



# H 7810

## Description

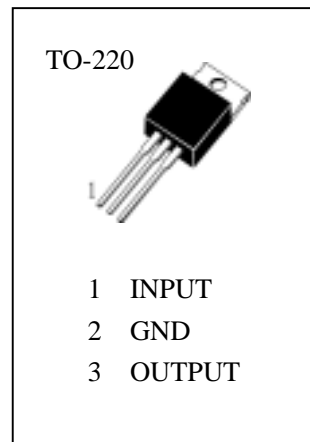
The H7810 series of three terminal positive Regulators are available in the TO-220 package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, Thermal shut down and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulator, these devices can be used with external components to obtain adjustable voltages and currents.

## Features

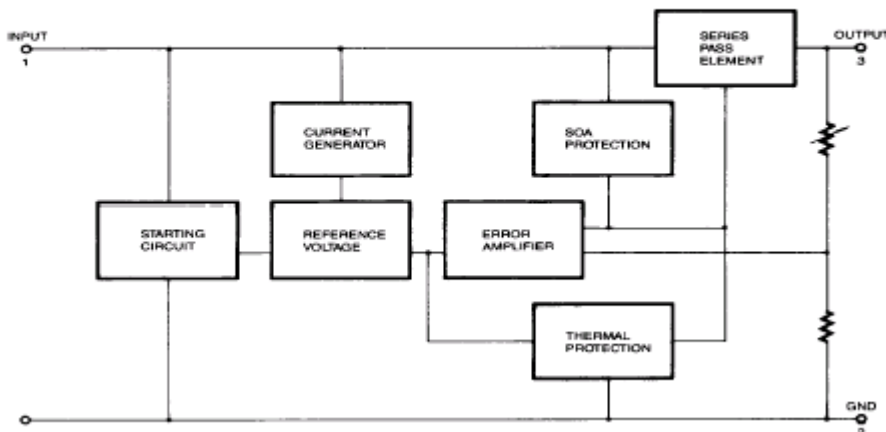
- Output current up to 1A
- Output Voltages of 10V
- Thermal Overload Protection
- Short Circuit Protection
- Output Transistor Safe Operating Area Protection

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

- $V_I$ —Input Voltage (for  $V_O=5\text{V}$  to  $18\text{V}$ )..... 35V
- $R_{JC}$ —Thermal Resistance Junction-Cases..... 5  $^\circ\text{C}/\text{W}$
- $R_{JA}$ —Thermal Resistance Junction-Air..... 65  $^\circ\text{C}/\text{W}$
- $T_{OPR}$ —Operating Temperature Range..... 0~125
- $T_{STG}$ —Storage Temperature Range..... -65~150



## Internal Block Diagram



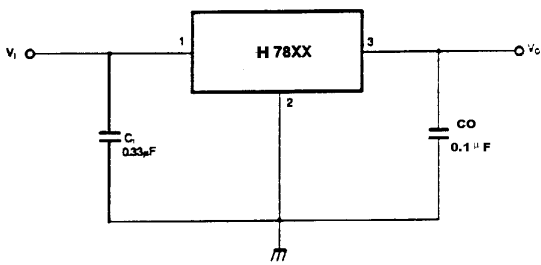


( Refer to test circuit, unl ess otherwi se speci fi ed , 0  $T_J = 25$  ,  $I_o=500mA$ ,  $V_i=16V$ ,  $C_1=0.33 \mu F$ ,  $C_o=0.1 \mu F$  )

