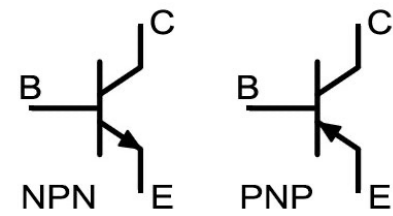


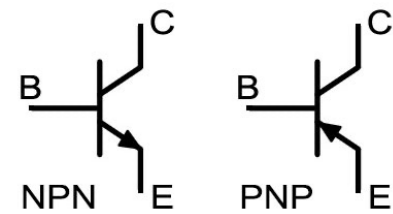
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Transistor – Smári - Þristur

- Efnis- og eðlisfærði transistors
- Mismunandi gerðir transinstora
- BJT Bipolar-Junction-Transistor
- Mælanleg gildi, fastar

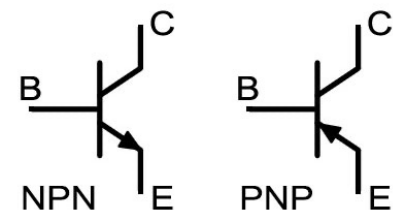
REIT



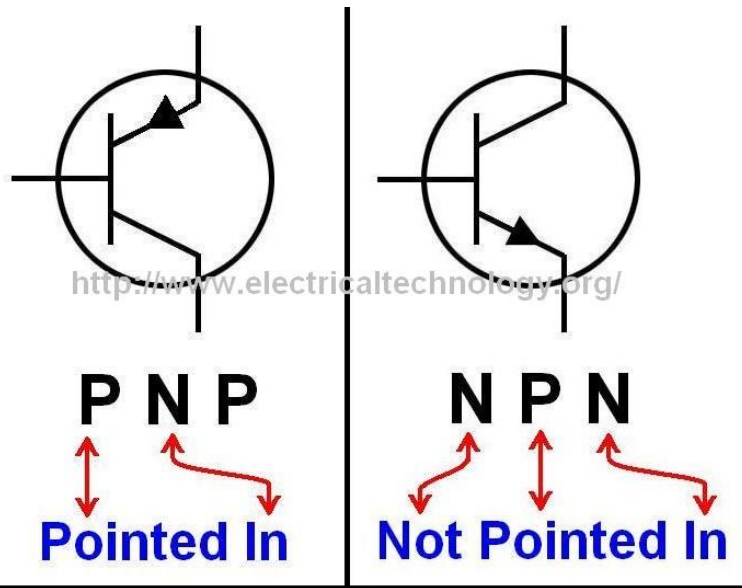
Transistorinn- efnis/eðlisfræðin

- Hálfleiðari, ekki góður leiðari ekki góður einangrari
- Semiconductor, (Solid state)
- Tvær megin gerðir:
 - Germanium [Ge], (fyrsti transistorinn, ennþá notað)
 - Silicon (Kísil) [Si], (miklu meira notað í dag)
Silicon er ódýrari í framleiðslu og þola hita betur
- Það er bætt við efnum til að ná fram eiginleikum til að stýra leiðni efnanna.
 - Kallað að menga, dópa efnið, með þessu verða til auka rafeindir eða holur fyrir rafeindir í efnunum.

