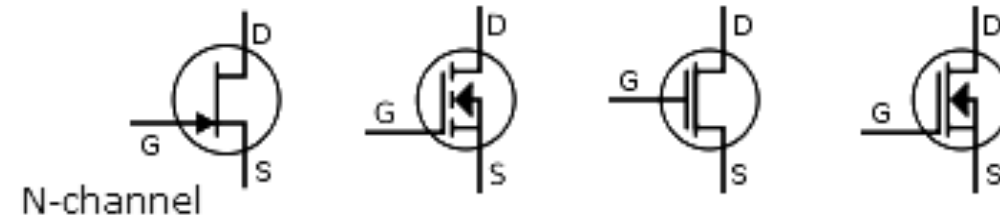
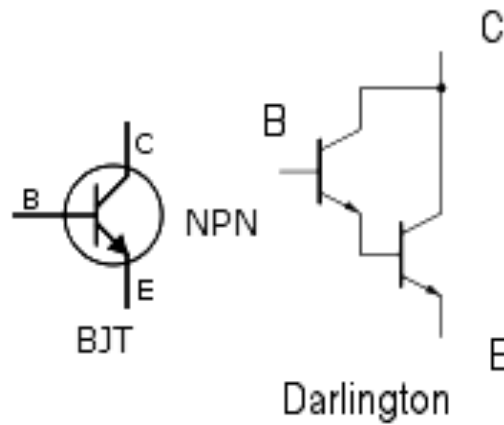
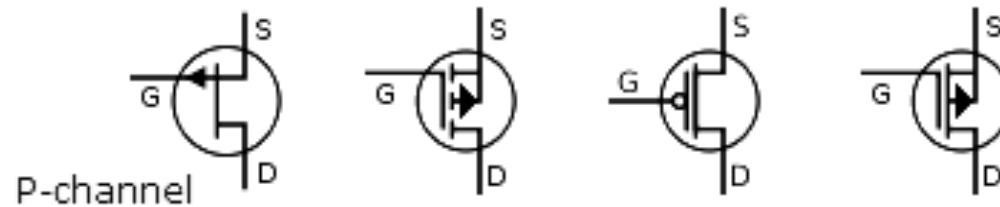
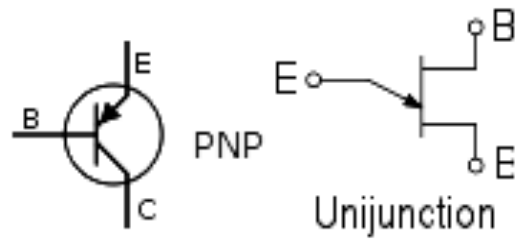


RTM

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.