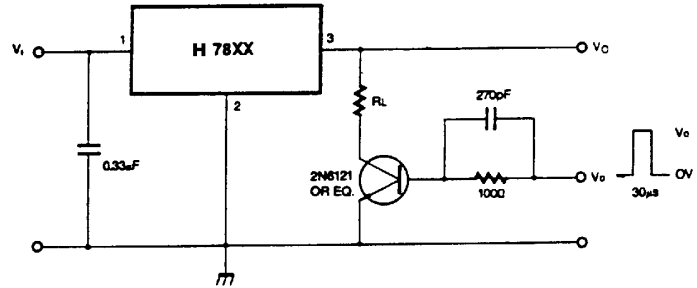
Symbol	Parameter	Min.	Typ.	Max.	Unit	Condi ti ons
$V_o$	Output Vol tage	9.6	10	10.4	V	$T_J=25$
		9.5	10	10.5		$5.0mA \leq I_o \leq 1.0A$ , $P_D \leq 15W$ , $12.5V \leq V_i \leq 25V$
$V_o$	Line Regulation (Note1)		10	200	mV	$T_J=25$ , $12.5V \leq V_i \leq 25V$
			3	100		$T_J=25$ , $13V \leq V_i \leq 20V$
$V_o$	Load Regulation (Note1)		12	200	mV	$T_J=25$ , $5.0mA \leq I_o \leq 1.5A$
			4	100		$T_J=25$ , $250mA \leq I_o \leq 750mA$
$I_o$	Quiescent Current		5.1	8	mA	$T_J=25$
$I_o$	Quiescent Current Change			0.5	mA	$5mA \leq I_o \leq 1.0A$
				1.0		$12.5V \leq V_i \leq 29V$
$V_o/T$	Output Vol tage Dri ft		-1		mV/	$I_o=5mA$
$V_N$	Output Noise Vol tage		58		$\mu V$	$T_A=25$ , $10Hz \leq f \leq 100kHz$
RR	Ri pple Rejection	56	71		dB	$f=120Hz$ , $14V \leq V_i \leq 24V$
$V_D$	Dropout Vol tage		2		V	$I_o=1A$ , $T_J=25$
$R_o$	Output Resistance		17		m	$f=1kHz$
$I_{SC}$	Short Circuit Current		250		mA	$V_i=35V$ , $T_A=25$
$I_{PK}$	Peak Current		2.2		A	$T_J=25$



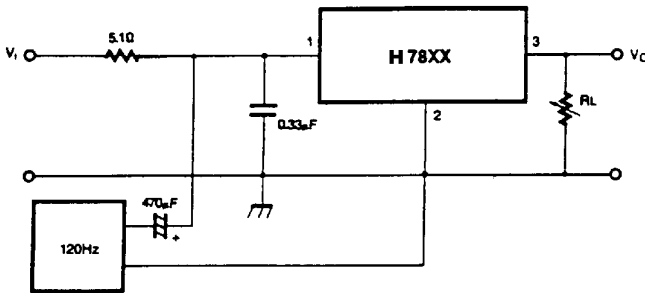
## Typical Applications



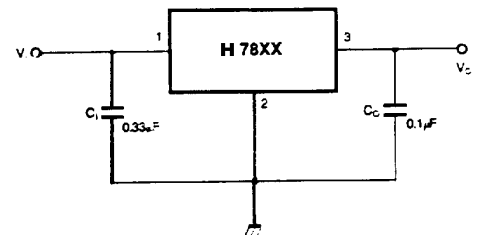
1、 DC Parameters



2、 Load Regulation



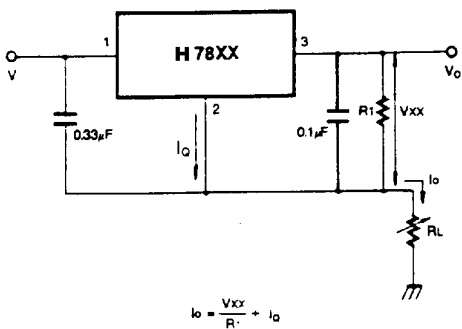
3、 Ripple Rejection



4、 Fixed Output Regulator

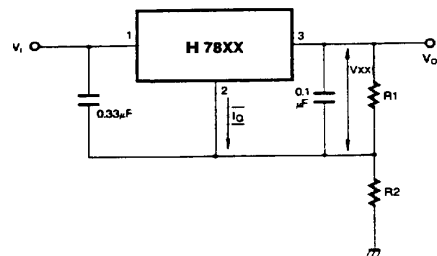
### Notes:

- (1) To specify an output voltage, substitute voltage value for "XX." A common ground is required between the input and the Output voltage. The input voltage must remain typically 2.0V above the output voltage even during the low point on the input ripple voltage.
- (2) C<sub>1</sub> is required if regulator is located an appreciable distance from power Supply filter.
- (3) C<sub>0</sub> improves stability and transient response.



$$I_o = \frac{V_{XX}}{R_1} + I_o$$

5、 Constant Current Regulator



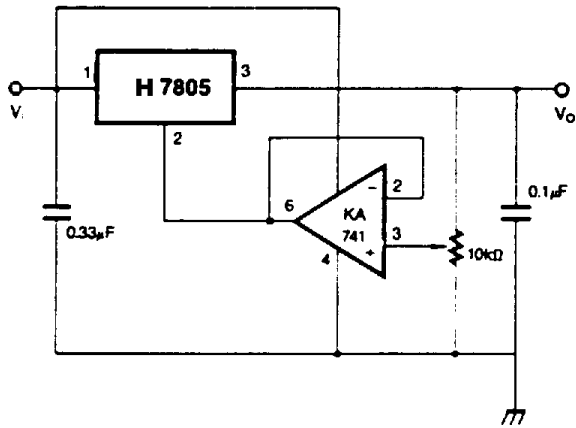
$$I_{R1} \geq 5 I_o$$

$$V_o = V_{XX} (1 + R_2/R_1) + I_o R_2$$

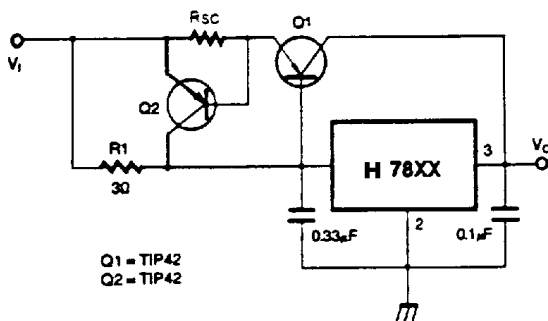
6、 Circuit for Increasing Output Voltage



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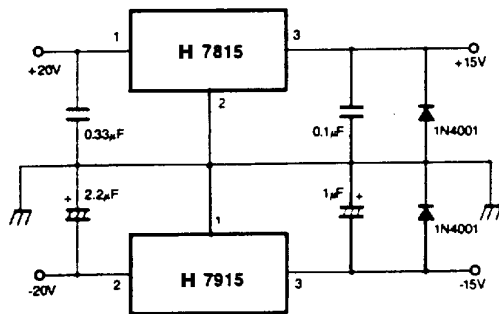
7、Adjustable Output Regulator (7 to 30V)



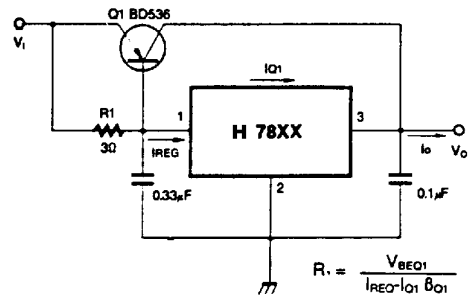
Q1 = TIP42  
Q2 = TIP42

$$R_{sc} = \frac{V_{BEQ2}}{I_{sc}}$$

9、High Output Current with Short Circuit Protection



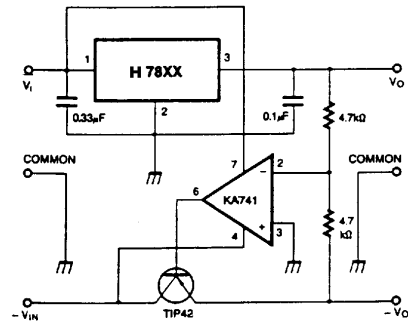
11、Split Power Supply (±15V-1A)



