

Introduction to Integrated Circuit

Introduction to Integrated Circuit

- Integrated Circuit (IC) is a collection of number of components fabricated on the same “chip ”.
- First Developed Integrated Circuit in 1958 at Texas Instruments

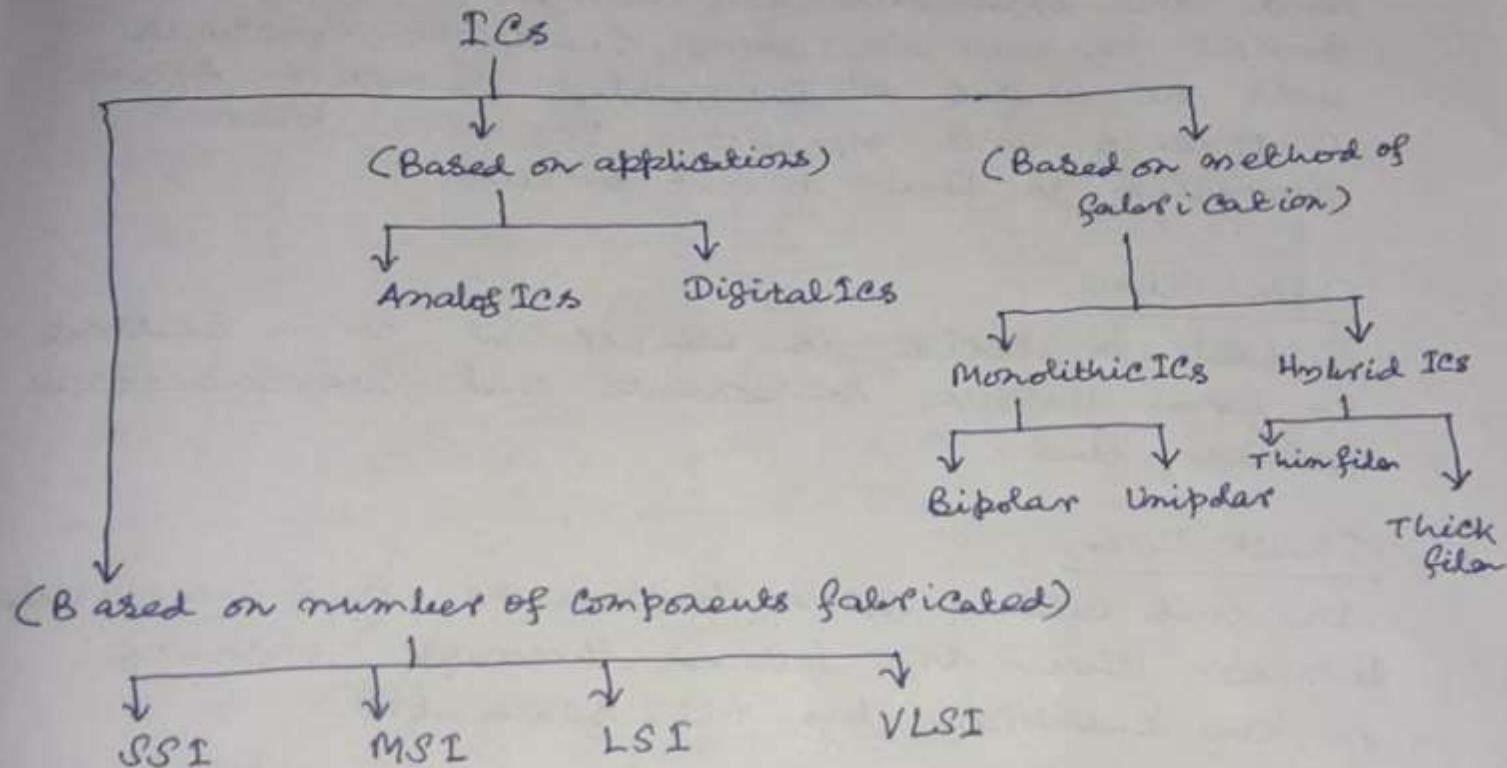
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Advantages of Integrated Circuits (ICs)

- <1> Number of components can be fabricated on a single chip, hence reduces size and increases equipment density.
- <2> Complex circuits can be fabricated with improved functional performance.
- <3> Batch processing (mass production) is possible. Hence it reduces cost of IC.
- <4> Increased system reliability.
- <5> Less power consumption.
- <6> Reduction in overall complexity of circuit.
- <7> Improved operating speed.

