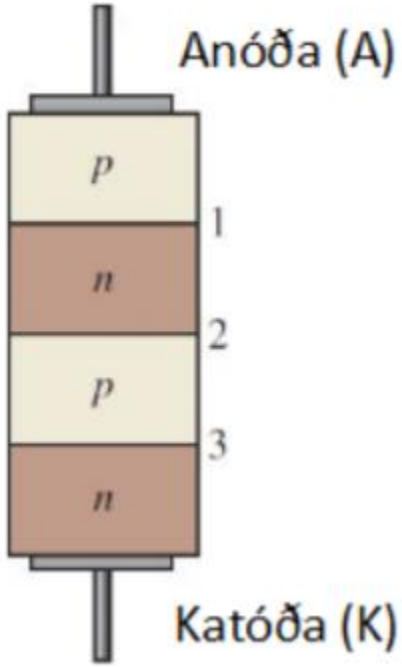
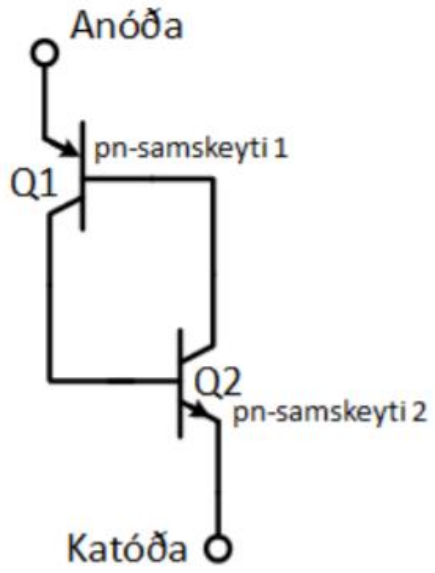
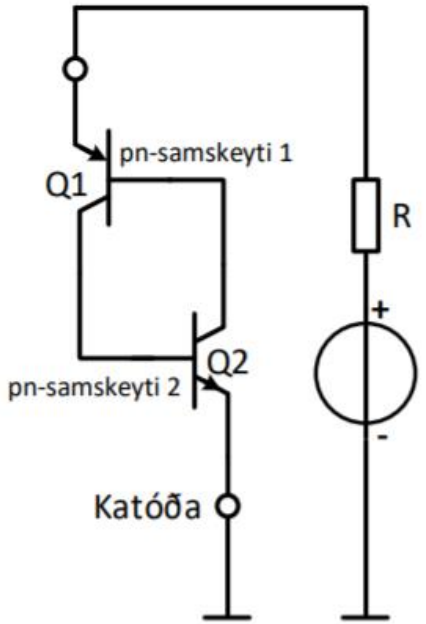
Tyristorar

Shockley díóða

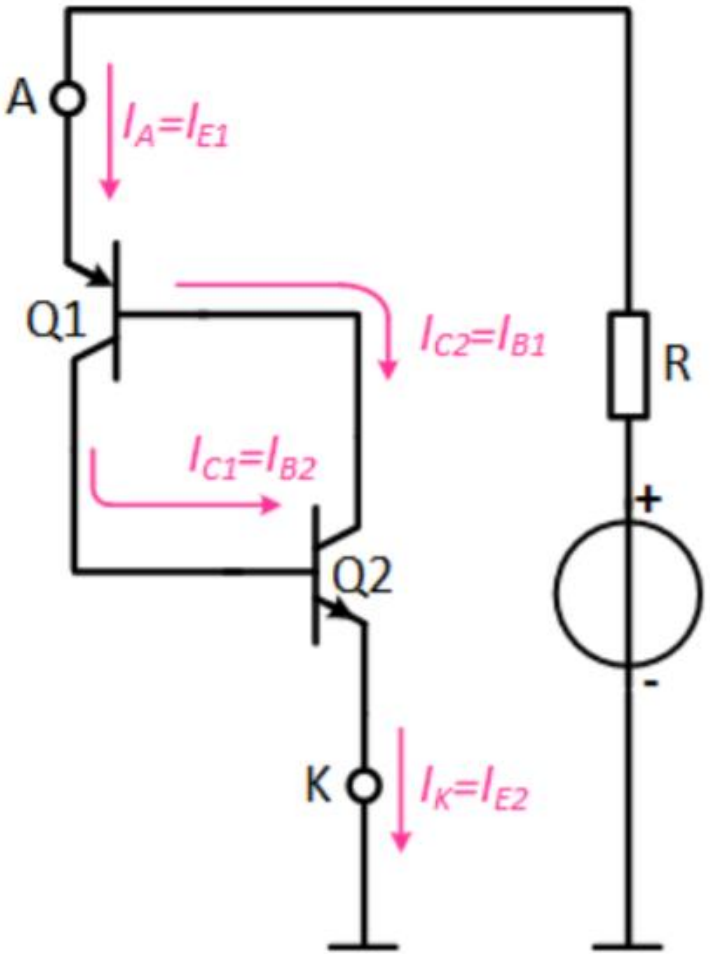






Jafngildismynd

Straumar/spennur í fjögurra laga díóðu



Jákvæð spenna á Anóðu og neikvæð á katóðu

Fyrir BE samskeyti á Q1 og Q2 gildir að þau eru bæði forspennt.

Fyrir BC samskeyti á Q2 gildir að þau eru bakspennt.

