

ADJUSTABLE 3-TERMINAL POSITIVE VOLTAGE REGULATOR

■ GENERAL DESCRIPTION

The NJM317 is adjustable 3-terminal positive voltage regulator IC. It is capable of adjustment from typical 1.25V to 37V output voltage range with two resistors. It is capable of supplying in excess of 1.5A with heat sink.

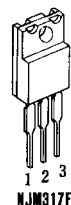
The NJM317 is suitable for the power supply of VCR, CD player and others.

■ FEATURES

- Operating Voltage (+4.25V ~ +40V)
- Adjustable Output Down to 1.2V
- Guarantee'd 1.5A Output Current
- Line Regulation typically (0.01 %/V)
- Load Regulation typically (0.1%)
- 80dB Ripple Rejection
- Package Outline TO-220F
- Bipolar Technology

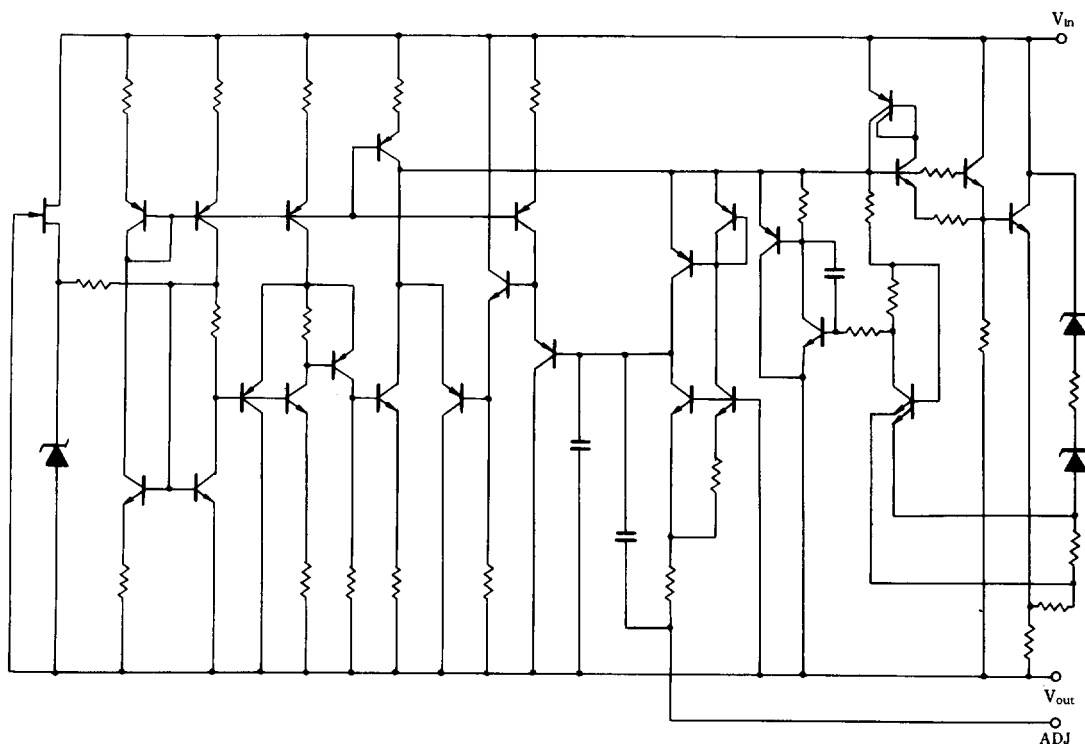
■ PACKAGE OUTLINE

(TO-220F)



1. Adjustment
2. Output
3. Input

■ EQUIVALENT CIRCUIT





■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Input-Output Differential Voltage	$V_{IN}-V_O$	40	V
Power Dissipation	P_D	16 (Tc≤70°C)	W
Operating Temperature Range (Junction)	$T_{opr(j)}$	-30~+150	°C
(Ambient)	$T_{opr(a)}$	-30~+85	°C
Storage Temperature Range	T_{stg}	-50~+150	°C

■ THERMAL CHARACTERISTICS

Terminal Resistance	Junction-To-Ambient	θ_{ja}	60	°C/W
	Junction-To-Case	θ_{jc}	5	

