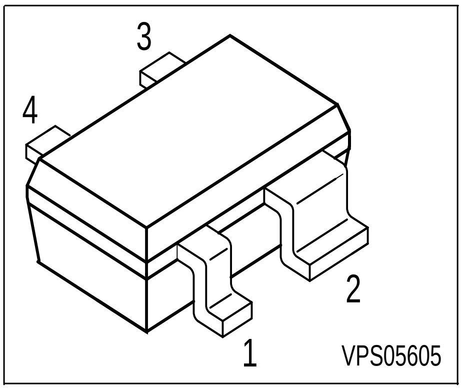
Active Bias Controller

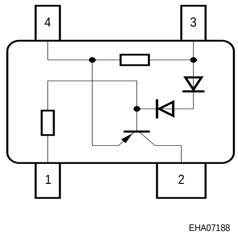


Characteristics

- Supplies stable bias current even at low battery voltage and extreme ambient temperature variation
- Low voltage drop of 0.7V

Application notes

- Stabilizing bias current of NPN transistors and FET's from less than 0.2mA up to more than 200mA
- Ideal supplement for Sieget and other transistors
- also usable as current source up to 5mA



Type	Marking	Pin Configuration				Package
BCR400W	W4s	1=GND/**E**$_{NPN}$	2=Contr/**B**$_{NPN}$	3V_S	4=Rext/**C**$_{NPN}$	SOT343

(E_{NPN}, B_{NPN}, C_{NPN} are electrodes of a stabilized NPN transistor)

Maximum Ratings

Parameter	Symbol	Value	Unit
Source voltage	V_S	18	V
Control current	$I_{Contr.}$	10	mA
Control voltage	$V_{Contr.}$	16	V
Reverse voltage between all terminals	V_R	0.5	
Total power dissipation, T_S = 117 °C	P_{tot}	330	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Junction - soldering point[1)]	R_{thJS}	≤ 100	K/W

[1]For calculation of R_{thJA} please refer to Application Note Thermal Resistance

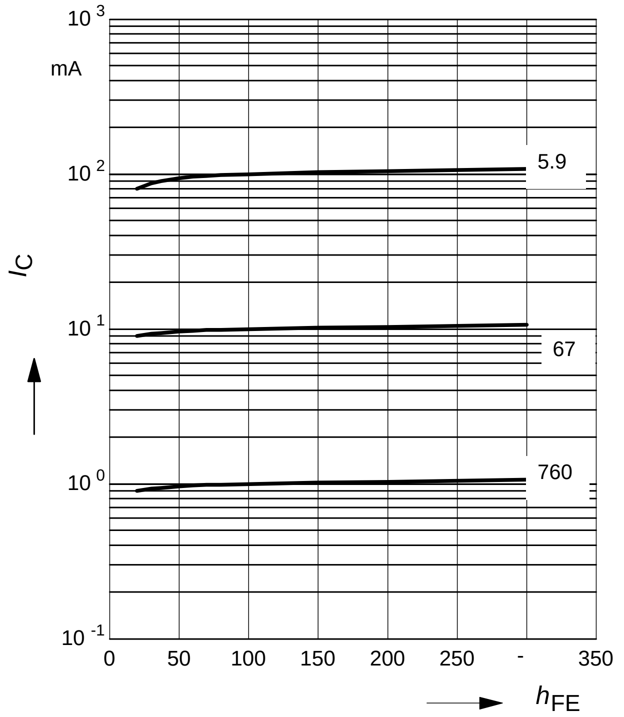
Electrical Characteristics at T_A=25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Additional current consumption V_S = 3 V	I_0	-	20	40	µA
Lowest stabilizing current V_S = 3 V	I_{min}	-	0.1	-	mA

