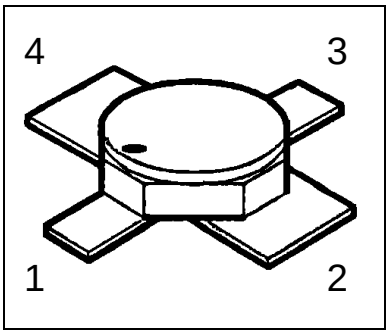
HiRel NPN Silicon RF Transistor



- ***HiRel* Discrete and Microwave Semiconductor**
- For Low Current Applications
- For Oscillators up to 12 GHz
- Noise Figure F = 1.15 dB at 1.8 GHz
  Outstanding Gms = 23dB at 1.8 GHz
- Hermetically sealed microwave package
- Transition Frequency f_T = 20 GHz
- **SIEGET®25-Line**
  Infineon Technologies Grounded **E**mitter **T**ransistor-
  25 GHz f_T-**Line**
- esa **Space Qualified**
  ESA/SCC Detail Spec. No.: 5611/008
  Type Variant No. 01

ESD: **E**lectro**s**tatic **d**ischarge sensitive device,
observe handling precautions!

Type	Marking	Ordering Code	Pin Configuration				Package
			1	2	3	4	
BFY405 (ql)	-	see below	C	E	B	E	Micro-X

(ql) Quality Level: P: Professional Quality
H: High Rel Quality
S: Space Quality
ES: ESA Space Quality

(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	12	mA
Base current	I_B	1.0	mA
Total power dissipation, $T_S \leq 145°C$ [1), 2)]	P_{tot}	55	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 [2)]	$R_{th\ JS}$	< 545	K/W

Notes.:
1) At T_S = + 145 °C. For T_S > + 145 °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°C; unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-base cutoff current V_{CB} = 5 V, I_E = 0	I_{CBO}	-	-	10	nA
Collector-emitter cutoff current [1.)] V_{CE} = 4.5 V, I_B = 0.1µA	I_{CEX}	-	-	20 (t.b.d.)	µA
Emitter-base cuttoff current V_{EB} = 1.5 V, I_C = 0	I_{EBO}	-	-	5.0	µA
DC current gain I_C = 5 mA, V_{CE} = 1 V	h_{FE}	50	90	150	-

Notes:

1.) This Test assures $V_{(BR)CE0}$ > 4.5V

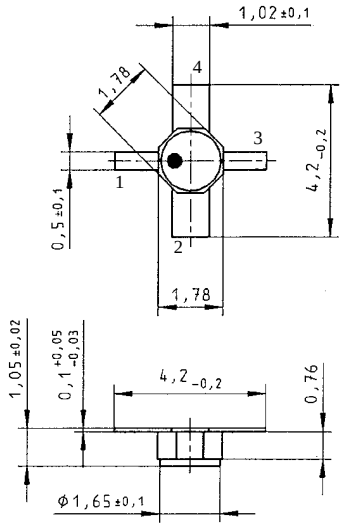
Electrical Characteristics (continued)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Transition frequency I_C = 10mA, V_{CE} = 3 V, f = 2.0 GHz	f_T	20	22	-	GHz
Collector-base capacitance V_{CB} = 2 V, V_{BE} = vbe = 0, f = 1 MHz	C_{CB}	-	0.05	0.9	pF
Collector-emitter capacitance V_{CE} = 2 V, V_{BE} = vbe = 0, f = 1 MHz	C_{CE}	-	0.32	0.48	pF
Emitter-base capacitance V_{EB} = 0.5V, V_{CB} = vcb = 0, f = 1 MHz	C_{EB}	-	0.36	3.0	pF
Noise Figure I_C = 2 mA, V_{CE} = 2 V, f = 1.8 GHz, $Z_S = Z_{sopt}$	F	-	1.15	1.8	dB
Insertion power gain I_C = 5 mA, V_{CE} = 2 V, f = 1.8 GHz $Z_S = Z_L$ = 50 Ω	$\|S_{21e}\|^2$	14	18	-	dB
Power gain I_C = 5 mA, V_{CE} = 2 V, f = 1.8 GHz $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	Gms [1.)]	-	23	-	dB
1dB Compression point I_C = 5 mA, V_{CE} = 2 V, f = 1.8 GHz $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	P_{-1dB}	-	5	-	dBm

Notes.:

1) $G_{ms} = \left|\frac{S21}{S12}\right|$

Micro-X Package



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