

**Low Noise Silicon Bipolar RF Transistor**

- For low noise, low distortion broadband amplifiers in antenna and telecommunications systems up to 1.5 GHz at collector currents from 10 mA to 70 mA
- Pb-free (RoHS compliant) package
- Qualification report according to AEC-Q101 available



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

Type	Marking	Pin Configuration			Package
BFQ19S	FG	1 = B	2 = C	3 = E	SOT89

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

Parameter	Symbol	Value	Unit
Collector-emitter voltage	$V_{CEO}$	15	V
Collector-emitter voltage	$V_{CES}$	20	
Collector-base voltage	$V_{CBO}$	20	
Emitter-base voltage	$V_{EBO}$	3	
Collector current	$I_C$	120	mA
Base current	$I_B$	12	
Total power dissipation <sup>1)</sup> $T_S \leq 85\text{ °C}$	$P_{tot}$	1	W
Junction temperature	$T_J$	150	°C
Ambient temperature	$T_A$	-65 ... 150	
Storage temperature	$T_{Stg}$	-65 ... 150	

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>2)</sup>	$R_{thJS}$	65	K/W

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

<sup>2)</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.	
<b>DC Characteristics</b>					
Collector-emitter breakdown voltage $I_C = 1\text{ mA}, I_B = 0$	$V_{(BR)CEO}$	15	-	-	V
Collector-emitter cutoff current $V_{CE} = 20\text{ V}, V_{BE} = 0$	$I_{CES}$	-	-	10	$\mu\text{A}$
Collector-base cutoff current $V_{CB} = 10\text{ V}, I_E = 0$	$I_{CBO}$	-	-	100	nA
Emitter-base cutoff current $V_{EB} = 2\text{ V}, I_C = 0$	$I_{EBO}$	-	-	100	$\mu\text{A}$
DC current gain $I_C = 70\text{ mA}, V_{CE} = 8\text{ V}$ , pulse measured	$h_{FE}$	70	100	140	-

