
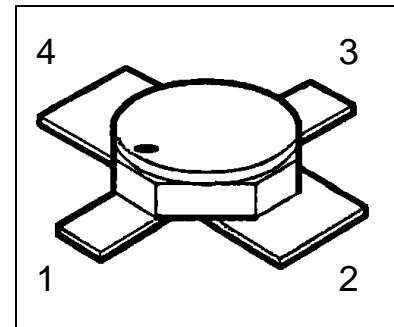


## HiRel NPN Silicon Germanium RF Transistor

- **HiRel Discrete and Microwave Semiconductor**
- High gain ultra low noise RF transistor
- Outstanding noise figure  $F = 0.7 \text{ dB}$  at 1.8 GHz  
Outstanding noise figure  $F = 1.0 \text{ dB}$  at 6 GHz
- Hermetically sealed microwave package
-  **ESA Space Qualified**  
ESCC Detail Spec. No.: 5611/011



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

Type	Marking	Pin Configuration				Package
		1	2	3	4	
BFY740B-01	-	C	E	B	E	Micro-X

### Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage $T_a > 0 \text{ }^{\circ}\text{C}$ $T_a \leq 0 \text{ }^{\circ}\text{C}$	$V_{\text{CEO}}$	4.0 3.5	V V
Collector-base voltage	$V_{\text{CBO}}$	13	V
Emitter-base voltage	$V_{\text{EBO}}$	1.2	V
Collector current <sup>1)</sup>	$I_{\text{C}}$	30	mA
Base current	$I_{\text{B}}$	3	mA
Junction temperature	$T_{\text{j}}$	175	$^{\circ}\text{C}$
Operating temperature range	$T_{\text{op}}$	-65...+175	$^{\circ}\text{C}$
Storage temperature range	$T_{\text{stg}}$	-65...+175	$^{\circ}\text{C}$

### Thermal Resistance

Junction-soldering point <sup>2)</sup>	$R_{\text{th JS}}$	400	K/W
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### Notes.:

1) For  $T_{\text{S}} \leq 125^{\circ}\text{C}$ . For  $T_{\text{S}} > 125^{\circ}\text{C}$  derating is required.

2)  $T_{\text{S}}$  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

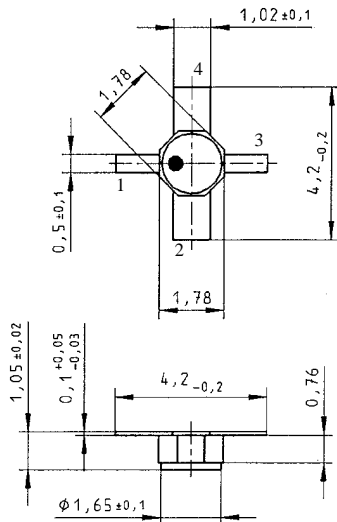
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-base cutoff current $V_{CB} = 5\text{ V}, I_E = 0$	$I_{CBO}$	-	-	10	$\mu\text{A}$
Collector-emitter cutoff current <sup>1)</sup> $V_{CE} = 4.0\text{ V}, I_B = 0.1\text{ }\mu\text{A}$	$I_{CEX}$	-	-	200	$\mu\text{A}$
Emitter-base cutoff current $V_{EB} = 1.2\text{ V}, I_C = 0$	$I_{EBO}$	-	-	5	$\mu\text{A}$
DC current gain $I_C = 20\text{ mA}, V_{CE} = 3\text{ V}$	$h_{FE}$	130	270	480	-
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 ( $Z_S = Z_{\text{sopt}}$ ) $I_C = 8\text{ mA}, V_{CE} = 3\text{ V}, f = 1.8\text{ GHz}$ $I_C = 8\text{ mA}, V_{CE} = 3\text{ V}, f = 6.0\text{ GHz}$	$F$	- -	0.7 1.0	- -	dB
Insertion power gain ( $Z_S = Z_L = 50\text{ }\Omega$ ) $I_C = 20\text{ mA}, V_{CE} = 3\text{ V}, f = 1.8\text{ GHz}$ $I_C = 20\text{ mA}, V_{CE} = 3\text{ V}, f = 6.0\text{ GHz}$	$ S_{21e} ^2$	- -	24 14	- -	dB
Power gain ( $Z_S = Z_{\text{Sopt}}, Z_L = Z_{\text{Lopt}}$ ) $I_C = 20\text{ mA}, V_{CE} = 3\text{ V}, f = 1.8\text{ GHz}$	$G_{\text{ms}}^{2)}$	-	26.5	-	dB
Power gain ( $Z_S = Z_{\text{Sopt}}, Z_L = Z_{\text{Lopt}}$ ) $I_C = 20\text{ mA}, V_{CE} = 3\text{ V}, f = 6.0\text{ GHz}$	$G_{\text{ma}}^{2)}$	-	18.3	-	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



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