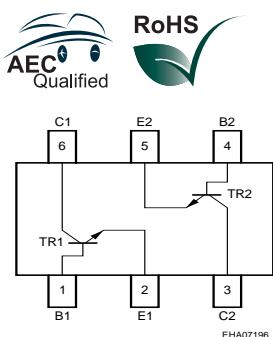
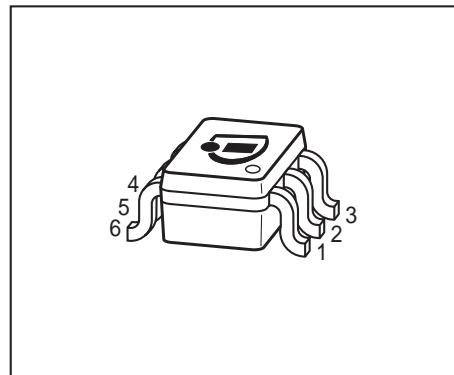


NPN Silicon RF Transistor*

- For low noise, high-gain broadband amplifiers at collector currents from 0.5 mA to 12 mA
- $f_T = 8$ GHz, $F = 0.9$ dB at 900 MHz
- Two (galvanic) internal isolated Transistors in one package
- For orientation in reel see package information below
- Pb-free (RoHS compliant) package¹⁾
- Qualified according AEC Q101

* Short term description



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

Type	Marking	Pin Configuration						Package
BFS481	RFs	1=B	2=E	3=C	4=B	5=E	6=C	SOT363

¹Pb-containing package may be available upon special request

Maximum Ratings

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	20	mA
Base current	I_B	2	
Total power dissipation ¹⁾ $T_S \leq 83 \text{ }^\circ\text{C}$	P_{tot}	175	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Ambient temperature	T_A	-65 ... 150	
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point ²⁾	R_{thJS}	≤ 380	K/W

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

DC Characteristics

Collector-emitter breakdown voltage $I_C = 1 \text{ mA}, I_B = 0$	$V_{(BR)CEO}$	12	-	-	V
Collector-emitter cutoff current $V_{CE} = 20 \text{ V}, V_{BE} = 0$	I_{CES}	-	-	100	μA
Collector-base cutoff current $V_{CB} = 10 \text{ V}, I_E = 0$	I_{CBO}	-	-	100	nA
Emitter-base cutoff current $V_{EB} = 1 \text{ V}, I_C = 0$	I_{EBO}	-	-	1	μA
DC current gain- $I_C = 5 \text{ mA}, V_{CE} = 8 \text{ V}$, pulse measured	h_{FE}	70	100	140	-

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

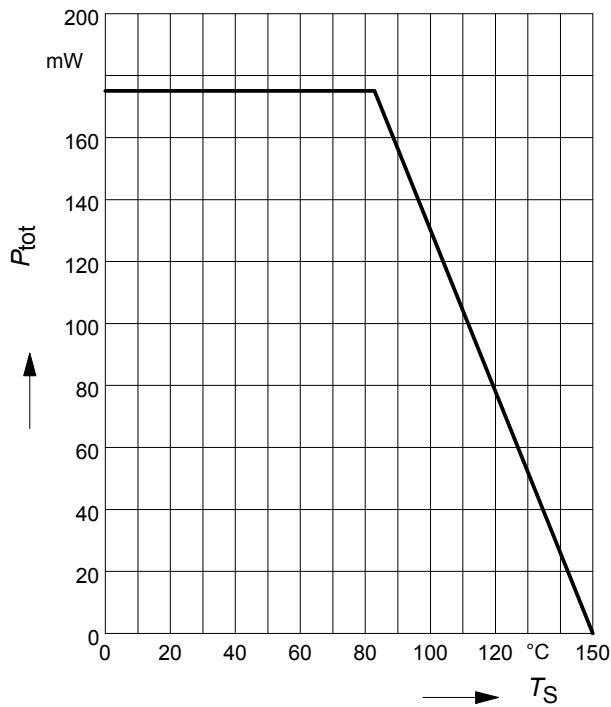
²⁾For calculation of R_{thJA} please refer to Application Note Thermal Resistance