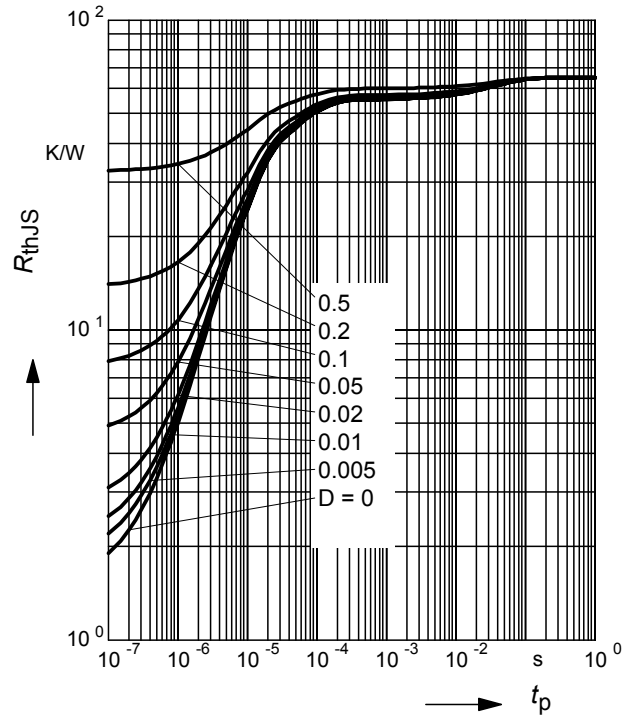
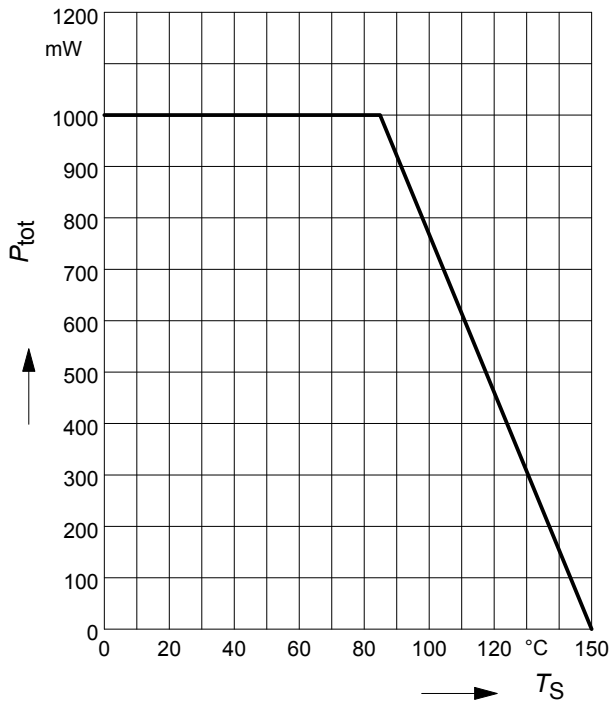
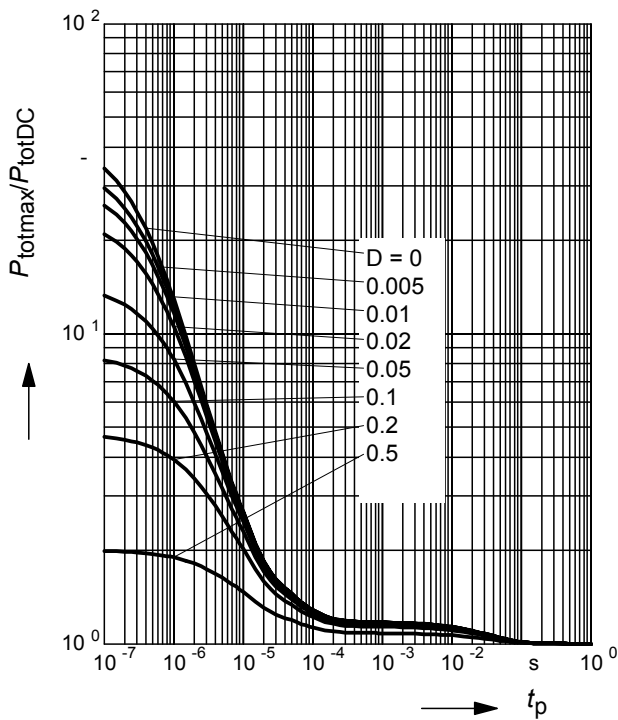
**Electrical Characteristics at  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics (verified by random sampling)</b>					
Transition frequency $I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $f = 500\text{ MHz}$	$f_T$	4	5.5	-	GHz
Collector-base capacitance $V_{CB} = 10\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , emitter grounded	$C_{cb}$	-	1.05	1.35	pF
Collector emitter capacitance $V_{CE} = 10\text{ V}$ , $f = 1\text{ MHz}$ , $V_{BE} = 0$ , base grounded	$C_{ce}$	-	0.4	-	
Emitter-base capacitance $V_{EB} = 0.5\text{ V}$ , $f = 1\text{ MHz}$ , $V_{CB} = 0$ , collector grounded	$C_{eb}$	-	3.9	-	
Minimum noise figure $I_C = 20\text{ mA}$ , $V_{CE} = 6\text{ V}$ , $Z_S = Z_{Sopt}$ , $f = 900\text{ MHz}$ $f = 1.8\text{ GHz}$	$NF_{min}$	-	1.8	-	dB
		-	3	-	
Power gain, maximum available <sup>1)</sup> $I_C = 70\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 900\text{ MHz}$ $f = 1.8\text{ GHz}$	$G_{ma}$	-	11.5	-	
		-	7	-	
Transducer gain $I_C = 30\text{ mA}$ , $V_{CE} = 8\text{ V}$ , $Z_S = Z_L = 50\Omega$ , $f = 900\text{ MHz}$ $f = 1.8\text{ GHz}$	$ S_{21e} ^2$	-	9.5	-	dB
		-	4	-	
Third order intercept point at output <sup>2)</sup> $V_{CE} = 8\text{ V}$ , $I_C = 70\text{ mA}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 1.8\text{ GHz}$	$IP_3$	-	32	-	dBm
1dB Compression point $V_{CE} = 8\text{ V}$ , $I_C = 70\text{ mA}$ , $Z_S = Z_{Sopt}$ , $Z_L = Z_{Lopt}$ , $f = 1.8\text{ GHz}$	$P_{-1dB}$	-	22	-	

