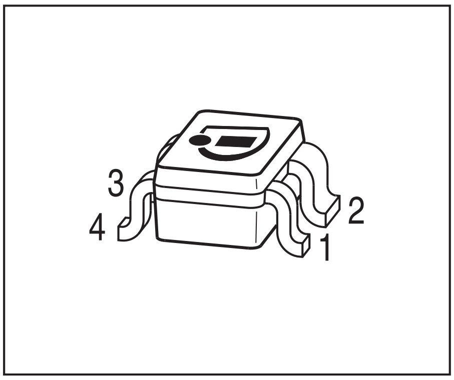
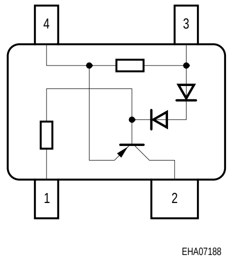
# BCR400W

## Active Bias Controller




### Characteristics

- Supplies stable bias current even at low battery voltage and extreme ambient temperature variatior
- 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

- Pb-free (RoHS compliant) package[1)]
- Qualified according AEC Q101

AEC Qualified RoHS

| Type | Marking | Pin Configuration | | | | Package |
|---|---|---|---|---|---|---|
| BCR400W | W4s | 1=GND/**E**$_{NPN}$ | 2=Contr/**B**$_{NPN}$ | 3$V_S$ | 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

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Junction - soldering point[2)] | $R_{thJS}$ | ≤ 100 | K/W |

[1]Pb-containing package may be available upon special request

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

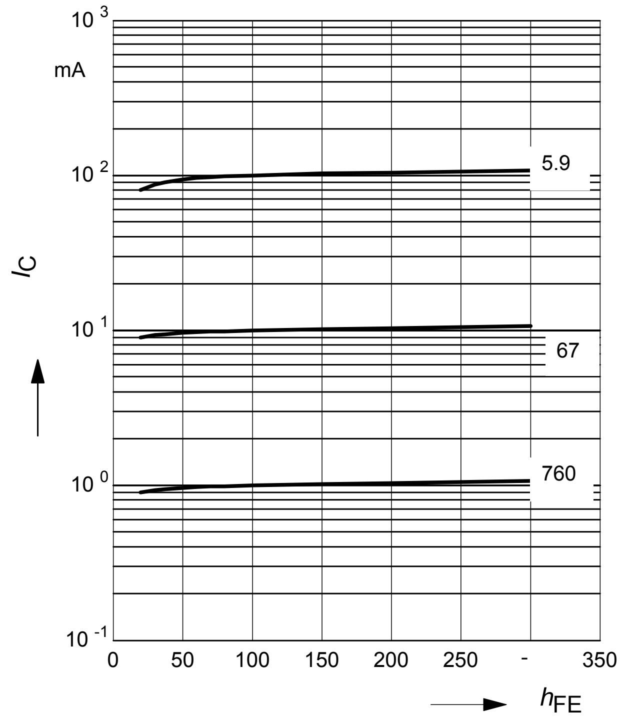
**Electrical Characteristics** at $T_A$=25°C, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **DC Characteristics** | | | | | |
| Additional current consumption<br>$V_S$ = 3 V | $I_0$ | - | 20 | 40 | µA |
| Lowest stabilizing current<br>$V_S$ = 3 V | $I_{min}$ | - | 0.1 | - | mA |
| **DC Characteristics with stabilized NPN-Transistors** | | | | | |
| Lowest sufficient battery voltage<br>$I_B$ (NPN) < 0.5mA | $V_{Smin}$ | - | 1.6 | - | V |
| Voltage drop ($V_S$ - $V_{CE}$)<br>$I_C$ = 25 mA | $V_{drop}$ | - | 0.65 | - | |
| Change of $I_C$ versus $h_{FE}$<br>$h_{FE}$ = 50 | $\Delta I_C/I_C$ | - | 0.08 | - | $\Delta h_{FE}$ / $h_{FE}$ |
| Change of $I_C$ versus $V_S$<br>$V_S$ = 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

