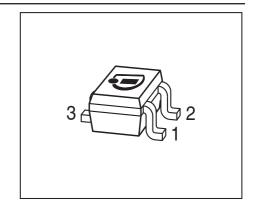


#### **NPN Silicon RF Transistor**

- For broadband amplifiers up to 1 GHz at collector currents from 1 mA to 20 mA
- Pb-free (RoHS compliant) package





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

Туре	Marking	Pin Configuration			Package
BFS17W	MCs	1 = B	2 = E	3 = C	SOT323

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

Parameter	Symbol	Value	Unit
Collector-emitter voltage	$V_{\sf CEO}$	15	V
Collector-base voltage	$V_{\mathrm{CBO}}$	25	
Emitter-base voltage	V <sub>EBO</sub>	2.5	
Collector current	I <sub>C</sub>	25	mA
Peak collector current, <i>f</i> = 10 MHz	I <sub>CM</sub>	50	
Total power dissipation <sup>1)</sup>	P <sub>tot</sub>	280	mW
<i>T</i> <sub>S</sub> ≤ 93 °C			
Junction temperature	$T_{J}$	150	°C
Ambient temperature	$T_{A}$	-65 150	
Storage temperature	T <sub>Stg</sub>	-65 150	

#### **Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>2)</sup>	R <sub>thJS</sub>	≤ 205	K/W

1

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

 $<sup>^2</sup>$ For calculation of  $R_{\mathrm{thJA}}$  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	V <sub>(BR)CEO</sub>	15	-	-	V
$I_{\rm C}$ = 1 mA, $I_{\rm B}$ = 0					
Collector-base cutoff current	I <sub>CBO</sub>				μΑ
$V_{\rm CB} = 10 \text{ V}, I_{\rm E} = 0$		-	-	0.05	
$V_{\rm CB} = 25  \text{V},  I_{\rm E} = 0$		ı	-	10	
Emitter-base cutoff current	I <sub>EBO</sub>	ı	-	100	
$V_{\rm EB}$ = 2.5 V, $I_{\rm C}$ = 0					
DC current gain	h <sub>FE</sub>				-
$I_{\rm C}$ = 2 mA, $V_{\rm CE}$ = 1 V, pulse measured		40	-	150	
$I_{\rm C}$ = 25 mA, $V_{\rm CE}$ = 1 V, pulse measured		20	70	-	
Collector-emitter saturation voltage	V <sub>CEsat</sub>	-	0.1	0.4	V
$I_{\rm C}$ = 10 mA, $I_{\rm B}$ = 1 mA					



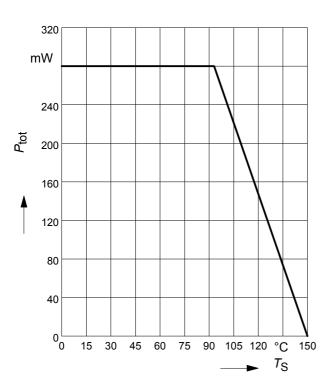
**Electrical Characteristics** at  $T_{\Delta}$  = 25°C, unless otherwise specified

