
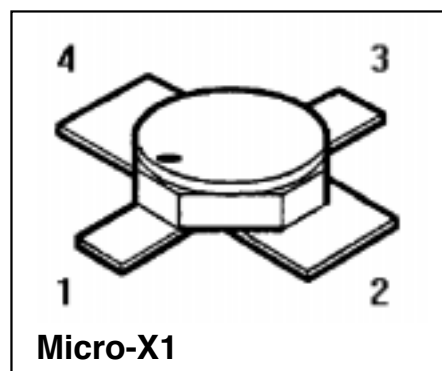


HiRel NPN Silicon RF Transistor

BFY 193

Features

- **HiRel Discrete and Microwave Semiconductor**
- For low noise, high gain broadband amplifiers up to 2 GHz.
- For linear broadband amplifiers
- Hermetically sealed microwave package
- $f_T = 8$ GHz, $F = 2.3$ dB at 2 GHz
-  **esa** qualified
- ESA/SCC Detail Spec. No.: 5611/006



ESD: Electrostatic discharge sensitive device, observe handling precautions!

Type	Marking	Ordering Code	Pin Configuration				Package
BFY 193 (ql)	–	see below	C	E	B	E	Micro-X1

(ql) Quality Level: P: Professional Quality, Ordering Code: Q62702F1610

H: High Rel Quality, Ordering Code: on request

S: Space Quality, Ordering Code: on request

ES: ESA Space Quality, Ordering Code: Q62702F1701

(see **Chapter Order Instructions** for ordering example)

Table 1 Maximum Ratings

Parameter	Symbol	Limit Values	Unit
Collector-emitter voltage	V_{CEO}	12	V
Collector-emitter voltage, $V_{BE} = 0$	V_{CES}	20	V
Collector-base voltage	V_{CBO}	20	V
Emitter-base voltage	V_{EBO}	2	V
Collector current	I_C	80	mA
Base current	I_B	10 ¹⁾	mA
Total power dissipation, $T_S \leq 104$ °C ²⁾	P_{tot}	580	mW
Junction temperature	T_j	200	°C
Operating temperature range	T_{op}	– 65 ... + 200	°C
Storage temperature range	T_{stg}	– 65 ... + 200	°C

Thermal Resistance

Junction soldering point ²⁾	$R_{th JS}$	< 165	K/W
--	-------------	-------	-----

¹⁾ The maximum permissible base current for V_{FBE} measurements is 30 mA (spot measurement duration < 1 s).

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

Electrical Characteristics

Table 2 DC Characteristics at $T_A = 25\text{ °C}$ unless otherwise specified

Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
Collector-base cutoff current $V_{CB} = 20\text{ V}, I_E = 0$	I_{CBO}	–	–	100	μA
Collector-emitter cutoff current $V_{CE} = 12\text{ V}, I_B = 0.5\text{ }\mu\text{A}$ ³⁾	I_{CEX}	–	–	600	μA
Collector-base cutoff current $V_{CB} = 10\text{ V}, I_E = 0$	I_{CBO}	–	–	50	nA
Emitter-base cutoff current $V_{EB} = 2\text{ V}, I_C = 0$	I_{EBO}	–	–	25	μA
Emitter-base cutoff current $V_{EB} = 1\text{ V}, I_C = 0$	I_{EBO}	–	–	0.5	μA
Base-emitter forward voltage $I_E = 30\text{ mA}, I_C = 0$	V_{FBE}	–	–	1	V
DC current gain $I_C = 30\text{ mA}, V_{CE} = 8\text{ V}$	h_{FE}	50	100	175	–

³⁾ This test assures $V_{(BR)CE0} > 12\text{ V}$.

Table 3 AC Characteristics at $T_A = 25\text{ °C}$ unless otherwise specified

Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
Transition frequency $I_C = 40\text{ mA}, V_{CE} = 5\text{ V}, f = 500\text{ MHz}$ $I_C = 50\text{ mA}, V_{CE} = 8\text{ V}, f = 500\text{ MHz}$	f_T	6.5 –	7.5 8	– –	GHz
Collector-base capacitance $V_{CB} = 10\text{ V}, V_{BE} = v_{be} = 0, f = 1\text{ MHz}$	C_{CB}	–	0.56	0.75	pF
Collector-emitter capacitance $V_{CE} = 10\text{ V}, V_{BE} = v_{be} = 0, f = 1\text{ MHz}$	C_{CE}	–	0.34	–	pF
Emitter-base capacitance $V_{EB} = 0.5\text{ V}, V_{CB} = v_{cb} = 0, f = 1\text{ MHz}$	C_{EB}	–	1.9	2.4	pF
Noise figure $I_C = 15\text{ mA}, V_{CE} = 5\text{ V}, f = 2\text{ GHz},$ $Z_S = Z_{Sopt}$	F	–	2.3	2.9	dB
Power gain $I_C = 40\text{ mA}, V_{CE} = 5\text{ V}, f = 2\text{ GHz},$ $Z_S = Z_{Sopt}, Z_L = Z_{Lopt}$	$G_{ma}^{4)}$	12.5	13.5	–	dB
Transducer gain $I_C = 40\text{ mA}, V_{CE} = 5\text{ V}, f = 2\text{ GHz},$ $Z_S = Z_L = 50\text{ }\Omega$	$ S_{21e} ^2$	8	9	–	dB
Output power $I_C = 50\text{ mA}, V_{CE} = 5\text{ V}, f = 2\text{ GHz},$ $P_{IN} = 10\text{ dBm}, Z_S = Z_L = 50\text{ }\Omega$	P_{out}	16.5	17.5	–	dBm

