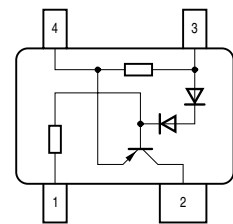
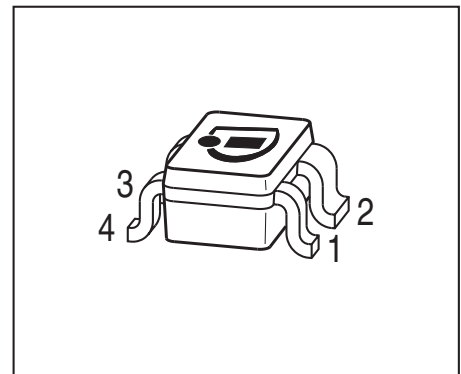


**Active Bias Controller**
**Characteristics**

- 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

- Pb-free (RoHS compliant) package<sup>1)</sup>
- Qualified according AEC Q101



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=Rext/ <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>2)</sup>	R <sub>thJS</sub>	≤ 100	K/W
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<sup>1</sup>Pb-containing package may be available upon special request

<sup>2</sup>For calculation of R<sub>thJA</sub> please refer to Application Note Thermal Resistance

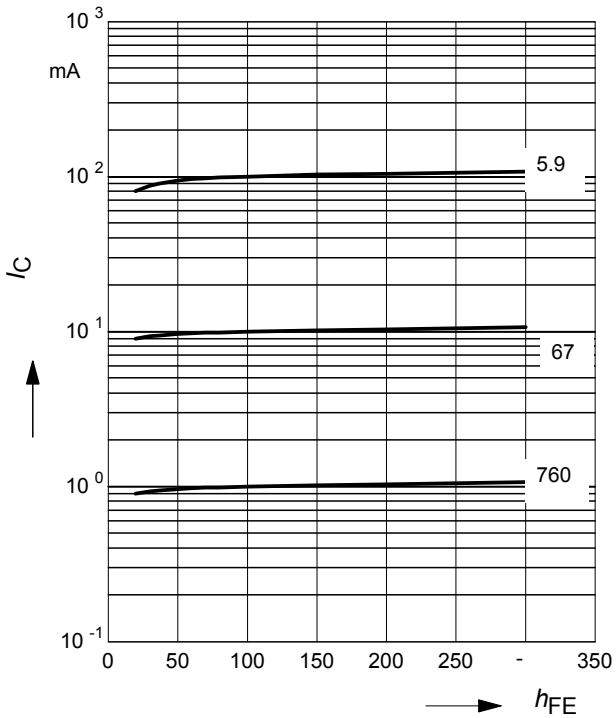
**Electrical Characteristics** at  $T_A=25^\circ\text{C}$ , unless otherwise specified

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	-	$\text{mA}$
<b>DC Characteristics with stabilized NPN-Transistors</b>					
Lowest sufficient battery voltage $I_B (\text{NPN}) < 0.5\text{mA}$	$V_{\text{Smin}}$	-	1.6	-	V
Voltage drop ( $V_S - V_{\text{CE}}$ ) $I_C = 25\text{ mA}$	$V_{\text{drop}}$	-	0.65	-	
Change of $I_C$ versus $h_{\text{FE}}$ $h_{\text{FE}} = 50$	$\Delta I_C / I_C$	-	0.08	-	$\Delta h_{\text{FE}} / h_{\text{FE}}$
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	-	$\%/\text{K}$

**Collector current  $I_C = f(h_{FE})$**

$I_C$  and  $h_{FE}$  refer to stabilized NPN Transistor

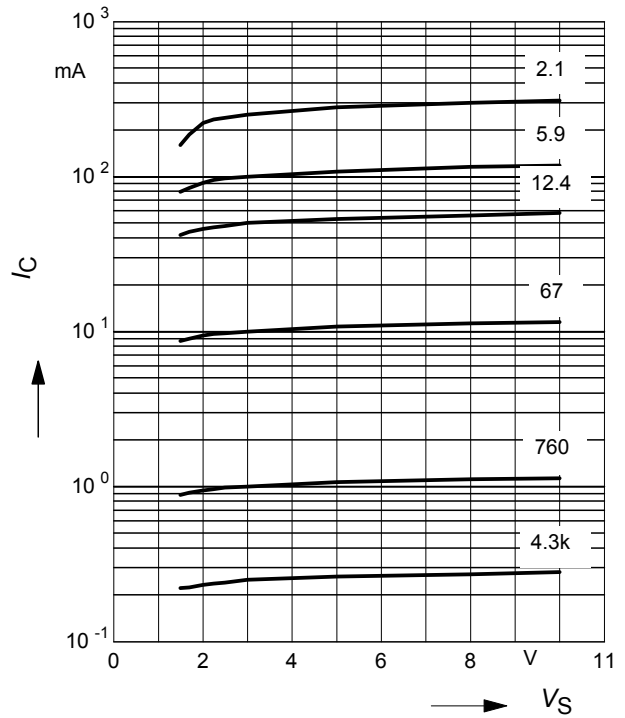
Parameter  $R_{ext.}$  ( $\Omega$ )