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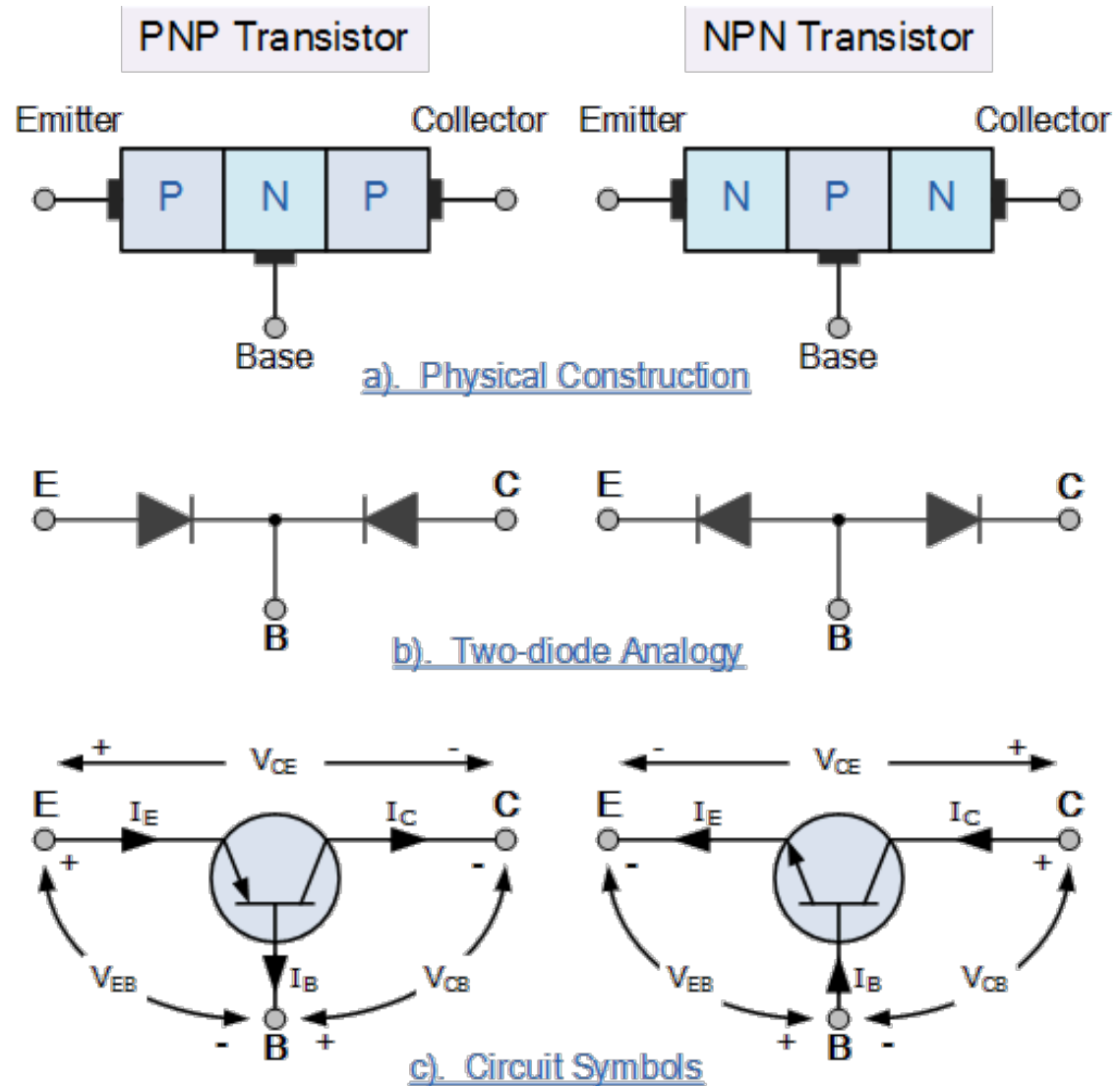


BJT Transistorinn

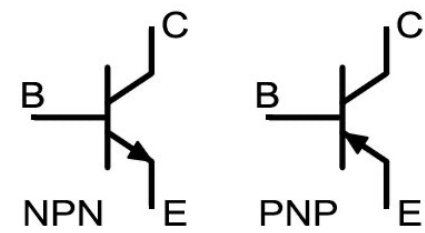


The Easiest way to remember the direction of PNP and NPN Transistor.