$$^4) G_{ma} = \left| \frac{S_{21}}{S_{12}} \right| (k - \sqrt{k^2 - 1}), G_{ms} = \left| \frac{S_{21}}{S_{12}} \right|$$

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...
BFY193 (x) (ql)
(ql): Quality Level

Ordering Example:

Ordering Code: Q62702F1701
BFY193 ES
For BFY193 in ESA Space Quality Level

Further Information

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@hl.siemens.de

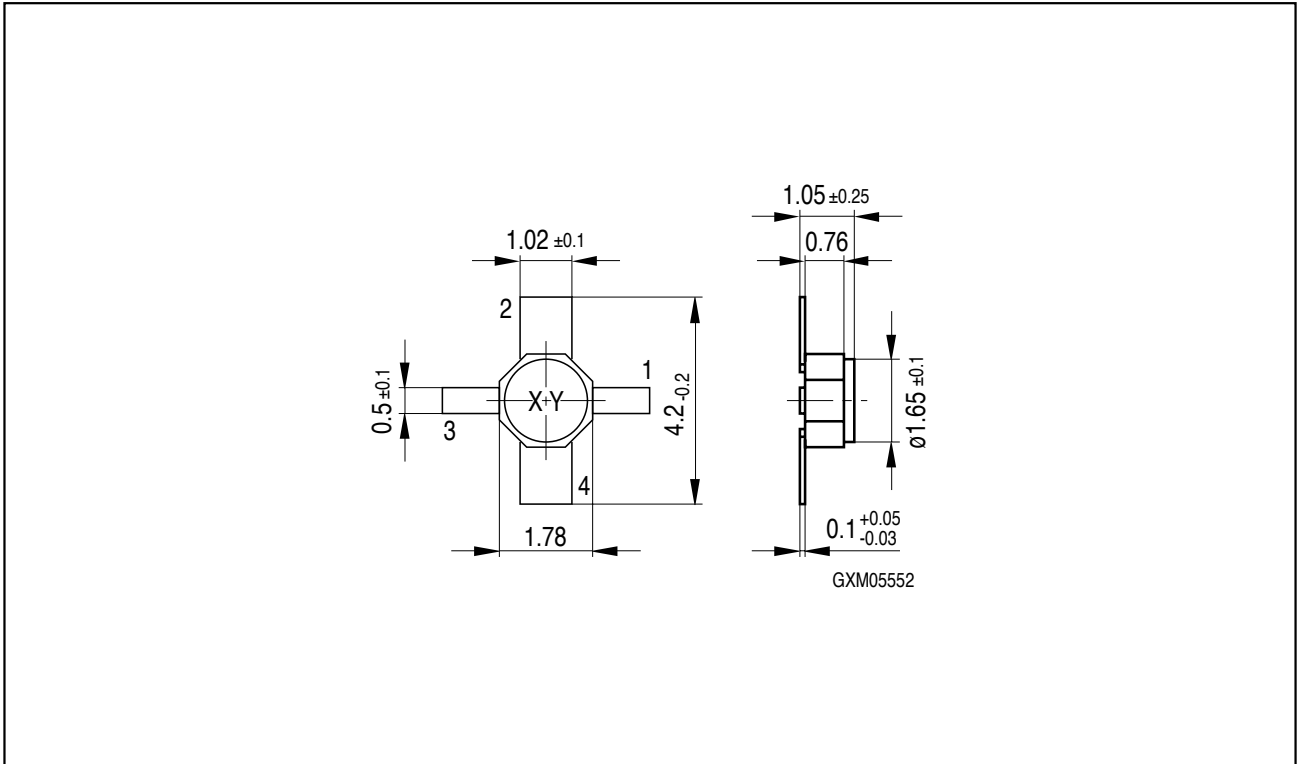


Figure 1 **Micro-X1 Package**