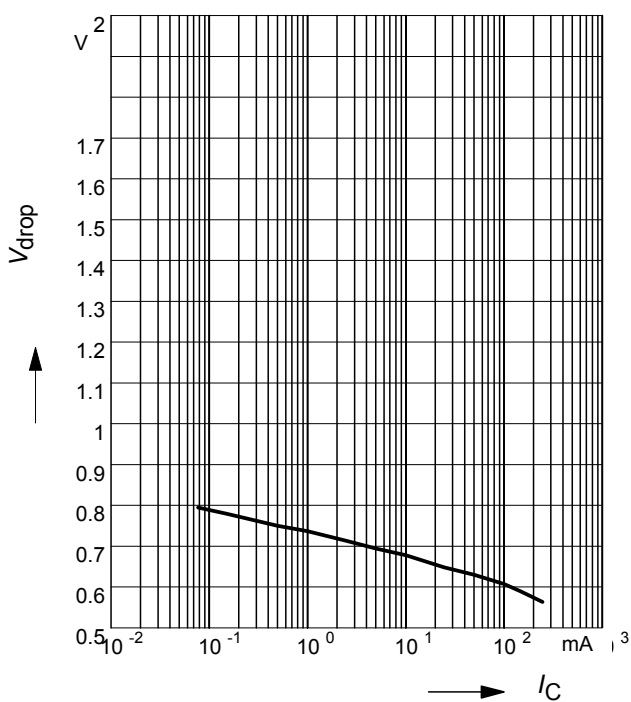
**Collector Current  $I_C = f(V_S)$**

of stabilized NPN Transistor

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

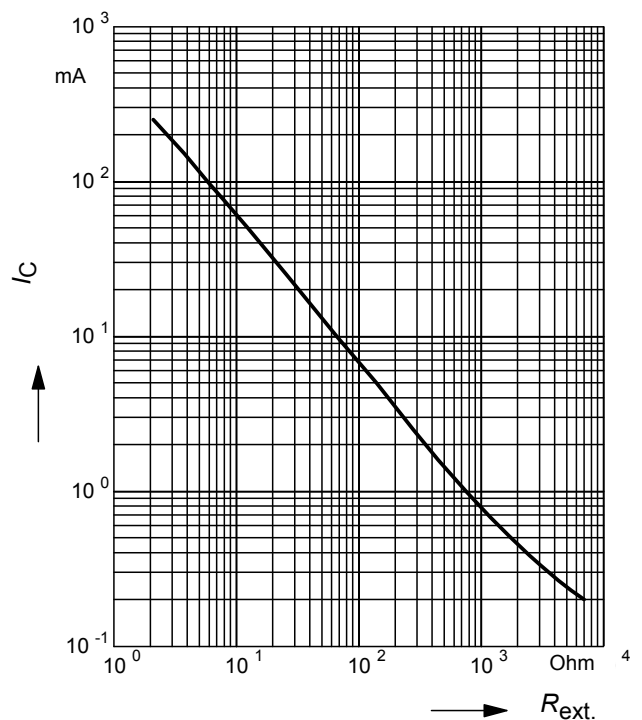


**Voltage drop  $V_{drop} = f(I_C)$**



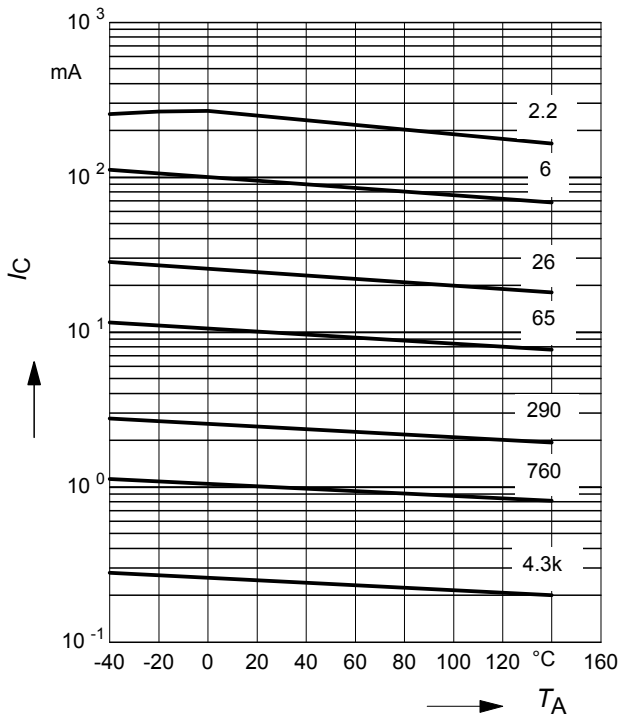
**Collector current  $I_C = f(R_{ext.})$**