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

<sup>2</sup>IP3 value depends on termination of all intermodulation frequency components.

Termination used for this measurement is  $50\Omega$  from 0.2 MHz to 12 GHz

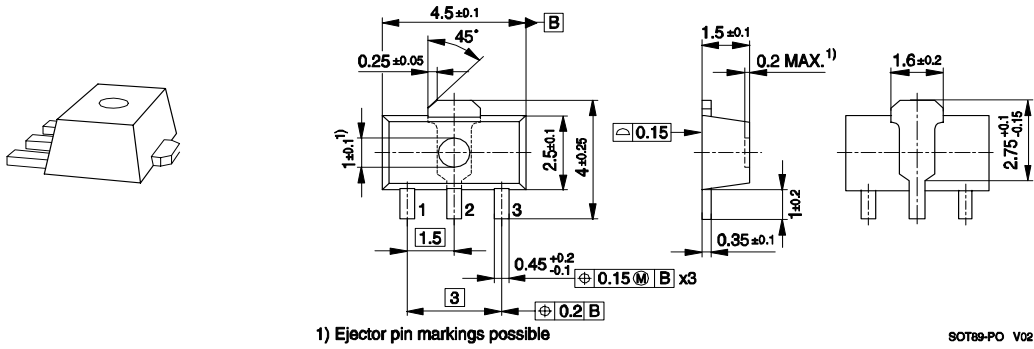
**Total power dissipation  $P_{\text{tot}} = f(T_S)$** 
**Permissible Pulse Load  $R_{\text{thJS}} = f(t_p)$** 

**Permissible Pulse Load**
 $P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$ 


**SPICE GP model**

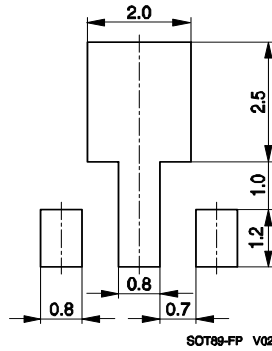
For the SPICE model as well as for S-parameters (including noise parameters) please refer to our internet website [www.infineon.com/rf.models](http://www.infineon.com/rf.models).

Please consult our website and download the latest versions before actually starting your design.

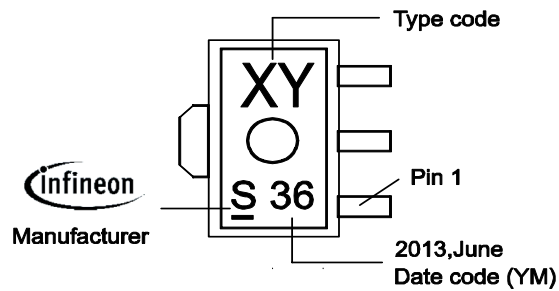
### Package Outline



### Foot Print

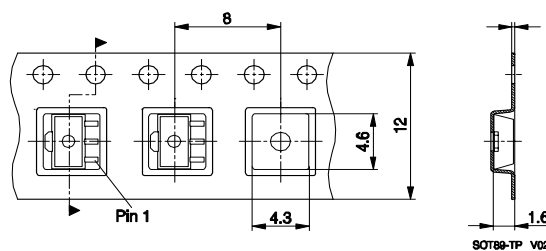


### Marking Layout (Example)



### Standard Packing

Reel Ø 180 mm= 1.000 Pieces/Reel  
 Reel Ø 330 mm= 4.000 Pieces/Reel



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