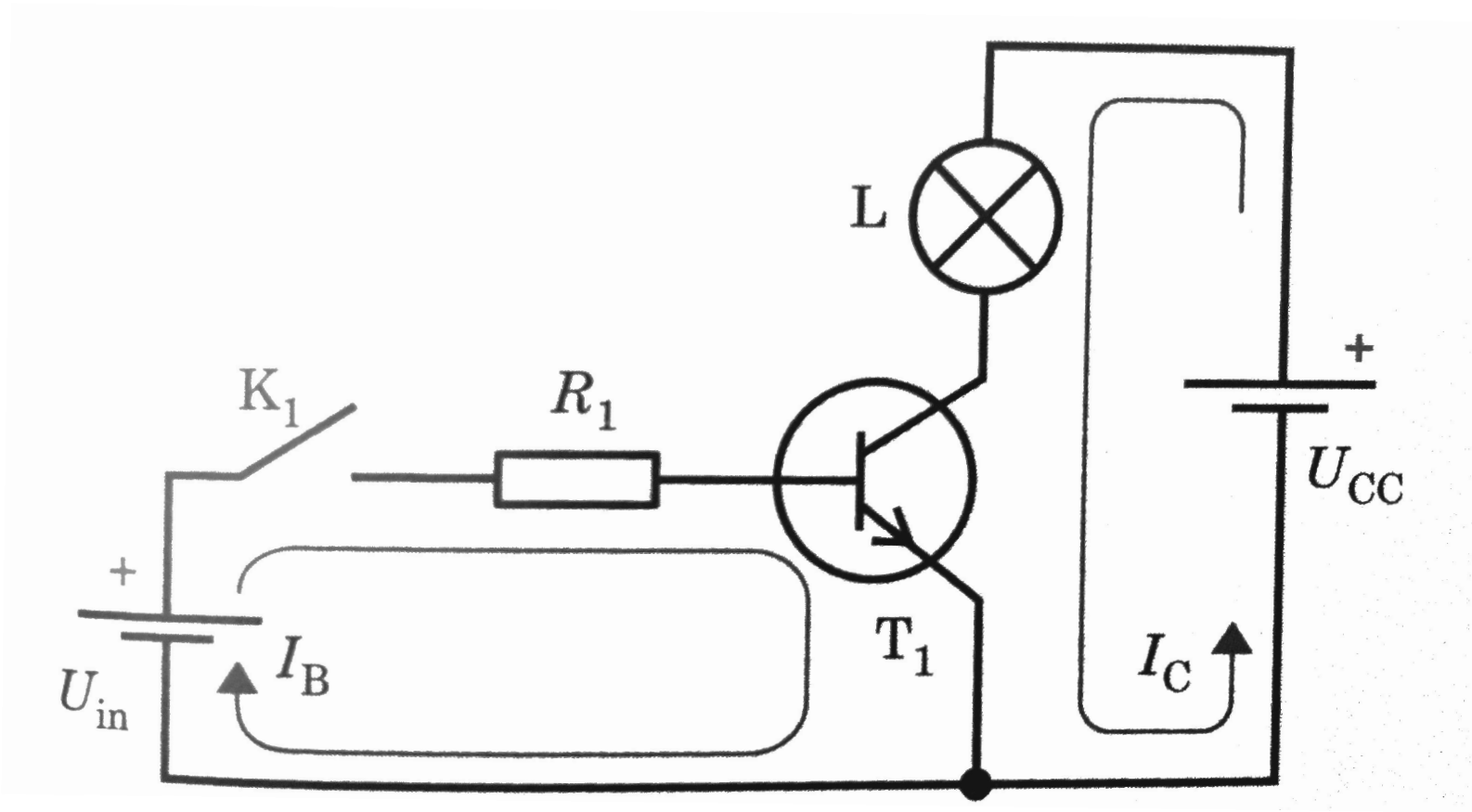
NPN eru algengari
Meiri hreifanleiki á
rafeindum í Si N efninu.
(ódýrari í framleiðslu IC rása)



