

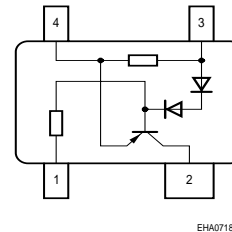
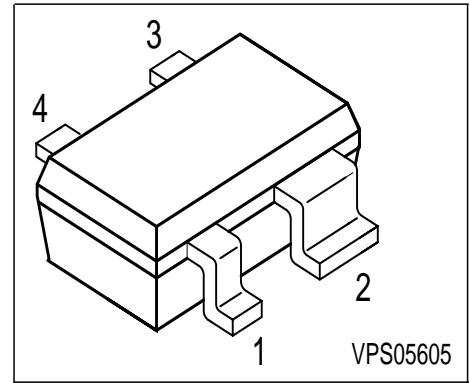
**Active Bias Controller**

**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



EHA07188

Type	Marking	Pin Configuration				Package
BCR400W	W4s	1=GND/ <b>E</b> <sub>NPN</sub>	2=Contr/ <b>B</b> <sub>NPN</sub>	3V <sub>S</sub>	4=R <sub>ext</sub> / <b>C</b> <sub>NPN</sub>	SOT343

(E<sub>NPN</sub>, B<sub>NPN</sub>, C<sub>NPN</sub> are electrodes of a stabilized NPN transistor)

**Maximum Ratings**

Parameter	Symbol	Value	Unit
Source voltage	V <sub>S</sub>	18	V
Control current	I <sub>Contr.</sub>	10	mA
Control voltage	V <sub>Contr.</sub>	16	V
Reverse voltage between all terminals	V <sub>R</sub>	0.5	
Total power dissipation, T <sub>S</sub> = 117 °C	P <sub>tot</sub>	330	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-65 ... 150	

**Thermal Resistance**

Junction - soldering point <sup>1)</sup>	R <sub>thJS</sub>	≤ 100	K/W
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<sup>1</sup>For calculation of R<sub>thJA</sub> 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.	
<b>DC Characteristics</b>					
Additional current consumption $V_S = 3\text{ V}$	$I_0$	-	20	40	$\mu\text{A}$
Lowest stabilizing current $V_S = 3\text{ V}$	$I_{\text{min}}$	-	0.1	-	$\text{mA}$

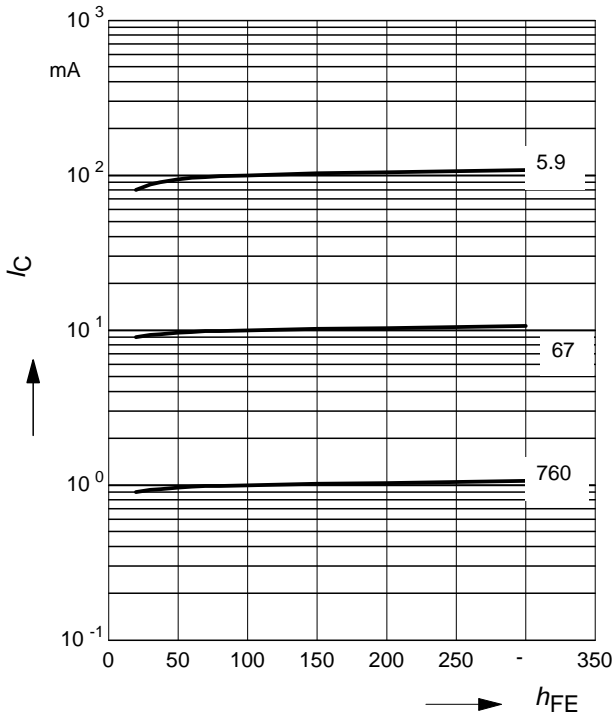
**DC Characteristics with stabilized NPN-Transistors**

Lowest sufficient battery voltage $I_B (\text{NPN}) < 0.5\text{mA}$	$V_{S\text{min}}$	-	1.6	-	V
Voltage drop ( $V_S - V_{CE}$ ) $I_C = 25\text{ mA}$	$V_{\text{drop}}$	-	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

