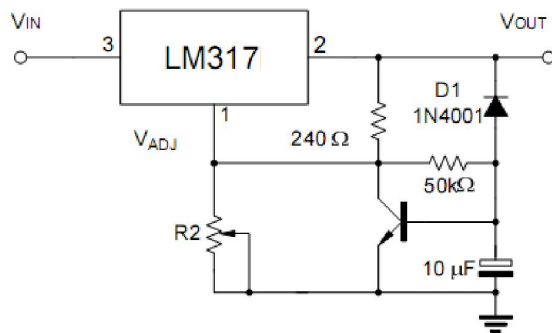


Fig.3 Soft Start Application

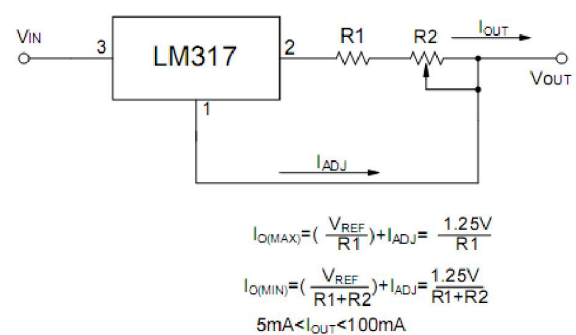


Fig.4 Constant Current Application

RATING AND CHARACTERISTIC CURVES

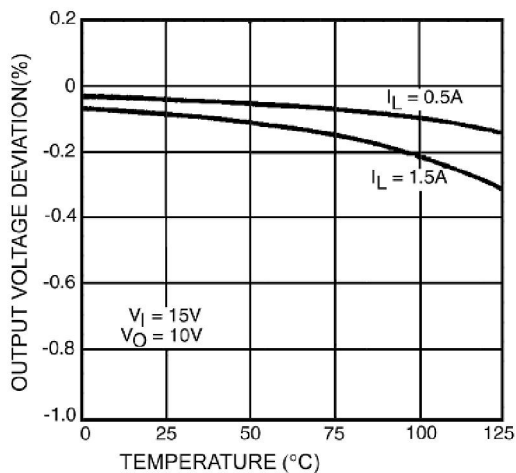


Fig.5 Load Regulation vs. temperature

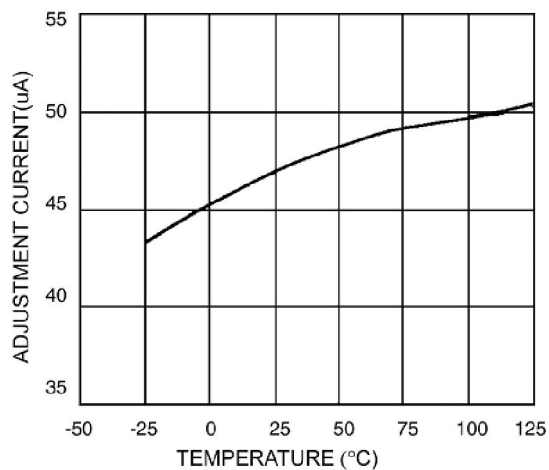


Fig.6 Adjustment Current vs. Temperature

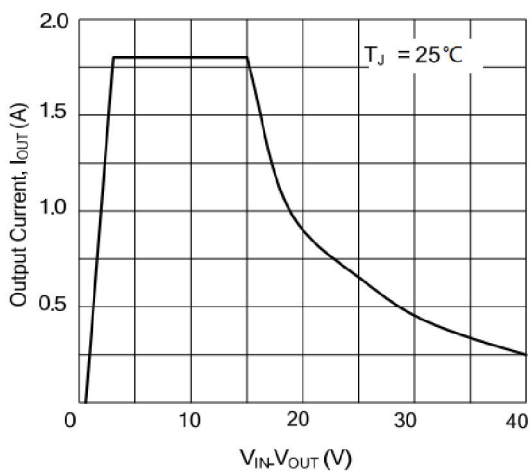


Fig.7 Current limit

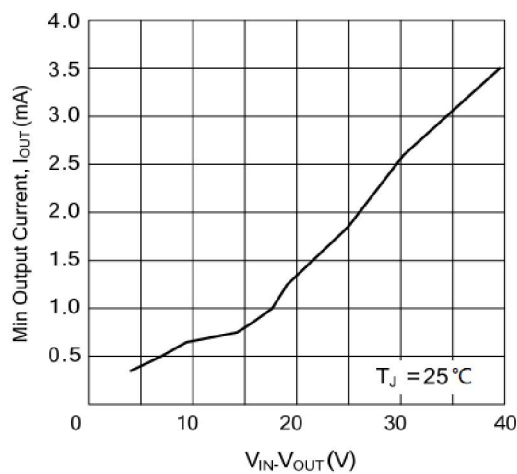
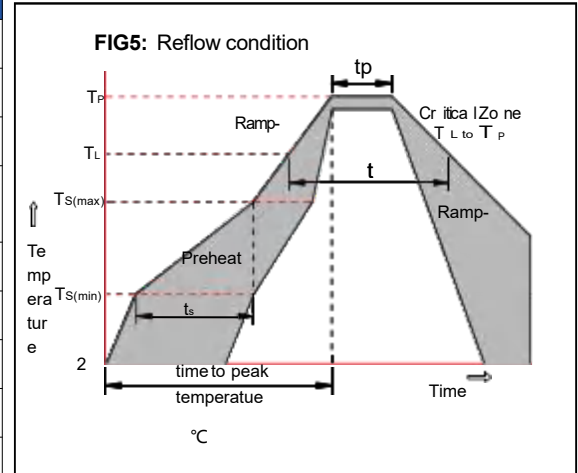