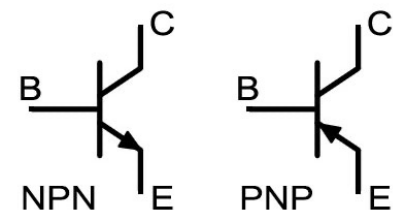
REIT



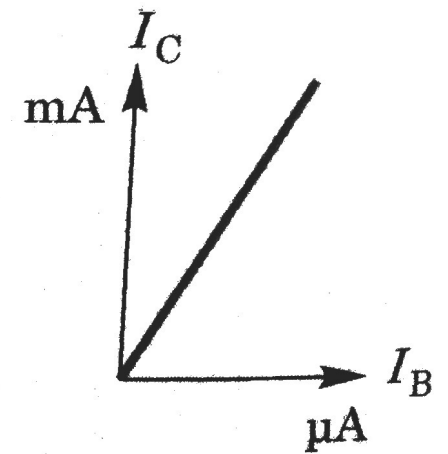
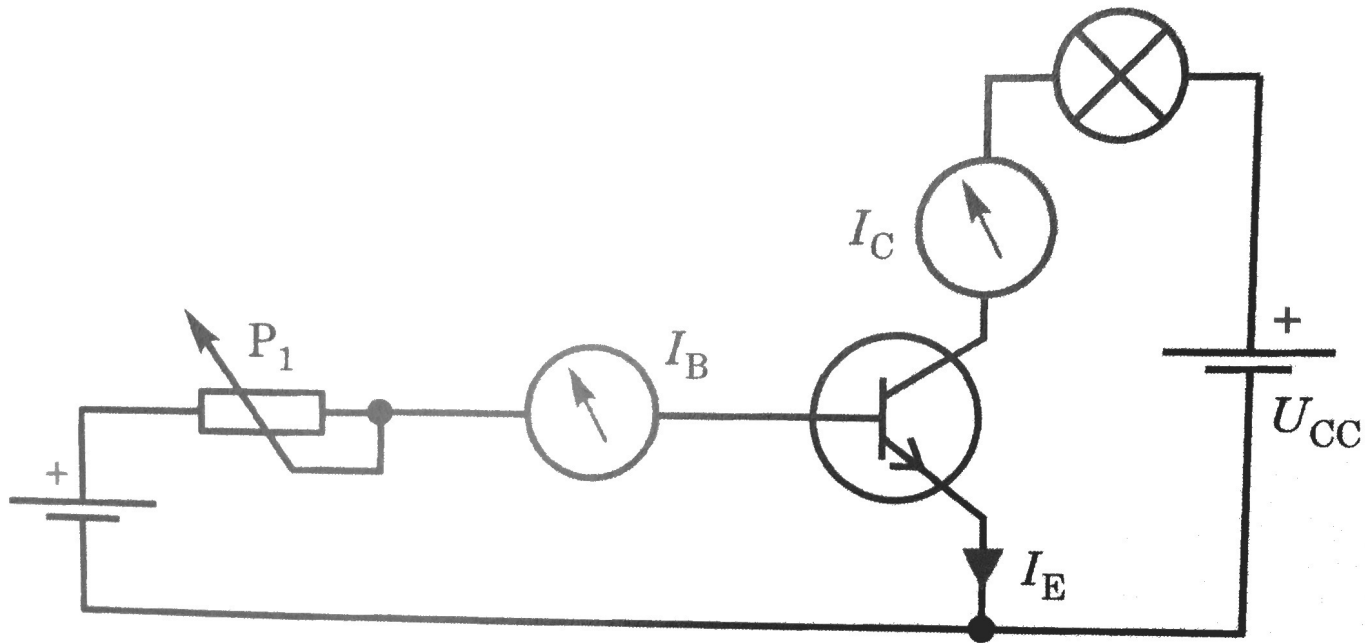
BJT Transistorinn



