

LM317S

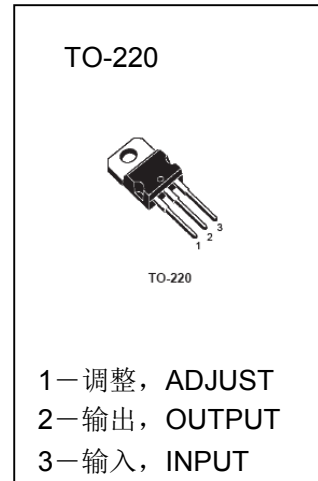
■ 概述

LM317S 为可调节 3 端正电压稳压器，在输出电压范围为 1.2V 到 37V 时能够提供超过 1.5A 的电流。该电路内置有内部限流、热关断、安全工作区补偿等。

■ 主要特点

- 输出电流超过 1.5A
- 输出在 1.2V 和 37V 之间可调节
- 内部热过载保护
- 不随温度变化的内部短路电流限制
- 输出晶体管 SOA 补偿
- 压应用浮空工作

■ 外形图及引脚排列



■ 极限值 (Ta=25°C)

$V_i - V_o$ ——输入输出电压差.....	40V
T_{OPR} ——工作结温范围.....	0~125°C
T_{STG} ——贮存温度范围.....	-65~150 °C
P_D —— 功耗	内部限制 W
$R_{\theta JC}$ ——热阻 (结到壳)	5°C/W
$R_{\theta JA}$ ——热阻 (结到环境)	80°C/W

■ 功能框图

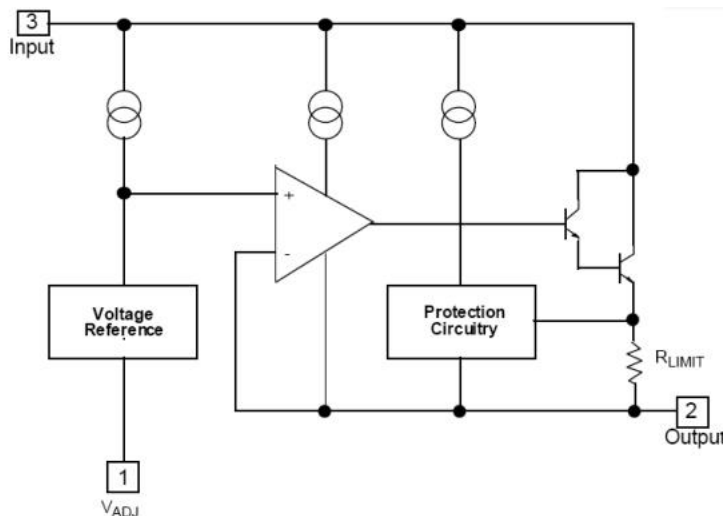


Figure 1. Block Diagram

电参数

($V_I - V_O = 5V$, $I_O = 500mA$, $0^\circ C \leq T_J \leq 125^\circ C$, $I_{MAX} = 1.5A$, $P_{MAX} = 20W$, 除非另有规定)

参数符号	符号说明	最小值	典型值	最大值	单位	测试条件	
R_{LINE}	电源调整率 (注1)		0.01	0.04	%/V	$T_A = 25^\circ C$, $3V \leq V_I - V_O \leq 40V$	
			0.02	0.07		$3V \leq V_I - V_O \leq 40V$	
R_{LOAD}	负载调整率 (注1)		18	25	mV	$T_A = 25^\circ C$,	$V_O < 5V$
			0.4	0.5	%/V _O	$10mA \leq I_O \leq I_{MAX}$	$V_O \geq 5V$
			40	70	mV	$10mA \leq I_O \leq I_{MAX}$	$V_O < 5V$
			0.8	1.5	%/V _O		$V_O \geq 5V$
I_{ADJ}	调整脚电流		46	100	μA		
ΔI_{ADJ}	调整脚电流变化		2.0	5.0	μA	$3V \leq V_I - V_O \leq 40V$, $10mA \leq I_O \leq I_{MAX}$, $P_D \leq P_{MAX}$	
V_{REF}	参考电压	1.2	1.25	1.3	V	$3V \leq V_I - V_O \leq 40V$, $10mA \leq I_O \leq I_{MAX}$, $P_D \leq P_{MAX}$	
TS	温度稳定性		0.7		%/V _O		
$I_{L(MIN)}$	最小负载电流以保持调整率		5	12	mA	$V_I - V_O = 40V$	
$I_{O(MAX)}$	最大输出电流	1.5	2.2		A	$T_A = 25^\circ C$, $V_I - V_O \leq 15V$, $P_D \leq P_{MAX}$	
			0.3			$T_A = 25^\circ C$, $V_I - V_O \leq 40V$, $P_D \leq P_{MAX}$	
N	RMS噪声, % of V _{OUT}		0.003	0.01	%/V _O	$T_A = 25^\circ C$, $10Hz \leq f \leq 10kHz$	
RR	纹波抑制比		60		dB	$f = 120Hz$, $V_O = 10V$, 无C _{ADJ}	
		66	75	C _{ADJ} = 10 μF (注2)			
ST	长期稳定性 $T_J = T_{HIGH}$		0.3	1	%	$T_A = 25^\circ C$, 1000HR, 终点测量时	