Fig.8 Minimum Operating Current

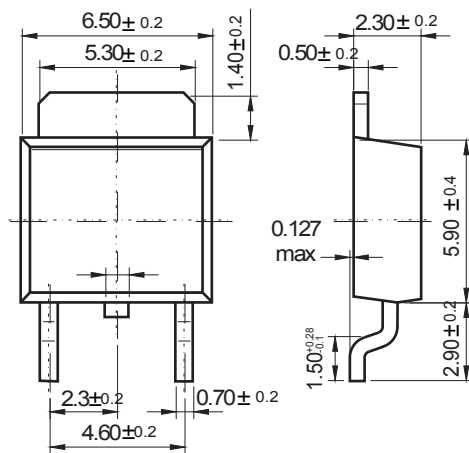
Soldering parameters

Reflow Condition		Pb-Free assembly (see as below)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max($T_{s(max)}$)	+200°C
	-Time (Min to Max) (ts)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3°C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature(T_L)(Liquid us)	+217°C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_P)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_P)		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C

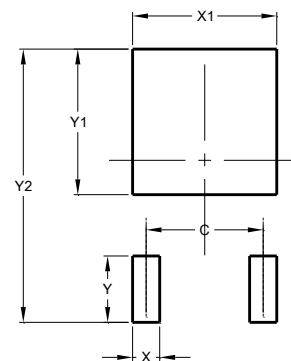


Package Dimensions & Suggested Pad Layout

TO-252

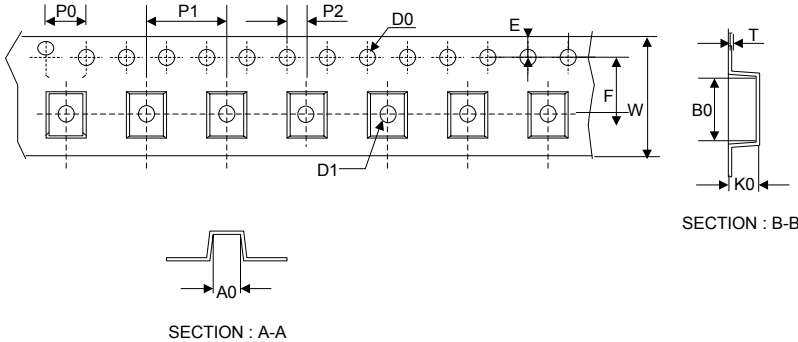
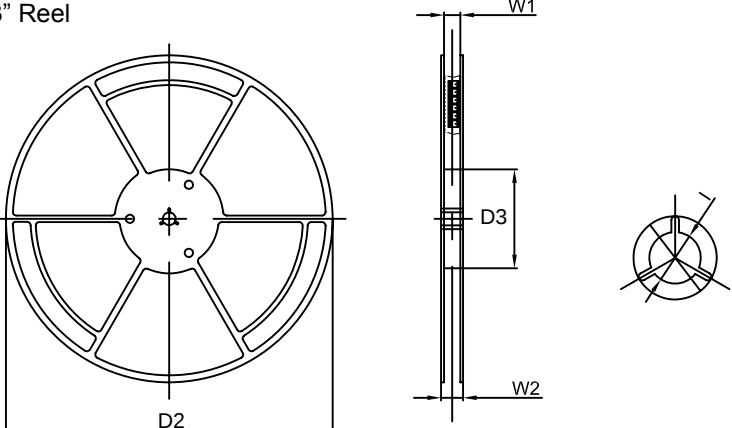


Dimensions in inches and (millimeters)



Dimensions	Value (in mm)
C	4.55
X	1.50
X1	5.80
Y	2.70
Y1	6.00
Y2	10.90

Tape & reel specification

Tape		Symbol	Dimension (mm)
		P0	4.00±0.20
		P1	8.00±0.20
		P2	2.00±0.20
		D0	1.55±0.15
		D1	1.55±0.20
		E	1.75±0.20
		F	7.50±0.20
		W	16.00±0.20
		A0	7.10±0.20
		B0	10.50±0.20
		K0	2.70±0.20
		T	0.30±0.10
		D2	330.0±5.0
		D3	100.0±4.0
		W1	20.0±5.0
13" Reel		W2	25.0±5.0
		I	13.0±2.0
		Quantity: 2500PCS	