Embedded Computer Design

(DISEÑO DE COMPUTADORES EMPOTRADOS)

Course 2017/18

Introduction to Basics Components

Professors:

- Arturo Morgado Estévez
- Mirian Cifredo Chacón

Computer Engineering Degree

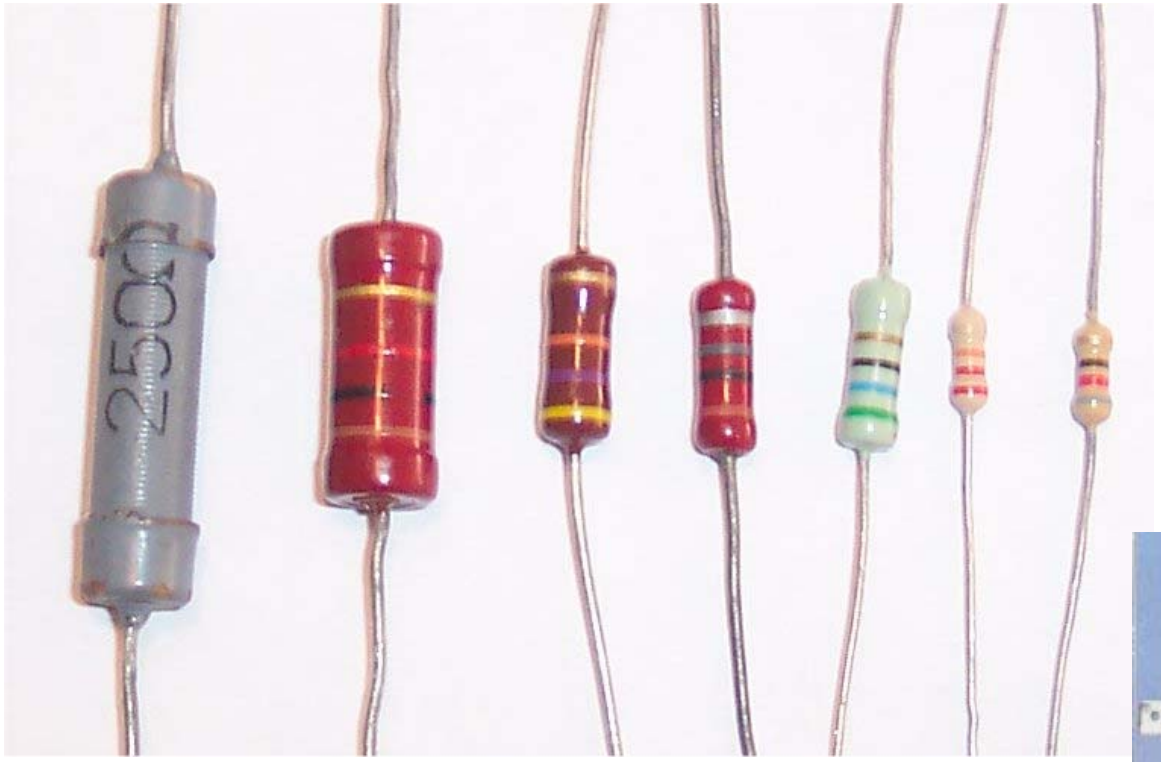
Introduction to Basics Components

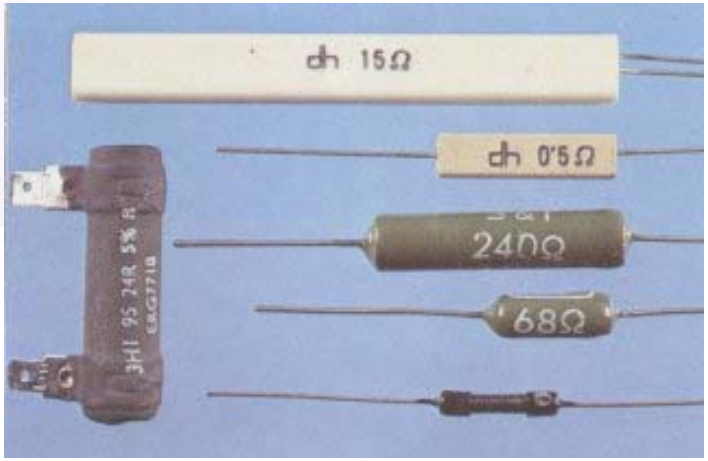
- Shopping for electronics components
  - http://es.farnell.com/
  - http://es.rs-online.com
  - http://www.digikey.es/

- Robotics shops in Spain
  - http://www.cooking-hacks.com/
  - http://www.bricogeek.com/shop/

Introduction to Basics Components

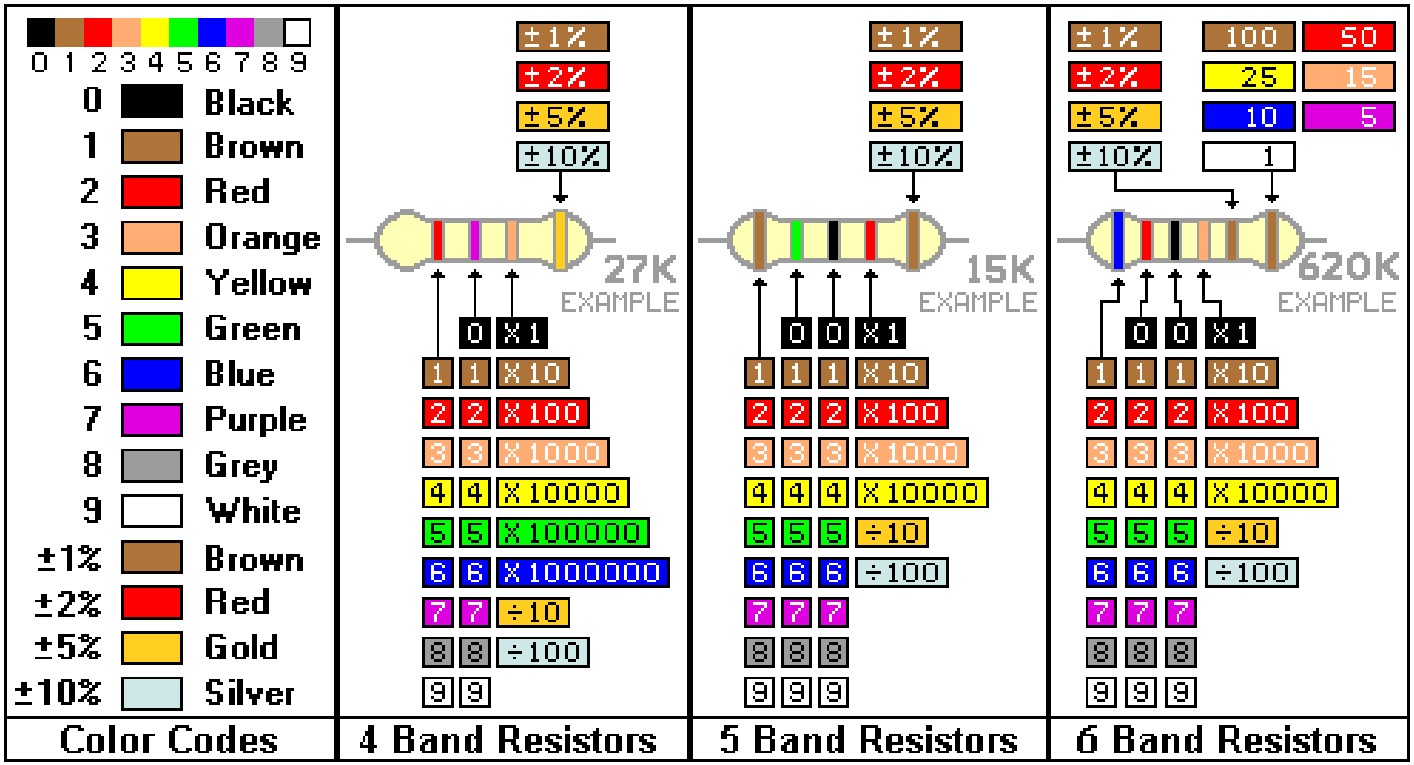
- Basics Components. Resistor.
  - Termination style. Axial and SMD.