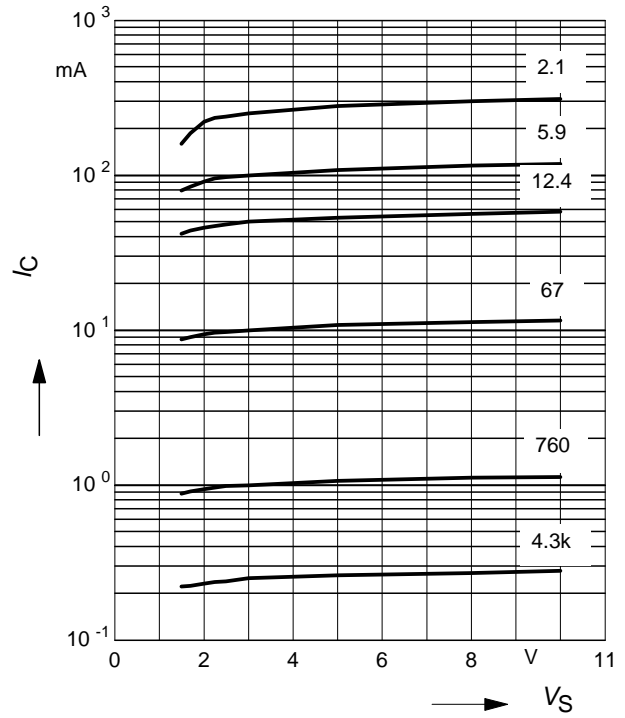
Parameter  $R_{ext.} (\Omega)$



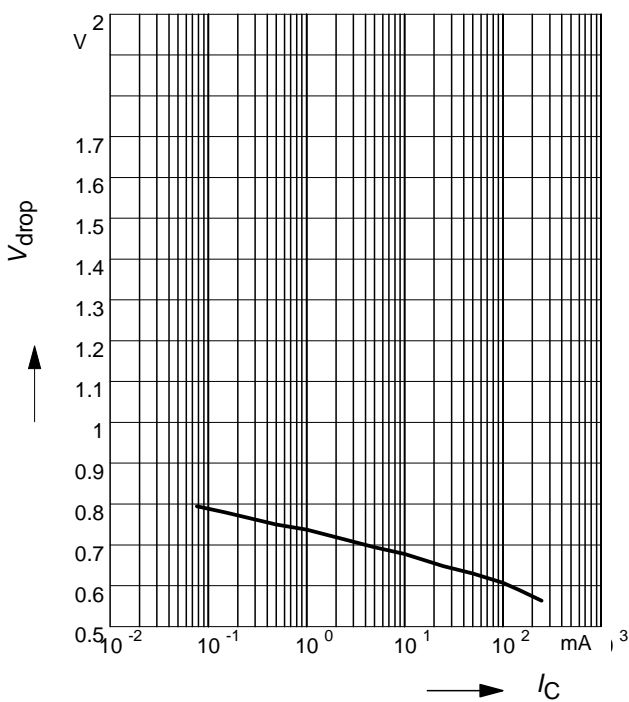
**Collector Current  $I_C = f(V_S)$**

of stabilized NPN Transistor

