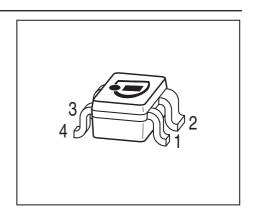


## Low Noise Silicon Bipolar RF Transistor

- For low noise, high-gain broadband amplifiers at collector currents from 1 mA to 20 mA
- $f_T$  = 8 GHz,  $NF_{min}$  = 0.9 dB at 900 MHz
- Pb-free (RoHS compliant) and halogen-free package with visible leads
- Qualification report according to AEC-Q101 available







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

Туре	Marking	Pin Configuration				Package		
BFP182W	RGs	1=E	2=C	3=E	4 = B	-	-	SOT343

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

Parameter	Symbol	Value	Unit
Collector-emitter voltage	$V_{\sf CEO}$	12	V
Collector-emitter voltage	$V_{CES}$	20	
Collector-base voltage	$V_{\mathrm{CBO}}$	20	
Emitter-base voltage	$V_{EBO}$	2	
Collector current	I <sub>C</sub>	35	mA
Base current	l <sub>B</sub>	4	
Total power dissipation <sup>1)</sup>	P <sub>tot</sub>	250	mW
<i>T</i> <sub>S</sub> ≤ 91 °C			
Junction temperature	$T_{J}$	150	°C
Storage temperature	$T_{Stq}$	-55 150	

#### **Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>2)</sup>	R <sub>thJS</sub>	235	K/W

1

 $<sup>{}^{1}</sup>T_{\rm S}$  is measured on the collector lead at the soldering point to the pcb

 $<sup>^2</sup>$ For the definition of  $R_{\text{thJS}}$  please refer to Application Note AN077 (Thermal Resistance Calculation)



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

Parameter	Symbol		Values		
		min.	typ.	max.	
DC Characteristics				•	•
Collector-emitter breakdown voltage	V <sub>(BR)CEO</sub>	12	-	_	V
$I_{\rm C}$ = 1 mA, $I_{\rm B}$ = 0	, ,				
Collector-emitter cutoff current	I <sub>CES</sub>	-	-	100	μΑ
$V_{CE} = 20 \text{ V}, V_{BE} = 0$					
Collector-base cutoff current	I <sub>CBO</sub>	-	-	100	nA
$V_{\rm CB} = 10 \text{ V}, I_{\rm E} = 0$					
Emitter-base cutoff current	I <sub>EBO</sub>	-	-	1	μΑ
$V_{\rm EB} = 1 \text{ V}, I_{\rm C} = 0$					
DC current gain	h <sub>FE</sub>	70	100	140	-
$I_{\rm C}$ = 10 mA, $V_{\rm CE}$ = 8 V, pulse measured					

