

The **78xx and 79xx integrated circuit (IC) families** are series of **linear voltage regulators** used to provide stable DC voltage outputs in electronic circuits. They belong to the **78xx (positive voltage regulators)** and **79xx (negative voltage regulators)** series, manufactured by various semiconductor companies such as Texas Instruments, ON Semiconductor, and STMicroelectronics.

78xx Series: Positive Voltage Regulators

The **78xx** series provides **fixed positive output voltages** and is widely used in power supply circuits. The last two digits indicate the output voltage.

Common 78xx Models and Their Outputs

- **7805** → +5V
- **7809** → +9V
- **7812** → +12V
- **7815** → +15V
- **7824** → +24V

Features of the 78xx Series

- **Fixed positive voltage output**
- **Built-in short circuit protection**
- **Thermal overload protection**
- **Current limiting**
- **Simple to use with minimal external components**

Typical 78xx Circuit Configuration

A **78xx regulator** requires:

- **An input voltage** at least 2V higher than the output (e.g., for 7805, at least 7V input).
- **A capacitor at the input and output** (typically 0.33μF at input and 0.1μF at output) to improve stability.

Basic Circuit:

Vin --> [78xx] --> Vout
| |
C1 (0.33μF) C2 (0.1μF)

79xx Series: Negative Voltage Regulators

The **79xx** series provides **fixed negative voltage outputs**, complementing the 78xx series.

Common 79xx Models and Their Outputs

- **7905** → -5V
- **7909** → -9V
- **7912** → -12V
- **7915** → -15V
- **7924** → -24V

Features of the 79xx Series

- Fixed negative voltage output
- Overcurrent and short-circuit protection
- Thermal shutdown
- Current limiting
- Used in dual-polarity power supplies (e.g., for op-amps and analog circuits)

Typical 79xx Circuit Configuration

A **79xx** regulator requires:

- **An input voltage** at least 2V more negative than the output (e.g., for 7912, at least -14V input).
- **Capacitors for stability** (same as the 78xx series).

Basic Circuit:

Vin --> [79xx] --> Vout
| |
C1 (0.33μF) C2 (0.1μF)

Applications of 78xx & 79xx Voltage Regulators

- Microcontroller and digital circuits (7805 for +5V logic)
- Dual power supply designs (e.g., ±12V for op-amps using 7812 & 7912)
- Battery-powered devices
- Power adapters and chargers
- Embedded systems

Conclusion

The **78xx** and **79xx** voltage regulator ICs are reliable, simple, and effective for providing **stable DC power** in electronics. The **78xx** series is used for **positive voltages**, while the **79xx** series is used for **negative voltages**, making them a common choice for **power regulation circuits**.

Here is a complete list of the **78xx (positive voltage) and 79xx (negative voltage) voltage regulator ICs**, along with their specifications:

78xx Series (Positive Voltage Regulators)

IC Model	Output Voltage (V)	Maximum Output Current (A)	Input Voltage Range (V)	Typical Dropout Voltage (V)	Application
7805	+5V	1A	7V - 25V	~2V	5V logic circuits, microcontrollers
7806	+6V	1A	8V - 25V	~2V	Low-voltage devices
7808	+8V	1A	10V - 25V	~2V	Sensors, communication circuits
7809	+9V	1A	11V - 25V	~2V	Low-power analog circuits
7810	+10V	1A	12V - 25V	~2V	General-purpose voltage regulation

7812	+12V	1A	14V - 30V	~2V	Op-amps, audio circuits
7815	+15V	1A	17V - 30V	~2V	Analog circuits, dual power supplies
7818	+18V	1A	20V - 30V	~2V	High-power analog applications
7824	+24V	1A	26V - 40V	~2V	Power amplifiers, industrial devices

♦ *High-current versions (2A - 3A) exist, such as **78Sxx**, **78Txx**, and **78Hxx**.*

79xx Series (Negative Voltage Regulators)

IC Model	Output Voltage (V)	Maximum Output Current (A)	Input Voltage Range (V)	Typical Dropout Voltage (V)	Application
7905	-5V	1A	-7V to -25V	~2V	Complementary to 7805 in dual supplies
7906	-6V	1A	-8V to -25V	~2V	Low-voltage analog circuits
7908	-8V	1A	-10V to -25V	~2V	Audio circuits, power amplifiers

7909	-9V	1A	-11V to -25V	~2V	Communication circuits
7910	-10V	1A	-12V to -25V	~2V	General-purpose voltage regulation
7912	-12V	1A	-14V to -30V	~2V	Op-amps, audio processing
7915	-15V	1A	-17V to -30V	~2V	Dual power supplies for analog devices
7918	-18V	1A	-20V to -30V	~2V	Industrial automation circuits
7924	-24V	1A	-26V to -40V	~2V	High-power applications

♦ *Higher current versions* are available as **79Sxx**, **79Txx**, and **79Hxx**.

Common Features of 78xx & 79xx Regulators

- ✓ Fixed voltage output
- ✓ Short-circuit protection
- ✓ Thermal overload protection
- ✓ Current limiting
- ✓ Low-cost and easy to use