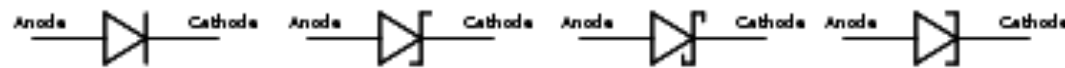
JFET

MOSFET enh

MOSFET dep



Silicon controlled rectifier
SCR or Thyristor



Diode

Zener
diode

Schottky
diode

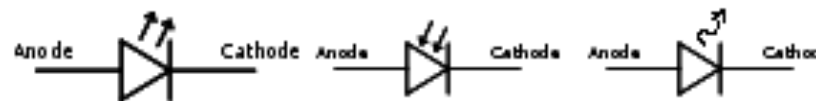
Tunnel
diode



Triac



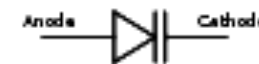
Diac



Light-emitting
diode

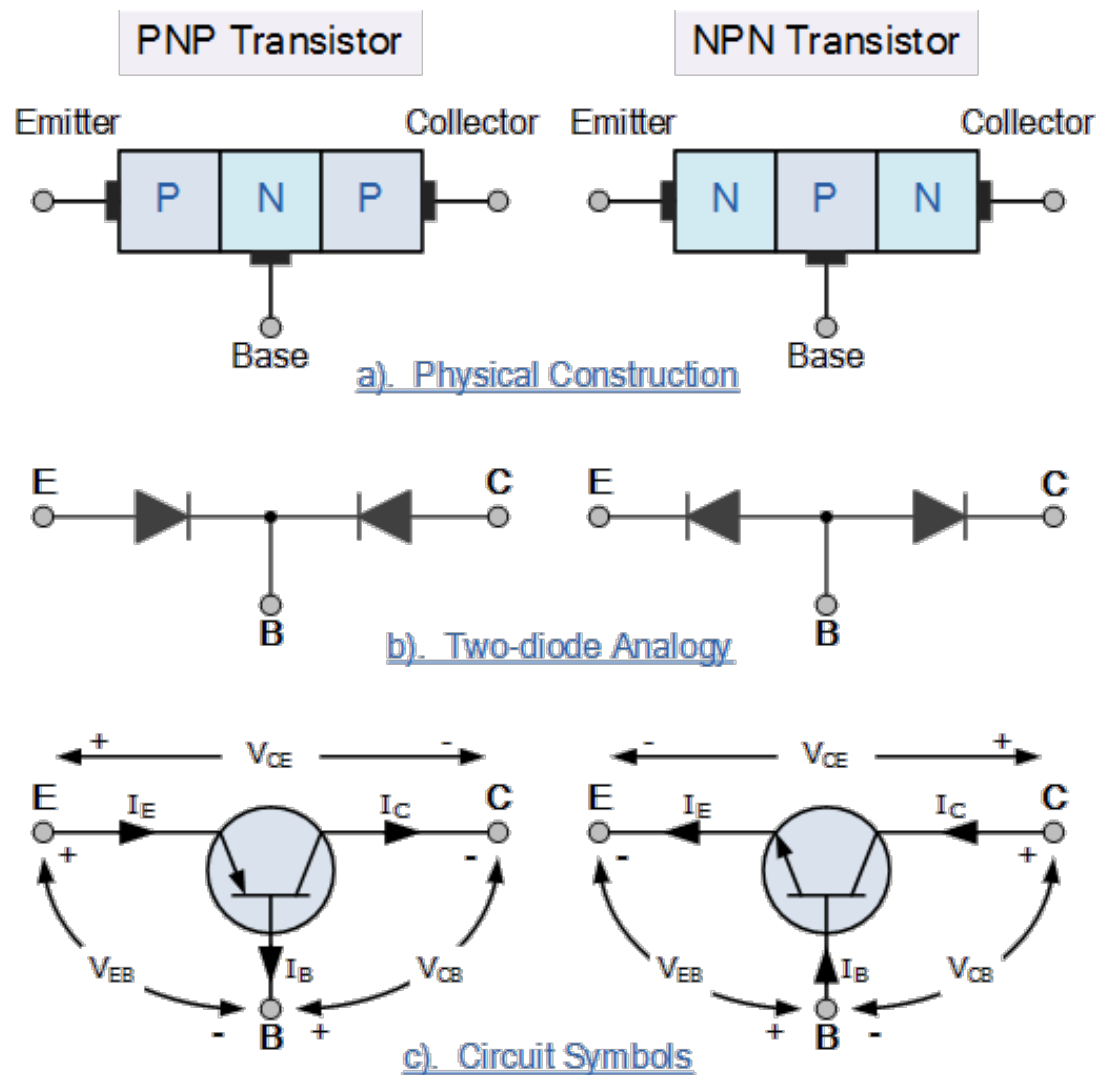
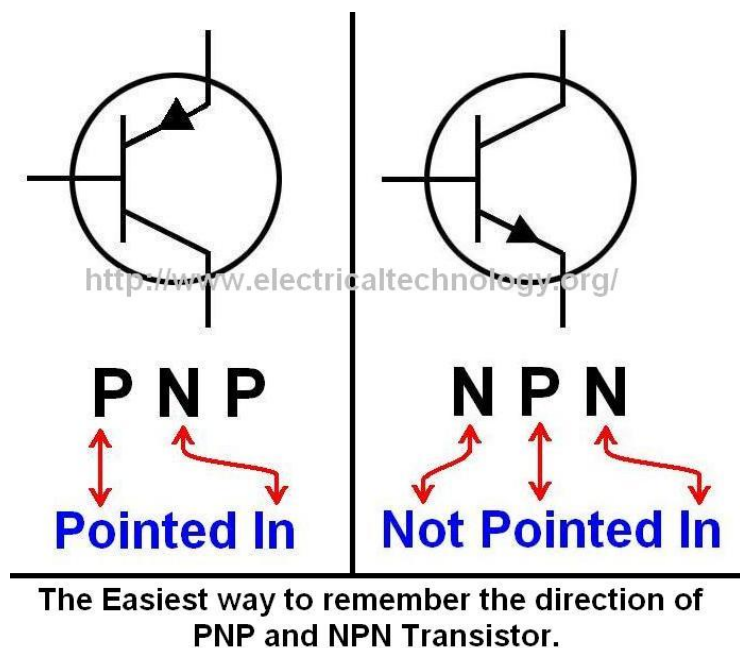
Photodiode