REIT

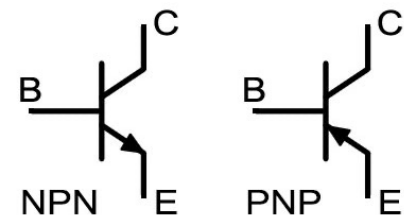


BJT Transistorinn

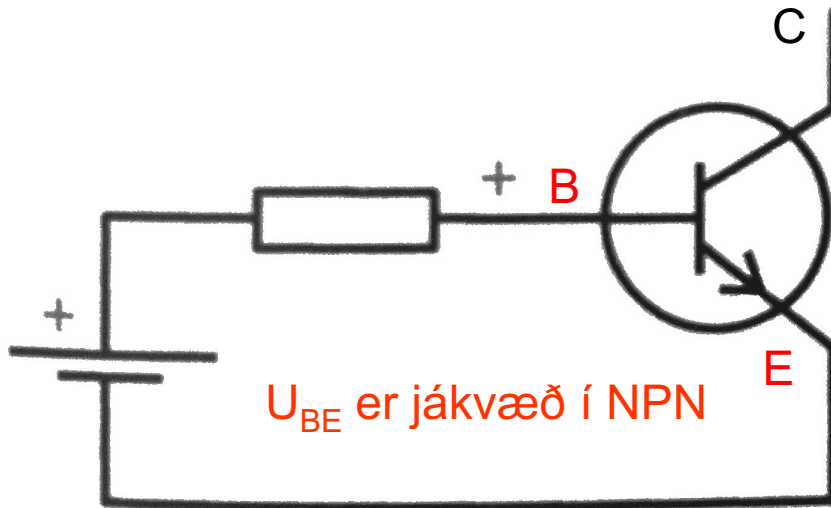


REIT

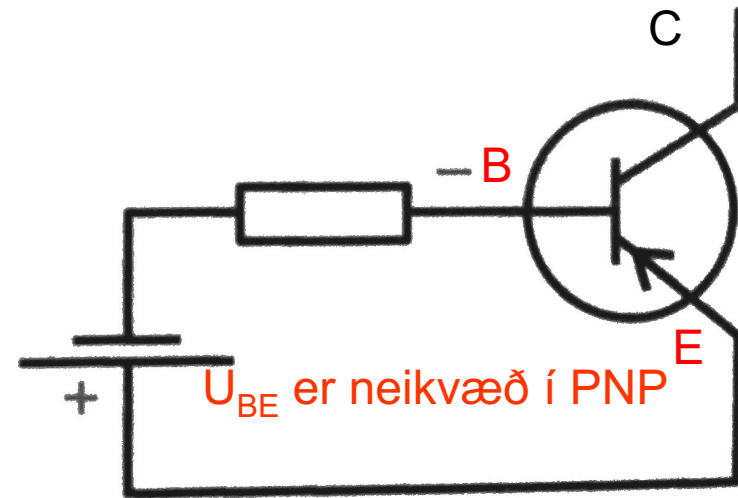
BJT Transistorinn



U_{BE} , spennan milli base og emitter



NPN



PNP

U_{BE} til að transistor opni:
Silicon-Kísil-Si: 0,5 – 0,8 V
Germaníum-Ge: 0,1 – 0,3 V

