

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



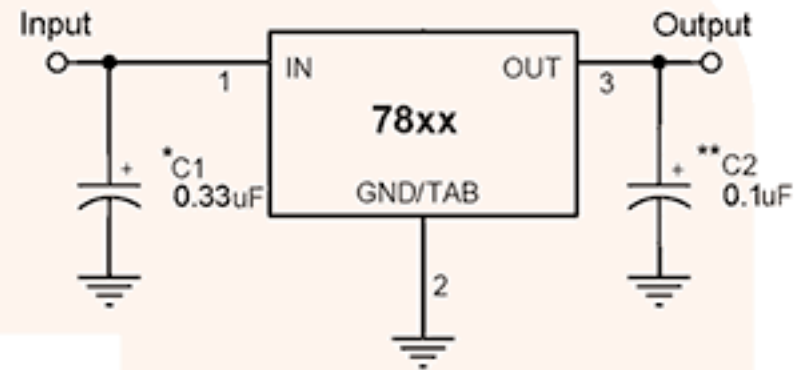
Pin Definition:

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 | $^\circ\text{C}$ |

7812 Electrical Characteristics

($V_{in}=19\text{V}$, $I_{out}=500\text{mA}$, $0^\circ\text{C} \leq T_J \leq 125^\circ\text{C}$, $C_{in}=0.33\mu\text{F}$, $C_{out}=0.1\mu\text{F}$; unless otherwise specified.)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit | |
|---|-------------------------------|---|---|-----|-------|------------------------------|----|
| Output Voltage | V_{out} | $T_J=25^\circ\text{C}$ | 11.53 | 12 | 12.48 | V | |
| | | $14.5\text{V} \leq V_{in} \leq 27\text{V}$, $10\text{mA} \leq I_{out} \leq 1\text{A}$, $P_D \leq 15\text{W}$ | 11.42 | 12 | 12.60 | | |
| Line Regulation | REG _{line} | $T_J=25^\circ\text{C}$ | $14.5\text{V} \leq V_{in} \leq 30\text{V}$ | -- | 10 | 240 | mV |
| | | | $15\text{V} \leq V_{in} \leq 19\text{V}$ | -- | 3 | 120 | |
| Load Regulation | REG _{load} | $T_J=25^\circ\text{C}$ | $10\text{mA} \leq I_{out} \leq 1\text{A}$ | -- | 12 | 240 | mV |
| | | | $250\text{mA} \leq I_{out} \leq 750\text{mA}$ | -- | 4 | 120 | |
| Quiescent Current | I_q | $T_J=25^\circ\text{C}$, $I_{out}=0$ | -- | 4.3 | 8 | mA | |
| Quiescent Current Change | ΔI_q | $14.5\text{V} \leq V_{in} \leq 30\text{V}$ | -- | -- | 1 | | mA |
| | | $10\text{mA} \leq I_{out} \leq 1\text{A}$ | -- | -- | 0.5 | | |
| Output Noise Voltage | V_n | $10\text{Hz} \leq f \leq 100\text{KHz}$, $T_J=25^\circ\text{C}$ | -- | 75 | -- | μV | |
| Ripple Rejection Ratio | RR | $f=120\text{Hz}$, $15\text{V} \leq V_{in} \leq 25\text{V}$ | 55 | 71 | -- | dB | |
| Voltage Drop | V_{drop} | $I_{out}=1.0\text{A}$, $T_J=25^\circ\text{C}$ | -- | 2 | -- | V | |
| Output Resistance | R_{out} | $f=1\text{KHz}$ | -- | 18 | -- | $\text{m}\Omega$ | |
| Output Short Circuit Current | I_{os} | $T_J=25^\circ\text{C}$ | -- | 350 | -- | 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 | -- | $\text{mV} / ^\circ\text{C}$ | |