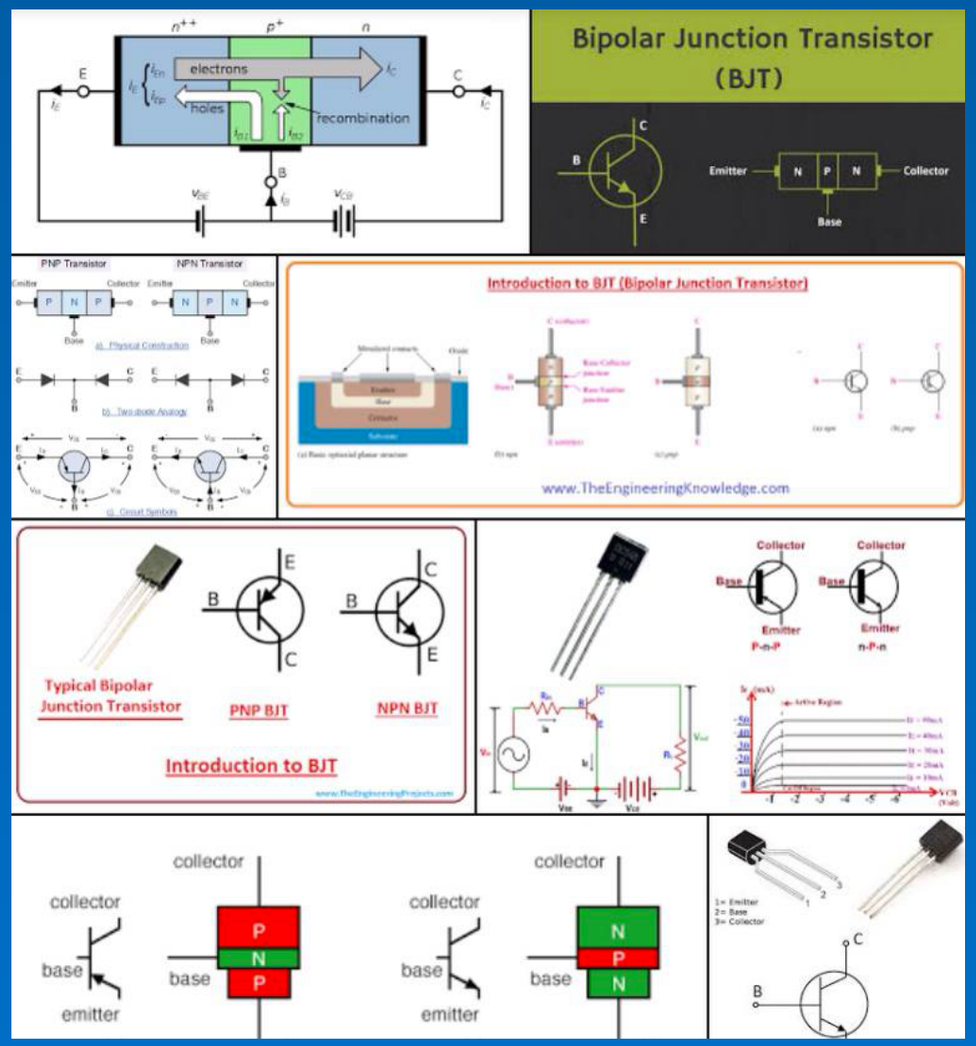
21D04120402
DASAR ELEKTRONIKA
Modul 02 KOMPONEN-KOMPONEN ELEKTRONIKA
Sub-Modul 2G Komponen Aktif: TRANSISTOR (Pengantar)

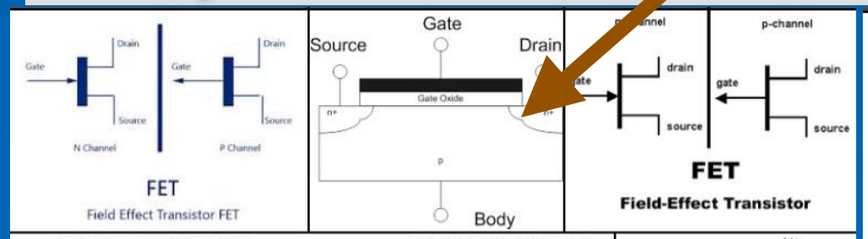


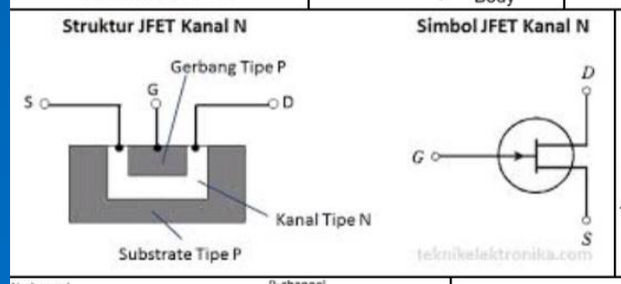
(versi kuliah DARLING = semi-DARing semi-LurING)

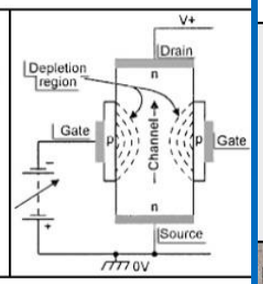
Semester Awal 2021-2022

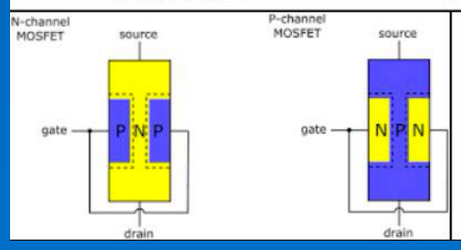
"KELUARGA BESAR" TRANSISTOR

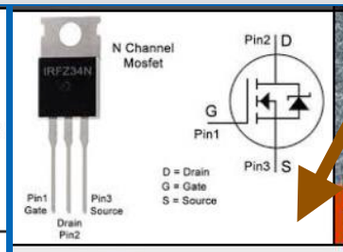
- Ada 2 (dua) "keluarga besar" **TRANSISTOR**:
  - ***Bipolar Junction Transistor*** (**BJT,** atau **transistor**), banyak digunakan dalam sistem **ELEKTRONIKA ANALOG**, utamanya sebagai **penguat** (**amplifier**)
  - ***Field Effect Transistor*** (**FET**), seperti **JFET, MOSFET, CMOS,** dll, sistem **ELEKTRONIKA DIGITAL** dan **ELEKTRONIKA DAYA**, utamanya sebagai saklar (switch) yang lebih efisien daripada **BJT**
- **Transistor** sebagai komponen **DISKRIT** sudah semakin sedikit digunakan, lebih banyak digunakan dalam rangkaian terpadu (**IC**), **SMD**, dan lain-lain.
- Dalam matakuliah ini, yang dimaksud dengan "**transistor**" adalah **BJT** dalam bentuk komponen **DISKRIT**.

