

Analog Implementation

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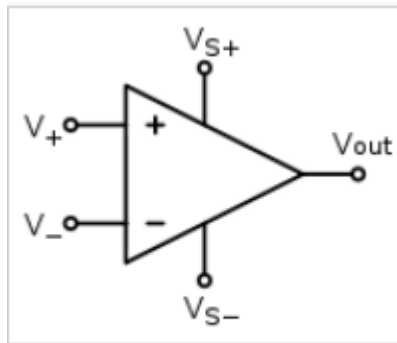
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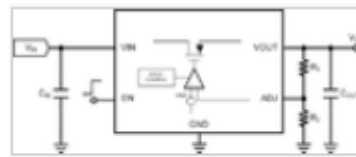
Analog IC

Analog IC design is used in the design of

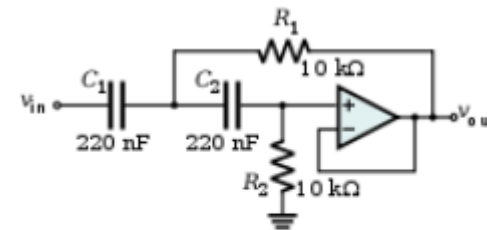
- op-amps
- linear regulators
- phase locked loops
- oscillators
- active filters



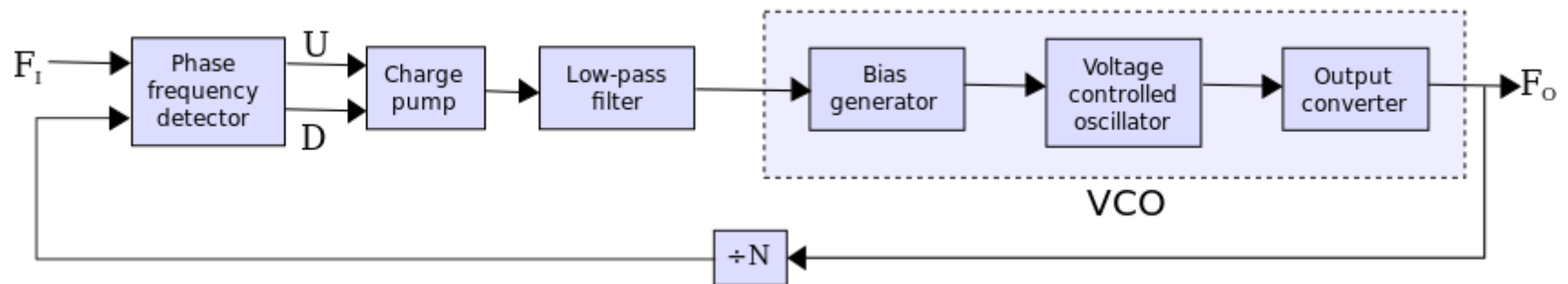
Circuit diagram symbol for



adjustable voltage regulator circuit showing 'adjust' terminal



An example of high-pass active filter of the [Sallen-Key topology](#). The operational amplifier is used as a buffer amplifier.



Linear IC

the amplification curve of a linear IC is a straight line;

operational amplifier or op amp

Linear ICs are employed in

- audio amplifiers
- A/D (analog-to-digital) converters
- oscillators
- audio filters
- sweep generators

2 Amplifiers

- 2.1 Inverting amplifier
- 2.2 Non-inverting amplifier
- 2.3 Differential amplifier
- 2.4 Voltage follower (Unity Buffer Amplifier)
- 2.5 Summing amplifier
- 2.6 Instrumentation amplifier

3 Oscillators

- 3.1 Wien bridge oscillator
- 3.2 Relaxation oscillator

4 Filters

5 Comparators and detectors

- 5.1 Comparator
- 5.2 Threshold detector
- 5.3 Zero level detector
- 5.4 Schmitt trigger

6 Integration and differentiation

- 6.1 Inverting integrator
- 6.2 Inverting differentiator

7 Synthetic elements

- 7.1 Inductance gyrator
- 7.2 Negative impedance converter (NIC)

8 Non-linear

- 8.1 Precision rectifier
- 8.2 Logarithmic output
- 8.3 Exponential output

Power IC

A power semiconductor device is a semiconductor device used as a switch or rectifier in power electronics; a switch-mode power supply is an example. Such a device is also called a power device or, when used in an integrated circuit, a power IC.

