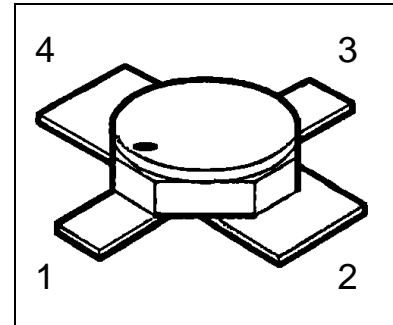


HiRel NPN Silicon RF Transistor

- **HiRel Discrete and Microwave Semiconductor**
- For low noise, high-gain broadband amplifiers at collector currents from 2mA to 30mA.
- Hermetically sealed microwave package
- $f_T = 8$ GHz
F = 2.3 dB at 2 GHz
-  **ESA Space Qualified**
ESA/SCC Detail Spec. No.: 5611/006
Type Variant No. 05



ESD: Electrostatic discharge sensitive device, observe handling precautions!

Type	Marking	Ordering Code	Pin Configuration				Package
			C	E	B	E	
BFY183 (ql)	-	see below	C	E	B	E	Micro-X1

(ql) Quality Level: P: Professional Quality
ES: ESA Space Quality

(see order instructions for ordering example)

Maximum Ratings

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	65	mA
Base current	I_B	5 ^{1.)}	mA
Total power dissipation, $T_S \leq 99^\circ\text{C}$ ^{2.)}	P_{tot}	450	mW
Junction temperature	T_j	200	$^\circ\text{C}$
Operating temperature range	T_{op}	-65...+200	$^\circ\text{C}$
Storage temperature range	T_{stg}	-65...+200	$^\circ\text{C}$

Thermal Resistance

Junction-soldering point ^{2.)}	$R_{th\ JS}$	< 225	K/W
---	--------------	-------	-----

Notes.:

- 1) The maximum permissible base current for V_{FBE} measurements is 20mA (spot-measurement duration < 1s)
- 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 $V_{CB} = 20\text{ V}, I_E = 0$	I_{CBO}	-	-	100	μA
Collector-emitter cutoff current $V_{CE} = 12\text{ V}, I_B = 0,3\mu\text{A}$ ^{1.)}	I_{CEX}	-	-	300	μA
Collector-base cutoff current $V_{CB} = 10\text{ V}, I_E = 0$	I_{CBO}	-	-	50	nA
Emitter base cutoff current $V_{EB} = 2\text{ V}, I_C = 0$	I_{EBO}	-	-	25	μA
Emitter base cutoff current $V_{EB} = 1\text{ V}, I_C = 0$	I_{EBO}	-	-	0.5	μA

Notes:

- 1.) This Test assures $V(BR)_{CE0} > 12\text{V}$

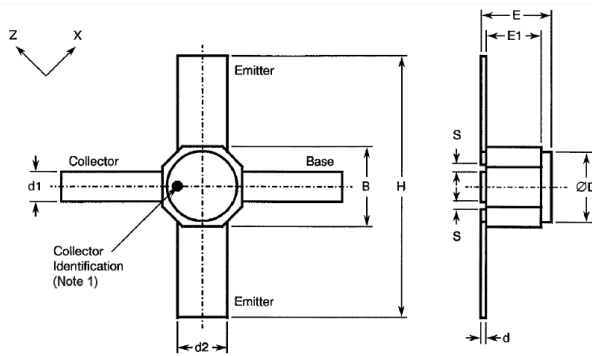
Electrical Characteristics (continued)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Base-Emitter forward voltage $I_E = 30 \text{ mA}, I_C = 0$	V_{FBE}	-	-	1	V
DC current gain $I_C = 5 \text{ mA}, V_{CE} = 6 \text{ V}$	h_{FE}	55	90	160	-
AC Characteristics					
Transition frequency $I_C = 20 \text{ mA}, V_{CE} = 5 \text{ V}, f = 500 \text{ MHz}$ $I_C = 25 \text{ mA}, V_{CE} = 8 \text{ V}, f = 500 \text{ MHz}$	f_T	6,5 -	7.5 8	- -	GHz
Collector-base capacitance $V_{CB} = 10 \text{ V}, V_{BE} = v_{be} = 0, f = 1 \text{ MHz}$	C_{CB}	-	0.32	0.44	pF
Collector-emitter capacitance $V_{CE} = 10 \text{ V}, V_{BE} = v_{be} = 0, f = 1 \text{ MHz}$	C_{CE}	-	0.34	-	pF
Emitter-base capacitance $V_{EB} = 0.5 \text{ V}, V_{CB} = v_{cb} = 0, f = 1 \text{ MHz}$	C_{EB}	-	1.1	1.4	pF
Noise Figure $I_C = 8 \text{ mA}, V_{CE} = 5 \text{ V}, f = 2 \text{ GHz},$ $Z_S = Z_{Sopt}$	F	-	2.3	2.9	dB
Power gain $I_C = 20 \text{ mA}, V_{CE} = 5 \text{ V}, f = 2 \text{ GHz}$ $Z_S = Z_{Sopt}, Z_L = Z_{Lopt}$	$G_{ma}^{1)}$	12.5	14	-	dB
Transducer gain $I_C = 20 \text{ mA}, V_{CE} = 5 \text{ V}, f = 2 \text{ GHz}$ $Z_S = Z_L = 50 \Omega$	$ S_{21e} ^2$	9	10,5	-	dB
Output Power $I_C = 30 \text{ mA}, V_{CE} = 5 \text{ V}, f = 2 \text{ GHz},$ $P_{IN} = 7 \text{ dBm}$ $Z_S = Z_L = 50 \Omega$	P_{OUT}	13.5	14.5	-	dBm

Notes.:

$$1) \quad G_{ma} = \left| \frac{S_{21}}{S_{12}} \right| (k - \sqrt{k^2 - 1}), \quad G_{ms} = \left| \frac{S_{21}}{S_{12}} \right|$$

Micro-X1 Package



Symbols	Dimensions mm	
	Min	Max
B	1.68	1.88
d	0.07	0.15
d1	0.4	0.6
d2	0.92	1.12
ØD	1.55	1.85
E	0.85	1.25
E1	0.66	0.86
H	4	4.4
S	0.08	0.3

Edition 2016-06

Published by

Infineon Technologies AG

85579 Neubiberg, Germany

© Infineon Technologies AG 2016

All Rights Reserved.

Attention please!

The information given in this document 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 a third party.

Information

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office (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.