

NPN EPITAXIAL SILICON TRANSISTOR  
FOR MICROWAVE LOW-NOISE AMPLIFICATION

The 2SC3587 is an NPN epitaxial transistor designed for low-noise amplification at 0.5 to 6.0 GHz. This transistor has low-noise and high-gain characteristics in a wide collector current region, and has a wide dynamic range.

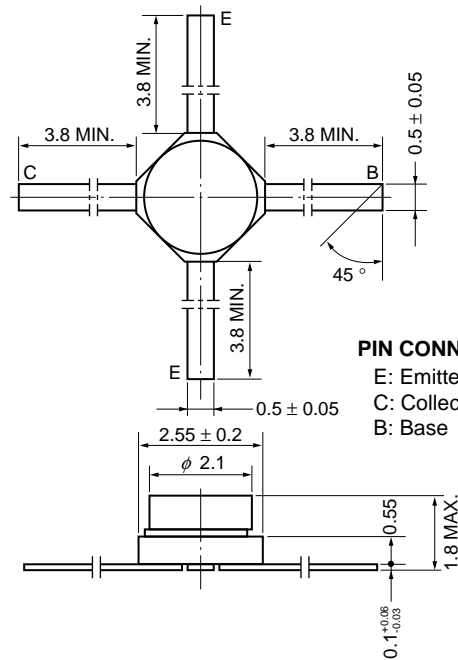
FEATURES

- Low noise : NF = 1.7 dB TYP. @ f = 2 GHz  
NF = 2.6 dB TYP. @ f = 4 GHz
- High power gain : GA = 12.5 dB TYP. @ f = 2 GHz  
GA = 8.0 dB TYP. @ f = 4 GHz

ABSOLUTE MAXIMUM RATINGS (TA = 25 °C)

PARAMETER	SYMBOL	RATING	UNIT
Collector to Base Voltage	V <sub>CB0</sub>	20	V
Collector to Emitter Voltage	V <sub>CEO</sub>	10	V
Emitter to Base Voltage	V <sub>EBO</sub>	1.5	V
Collector Current	I <sub>c</sub>	35	mA
Total Power Dissipation	P <sub>T</sub> (T <sub>C</sub> = 25 °C)	580	mW
Junction Temperature	T <sub>j</sub>	200	°C
Storage Temperature	T <sub>stg</sub>	-65 to +150	°C

PACKAGE DIMENSIONS (in mm)