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

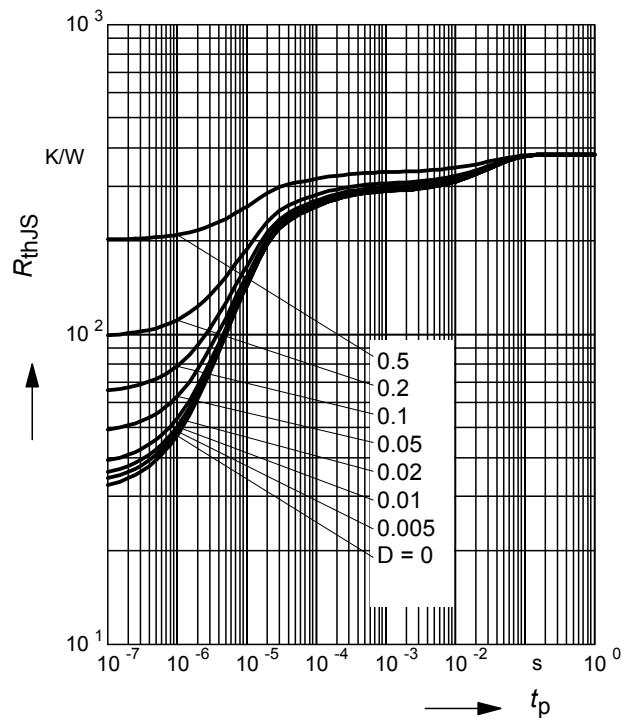
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling)					
Transition frequency $I_C = 10 \text{ mA}, V_{CE} = 8 \text{ V}, f = 500 \text{ MHz}$	f_T	6	8	-	GHz
Collector-base capacitance $V_{CB} = 10 \text{ V}, f = 1 \text{ MHz}, V_{BE} = 0 \text{ , emitter grounded}$	C_{cb}	-	0.23	0.4	pF
Collector emitter capacitance $V_{CE} = 10 \text{ V}, f = 1 \text{ MHz}, V_{BE} = 0 \text{ , base grounded}$	C_{ce}	-	0.13	-	
Emitter-base capacitance $V_{EB} = 0.5 \text{ V}, f = 1 \text{ MHz}, V_{CB} = 0 \text{ , collector grounded}$	C_{eb}	-	0.4	-	
Noise figure $I_C = 2 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_{\text{Sopt}}, f = 900 \text{ MHz}$ $I_C = 2 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_{\text{Sopt}}, f = 1.8 \text{ GHz}$	F	-	0.9	-	dB
Power gain, maximum stable ¹⁾ $I_C = 5 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_{\text{Sopt}}, Z_L = Z_{\text{Lopt}}, f = 900 \text{ MHz}$	G_{ms}	-	20	-	dB
Power gain, maximum available ²⁾ $I_C = 5 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_{\text{Sopt}}, Z_L = Z_{\text{Lopt}}, f = 1.8 \text{ GHz}$	G_{ma}	-	15	-	dB
Transducer gain $I_C = 5 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_L = 50 \Omega, f = 900 \text{ MHz}$ $I_C = 5 \text{ mA}, V_{CE} = 8 \text{ V}, Z_S = Z_L = 50 \Omega, f = 1.8 \text{ MHz}$	$ S_{21e} ^2$	-	16	-	dB
¹ $G_{ms} = S_{21} / S_{12} $					
² $G_{ma} = S_{21e} / S_{12e} (k - (k^2 - 1)^{1/2})$					