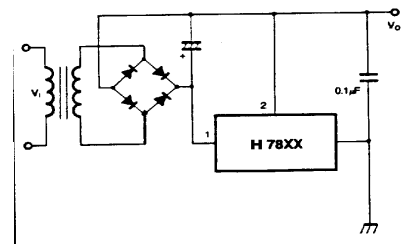
$$R_1 = \frac{V_{BEQ1}}{I_{REG} - I_{O1} \beta_{O1}}$$

$$I_o = I_{REG} + \beta_{O1} (I_{REG} - V_{BEQ1}/R_1)$$

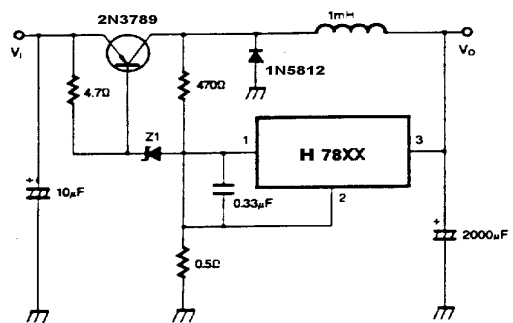
8、High Current Voltage Regulator



10、Tracking Voltage Regulator



12、Negative Output Voltage Circuit



13、Switching Regulator



## Typical Performance Characteristics

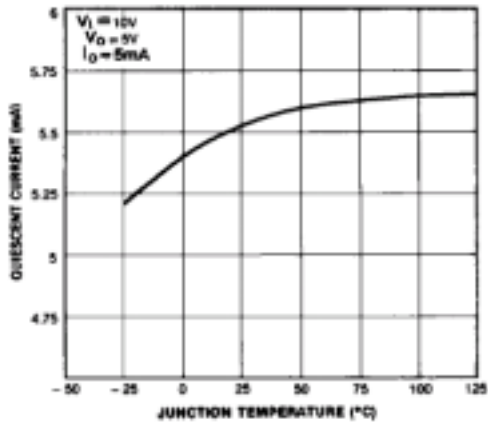


Figure 1. Quiescent Current

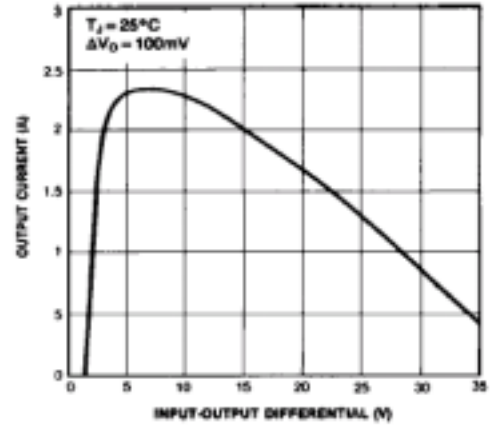


Figure 2. Peak Output Current

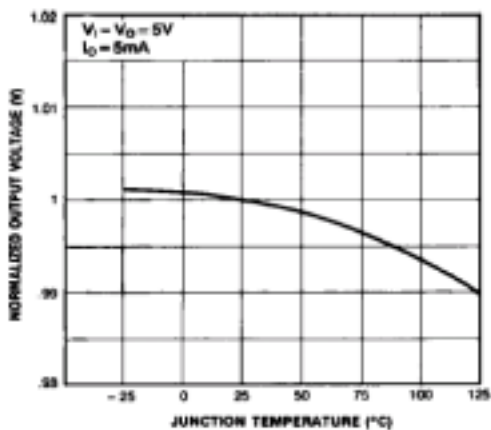


Figure 3. Output Voltage

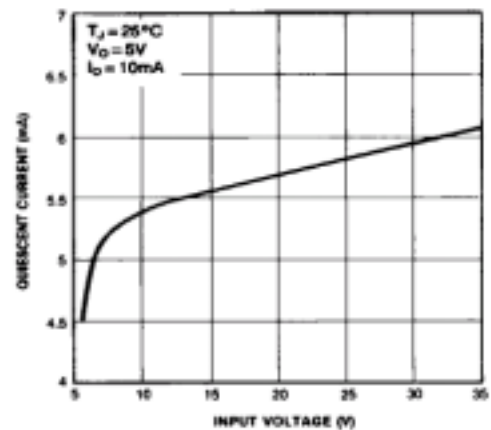


Figure 4. Quiescent Current