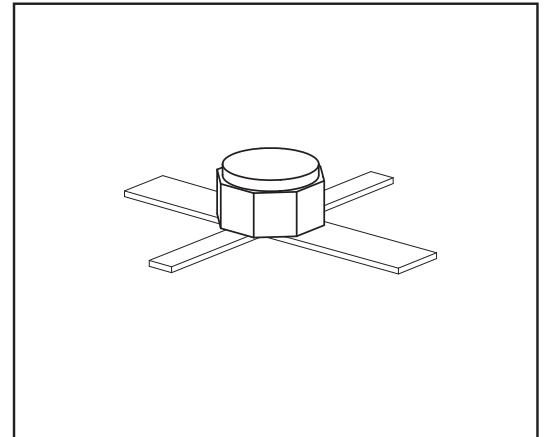


**HiRel NPN Silicon RF Transistor**

- **HiRel Discrete and Microwave Semiconductor**
- For High Gain Low Noise Amplifiers
- For Oscillators up to 10 GHz
- Noise Figure  $F = 1.1$  dB at 1.8 GHz  
Outstanding  $G_{mS} = 21$  dB at 1.8 GHz
- Hermetically sealed microwave package
- Transition Frequency  $f_T = 22$  GHz
- **SIEGET<sup>®</sup> 25 GHz  $f_T$  - Line**  
**Infineon Technologies Grounded Emitter Transistor-**  
**25 GHz  $f_T$ - Line**
- **esa Space Qualified**  
ESA/SCC Detail Spec. No.: 5611/008  
Type Variant No. 02



**ESD: Electrostatic discharge sensitive device, observe handling precaution!**

Type	Marking	Pin Configuration						Package
		1=C	2=E	3=B	4=E	-	-	
BFY420 (ql)	-	1=C	2=E	3=B	4=E	-	-	MICRO-X

(ql) Testing level: P: Professional testing  
H: High Rel quality  
S: Space quality  
ES: ESA qualified

**Maximum Ratings**

Parameter	Symbol	Value	Unit
Collector-emitter voltage	$V_{CEO}$	4.5	V
Collector-base voltage	$V_{CBO}$	15	
Emitter-base voltage	$V_{EBO}$	1.5	
Collector current	$I_C$	35	mA
Base current	$I_B$	3.0	
Total power dissipation $T_S \leq 129^\circ\text{C}$ 1)2)	$P_{tot}$	160	mW
Junction temperature	$T_j$	175	$^\circ\text{C}$
Operating temperature range	$T_{op}$	-65 ... 175	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-65 ... 175	$^\circ\text{C}$

<sup>1</sup>At  $T_S = 129^\circ\text{C}$ . For  $T_S > 129^\circ\text{C}$  derating is required.

<sup>2</sup> $T_S$  is measured on the collector lead at the soldering point to the pcb.

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>1)</sup>	$R_{thJS}$	< 285	K/W

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

**DC Characteristics**

Collector-emitter cutoff current <sup>2)</sup> $V_{CE} = 4.5\text{ V}, I_B = 1.0\ \mu\text{A}$	$I_{CEX}$	-	-	200	$\mu\text{A}$
Collector -base cutoff current $V_{CB} = 5\text{ V}, I_E = 0$	$I_{CBO}$	-	-	30	nA
Emitter-base cutoff current $V_{EB} = 1.5\text{ V}, I_C = 0$	$I_{EBO}$	-	-	20	$\mu\text{A}$
DC current gain $I_C = 5\text{ mA}, V_{CE} = 1\text{ V}$	$h_{FE}$	50	90	150	-

<sup>1)</sup>  $T_S$  is measured on the collector lead at the soldering point to the pcb.

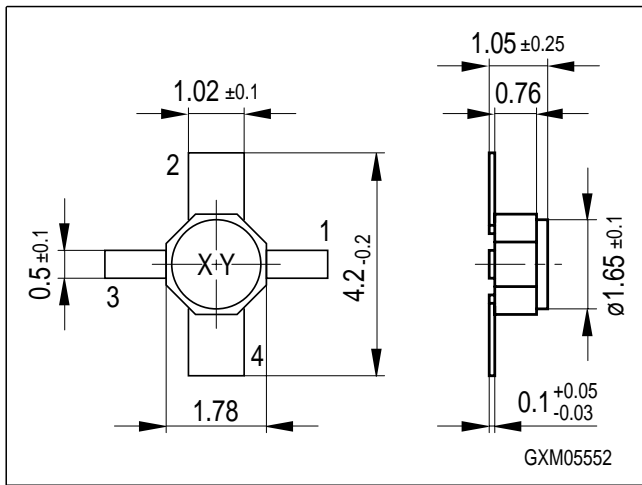
<sup>2)</sup> This test assures  $V_{(BR)CE0} > 4.5\text{V}$

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics (verified by random sampling)</b>					
Transition frequency $I_C = 30\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 2.0\text{ GHz}$	$f_T$	20	22	-	GHz
Collector-base capacitance $V_{CB} = 2\text{ V}$ , $V_{BE} = v_{be} = 0$ , $f = 1\text{ MHz}$	$C_{cb}$	-	0.14	0.9	pF
Collector emitter capacitance $V_{CE} = 2\text{ V}$ , $V_{BE} = v_{be} = 0$ , $f = 1\text{ MHz}$	$C_{ce}$	-	0.46	0.85	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$ , $V_{CB} = v_{cb} = 0$ , $f = 1\text{ MHz}$	$C_{eb}$	-	0.67	3.0	
Noise figure $I_C = 5\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $Z_S = Z_{Sopt}$ , $f = 1.8\text{ GHz}$	$F$	-	1.1	1.7	dB
Power gain $I_C = 20\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$	$G_{ms}^{1)}$	-	21	-	dB
Transducer gain $I_C = 20\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $Z_S = Z_L = 50\ \Omega$ , $f = 1.8\text{ GHz}$	$ S_{21e} ^2$	14	18	-	
1dB Compression point $I_C = 20\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 1.8\text{ GHz}$	$P_{-1dB}$	-	12	-	dBm

$$^1G_{ms} = |S_{21} / S_{12}|$$

Micro-X Package



Edition 2006-02-01

Published by

Infineon Technologies AG

81726 München, Germany

© Infineon Technologies AG 2007.

All Rights Reserved.

### **Attention please!**

The information given in this dokument shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenheitsgarantie"). With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

### **Information**

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office ([www.infineon.com](http://www.infineon.com)).

### **Warnings**

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.

Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system.

Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.