Laser
Diode



Varicap

BJT Transistorinn



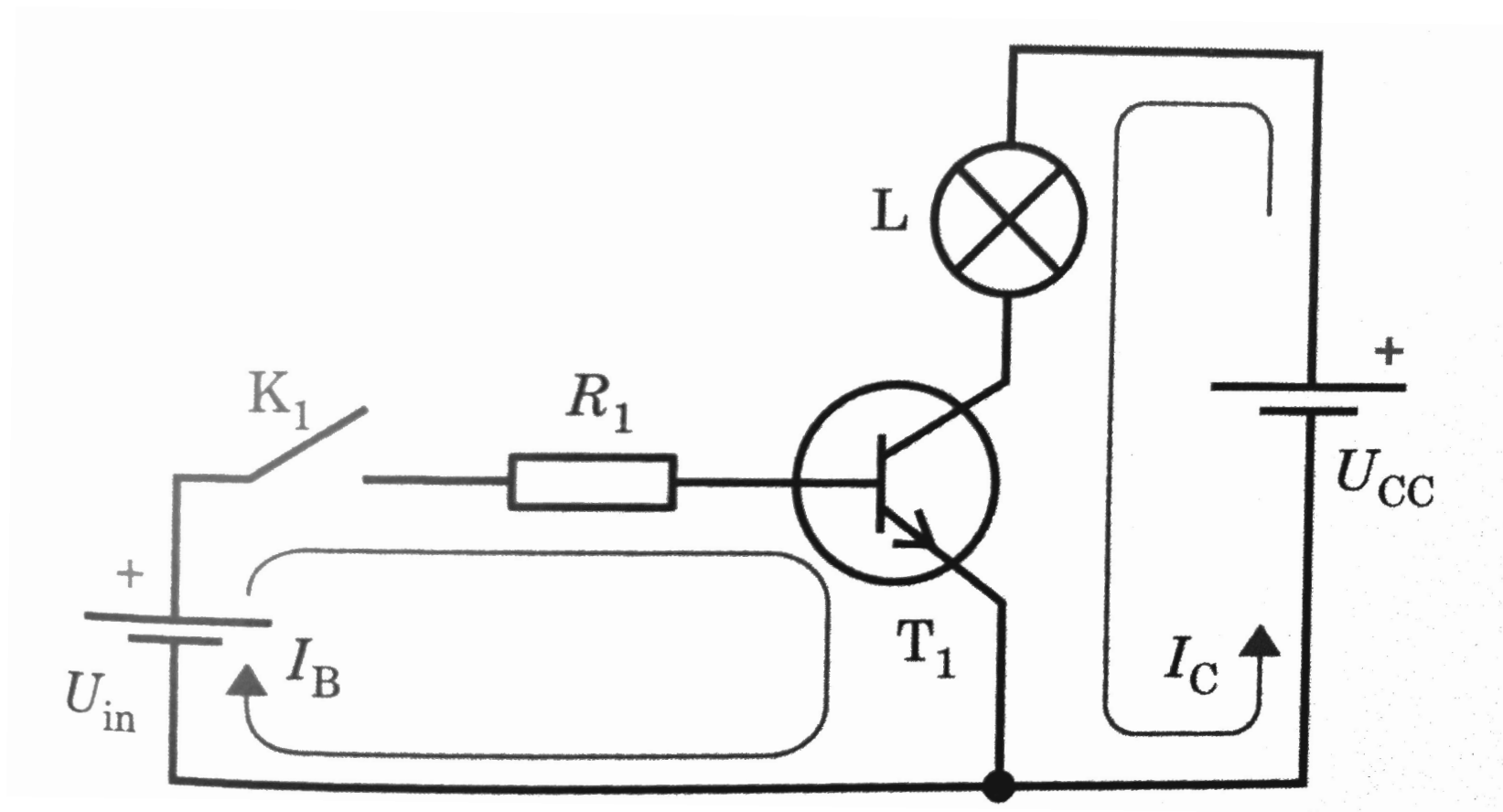
NPN eru algengari
Meiri hreyfanleiki á
rafeindum í Si N efninu.
(óðýrari í framleiðslu IC rása)

