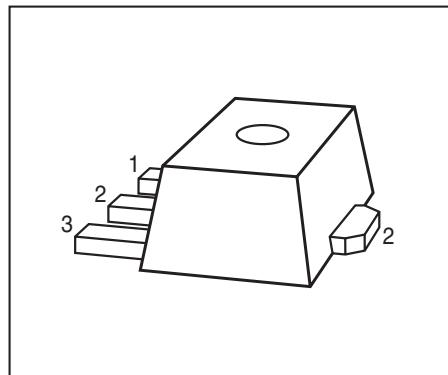


Low Noise Silicon Bipolar RF Transistor

- 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 $T_A = 25^\circ\text{C}$, 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 ¹⁾ $T_S \leq 85^\circ\text{C}$	P_{tot}	1	
Junction temperature	T_J	150	
Ambient temperature	T_A	-65 ... 150	$^\circ\text{C}$
Storage temperature	T_{Stg}	-65 ... 150	

Thermal Resistance

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

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

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

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 $I_C = 1 \text{ mA}, I_B = 0$	$V_{(\text{BR})\text{CEO}}$	15	-	-	V
Collector-emitter cutoff current $V_{CE} = 20 \text{ V}, V_{BE} = 0$	I_{CES}	-	-	10	μA
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	μA
DC current gain $I_C = 70 \text{ mA}, V_{CE} = 8 \text{ V}$, pulse measured	h_{FE}	70	100	140	-

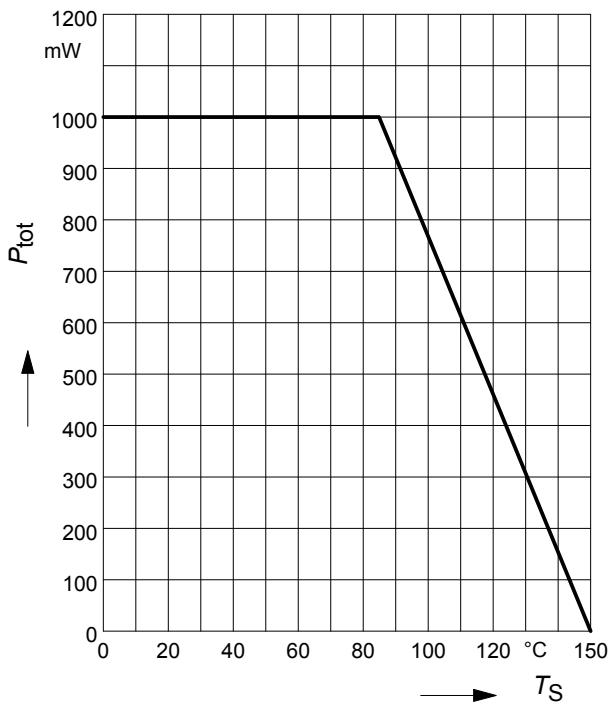
Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
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 $V_{CB} = 10 \text{ V}, f = 1 \text{ MHz}, V_{BE} = 0 \text{ , emitter grounded}$	C_{cb}	-	1.05	1.35	pF
Collector emitter capacitance $V_{CE} = 10 \text{ V}, f = 1 \text{ MHz}, V_{BE} = 0 \text{ , base grounded}$	C_{ce}	-	0.4	-	
Emitter-base capacitance $V_{EB} = 0.5 \text{ V}, f = 1 \text{ MHz}, V_{CB} = 0 \text{ , collector grounded}$	C_{eb}	-	3.9	-	
Minimum noise figure $I_C = 20 \text{ mA}, V_{CE} = 6 \text{ V}, Z_S = Z_{\text{Sopt}}, f = 900 \text{ MHz}, f = 1.8 \text{ GHz}$	NF_{min}	-	1.8	-	dB
-	-	3	-	-	
Power gain, maximum available ¹ $I_C = 70 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_{\text{Sopt}}, Z_L = Z_{\text{Lopt}}, f = 900 \text{ MHz}, f = 1.8 \text{ GHz}$	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 ² $V_{CE} = 8 \text{ V}, I_C = 70 \text{ mA}, Z_S = Z_{\text{Sopt}}, Z_L = Z_{\text{Lopt}}, f = 1.8 \text{ GHz}$	IP_3	-	32	-	dBm
1dB Compression point $V_{CE} = 8 \text{ V}, I_C = 70 \text{ mA}, Z_S = Z_{\text{Sopt}}, Z_L = Z_{\text{Lopt}}, f = 1.8 \text{ GHz}$	$P_{-1\text{dB}}$	-	22	-	

