



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution



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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

23ECB202 – LINEAR INTEGRATED CIRCUITS

II YEAR/ IV SEMESTER

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UNIT 3 – WAVEFORM GENERATORS AND VOLTAGE REGULATORS

TOPIC 7 – IC 723 general purpose regulator



Outline



- Disadvantages of fixed voltage regulator
- Features of IC723
- Functional blocks
- Pin diagram of IC723



Disadvantages of fixed voltage regulator



- Do not have the short circuit protection
- Output voltage is not adjustable

These limitations can be overcomes in IC723.



Features of IC723

1. Unregulated dc supply voltage at the input between 9.5V & 40V
2. Adjustable regulated output voltage between 2 to 3V.
3. Maximum load current of 150 mA ($I_{Lmax} = 150mA$).
4. With the additional transistor used, I_{Lmax} upto 10A is obtainable.
5. Positive or Negative supply operation
6. Internal Power dissipation of 800mW.
7. Built in short circuit protection.
8. Very low temperature drift.
9. High ripple rejection.



Functional blocks

The simplified functional block diagram can be divided into 4 blocks.

1. Reference generating block
2. Error Amplifier
3. Series Pass transistor
4. Circuitry to limit the current

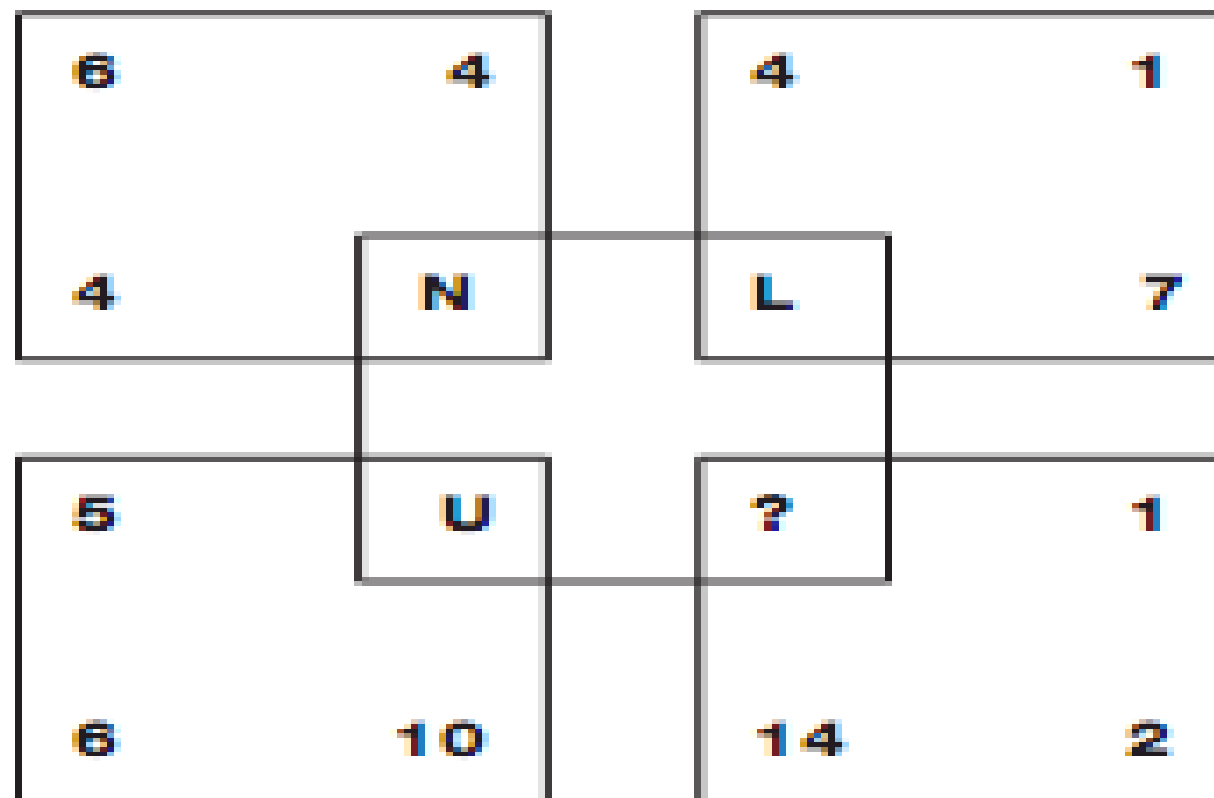


Activity



In class activity

Which letter replaces the question mark?





Functional blocks

Reference Generating block:

- The temperature compensated Zener diode, constant current source & voltage reference amplifier together form the reference generating block.
- The Zener diode is used to generate a fixed reference voltage internally.
- Constant current source will make the Zener diode to operate at a fixed point & it is applied to the Non – inverting terminal of error amplifier.
- The Unregulated input voltage $\pm V_{CC}$ is applied to the voltage reference amplifier as well as error amplifier.