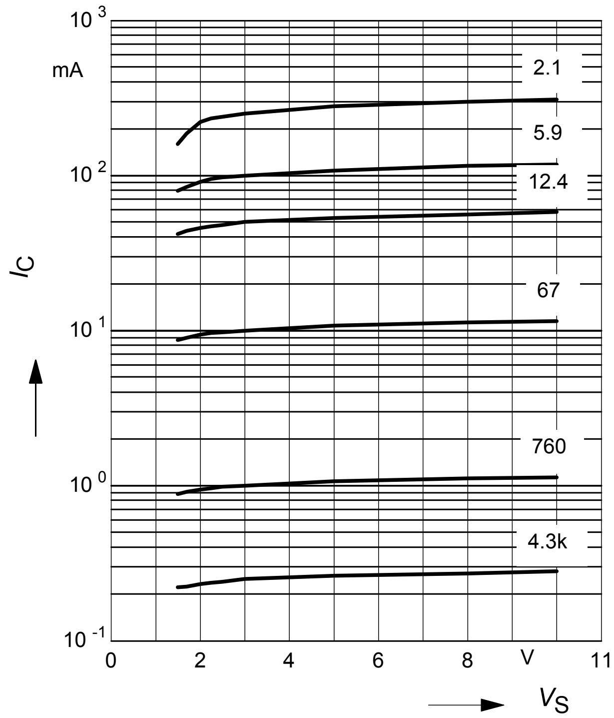
Parameter $R_{ext.}$ (Ω)



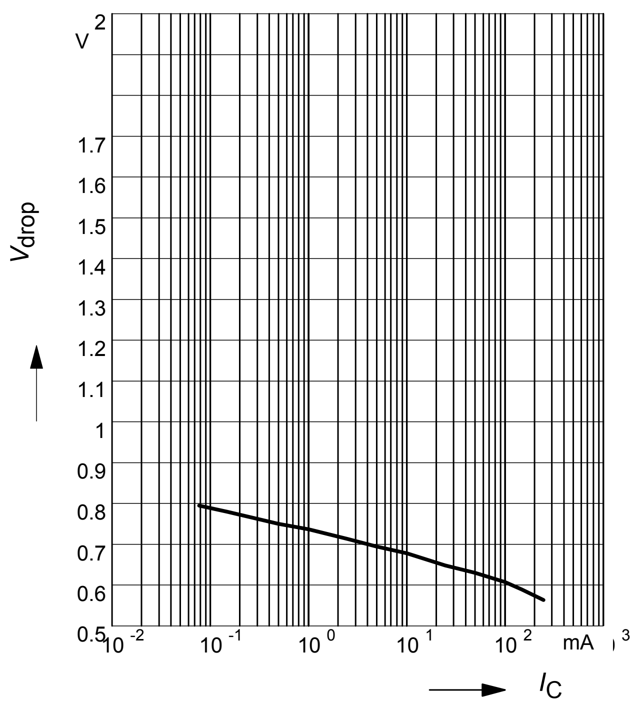

**Collector Current $I_C = f(V_S)$**

of stabilized NPN Transistor

Parameter $R_{ext.}$ (Ω)