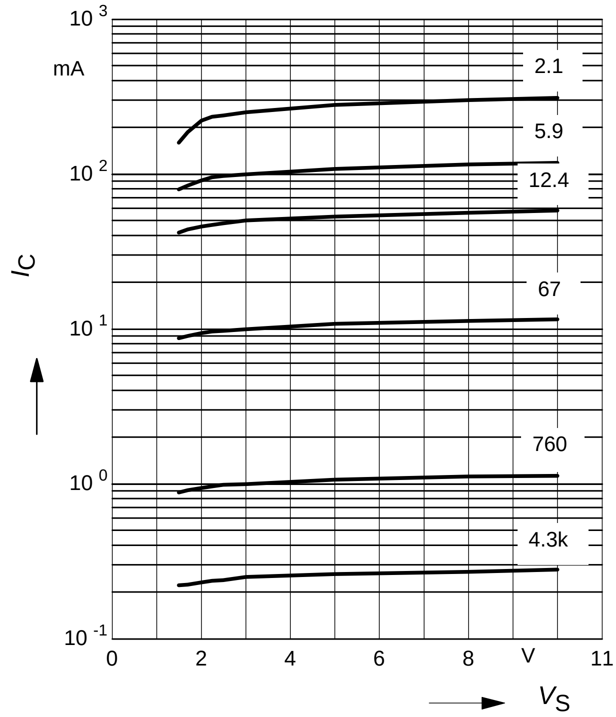
DC Characteristics with stabilized NPN-Transistors

Lowest sufficient battery voltage I_B (NPN) < 0.5mA	V_{Smin}	-	1.6	-	V
Voltage drop (V_S - V_{CE}) I_C = 25 mA	V_{drop}	-	0.65	-	
Change of I_C versus h_{FE} h_{FE} = 50	$\Delta I_C/I_C$	-	0.08	-	Δh_{FE} / h_{FE}
Change of I_C versus V_S V_S = 3 V	$\Delta I_C/I_C$	-	0.15	-	$\Delta V_S/V_S$
Change of I_C versus T_A	$\Delta I_C/I_C$	-	0.2	-	%/K

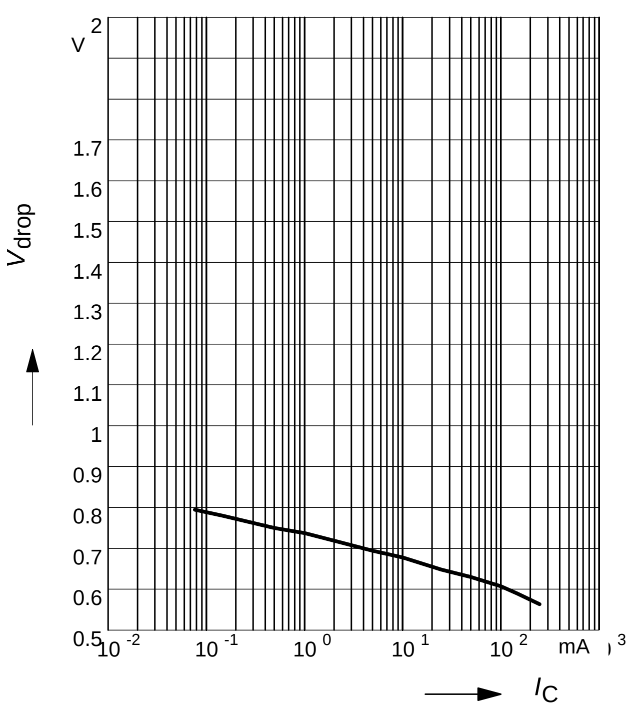
Collector current $I_C = f\ (h_{FE})$
I_C and h_{FE} refer to stabilized NPN Transistor
Parameter $R_{ext.}$ (Ω)



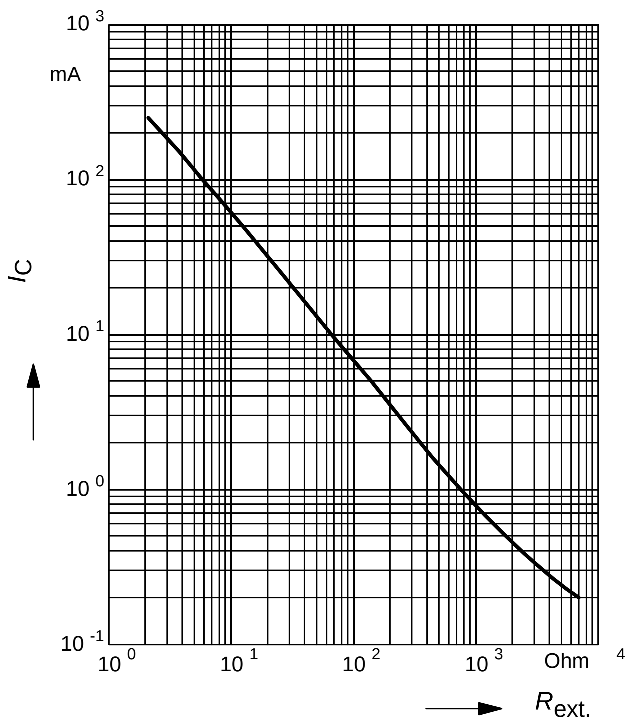
Collector Current $I_C = f\ (V_S)$
of stabilized NPN Transistor
Parameter $R_{ext.}$ (Ω)