Myndbönd

- <https://www.youtube.com/watch?v=lcrBqCFLHIY>
- <https://www.youtube.com/watch?v=7ukDKVHnac4&t=262s>
- <https://www.youtube.com/watch?v=sRVvUkK0U80>

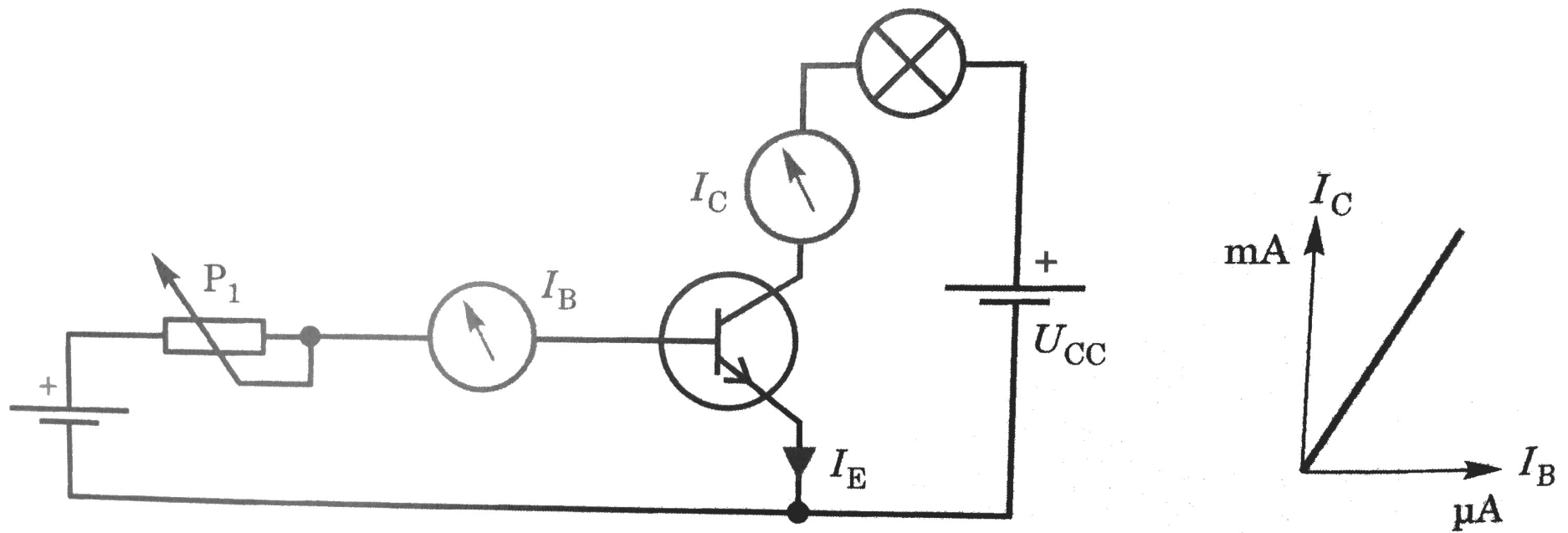
RTM

BJT Transistorinn



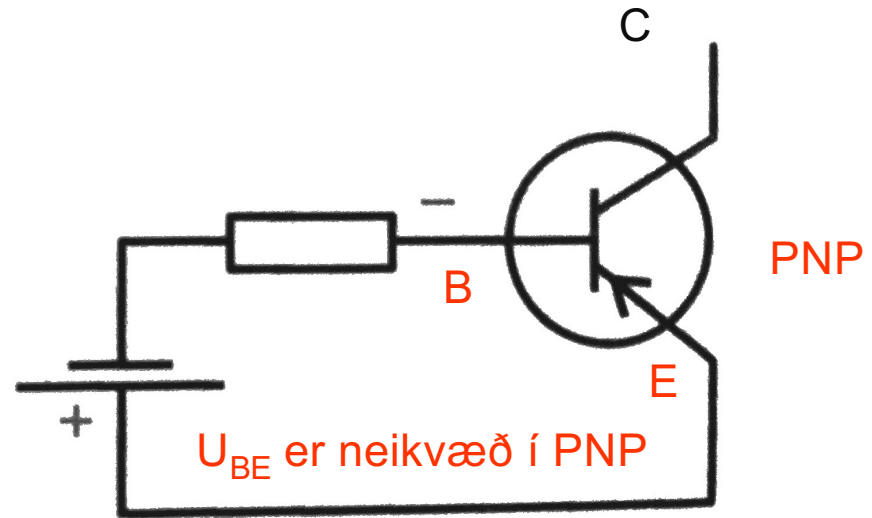
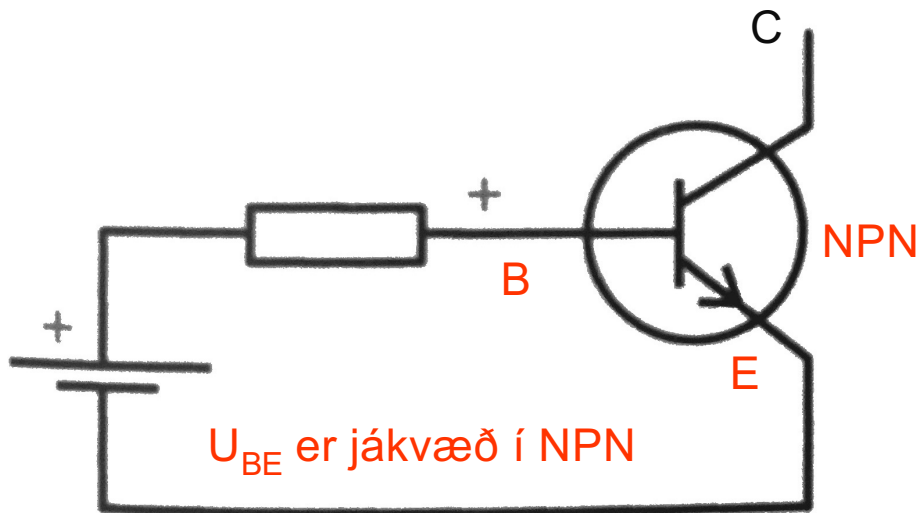
RTM

