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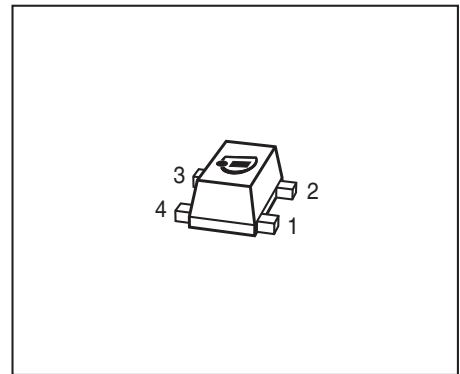
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**Low Noise Silicon Bipolar RF Transistor**

- For low current applications
- Minimum noise figure  $NF_{\min} = 1.25$  dB at 1.8 GHz  
Outstanding  $G_{ms} = 22.5$  dB at 1.8 GHz
- Transition frequency  $f_T = 25$  GHz
- Pb-free (RoHS compliant) and halogen-free thin small flat package (1.4 x 0.8 x 0.59 mm) with visible leads
- Qualification report according to AEC-Q101 available



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

Type	Marking	Pin Configuration						Package
BFP405F	ALs	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	$V_{CEO}$		V
$T_A = 25$ °C		4.5	
$T_A = -55$ °C		4.1	
Collector-emitter voltage	$V_{CES}$	15	
Collector-base voltage	$V_{CBO}$	15	
Emitter-base voltage	$V_{EBO}$	1.5	
Collector current	$I_C$	25	mA
Base current	$I_B$	3	
Total power dissipation <sup>1)</sup>	$P_{tot}$	75	mW
$T_S \leq 112$ °C			
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 the pcb

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>1)</sup>	$R_{thJS}$	500	K/W

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>DC Characteristics</b>					
Collector-emitter breakdown voltage $I_C = 1\text{ mA}, I_B = 0$	$V_{(BR)CEO}$	4	5	-	V
Collector-emitter cutoff current $V_{CE} = 15\text{ V}, V_{BE} = 0$	$I_{CES}$	-	-	10	$\mu\text{A}$
Collector-base cutoff current $V_{CB} = 5\text{ V}, I_E = 0$	$I_{CBO}$	-	-	100	nA
Emitter-base cutoff current $V_{EB} = 0.5\text{ V}, I_C = 0$	$I_{EBO}$	-	-	1	$\mu\text{A}$
DC current gain $I_C = 5\text{ mA}, V_{CE} = 4\text{ V}$ , pulse measured	$h_{FE}$	60	95	130	-

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

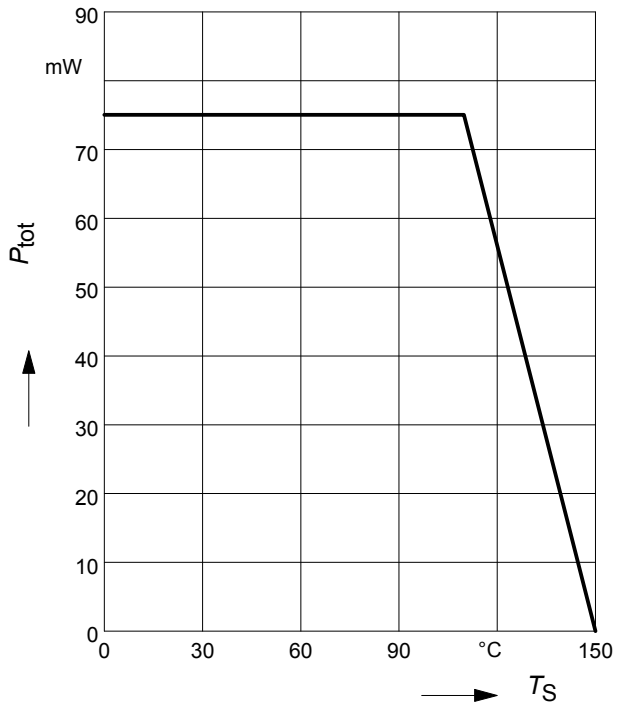
**Electrical Characteristics at  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics (verified by random sampling)</b>					
Transition frequency $I_C = 10\text{ mA}$ , $V_{CE} = 3\text{ V}$ , $f = 2\text{ GHz}$	$f_T$	18	25	-	GHz
Collector-base capacitance $V_{CB} = 2\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , emitter grounded	$C_{cb}$	-	0.05	0.1	pF
Collector emitter capacitance $V_{CE} = 2\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , base grounded	$C_{ce}$	-	0.2	-	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$ , $V_{CB} = 0$ , collector grounded	$C_{eb}$	-	0.25	-	
Minimum noise figure $I_C = 2\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_{Sopt}$	$NF_{min}$	-	1.25	-	dB
Power gain, maximum stable <sup>1)</sup> $I_C = 5\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 1.8\text{ GHz}$	$G_{ms}$	-	22.5	-	dB
Insertion power gain $V_{CE} = 2\text{ V}$ , $I_C = 5\text{ mA}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_L = 50\text{ }\Omega$	$ S_{21} ^2$	-	18	-	
Third order intercept point at output <sup>2)</sup> $V_{CE} = 2\text{ V}$ , $I_C = 5\text{ mA}$ , $f = 1.8\text{ GHz}$ , $Z_S = Z_L = 50\text{ }\Omega$	$IP3$	-	14	-	dBm
1dB compression point at output $I_C = 5\text{ mA}$ , $V_{CE} = 2\text{ V}$ , $Z_S = Z_L = 50\text{ }\Omega$ , $f = 1.8\text{ GHz}$	$P_{-1dB}$	-	0	-	

