

**HiRel NPN Silicon RF Transistor**

- **HiRel Discrete and Microwave Semiconductor**

- For Medium Power Amplifiers
- Compression Point  $P_{-1dB} = 19$  dbm 1.8 GHz  
Max. available gain  $G_{ma} = 16$  dB at 1.8 GHz

- Hermetically sealed microwave package
- Transistor frequency  $f_T = 20$  GHz

- **SIEGET<sup>®</sup> 25 GHz  $f_T$  - Line**

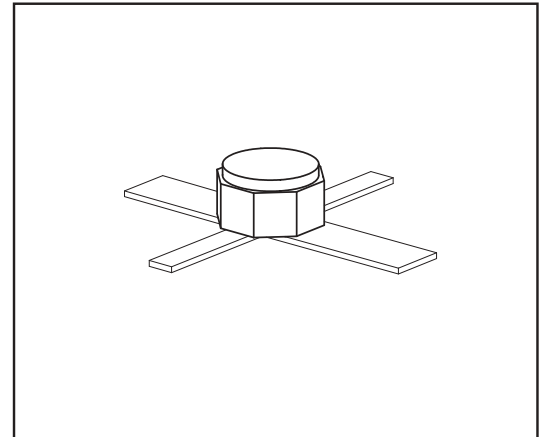
**Infineon Technologies Grounded Emitter Transistor-  
25 GHz  $f_T$  - Line**

- **esa Space Qualified**

ESA/SCC Detail Spec. No.: 5611/008

Type Variant No. 03

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



Type	Marking	Pin Configuration						Package
BFY450 (ql)	-	1=C	2=E	3=B	4=E	-	-	MICRO-X

(ql) Testing level: P: Professional testing  
H: High Rel quality  
S: Space quality  
ES: ESA qualified

**Maximum Ratings**

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

<sup>1</sup>  $T_S$  is measured on the collector lead at the soldering point to the pcb.

<sup>2</sup>At  $T_S = 110$ °C. For  $T_S > 110$ °C derating is required.

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>1)</sup>	$R_{thJS}$	< 145	K/W

**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

**DC Characteristics**

Collector-emitter cutoff current <sup>2)</sup> $V_{CE} = 4.5 \text{ V}, I_B = 1 \mu\text{A}$	$I_{CEX}$	-	-	200	$\mu\text{A}$
Collector -base cutoff current $V_{CB} = 5 \text{ V}, I_E = 0$	$I_{CBO}$	-	-	100	nA
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	-

<sup>1)</sup>  $T_S$  is measured on the collector lead at the soldering point to the pcb.

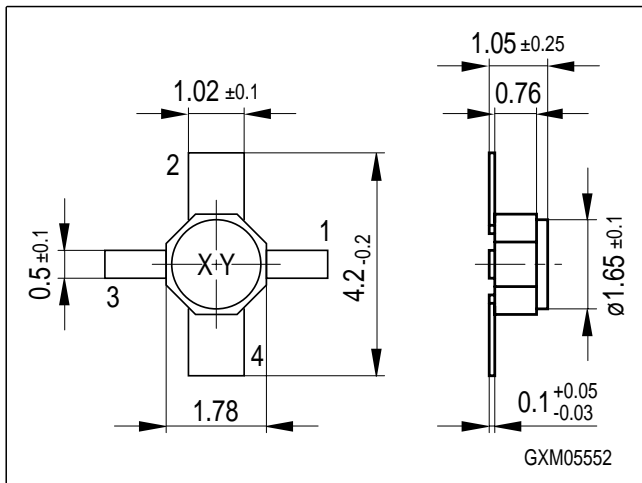
<sup>2)</sup> This test assures  $V_{(BR)CE0} > 4.5 \text{ V}$

**Electrical Characteristics at  $T_A = 25^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics (verified by random sampling)</b>					
Transition frequency $I_C = 90\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 1\text{ GHz}$ $I_C = 90\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 2\text{ GHz}$	$f_T$	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	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$ , $V_{CB} = v_{cb} = 0$ , $f = 1\text{ MHz}$	$C_{eb}$	-	2	3	
Noise figure $I_C = 10\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $Z_S = Z_{\text{Sopt}}$ , $f = 1.8\text{ GHz}$	$F$	-	1.25	2	dB
Power gain, maximum available $I_C = 50\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $Z_S = Z_{\text{Sopt}}$ , $Z_L = Z_{\text{Lopt}}$ , $f = 1.8\text{ GHz}$	$G_{\text{ma}}^{1)}$	-	16	-	
Transducer gain $I_C = 50\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $Z_S = Z_L = 50\ \Omega$ , $f = 1.8\text{ GHz}$	$ S_{21e} ^2$	8	12	-	dB
1dB Compression point $I_C = 50\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $Z_S = Z_{\text{Sopt}}$ , $Z_L = Z_{\text{Lopt}}$ , $f = 1.8\text{ GHz}$	$P_{-1\text{dB}}$	-	19	-	dBm

$$^1G_{\text{ma}} = |S_{21e} / S_{12e}| (k - (k^2 - 1)^{1/2})$$

Micro-X Package



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