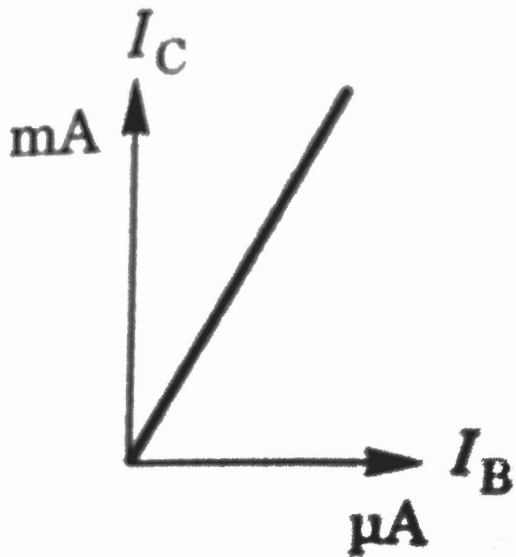
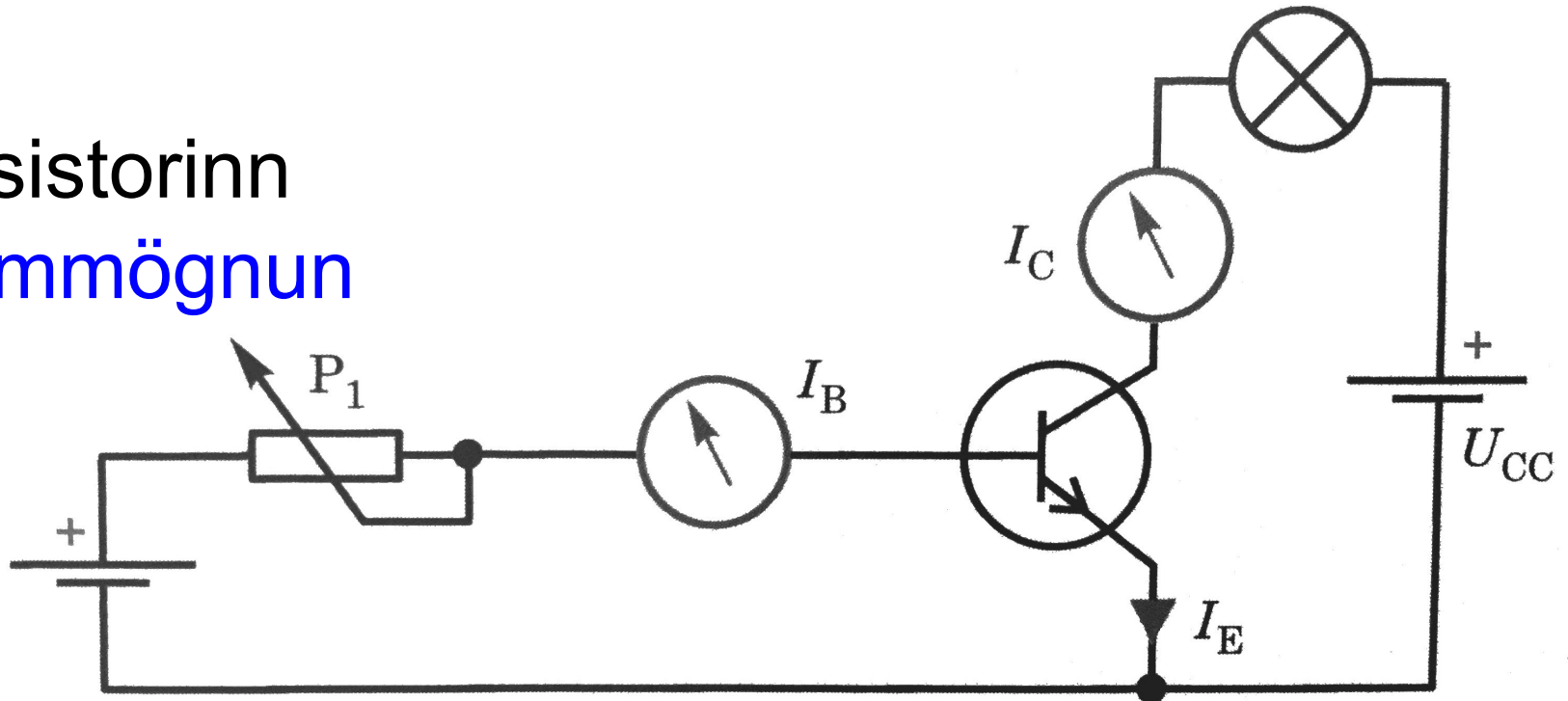
Minnisregla: miðjustafurinn segir til
Hvort U_{BE} sé jákvæ eða neikvæð.
NPN = jákvæð (**positive**)
PNP = neikvæð (**negative**)