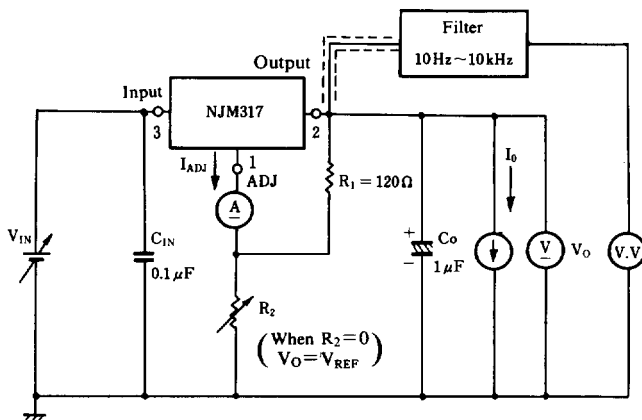
■ ELECTRICAL CHARACTERISTICS (V_{IN}-V_O=5V, I_O=500mA, C_{IN}=0.1 μF, C_O=1 μF, T_j=25°C, Pules Measurement.)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Reference Voltage	V_{REF}		1.2	1.25	1.3	V
	$V_{REF}-V_{IN}$	$3V \leq (V_{IN}-V_O) \leq 40V, I_O=100mA$	1.2	1.25	1.3	V
	$V_{REF}-I_O$	$10mA \leq I_O \leq 1.5A$	1.2	1.25	1.3	V
Reference Voltage Thermal Change	$\Delta V_{REF}-T$	$0 \leq T_j \leq 125^\circ C$	—	5	—	mV
Adjustment Pin Current	I_{ADJ}		—	50	100	μA
Adjustment Pin Current Change	$\Delta I_{ADJ}-V_{IN}$	$3V \leq (V_{IN}-V_O) \leq 40V, I_O=100mA$	—	0.2	5	μA
	$\Delta I_{ADJ}-I_O$	$10mA \leq I_O \leq 1.5A$	—	0.2	5	μA
Line Regulation	ΔV_O-V_{IN}	$3V \leq (V_{IN}-V_O) \leq 40V, I_O=100mA$	—	0.01	0.04	%/V
Load Regulation	ΔV_O-I_O	$10mA \leq I_O \leq 1.5A, V_O \leq 5V$ $V_O > 5V$	—	5	25	mV
Minimum Load Current	$I_{O(MIN)}$	$(V_{IN}-V_O)=40V$	—	3.5	10	mA
Peak Output Current	$I_{O(PEAK)}$	$5V \leq (V_{IN}-V_O) \leq 15V$ $(V_{IN}-V_O)=40V$	1.5	2.2	—	A
RMS Output Noise Voltage	V_{NO}	$10Hz \leq f \leq 10kHz$	0.15	0.4	—	A
Ripple Rejection Ratio	RR	$(V_O=10V, f=120Hz)$, $C_{ADJ}=0$ $(\Delta V_{IN}=1V_{rms})$, $C_{ADJ}=10\mu F$	66	80	—	dB

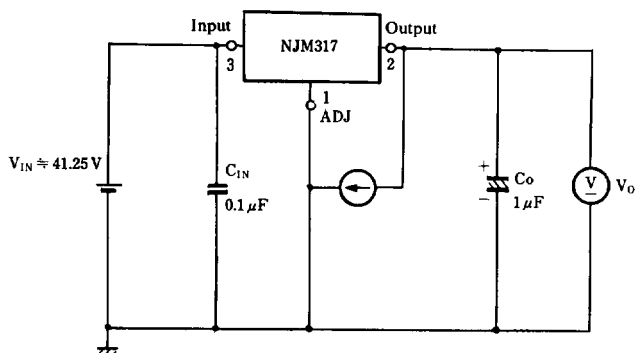


■ TEST CIRCUIT

- 1) (Reference Voltage Thermal Change), (Adjustment Pin Current Change), (Line Regulation), (Load Regulation), (Peak Output Current), (RMS Output Noise Current)

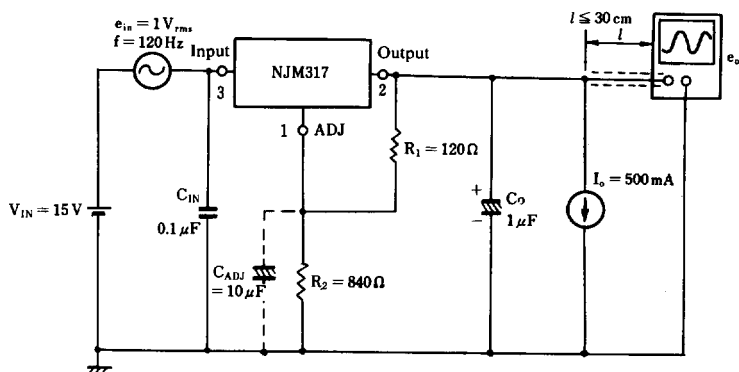


- 2) Minimum Load Current



I_{OMIN} : Minimum I_0 for
 $V_O = V_{REF}$ (Typical 1.25V)
 $(V_{IN} = 40 + V_{REF})$