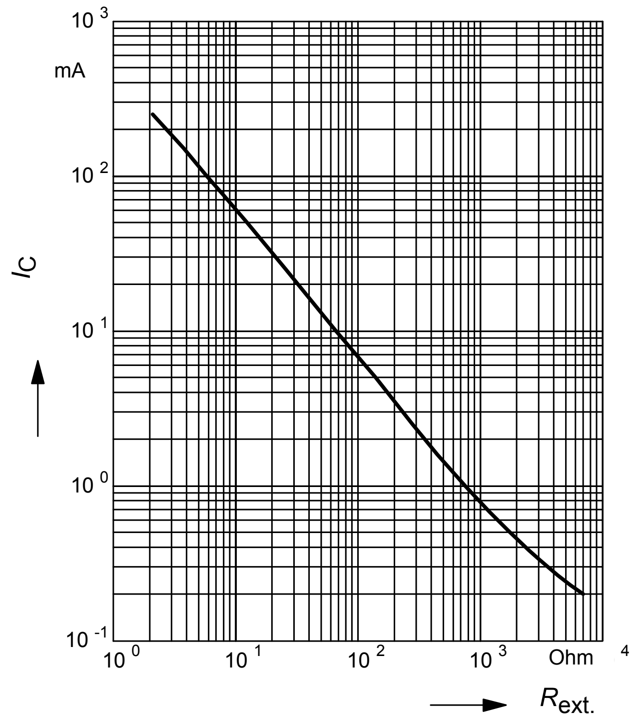



**Voltage drop $V_{drop} = f(I_C)$**

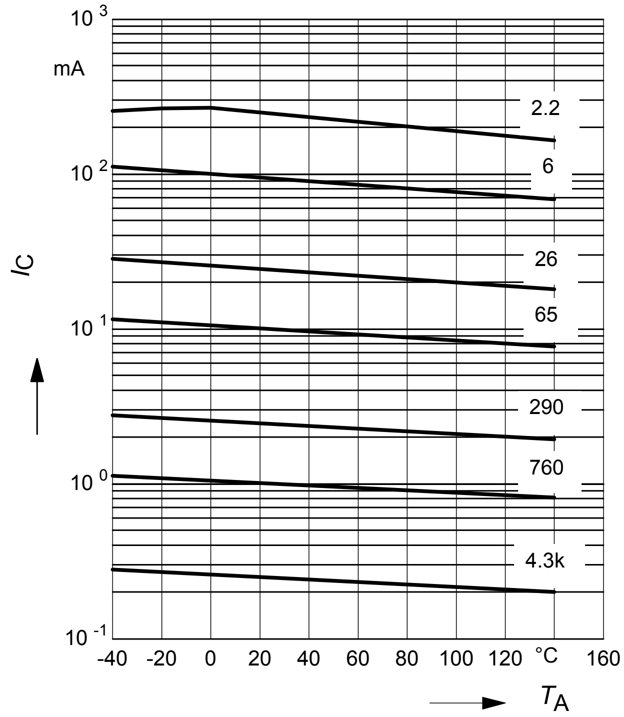



**Collector current $I_C = f(R_{ext.})$**

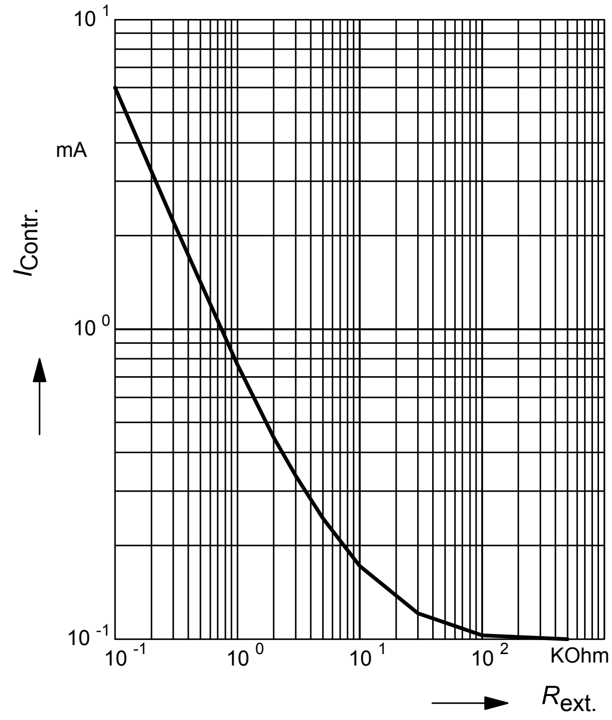
of stabilized NPN Transistor



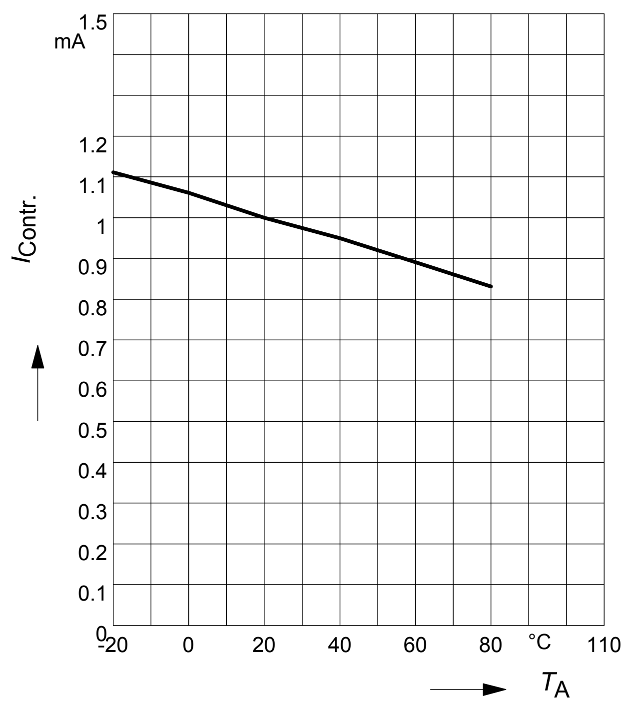
**Collector current** $T_A = f(I_C)$
of stabilized NPN Transistor
Parameter: $R_{ext.}(\Omega)$