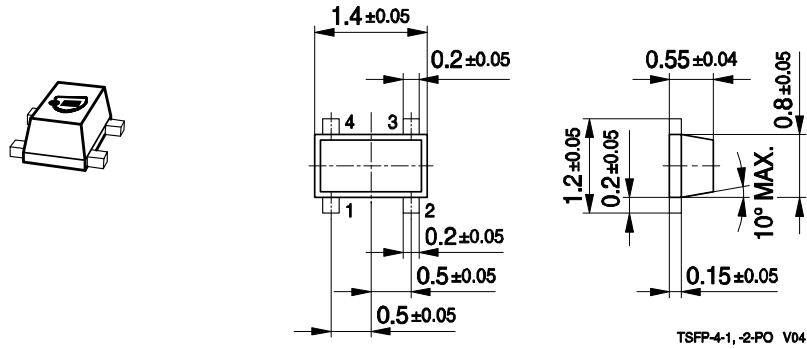
$$^1G_{ms} = |S_{21} / S_{12}|$$

<sup>2</sup>IP3 value depends on termination of all intermodulation frequency components.  
Termination used for this measurement is 50Ω from 0.1 MHz to 6 GHz

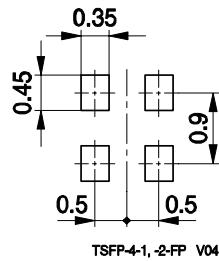
Total power dissipation  $P_{\text{tot}} = f(T_S)$



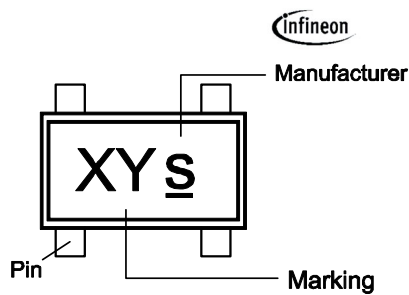
Package Outline



Foot Print

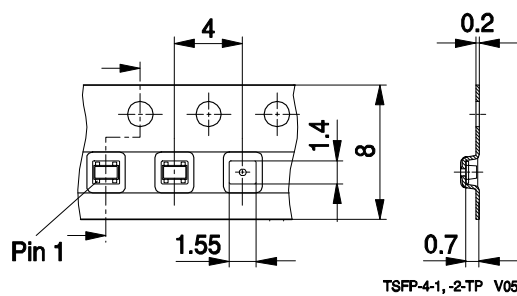


Marking Layout (Example)



Standard Packing

Reel  $\varnothing$ 180 mm = 3.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 10.000 Pieces/Reel



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