



H 7815A

Description

The H7815A 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 15V
- 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 18V)..... 35V

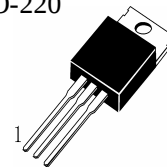
$R_{\theta JC}$ —Thermal Resistance Junction-Cases..... 5 $^\circ\text{C}/\text{W}$

$R_{\theta JA}$ —Thermal Resistance Junction-Air..... 65 $^\circ\text{C}/\text{W}$

T_{OPR} —Operating Temperature Range..... $0\sim 125^\circ\text{C}$

T_{STG} —Storage Temperature Range..... $-65\sim 150^\circ\text{C}$

TO-220

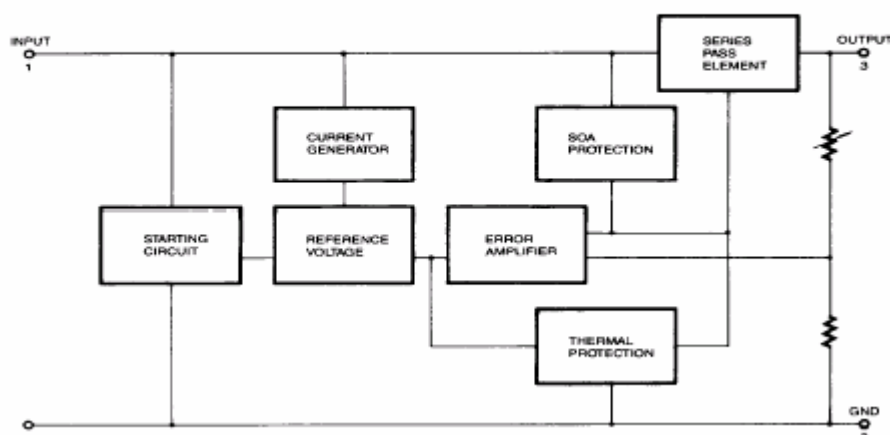


1—INPUT

2—GND

3—OUTPUT

Internal Block Diagram

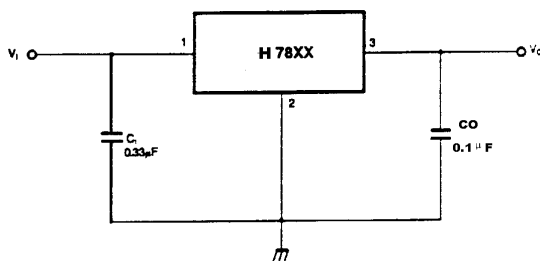


(Refer to test circuit, unless otherwise specified , $0 \leq T_j \leq 125$, $I_o=500\text{mA}$, $V_i=23\text{V}$, $C_i=0.33\mu\text{F}$, $C_o=0.1\mu\text{F}$)

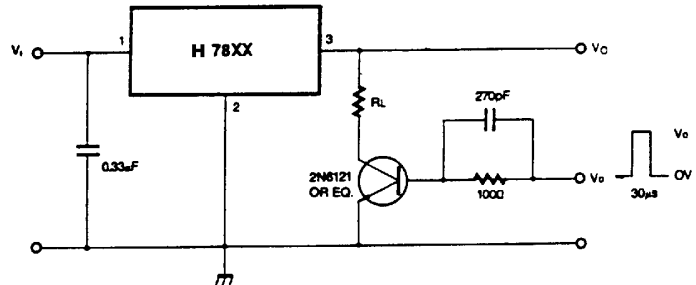
Symbol	Parameter	Min.	Typ.	Max.	Unit	Conditions
V_o	Output Voltage	14.4	15	15.6	V	$T_j=25$
		14.25	15	15.75		$5.0\text{mA} \leq I_o \leq 1.0\text{A}$, $P_o \leq 15\text{W}$, $17.5\text{V} \leq V_i \leq 30\text{V}$
ΔV_o	Line Regulation (Note1)		11	150	mV	$T_j=25$, $17.5\text{V} \leq V_i \leq 30\text{V}$
			3	75		$T_j=25$, $20\text{V} \leq V_i \leq 26\text{V}$
ΔV_o	Load Regulation (Note1)		12	100	mV	$T_j=25$, $5.0\text{mA} \leq I_o \leq 1.5\text{A}$
			5	50		$T_j=25$, $250\text{mA} \leq I_o \leq 750\text{mA}$
I_q	Quiescent Current		5.2	8	mA	$T_j=25$
ΔI_q	Quiescent Current Change			0.5	mA	$5\text{mA} \leq I_o \leq 1.0\text{A}$
				0.81.0		$17.5\text{V} \leq V_i \leq 30\text{V}$
$\Delta V_o / \Delta T$	Output Voltage Drift		-1		mV/	$I_o=5\text{mA}$
V_N	Output Noise Voltage		90		μV	$T_A=25$, $10\text{Hz} \leq f \leq 100\text{kHz}$
RR	Ripple Rejection	54	70		dB	$f=120\text{Hz}$, $18.5\text{V} \leq V_i \leq 28.5\text{V}$
V_D	Dropout Voltage		2		V	$I_o=1\text{A}$, $T_j=25$
R_o	Output Resistance		19		$\text{m}\Omega$	$f=1\text{kHz}$
I_{SC}	Short Circuit Current		250		mA	$V_i=35\text{V}$, $T_A=25$
I_{PK}	Peak Current		2.2		A	$T_j=25$