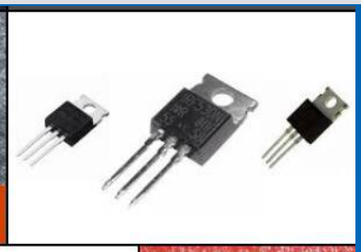


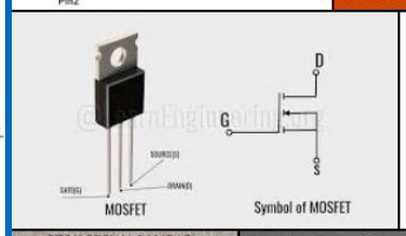


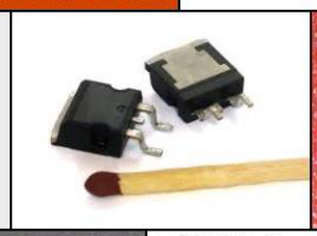


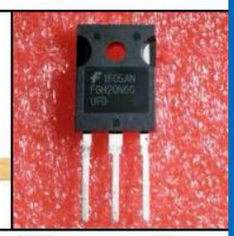


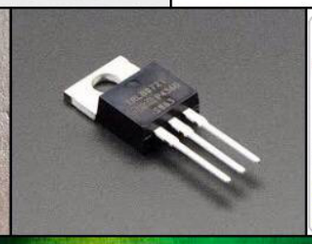


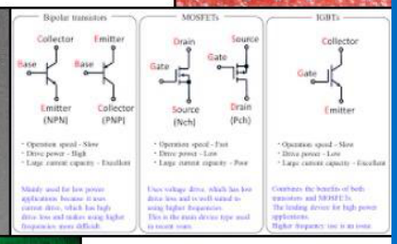


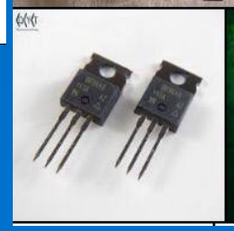


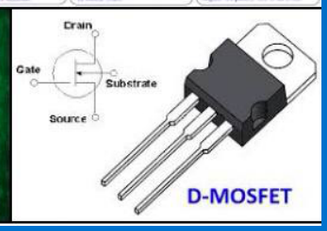


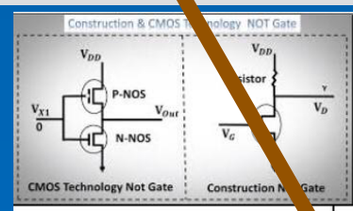