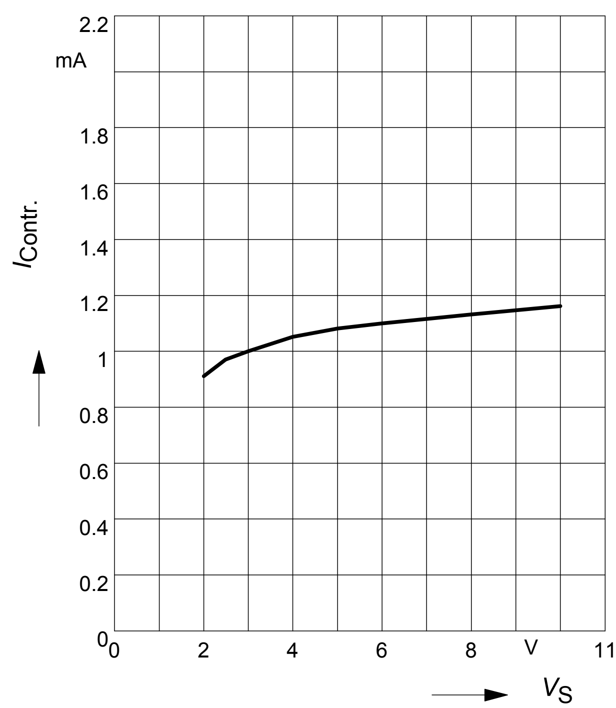

**Control current** $I = f(R_{ext.})$
in current source application



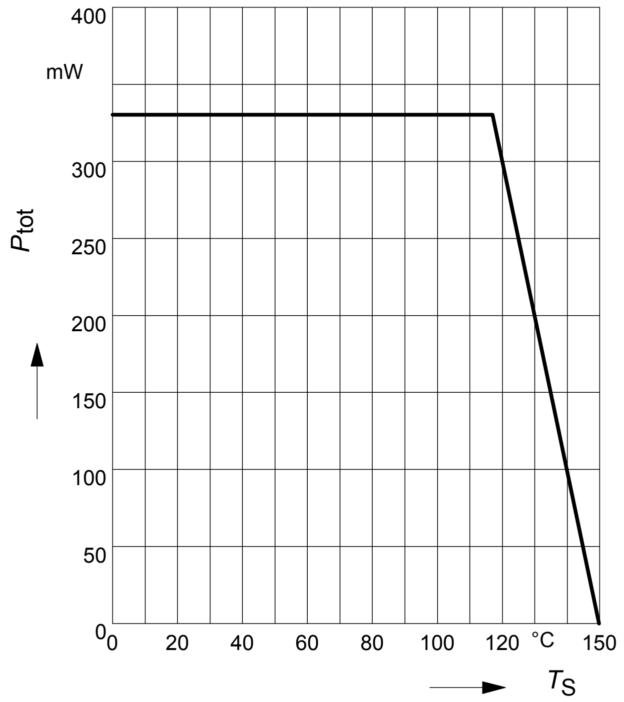

**Control current** $I = f(T_A)$
in current source application




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

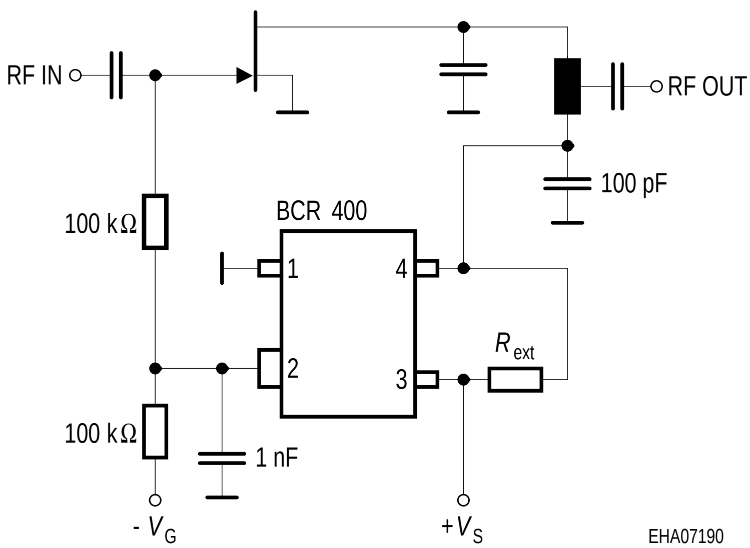