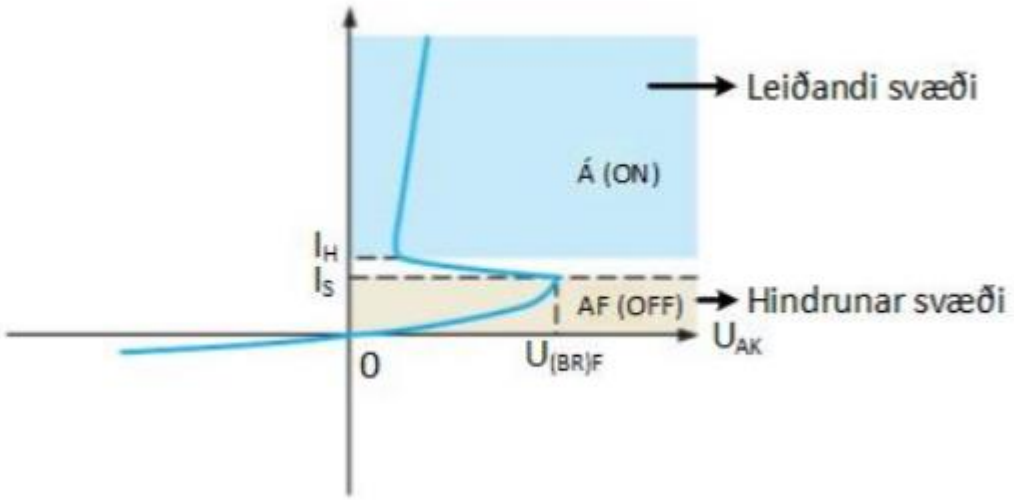
Þetta þýðir að transistorarnir eru að vinna á línulega hluta sínum.

Sýnidæmi

4-laga díóða er forspennt í leiðandi átt þannig að anóðu-katóðu spennan U_{AK} er 20 V. Við þessa forspennu rennur 1 µA anóðustraumur í rásinni. Hver er mótstaða rásarinnar?

$$R_{AK} = \frac{U_{AK}}{I_{AK}} = \frac{20V}{1\mu A} = 20M\Omega$$

Gegnumslagsspenna (Forward-Breakover Voltage)



Virkar sem opinn rofi þó að sé forspennt

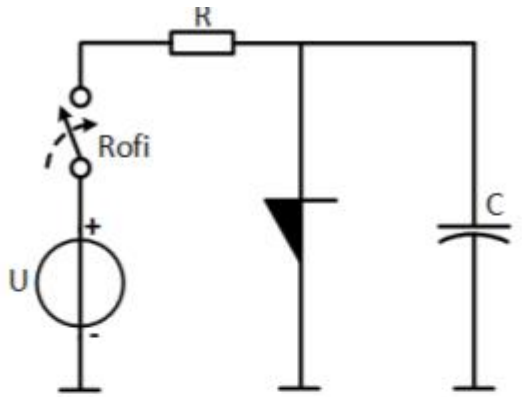
Hindrunarsvæði fyrir U_{AK} = 0V – U_{AK} = $U_{(BR)F}$

Aukið U_{AK} leiðir til aukins I_A þar til hann nær skiptistraumnum I_S. Þá verður Díóðan leiðandi og spennufallið U_{AK} mjög lítið

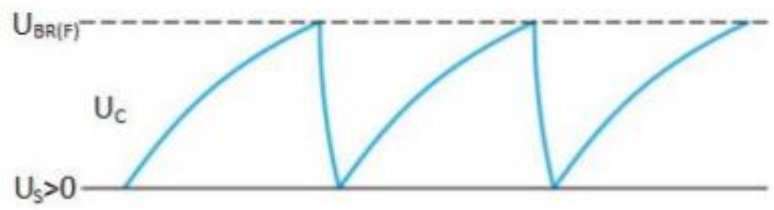
Haldstraumur I_H: Ef $I_A > I_H$ Þá er díóðan viðvarandi opin (ON). Ef $I_A < I_H$ þá er díóðan viðvarandi lokuð (OFF).

Straumgildi I_S er alltaf lægir en I_H

Dæmi um notkun



Mynd 5a)



Mynd 5b)

Þegar rofanum er lokað:

Shockley díóðan er lokuð -> Þéttirinn hleðst upp

Þegar þéttirinn er nógu mikið hlaðinn upp að gegnumslagsspennu -> Shockley díóðan opnast og þéttirinn afhleðst í gegnum hana.

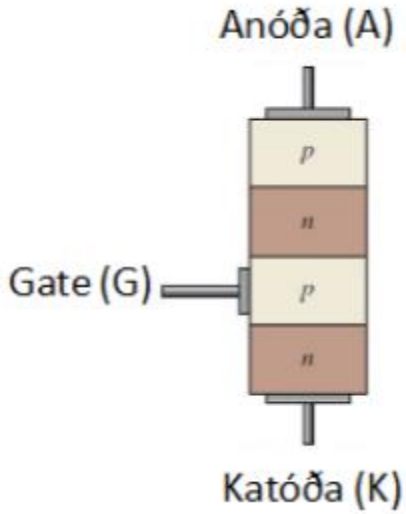
Afhleðslan er viðvarandi þar til $I_A < I_H$ og díóðan lokast