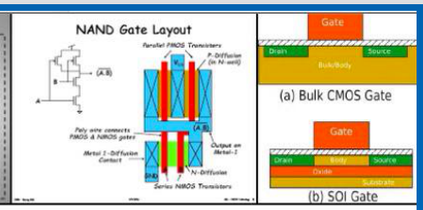


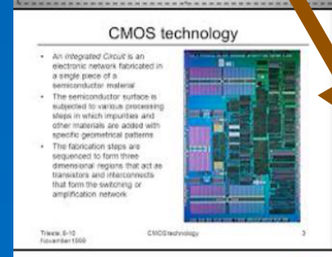


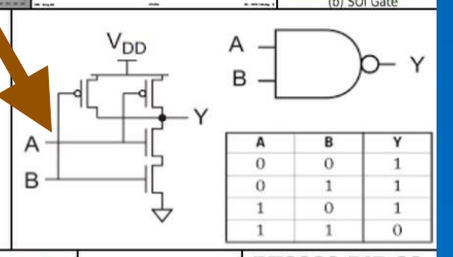


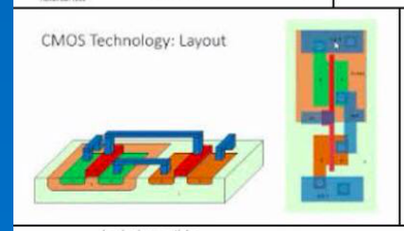


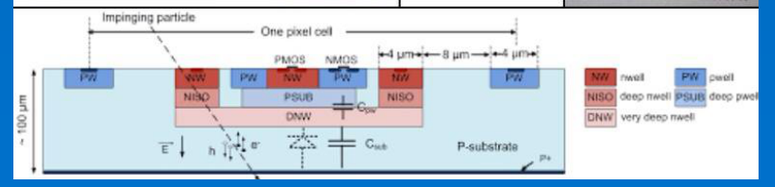




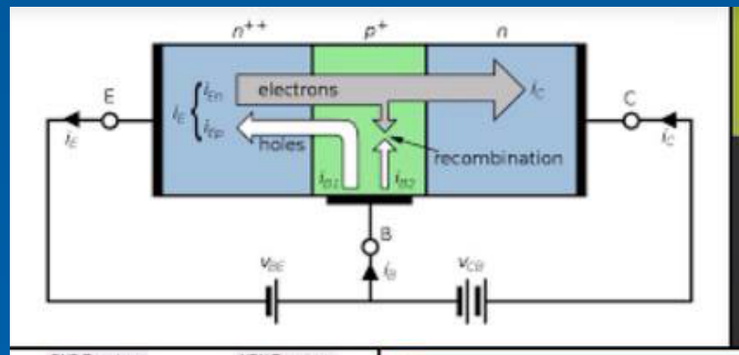


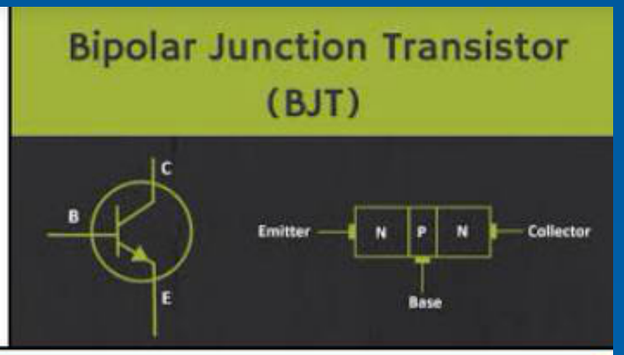


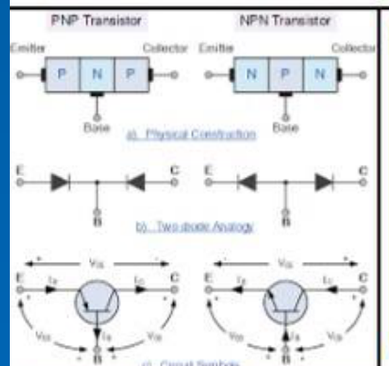


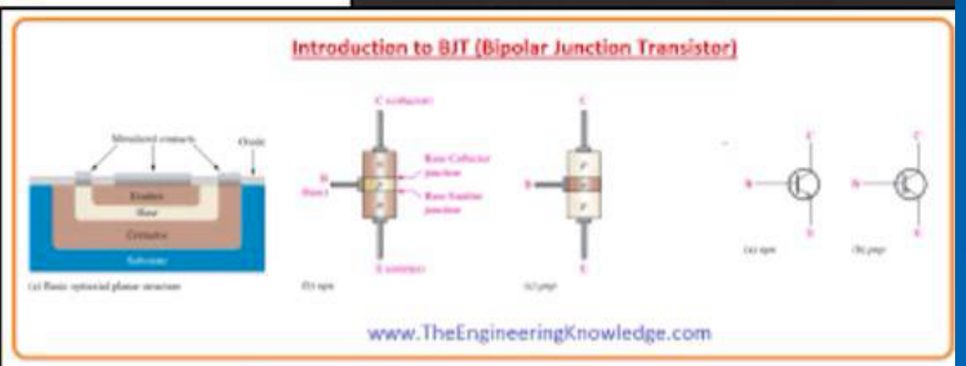


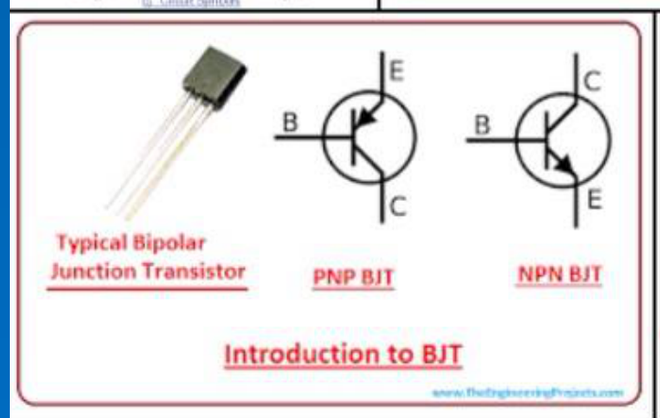