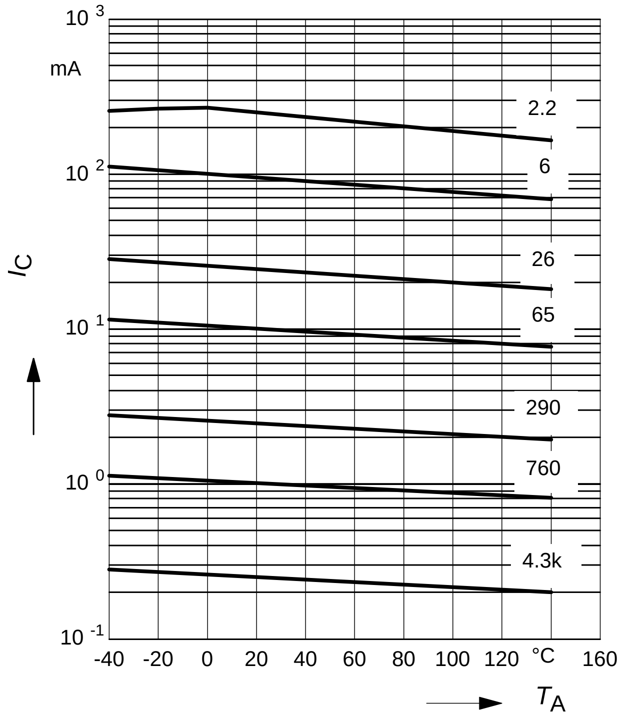
Voltage drop $V_{drop} = f\ (I_C)$



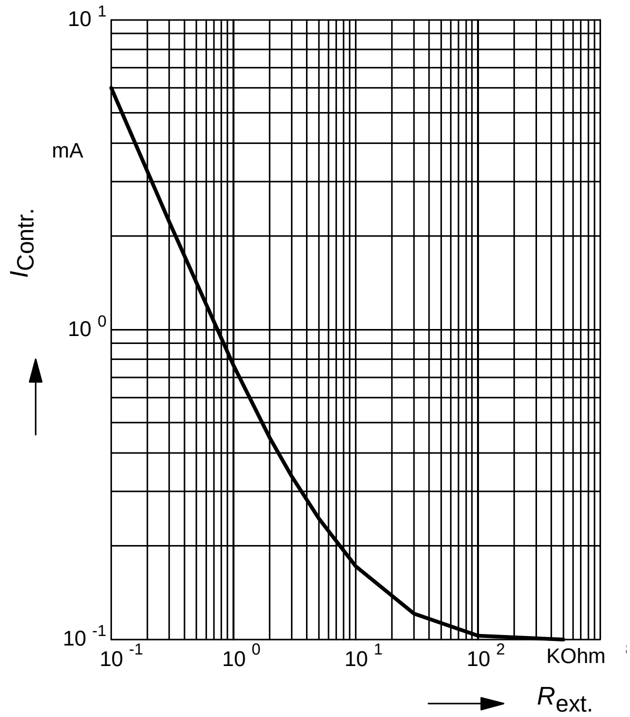
Collector current $I_C = f\ (R_{ext.})$
of stabilized NPN Transistor



