

HiRel NPN Silicon RF Transistor

- **HiRel Discrete and Microwave Semiconductor**

- For High Gain Low Noise Amplifiers
- For Oscillators up to 10 GHz
- Noise Figure $F = 1.1$ dB at 1.8 GHz
Outstanding $G_{mS} = 21$ dB at 1.8 GHz
- Hermetically sealed microwave package
- Transition Frequency $f_T = 22$ GHz

- **SIEGET[®] 25 GHz f_T - Line**

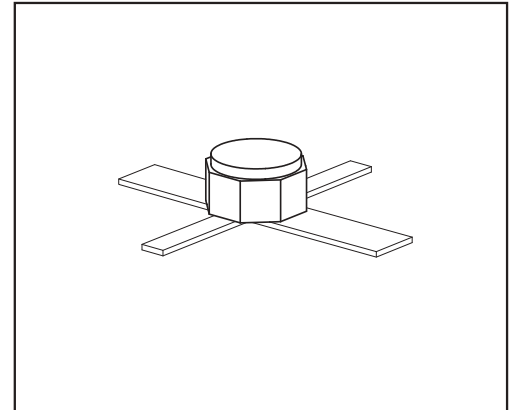
**Infineon Technologies Grounded Emitter Transistor-
25 GHz f_T - Line**

- **ESA Space Qualified**

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

Type Variant No. 02

ESD: Electrostatic discharge sensitive device, observe handling precaution!



Type	Marking	Pin Configuration						Package
		1=C	2=E	3=B	4=E	-	-	
BFY420 (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	35	mA
Base current	I_B	3.0	
Total power dissipation $T_S \leq 129^\circ\text{C}$ 1)2)	P_{tot}	160	mW
Junction temperature	T_j	175	$^\circ\text{C}$
Operating temperature range	T_{op}	-65 ... 175	$^\circ\text{C}$
Storage temperature	T_{stg}	-65 ... 175	$^\circ\text{C}$

¹At $T_S = 129^\circ\text{C}$. For $T_S > 129^\circ\text{C}$ derating is required.

² T_S is measured on the collector lead at the soldering point to the pcb.

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point ¹⁾	R_{thJS}	< 285	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 ²⁾ $V_{CE} = 4.5\text{ V}, I_B = 1.0\ \mu\text{A}$	I_{CEX}	-	-	200	μA
Collector -base cutoff current $V_{CB} = 5\text{ V}, I_E = 0$	I_{CBO}	-	-	30	nA
Emitter-base cutoff current $V_{EB} = 1.5\text{ V}, I_C = 0$	I_{EBO}	-	-	20	μA
DC current gain $I_C = 5\text{ mA}, V_{CE} = 1\text{ V}$	h_{FE}	50	90	150	-

¹⁾ T_S is measured on the collector lead at the soldering point to the pcb.

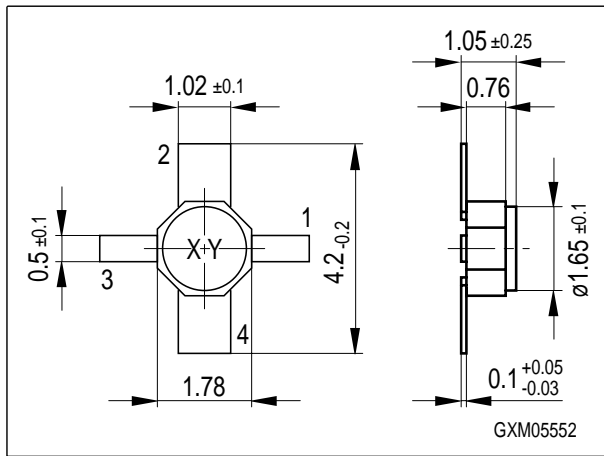
²⁾ This test assures $V_{(BR)CE0} > 4.5\text{V}$

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
Transition frequency $I_C = 30\text{ mA}$, $V_{CE} = 3\text{ V}$, $f = 2.0\text{ GHz}$	f_T	20	22	-	GHz
Collector-base capacitance $V_{CB} = 2\text{ V}$, $V_{BE} = v_{be} = 0$, $f = 1\text{ MHz}$	C_{cb}	-	0.14	0.9	pF
Collector emitter capacitance $V_{CE} = 2\text{ V}$, $V_{BE} = v_{be} = 0$, $f = 1\text{ MHz}$	C_{ce}	-	0.46	0.85	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$, $V_{CB} = v_{cb} = 0$, $f = 1\text{ MHz}$	C_{eb}	-	0.67	3.0	
Noise figure $I_C = 5\text{ mA}$, $V_{CE} = 2\text{ V}$, $Z_S = Z_{Sopt}$, $f = 1.8\text{ GHz}$	F	-	1.1	1.7	dB
Power gain $I_C = 20\text{ mA}$, $V_{CE} = 2\text{ V}$, $f = 1.8\text{ GHz}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	$G_{ms}^{1)}$	-	21	-	dB
Transducer gain $I_C = 20\text{ mA}$, $V_{CE} = 2\text{ V}$, $Z_S = Z_L = 50\ \Omega$, $f = 1.8\text{ GHz}$	$ S_{21e} ^2$	14	18	-	
1dB Compression point $I_C = 20\text{ mA}$, $V_{CE} = 2\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 1.8\text{ GHz}$	P_{-1dB}	-	12	-	dBm

$$^1G_{ms} = |S_{21} / S_{12}|$$

Micro-X Package



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