<http://tinyurl.com/y9u8vxq3>

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BJT Transistorinn

h_{FE} straummögnun



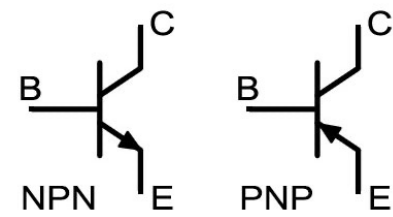
Straummögnun h_{FE} eða β (beta) (40 – 800 algengt)

$$h_{FE} = I_C / I_B \Rightarrow I_C = h_{FE} * I_B \Rightarrow I_B = I_C / h_{FE}$$

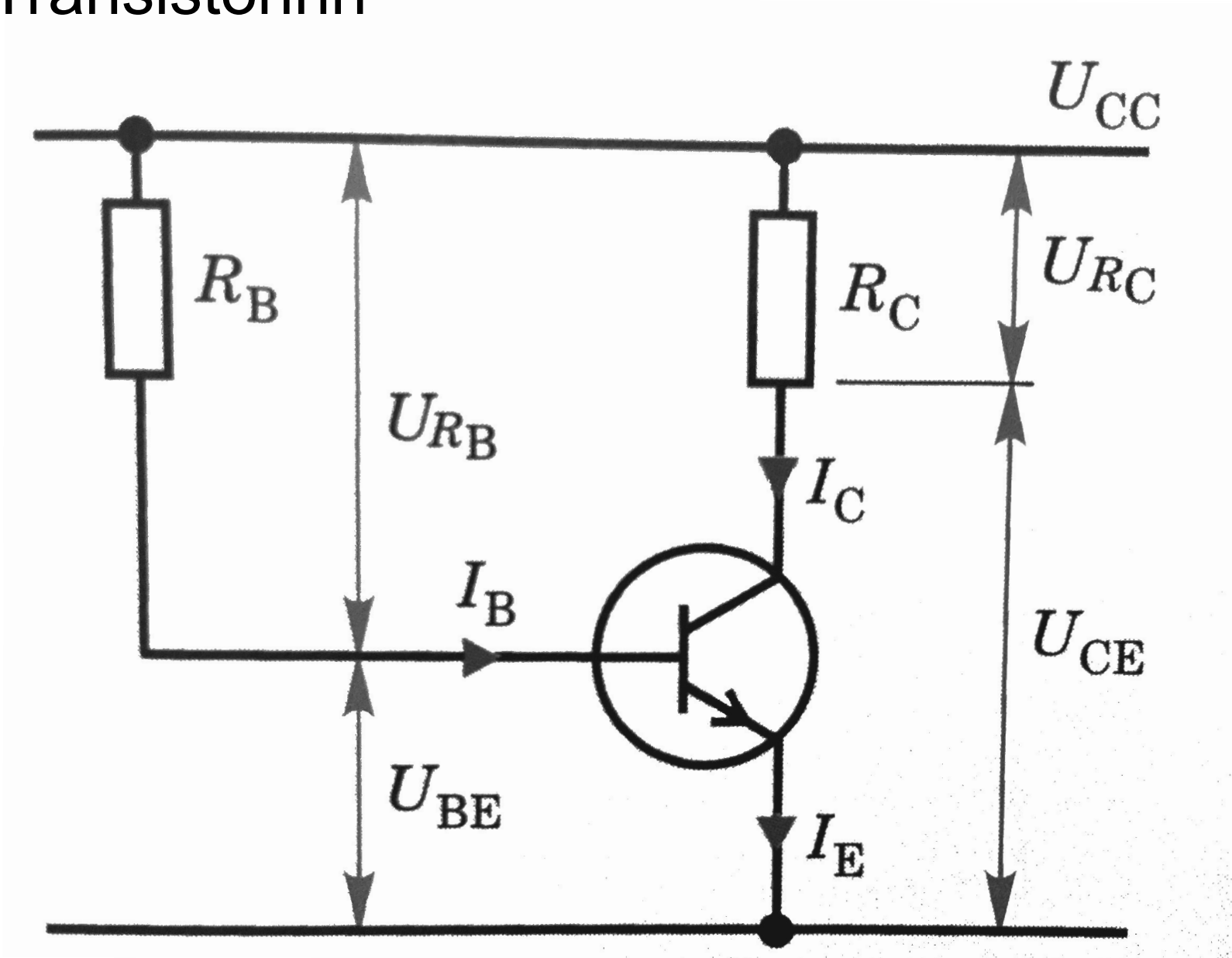
$I_E = I_B + I_C$ þessu má svo snúa að vild en $I_E \approx I_C$

