

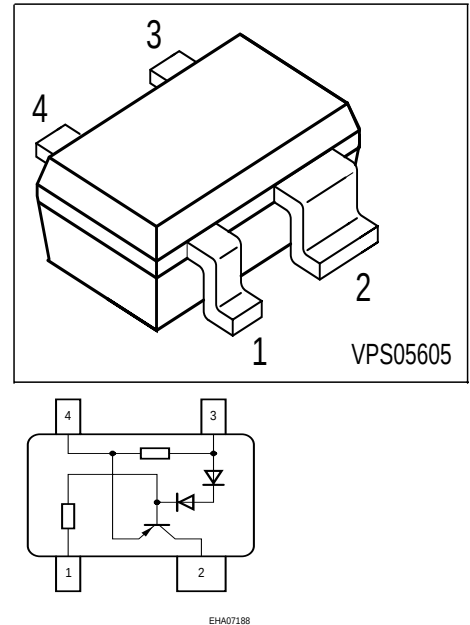
Active Bias Controller

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

Electrical Characteristics at $T_A=25^\circ\text{C}$, unless otherwise specified

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

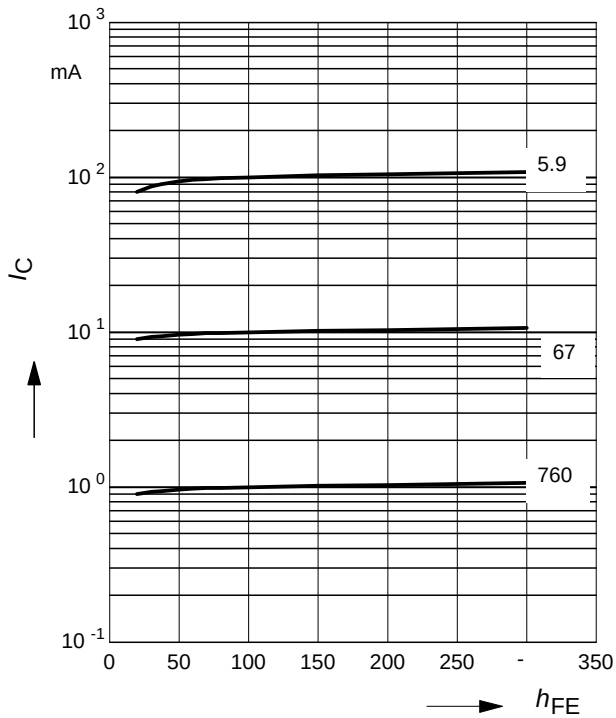
DC Characteristics with stabilized NPN-Transistors

Lowest sufficient battery voltage $I_B (\text{NPN}) < 0.5\text{mA}$	$V_{S\min}$	-	1.6	-	V
Voltage drop ($V_S - V_{CE}$) $I_C = 25\text{ mA}$	V_{drop}	-	0.65	-	
Change of I_C versus h_{FE} $h_{FE} = 50$	$\Delta I_C / I_C$	-	0.08	-	$\Delta h_{FE} / h_{FE}$
Change of I_C versus V_S $V_S = 3\text{ V}$	$\Delta I_C / I_C$	-	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