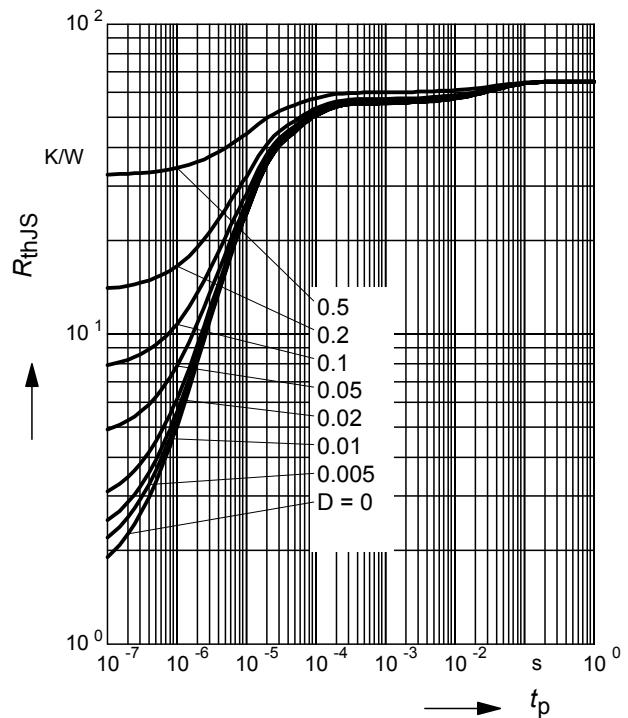
¹ $G_{\text{ma}} = |S_{21}/S_{12}| (\kappa - (\kappa^2 - 1)^{1/2})$
²IP3 value depends on termination of all intermodulation frequency components.

Termination used for this measurement is 50Ω from 0.2 MHz to 12 GHz

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

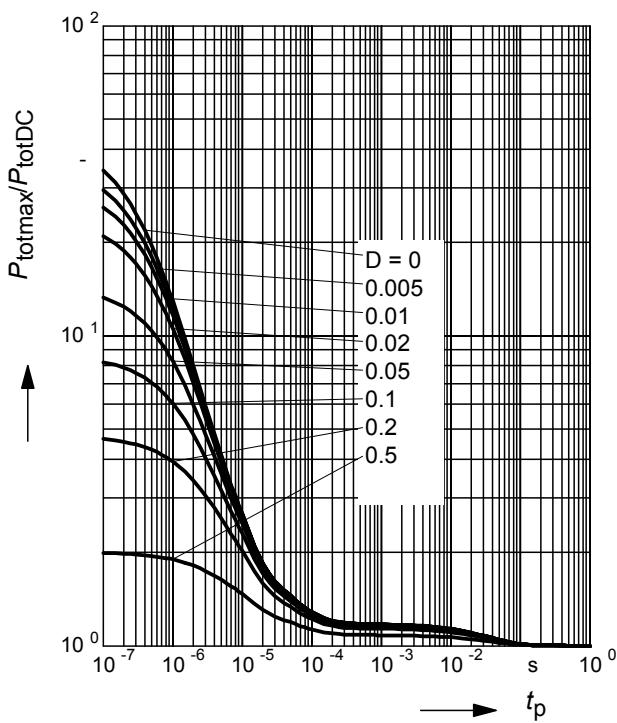


Permissible Pulse Load $R_{\text{thJS}} = f(t_p)$



Permissible Pulse Load

$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$

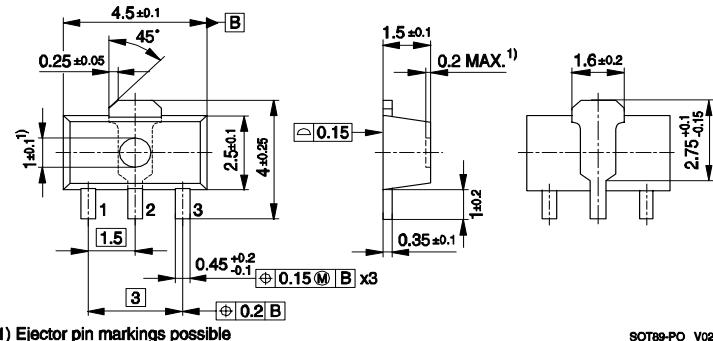
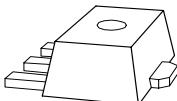


SPICE GP model

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

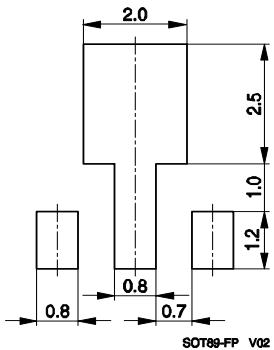
Please consult our website and download the latest versions before actually starting your design.

Package Outline



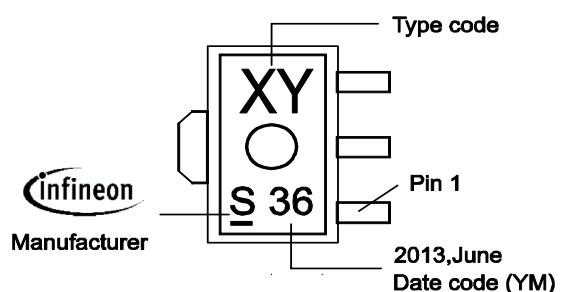
SOT89-PO V02

Foot Print



SOT89-FP V02

Marking Layout (Example)



Standard Packing

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

