
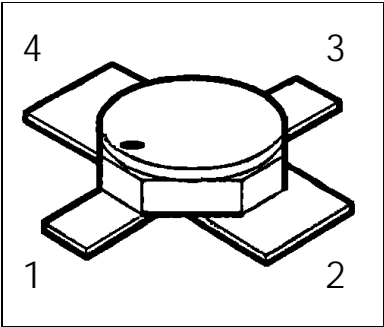


HiRel NPN Silicon RF Transistor

- **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 $f_T = 20\text{ GHz}$
- **SIEGET[®] 25-Line**
Siemens Grounded Emitter Transistor-
25 GHz f_T -Line
-  **ESA Space Qualified**
ESA/SCC Detail Spec. No.: 5611/008
Type Variant No. 01



ESD: Electrostatic discharge 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,	Ordering Code:	Q62702F1661
	H: High Rel Quality,	Ordering Code:	on request
	S: Space Quality,	Ordering Code:	on request
	ES: ESA Space Quality,	Ordering Code:	Q62702F1710

(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, $T_s \leq 145^\circ\text{C}$ ^{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
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Notes.:

- 1) At $T_s = +145^\circ\text{C}$. For $T_s > +145^\circ\text{C}$ 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}	-	-	10	nA
Collector-emitter cutoff current ^{1.)} $V_{CE} = 4.5\text{ V}, I_B = 0.1\mu\text{A}$	I_{CEX}	-	-	20 (t.b.d.)	μA
Emitter-base cutoff current $V_{EB} = 1.5\text{ V}, I_C = 0$	I_{EBO}	-	-	5.0	μA
DC current gain $I_C = 5\text{ mA}, V_{CE} = 1\text{ V}$	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 $I_C = 10\text{mA}$, $V_{CE} = 3\text{ V}$, $f = 2.0\text{ GHz}$	f_T	20	22	-	GHz
Collector-base capacitance $V_{CB} = 2\text{ V}$, $V_{BE} = v_{be} = 0$, $f = 1\text{ MHz}$	C_{CB}	-	0.05	0.9	pF
Collector-emitter capacitance $V_{CE} = 2\text{ V}$, $V_{BE} = v_{be} = 0$, $f = 1\text{ MHz}$	C_{CE}	-	0.32	0.48	pF
Emitter-base capacitance $V_{EB} = 0.5\text{V}$, $V_{CB} = v_{cb} = 0$, $f = 1\text{ MHz}$	C_{EB}	-	0.36	3.0	pF
Noise Figure $I_C = 2\text{ mA}$, $V_{CE} = 2\text{ V}$, $f = 1.8\text{ GHz}$, $Z_S = Z_{s_{opt}}$	F	-	1.15	1.8	dB
Insertion power gain $I_C = 5\text{ mA}$, $V_{CE} = 2\text{ V}$, $f = 1.8\text{ GHz}$ $Z_S = Z_L = 50\ \Omega$	$ S_{21e} ^2$	14	18	-	dB
Power gain $I_C = 5\text{ mA}$, $V_{CE} = 2\text{ V}$, $f = 1.8\text{ GHz}$ $Z_S = Z_{S_{opt}}$, $Z_L = Z_{L_{opt}}$	$G_{ms}^{1.)}$	-	23	-	dB
1dB Compression point $I_C = 5\text{ mA}$, $V_{CE} = 2\text{ V}$, $f = 1.8\text{ GHz}$ $Z_S = Z_{S_{opt}}$, $Z_L = Z_{L_{opt}}$	$P_{-1\text{dB}}$	-	5	-	dBm

Notes.:

$$1) \quad G_{ms} = \left| \frac{S_{21}}{S_{12}} \right|$$

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.....
BFY405 (ql)
(ql): Quality Level

Ordering Example:

Ordering Code: Q62702F1710
BFY405 ES
For BFY405 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

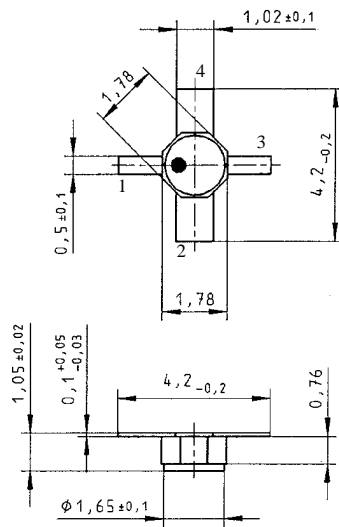
- *HiRel* Discrete and Microwave Semiconductors

www.siemens.de/semiconductor/products/35/353.htm

Please contact also our marketing division :

Tel.: ++89 6362 4480
Fax.: ++89 6362 5568
e-mail: martin.wimmers@siemens-scg.com
Address: Siemens Semiconductors,
High Frequency Products Marketing,
P.O.Box 801709,
D-81617 Munich

Micro-X Package



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