
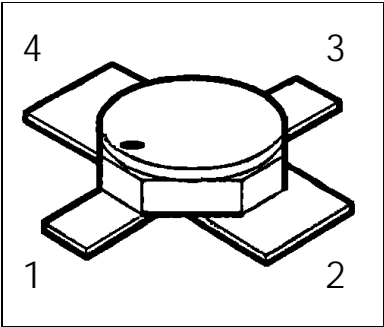


HiRel NPN Silicon RF Transistor

- **HiRel Discrete and Microwave Semiconductor**
- For Medium Power Amplifiers
- Compression Point  $P_{-1dB} = 19dBm$  1.8 GHz  
Max. Available Gain  $G_{ma} = 16dB$  at 1.8 GHz
- Hermetically sealed microwave package
- Transition Frequency  $f_T = 20\text{ GHz}$
- **SIEGET<sup>®</sup> 25-Line**  
Siemens Grounded Emitter Transistor-  
25 GHz  $f_T$ -Line
-  **ESA Space Qualified**  
ESA/SCC Detail Spec. No.: 5611/008  
Type Variant No. 03



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

Type	Marking	Ordering Code	Pin Configuration				Package
			1	2	3	4	
BFY450 (ql)	-	see below	C	E	B	E	Micro-X

(ql) Quality Level:	P: Professional Quality,	Ordering Code:	Q62702F1663
	H: High Rel Quality,	Ordering Code:	on request
	S: Space Quality,	Ordering Code:	on request
	ES: ESA Space Quality,	Ordering Code:	Q62702F1708

(see order instructions for ordering example)

## Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage	$V_{CEO}$	4.5	V
Collector-base voltage	$V_{CBO}$	15	V
Emitter-base voltage	$V_{EBO}$	1.5	V
Collector current	$I_C$	100	mA
Base current	$I_B$	10	mA
Total power dissipation, $T_s \leq 110^\circ\text{C}$ <sup>1), 2)</sup>	$P_{tot}$	450	mW
Junction temperature	$T_j$	175	°C
Operating temperature range	$T_{op}$	-65...+175	°C
Storage temperature range	$T_{stg}$	-65...+175	°C

## Thermal Resistance

Junction-soldering point <sup>2)</sup>	$R_{th JS}$	< 145	K/W
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## Notes.:

- 1) At  $T_s = +110^\circ\text{C}$ . For  $T_s > +110^\circ\text{C}$  derating is required.  
 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 $V_{CB} = 5\text{ V}, I_E = 0$	$I_{CBO}$	-	-	100	nA
Collector-emitter cutoff current <sup>1.)</sup> $V_{CE} = 4.5\text{ V}, I_B = 1.0\mu\text{A}$	$I_{CEX}$	-	-	200 (t.b.d.)	$\mu\text{A}$
Emitter-base cutoff current $V_{EB} = 1.5\text{ V}, I_C = 0$	$I_{EBO}$	-	-	50	$\mu\text{A}$
DC current gain $I_C = 20\text{ mA}, V_{CE} = 1\text{ V}$	$h_{FE}$	50	90	150	-

## Notes:

- 1.) This Test assures  $V(BR)_{CE0} > 4.5\text{V}$

**Electrical Characteristics** (continued)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Transition frequency $I_C = 90\text{mA}$ , $V_{CE} = 3\text{ V}$ , $f = 1.0\text{ GHz}$ $I_C = 90\text{mA}$ , $V_{CE} = 3\text{ V}$ , $f = 2.0\text{ GHz}$	$f_T$	18 -	22 17	- -	GHz
Collector-base capacitance $V_{CB} = 2\text{ V}$ , $V_{BE} = v_{be} = 0$ , $f = 1\text{ MHz}$	$C_{CB}$	-	0.42	0.9	pF
Collector-emitter capacitance $V_{CE} = 2\text{ V}$ , $V_{BE} = v_{be} = 0$ , $f = 1\text{ MHz}$	$C_{CE}$	-	1.27	2.6	pF
Emitter-base capacitance $V_{EB} = 0.5\text{V}$ , $V_{CB} = v_{cb} = 0$ , $f = 1\text{ MHz}$	$C_{EB}$	-	2.0	3	pF
Noise Figure $I_C = 10\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_{\text{sopt}}$	F	-	1.25	2.0	dB
Insertion power gain $I_C = 50\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $f = 1.8\text{ GHz}$ $Z_S = Z_L = 50\ \Omega$	$ S_{21e} ^2$	8.0	12	-	dB
Power gain $I_C = 50\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $f = 1.8\text{ GHz}$ $Z_S = Z_{\text{Sopt}}$ , $Z_L = Z_{\text{Lopt}}$	$G_{ma}^{1)}$	-	16.0	-	dB
1dB Compression point $I_C = 50\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $f = 1.8\text{ GHz}$ $Z_S = Z_{\text{Sopt}}$ , $Z_L = Z_{\text{Lopt}}$	$P_{-1\text{dB}}$	-	19	-	dBm

**Notes.:**

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

**Order Instructions:**

Full type variant including quality level must be specified by the orderer. For *HiRel* Discrete and Microwave Semiconductors the ordering code specifies device family and quality level.

**Ordering Form:**

Ordering Code: Q.....  
BFY450 (ql)  
(ql): Quality Level

**Ordering Example:**

Ordering Code: Q62702F1708  
BFY450 ES  
For BFY450 in ESA Space Quality Level

**Further Informations:**

See our WWW-Pages:

- Discrete and RF-Semiconductors (Small Signal Semiconductors)

[www.siemens.de/semiconductor/products/35/35.htm](http://www.siemens.de/semiconductor/products/35/35.htm)

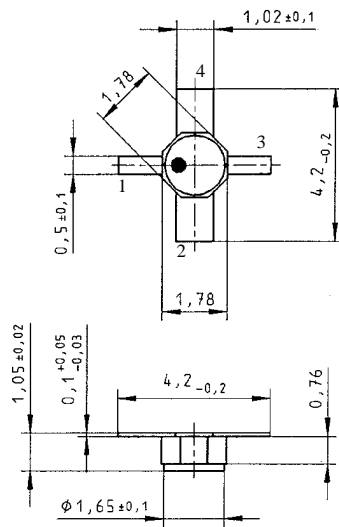
- *HiRel* Discrete and Microwave Semiconductors

[www.siemens.de/semiconductor/products/35/353.htm](http://www.siemens.de/semiconductor/products/35/353.htm)

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## Micro-X Package



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