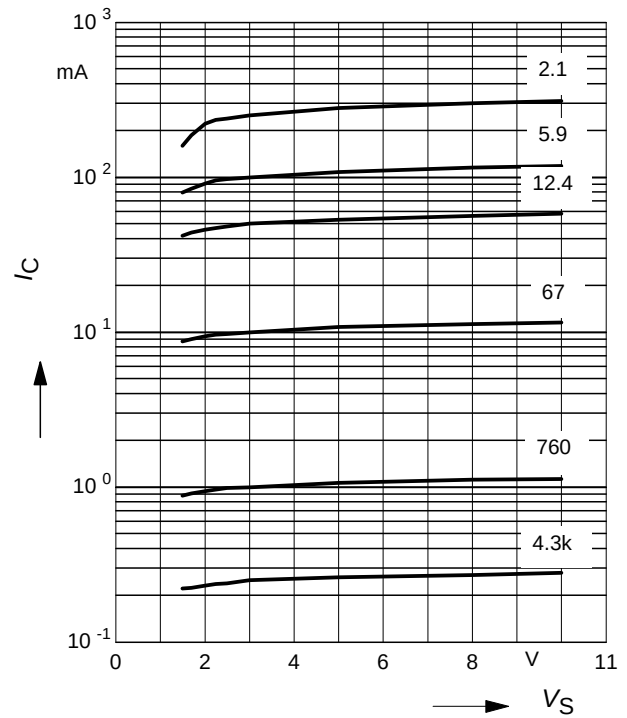
Parameter $R_{ext.} (\Omega)$



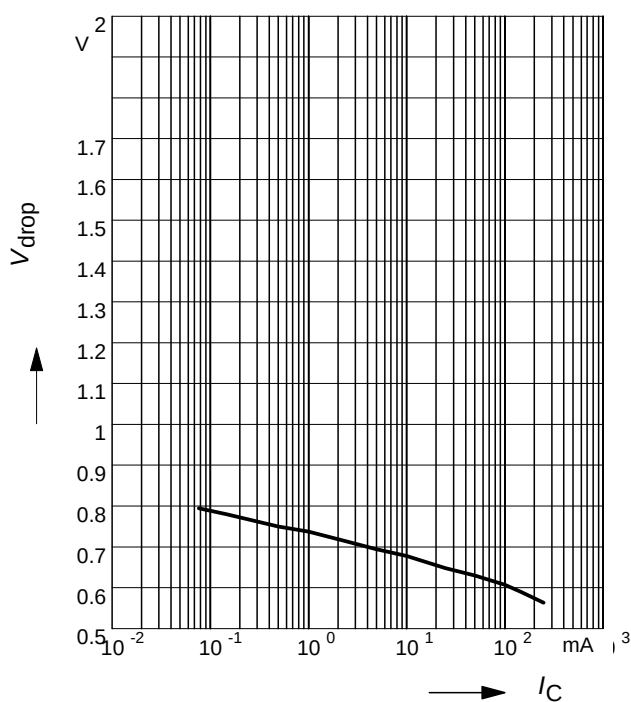
Collector Current $I_C = f(V_S)$

of stabilized NPN Transistor

Parameter $R_{ext.} (\Omega)$

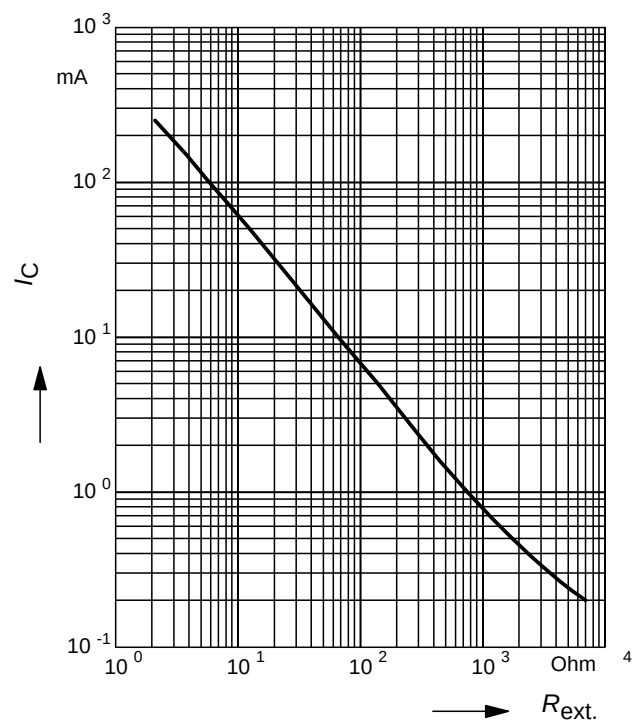


Voltage drop $V_{drop} = f(I_C)$



Collector current $I_C = f(R_{ext.})$