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

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

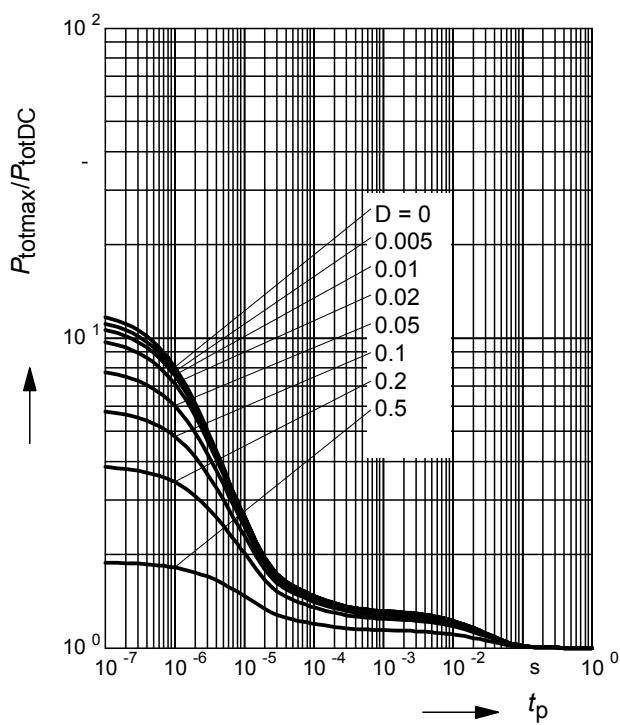


Permissible Pulse Load $R_{\text{thJS}} = f(t_p)$

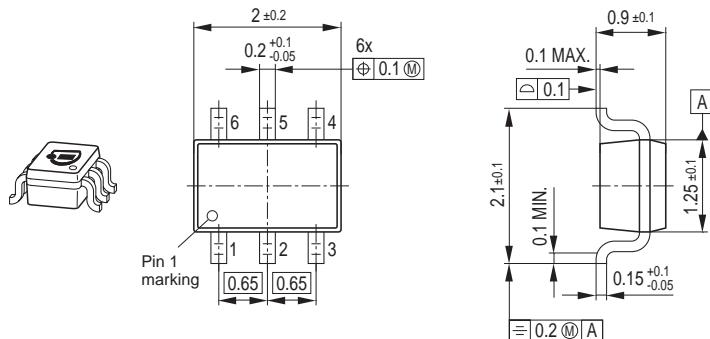


Permissible Pulse Load

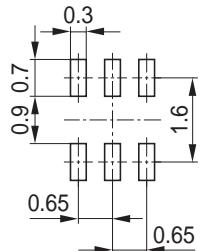
$P_{\text{totmax}}/P_{\text{totDC}} = f(t_p)$



Package Outline

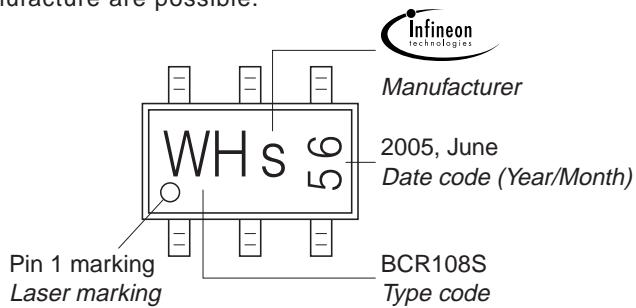


Foot Print



Marking Layout (Example)

Small variations in positioning of Date code, Type code and Manufacture are possible.

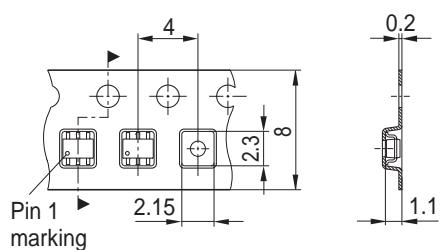


Standard Packing

Reel ø180 mm = 3.000 Pieces/Reel

Reel ø330 mm = 10.000 Pieces/Reel

For symmetric types no defined Pin 1 orientation in reel.



Edition 2006-02-01

Published by

Infineon Technologies AG

81726 München, Germany

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