
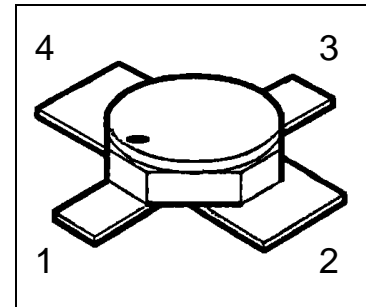


**HiRel NPN Silicon RF Transistor**

- **HiRel Discrete and Microwave Semiconductor**
- For Low Current Applications
- For Oscillators up to 12 GHz
- Noise Figure F = 1.15 dB at 1.8 GHz  
Outstanding Gms = 23dB at 1.8 GHz
- Hermetically sealed microwave package
- Transition Frequency  $f_T = 20$  GHz
- **SIEGET<sup>®</sup> 25-Line**  
**Infineon Technologies Grounded Emitter Transistor-**  
**25 GHz  $f_T$ -Line**
-  **ESA Space Qualified**  
ESA/SCC Detail Spec. No.: 5611/008  
Type Variant No. 01



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

Type	Marking	Ordering Code	Pin Configuration				Package
			1	2	3	4	
BFY405 (ql)	-	see below	C	E	B	E	Micro-X

(ql) Quality Level:    P: Professional Quality  
                               H: High Rel Quality  
                               S: Space Quality  
                               ES: ESA Space Quality

(see order instructions for ordering example)

**Maximum Ratings**

Parameter	Symbol	Values	Unit
Collector-emitter voltage	$V_{CEO}$	4.5	V
Collector-base voltage	$V_{CBO}$	15	V
Emitter-base voltage	$V_{EBO}$	1.5	V
Collector current	$I_C$	12	mA
Base current	$I_B$	1.0	mA
Total power dissipation, $T_S \leq 145^\circ\text{C}$ <sup>1), 2)</sup>	$P_{tot}$	55	mW
Junction temperature	$T_j$	175	$^\circ\text{C}$
Operating temperature range	$T_{op}$	-65...+175	$^\circ\text{C}$
Storage temperature range	$T_{stg}$	-65...+175	$^\circ\text{C}$

**Thermal Resistance**

Junction-soldering point <sup>2)</sup>	$R_{th JS}$	< 545	K/W
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**Notes.:**

- 1) At  $T_S = +145^\circ\text{C}$ . For  $T_S > +145^\circ\text{C}$  derating is required.  
 2)  $T_S$  is measured on the collector lead at the soldering point to the pcb.

**Electrical Characteristics**

 at  $T_A = 25^\circ\text{C}$ ; unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

**DC Characteristics**

Collector-base cutoff current $V_{CB} = 5\text{ V}, I_E = 0$	$I_{CBO}$	-	-	10	nA
Collector-emitter cutoff current <sup>1.)</sup> $V_{CE} = 4.5\text{ V}, I_B = 0.1\mu\text{A}$	$I_{CEX}$	-	-	20 (t.b.d.)	$\mu\text{A}$
Emitter-base cutoff current $V_{EB} = 1.5\text{ V}, I_C = 0$	$I_{EBO}$	-	-	5.0	$\mu\text{A}$
DC current gain $I_C = 5\text{ mA}, V_{CE} = 1\text{ V}$	$h_{FE}$	50	90	150	-

**Notes:**

- 1.) This Test assures  $V(BR)_{CE0} > 4.5\text{V}$

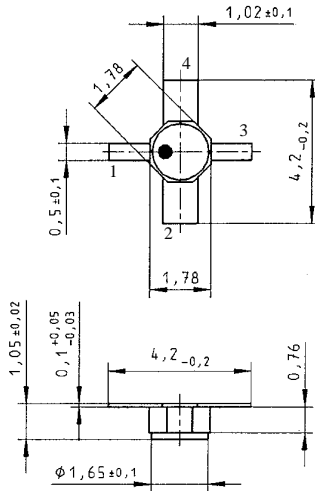
**Electrical Characteristics** (continued)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics</b>					
Transition frequency $I_C = 10\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 2.0\text{ GHz}$	$f_T$	20	22	-	GHz
Collector-base capacitance $V_{CB} = 2\text{ V}$ , $V_{BE} = v_{be} = 0$ , $f = 1\text{ MHz}$	$C_{CB}$	-	0.05	0.9	pF
Collector-emitter capacitance $V_{CE} = 2\text{ V}$ , $V_{BE} = v_{be} = 0$ , $f = 1\text{ MHz}$	$C_{CE}$	-	0.32	0.48	pF
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$ , $V_{CB} = v_{cb} = 0$ , $f = 1\text{ MHz}$	$C_{EB}$	-	0.36	3.0	pF
Noise Figure $I_C = 2\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_{\text{sopt}}$	F	-	1.15	1.8	dB
Insertion power gain $I_C = 5\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $f = 1.8\text{ GHz}$ $Z_S = Z_L = 50\ \Omega$	$ S_{21e} ^2$	14	18	-	dB
Power gain $I_C = 5\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $f = 1.8\text{ GHz}$ $Z_S = Z_{\text{Sopt}}$ , $Z_L = Z_{\text{Lopt}}$	$G_{ms}^{1)}$	-	23	-	dB
1dB Compression point $I_C = 5\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $f = 1.8\text{ GHz}$ $Z_S = Z_{\text{Sopt}}$ , $Z_L = Z_{\text{Lopt}}$	$P_{-1\text{dB}}$	-	5	-	dBm

**Notes.:**

$$1) \quad G_{ms} = \frac{|S_{21}|}{|S_{12}|}$$

## Micro-X Package



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