

# 7800 Series

## 3-Terminal Fixed Positive Voltage Regulator

### General Description

These voltage regulators are monolithic integrated circuits designed as fixed-voltage regulators for a wide variety of applications including local, on-card regulation. These regulators employ internal current limiting, thermal shutdown, and safe-area compensation. With adequate heatsink they can deliver output currents up to 1 ampere.

Although designed primarily as a fixed voltage regulator, these devices can be used with external components to obtain adjustable voltages and currents.

This series is offered in 3-pin TO-220, ITO-220 & TO-263 package.

#### TO-220



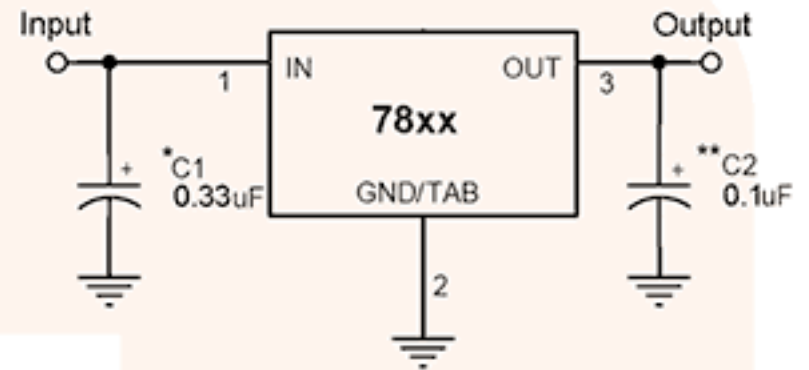
#### Pin Definition:

1. Input
2. Ground (tab)
3. Output

#### Features

- Output Voltage Range 5 to 24V
- Output current up to 1A
- No external components required
- Internal thermal overload protection
- Internal short-circuit current limiting
- Output transistor safe-area compensation
- Output voltage offered in 4% tolerance

#### Standard Application Circuit



A common ground is required between the input and the output voltages. The input voltage must remain typically 2.0V above the output voltage even during the low point on the input ripple voltage.

XX = these two digits of the type number indicate voltage.

\* =  $C_{in}$  is required if regulator is located an appreciable distance from power supply filter.

\*\* =  $C_o$  is not needed for stability; however, it does improve transient response.

#### Absolute Maximum Rating ( $T_a = 25^\circ\text{C}$ unless otherwise noted)

Parameter	Symbol	Limit	Unit
Input Voltage	$V_{IN}^*$	35	V
Input Voltage	$V_{IN}^{**}$	40	V
Power Dissipation	$P_D$	Internal Limited	W
Operating Junction Temperature	$T_J$	0~+125	$^\circ\text{C}$
Storage Temperature Range	$T_{STG}$	-65~+150	$^\circ\text{C}$

#### 7809 Electrical Characteristics

( $V_{in}=15\text{V}$ ,  $I_{out}=500\text{mA}$ ,  $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$ ,  $C_{in}=0.33\mu\text{F}$ ,  $C_{out}=0.1\mu\text{F}$ ; unless otherwise specified.)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit	
Output Voltage	$V_{out}$	$T_J=25^\circ\text{C}$	8.65	9	9.36	V	
		$11.5\text{V} \leq V_{in} \leq 23\text{V}$ , $10\text{mA} \leq I_{out} \leq 1\text{A}$ , $P_D \leq 15\text{W}$	8.57	9	9.45		
Line Regulation	REG <sub>line</sub>	$T_J=25^\circ\text{C}$	$11.5\text{V} \leq V_{in} \leq 26\text{V}$	--	6	180	mV
			$12\text{V} \leq V_{in} \leq 17\text{V}$	--	2	90	
Load Regulation	REG <sub>load</sub>	$T_J=25^\circ\text{C}$	$10\text{mA} \leq I_{out} \leq 1\text{A}$	--	12	180	mV
			$250\text{mA} \leq I_{out} \leq 750\text{mA}$	--	4	90	
Quiescent Current	$I_q$	$I_{out}=0$ , $T_J=25^\circ\text{C}$	--	4.3	8	mA	
Quiescent Current Change	$\Delta I_q$	$11.5\text{V} \leq V_{in} \leq 26\text{V}$	--	--	1		
		$10\text{mA} \leq I_{out} \leq 1\text{A}$	--	--	0.5		
Output Noise Voltage	$V_n$	$10\text{Hz} \leq f \leq 100\text{KHz}$ , $T_J=25^\circ\text{C}$	--	52	--	$\mu\text{V}$	
Ripple Rejection Ratio	RR	$f=120\text{Hz}$ , $12\text{V} \leq V_{in} \leq 22\text{V}$	55	72	--	dB	
Voltage Drop	$V_{drop}$	$I_{out}=1.0\text{A}$ , $T_J=25^\circ\text{C}$	--	2	--	V	
Output Resistance	$R_{out}$	$f=1\text{KHz}$	--	16	--	$\text{m}\Omega$	
Output Short Circuit Current	$I_{os}$	$T_J=25^\circ\text{C}$	--	450	--	mA	
Peak Output Current	$I_{o\ peak}$	$T_J=25^\circ\text{C}$	--	2.2	--	A	
Temperature Coefficient of Output Voltage	$\Delta V_{out} / \Delta T_J$	$I_{out}=10\text{mA}$ , $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$	--	-1	--	$\text{mV} / ^\circ\text{C}$	