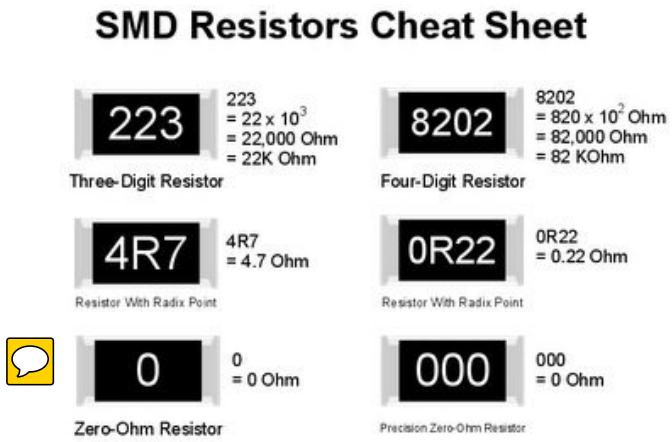




Introduction to Basics Components

- Basics Components. Resistor.
  - Values.



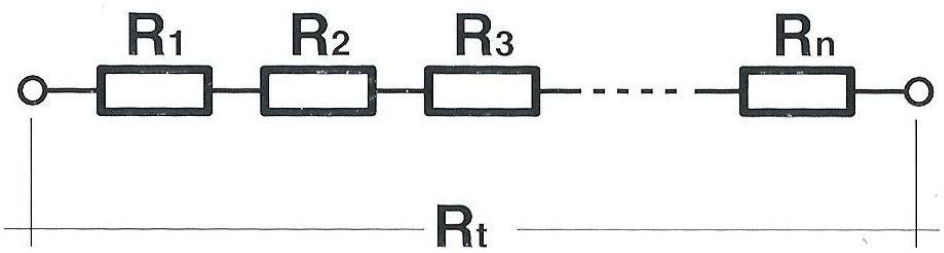


Introduction to Basics Components

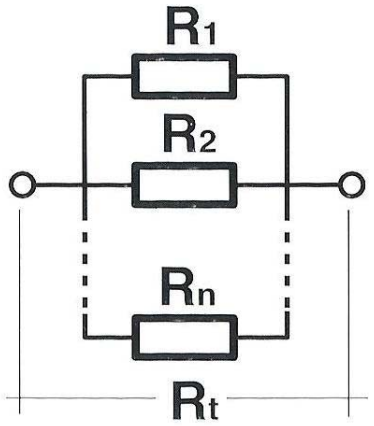
- Basics Components. Resistor.
  - Series and parallel resistors.

$$R = \frac{V}{I}$$

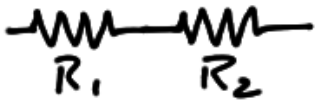
$$R_t = R_1 + R_2 + R_3 + \ldots R_n$$



$$R_t = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots \frac{1}{R_n}}$$



SERIE



$$R_T = R_1 + R_2$$

PARALELO

$$R_T = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2}}$$

Introduction to Basics Components

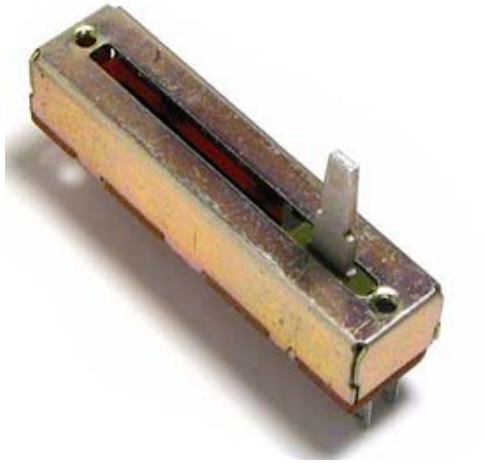
- Basics Components. Resistor. Preferred values.
  - Resistors kits 1/4W.
    - Values:
      - 0Ω, 1.5Ω, 4.7Ω, 10Ω, 47Ω
      - 110Ω, 220Ω, 330Ω, 470Ω, 680Ω
      - 1kΩ, 2.2kΩ, 3.3kΩ, 4.7kΩ, 10kΩ
      - 22kΩ, 47kΩ, 100kΩ, 330kΩ, 1MΩ.

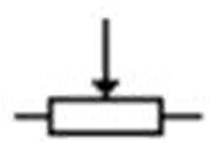
E12	E24	E48	E12	E24	E48
100	100	100	330	330	316
		105			332
	110	110		360	348
		115			365
120	120	121	390	390	383
		127			402
	130	133		430	422
		140			442
150	150	147	470	470	464
		154			487
	160	162		510	511
		169			536
180	180	178	560	560	562
		187			590
	200	196		620	619
		205			649
220	220	215	680	680	681
		226			715
	240	237		750	750
		249			787
270	270	261	820	820	825
		274			866
	300	287		910	909
		301			953

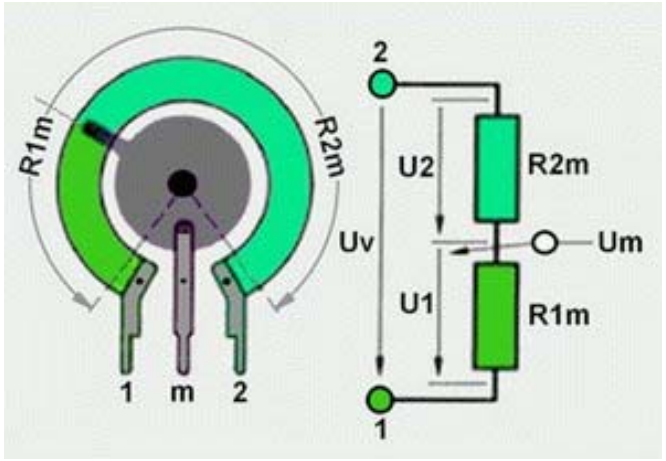
Introduction to Basics Components

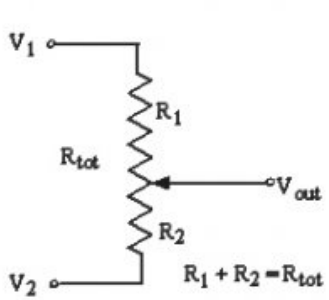
- Basics Components. Potentiometers.
- Lineal Potentiometers