BIPOLAR JUNCTION TRANSISTOR

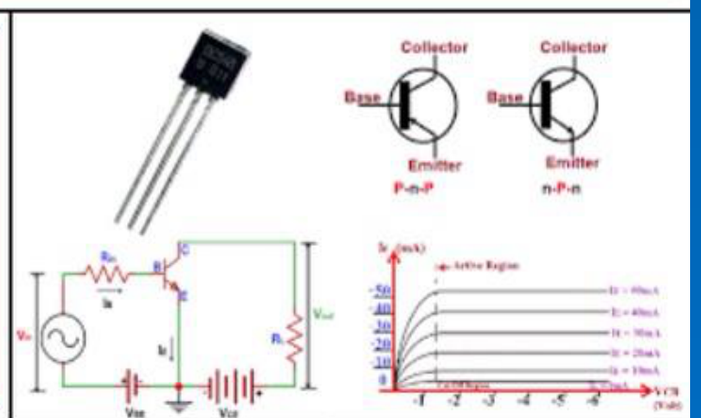


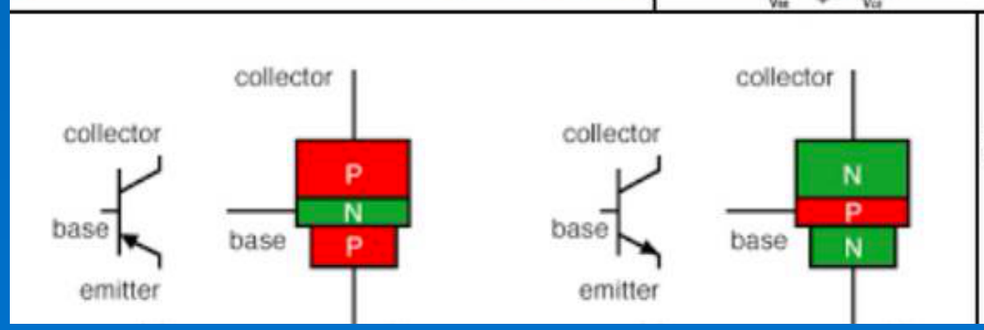


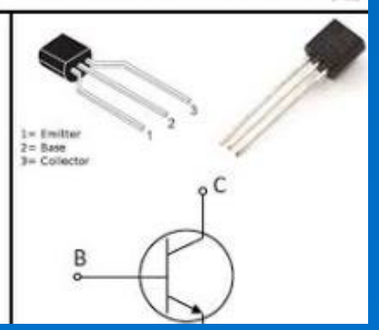


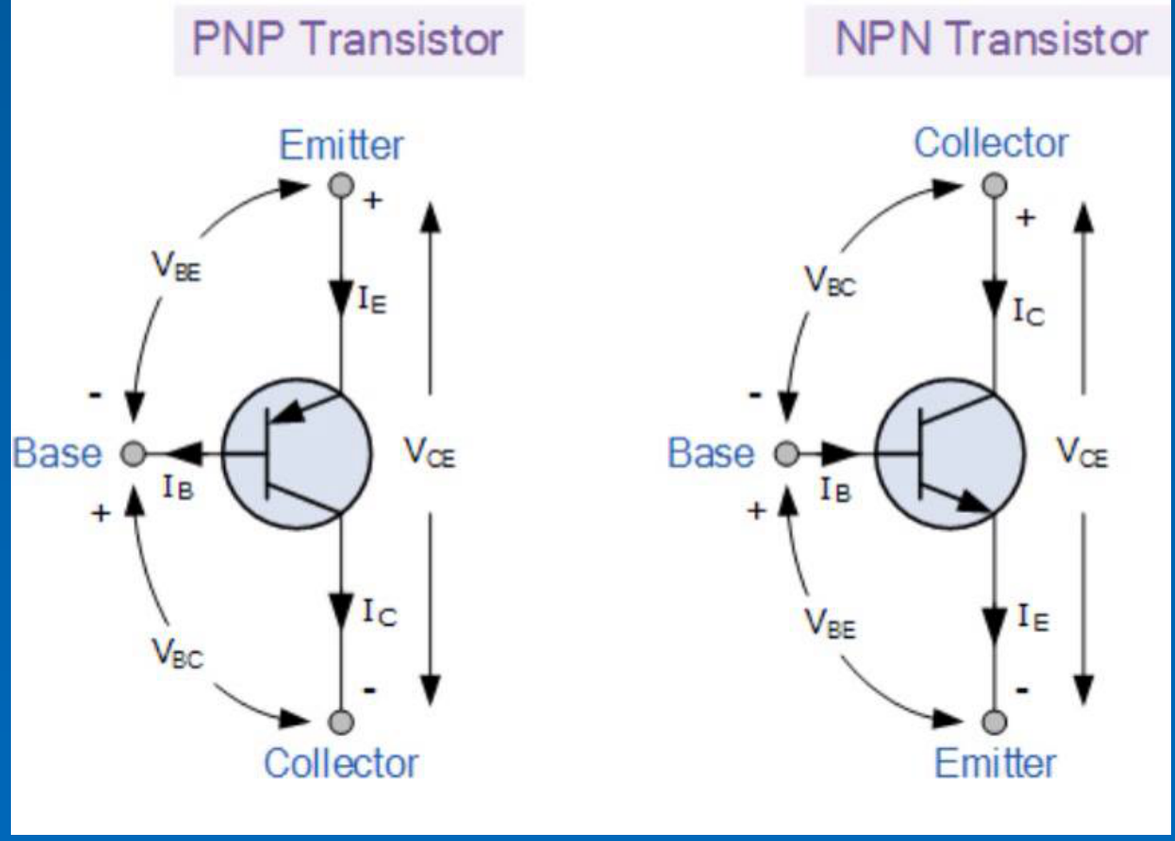






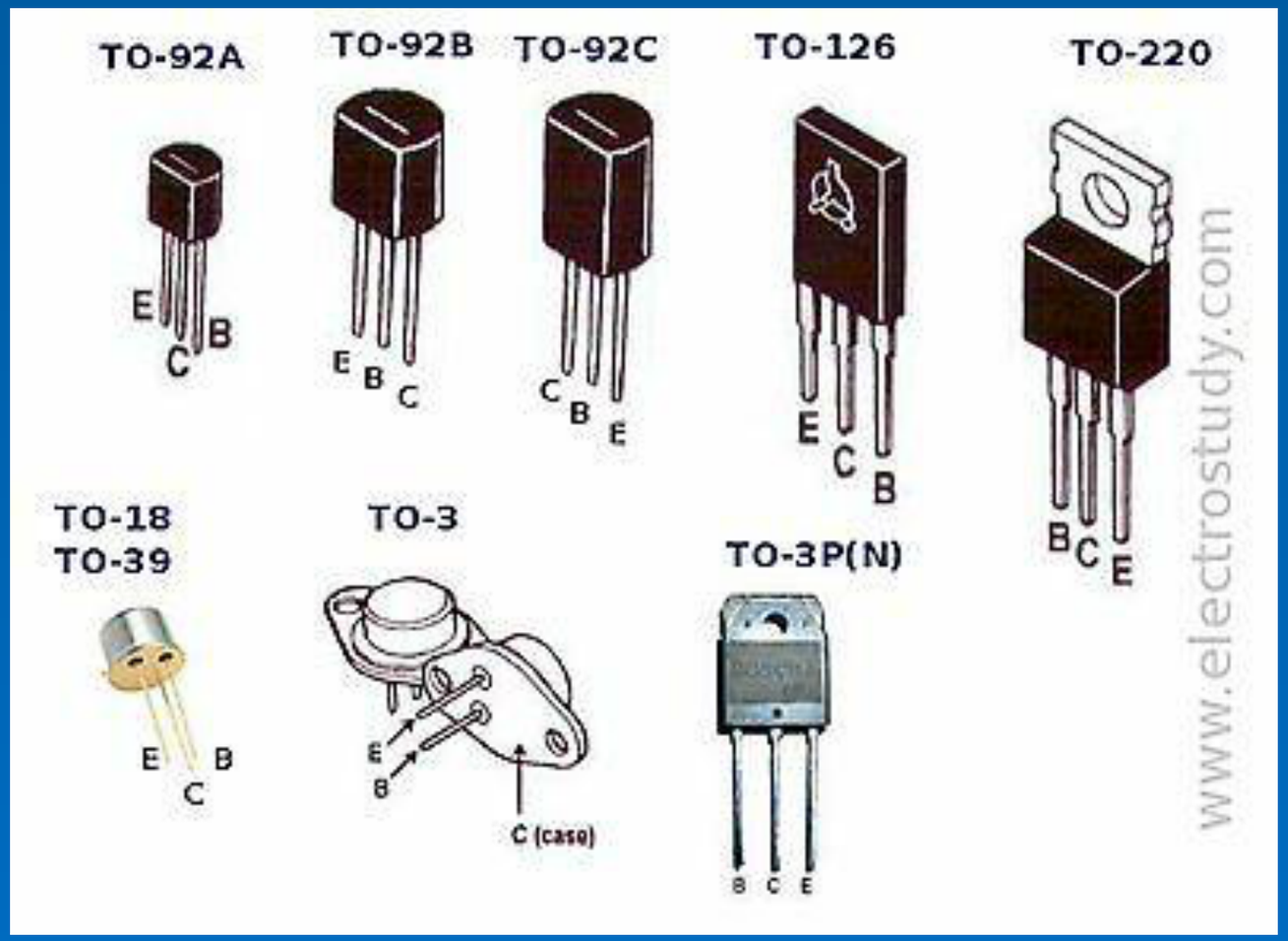


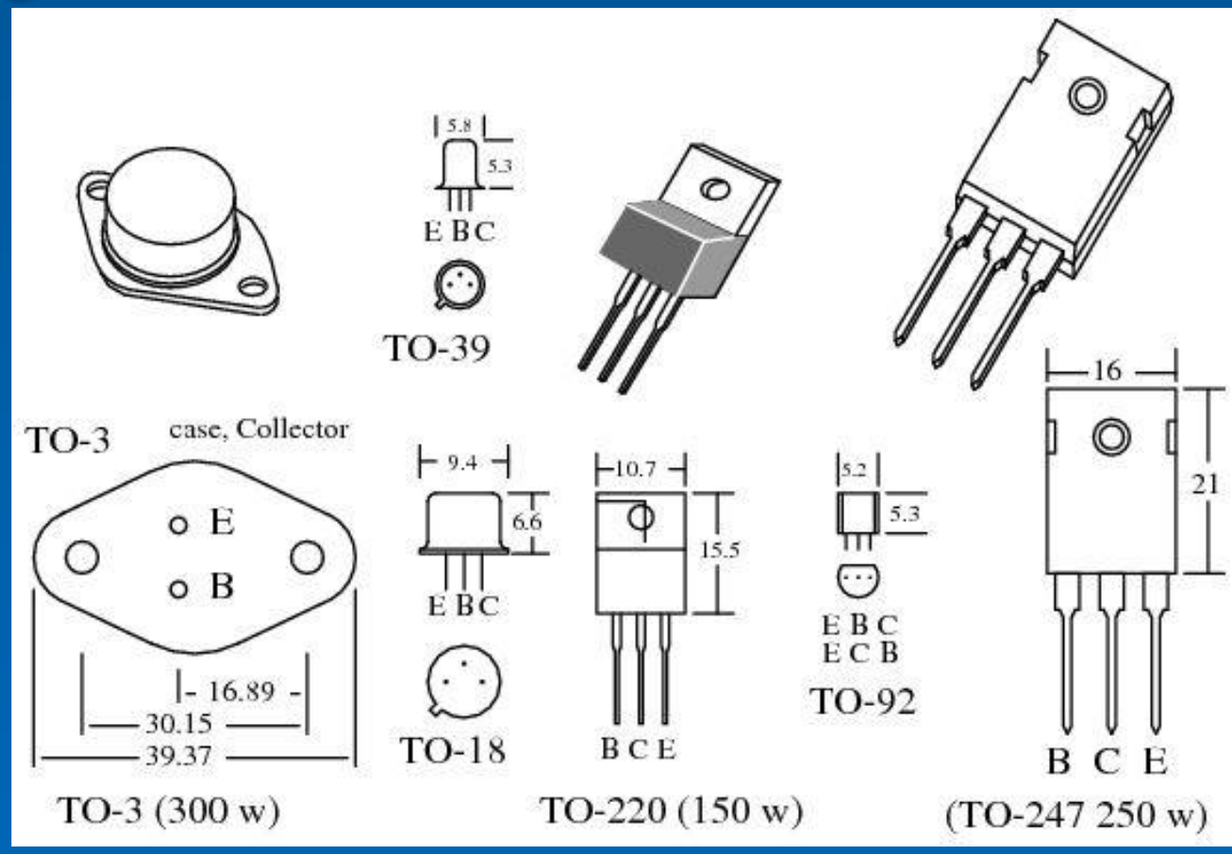




NPN dan PNP

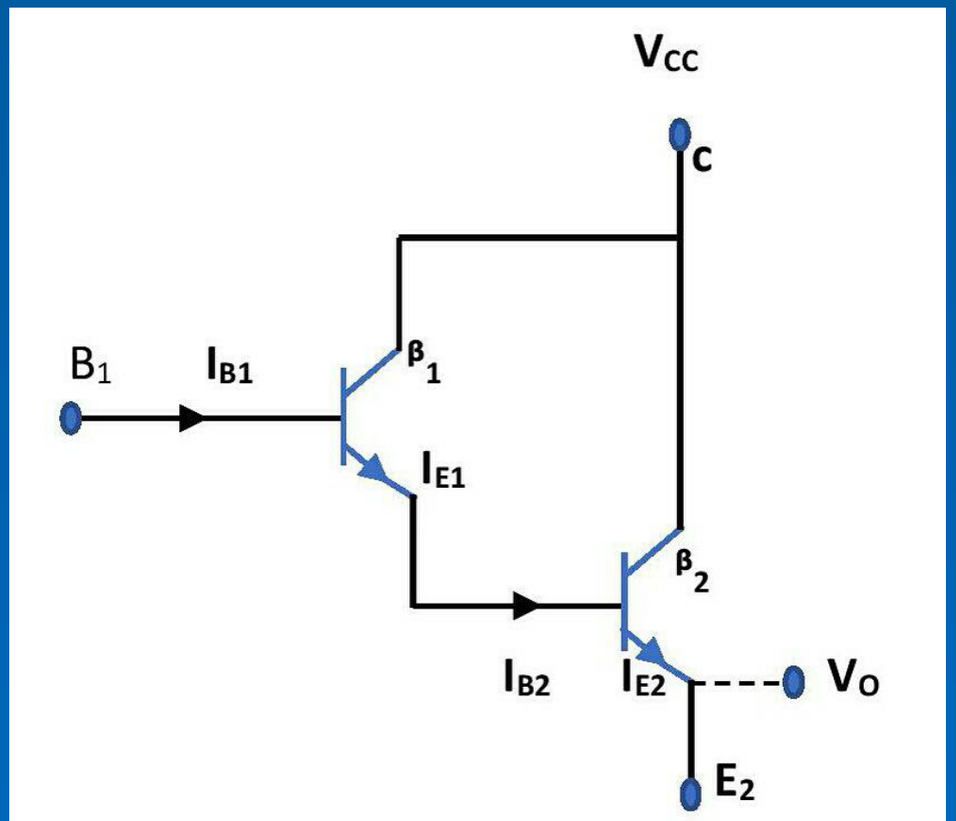
"KEMASAN" TRANSISTOR





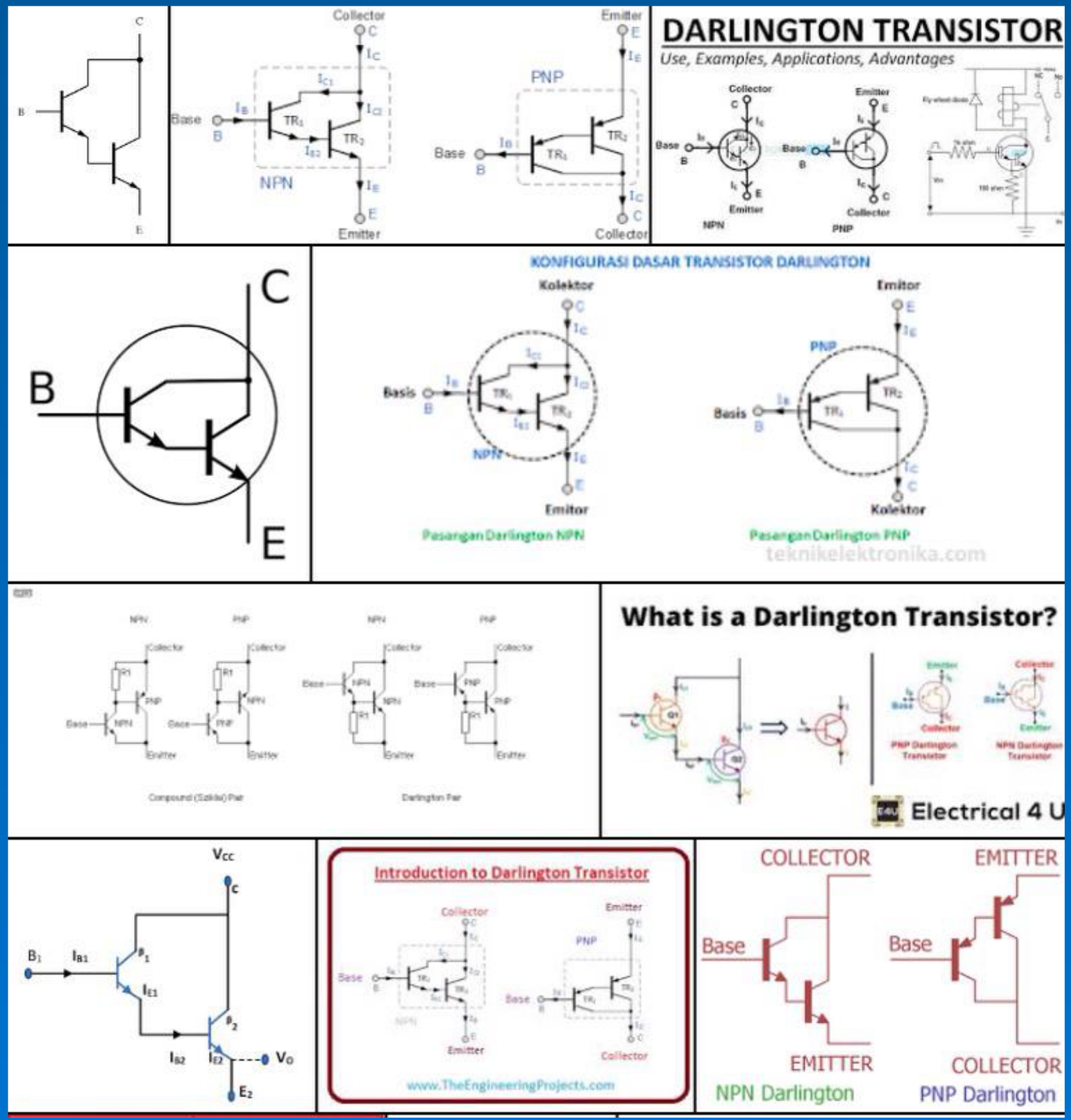
