

±12V TRACKING REGULATOR WITH RESET CIRCUIT**DESCRIPTION**

M5292 is a semiconductor integrated circuit designed for voltage regulator which is dual tracking type (positive/negative output voltage) with system reset circuit. M5292P is a tracking regulator with ±12V output voltage.

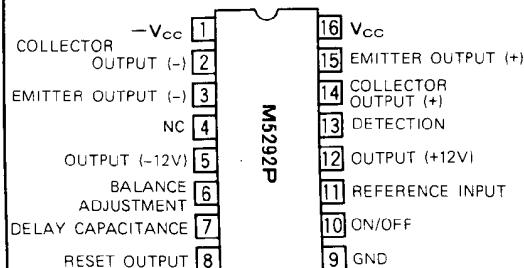
Since the output voltage is fixed inside, User can omit the outside resistors, and this IC includes the system reset circuit for detecting the abnormal status of Power Supply. When Power Supply of system is in abnormal status, this IC sends the system reset output (Low) to the MPU/CPU, so User can make the system operate safely.

FEATURES

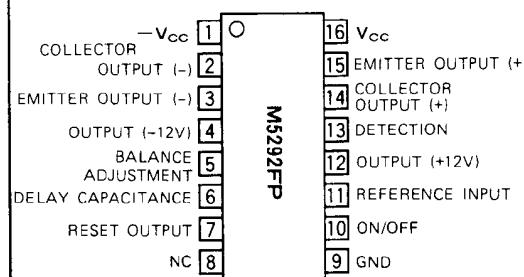
- High input voltage $V_I = \pm 20V$
- Fixed output voltage $V_O = \pm 12V$
- Internal system reset circuit (with hysteresis) detectable voltage 4.2V (delay time is variable by connecting capacity at 7pin (6pin for the FP))
- Current limiting circuit, thermal protection circuit
- Capable of ON/OFF control (10pin)
- Very Low input-output voltage differential operation by using transistor
- Variable output voltage (with external resistors connected between terminals ⑪ and GND and between positive output terminals).

APPLICATION

Dual power supply for CD players and stereo set pre-/main-amplifiers

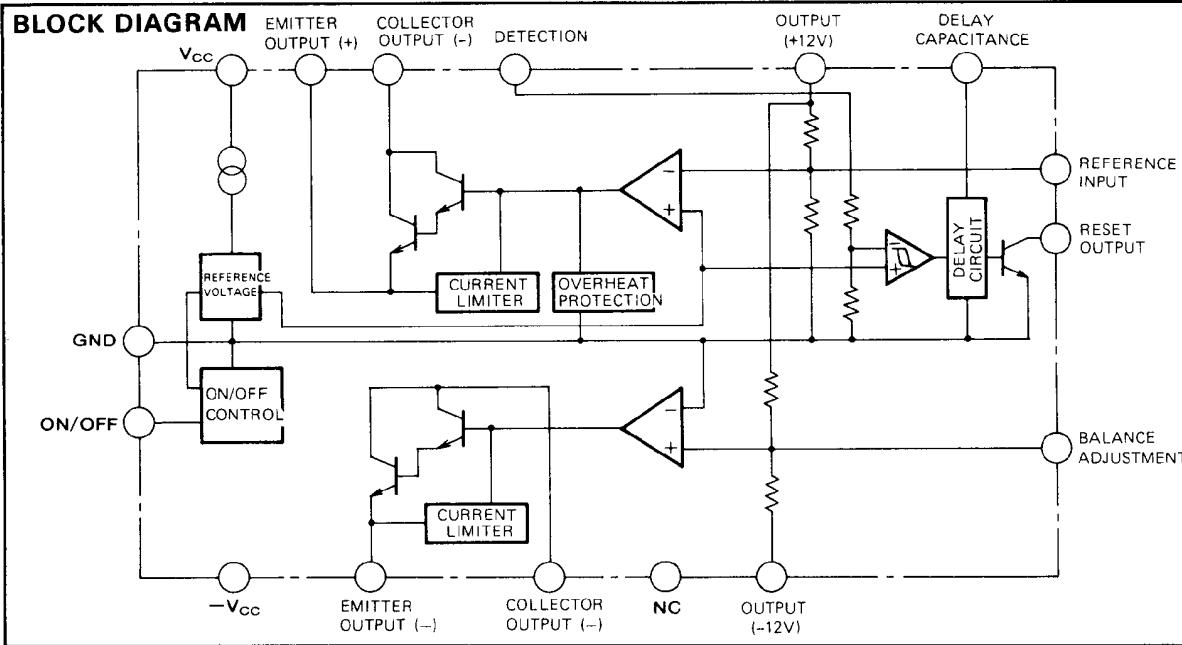
PIN CONFIGURATION (TOP VIEW)