BJT Transistorinn



BJT Transistorinn

U_{BE} , spennan milli base og emitter



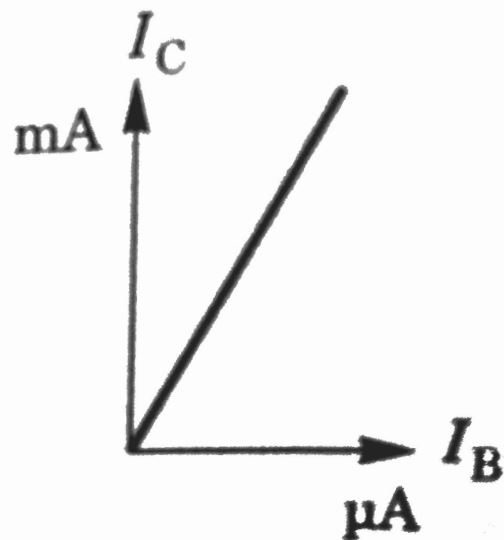
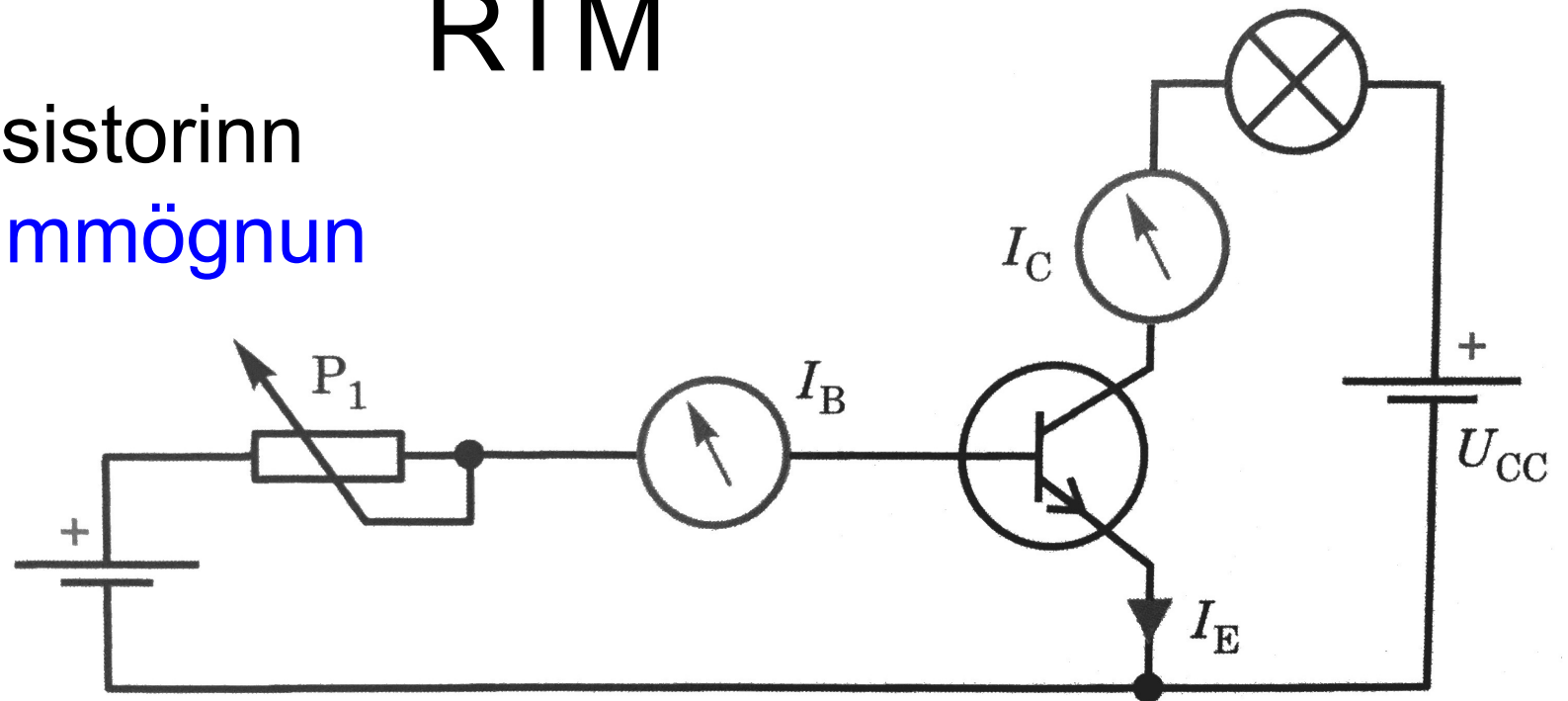
UBE til að transistor opni:
Silicon-Kísil-Si: 0,5 – 0,8 V
Germaníum-Ge: 0,1 – 0,3 V

