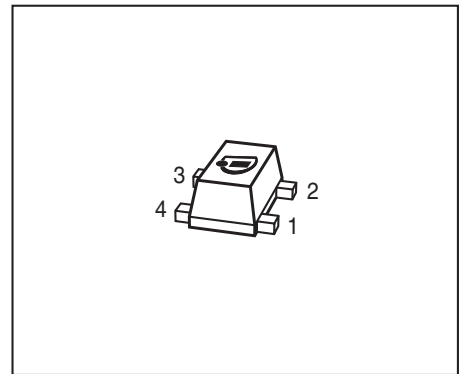


## Low Noise Silicon Bipolar RF Transistor

- For highest gain and low noise amplifier  
Outstanding  $G_{ms} = 22.5$  dB at 1.8 GHz  
Minimum noise figure  $NF_{min} = 0.95$  dB at 1.8 GHz
- For oscillators up to 15 GHz
- Transition frequency  $f_T = 45$  GHz
- Pb-free (RoHS compliant) and halogen-free thin small flat package with visible leads
- Qualification report according to AEC-Q101 available



**ESD** (Electrostatic discharge) sensitive device, observe handling precaution!

Type	Marking	Pin Configuration						Package
BFP520F	APs	1=B	2=E	3=C	4=E	-	-	TSFP-4

**Maximum Ratings** at  $T_A = 25$  °C, unless otherwise specified

Parameter	Symbol	Value	Unit
Collector-emitter voltage $T_A = 25$ °C $T_A = -55$ °C	$V_{CEO}$	2.5 2.4	V
Collector-emitter voltage	$V_{CES}$	10	
Collector-base voltage	$V_{CBO}$	10	
Emitter-base voltage	$V_{EBO}$	1	
Collector current	$I_C$	50	mA
Base current	$I_B$	5	
Total power dissipation <sup>1)</sup> $T_S \leq 98$ °C	$P_{tot}$	120	mW
Junction temperature	$T_J$	150	°C
Storage temperature	$T_{Stg}$	-55 ... 150	

<sup>1)</sup>  $T_S$  is measured on the emitter lead at the soldering point to pcb

## Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>1)</sup>	$R_{thJS}$	430	K/W

**Electrical Characteristics** at  $T_A = 25\text{ °C}$ , unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage $I_C = 1\text{ mA}$ , $I_B = 0$	$V_{(BR)CEO}$	2.5	3	3.5	V
Collector-emitter cutoff current $V_{CE} = 10\text{ V}$ , $V_{BE} = 0$	$I_{CES}$	-	-	10	$\mu\text{A}$
Collector-base cutoff current $V_{CB} = 5\text{ V}$ , $I_E = 0$	$I_{CBO}$	-	-	200	mA
Emitter-base cutoff current $V_{EB} = 1\text{ V}$ , $I_C = 0$	$I_{EBO}$	-	-	35	$\mu\text{A}$
DC current gain $I_C = 20\text{ mA}$ , $V_{CE} = 2\text{ V}$ , pulse measured	$h_{FE}$	70	110	170	-

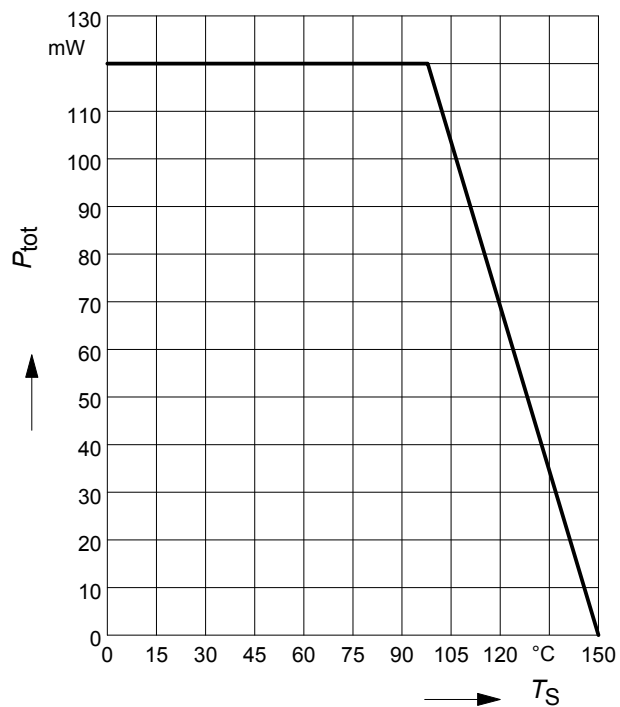
<sup>1</sup>For the definition of  $R_{thJS}$  please refer to Application Note AN077 (Thermal Resistance Calculation)