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

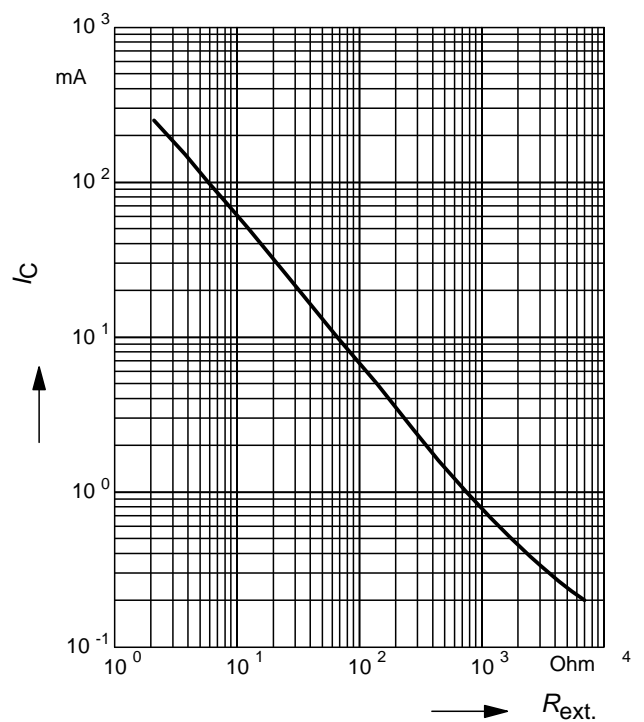


**Voltage drop  $V_{drop} = f(I_C)$**



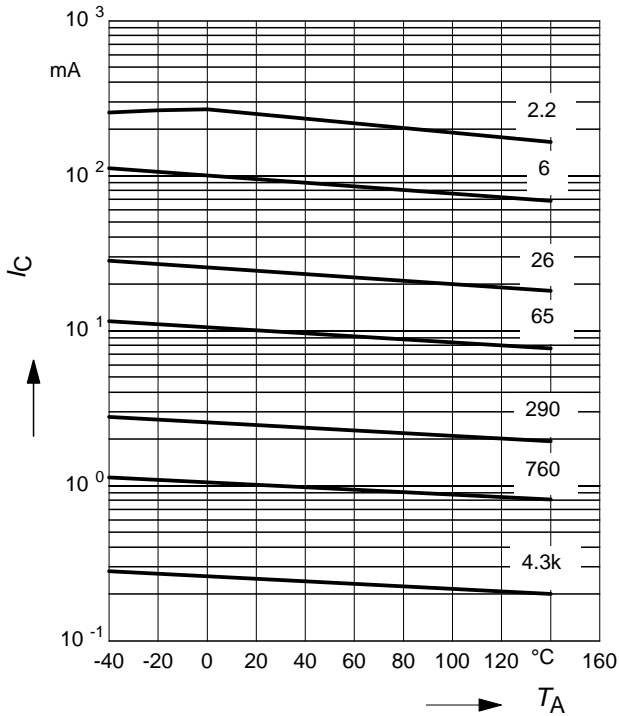
**Collector current  $I_C = f(R_{ext.})$**

