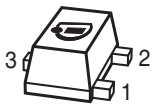
Low Noise Silicon Bipolar RF Transistor



- For low noise, high-gain amplifiers up to 2 GHz
- For linear broadband amplifiers
- f_T = 8 GHz, NF_{min} = 1 dB at 900 MHz
- Pb-free (RoHS compliant) and halogen-free product
- Qualification report according to AEC-Q101 available

ESD (**E**lectro**s**tatic **d**ischarge) sensitive device, observe handling precaution!

Type	Marking	Pin Configuration			Package
BFR193F	RCs	1 = B	2 = E	3 = C	TSFP-3

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

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	80	mA
Base current	I_B	10	
Total power dissipation[1)] $T_S \leq 72$°C	P_{tot}	580	mW
Junction temperature	T_J	150	°C
Storage temperature	T_{Stg}	-55 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point[2)]	R_{thJS}	135	K/W

[1] T_S is measured on the collector lead at the soldering point to the pcb

[2] For the definition of R_{thJS} please refer to Application Note AN077 (Thermal Resistance Calculation)

Electrical Characteristics at T_A = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)CEO}$	12	-	-	V
Collector-emitter cutoff current V_{CE} = 20 V, V_{BE} = 0	I_{CES}	-	-	100	µA
Collector-base cutoff current V_{CB} = 10 V, I_E = 0	I_{CBO}	-	-	100	nA
Emitter-base cutoff current V_{EB} = 1 V, I_C = 0	I_{EBO}	-	-	1	µA
DC current gain I_C = 30 mA, V_{CE} = 8 V, pulse measured	h_{FE}	70	100	140	-

Electrical Characteristics at T_A = 25 °C, unless otherwise specified

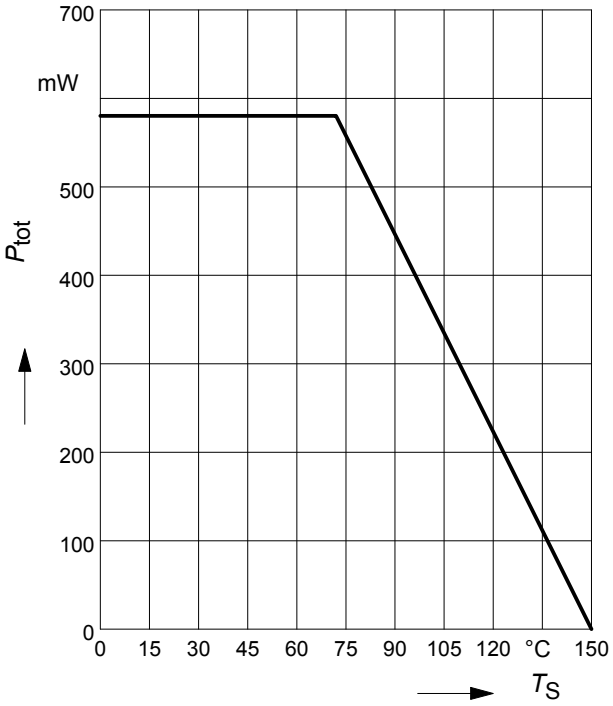
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
Transition frequency I_C = 50 mA, V_{CE} = 8 V, f = 500 MHz	f_T	6	8	-	GHz
Collector-base capacitance V_{CB} = 10 V, f = 1 MHz, V_{BE} = 0, emitter grounded	C_{cb}	-	0.63	1	pF
Collector emitter capacitance V_{CE} = 10 V, f = 1 MHz, V_{BE} = 0, base grounded	C_{ce}	-	0.25	-	
Emitter-base capacitance V_{EB} = 0.5 V, f = 1 MHz, V_{CB} = 0 , collector grounded	C_{eb}	-	2.25	-	
Minimum noise figure I_C = 10 mA, V_{CE} = 8 V, Z_S = Z_{Sopt} , f = 900 MHz f = 1.8 GHz	NF_{min}	 - -	 1 1.6	 - -	dB
Power gain, maximum stable[1)] I_C = 30 mA, V_{CE} = 8 V, Z_S = Z_{Sopt}, Z_L = Z_{Lopt} , f = 900 MHz	G_{ms}	-	12.5	-	dB
Power gain, maximum available[1)] I_C = 30 mA, V_{CE} = 8 V, Z_S = Z_{Sopt} , Z_L = Z_{Lopt} , f = 1.8 GHz	G_{ma}	-	19	-	dB
Transducer gain I_C = 30 mA, V_{CE} = 8 V, Z_S=Z_L=50Ω, f = 900 MHz f = 1.8 GHz	$\lvert S_{21e}\rvert^2$	 - -	 14.5 8.5	 - -	dB
Third order intercept point at output[2)] V_{CE} = 8 V, I_C = 30 mA, f = 900 MHz, Z_S = Z_L = 50 Ω	IP_3	-	29	-	dBm
1dB compression point at output[3)] I_C = 30 mA, V_{CE} = 8 V, Z_S = Z_L = 50 Ω, f = 900 MHz	P_{-1dB}	-	14.5	-	