of stabilized NPN Transistor

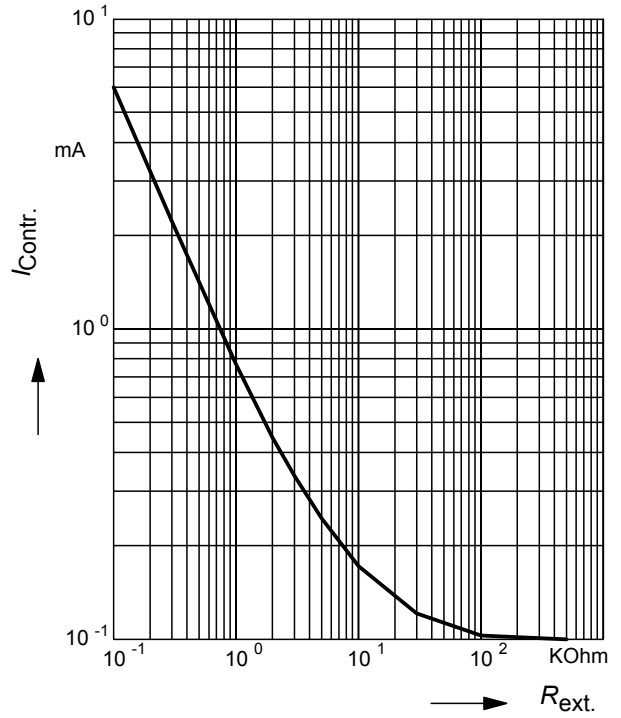


**Collector current  $T_A = f(I_C)$**   
of stabilized NPN Transistor

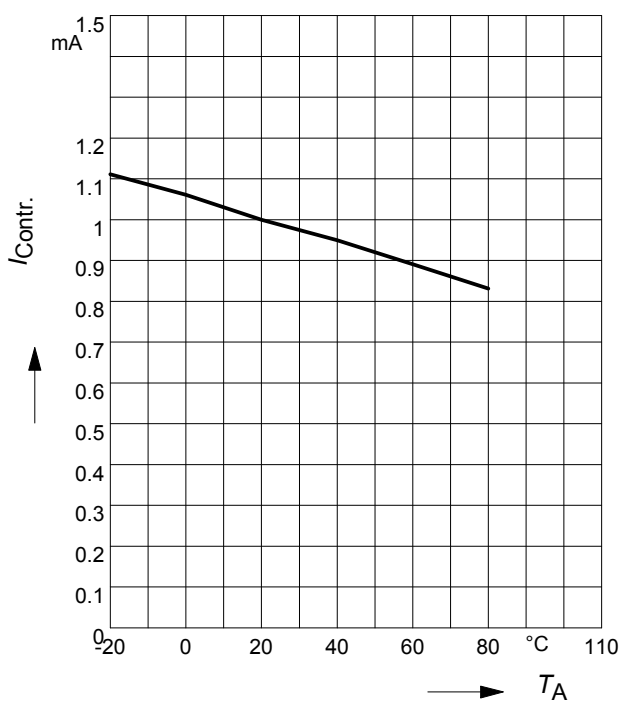
Parameter:  $R_{ext.} (\Omega)$



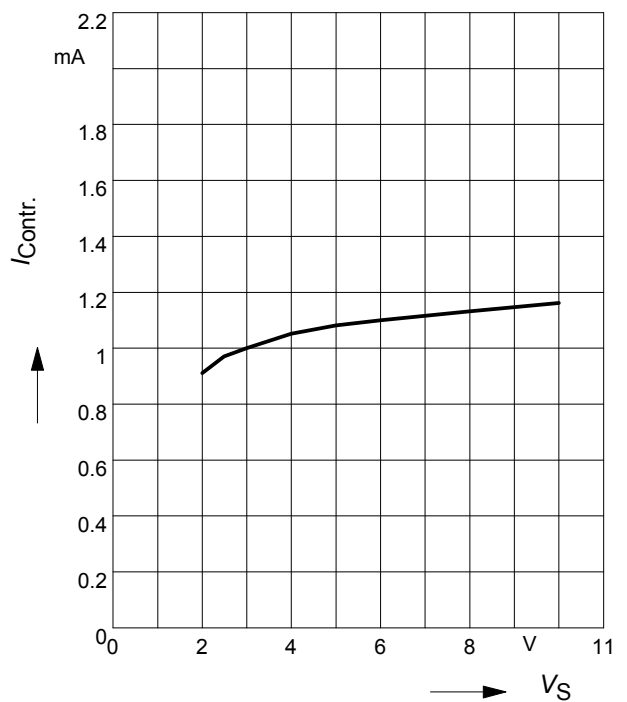
**Control current  $I = f(R_{ext.})$**   
in current source application



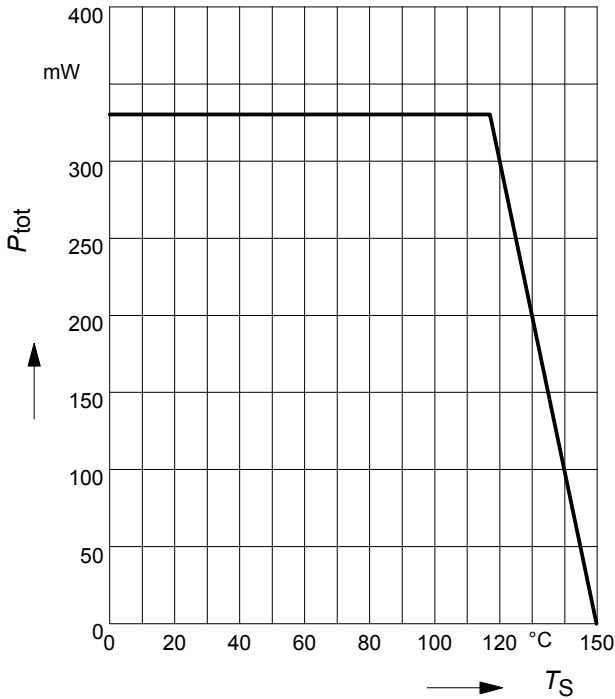
**Control current  $I = f(T_A)$**   
in current source application