KAPASITAS DAYA [Vce * Ic] maximum

DARLINGTON TRANSISTOR



KAPASITAS DAYA

[Vce * Ic] maximum



DATA SHEET

KEC **SEMICONDUCTOR** **TECHNICAL DATA**

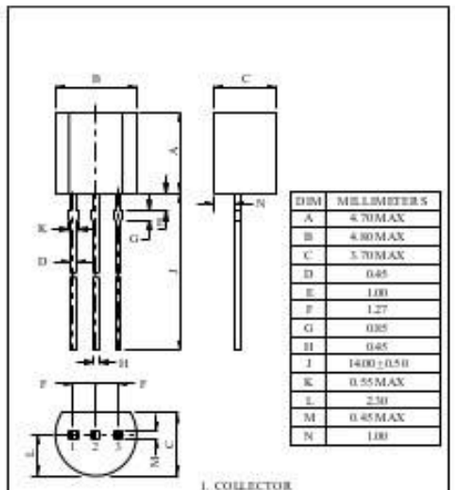
BC546/7/8

EPITAXIAL PLANAR NPN TRANSISTOR

GENERAL PURPOSE APPLICATION.
SWITCHING APPLICATION .

FEATURES

- High Voltage : BC546 V_{CEO}=65V.
- For Complementary With PNP Type BC556/557/558.