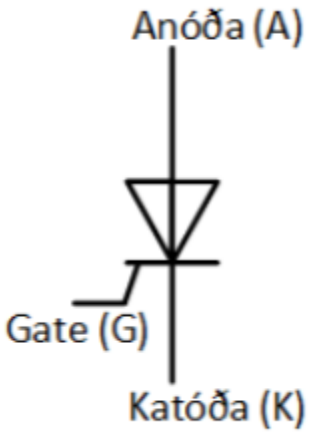
Ferlið byrjar upp á nýtt

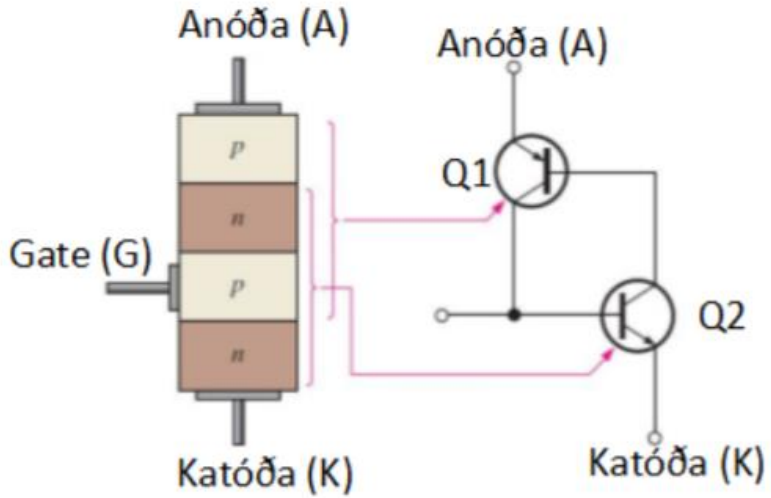
Dæmi

1. Af hverju er 4-laga díóðan flokkuð með *tyristorum*?
2. Hvað er hindrunarsvæði díóðunnar?
3. Hvað gerist þegar U_{AK} nálgast gegnumslagsspennu $U_{BR(F)}$?
4. Hvernig er hægt að slökkva á 4-laga díóðunni eftir að kveikt var á henni?

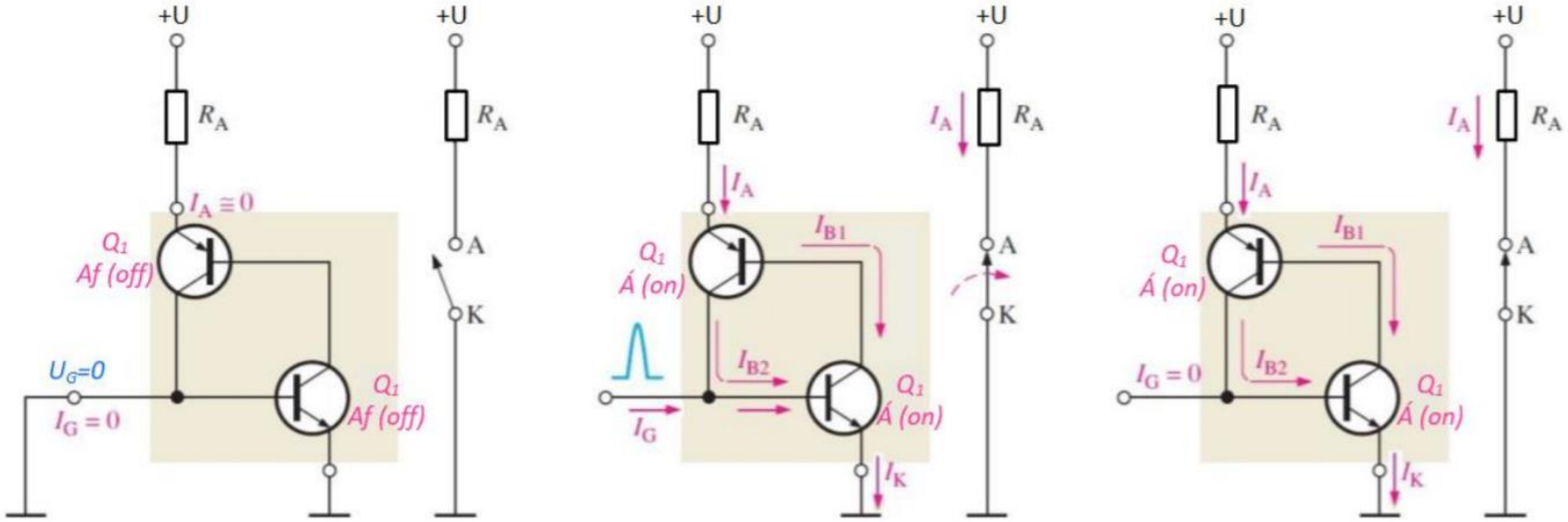
Kísil Stýrður Afriðill (SCR)