**Total power dissipation** $P_{tot} = f(T_S)$

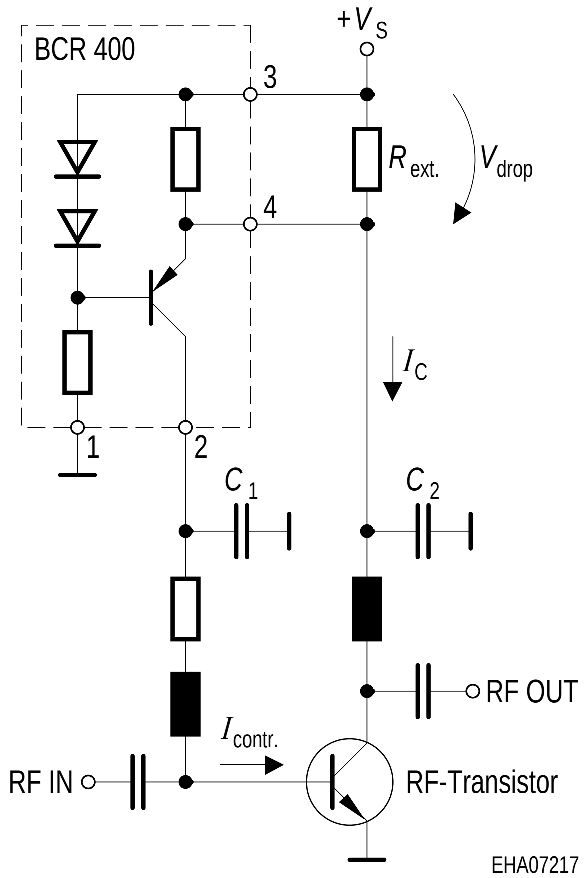



Note that up to $T_S$=115°C it is not possible to exceed $P_{tot}$ respecting the maximum ratings of $V_S$ and $I_{Contr.}$
The collector or drain current (respectively) of the stabilized RF transistor does not affect BCR 400 directly, as it provides just the base current.