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Classification of Integrated Circuits (ICs)



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Digital ICs

- Logic networks
- Gates, counters, multiplexers, shift registers etc.

Analog ICs

- Similar to discrete transistor circuits.
- amplifiers, filter, frequency multiplier etc.
- Most of the ICs are operational amplifiers

Monolithic ICs

→ one stone
→ all components (active and passive) are fabricated on a single chip of semiconductor.

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Monolithic ICs

Passive components (such as resistors and capacitors) and the interconnections between them are formed on an insulating substrate. Substrate acts as chassis of integrated elements. Active components and monolithic ICs are then connected to form a net circuit.

Thin Film

Suitable material is evaporated on a substrate to form passive components and interconnections between them.

Thick Film

In this case passive components and interconnections between them are formed through etching on the substrate by silk screening.

Level of Integration

1. Small Scale Integration SSI < 10 components
2. Medium Scale Integration MSI < 100 "
3. Large Scale Integration LSI > 100 "
4. Very Large Scale Integration VLSI > 1000 "

Well Known IC manufacturers

Fairchild, National Semiconductor, RCA
Motorola, Texas Instruments, Intersil,

Signetics

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Sl. no.	Manufacturer	Initials used	Example
1	Fairchild	FA	MA741
2	National Semiconductor	LM, LH, LF, TBA	LM741, TBA810
3	RCA	CA, CD	CA2741
4	Motorola	MC, MFC	MC1741
5	Texas Instruments	SN	SN52741
6	Intersil	ICL, IH	ICL8038
7	Signetics	N/S, NE/SE, N5741	NE535 NS741