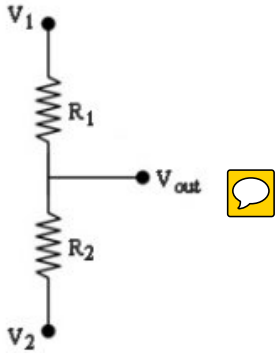
Rotatory Potentiometers









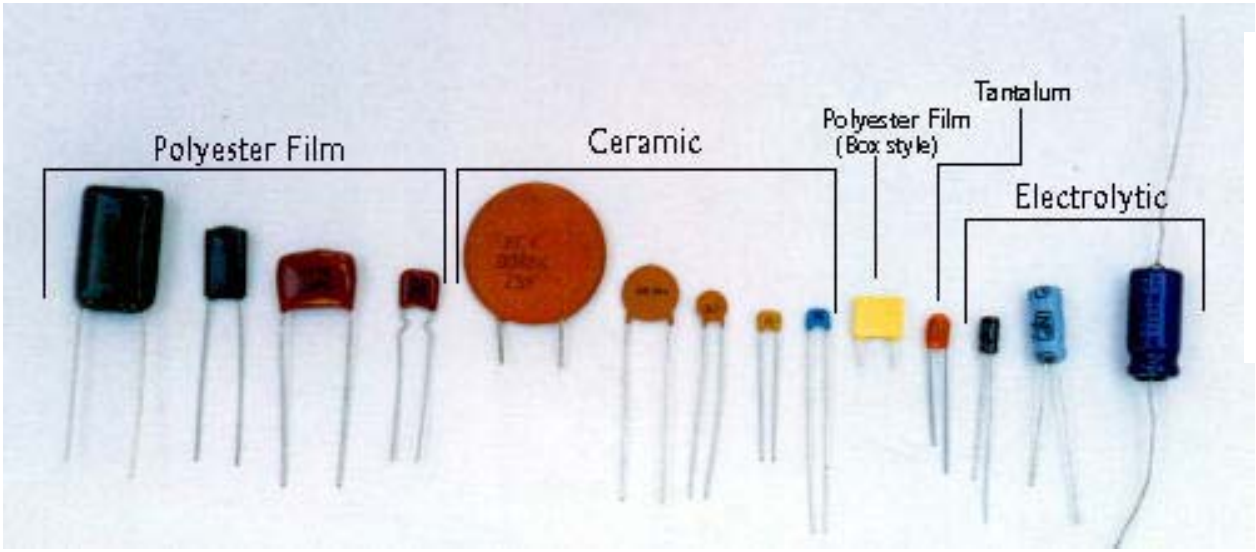


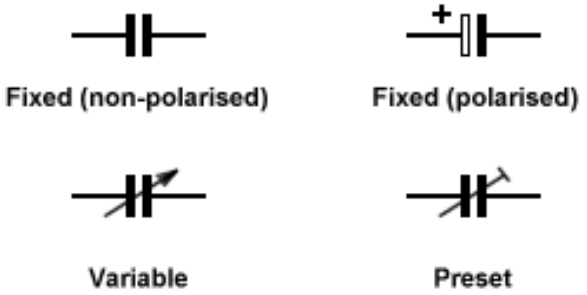
Introduction to Basics Components

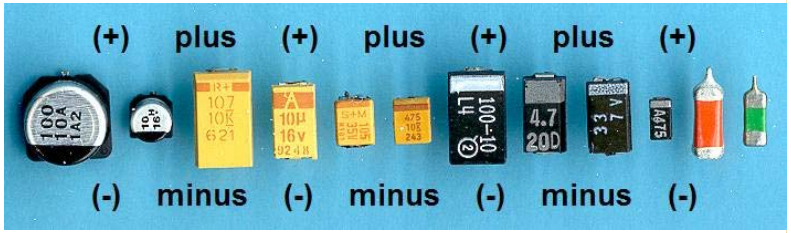
- Basics Components. Potentiometers.
  - Potentiometer 10K LIN.
    - Track Resistance: 10kohm
    - Track Taper: Lineal
    - Shaft Diameter: 6.35mm
    - Shaft Length - Metric: 51mm
    - Resistance Tolerance: ± 20%
    - Nominal Power: 400mW
    - http://www.tycoelectronics.com/commerce/DocumentDelivery/DDEController?Action=srchrtrv&DocNm=1773115&DocType=Data+Sheet&DocLang=English

Introduction to Basics Components

- Basics Components. Capacitor.

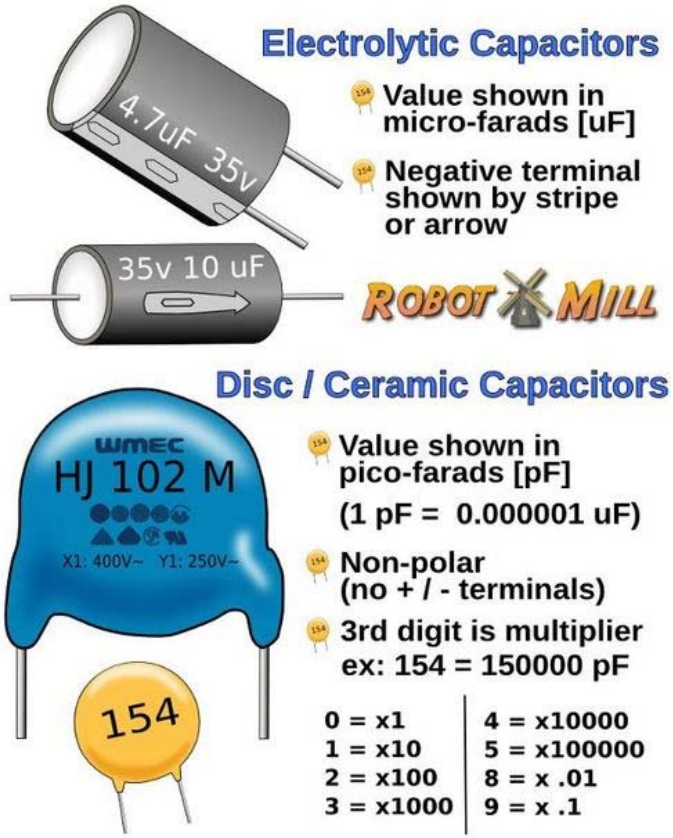


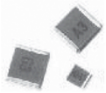


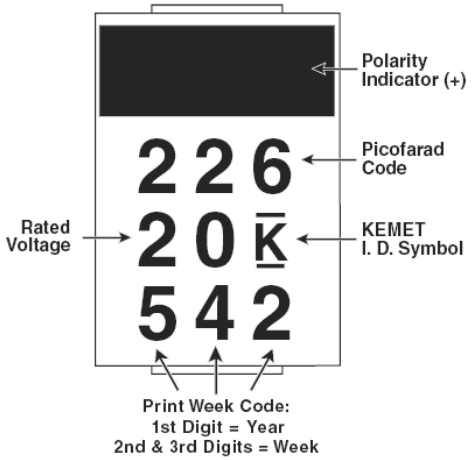


Introduction to Basics Components

- Basics Components. Capacitor. Values.