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



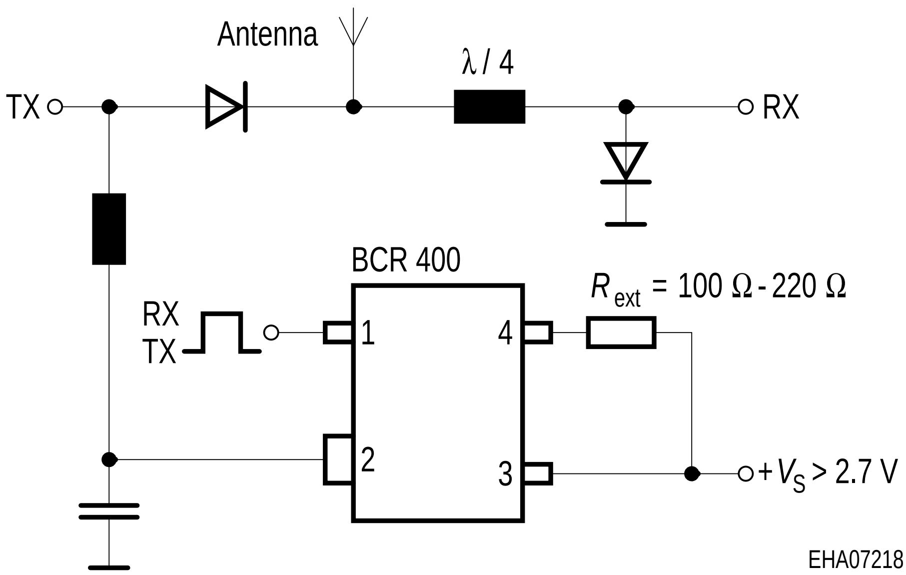
**RF transistor controlled by BCR400**



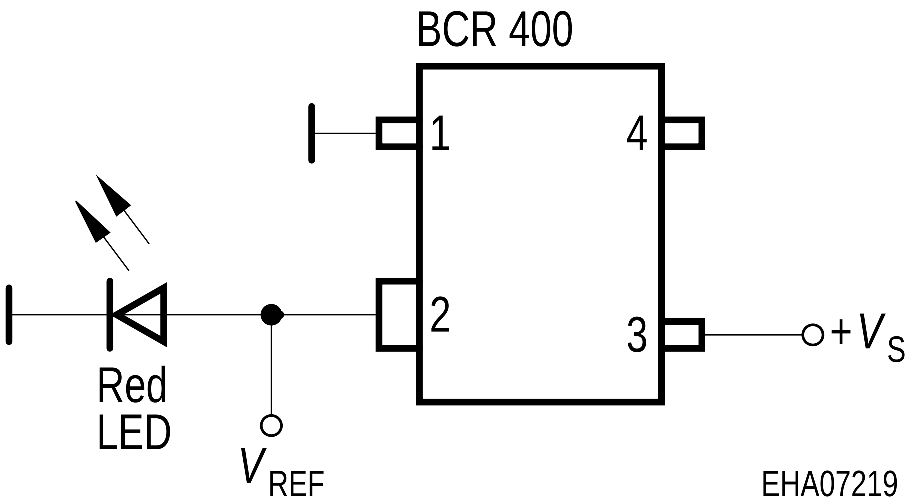

Be aware that BCR400 stabilized bias current of transistors in an active control loop