注:

1、电源和负载调整率在恒定结温时规定。热效应引起的 V_O 变化必须分别考虑。使用低占空比的脉冲测试 ($P_{MAX} = 20W$)

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 ($P_{MAX} = 20 W$).

2、使用 C_{ADJ}时应连接在调整管脚和地之间。

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

典型特性曲线

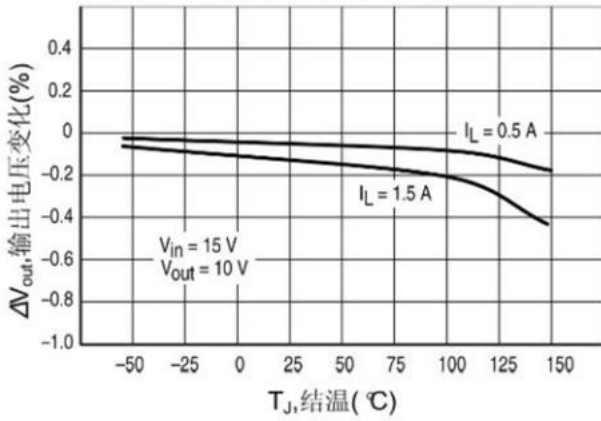


图 2. 负载调整率

Figure 2. Load Regulation

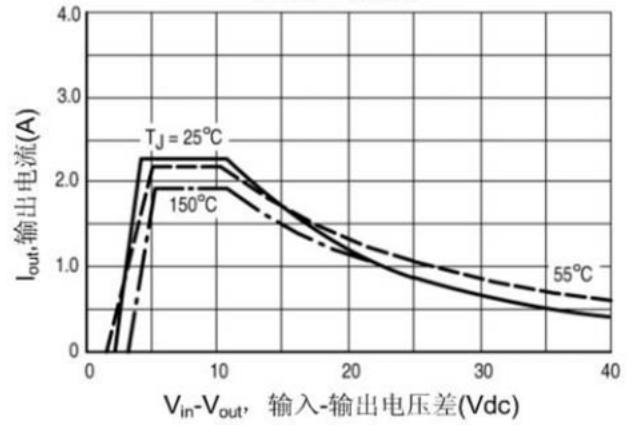


图 3. 电流限制

Figure 3. Current Limit

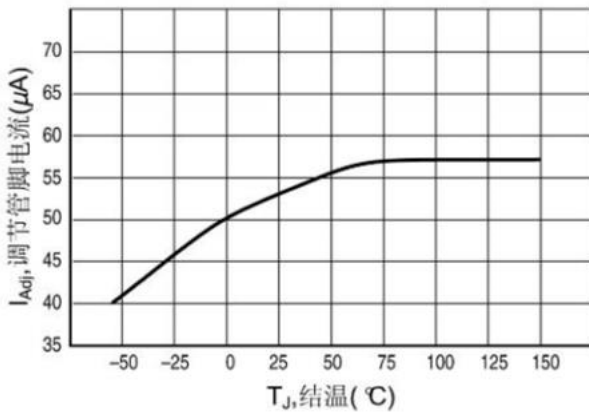


图 4. 调整管脚电流

Figure 4. Adjustment Current

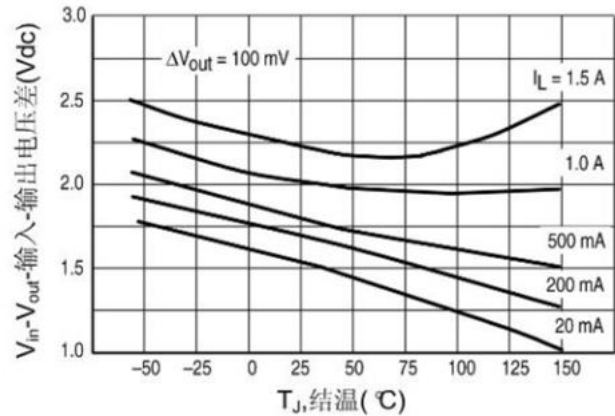


图 5. 电压压降

Figure 5. Dropout Voltage

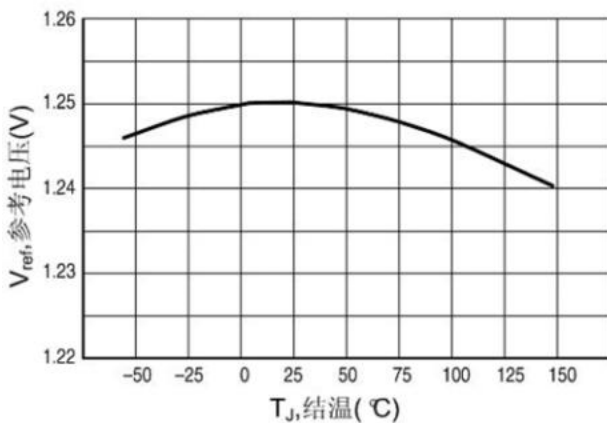


图 6. 参考电压

Figure 6. Reference Voltage

