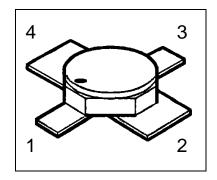


HiRel NPN Silicon RF Transistor

- HiRel Discrete and Microwave Semiconductor
- For low noise, high-gain broadband amplifiers at collector currents from 0,5 mA to 12 mA.
- Hermetically sealed microwave package
- f_T= 8 GHz
 F = 2.2 dB at 2 GHz
- Space Qualified

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

Type Variant No. 03



ESD: Electrostatic discharge sensitive device, observe handling precautions!

Туре	Marking	Ordering Code	Pin Configuration		Package		
BFY181 (ql)	-	see below	С	Е	В	Е	Micro-X1

(ql) Quality Level: P: Professional Quality

H: High Rel QualityS: Space Quality

ES: ESA Space Quality

(see order instructions for ordering example)



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Parameter	Symbol	Values	Unit	
Collector-emitter voltage	V_{CEO}	12	V	
Collector-emitter voltage, V _{BE} =0	V _{CES}	20	V	
Collector-base voltage	V_{CBO}	20	V	
Emitter-base voltage	V_{EBO}	2	V	
Collector current	I _C	20	mA	
Base current	I _B	2 ¹⁾	mA	
Total power dissipation, $T_S \le 137^{\circ}C^{-2), 3)}$	P _{tot}	175	mW	
Junction temperature	T _j	200	°C	
Operating temperature range	T _{op}	-65+200	°C	
Storage temperature range	T _{stg}	-65+200	°C	
Thermal Resistance		•	1	
Junction-soldering point 3)	R _{th JS}	< 360	K/W	

Notes.:

- 1) The maximum permissible base current for V_{FBE} measurements is 15mA (spot-measurement duration < 1s)
- 2) At $T_S = + 137$ °C. For $T_S > + 137$ °C derating is required.
- 3) T_S is measured on the collector lead at the soldering point to the pcb.

Electrical Characteristics

at T_A=25°C; unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-base cutoff current	I _{CBO}	-	-	100	μA
$V_{CB} = 20 \text{ V}, I_{E} = 0$					
Collector-emitter cutoff current	I _{CEX}	-	-	100	μA
$V_{CE} = 12 \text{ V}, I_B = 0.1 \mu A^{-1.3}$					
Collector-base cutoff current	I _{CBO}	-	-	50	nA
$V_{CB} = 10 \text{ V}, I_{E} = 0$					
Emitter base cuttoff current	I _{EBO}	-	-	25	μΑ
$V_{EB} = 2 \text{ V}, I_{C} = 0$					
Emitter base cuttoff current	I _{EBO}	-	-	0.5	μΑ
$V_{EB} = 1 \text{ V}, I_{C} = 0$					

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Notes:

1.) This Test assures V(BR)CE0 > 12V IFAG IMM RPD D HIR



Electrical Characteristics (continued)

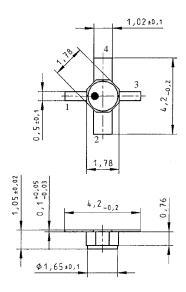
Parameter	Symbol	Symbol		3	Unit
		min.	typ.	max.	
DC Characteristics		•	•	•	
Base-Emitter forward voltage	V_{FBE}	-	-	1	V
$I_E = 15 \text{ mA}, I_C = 0$					
DC current gain	h _{FE}	55	100	175	-
$I_C = 5 \text{ mA}, V_{CE} = 6 \text{ V}$					
AC Characteristics					
Transition frequency	f⊤				GHz
I_C = 10 mA, V_{CE} = 5 V, f = 500 MHz		6.5	7.5	-	
I_C = 10 mA, V_{CE} = 8 V, f = 500 MHz		-	8	-	
Collector-base capacitance	ССВ	-	0.21	0.29	pF
$V_{CB} = 10 \text{ V}, V_{BE} = \text{vbe} = 0, f = 1 \text{ MHz}$					
Collector-emitter capacitance	C _{CE}	-	0.34	-	pF
$V_{CE} = 10 \text{ V}, V_{BE} = \text{vbe} = 0, f = 1 \text{ MHz}$					
Emitter-base capacitance	C _{EB}	-	0.45	0.6	pF
$V_{EB} = 0.5V$, $V_{CB} = vcb = 0$, $f = 1 \text{ MHz}$					
Noise Figure	F	-	2.2	2.9	dB
$I_C = 4$ mA, $V_{CE} = 5$ V, $f = 2$ GHz,					
$Z_S = Z_{Sopt}$					
Power gain	Gma 1.)	13.5	14.5	-	dB
$I_C = 10$ mA, $V_{CE} = 5V$, $f = 2$ GHz					
$Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$					
Transducer gain	S _{21e} ²	10	11	-	dB
$I_C = 10$ mA, $V_{CE} = 5$ V, $f = 2$ GHz					
$Z_S = Z_L = 50 \Omega$					

Notes.:

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



Micro-X1 Package



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