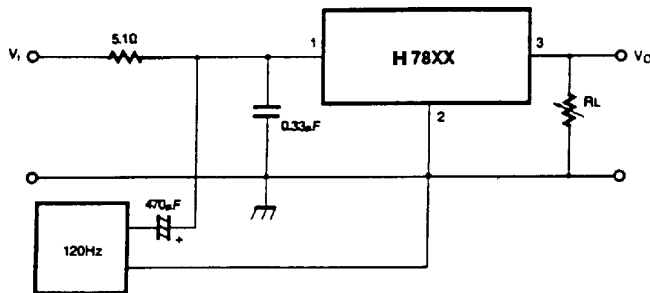
Typical Applications



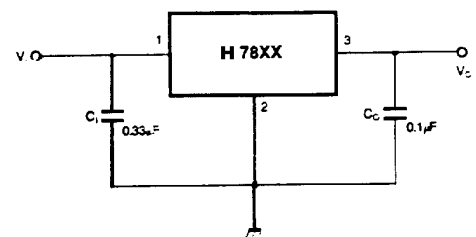
1、DC Parameters



2、Load Regulation



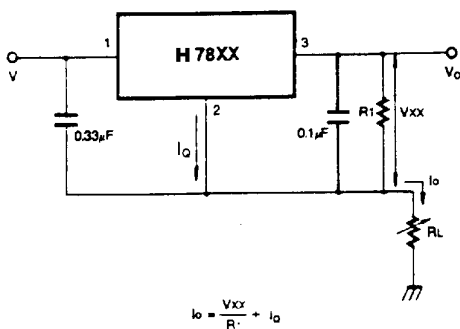
3、Ripple Rejection



4、Fixed Output Regulator

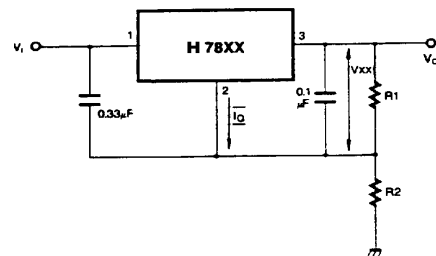
Notes:

- (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_1 is required if regulator is located an appreciable distance from power Supply filter.
- (3) C_0 improves stability and transient response.



$$I_0 = \frac{V_{XX}}{R_1} + I_Q$$

5、Constant Current Regulator



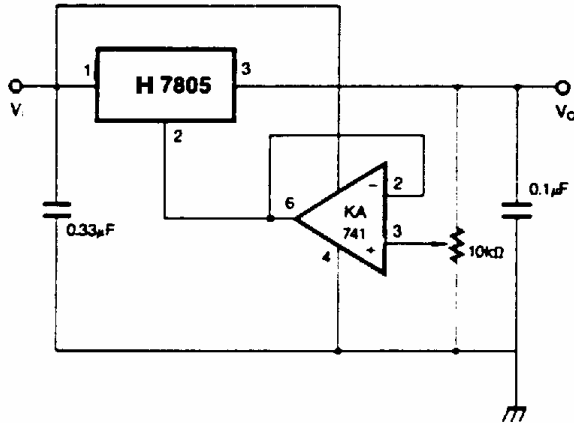
$$I_{R1} \geq 5 I_Q$$

$$V_O = V_{XX} (1 + R_2/R_1) + I_Q R_2$$

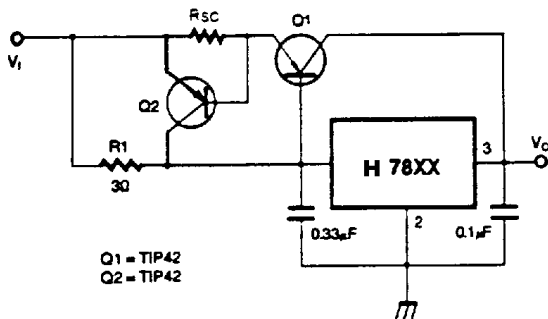
6、Circuit for Increasing Output Voltage



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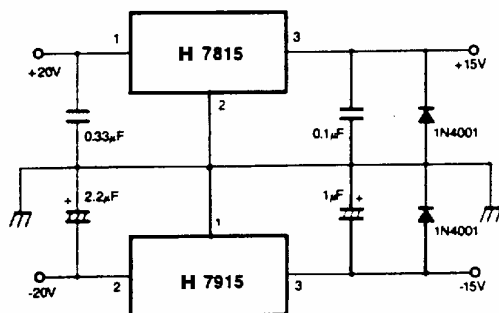
7、Adjustable Output Regulator (7 to 30V)