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

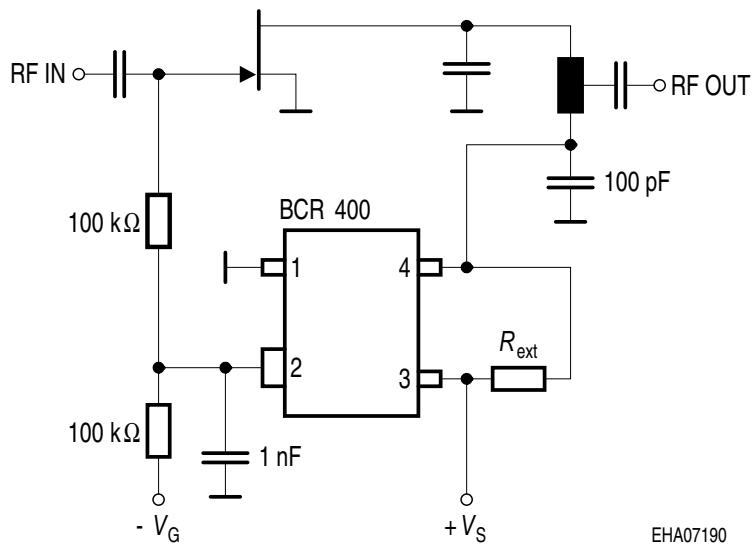


**Total power dissipation  $P_{tot} = f(T_S)$**

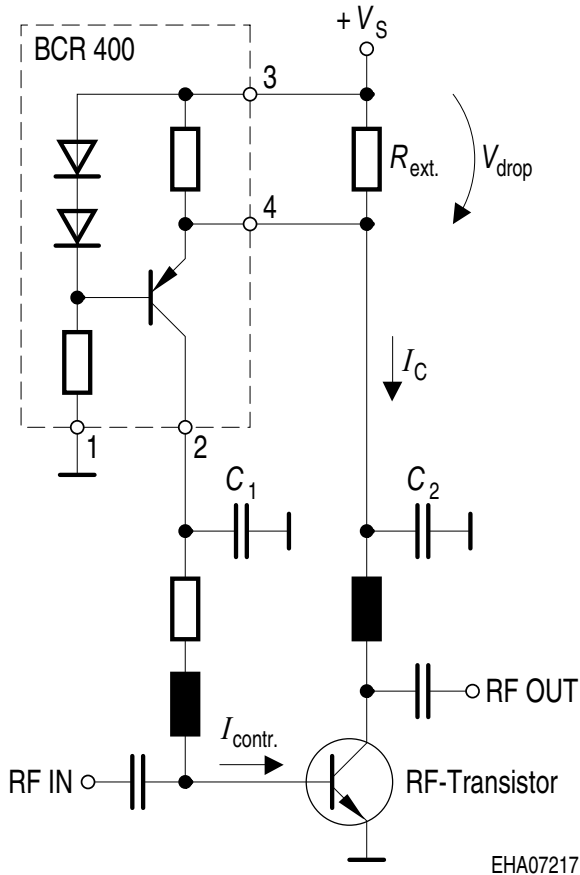


Note that up to  $T_S=115^\circ\text{C}$  it is not possible to exceed  $P_{tot}$  respecting the maximum ratings of  $V_S$  and  $I_{Contr}$ .  
