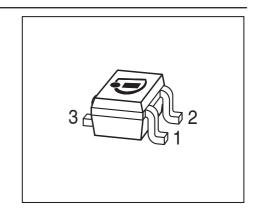


Low Noise Silicon Bipolar RF Transistor

- For low noise, high-gain amplifiers up to 2 GHz
- For linear broadband amplifiers
- f_T = 8 GHz, NF_{min} = 1 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
BFR193W	RCs	1 = B	2 = E	3 = C	SOT323

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

Parameter	Symbol	Value	Unit
Collector-emitter voltage	$V_{\sf CEO}$	12	V
Collector-emitter voltage	V_{CES}	20	
Collector-base voltage	V_{CBO}	20	
Emitter-base voltage	V_{EBO}	2	
Collector current	I _C	80	mA
Base current	I _B	10	
Total power dissipation ¹⁾	P _{tot}	580	mW
<i>T</i> _S ≤ 63°C			
Junction temperature	TJ	150	°C
Storage temperature	T_{Stg}	-55 150	

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - soldering point ²⁾	R _{thJS}	150	K/W

1

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

 $^{^2}$ For calculation of R_{thJS} 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	$V_{(BR)CEO}$	12	-	-	V
$I_{\rm C}$ = 1 mA, $I_{\rm B}$ = 0					
Collector-emitter cutoff current	I _{CES}	-	-	100	μΑ
$V_{CE} = 20 \text{ V}, V_{BE} = 0$					
Collector-base cutoff current	I _{CBO}	-	-	100	nA
$V_{\text{CB}} = 10 \text{ V}, I_{\text{E}} = 0$					
Emitter-base cutoff current	I _{EBO}	-	-	1	μΑ
$V_{\rm EB}$ = 1 V, $I_{\rm C}$ = 0					
DC current gain	h _{FE}	70	100	140	-
$I_{\rm C}$ = 30 mA, $V_{\rm CE}$ = 8 V, pulse measured					



Electrical Characteristics at T_{Δ} = 25 °C, unless otherwise specified

Parameter Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics (verified by random sampling	g)	T	T	T	
Transition frequency	f _T	6	8	-	GHz
$I_{\rm C}$ = 50 mA, $V_{\rm CE}$ = 8 V, f = 500 MHz					
Collector-base capacitance	C _{cb}	-	0.74	1	pF
$V_{\text{CB}} = 10 \text{ V}, f = 1 \text{ MHz}, V_{\text{BE}} = 0$,					
emitter grounded					
Collector emitter capacitance	C _{ce}	-	0.28	-	
$V_{CE} = 10 \text{ V}, f = 1 \text{ MHz}, V_{BE} = 0$,					
base grounded					
Emitter-base capacitance	C _{eb}	-	1.8	-	
$V_{\text{EB}} = 0.5 \text{ V}, f = 1 \text{ MHz}, V_{\text{CB}} = 0$,					
collector grounded					
Minimum noise figure	NF _{min}				dB
$I_{\rm C}$ = 10 mA, $V_{\rm CE}$ = 8 V, $Z_{\rm S}$ = $Z_{\rm Sopt}$,					
f = 900 MHz		-	1	-	
f = 1.8 GHz		-	1.6	-	
Power gain, maximum available ¹⁾	G _{ma}				
$I_{\rm C}$ = 30 mA, $V_{\rm CE}$ = 8 V, $Z_{\rm S}$ = $Z_{\rm Sopt,}$ $Z_{\rm L}$ = $Z_{\rm Lopt}$,					
f = 900 MHz		-	16	-	
f = 1.8 GHz		-	10.5	-	
Transducer gain	$ S_{21e} ^2$				dB
$I_{\rm C}$ = 30 mA, $V_{\rm CE}$ = 8 V, $Z_{\rm S}$ = $Z_{\rm L}$ = 50 Ω ,					
f = 900 MHz		-	13.5	-	
f = 1.8 GHz		-	8	-	
Third order intercept point at output ²⁾	IP ₃	-	30	-	dBm
$I_{\rm C}$ = 30 mA, $V_{\rm CE}$ = 8 V, $Z_{\rm S}$ = $Z_{\rm L}$ = 50 Ω ,					
f = 900 MHz					
1dB Compression point	P _{-1dB}	-	13	-	
$I_{\rm C}$ = 30 mA, $V_{\rm CE}$ = 8 V, $Z_{\rm S}$ = $Z_{\rm L}$ = 50 Ω ,					
f = 900 MHz					
		•			•

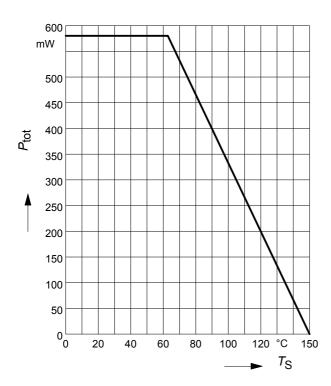
 $^{{}^{1}}G_{\text{ma}} = |S_{21} / S_{12}| (k-(k^{2}-1)^{1/2})$

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 $P_{tot} = f(T_S)$

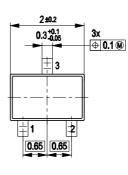


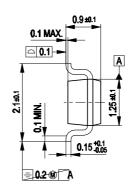
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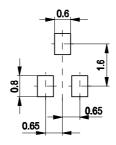
Package Outline



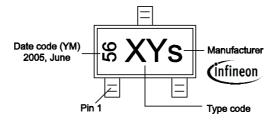




Foot Print

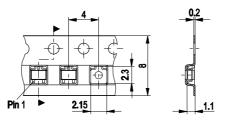


Marking Layout (Example)



Standard Packing

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





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