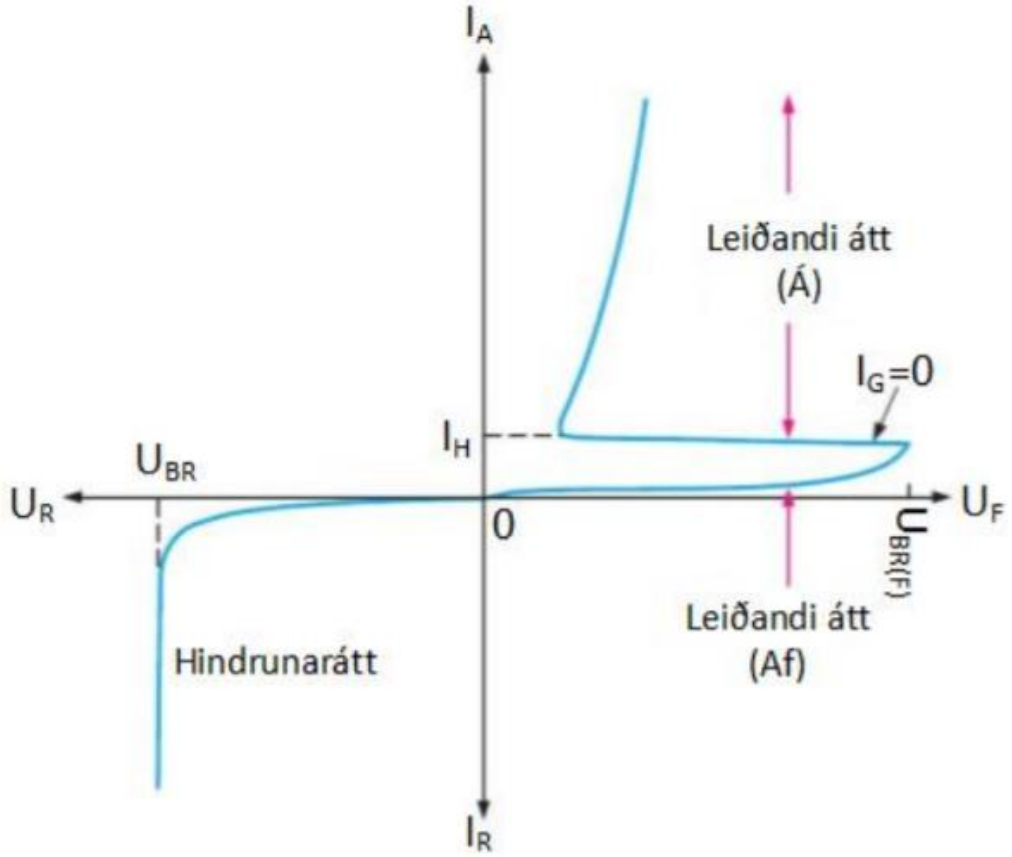


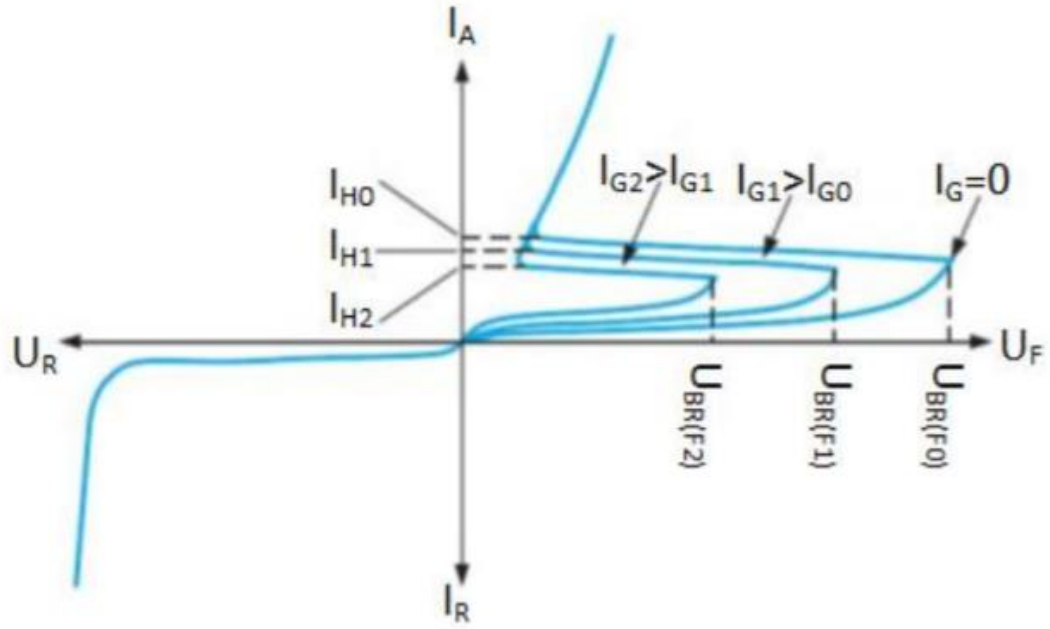
Straumar og spennur í SCR



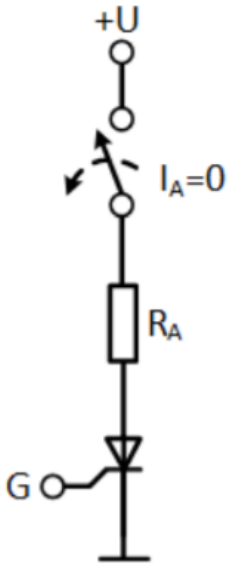
8a) SCR lokaður. *8b) SCR opnaður.* *8c) SCR opinn eftir gate púls.*

