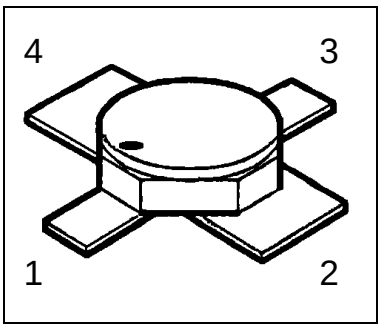
HiRel NPN Silicon RF Transistor

BFY740B-02(ES)



Features

- High gain ultra low noise RF transistor
- Outstanding noise figure F = 0.65 dB at 1.8 GHz
  F = 1.05 dB at 6 GHz
  F = 1.50 dB at 10 GHz
  F = 1.60 dB at 12 GHz
- Hermetically sealed microwave package

Product validation

- esa **Space Qualified**
  ESCC Detail Spec. No.: 5611/011
  Type Variant No. 02

Description

ESD: **E**lectro**s**tatic **d**ischarge sensitive device,
observe handling precautions!

Table 1 Product information

Type	Comment	Pin Configuration				Package
		1	2	3	4	
BFY740B-02(ES)	For flight use	C	E	B	E	Micro-X
BFY740B-02(P)[1]	Not for flight use[1]					

[1] (P) parts have the same fit, form and function as (ES) parts,
no screening acc. to Chart F3 in ESCC Generic Specification No. 5010

Table of contents

1 Maximum ratings

Table 2 Maximum ratings

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Collector-emitter voltage	V_{CEO}	- -	- -	4 3.5	V	$T_A > 0$ °C $T_A \leq 0$ °C
Collector-base voltage	V_{CBO}	-	-	13	V	
Emitter-base voltage	V_{EBO}	-	-	1.2	V	
Collector current	I_C	-	-	30	mA	
Base current [1]	I_B	-	-	3	mA	
Total power dissipation [2]	P_{tot}	-	-	120	mW	$T_S \leq 125$ °C
Junction temperature	T_j	-	-	175	°C	
Operating temperature	T_{op}	-65	-	175	°C	
Storage temperature	T_{stg}	-65	-	175	°C	

[1] Maximum ratings must not be exceeded under any combination of DC ratings and RF voltage/current swings except as specified in §3

[2] For $T_S > 125$ °C derating is required. T_S is measured on the collector lead at the soldering point to the PCB

2 Thermal characteristics

Table 3 Thermal characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction –soldering point	$R_{th,JS}$	-	-	400	K/W	T_S is measured on the collector lead at the soldering point to the PCB
Soldering Temperature	T_{sol}	-	-	250	°C	Duration 5 seconds maximum at a distance of not less than 0.5mm from the device body and the same lead shall not be resoldered until 3 minutes have elapsed.

3 Electrical characteristics

at T_A=25°C, unless otherwise specified

Table 4 Static characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Collector-base cutoff current	I_{CBO}	-	-	10	µA	V_{CB} = 5V, I_E = 0A
Collector-emitter cutoff current [1]	I_{CEX}	-	-	200	µA	V_{CE} = 4V, I_B = 0.1µA
Emitter base cuttoff current	I_{EBO}	-	-	5	µA	V_{EB} = 1.2V, I_C = 0A
DC current gain	h_{FE}	170	280	400	-	I_C = 20mA, V_{CE} = 3V

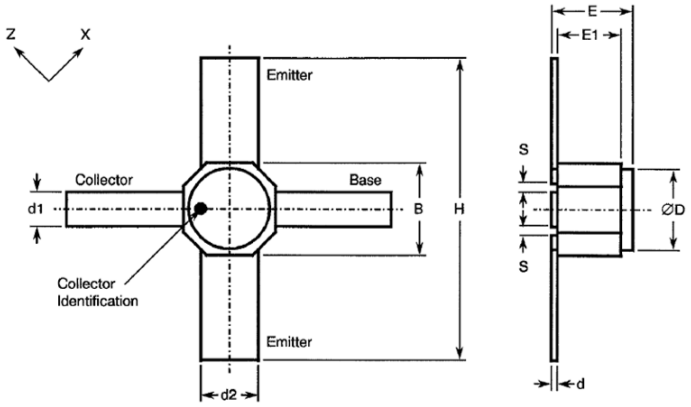
Table 5 Dynamic characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Collector-base capacitance	C_{CB}	-	0.07	-	pF	V_{CB}= 2V, V_{BE}= vbe= 0, f= 1MHz
Collector-emitter capacitance	C_{CE}	-	0.45	-	pF	V_{CE}= 2V, V_{BE}= vbe= 0, f= 1MHz
Emitter-base capacitance	C_{EB}	-	0.6	-	pF	V_{EB}=0.5V, V_{CB}= vcb= 0, f= 1MHz
Noise Figure (Z_S= Z_{Sopt})	F	- - - -	0.65 1.05 1.5 1.6	- - - -	dB	I_C= 8mA, V_{CE}= 3V, f = 1.8GHz I_C= 8mA, V_{CE}= 3V, f = 6.0GHz I_C= 8mA, V_{CE}= 3V, f = 10GHz I_C= 8mA, V_{CE}= 3V, f = 12GHz
Insertion power gain (Z_S = Z_L = 50Ω)	$\lvert S_{21e}\rvert^2$	- - - -	24 14 9 7	- - - -	dB	I_C= 20mA, V_{CE}= 3V, f = 1.8GHz I_C= 20mA, V_{CE}= 3V, f = 6.0GHz I_C= 20mA, V_{CE}= 3V, f = 10GHz I_C= 20mA, V_{CE}= 3V, f = 14GHz
Power Gain [2]	G_{ms}	-	26.5	-	dB	I_C= 20mA, V_{CE}= 3V, f = 1.8GHz, Z_S = Z_{Sopt}, Z_L = Z_{Lopt}
Power Gain [2]	G_{ma}	- -	19 15	- -	dB	I_C= 20mA, V_{CE}= 3V, f = 6.0GHz, Z_S = Z_{Sopt}, Z_L = Z_{Lopt} I_C= 20mA, V_{CE}= 3V, f = 10GHz, Z_S = Z_{Sopt}, Z_L = Z_{Lopt}
Output power	P_{out}	-	14.8	-	dBm	I_C= 20mA, V_{CE}= 3V, f = 1.8GHz, P_{in} = 0 dBm

[1] This test assures $V_{(BR)CE0}$ > 4V

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

4 Package outlines



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

Trademarks
All referenced product or service names and trademarks are the property of their respective owners.

Edition 4, January 2022
Published by
Infineon Technologies AG
81726 München, Germany

Do you have a question about this document?
Email: erratum@infineon.com

IMPORTANT NOTICE
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, hints or any typical values stated herein and/or any information regarding the application of the product, 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.

In addition, any information given in this document is subject to customer’s compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer’s products and any use of the product of Infineon Technologies in customer’s applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer’s technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies office (**www.infineon.com**).

WARNINGS
Due to technical requirements products 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 expressed 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.