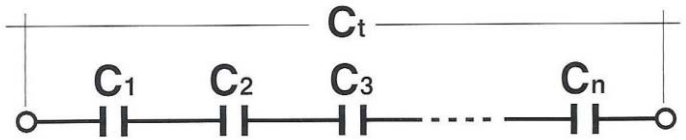


Type ⊕ = polarized	Pic	Cap Range	ESR	Leakage	Voltage Rating	Temp Range	Gen Notes
Ceramic		pF - µF	low	med	high	-55° to +125°C	Multipurpose Cheap
Mica (silver mica)		pF - nF	low 0.01-0.1Ω	low	high	-55° to +125°C	For RF filters Expensive Very stable
Plastic Film (polyethylene polystyrene)		few µFs	med	med	high	varies	For low freq Cheap
Tantalum ⊕		µFs	high 0.5-5.0Ω	low	lowest	-55° to +125°C	Expensive Nonlinear (bad for audio)
OSCON ⊕		µFs	low 0.01-0.5Ω	low	low	-55° to +105°C	Best quality Highest price
Aluminum Electrolytic ⊕		high µFs	high 0.05-2.0Ω	med	low	-40° to +85°C	For low-med frequencies Cheap Hold charge for long time – not for production test

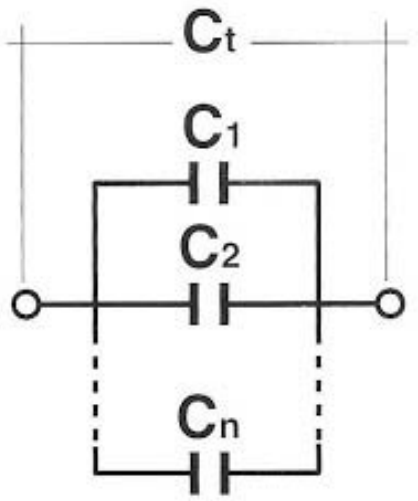


Introduction to Basics Components

- Basics Components. Series and parallel Capacitor.



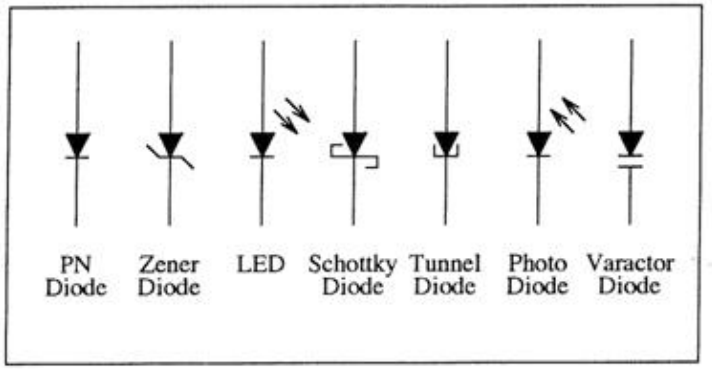
$$C_t = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3} + \ldots \frac{1}{C_n}}$$

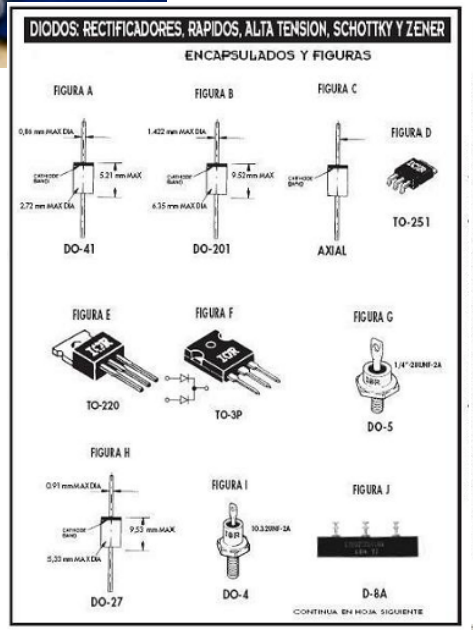


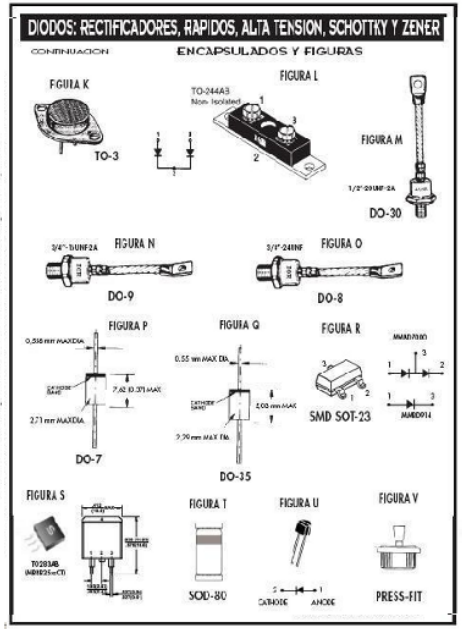
$$C_t = C_1 + C_2 + C_3 + \ldots C_n$$

Introduction to Basics Components

- Basics Components. Diode.