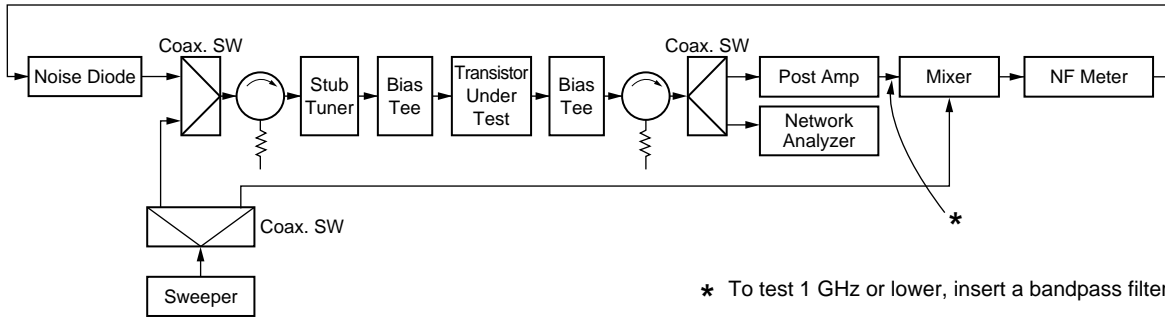
PIN CONNECTIONS

- E: Emitter
- C: Collector
- B: Base

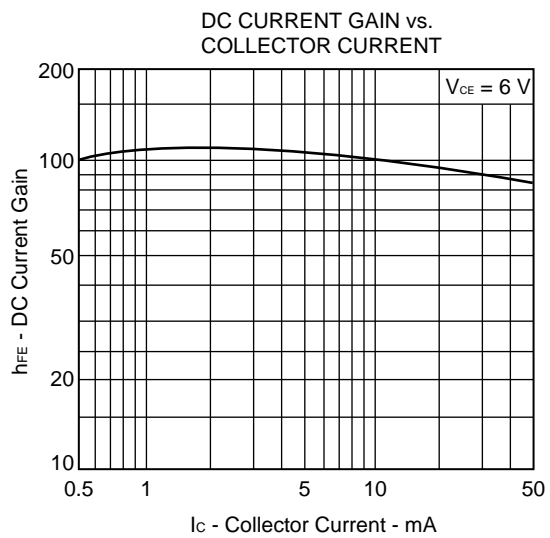
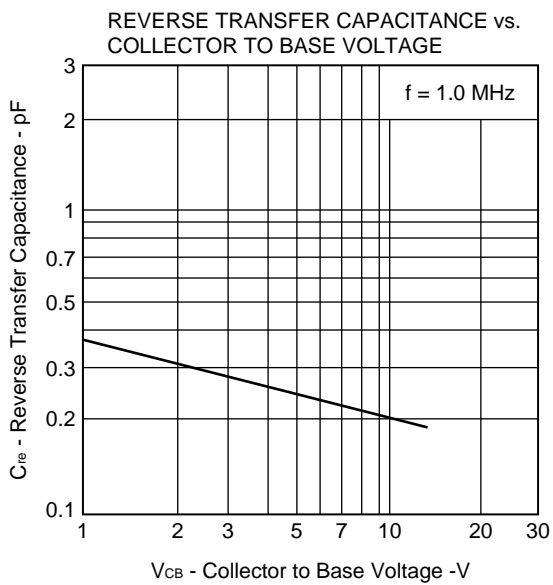
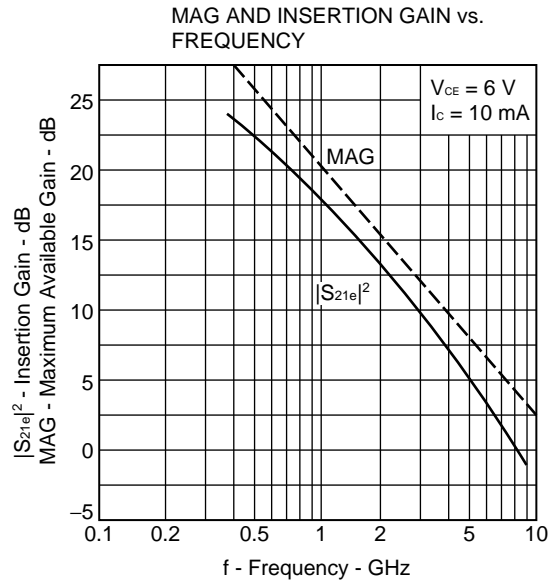
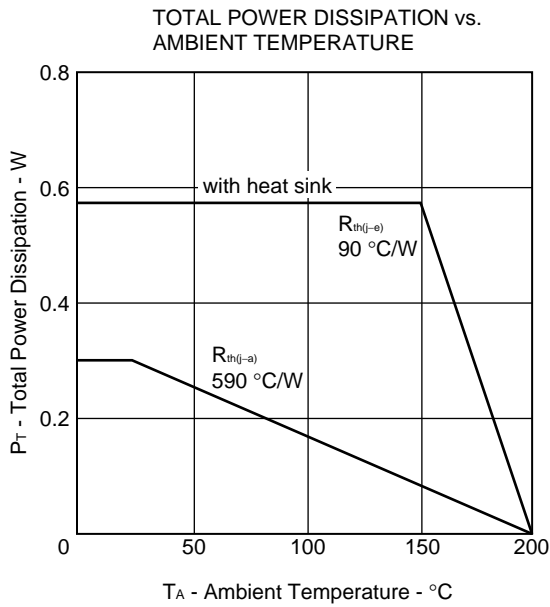
ELECTRICAL CHARACTERISTICS (TA = 25 °C)