of stabilized NPN Transistor

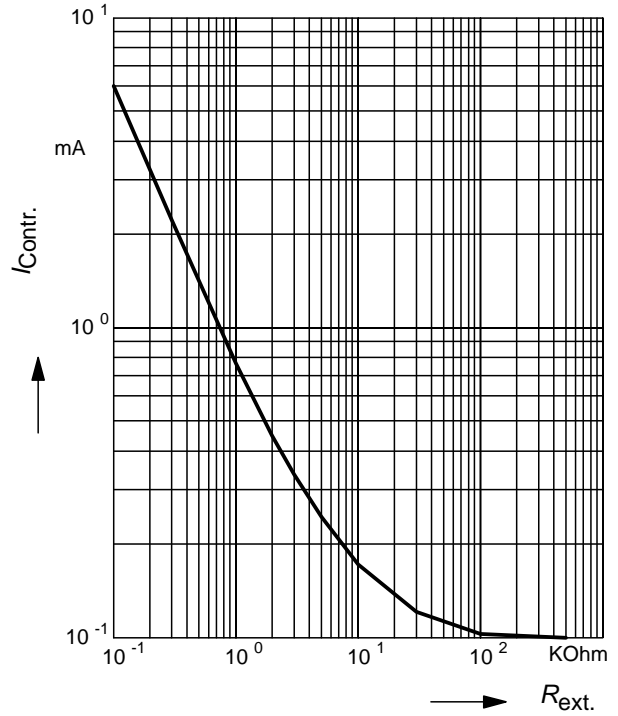


**Collector current  $T_A = f(I_C)$**   
of stabilized NPN Transistor

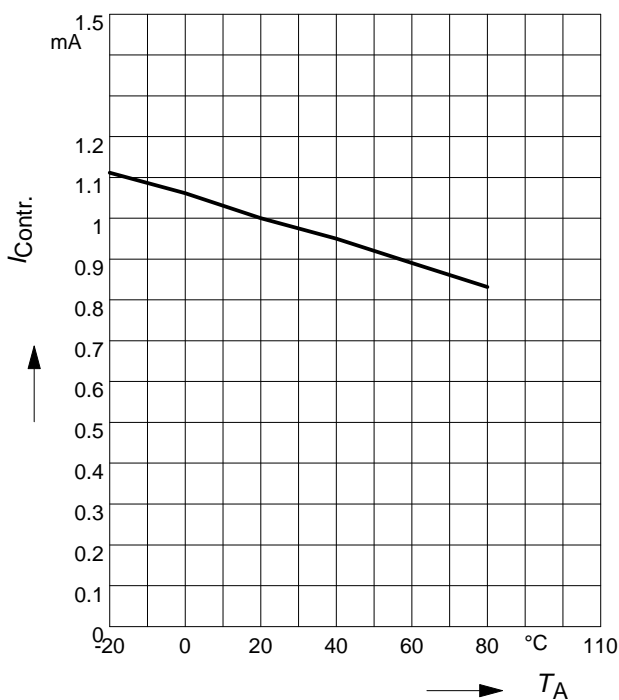
Parameter:  $R_{ext.}(\Omega)$



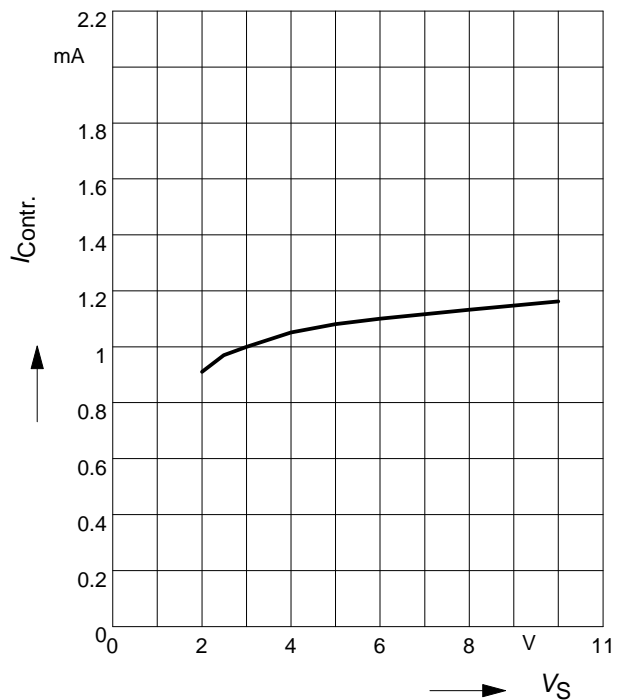
**Control current  $I = f(R_{ext.})$**   
in current source application



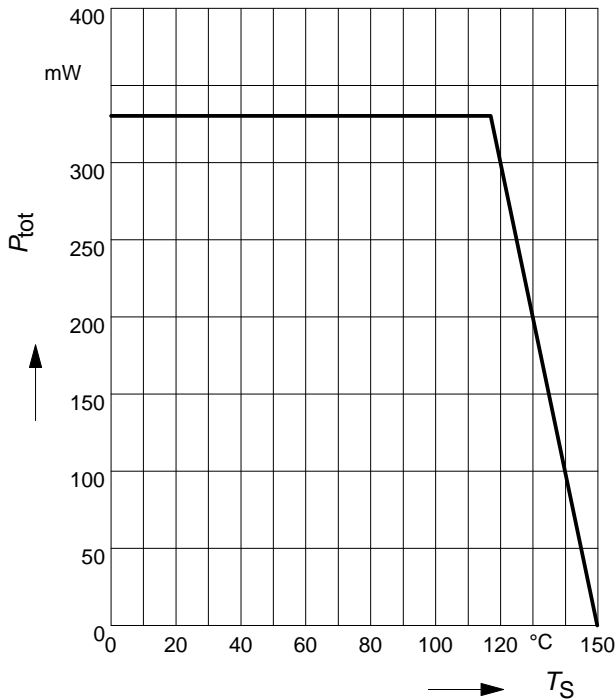
**Control current  $I = f(T_A)$**   
in current source application