Outline 16P4



Outline 16P2S-A

NC: NO CONNECTION



±12V TRACKING REGULATOR WITH RESET CIRCUIT**ABSOLUTE MAXIMUM RATINGS** ($T_a = 25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
V _{CC}	Supply voltage		±20(40)	V
I _{LP}	Load current		±30	mA
V _{DIF}	Input/output voltage difference		±15(30)	V
P _d	Internal power consumption		1.0(P)/0.55(FP)	W
K _θ	Thermal derating	$T_a \geq 25^\circ\text{C}$	10.0(P)/5.5(FP)	mW/°C
T _{opr}	Operating ambient temperature		-20 ~ +75	°C
T _{stg}	Storage temperature		-55 ~ +125	°C

ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$, $V_{CC} = \pm 15\text{V}$, $I_L = \pm 10\text{mA}$, unless otherwise stated)

Symbol	Parameter	Test condition	Limit			Unit
			Min	Typ	Max	
I _{CC}	Circuit current	$V_{13} = 5\text{V}$		3.0	6.0	mA

REGULATOR PART

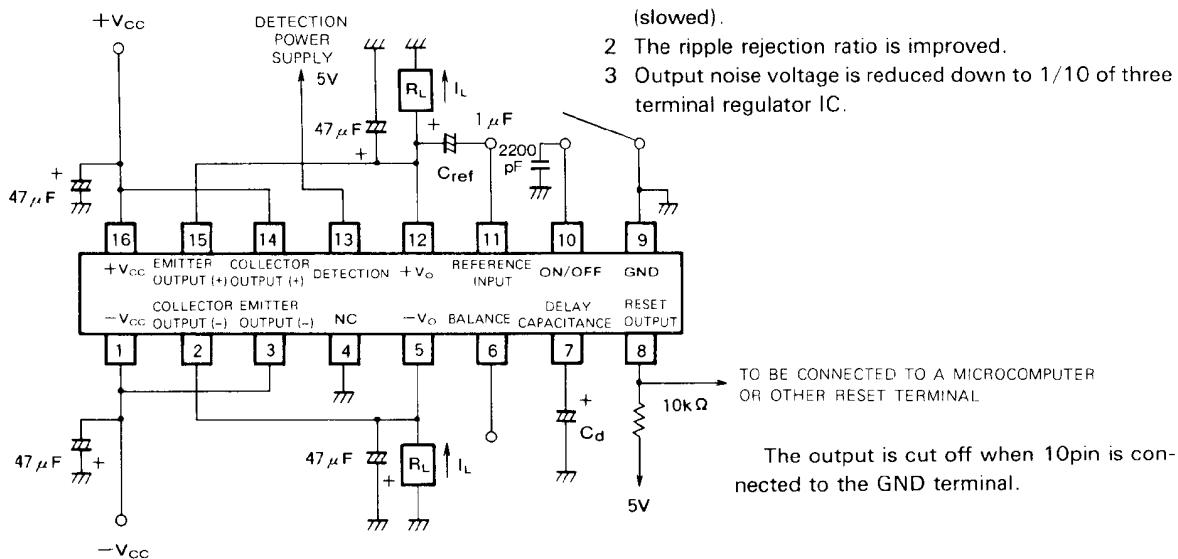
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V _{IN}	Input voltage		±V _O ±2		±20	V
V _O	Output voltage		±11.4	±12.0	±12.6	V
V _{REF}	Reference input voltage		1.15	1.20	1.25	V
ΔV _O	Positive/negative voltage tracking			0.5	2	%
RR	Ripple rejection	$C_{REF} = 1\mu\text{F}$, $f = 120\text{Hz}$	50	62		dB
Reg-in	Input voltage variation	$V_I = \pm 15 \sim \pm 18\text{V}$		0.05	0.2	%/V
Reg-LO	Load variation	$I_L = 0 \sim 20\text{mA}$		30	240	mV
V _{NO}	Output noise voltage	$f = 20\text{Hz} \sim 100\text{kHz}$		15		μVrms
V _{O(OFF)}	Output cut-off voltage	Terminal ⑩ GND			+0.1	V

