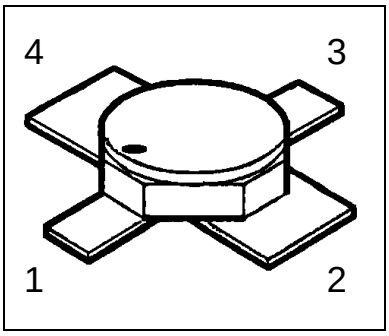
HiRel NPN Silicon RF Transistor



- ***HiRel* Discrete and Microwave Semiconductor**
- For low noise, high-gain amplifiers up to 2GHz.
- For linear broadband amplifiers
- Specified 1/f Noise
- Hermetically sealed microwave package
- f_T= 8 GHz
  F = 2.3 dB at 2 GHz
- **esa Space Qualified**
  ESA/SCC Detail Spec. No.: 5611/006
  Type Variant No. 08

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

Type	Marking	Ordering Code	Pin Configuration				Package
			1	2	3	4	
BFY193C (ql)	-	see below	C	E	B	E	Micro-X1

(ql) Quality Level: P: Professional Quality
ES: ESA Space Quality

(see order instructions for ordering example)

Maximum Ratings

Parameter	Symbol	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), 3)]	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 [3)]	$R_{th\ JS}$	< 165	K/W

Notes.:

1) The maximum permissible base current for V_{FBE} measurements is 30mA (spot-measurement duration < 1s)
2) At T_S = + 104 °C. For T_S > + 104 °C derating is required.
3) 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} = 20 V, I_E = 0	I_{CBO}	-	-	100	µA
Collector-emitter cutoff current V_{CE} = 12 V, I_B = 0,5µA [1.)]	I_{CEX}	-	-	600	µA
Collector-base cutoff current V_{CB} = 10 V, I_E = 0	I_{CBO}	-	-	50	nA
Emitter base cuttoff current V_{EB} = 2 V, I_C = 0	I_{EBO}	-	-	25	µA
Emitter base cuttoff current V_{EB} = 1 V, I_C = 0	I_{EBO}	-	-	0.5	µA

Notes:

1.) This Test assures V(BR)CE0 > 12V

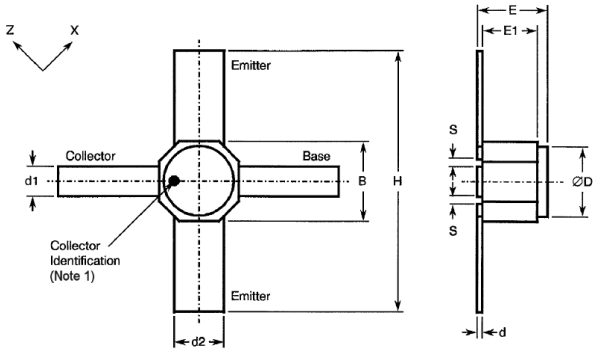
Electrical Characteristics (continued)

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Base-Emitter forward voltage I_E = 30 mA, I_C = 0	V_{FBE}	-	-	1	V
DC current gain I_C = 30 mA, V_{CE} = 8 V	h_{FE}	50	100	175	-
AC Characteristics					
Transition frequency I_C = 40mA, V_{CE} = 5 V, f = 500 MHz I_C = 50 mA, V_{CE} = 8 V, f = 500 MHz	f_T	 6,5 -	 7.5 8	 - -	GHz
Collector-base capacitance V_{CB} = 10 V, V_{BE} = vbe = 0, f = 1 MHz	C_{CB}	-	0.56	0.75	pF
Collector-emitter capacitance V_{CE} = 10 V, V_{BE} = vbe = 0, f = 1 MHz	C_{CE}	-	0.34	-	pF
Emitter-base capacitance V_{EB} = 0.5V, V_{CB} = vcb = 0, f = 1 MHz	C_{EB}	-	1.9	2.4	pF
Noise Figure I_C = 15 mA, V_{CE} = 5 V, f = 2 GHz, $Z_S = Z_{Sopt}$	F	-	2.3	2.9	dB
Power gain I_C = 40 mA, V_{CE} = 5V, f = 2 GHz $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	Gma [1.)]	12.5	13.5	-	dB
Transducer gain I_C = 40 mA, V_{CE} = 5 V, f = 2 GHz $Z_S = Z_L$ = 50 Ω	$\|S_{21e}\|^2$	8	9	-	dB
Output Power I_C = 50 mA, V_{CE} = 5 V, f = 2GHz, P_{IN}=10dBm, $Z_S = Z_L$ = 50 Ω	P_{OUT}	16.5	17.5	-	dBm
1/f Noise	F_{10Hz}	-	-	300	nV/√Hz

Notes.:

1.) $G_{ma} = \left|\frac{S21}{S12}\right|(k - \sqrt{k^2 - 1})$, $G_{ms} = \left|\frac{S21}{S12}\right|$

Micro-X1 Package



Symbols	Dimensions mm	
	Min	Max
B	1.68	1.88
d	0.07	0.15
d1	0.4	0.6
d2	0.92	1.12
ØD	1.55	1.85
E	0.85	1.25
E1	0.66	0.86
H	4	4.4
S	0.08	0.3

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