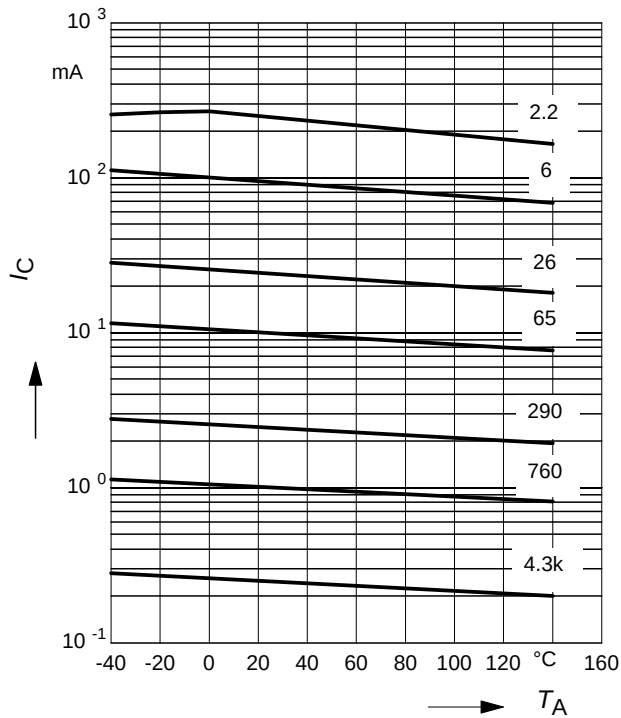
of stabilized NPN Transistor



Collector current $T_A = f(I_C)$

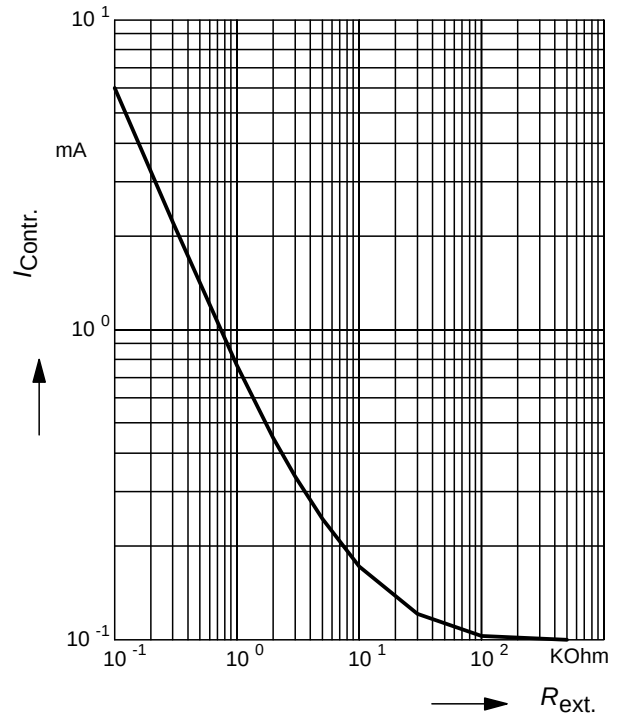
of stabilized NPN Transistor

Parameter: $R_{ext.}(\Omega)$



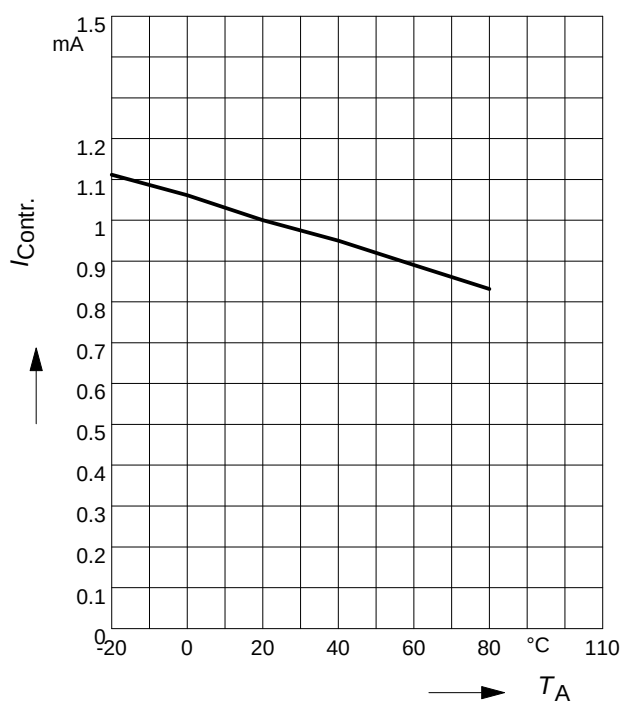
Control current $I = f(R_{ext.})$

in current source application



