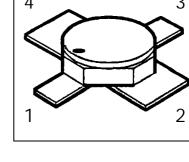


## HiRel NPN Silicon RF Transistor

- HiRel Discrete and Microwave Semiconductor
- For low power amplifiers at collector currents from 0,2 mA to 2,5 mA.
- Hermetically sealed microwave package
- f<sub>T</sub>= 6,5 GHz F = 2.6 dB at 2 GHz
- Space Qualified

ESA/SCC Detail Spec. No.: 5611/006

Type Variant No. 01



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

Туре	Marking	Ordering Code	Pin Configuration		Package		
BFY180 (ql)	-	see below	С	Е	В	Е	Micro-X1

(ql) Quality Level: P: Professional Quality, Ordering Code: Q97301013
H: High Rel Quality, Ordering Code: on request
S: Space Quality, Ordering Code: on request
ES: ESA Space Quality, Ordering Code: Q97111419

(see order instructions for ordering example)



# Maximum Ratings

Parameter	Symbol	Values	Unit			
Collector-emitter voltage	$V_{CEO}$	8	V			
Collector-emitter voltage, V <sub>BE</sub> =0	$V_{CES}$	15	V			
Collector-base voltage	$V_{CBO}$	15	V			
Emitter-base voltage	$V_{EBO}$	2	V			
Collector current	I <sub>C</sub>	4	mA			
Base current	I <sub>B</sub>	0.5 1)	mA			
Total power dissipation, $T_S \le 176^{\circ}C^{-2), 3)}$	P <sub>tot</sub>	30	mW			
Junction temperature	Tj	200	°C			
Operating temperature range	T <sub>op</sub>	-65+200	°C			
Storage temperature range	T <sub>stg</sub>	-65+200	°C			
Thermal Resistance						
Junction-soldering point 3)	R <sub>th JS</sub>	< 805	K/W			

# Notes .:

### **Electrical Characteristics**

at  $T_A=25$ °C; unless otherwise specified

Parameter	Symbol	Values		Unit		
		min.	typ.	max.		
DC Characteristics						
Collector-base cutoff current	I <sub>CBO</sub>	-	-	100	μA	
$V_{CB} = 10 \text{ V}, I_{E} = 0$						
Collector-emitter cutoff current	I <sub>CEX</sub>	-	-	50	μΑ	
$V_{CE} = 8 \text{ V}, I_{B} = 0.05 \mu A^{-1.}$						
Collector-base cutoff current	I <sub>CBO</sub>	-	-	50	nA	
$V_{CB} = 8 \text{ V}, I_{E} = 0$						
Emitter base cuttoff current	I <sub>EBO</sub>	-	-	25	μΑ	
$V_{EB} = 2 \text{ V}, I_{C} = 0$						
Emitter base cuttoff current	I <sub>EBO</sub>	-	-	0.5	μΑ	
$V_{EB} = 1 \text{ V}, I_{C} = 0$						

## Notes:

1.) This Test assures V(BR)CE0 > 8V

<sup>1)</sup> The maximum permissible base current for V<sub>FBE</sub> measurements is 3mA (spotmeasurement duration < 1s)

<sup>2)</sup> At T<sub>S</sub> = + 176 °C. For T<sub>S</sub> > + 176 °C derating is required.
3) T<sub>S</sub> is measured on the collector lead at the soldering point to the pcb.



# **Electrical Characteristics** (continued)

Parameter	Symbol		Values	Unit	
		min.	typ.	max.	
DC Characteristics				•	
Base-Emitter forward voltage	$V_{FBE}$	-	-	1	V
$I_E = 3 \text{ mA}, I_C = 0$					
DC current gain	h <sub>FE</sub>	30	100	175	-
$I_C = 0.25 \text{ mA}, V_{CE} = 1 \text{ V}$					
AC Characteristics					
Transition frequency	f <sub>T</sub>	5,5	6.5	-	GHz
$I_C$ = 2 mA, $V_{CE}$ = 5 V, f = 500 MHz					
Collector-base capacitance	ССВ	-	0.15	0.24	pF
$V_{CB} = 5 \text{ V}, V_{BE} = \text{vbe} = 0, f = 1 \text{ MHz}$					
Collector-emitter capacitance	C <sub>CE</sub>	-	0.34	-	pF
$V_{CE} = 5 \text{ V}, V_{BE} = \text{vbe} = 0, f = 1 \text{ MHz}$					
Emitter-base capacitance	C <sub>EB</sub>	-	0.25	0.4	pF
$V_{EB} = 0.5V$ , $V_{CB} = vcb = 0$ , $f = 1 MHz$					
Noise Figure	F	-	2.6	3.2	dB
$I_C$ = 2 mA, $V_{CE}$ = 5 V, f = 2 GHz,					
$Z_S = Z_{Sopt}$					
Power gain	Gma 1.)	12	13.5	-	dB
$I_C = 2 \text{ mA}$ , $V_{CE} = 5V$ , $f = 2 \text{ GHz}$					
$Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$					
Transducer gain	$\left S_{21\mathrm{e}}\right ^2$	6.5	8	-	dB
$I_C = 2$ mA, $V_{CE} = 5$ V, $f = 2$ GHz					
$Z_S = Z_L = 50 \Omega$					

# Notes.:

1) 
$$G_{ma} = \left| \frac{S21}{S12} \right| (k - \sqrt{k^2 - 1}), \quad G_{ms} = \left| \frac{S21}{S12} \right|$$

Draft B, September 99



#### **Order Instructions:**

Full type variant including quality level must be specified by the orderer. For *HiRel* Discrete and Microwave Semiconductors the ordering code specifies device family and quality level.

Ordering Form:

Ordering Code: Q.....

BFY180 (ql)

(ql): Quality Level

Ordering Example:

Ordering Code: Q97111419

BFY180 ES

For BFY180 in ESA Space Quality Level

### **Further Informations:**

See our WWW-Pages:

- Discrete and RF-Semiconductors (Small Signal Semiconductors) www.infineon.com/products/discrete/hirel.htm

- HiRel Discrete and Microwave Semiconductors

www.infineon.com/products/discrete/hirel.htm

Please contact also our marketing division:

Tel.: ++89 234 24480

Fax.: ++89 234 28438 e-mail: <u>martin.wimmers@infineon.com</u>

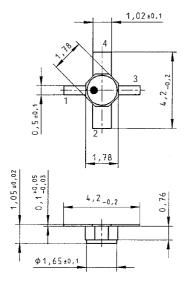
Address: Infineon Technologies Semiconductors,

High Frequency Products Marketing,

P.O.Box 801709, D-81617 Munich



# Micro-X1 Package



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