- 3) Ripple Rejection

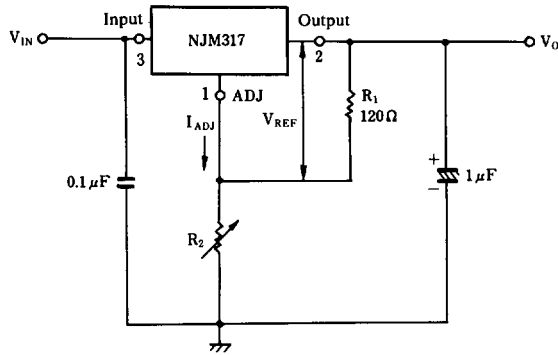


$$\text{Ripple Rejection} = 20 \log_{10} \left(\frac{e_{IN}}{e_O} \right) \text{ (dB)}$$



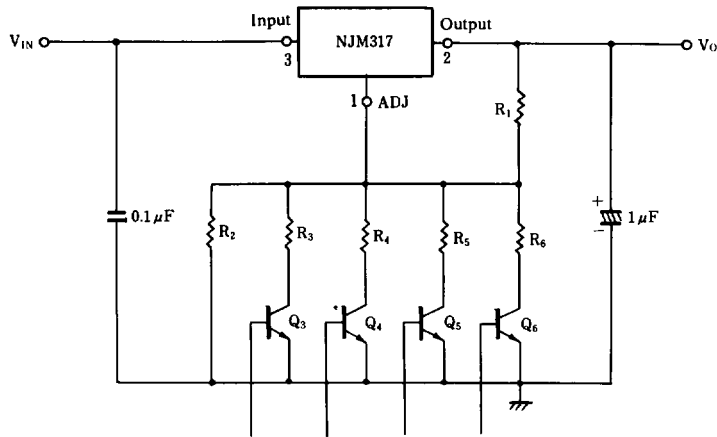
■ TYPICAL APPLICATIONS

1). $V_O = 1.25V \sim 37V$ Adjustable Voltage Regulator



$$V_O = V_{REF} \times \left(1 + \frac{R_2}{R_1}\right) + R_2 \times I_{ADJ}$$

2) Selected Output Voltage



The transistors Q_3 are switched by selective signal inputs and the output voltage V_O is controlled by the transistor on or off.

(Example)

When all transistor is off,

$$V_O \approx V_{REF} \times \left(1 + \frac{R_2}{R_1}\right)$$

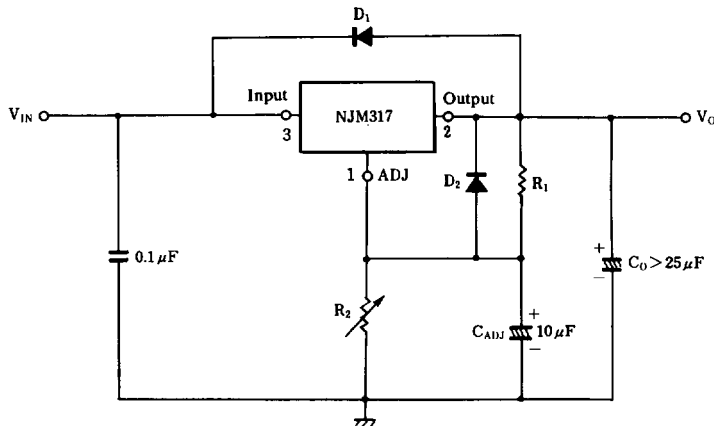
When the transistor Q_3 is on, and others are off.

$$V_O \approx V_{REF} \times \left\{1 + \frac{R_2 \times R_3}{(R_2 + R_3) \times R_1}\right\}$$

※ I_{ADJ} ignore.