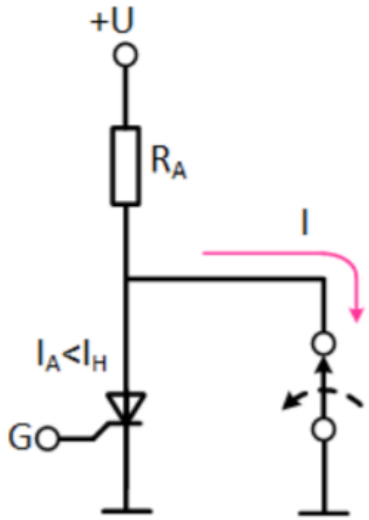
Straumar og spennur í SCR



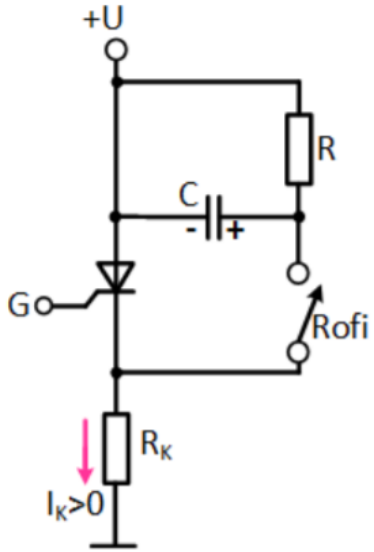


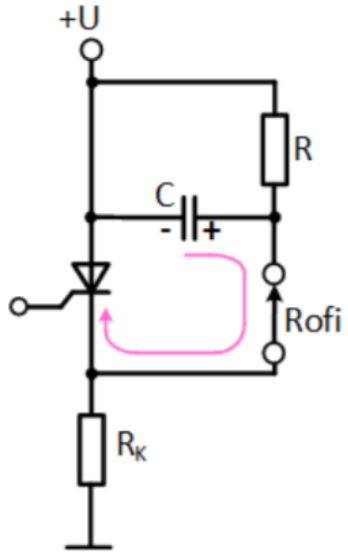
Að loka SCR





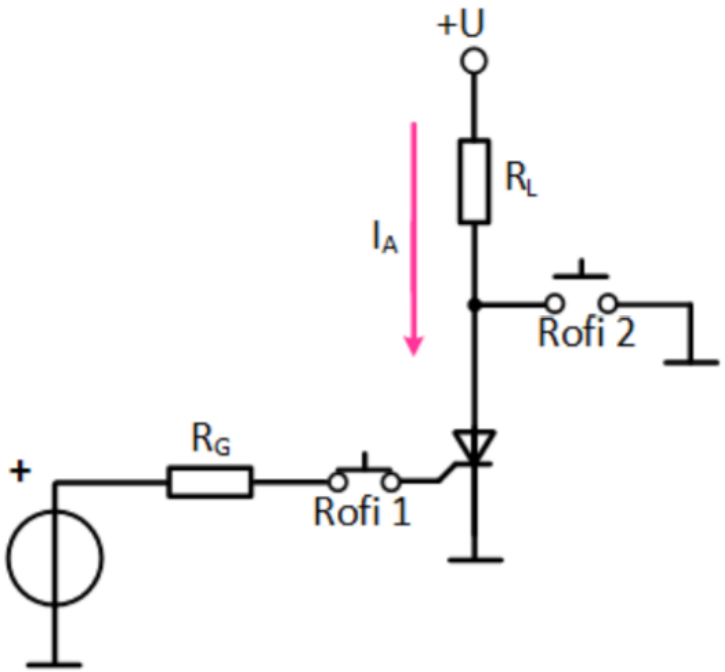
Lækka anóðustrauminn





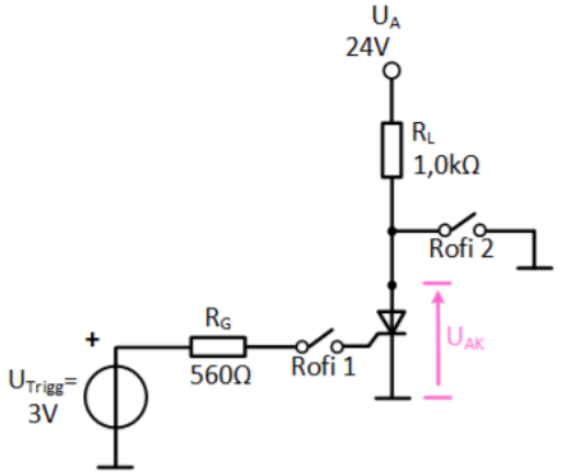
Þvinguð straumvending

Notkun á SCR



Sýnidæmi

Finnið *gate*- og anóðustrauminn fyrir *mynd 13* ef rofi 1 er tengdur í augnablik. Gerið ráð fyrir að $U_{AK} = 0{,}8$ V, $U_{GK} = 0{,}7$ V og $I_H = 20$ mA.



Mynd 13.

$$I_G = \frac{U_{TRIG} - U_{GK}}{R_G} = \frac{3V - 0{,}7V}{560\Omega} = 4{,}1mA$$

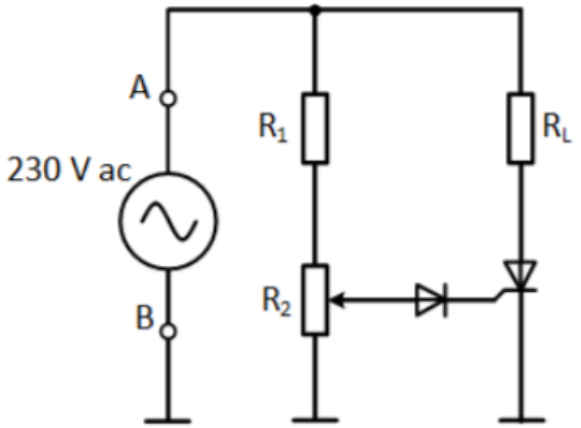
$$I_A = \frac{U_A - U_{AK}}{R_A} = \frac{24V - 0{,}8V}{1000\Omega} = 23{,}2mA$$

Dæmi

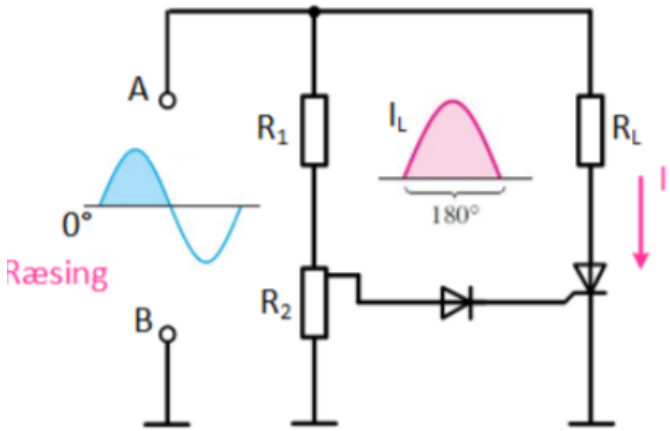
1. Hverskonar íhlutur er *SCR*?
2. Hvað heita skaut *SCR* íhlutar?
3. Hvernig ræsir maður *SCR* í rás?
4. Hvernig er slökkt á *SCR* íhlut?