$$U_{CE} = U_C - U_E$$

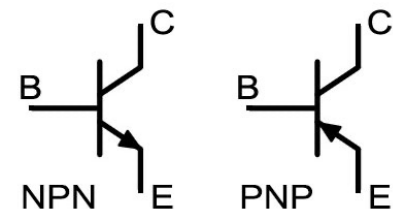
REIT



BJT Transistorinn



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BJT Transistorinn

Það er talað um að BJT Transistorinn hafi 3 megin stöður “Mode”

- **Cut-off** \Rightarrow **Open** \Rightarrow **Opinn rofi**

Leiðir ekki, ekki forspenntur, $U_{BE} = 0v$

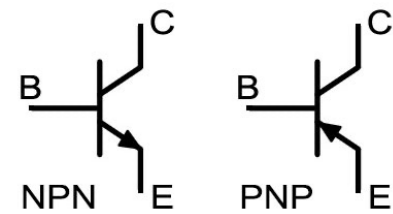
- **Saturation** \Rightarrow **Closed** \Rightarrow **Lokaður rofi**

Leiðir, full forspenntur, $U_{BE} = 0,7v$

- **Linear** \Rightarrow **Amplifier** \Rightarrow **Tilbúinn**

Leiðir, rétt forspenntur fyrir mögnun, ef hann er ekki á réttum vinnupunkti verður mögnun ekki línuleg. (skoðum betur seinna)

REIT



SILICON PLANAR EPITAXIAL TRANSISTORS

General purpose n-p-n transistors in a plastic TO-92 package.

TO= Transistor Outline, húsíð

QUICK REFERENCE DATA

		BC546	BC547	BC548
Collector-emitter voltage ($V_{BE} = 0$)	V_{CES} max.	80	50	30 V
Collector-emitter voltage (open base)	V_{CEO} max.	65	45	30 V
Collector current (peak value)	I_{CM} max.	200	200	200 mA
Total power dissipation up to $T_{amb} = 25\text{ }^{\circ}\text{C}$ herbergis hiti	P_{tot} max.	500	500	500 mW
Junction temperature	T_j max.	150	150	150 $^{\circ}\text{C}$
D.C. current gain $I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$	h_{FE} >	110	110	110
	h_{FE} <	450	800	800
Transition frequency at $f = 100\text{ MHz}$ $I_C = 10\text{ mA}; V_{CE} = 5\text{ V}$	f_T >	100	100	100 MHz
Noise figure at $R_S = 2\text{ k}\Omega$ $I_C = 200\text{ }\mu\text{A}; V_{CE} = 5\text{ V}$ $f = 1\text{ kHz}; B = 200\text{ Hz}$	F typ.	2	2	2 dB

Max $U_{CE} = 50\text{v sat.}$
Max $U_{CE} = 45\text{v open}$

Max $I_C = 200\text{mA}$

Max afl 500 mW
Max hiti kristals

$h_{FE} = 110 - 800$