Selective Signal Inputs

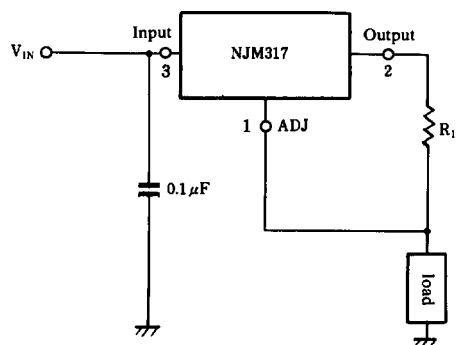
3). Regulator with Protection Diodes



D_1 protects about C_0
 D_2 protects about C_{ADJ}



4) Constant Current Regulator

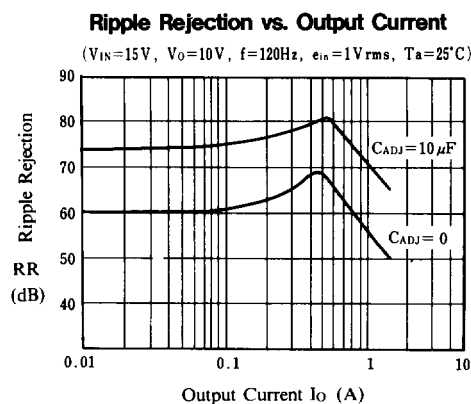
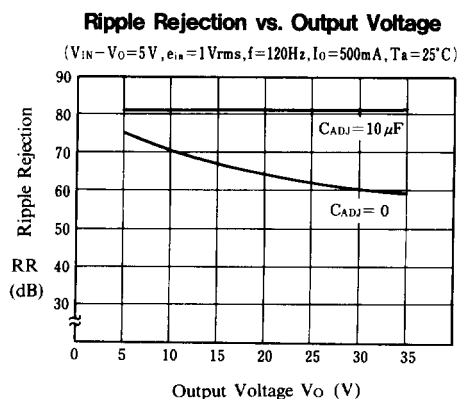
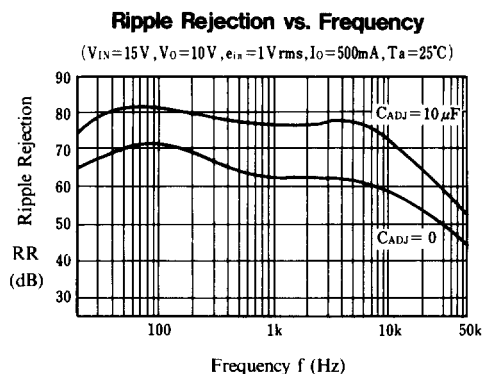
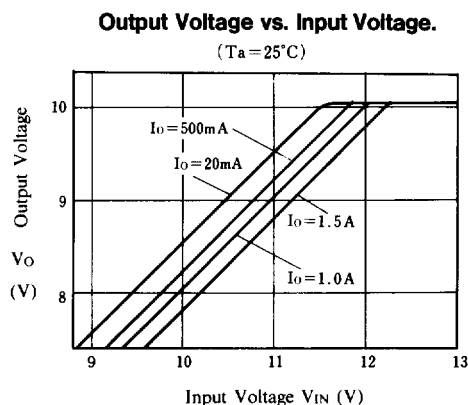
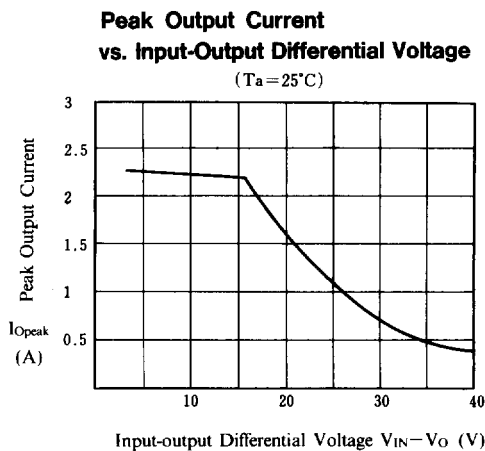
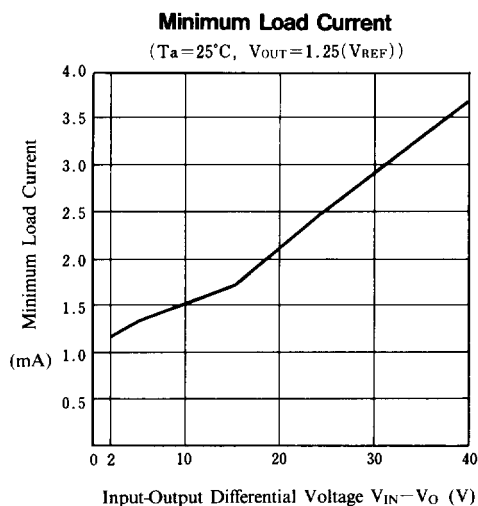


$$R_1 \leq 125\Omega$$

$$10\text{mA} \leq I_O \leq 1.5\text{A}$$

$$I_O = \frac{V_{REF}}{R_1}$$

■ TYPICAL CHARACTERISTICS





TYPICAL CHARACTERISTICS

