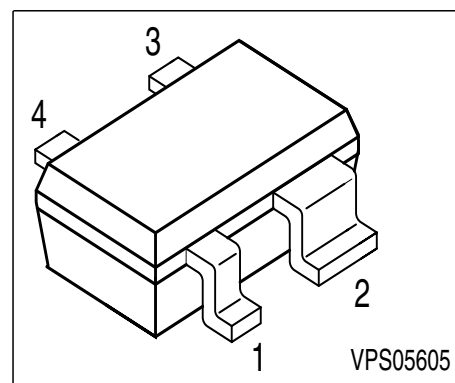


BFP 181W

NPN TY RF Transistor

- For low noise, high-gain broadband amplifier at collector currents from 0.5 mA to 12 mA
- $f_T = 8$ GHz
 $F = 1.45$ dB at 900 MHz



ESD: Electrostatic discharge sensitive device, observe handling precaution!

Type	Marking	Pin Configuration				Package
BFP 181W	RFs	1 = E	2 = C	3 = E	4 = B	SOT-343

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CEO}	12	V
Collector-emitter voltage	V_{CES}	20	
Collector-base voltage	V_{CBO}	20	
Emitter-base voltage	V_{EBO}	2	
Collector current	I_C	20	mA
Base current	I_B	2	
Total power dissipation, $T_S \leq 91$ °C 1)	P_{tot}	175	mW
Junction temperature	T_j	150	°C
Ambient temperature	T_A	-65 ... 150	
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Junction - soldering point	R_{thJS}	≤ 340	K/W
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Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC characteristics					
Collector-emitter breakdown voltage $I_C = 1\text{ mA}, I_B = 0$	$V_{(BR)CEO}$	12	-	-	V
Collector-emitter cutoff current $V_{CE} = 20\text{ V}, V_{BE} = 0$	I_{CES}	-	-	100	μA
Collector-base cutoff current $V_{CB} = 10\text{ V}, I_E = 0$	I_{CBO}	-	-	100	nA
Emitter-base cutoff current $V_{EB} = 1\text{ V}, I_C = 0$	I_{EBO}	-	-	1	μA
DC current gain $I_C = 5\text{ mA}, V_{CE} = 8\text{ V}$	h_{FE}	50	100	200	-

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 $I_C = 10\text{ mA}$, $V_{CE} = 8\text{ V}$, $f = 500\text{ MHz}$	f_T	6	8	-	GHz
Collector-base capacitance $V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$	C_{cb}	-	0.24	0.4	pF
Collector-emitter capacitance $V_{CE} = 10\text{ V}$, $f = 1\text{ MHz}$	C_{ce}	-	0.27	-	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$	C_{eb}	-	0.32	-	
Noise figure $I_C = 2\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_{Sopt}$, $f = 900\text{ MHz}$ $f = 1.8\text{ GHz}$	F	-	1.45 1.8	-	dB
Power gain, maximum stable ^{F)} $I_C = 5\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$, $f = 900\text{ MHz}$ $f = 1.8\text{ GHz}$	G_{ms}	-	20 16.5	-	
Transducer gain $I_C = 5\text{ mA}$, $V_{CE} = 8\text{ V}$, $Z_S = Z_L = 50\Omega$, $f = 900\text{ MHz}$ $I_C = 5\text{ mA}$, $V_{CE} = 8\text{ V}$	$ S_{21e} ^2$	-	16.5 11.5	-	

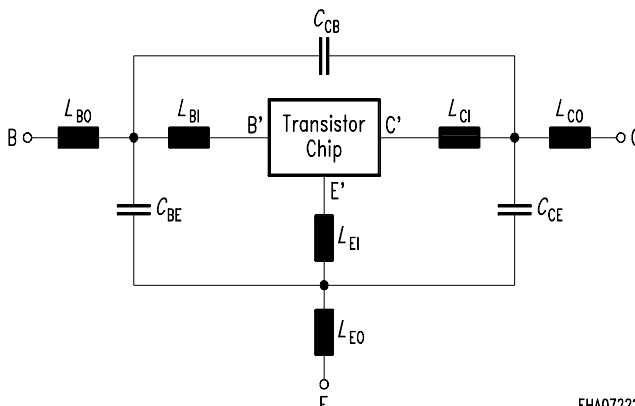
SPICE Parameters (Gummel-Poon Model, Berkley-SPICE 2G.6 Syntax) :

Transistor Chip Data

IS =	0.0010519	fA	BF =	96.461	-	NF =	0.90617	-
VAF =	22.403	V	IKF =	0.12146	A	ISE =	12.603	fA
NE =	1.7631	-	BR =	16.504	-	NR =	0.87757	-
VAR =	5.1127	V	IKR =	0.24951	A	ISC =	0.01195	fA
NC =	1.6528	-	RB =	9.9037	Ω	IRB =	0.69278	mA
RBM =	6.6315	Ω	RE =	2.1372		RC =	2.2171	Ω
CJE =	1.8168	fF	VJE =	0.73155	V	MJE =	0.43619	-
TF =	17.028	ps	XTF =	0.33814	-	VTF =	0.12571	V
ITF =	1.0549	mA	PTF =	0	deg	CJC =	319.69	fF
VJC =	1.1633	V	MJC =	0.30013	-	XCJC =	0.082903	-
TR =	2.7449	ns	CJS =	0	fF	VJS =	0.75	V
MJS =	0	-	XTB =	0	-	EG =	1.11	eV
XTI =	3	-	FC =	0.99768	-	TNOM	300	K

All parameters are ready to use, no scaling is necessary.

Package Equivalent Circuit:



L_{BI} =	0.43	nH
L_{BO} =	0.47	nH
L_{EI} =	0.26	nH
L_{EO} =	0.12	nH
L_{CI} =	0.06	nH
L_{CO} =	0.36	nH
C_{BE} =	68	fF
C_{CB} =	46	fF
C_{CE} =	232	fF

Valid up to 6GHz