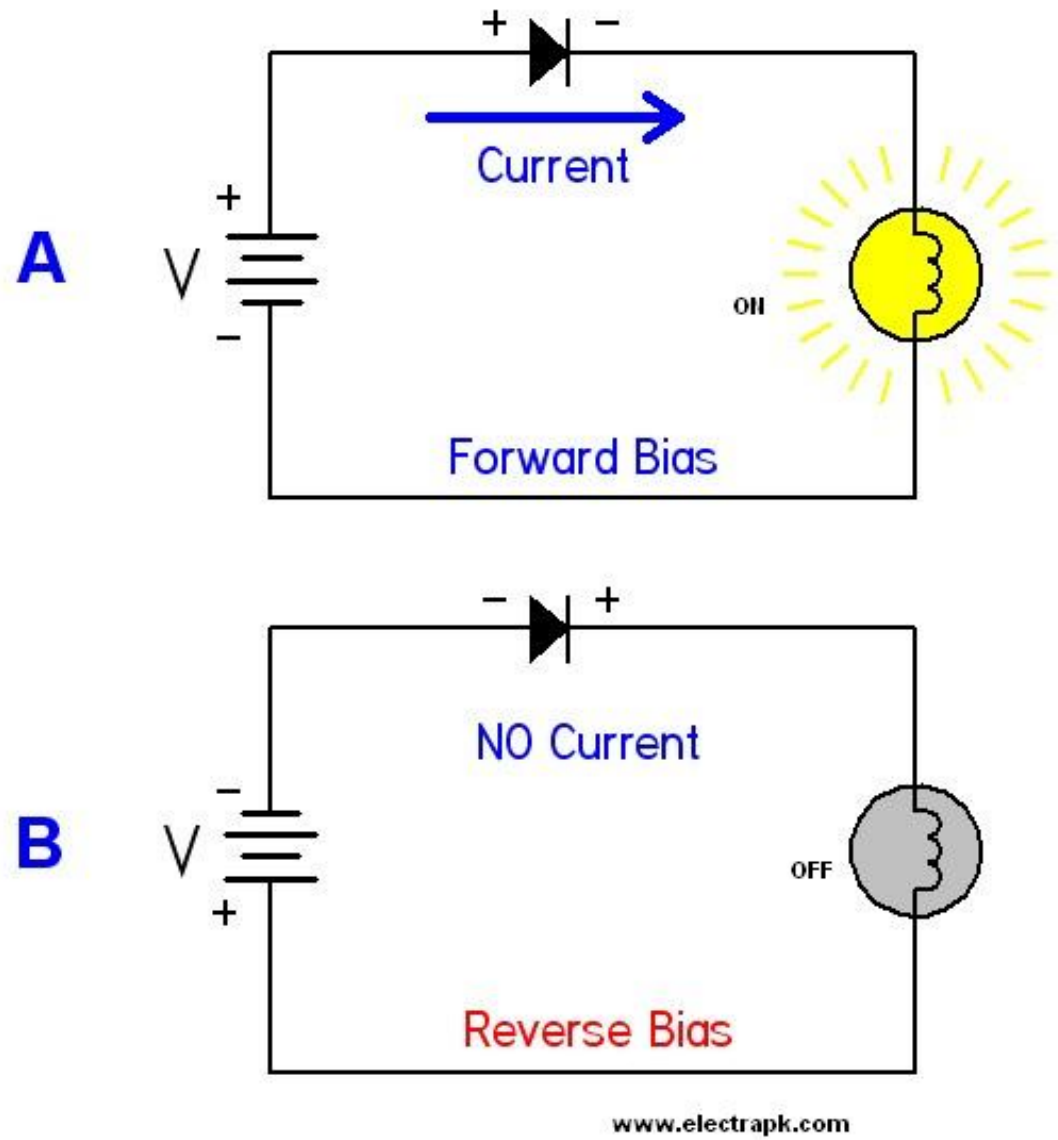


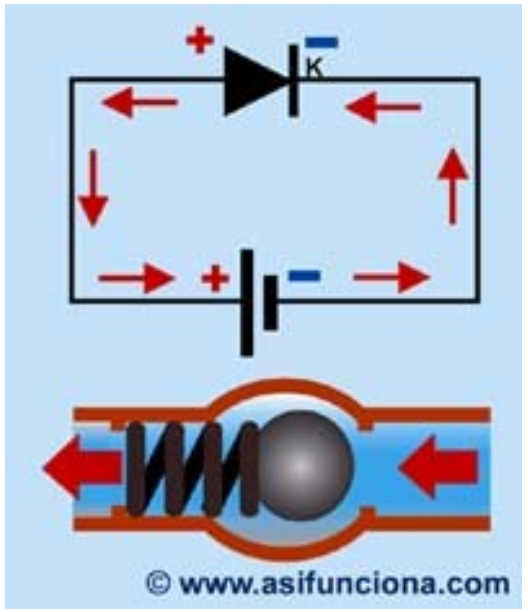


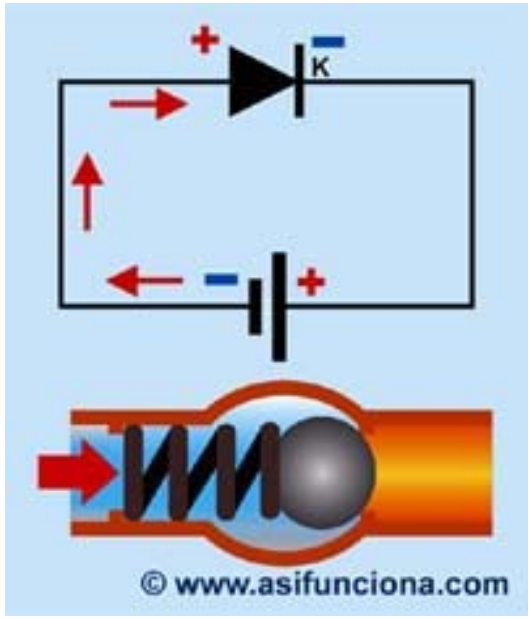


Introduction to Basics Components

- Basics Components. Diode.





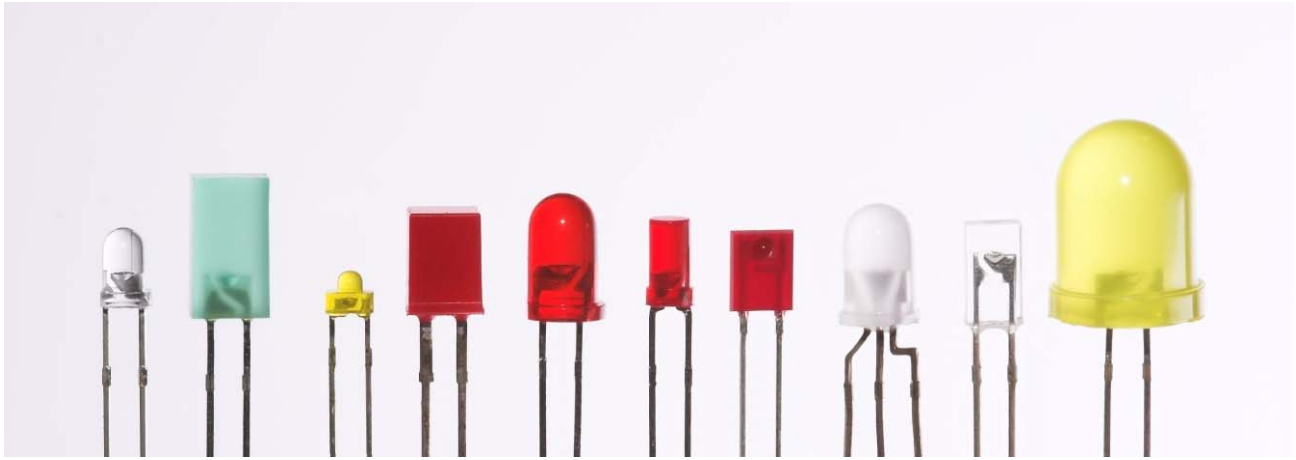


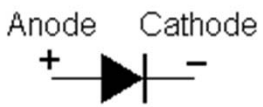
Introduction to Basics Components

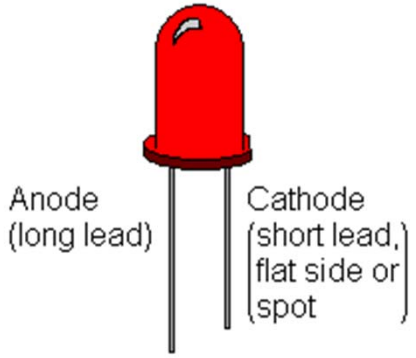
- Basics Components. Diode.
  - General purpose 1N4148 @ 200mA
  - http://www.fairchildsemi.com/ds/1N/1N4148.pdf

Introduction to Basics Components

- Basics Components. LED. Types.