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

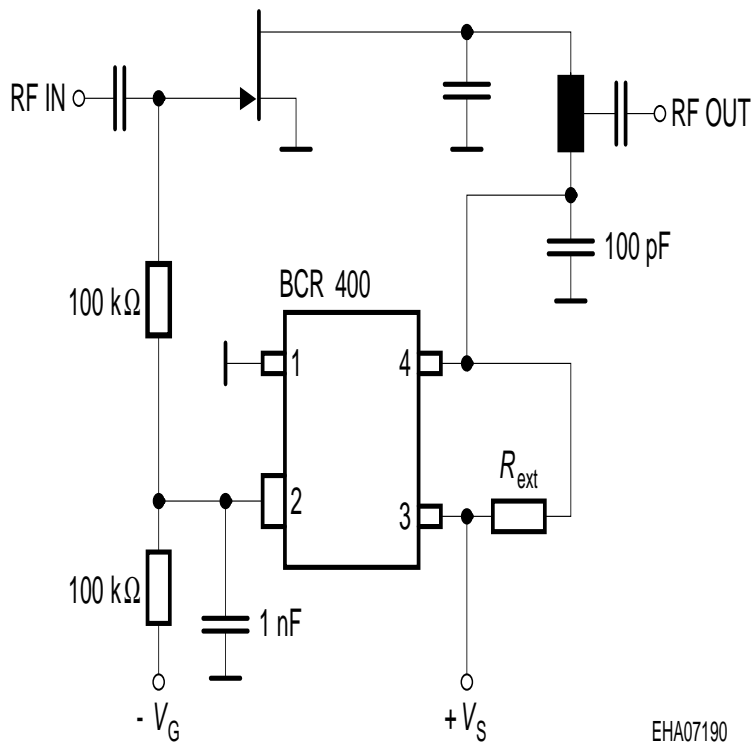


**Total power dissipation  $P_{tot} = f(T_S)$**



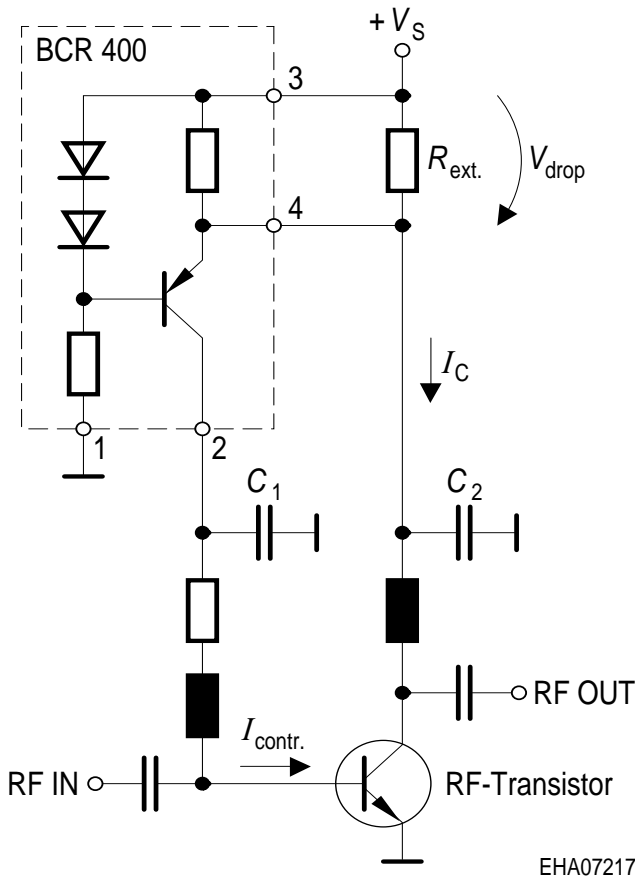
Note that up to  $T_S=115^\circ\text{C}$  it is not possible to exceed  $P_{tot}$  respecting the maximum ratings of  $V_S$  and  $I_{Contr}$ . The collector or drain current (respectively) of the stabilized RF transistor does not affect BCR 400 directly, as it provides just the base current.