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

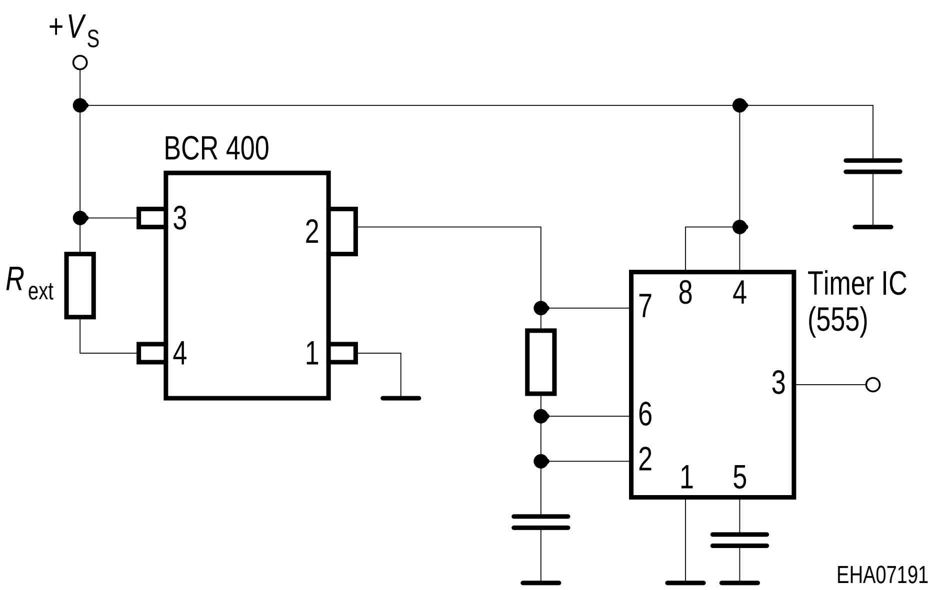
**RX/TX antenna switch, compatible to control logic and working at wide battery voltage range**



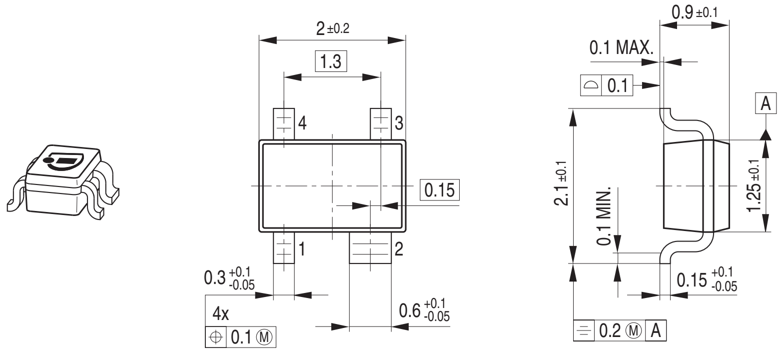
**Low voltage reference**



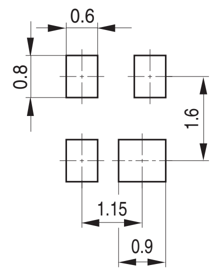

**Precision timer with BCR400**
**providing constant charge current**



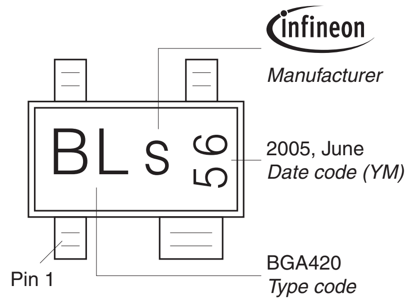
## Package Outline




## Foot Print

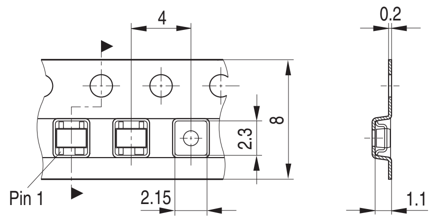



## Marking Layout (Example)




## Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel
Reel ø330 mm = 10.000 Pieces/Reel



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