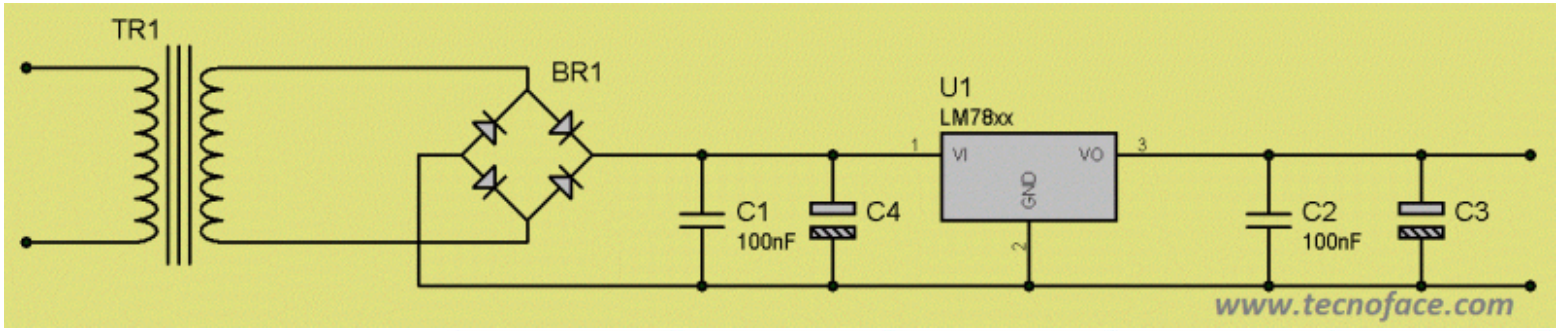
Introduction to Basics Components

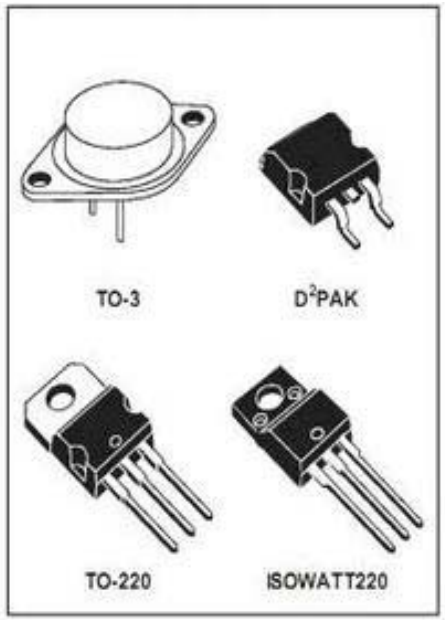
- Basics Components. LED.
  - Ultraviolet LED 5mm - 395-400nm
  - Features:
    - T1 3/4 5mm clear lens
    - 395-400nm
    - 100-180mcd
    - 3-3.6V forward drop

  - http://www.sparkfun.com/datasheets/Components/LED/YSL-R547P4C-E3.pdf

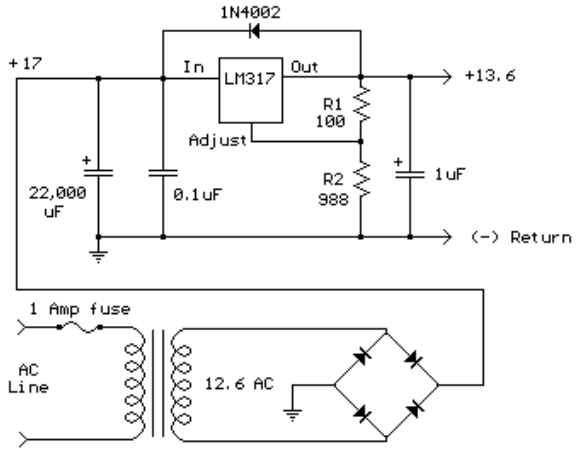
Introduction to Basics Components

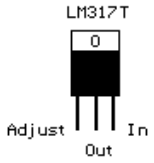
- Basics Components. Voltage Regulator.





Tensión de salida	U1	C3	C4	TR-1
5v	LM7805	100uF - 16v	1000uF - 16v	220v a 9v
6v	LM7806	100uF - 16v	1000uF - 16v	220v a 9v
8v	LM7808	100uF - 16v	1000uF - 25v	220v a 12v
9v	LM7809	100uF - 16v	1000uF - 25v	220v a 12v
12v	LM7812	100uF - 25v	1000uF - 35v	220v a 15v
15v	LM7815	100uF - 25v	1000uF - 35v	220v a 18v
24v	LM7824	100uF - 35v	1000uF - 40v	220v a 24v