Hálfbylgju Aflstýring

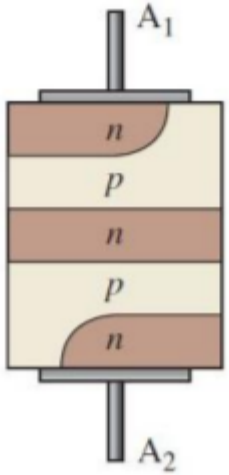
Sjá rás: https://tinyurl.com/y43xcf9d

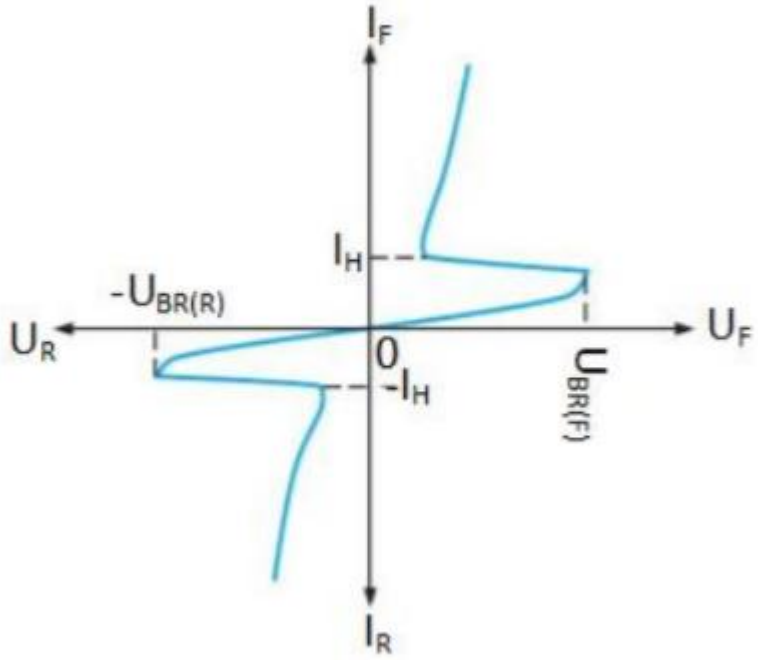


Mynd 14.