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

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h_{FE} straummögnun



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

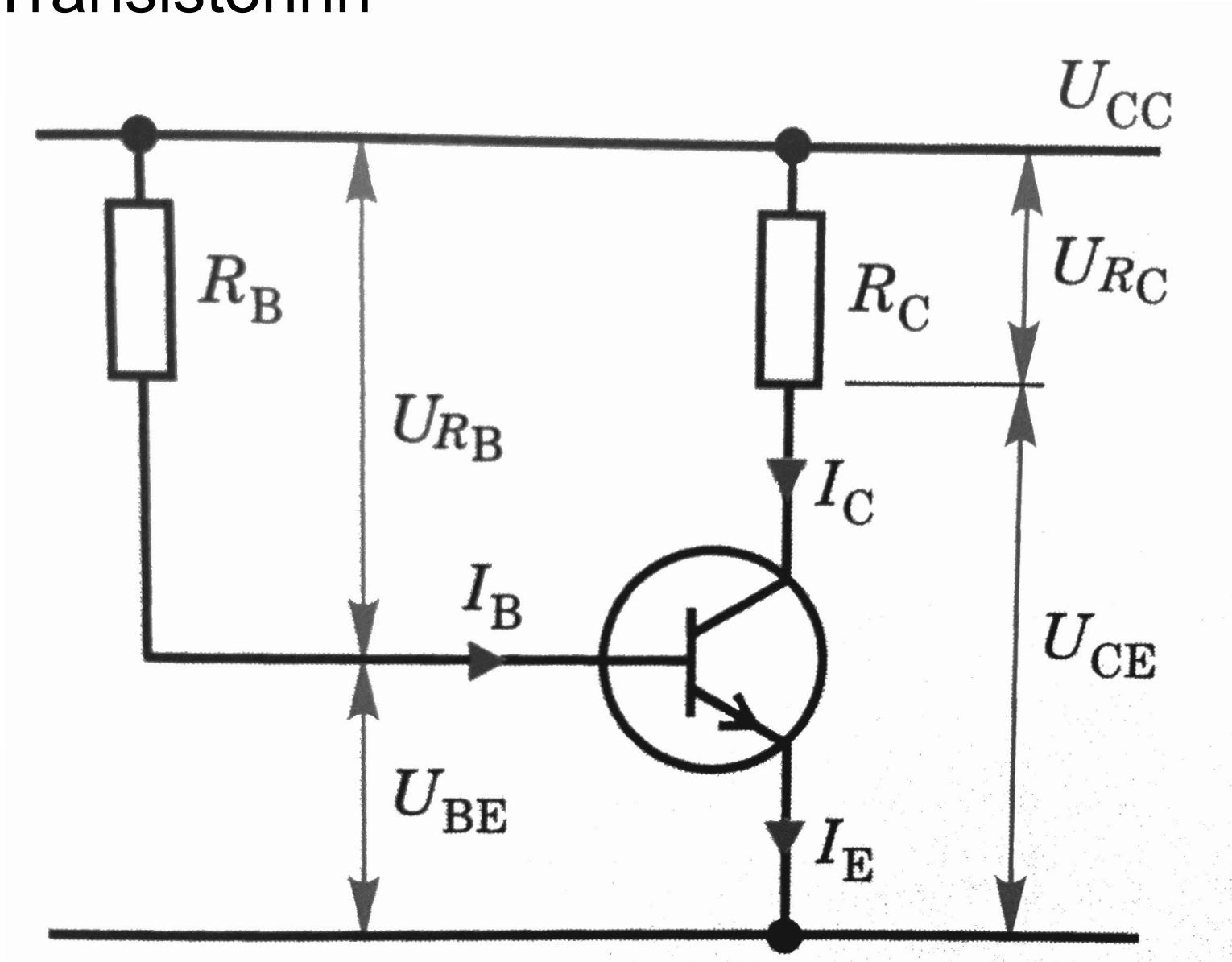
$$h_{FE} = I_C / I_B \Rightarrow I_C = h_{FE} * I_B \Rightarrow I_B = I_C / h_{FE}$$

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

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

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BJT Transistorinn



BJT Transistorinn

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

• Cut-off => Open => Opinn rofi

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

• Saturation => Closed => Lokaður rofi

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

• Linear => Amplifier => Tilbúinn

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

RTM

SILICON PLANAR EPITAXIAL TRANSISTORS

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

TO= Transistor Outline, húsið

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

$h_{FE} = 110 - 800$