**Typical application for GaAs FET with active bias controller**



EHA07190

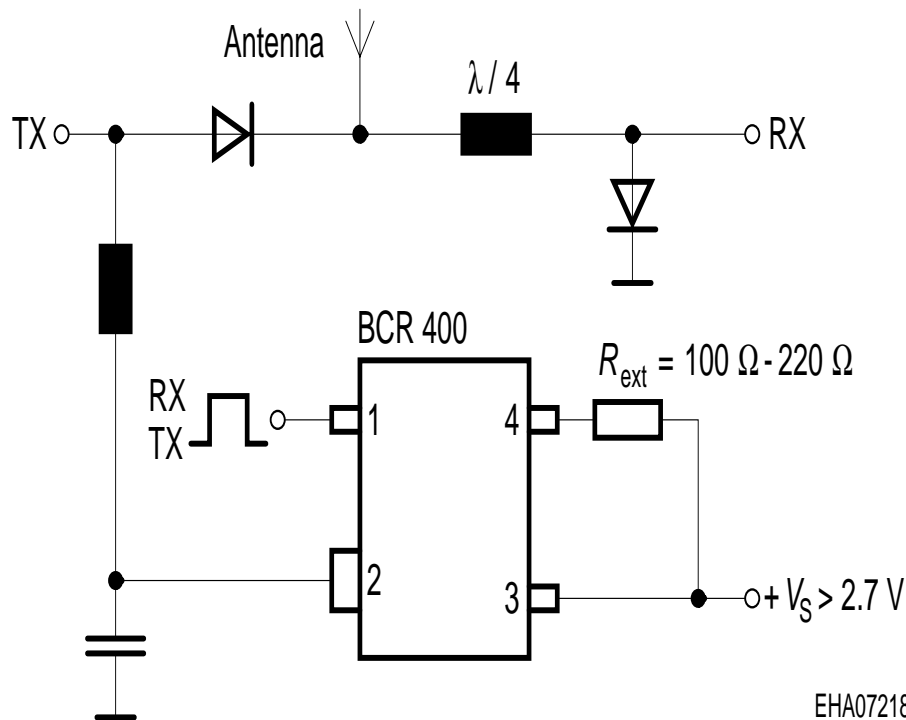
**RF transistor controlled by BCR400**



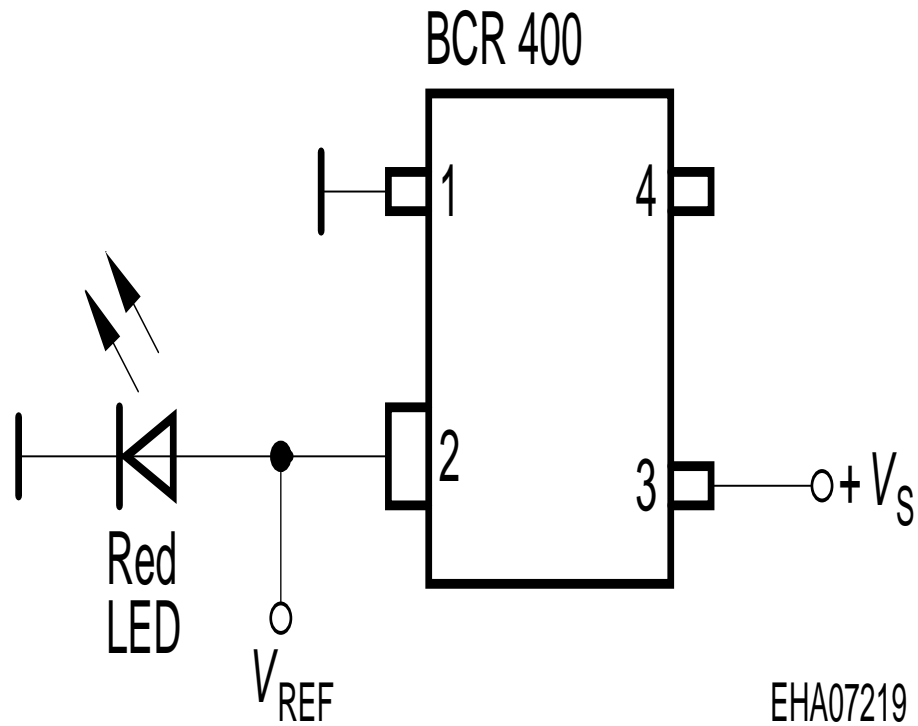
Be aware that BCR400 stabilized bias current of transistors in an active control loop

In order to avoid loop oscillation (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**