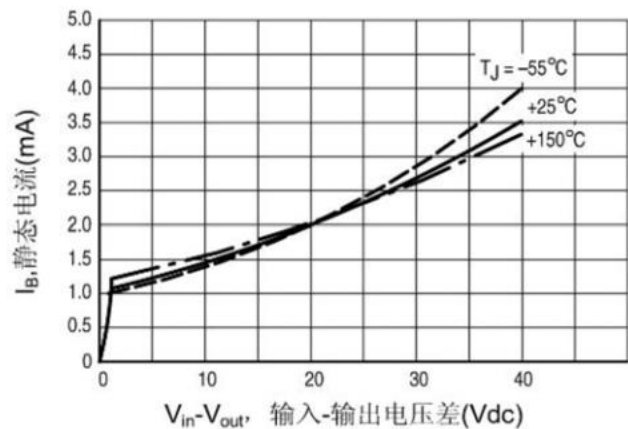
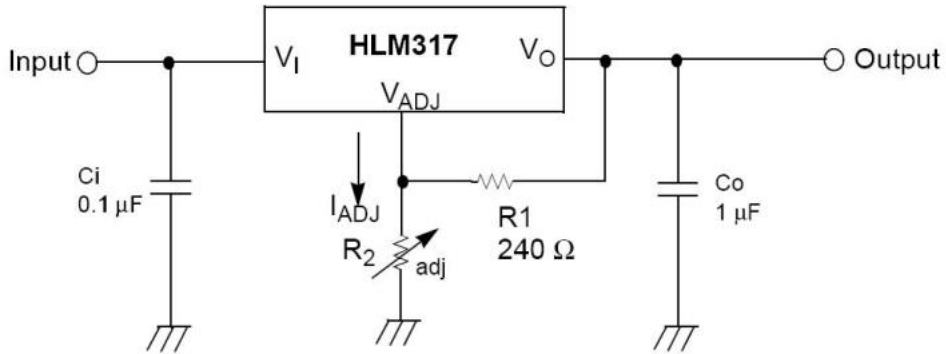


图 7. 最小工作电流

Figure 7. Minimum Operating Current

■ 典型应用电路



$$V_O = 1.25 V (1 + R_2 / R_1) + I_{ADJ}R_2$$

图 8. 典型应用线路

Figure 7. Typical Application

注:

当稳压器离电源滤波器有一定距离时, C_i 是必需的。 C_o 对稳定性而言不必要, 但可改进瞬态响应。因为 I_{ADJ} 控制小于 $100\mu A$, 这一项误差在多数应用中可忽略。

C_i is required when the regulator is located an appreciable distance from power supply filter. C_o is not needed for stability; however, it does improve transient response. Since I_{ADJ} is controlled to less than $100\mu A$, the error associated with this term is negligible in most applications.