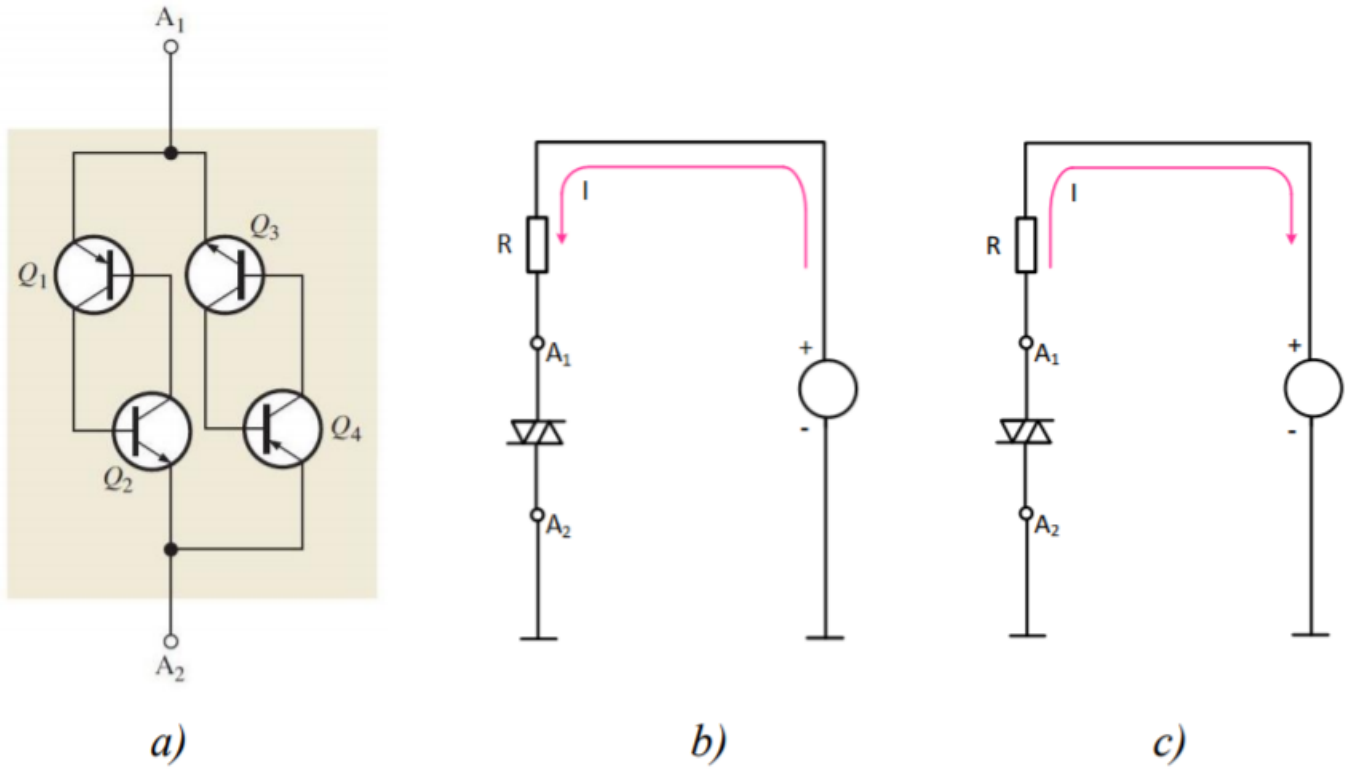


Diac

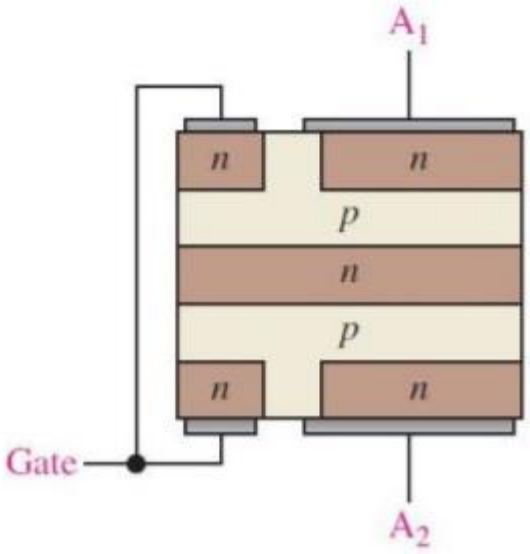


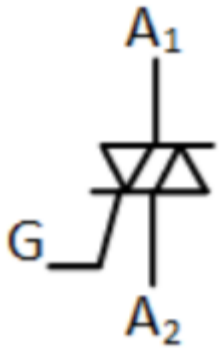


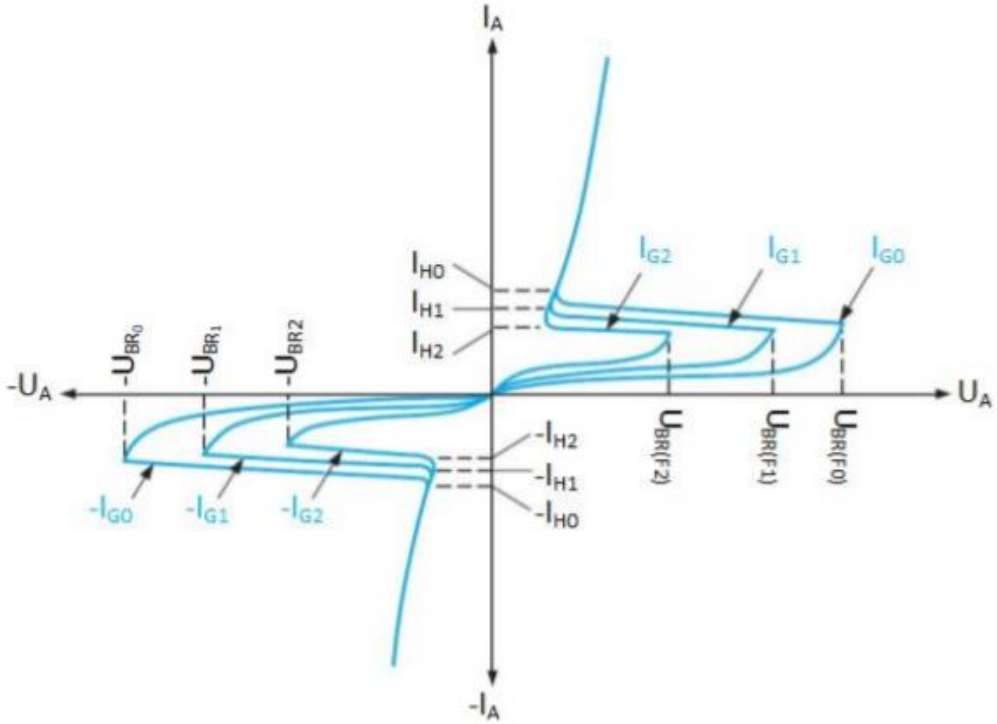
Diac jafngildismynd



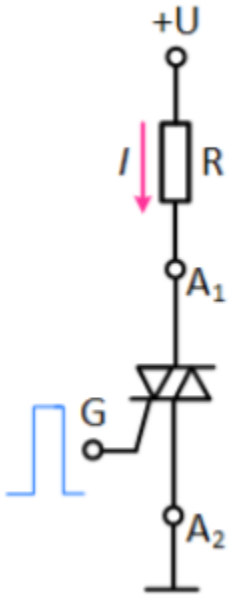
Triac

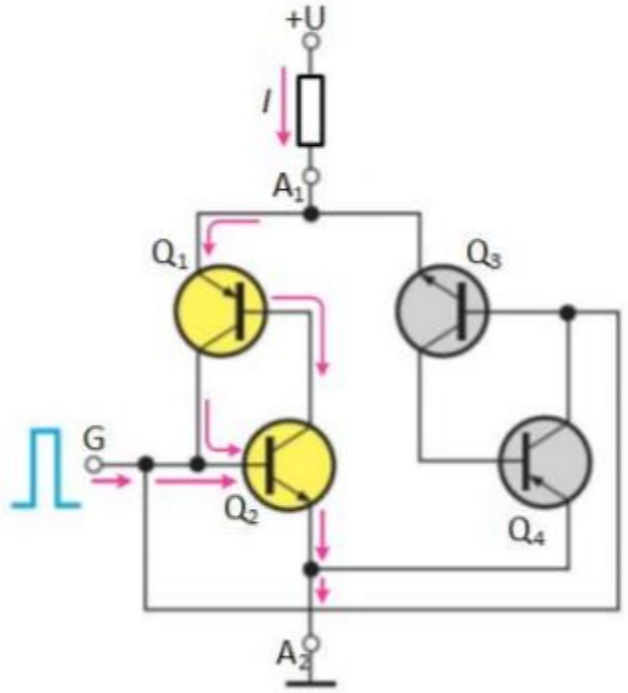

A1
n
n
p
n
p
n
n
Gate
A2

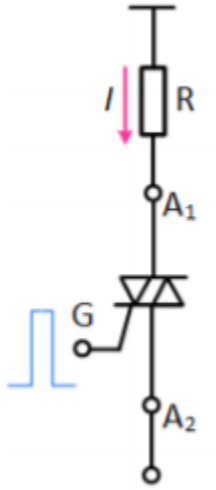

A1
G
A2

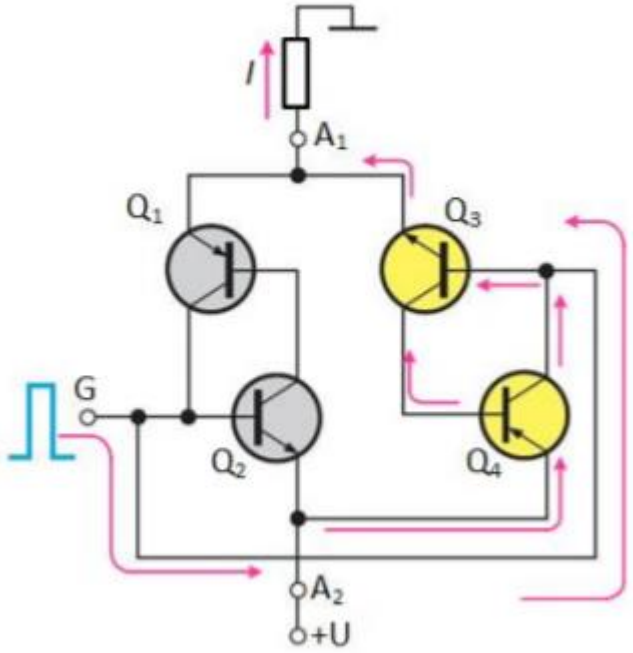

IA
IH0
IH1
IH2
IG2
IG1
IG0
-UA
UA
-UBR0
-UBR1
-UBR2
UBR(F2)
UBR(F1)