A power semiconductor device is usually used in "commutation mode" (i.e., it is either on or off), and therefore has a design optimized for such usage; it should usually not be used in linear operation.

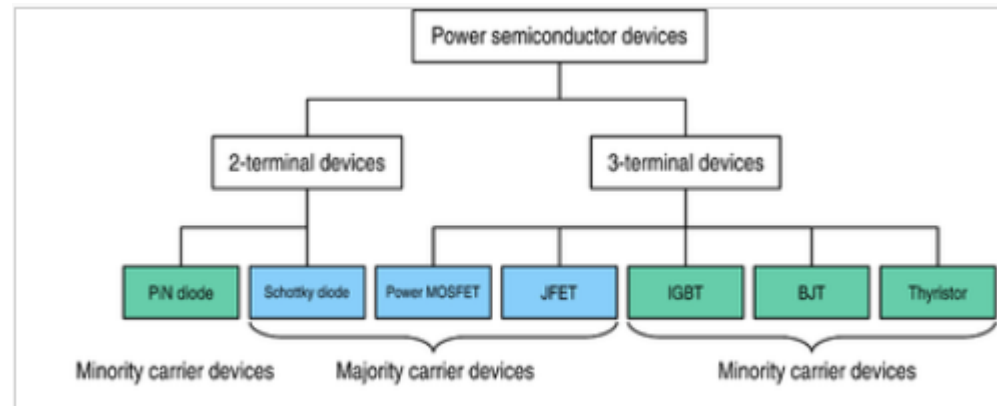


Fig. 1: The power devices family, showing the principal power switches.

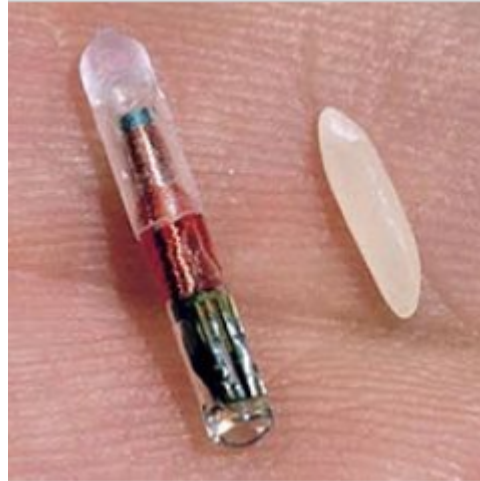
RFIC


RFIC is an abbreviation of Radio Frequency Integrated Circuit. RFICs are integrated circuits are operated in radio frequency (rf) range. The frequency range of rf is debatable, but normally falls between 300 MHz to 30 GHz.

Any integrated circuit operating in this range (e.g.: WLAN, UWB, mobile and cordless phones, RFIDs, ZigBee, and Bluetooth devices) are termed as RFIC. These are fabricated using CMOS, GaAs, and SiGe foundries, each with advantages and disadvantages in product performance. The optimal in this area are CMOS RFIC products for having the best performance and a low current meaning extended battery life.[1] These are integrated with systems called system on a chip.

Usage of RFIC is widespread among companies, being featured in products such as mobile phones, notebook computers, smart phones, Bluetooth devices, etc.

RFID



RFID chip next to a grain of rice. 
This chip contains a radio-frequency [electromagnetic field](#) coil that modulates an external magnetic field to transfer a coded identification number when queried by a reader device. This small type is incorporated in consumer products, and implanted in pets, for identification purposes.



An RFID tag used for [electronic toll collection](#).

Mixed Signal IC

A mixed-signal integrated circuit is any integrated circuit that has both analog circuits and digital circuits on a single semiconductor die.

Examples of mixed-signal integrated circuits include data converters using delta-sigma modulation, analog-to-digital converter/digital-to-analog converter using error detection and correction, and digital radio chips. Digitally controlled sound chips are also mixed-signal circuits. With the advent of cellular technology and network technology this category now includes cellular telephone, software radio, LAN and WAN router integrated circuits.

NAND Gate Layout View

References

[1] <http://en.wikipedia.org/>