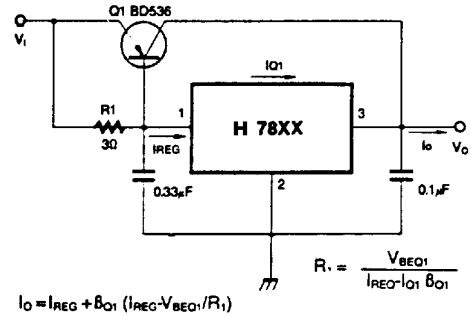
Q1 = TIP42
Q2 = TIP42

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

9、High Output Current with Short Circuit Protection



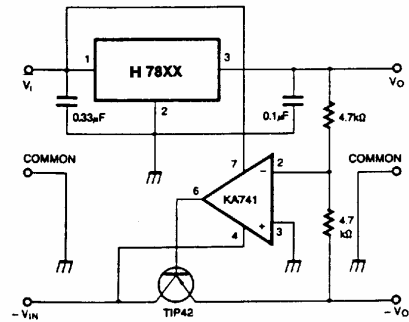
11、Split Power Supply (±15V-1A)



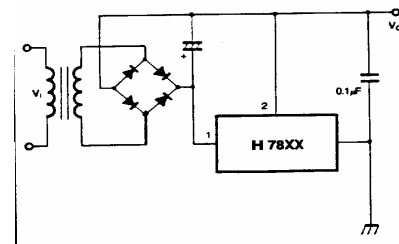
$$I_o = I_{REG} + \beta_{O1} (I_{REG} - V_{BEQ1} / R_1)$$

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

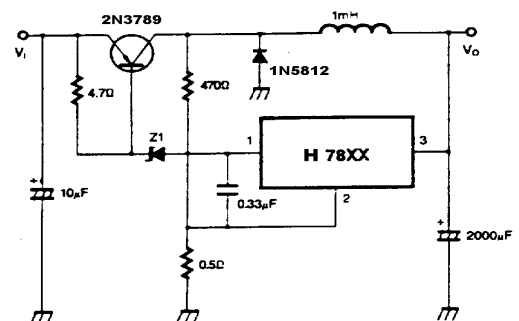
8、High Current Voltage Regulator



10、Tracking Voltage Regulator



12、Negative Output Voltage Circuit



13、Switching Regulator



Typical Performance Characteristics

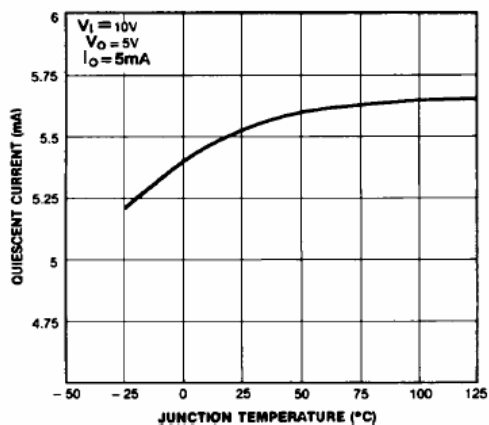


Figure 1. Quiescent Current

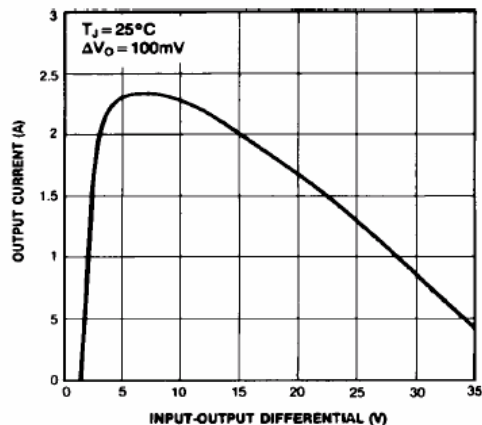


Figure 2. Peak Output Current

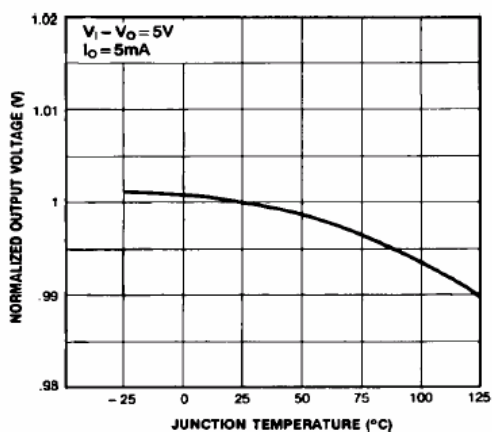


Figure 3. Output Voltage

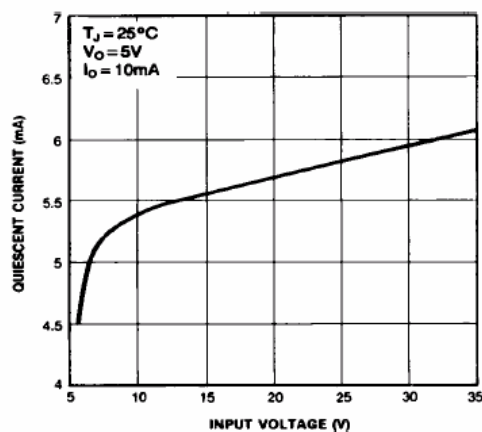


Figure 4. Quiescent Current