UBR(F0)
-IH2
-IH1
-IH0
-IG0
-IG1
-IG2
-IA

Triac jafngildismynd

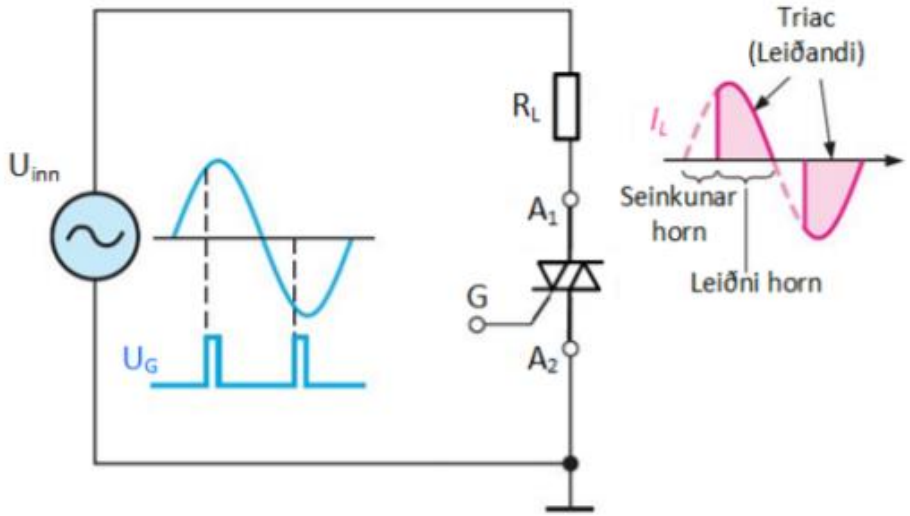




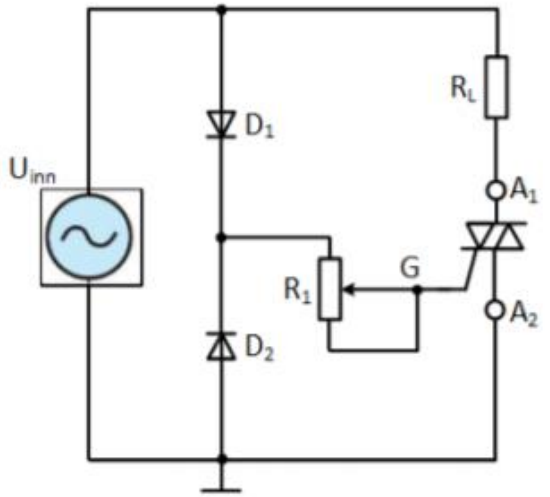


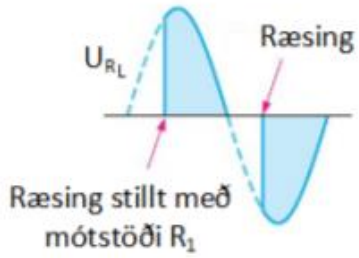


Triac notkun Aflstýringar

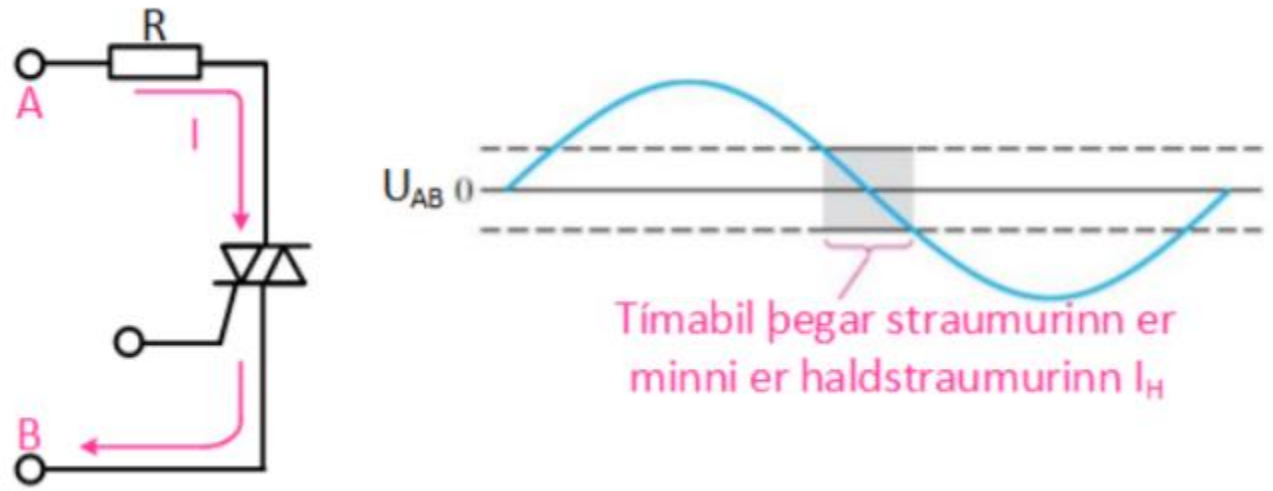


Fasastýring





Lokun á milli bylgja



Verkefni

1. Hvað er SCR (útskýrið í máli og myndum)?
2. Hvað er Triac (útskýrið með máli og myndum)?
3. Teiknið upp í Falstad og hermið aflstýringu þar sem Triac er notaður