2



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

Parameter	Symbol		Unit		
		min.	typ.	max.	
AC Characteristics (verified by random sampling	g)		· -	·	
Transition frequency	$f_{T}$	6	8	-	GHz
$I_{\rm C}$ = 15 mA, $V_{\rm CE}$ = 8 V, $f$ = 500 MHz					
Collector-base capacitance	C <sub>cb</sub>	-	0.34	0.5	pF
$V_{\text{CB}} = 10 \text{ V}, f = 1 \text{ MHz}, V_{\text{BE}} = 0$ ,					
emitter grounded					
Collector emitter capacitance	C <sub>ce</sub>	-	0.27	-	
$V_{CE} = 10 \text{ V}, f = 1 \text{ MHz}, V_{BE} = 0$ ,					
base grounded					
Emitter-base capacitance	C <sub>eb</sub>	-	8.0	-	
$V_{\text{EB}} = 0.5 \text{ V}, f = 1 \text{ MHz}, V_{\text{CB}} = 0$ ,					
collector grounded					
Minimum noise figure	<i>NF</i> <sub>min</sub>				dB
$I_{\rm C}$ = 3 mA, $V_{\rm CE}$ = 6 V, $Z_{\rm S}$ = $Z_{\rm Sopt}$ ,					
f = 900 MHz		-	0.9	-	
$I_{\rm C}$ = 3 mA, $V_{\rm CE}$ = 6 V, $Z_{\rm S}$ = $Z_{\rm Sopt}$ ,					
f = 1.8 GHz		-	1.3	-	
Power gain, maximum stable <sup>1)</sup>	G <sub>ms</sub>	-	22	-	dB
$I_{\rm C}$ = 10 mA, $V_{\rm CE}$ = 8 V, $Z_{\rm S}$ = $Z_{\rm Sopt}$ , $Z_{\rm L}$ = $Z_{\rm Lopt}$ ,					
f = 900 MHz					
Power gain, maximum available <sup>2)</sup>	G <sub>ma</sub>	-	16.5	-	dB
$I_{\rm C}$ = 10 mA, $V_{\rm CE}$ = 8 V, $Z_{\rm S}$ = $Z_{\rm Sopt}$ , $Z_{\rm L}$ = $Z_{\rm Lopt}$ ,					
f = 1.8 GHz					
Transducer gain	$ S_{21e} ^2$				dB
$I_{\rm C}$ = 10 mA, $V_{\rm CE}$ = 8 V, $Z_{\rm S}$ = $Z_{\rm L}$ = 50 $\Omega$ ,					
f = 900 MHz		-	18	_	
$I_{\rm C}$ = 10 mA, $V_{\rm CE}$ = 8 V, $Z_{\rm S}$ = $Z_{\rm L}$ = 50 $\Omega$ ,					
f = 1.8 GHz		-	12	-	

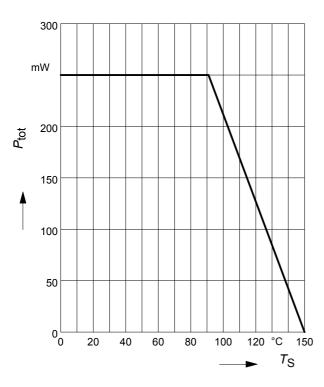
 $<sup>^{1}</sup>G_{ms} = |S_{21} / S_{12}|$ 

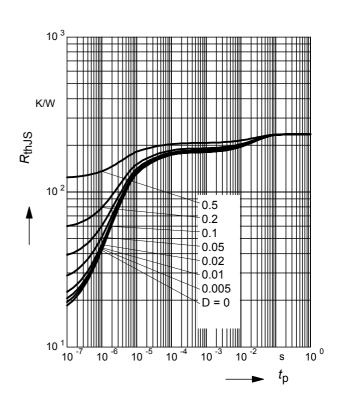
 $<sup>{}^{2}</sup>G_{\text{ma}} = |S_{21e} / S_{12e}| (k-(k^{2}-1)^{1/2})$ 



# Total power dissipation $P_{\text{tot}} = f(T_{\text{S}})$

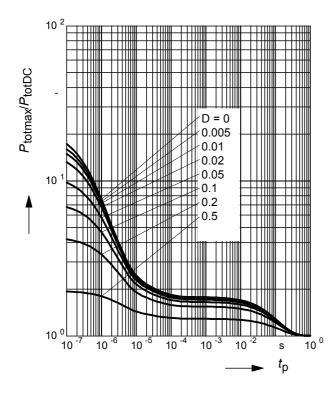
# Permissible Pulse Load $R_{thJS} = f(t_p)$





## **Permissible Pulse Load**

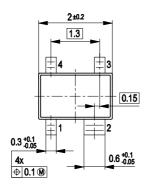
$$P_{\text{totmax}}/P_{\text{totDC}} = f(t_{\text{p}})$$

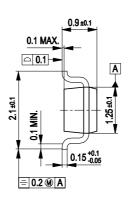




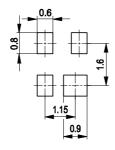
# Package Outline



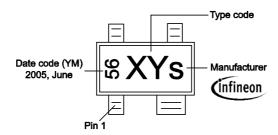




## **Foot Print**

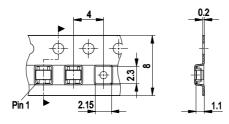


# Marking Layout (Example)



## Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel Reel ø330 mm = 10.000 Pieces/Reel





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