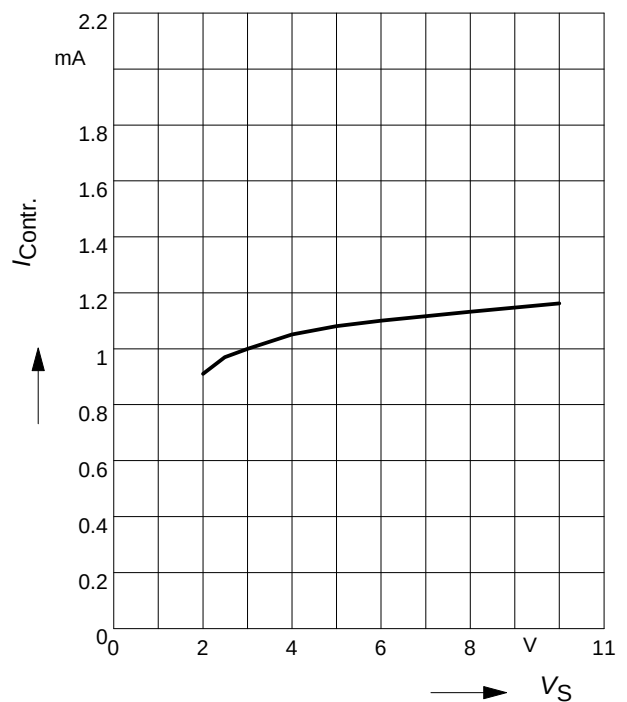
Control current $I = f(T_A)$

in current source application

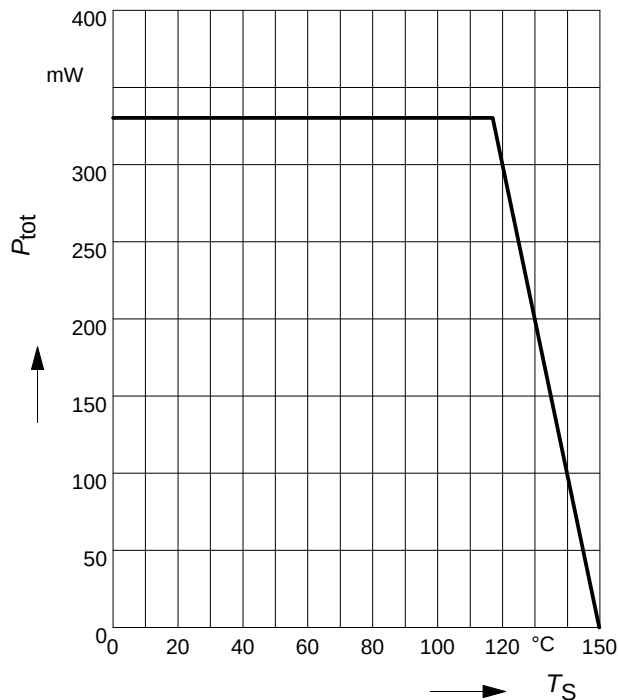


Control current $I = f(V_S)$

in current source application

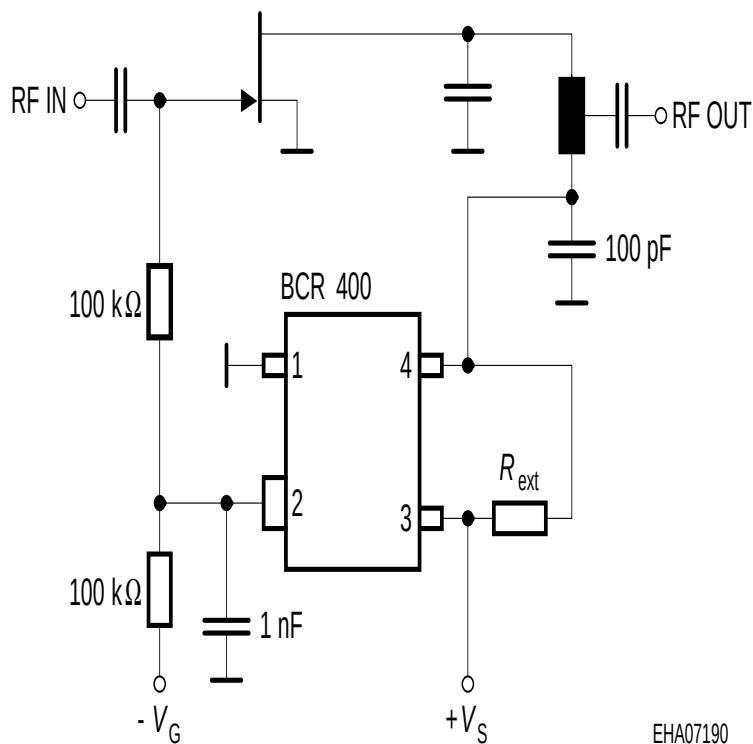


Total power dissipation $P_{\text{tot}} = f(T_S)$