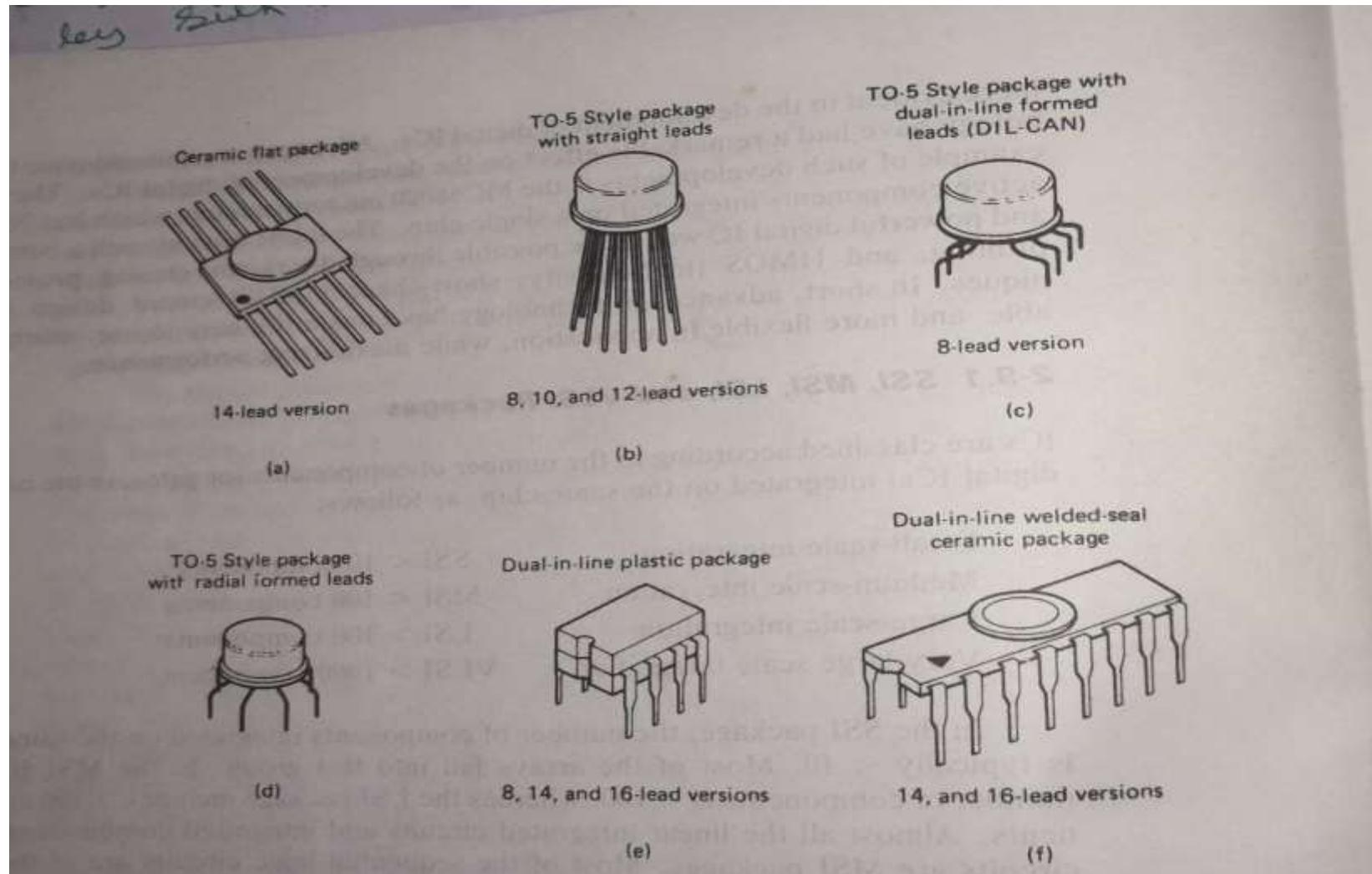
Package Types

1. Flat pack
2. Metal Can or Transistor Pack
3. Dual-in-line package (DIP)

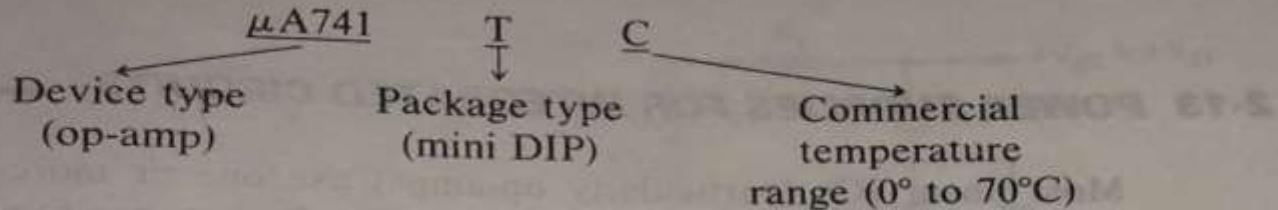
Temperature Ranges

1. Military Temperature range: -55°C to $+125^{\circ}\text{C}$
2. Industrial Temperature range: -20°C to $+85^{\circ}\text{C}$
3. Commercial Temperature range: 0°C to 70°C

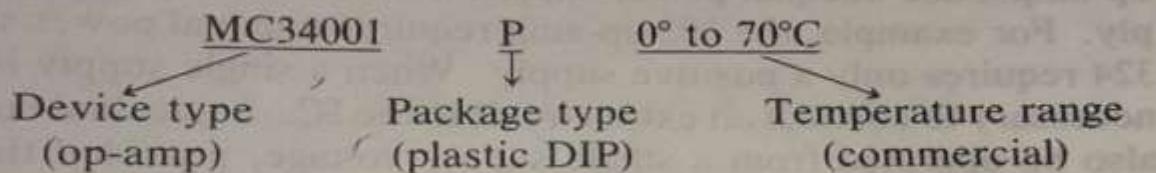
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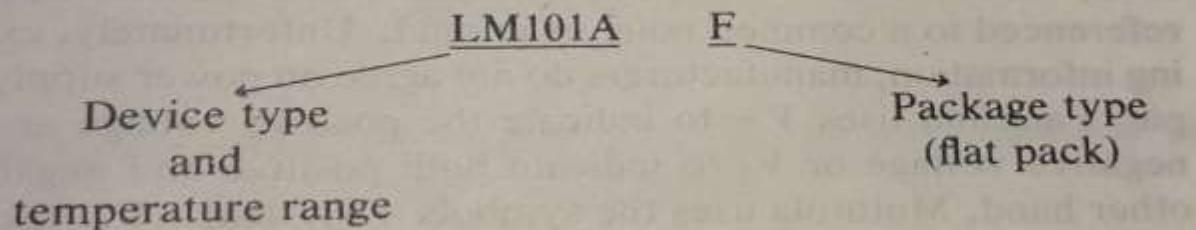
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On the other hand, the ordering information format for a typical Motorola IC is as follows:



In National Semiconductor ICs the temperature range is denoted in the device number itself:



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