RESET PART

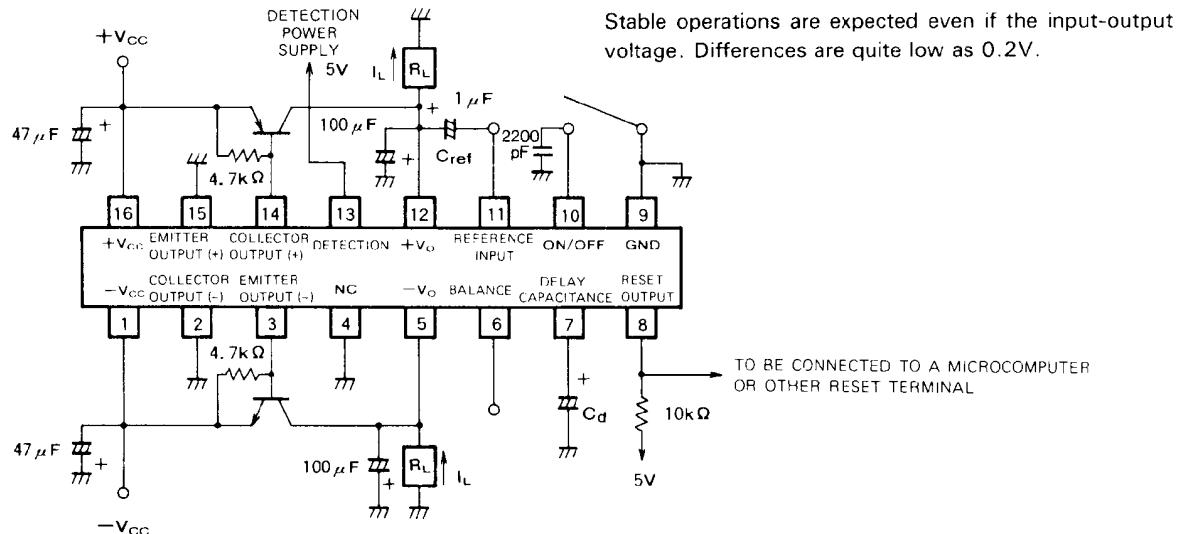
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
V _S	Detected voltage		3.95	4.2	4.45	V
ΔV _S	Hysteresis voltage		50	100	300	mV
t _{pd}	Delay time	$C_d = 0.1\mu\text{F}$	3	7	14	ms
V _{sat}	Output saturation voltage	$I_{sink} = 3\text{mA}$		0.2	0.4	V

Note: The employed measurement circuit conforms to application circuit example (1).



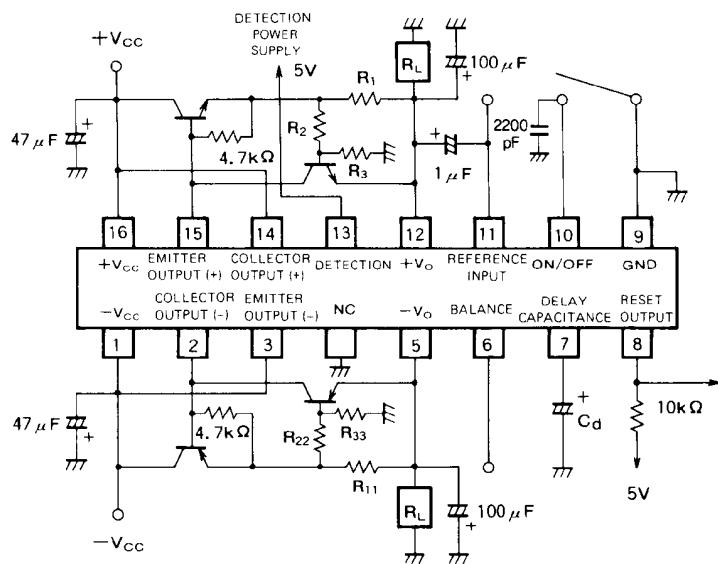
±12V TRACKING REGULATOR WITH RESET CIRCUIT**APPLICATION EXAMPLES****(1) Standard Application Circuit Example**

NOTE: Ensure that the capacitance of the employed capacitor does not significantly vary with the temperature.