The collector or drain current (respectively) of the stabilized RF transistor does not affect BCR 400 directly, as it provides just the base current.

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



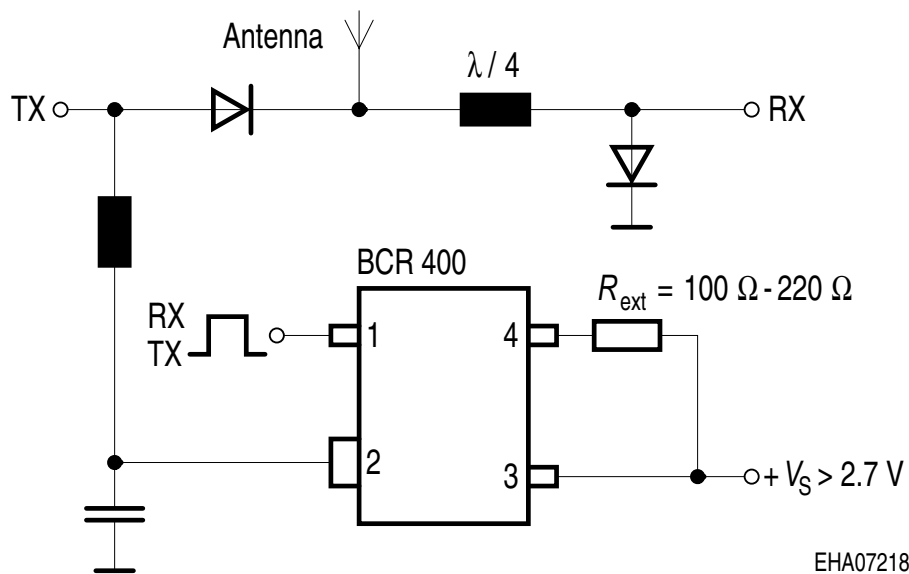
RF transistor controlled by BCR400



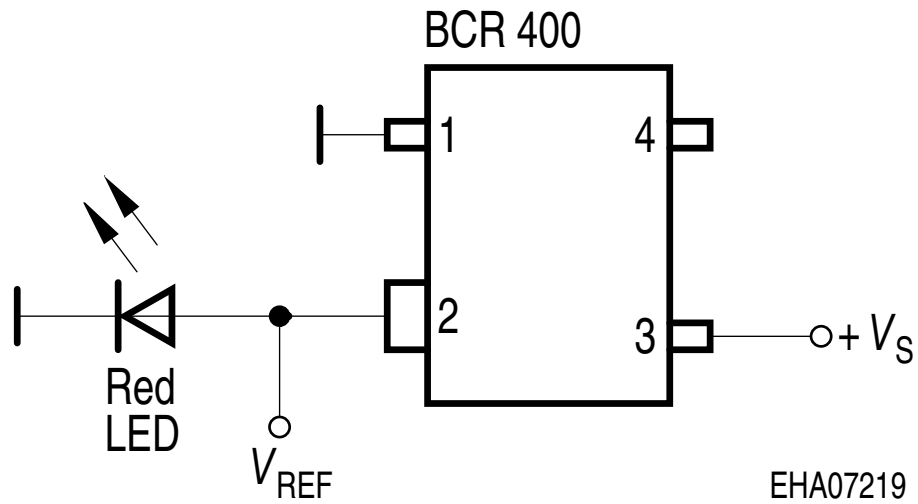
Be aware that BCR400 stabilized bias current of transistors in an active control loop