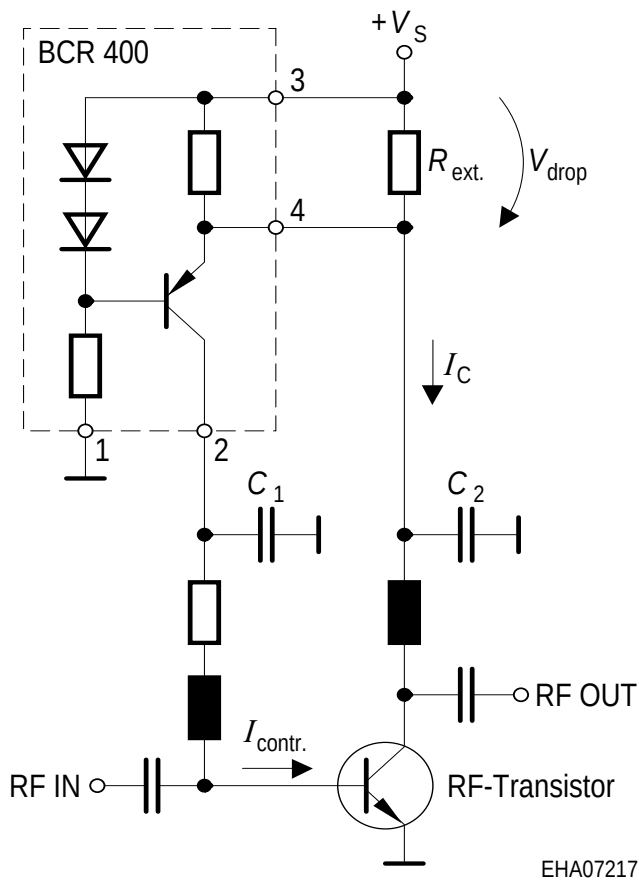
Note that up to $T_S=115^\circ\text{C}$ it is not possible to exceed P_{tot} respecting the maximum ratings of V_S and I_{Contr} . The collector or drain current (respectively) of the stabilized RF transistor does not affect BCR 400 directly, as it provides just the base current.

