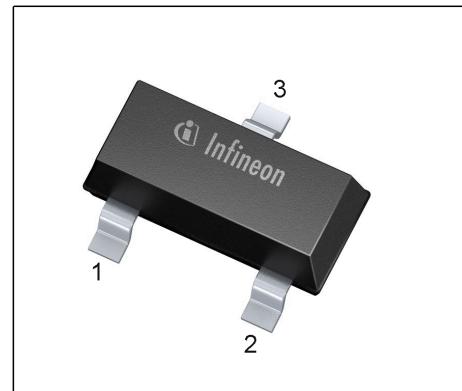


## Low Noise Silicon Bipolar RF Transistor

- For low noise, high-gain broadband amplifiers at collector currents from 2 mA to 30 mA
- $f_T = 8$  GHz,  $NF_{min} = 0.9$  dB at 900 MHz
- 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
BFR183	RHs	1=B	2=E	3=C	SOT23

**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	$I_C$	65	mA
Base current	$I_B$	5	
Total power dissipation <sup>1)</sup> $T_S \leq 60$ °C	$P_{tot}$	450	mW
Junction temperature	$T_J$	150	°C
Storage temperature	$T_{Stg}$	-55 ... 150	

### Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>2)</sup>	$R_{thJS}$	200	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  $T_A = 25^\circ\text{C}$ , unless otherwise specified

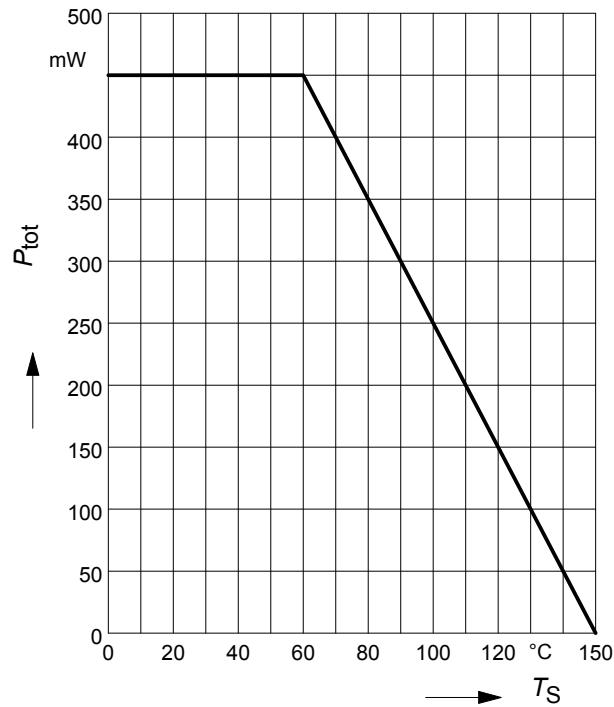
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>DC Characteristics</b>					
Collector-emitter breakdown voltage $I_C = 1 \text{ mA}, I_B = 0$	$V_{(\text{BR})\text{CEO}}$	12	-	-	V
Collector-emitter cutoff current $V_{\text{CE}} = 20 \text{ V}, V_{\text{BE}} = 0$	$I_{\text{CES}}$	-	-	100	$\mu\text{A}$
Collector-base cutoff current $V_{\text{CB}} = 10 \text{ V}, I_E = 0$	$I_{\text{CBO}}$	-	-	100	nA
Emitter-base cutoff current $V_{\text{EB}} = 1 \text{ V}, I_C = 0$	$I_{\text{EBO}}$	-	-	1	$\mu\text{A}$
DC current gain $I_C = 15 \text{ mA}, V_{\text{CE}} = 8 \text{ V}$ , pulse measured	$h_{\text{FE}}$	70	100	140	-

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

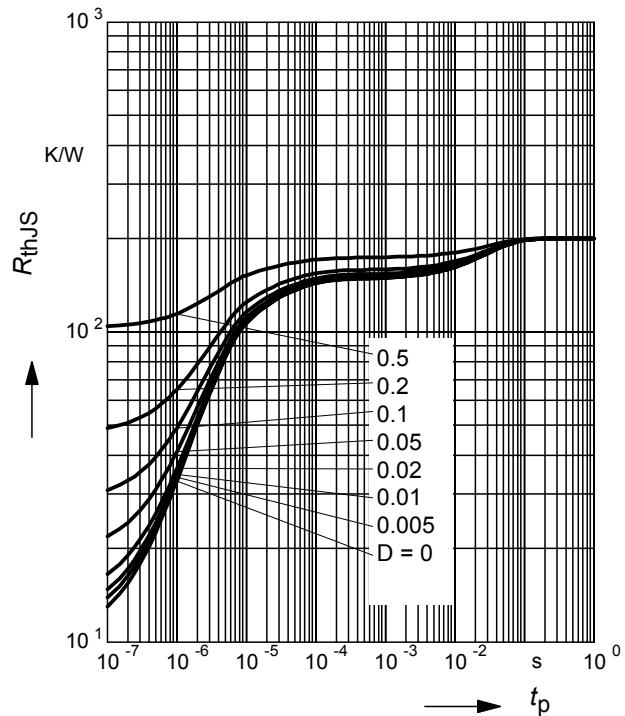
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC Characteristics (verified by random sampling)</b>					
Transition frequency $I_C = 25 \text{ mA}, V_{CE} = 8 \text{ V}, f = 500 \text{ MHz}$	$f_T$	6	8	-	GHz
Collector-base capacitance $V_{CB} = 10 \text{ V}, f = 1 \text{ MHz}, V_{BE} = 0 \text{ V}$ , emitter grounded	$C_{cb}$	-	0.37	0.57	pF
Collector emitter capacitance $V_{CE} = 10 \text{ V}, f = 1 \text{ MHz}, V_{BE} = 0 \text{ V}$ , base grounded	$C_{ce}$	-	0.2	-	
Emitter-base capacitance $V_{EB} = 0.5 \text{ V}, f = 1 \text{ MHz}, V_{CB} = 0 \text{ V}$ , collector grounded	$C_{eb}$	-	1.1	-	
Minimum noise figure $I_C = 5 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_{\text{Sopt}}$ , $f = 900 \text{ MHz}$ $f = 1.8 \text{ GHz}$	$NF_{\text{min}}$	-	0.9	-	dB
-	-	-	1.4	-	
Power gain, maximum stable <sup>1)</sup> $I_C = 15 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_{\text{Sopt}}, Z_L = Z_{\text{Lopt}}$ , $f = 900 \text{ MHz}$	$G_{\text{ms}}$	-	17.5	-	dB
Power gain, maximum available <sup>1)</sup> $I_C = 15 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_{\text{Sopt}}, Z_L = Z_{\text{Lopt}}$ , $f = 1.8 \text{ GHz}$	$G_{\text{ma}}$	-	11.5	-	dB
Transducer gain $I_C = 15 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_L = 50 \Omega$ , $f = 900 \text{ MHz}$ $f = 1.8 \text{ MHz}$	$ S_{21e} ^2$	-	14.5	-	dB
-	-	-	9	-	