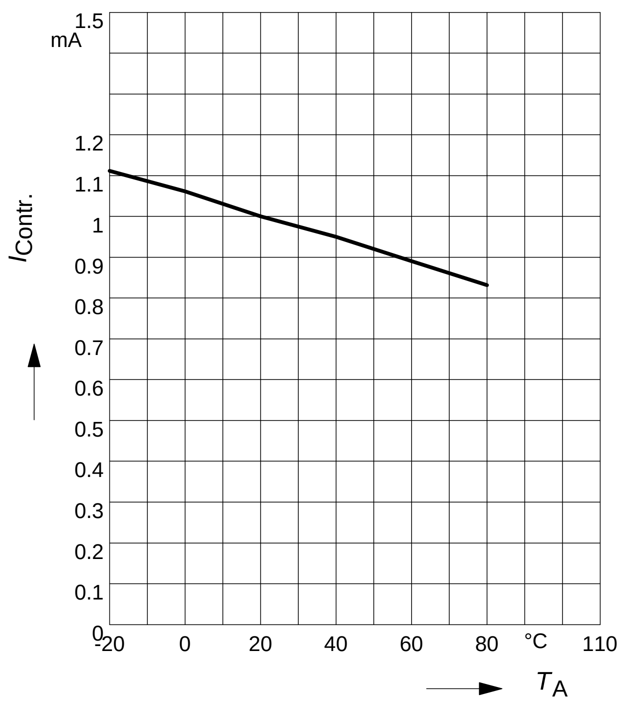
Collector current $T_A = f(I_C)$
of stabilized NPN Transistor
Parameter: $R_{ext.}(\Omega)$



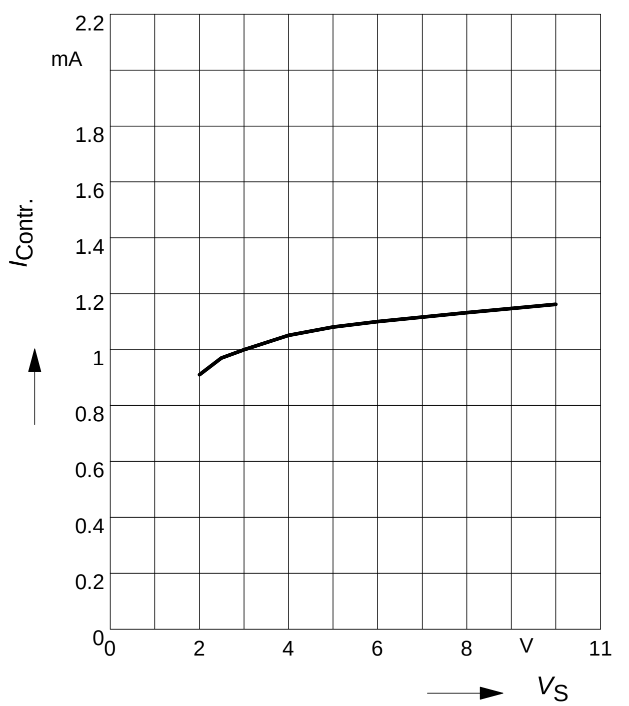
Control current $I = f(R_{ext.})$
in current source application



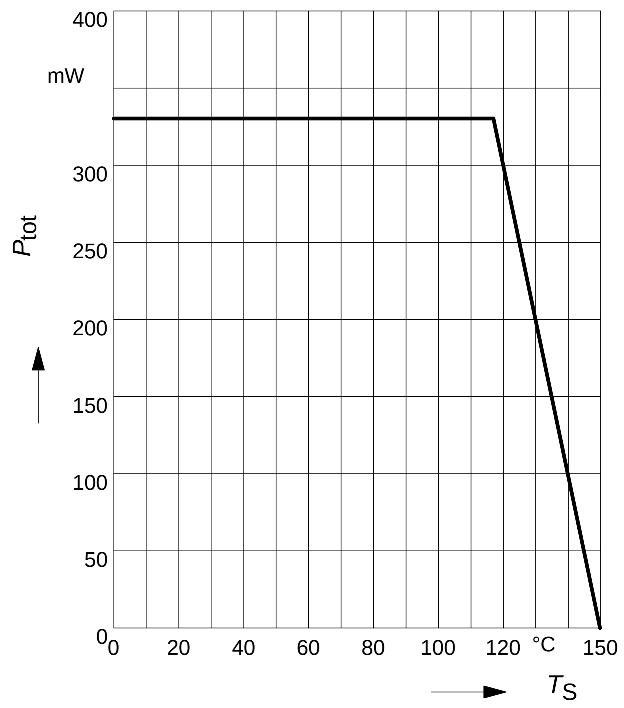
Control current $I = f(T_A)$
in current source application