R1	R2	Out
100	988	13.6
100	860	12
100	620	9
100	380	6
100	140	3
100	20	1.5

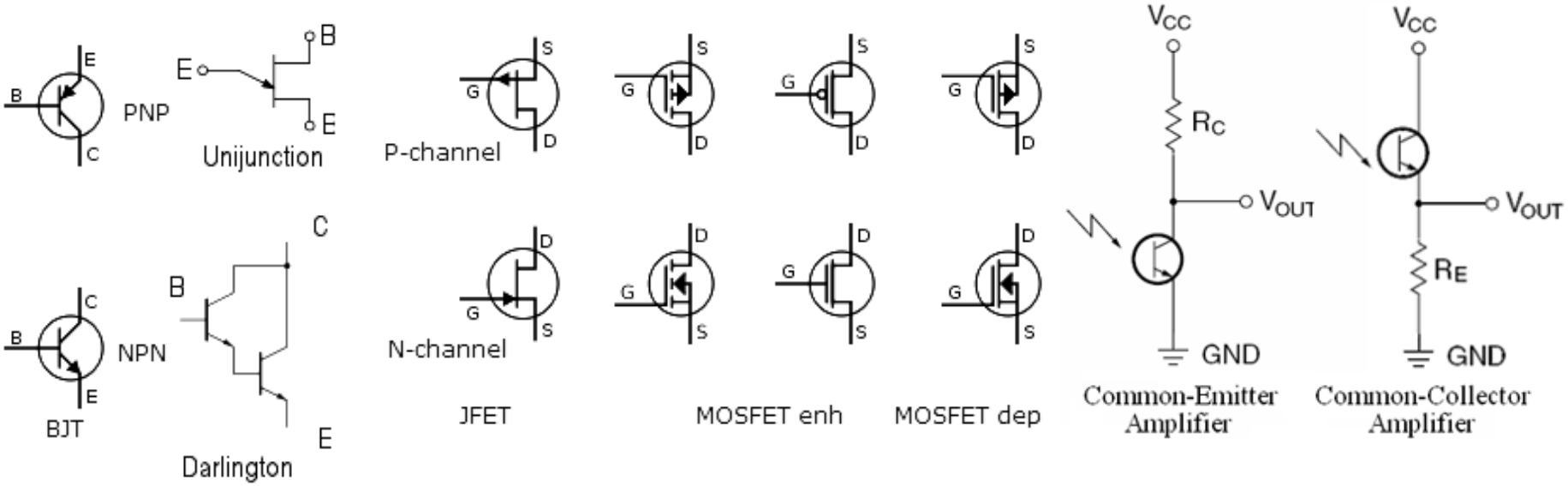
Introduction to Basics Components

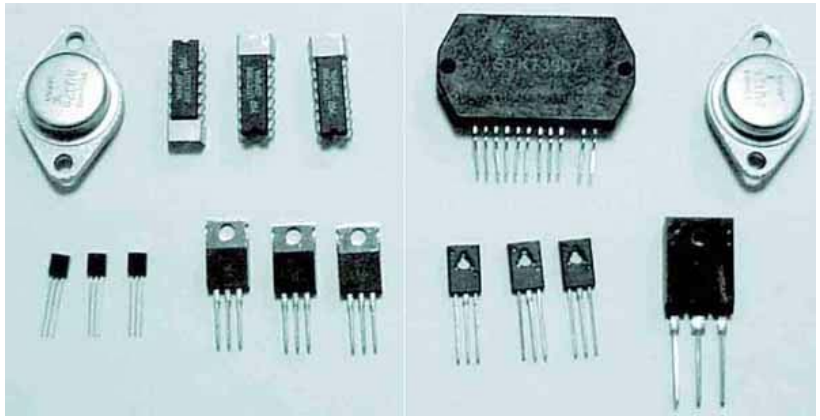
- Basics Components. Voltage Regulator.
  - LD1117V33,.3.3V Regulator
    - 800mA Max
    - TO-220

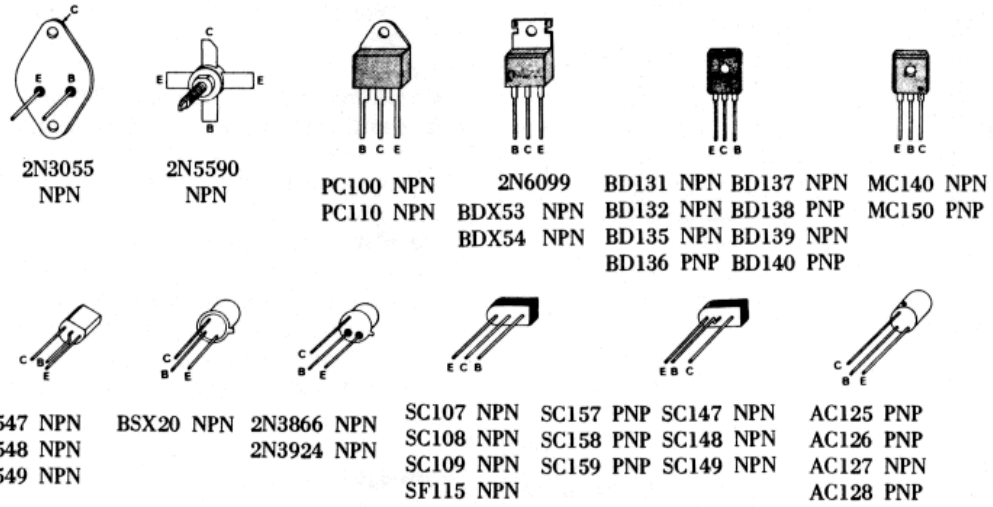
    - http://www.sparkfun.com/datasheets/Components/LD1117V33.pdf

Introduction to Basics Components

- Basics Components. Transistors. Types.

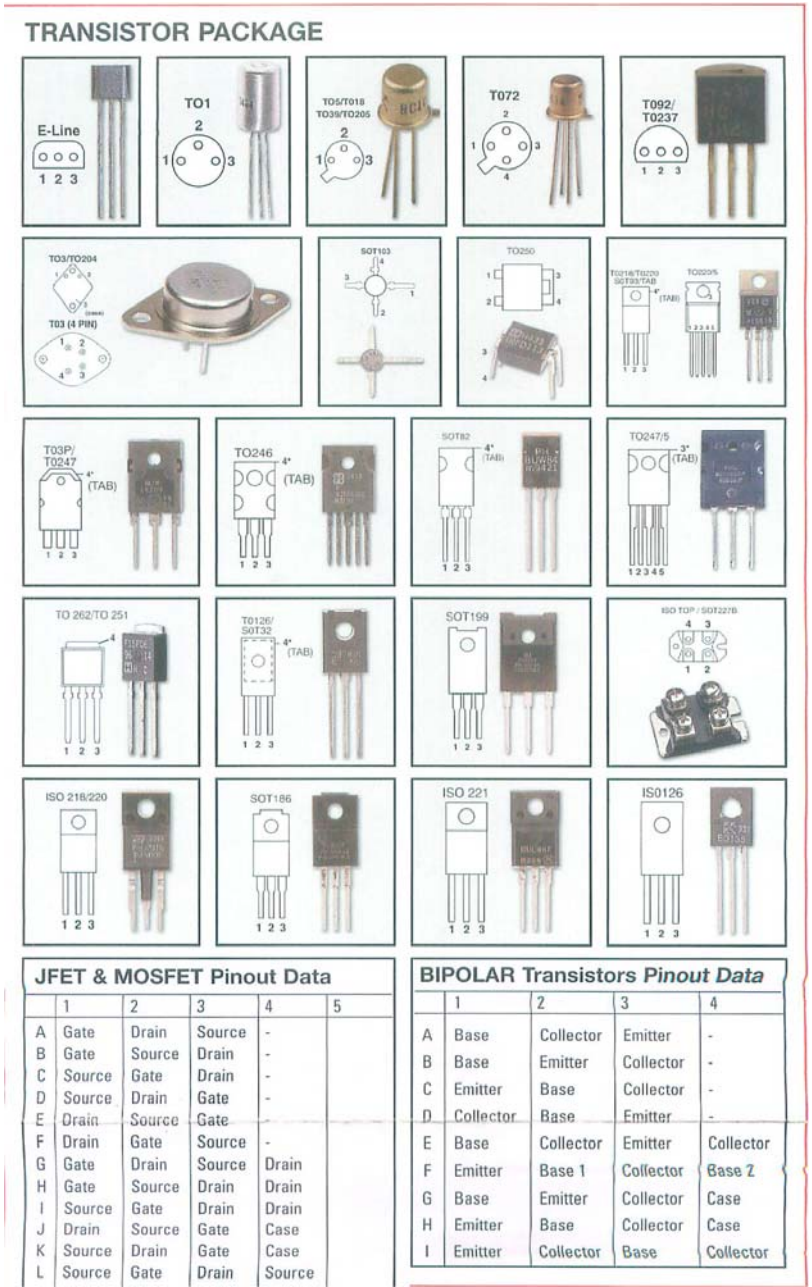






Introduction to Basics Components

- Basics Components. Transistors. Packaging.