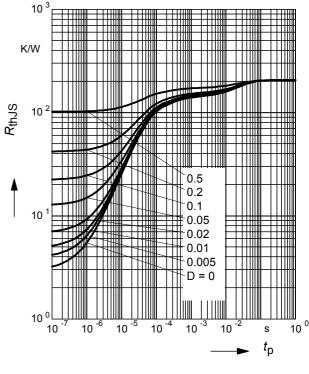
Parameter	Symbol		Values	1	Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling	ıg)				
Transition frequency	$f_{T}$				GHz
$I_{\rm C}$ = 2 mA, $V_{\rm CE}$ = 5 V, $f$ = 200 MHz		1	1.4	-	
$I_{\rm C}$ = 25 mA, $V_{\rm CE}$ = 5 V, $f$ = 200 MHz		1.3	2.5	-	
Collector-base capacitance	C <sub>cb</sub>	-	0.55	0.8	pF
$V_{\text{CB}} = 5 \text{ V}, f = 1 \text{ MHz}, V_{\text{BE}} = 0$ ,					
emitter grounded					
Collector emitter capacitance	C <sub>ce</sub>	-	0.3	-	
$V_{CE} = 5 \text{ V}, f = 1 \text{ MHz}, V_{BE} = 0$ ,					
base grounded					
Emitter-base capacitance	C <sub>eb</sub>	-	0.9	1.45	
$V_{\text{EB}} = 0.5 \text{ V}, f = 1 \text{ MHz}, V_{\text{CB}} = 0$ ,					
collector grounded					
Minimum noise figure	NF <sub>min</sub>	-	3.5	5	dB
$I_{\rm C}$ = 2 mA, $V_{\rm CE}$ = 5 V, $Z_{\rm S}$ = 50 $\Omega$ ,					
f = 800 MHz					
Transducer gain	S <sub>21e</sub>   <sup>2</sup>	-	14	-	dB
$I_{\rm C}$ = 20 mA, $V_{\rm CE}$ = 5 V, $Z_{\rm S}$ = $Z_{\rm L}$ = 50 $\Omega$ ,					
f = 500 MHz					
Third order intercept point at output	IP <sub>3</sub>	-	22.5	-	dBm
$V_{CE}$ = 5 V, $I_{C}$ = 20 mA, $f$ = 800 MHz,					
$Z_{\rm S} = Z_{\rm Sopt}, Z_{\rm L} = Z_{\rm Lopt}$					
1dB compression point	P <sub>-1dB</sub>	-	11	-	-
$I_{\rm C}$ = 20 mA, $V_{\rm CE}$ = 5 V, $Z_{\rm S}$ = $Z_{\rm L}$ = 50 $\Omega$ ,					
f = 800 MHz					



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

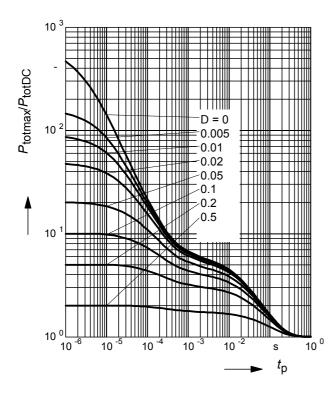
# Permissible Pulse Load $R_{thJS} = f(t_p)$



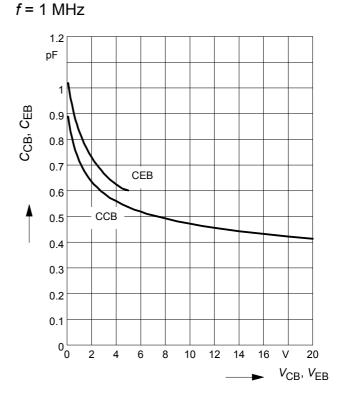


#### **Permissible Pulse Load**

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



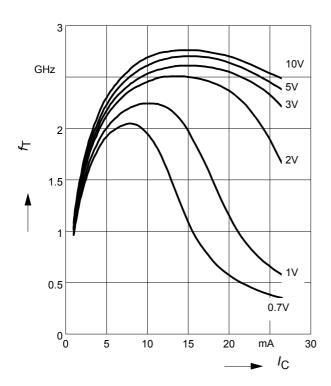
Collector-base capacitance  $C_{cb} = f(V_{CB})$ Emitter-base capacitance  $C_{eb} = f(V_{EB})$ 





# Transition frequency $f_T = f(I_C)$

 $V_{CE}$  = parameter

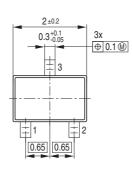


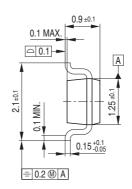
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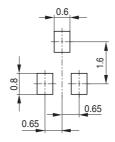
## Package Outline



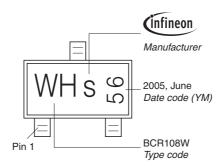




#### Foot Print

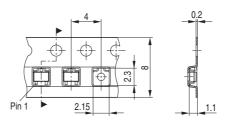


## Marking Layout (Example)



## Standard Packing

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



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