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

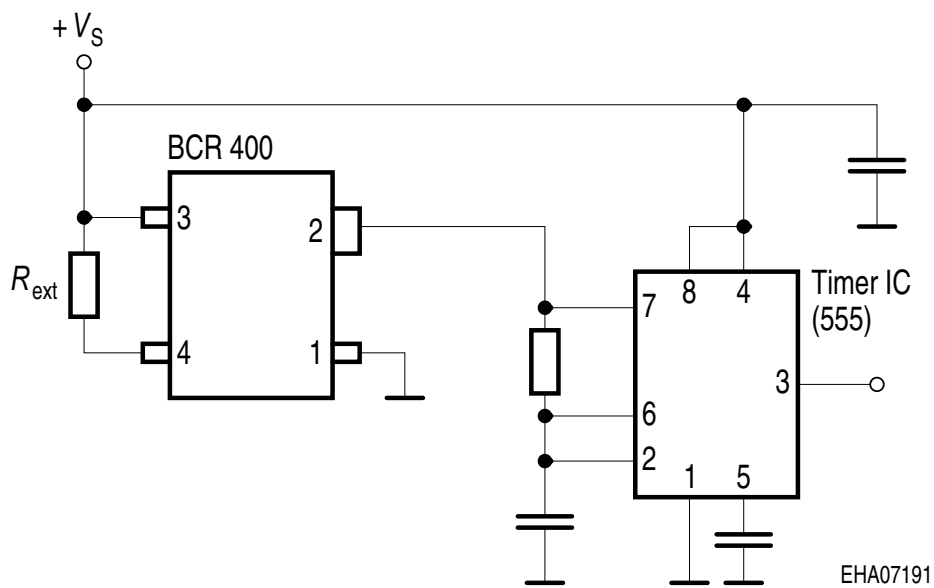
RX/TX antenna switch, compatible to control logic and working at wide battery voltage range



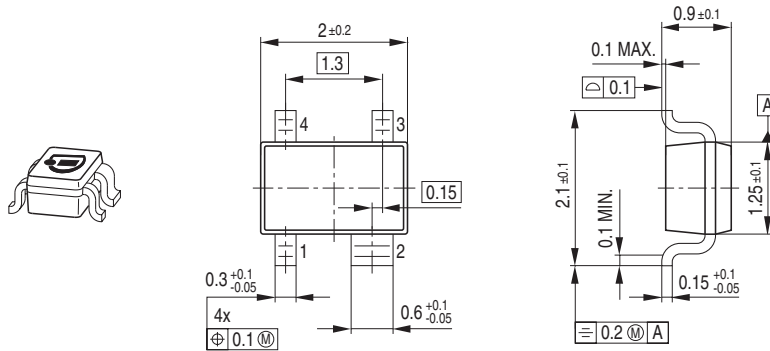
Low voltage reference



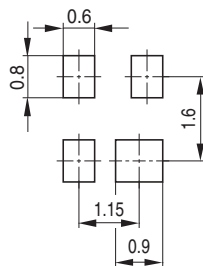
Precision timer with BCR400 providing constant charge current



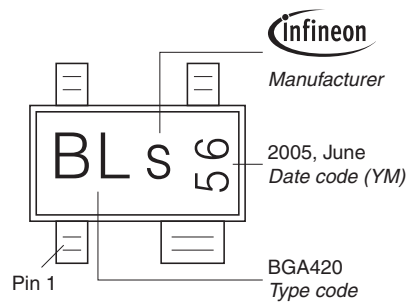
Package Outline



Foot Print

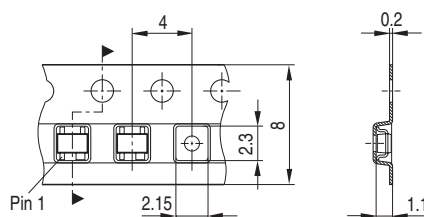


Marking Layout (Example)



Standard Packing

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



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Infineon Technologies AG  
81726 München, Germany  
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