Control current $I = f(V_S)$
in current source application

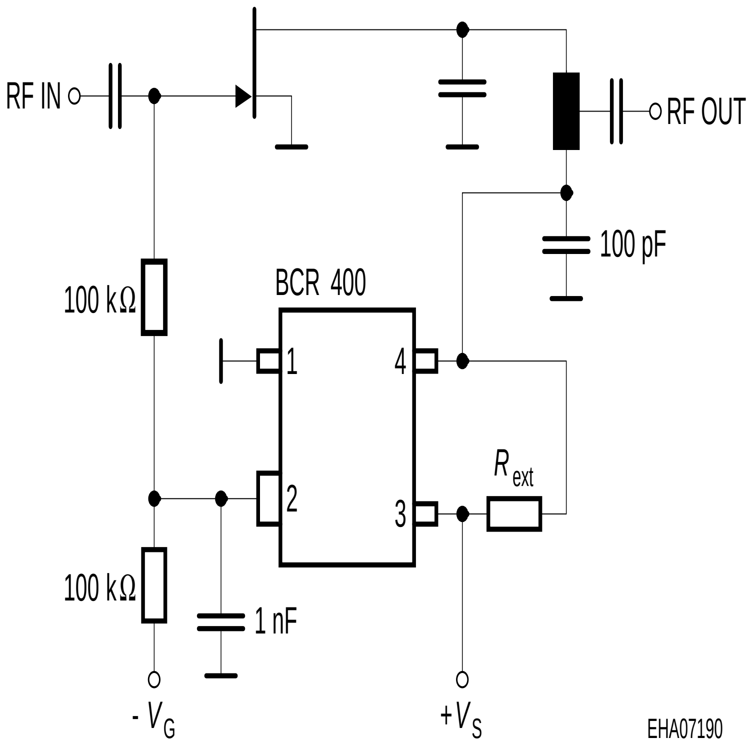


Total power dissipation $P_{tot} = f\ (T_S)$

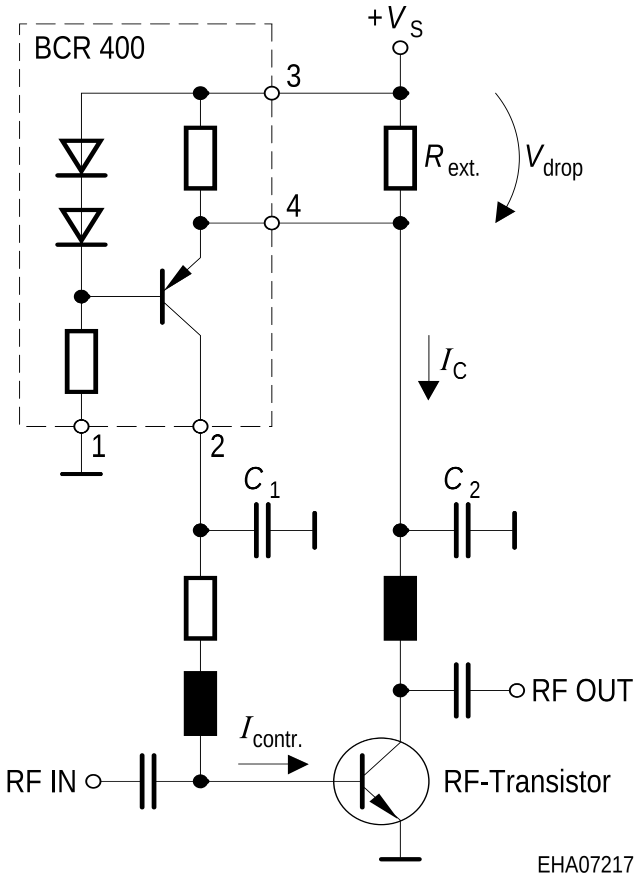


Note that up to T_S=115°C it is not possible to exceed P_{tot} respecting the maximum ratings of V_S and $I_{Contr.}$ The collector or drain current (respectively) of the stabilized RF transistor does not affect BCR 400 directly, as it provides just the base current.