**Electrical Characteristics at  $T_A = 25\text{ °C}$ , unless otherwise specified**

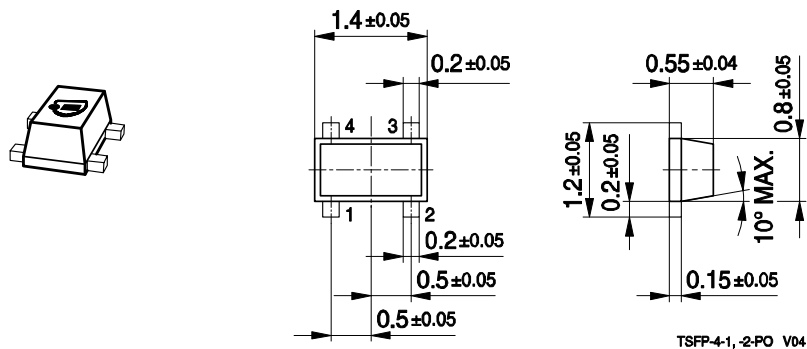
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
Transition frequency $I_C = 30\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $f = 2\text{ GHz}$	$f_T$	32	45	-	GHz
Collector-base capacitance $V_{CB} = 2\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , emitter grounded	$C_{cb}$	-	0.07	0.14	pF
Collector emitter capacitance $V_{CE} = 2\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , base grounded	$C_{ce}$	-	0.25	-	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$ , $V_{CB} = 0$ , collector grounded	$C_{eb}$	-	0.31	-	
Minimum noise figure $I_C = 2\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $Z_S = Z_{Sopt}$ , $f = 1.8\text{ GHz}$	$NF_{min}$	-	0.95	-	dB
Power gain, maximum stable <sup>1)</sup> $I_C = 20\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 1.8\text{ GHz}$	$G_{ms}$	-	22.5	-	dB
Insertion power gain $V_{CE} = 2\text{ V}$ , $I_C = 20\text{ mA}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_L = 50\text{ }\Omega$	$ S_{21} ^2$	-	20.5	-	
Third order intercept point at output $V_{CE} = 2\text{ V}$ , $I_C = 20\text{ mA}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$	$IP3$	-	23.5	-	dBm
1dB compression point $I_C = 20\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 1.8\text{ GHz}$	$P_{-1dB}$	-	10.5	-	

<sup>1)</sup> $G_{ms} = |S_{21} / S_{12}|$

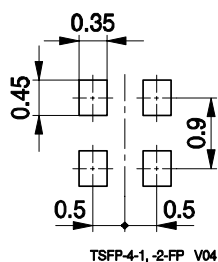
Total power dissipation  $P_{\text{tot}} = f(T_S)$



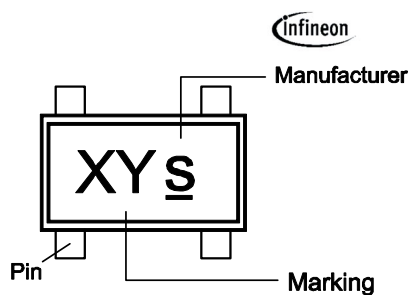
## Package Outline



## Foot Print

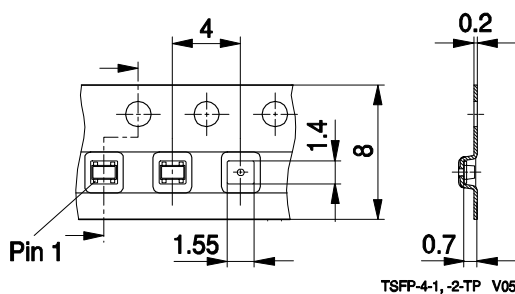


## Marking Layout (Example)



## Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel  
Reel ø330 mm = 10.000 Pieces/Reel



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