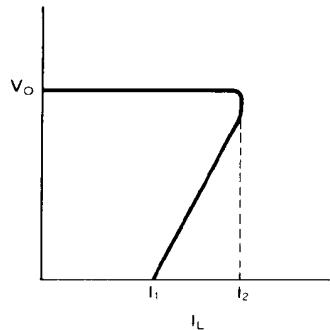
(2) Very Low Input/Output Voltage Differential Application Example

±12V TRACKING REGULATOR WITH RESET CIRCUIT**(3) Foldback Protection Circuit Application****Example (M5292P Foldback System)**

The input/output voltage differential V_{IO} should be adjusted to be high enough considering the voltage difference developed at R_1 .



When two protective transistors are employed, the M5292P/FP can provide foldback characteristic for protection purposes. The I_1 and I_2 values are determined according to the external resistance.



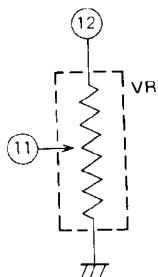
$$I_1 = \frac{R_2 + R_3}{R_1 \cdot R_3} \times 0.65 \text{ (A)}$$

$$I_2 = I_1 + \frac{R_2}{R_1 \cdot R_3} \times 12 \text{ (A)}$$

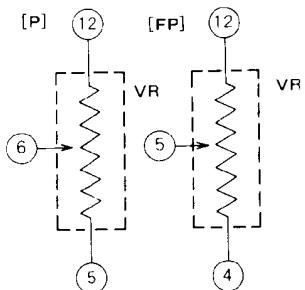
Cases where $I_{L(Peak)} = I_2 \approx 1.0\text{A}$ and $I_1 \approx 200\text{mA}$

$R_1 = R_{11} = 4.0\Omega$, $R_2 = R_{22} = 1.0k\Omega$, $R_3 = R_{33} = 3.9k\Omega$

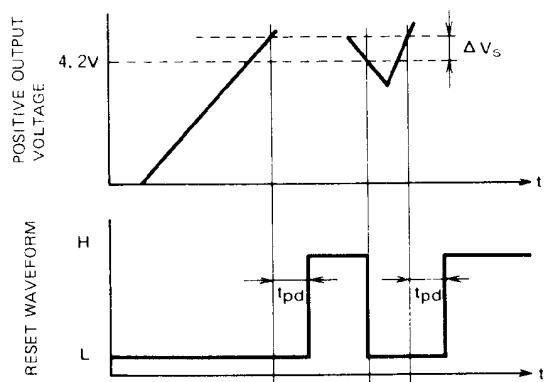
The required input/output voltage differential is 6V or greater.

±12V TRACKING REGULATOR WITH RESET CIRCUIT**PRECAUTIONS****1. In adjusting the output voltage (use ⑪ pin)**

M5292P, FP is fixed the output voltage by inside resistors, but user can adjust it by using the outside resistor.
(inside resistor: 2.4kΩ ⑪ to ⑨, 21.7kΩ ⑫ to ⑪)

2. In adjusting the tracking voltage (use ⑥pin (⑤pin on FP))

M5292P, FP is fixed the tracking voltage by inside resistor, but user can adjust it by using the output resistor.
(inside resistor: ⑫ to ⑥ ⑥ to ⑤, 10kΩ for the M5292P)
(⑫ to ⑤ ⑤ to ④, 10kΩ for the M5292FP)

3. Explaining figure of reset operation

When the positive output voltage is normal, the Reset output is High.
If it is lower than 4.2V, the Reset output is low.
(delay time is variable by connecting capacity at 7pin
(6pin for the FP))

$$t_{pd} = 7.0 \times 10^4 \times C \text{ (sec)}$$

C: delay time capacity