Typical application for GaAs FET with active bias controller



EHA07190

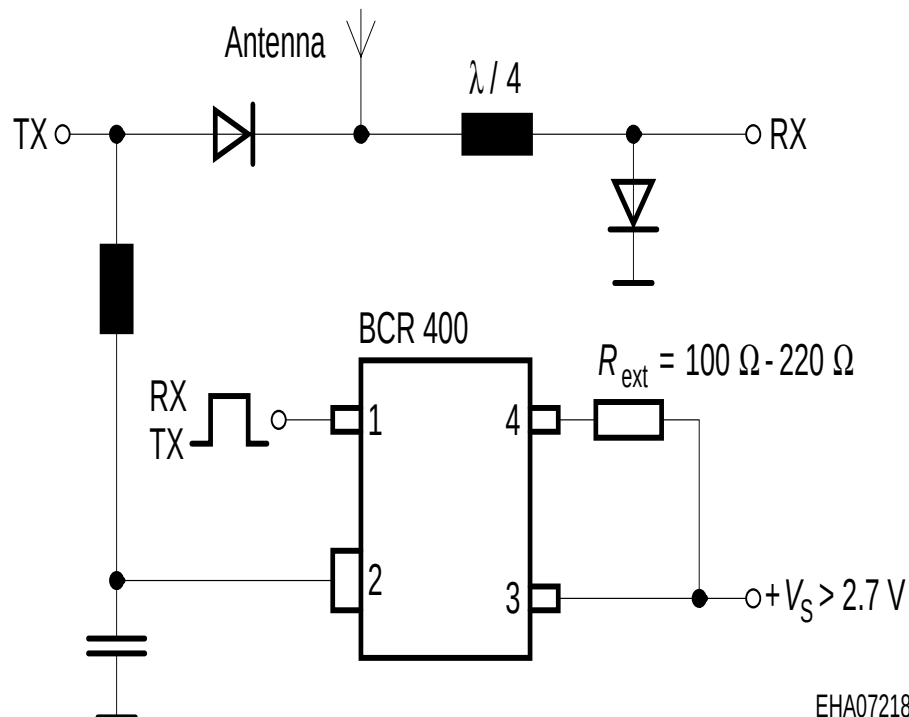
RF transistor controlled by BCR400



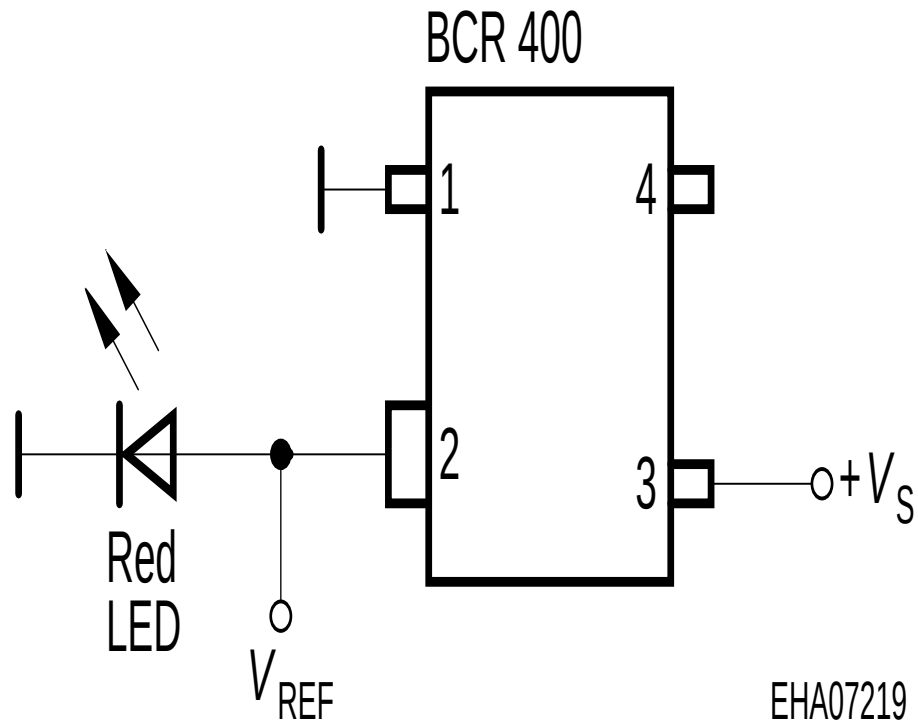
Be aware that BCR400 stabilized bias current of transistors in an active control loop

In order to avoid loop ascillation (hunting), time constants must be chosen adequately, i.e. $C1 \geq 10 \times C2$

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