Typical application for GaAs FET with active bias controller



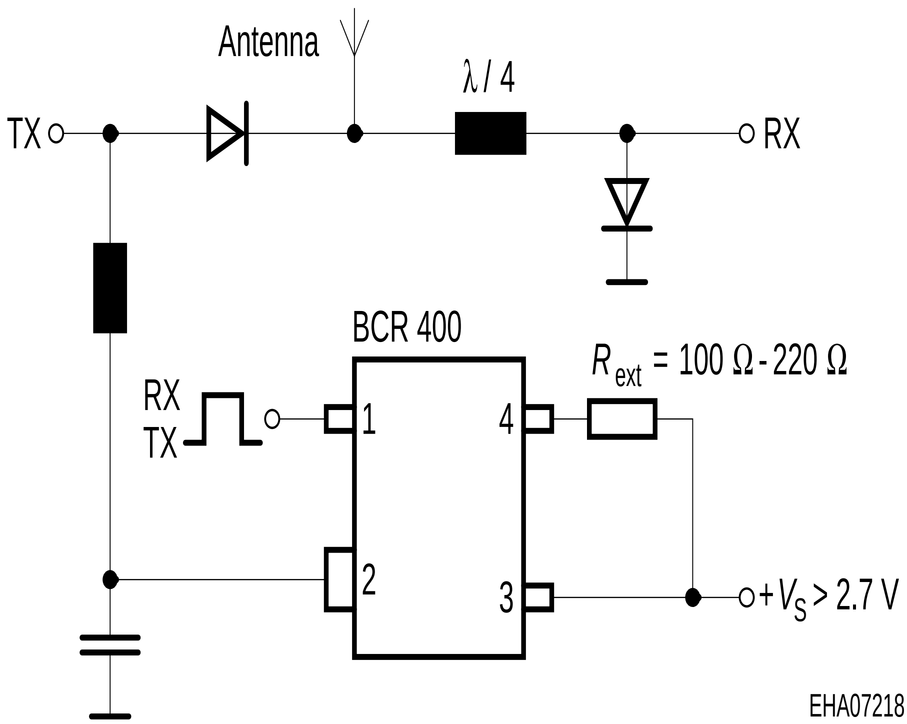
RF transistor controlled by BCR400



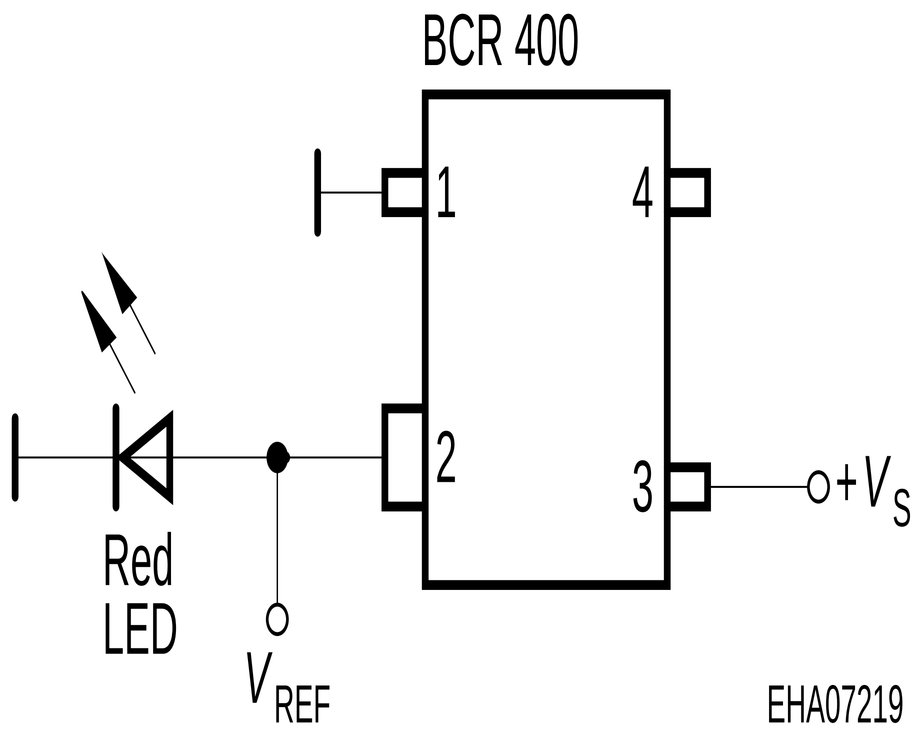
Be aware that BCR400 stabilized bias current of transistors in an active control loop

In order to avoid loop ascillation (hunting),
time constants must be chosen adequately, i.e. **C1 >= 10 x C2**

RX/TX antenna switch, compatible to control logic and working at wide battery voltage range



Low voltage reference



Precision timer with BCR400
providing constant charge current