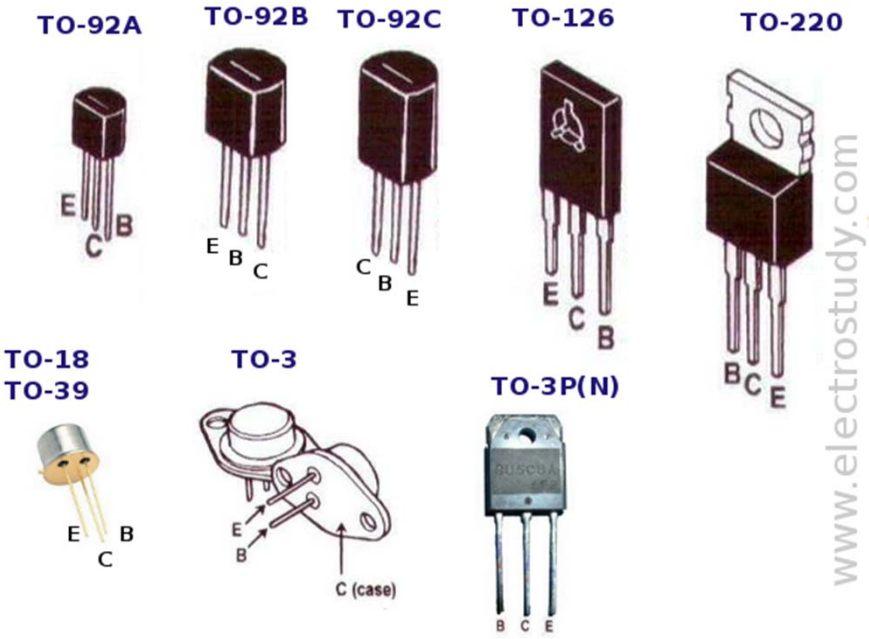


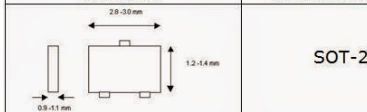
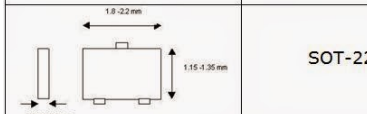
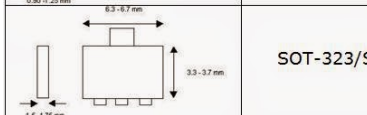
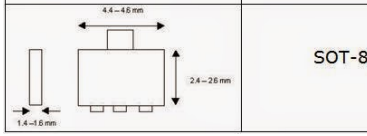
JFET & MOSFET Pinout Data

	1	2	3	4	5
A	Gate	Drain	Source	-	
B	Gate	Source	Drain	-	
C	Source	Gate	Drain	-	
D	Source	Drain	Gate	-	
E	Drain	Source	Gate	-	
F	Drain	Gate	Source	-	
G	Gate	Drain	Source	Drain	
H	Gate	Source	Drain	Drain	
I	Source	Gate	Drain	Drain	
J	Drain	Source	Gate	Case	
K	Source	Drain	Gate	Case	
L	Source	Gate	Drain	Source	

BIPOLAR Transistors *Pinout Data*

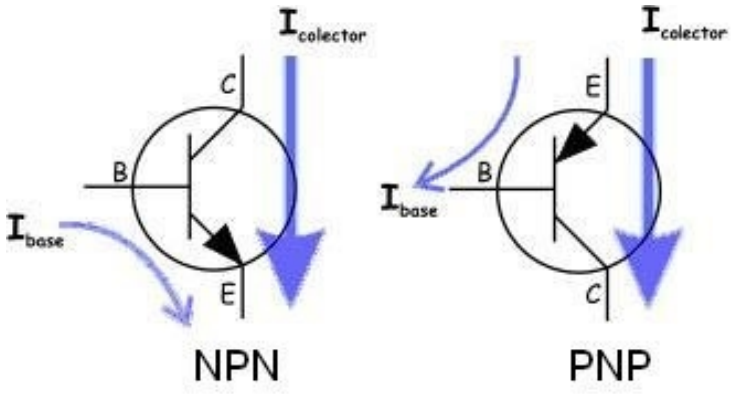
	1	2	3	4
A	Base	Collector	Emitter	-
B	Base	Emitter	Collector	-
C	Emitter	Base	Collector	-
D	Collector	Base	Emitter	-
E	Base	Collector	Emitter	Collector
F	Emitter	Base 1	Collector	Base 2
G	Base	Emitter	Collector	Case
H	Emitter	Base	Collector	Case
I	Emitter	Collector	Base	Collector

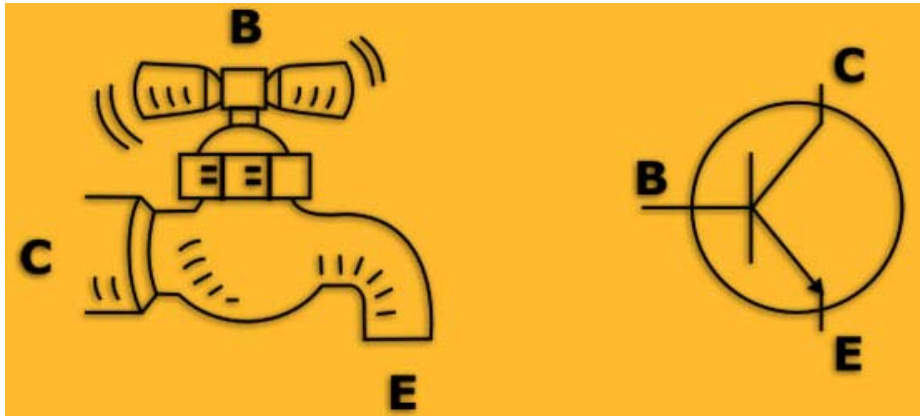


FIGURAS	DENOMINACIÓN	IMAGEN
	SOT-23	
	SOT-223	
	SOT-323/SC-70	
	SOT-89	

Introduction to Basics Components

- Basics Components. Transistors. Simplified operation.





Introduction to Basics Components

- Basics Components. Transistors.
  - Transistor NPN 2N3904
    - Transistor NPN.
    - http://www.sparkfun.com/datasheets/Components/2N3904.pdf

Embedded Computer Design

(DISEÑO DE COMPUTADORES EMPOTRADOS)

Course 2017/18

Introduction to Basics Components

Professors:

- Arturo Morgado Estévez
- Mirian Cifredo Chacón

Computer Engineering Degree