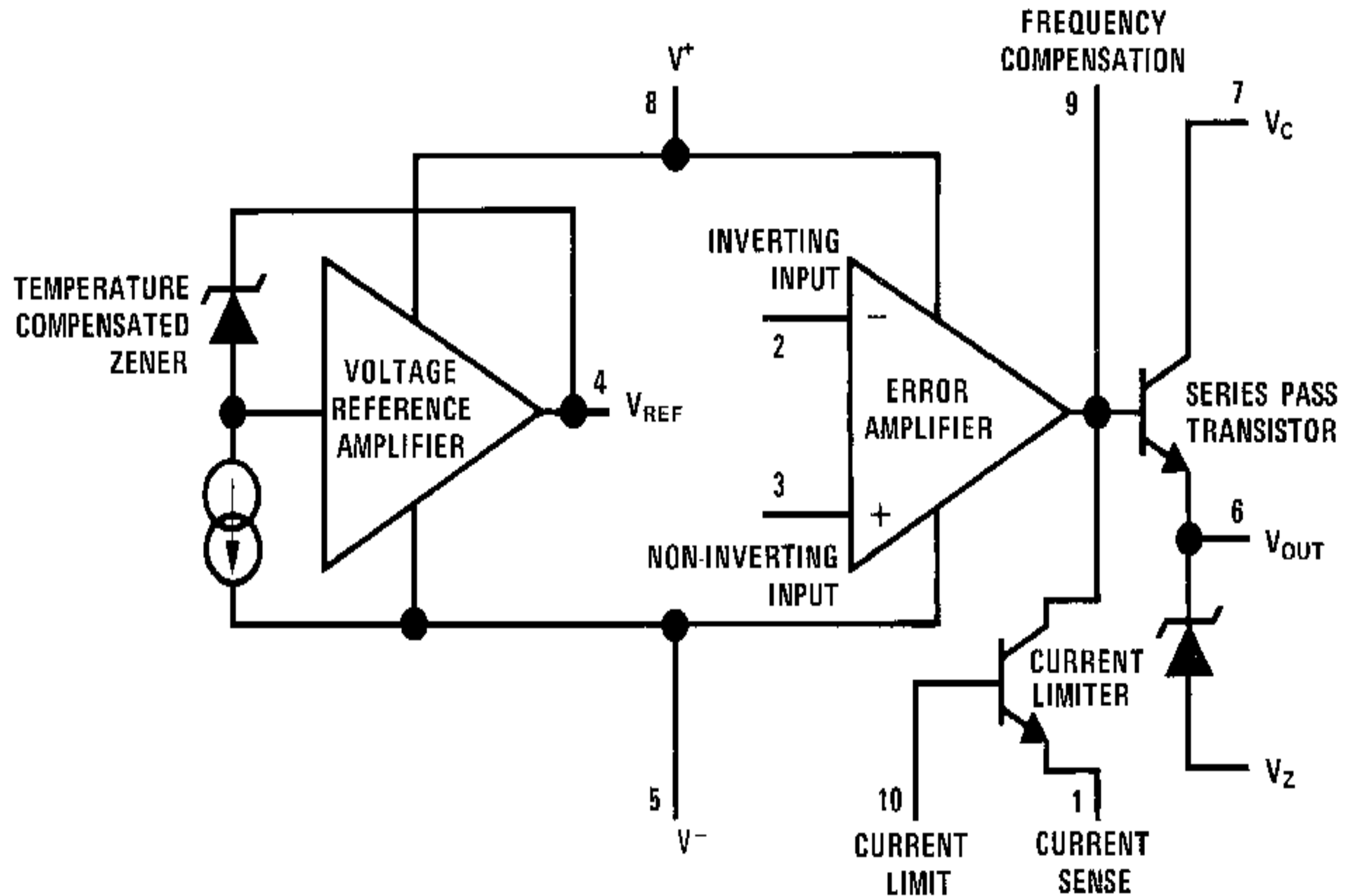
Functional blocks

Error Amplifier:

- Error amplifier is a high gain differential amplifier with 2 input (inverting & Non-inverting).
- The Non-inverting terminal is connected to the internally generated reference voltage.
- The Inverting terminal is connected to the full regulated output voltage.



Functional block diagram of IC723





Functional blocks



Series Pass Transistor:

- Q1 is the internal series pass transistor which is driven by the error amplifier.
- This transistor actually acts as a variable resistor & regulates the output voltage.
- The collector of transistor Q1 is connected to the Un-regulated power supply.
- The maximum collector voltage of Q1 is limited to 36Volts. The maximum current which can be supplied by Q1 is 150mA.



Functional blocks

Circuitry to limit the current:

- The internal transistor Q2 is used for current sensing & limiting.
- Q2 is normally OFF transistor. It turns ON when the I_L exceeds a predetermined limit.
- Low voltage, Low current is capable of supplying load voltage which is equal to or between 2 to 7 Volts.

$$V_{\text{load}} = 2 \text{ to } 7V$$

$$I_{\text{load}} = 150\text{mA}$$



Conclusion



- **Three-terminal voltage regulators** simplify voltage regulation in electronics.
- **Fixed regulators** (78xx, 79xx) are easy to use for standard applications.
- **Adjustable regulators** (LM317, LM337) provide flexibility for applications requiring variable voltages.
- **Key Design Considerations:**
 - Heat dissipation and thermal management.
 - Proper selection of capacitors for stability.
 - Protection circuits for reliability and safety.



Assessment



1. List the types of voltage regulators.

Answer: Linear regulators and switching regulators.

2. The switching regulator is more efficient than the linear series or shunt type.



THANK YOU