DIM	MILLIMETERS
A	4.70 MAX
B	4.80 MAX
C	3.70 MAX
D	0.45
E	1.00
F	1.27
G	0.85
H	0.45
J	14.00 ± 0.50
K	0.55 MAX
L	2.50
M	0.45 MAX
N	1.00

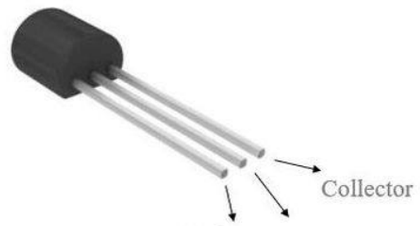
1. COLLECTOR
2. BASE
3. EMITTER

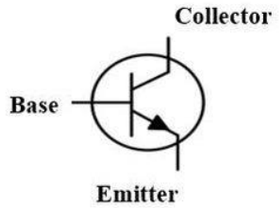
TO-92

MAXIMUM RATING (Ta=25℃)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-Base Voltage	BC546	V_{CBO}	80	V
	BC547		50	
	BC548		30	
Collector-Emitter Voltage	BC546	V_{CEO}	65	V
	BC547		45	
	BC548		30	
Emitter-Base Voltage	BC546	V_{EBO}	6	V
	BC547		6	
	BC548		5	
Collector Current	BC546	I_C	100	mA
	BC547		100	
	BC548		100	
Emitter Current	BC546	I_E	-100	mA
	BC547		-100	
	BC548		-100	
Collector Power Dissipation		P_C	625	mW
Junction Temperature		T_j	150	℃
Storage Temperature Range		T_{stg}	-55~150	℃

2N3904 NPN Transistor



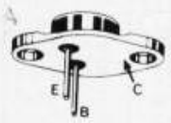


type	PNP NPN	max U_{CEO} (V)	max I_C (A)	P_{max} (W)	at h_{FE} I_C (mA)		Complementary to:	fig.	
BD 131	N	45	3	15		0,5 A	BD 132	4	
BD 132	P						BD 131	4	
BD 135	N		1	8	>40	0,15 A	BD 136	4	
BD 136	P						BD 135	4	
BD 137	N	60					BD 138	4	
BD 138	P						BD 137	4	
BD 139	N	80					BD 140	4	
BD 140	P						BD 139	4	
BD 169	N		1,5	20			BD 170	4	
BD 170	P						BD 169	4	
BD 183	N		15	117	>20	3 A	–	5	
BD 233	N	45	2	25	40	0,15 A	BD 234	4	
BD 234	P						BD 233	4	
BD 235	N	60					BD 236	4	
BD 236	P						BD 235	4	
BD 237	N	80					BD 238	4	
BD 238	P						BD 237	4	
BD 239	N	45	2	30		0,2 A	BD 240	6	2)
BD 240	P						BD 239	6	2)
BD 241	N		3	40	>25	1 A	BD 242	6	2)
BD 242	P						BD 241	6	2)
BD 243	N		6	65	>30	0,3 A	BD 244	6	2)
BD 244	P						BD 243	6	2)
BD 245	N		10	80	>40	1 A	BD 246	7	2)
BD 246	P						BD 245	7	2)
BD 249	N		25	125	>25	1,5 A	BD 250	7	2)
BD 250	P						BD 249	7	2)
BD 435	N	32	4	36	>85	0,5 A	BD 436	4	
BD 436	P						BD 435	4	
BD 437	N	45					BD 438	4	
BD 438	P						BD 437	4	
BD 439	N	60			>40		BD 440	4	
BD 440	P						BD 439	4	
BD 441	N	80					BD 442	4	
BD 442	P						BD 441	4	
BD 643	N	45	8	62,5	>750	3 A	BD 644	7	1)
BD 644	P						BD 643	7	1)
BD 645	N	60					BD 646	7	1)
BD 646	P						BD 645	7	1)
BD 675	N	45	4	40		1,5 A	BD 676	4	1)
BD 676	P						BD 675	4	1)
BD 677	N	60					BD 678	4	1)
BD 678	P						BD 677	4	1)
BD 679	N	80					BD 680	4	1)
BD 680	P						BD 679	4	1)
TIP 31	N	40	3	40	>20	0,5 A	TIP 32	6	2)
TIP 32	P						TIP 31	6	2)
TIP 33	N		10	80			TIP 34	7	2)
TIP 34	P						TIP 33	7	2)
TIP 35	N		25	125	>25	1 A	TIP 36	7	2)
TIP 36	P						TIP 35	7	2)
TIP 41	N		6	65	>20	0,5 A	TIP 42	6	2)
TIP 42	P						TIP 41	6	2)
TIP 122	N	100	8		>1000	5 A	TIP 127	6	1)
TIP 127	P						TIP 122	6	1)
TIP 142	N		15	125			TIP 147	7	1)
TIP 147	P						TIP 142	7	1)
TIP 2955	P	70	15	100	>20	4 A	TIP 3055	7	
TIP 3055	N						TIP 2955	7	
2N3055	N			115			MJ 2955	5	
MJ 2955	P						2N3055	5	
2N 2955	*P*	*25*	*100 m*	*0,3*	*>20*	*10 mA*	–	*1*	

3 TO-92Z

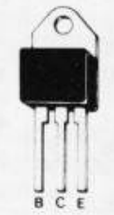
4 TO-126 (SOT-32)

