
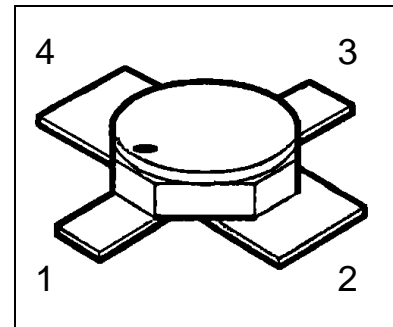


HiRel NPN Silicon Germanium RF Transistor

- **HiRel Discrete and Microwave Semiconductor**
- High gain low noise RF transistor
- High maximum stable gain: G_{ms} 24dB at 1.8 GHz
- Noise figure $F = 0.8$ dB at 1.8 GHz
Noise figure $F = 1.1$ dB at 6 GHz
- Hermetically sealed microwave package
-  **ESA Space Qualified**
ESCC Detail Spec. No.: 5611/009



ESD: Electrostatic discharge sensitive device,
observe handling precautions!

Type	Marking	Pin Configuration				Package
		1	2	3	4	
BFY640-04	-	C	E	B	E	Micro-X

Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage $T_a > 0\text{ }^{\circ}\text{C}$ $T_a \leq 0\text{ }^{\circ}\text{C}$	V_{CEO}	4.0 3.7	V V
Collector-base voltage	V_{CBO}	13	V
Emitter-base voltage	V_{EBO}	1.2	V
Collector current ¹⁾	I_C	50	mA
Base current	I_B	3	mA
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 ²⁾	$R_{th\text{ JS}}$	325	K/W
--	--------------------	-----	-----

Notes.:

- 1) For $T_S \leq 110^\circ\text{C}$. For $T_S > 110^\circ\text{C}$ derating is required.
 2) T_S is measured on the emitter lead at the soldering point to the pcb.

Electrical Characteristics

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

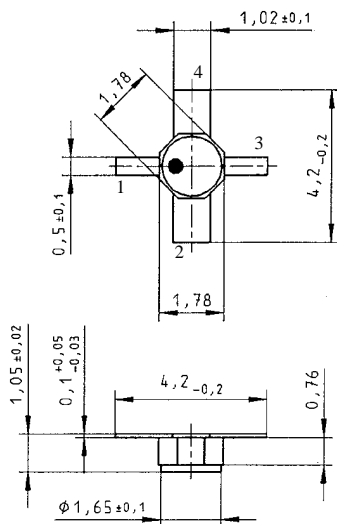
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-base cutoff current $V_{CB} = 5\text{ V}, I_E = 0$	I_{CBO}	-	-	10	μA
Collector-emitter cutoff current ¹⁾ $V_{CE} = 4.0\text{ V}, I_B = 0.1\text{ }\mu\text{A}$	I_{CEX}	-	-	200	μA
Emitter-base cutoff current $V_{EB} = 1.2\text{ V}, I_C = 0$	I_{EBO}	-	-	5	μA
DC current gain $I_C = 30\text{ mA}, V_{CE} = 3\text{ V}$	h_{FE}	135	180	250	-
AC Characteristics					
Collector-base capacitance $V_{CB} = 2\text{ V}, V_{BE} = v_{be} = 0, f = 1\text{ MHz}$	C_{CB}	-	0.07	-	pF
Collector-emitter capacitance $V_{CE} = 2\text{ V}, V_{BE} = v_{be} = 0, f = 1\text{ MHz}$	C_{CE}	-	0.45	-	pF
Emitter-base capacitance $V_{EB} = 0.5\text{V}, V_{CB} = v_{cb} = 0, f = 1\text{ MHz}$	C_{EB}	-	0.6	-	pF
Noise Figure ($Z_S = Z_{\text{sopt}}$) $I_C = 5\text{ mA}, V_{CE} = 3\text{ V}, f = 1.8\text{ GHz}$ $I_C = 5\text{ mA}, V_{CE} = 3\text{ V}, f = 6.0\text{ GHz}$	F	- -	0.8 1.1	- -	dB
Insertion power gain ($Z_S = Z_L = 50\text{ }\Omega$) $I_C = 30\text{ mA}, V_{CE} = 3\text{ V}, f = 1.8\text{ GHz}$ $I_C = 30\text{ mA}, V_{CE} = 3\text{ V}, f = 6.0\text{ GHz}$	$ S_{21e} ^2$	- -	22.5 12.5	- -	dB
Power gain ($Z_S = Z_{\text{Sopt}}, Z_L = Z_{\text{Lopt}}$) $I_C = 30\text{ mA}, V_{CE} = 3\text{ V}, f = 1.8\text{ GHz}$	$G_{\text{ms}}^{2)}$	-	24	-	dB
Power gain ($Z_S = Z_{\text{Sopt}}, Z_L = Z_{\text{Lopt}}$) $I_C = 30\text{ mA}, V_{CE} = 3\text{ V}, f = 6.0\text{ GHz}$	$G_{\text{ma}}^{2)}$	-	14	-	dB

Notes.:

- 1) This Test assures $V(BR)_{CE0} > 4.0\text{ V}$

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

Micro-X Package



Edition 2012-11

Published by

Infineon Technologies AG

85579 Neubiberg, Germany

© Infineon Technologies AG 2012

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.