<sup>1</sup> $G_{\text{ma}} = |S_{21e}| / S_{12e} (k - (k^2 - 1)^{1/2})$ ,  $G_{\text{ms}} = |S_{21} / S_{12}|$

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

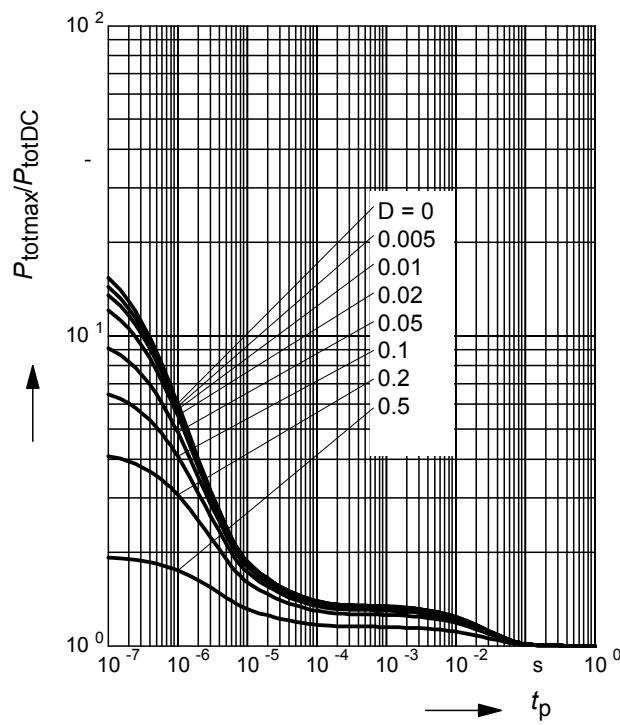


**Permissible Pulse Load  $R_{\text{thJS}} = f(t_p)$**

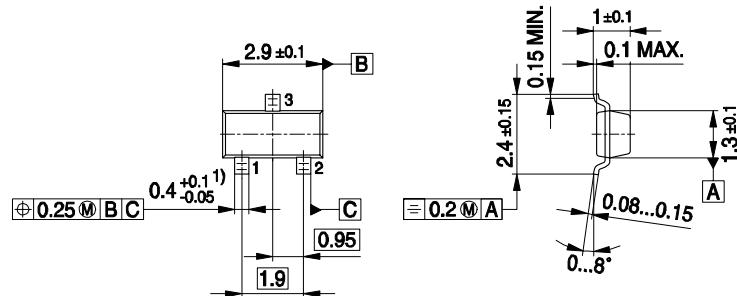
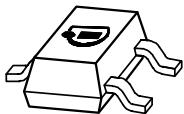


**Permissible Pulse Load**

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



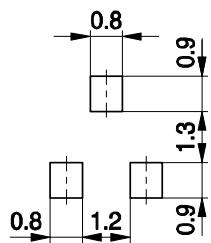
## Package Outline



1) Lead width can be 0.6 max. in dambar area

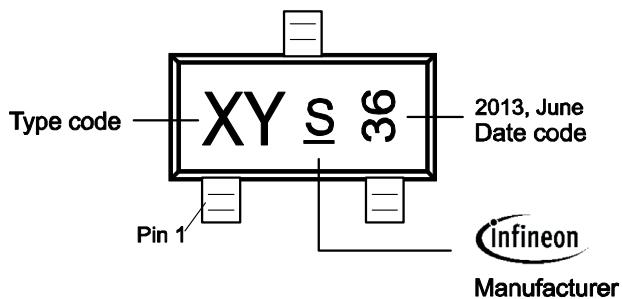
SOT23-PO V08

## Foot Print



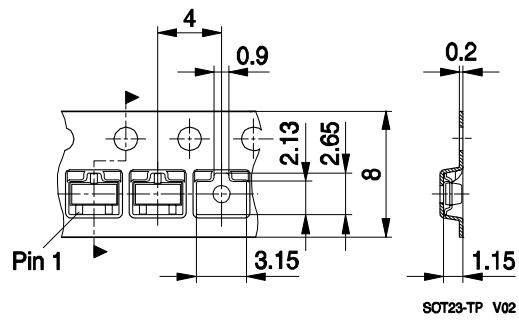
SOT23-FPR V08

## Marking Layout



## Standard Packing

Reel ø 180 mm: 3.000 Pieces / Reel  
Reel ø 330 mm = 10.000 Pieces / Reel



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