[1] $G_{ma} = |S_{21} / S_{12}| (k-(k^2-1)^{1/2})$, $G_{ms} = |S_{21} / S_{12}|$

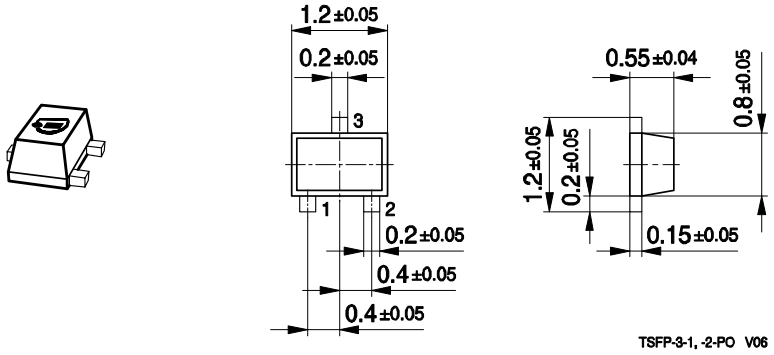
[2] IP3 value depends on termination of all intermodulation frequency components. Termination used for this measurement is 50Ω from 0.1 MHz to 6 GHz

[3] DC current at no input power

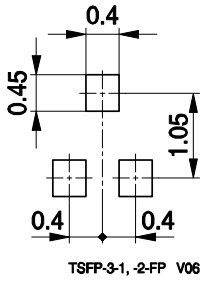
Total power dissipation $P_{tot} = f(T_S)$



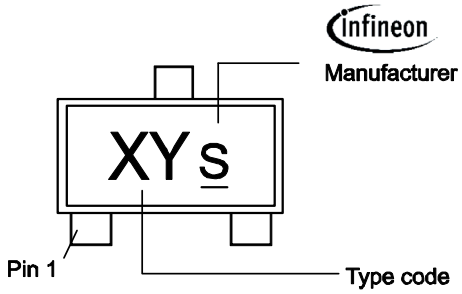
Package Outline



Foot Print

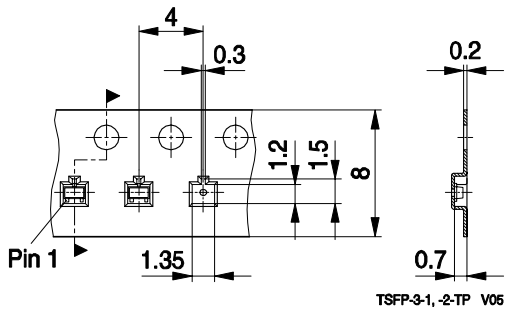


Marking Layout (Example)



Standard Packing

Reel Ø 180 mm = 3.000 Pieces/Reel
Reel Ø 330 mm = 10.000 Pieces/Reel



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