5 TO-3

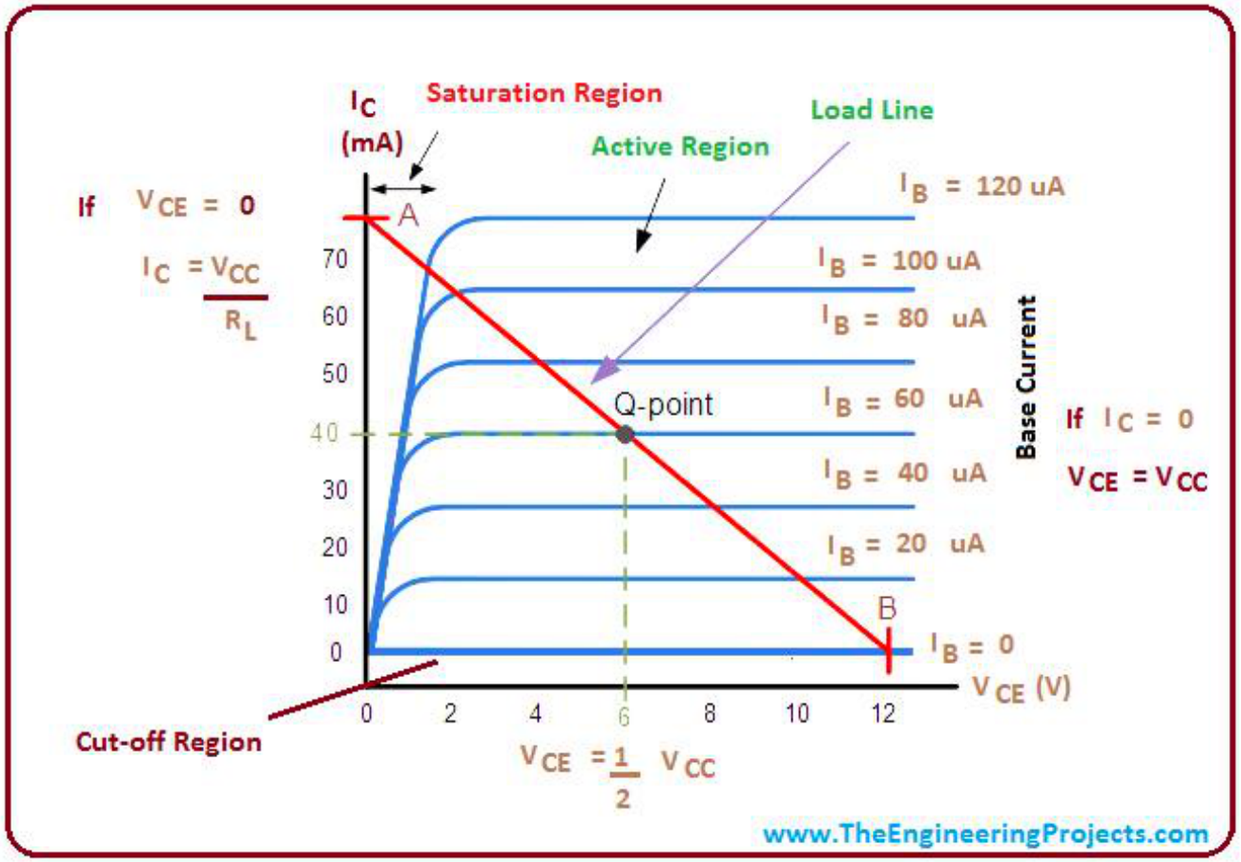


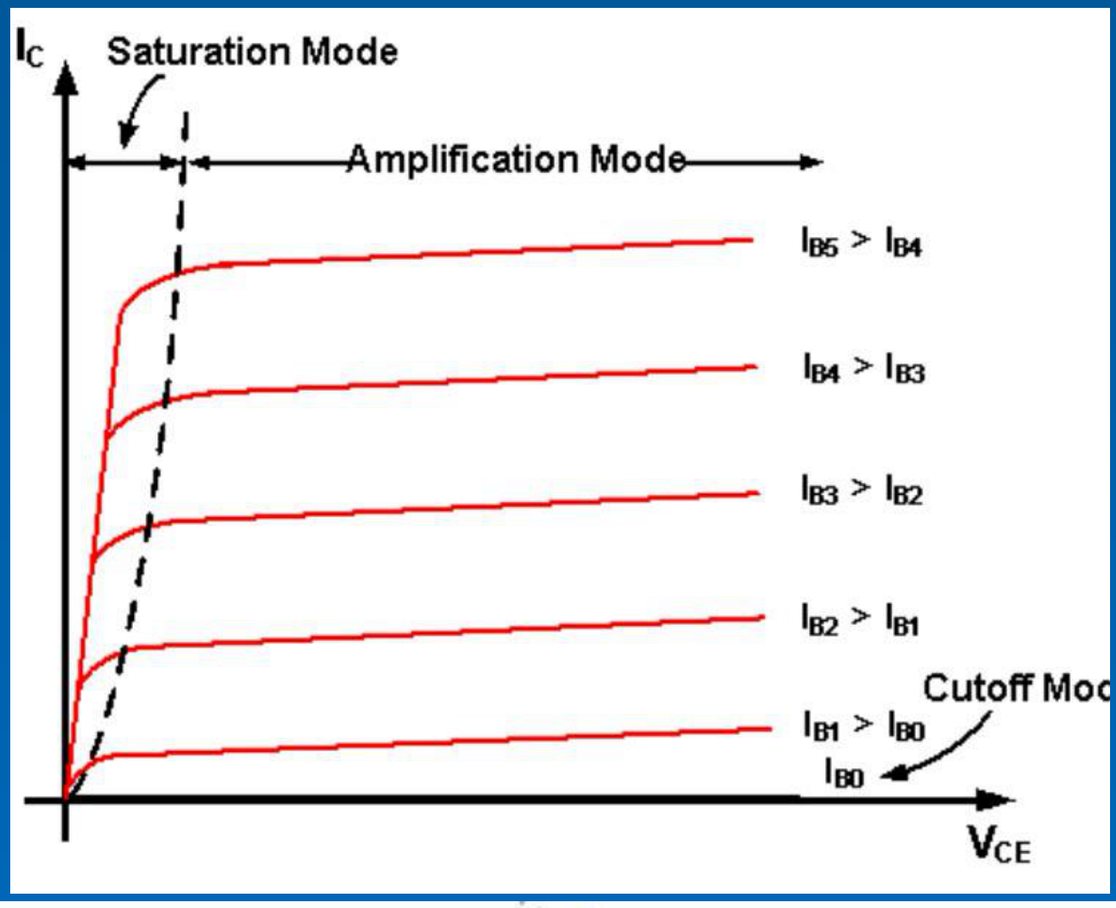
6 TO-220AB

7



Karakteristik TRANSISTOR



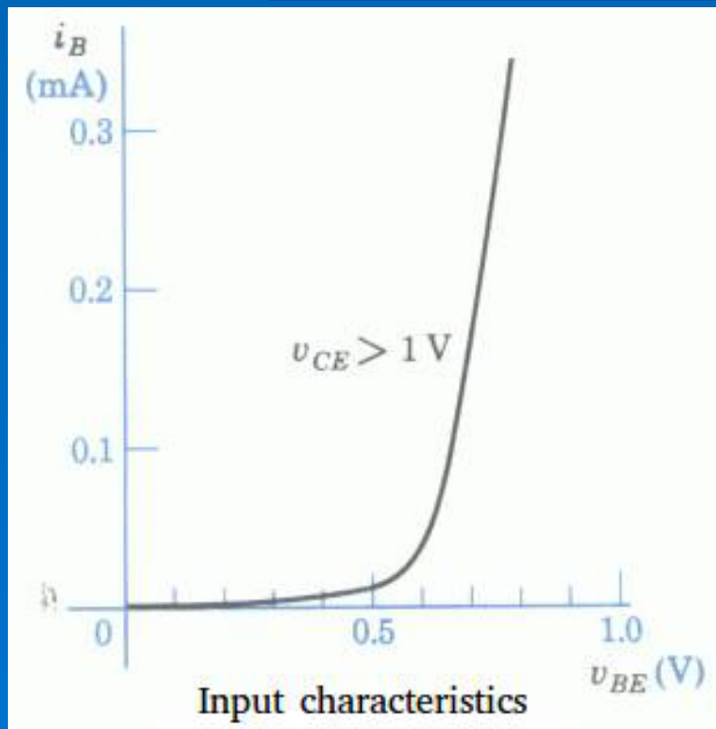


Titik Kerja TRANSISTOR:

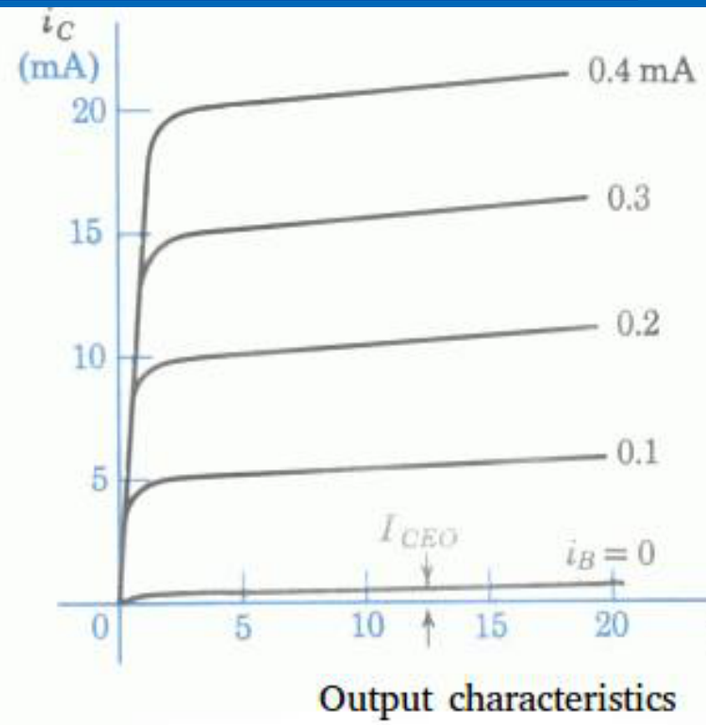
(1) Saturasi

(2) Cut Off

(3) Aktif, sebagai PENGUAT



Input characteristics

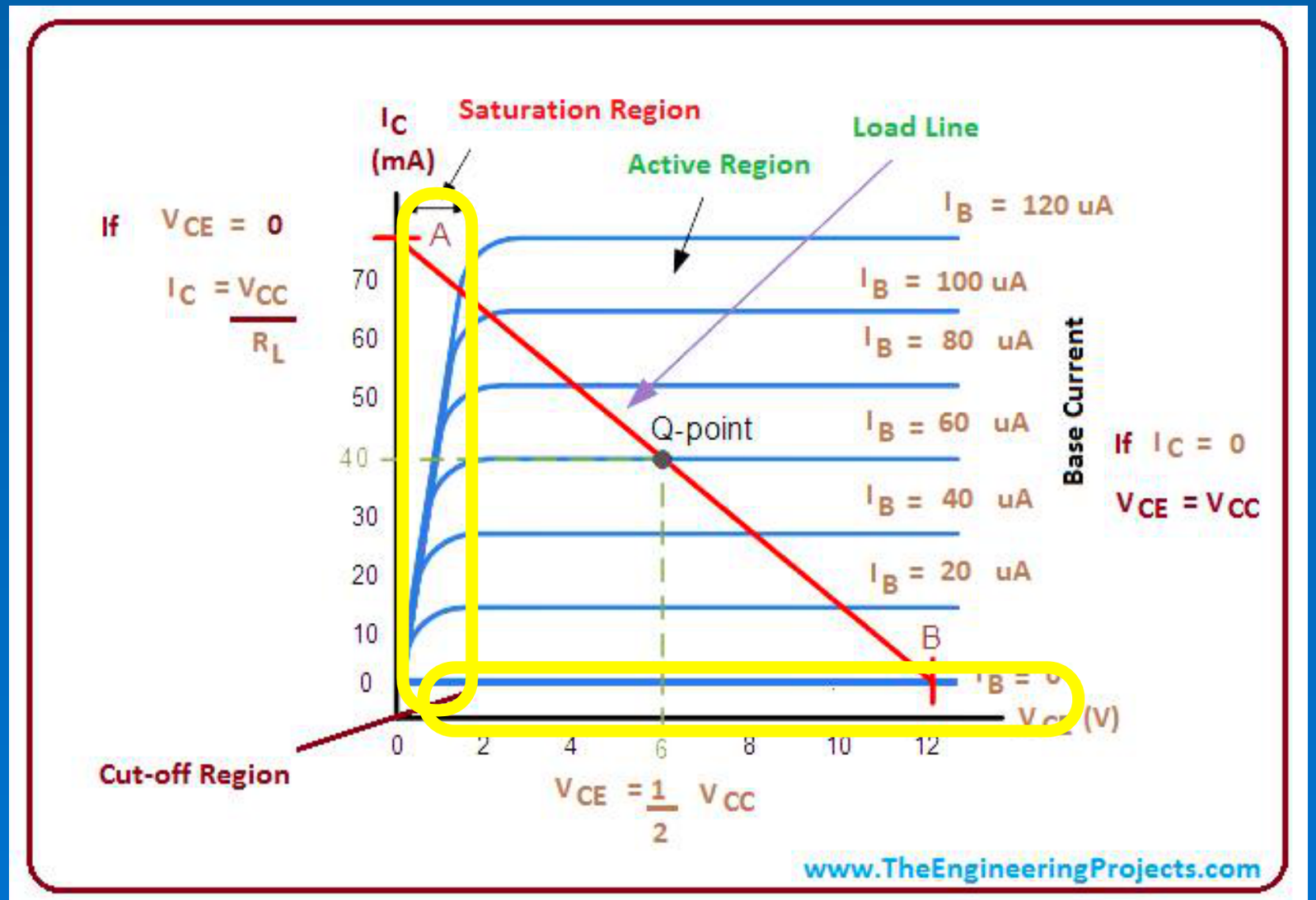


Output characteristics

INDIKASI KERJA TRANSISTOR

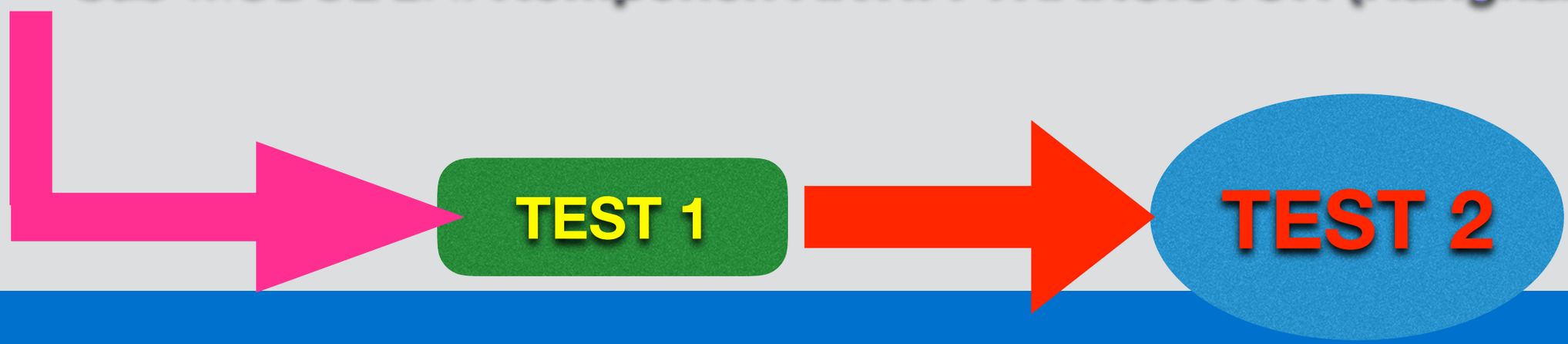
Indikasi Titik Kerja TRANSISTOR NPN

Titik Kerja	Indikasi 1	Indikasi 2	Indikasi 3	Indikasi 4	Seperti
SATURASI	$Ib > Ic/h_{FE}$	V_{CE} kecil = 0,2 V	V_{BE} = 0,8 V	Ic besar	Saklar ON
CUT OFF	Ib = 0	V_{CE} besar = Vcc	V_{BE} = 0 V	Ic = 0	Saklar OFF
AKTIF	$Ib = Ic/h_{FE}$	V_{CE} tengah2	V_{BE} = 0,6 V	$Ic = Ib*h_{FE}$	PENGUAT



MODUL PEMBELAJARAN

(tentatif, sewaktu-waktu berubah)

- **MODUL 0: PENGANTAR KULIAH**
- **MODUL 1: SERBA-SERBI ELEKTRONIKA**
- **MODUL 2: KOMPONEN-2 ELEKTRONIKA**
  - Sub-MODUL 2A: **Komponen PASIF: RESISTOR**
  - Sub-MODUL 2B: **Komponen PASIF: INDUKTOR**
  - Sub-MODUL 2C: **Komponen PASIF: KAPASITOR**
  - Sub-MODUL 2D: **Komponen PASIF: Catatan dan CONTOH SOAL**
  - Sub-MODUL 2E: **Komponen AKTIF: DIODE (Pengantar)**
  - Sub-MODUL 2F: **Komponen AKTIF: DIODE (Rangkaian)**
  - Sub-MODUL 2G: **Komponen AKTIF: TRANSISTOR (Pengantar)**
  - Sub-MODUL 2H: **Komponen AKTIF: TRANSISTOR (Rangkaian)**
- 

SELAMAT BELAJAR

Semoga SUKSES meraih PRESTASI!