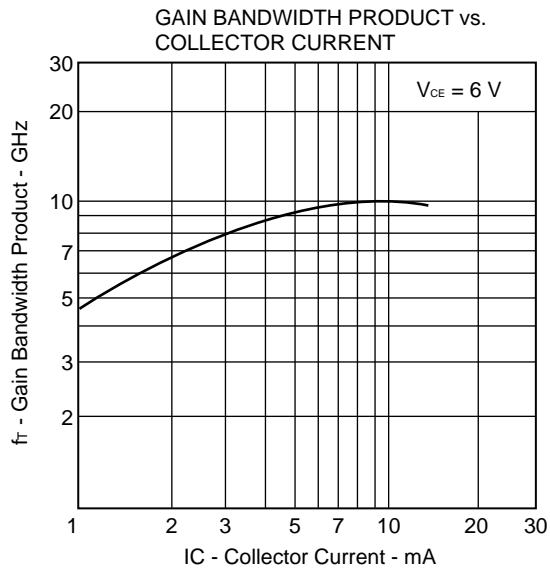
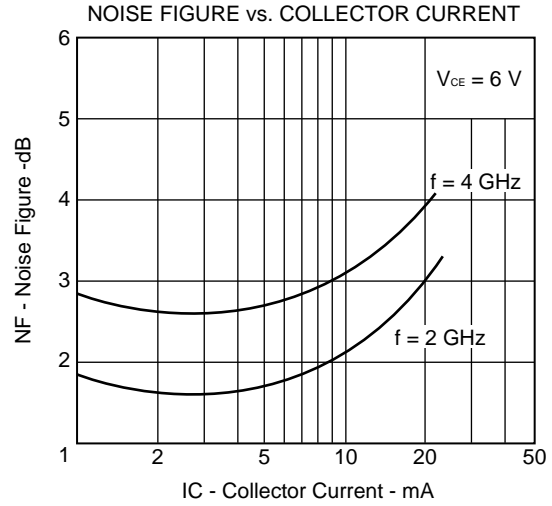
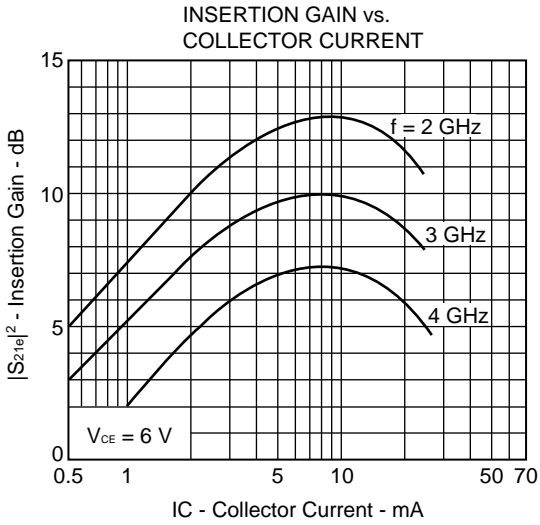
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I <sub>cBO</sub>	V <sub>CB</sub> = 10 V			1.0	μA
Emitter Cut-off Current	I <sub>EBO</sub>	V <sub>EB</sub> = 1 V			1.0	μA
DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> = 6 V, I <sub>c</sub> = 10 mA Pulse	50	100	250	
Gain Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> = 6 V, I <sub>c</sub> = 10 mA		10.0		GHz
Reverse Transfer Capacitance	C <sub>re</sub>	V <sub>CB</sub> = 10 V, f = 1 MHz		0.2	0.7	pF
Noise Figure	NF <sup>Note</sup>	V <sub>CE</sub> = 6 V, I <sub>c</sub> = 5 mA	f = 2 GHz	1.7	2.4	dB
			f = 4 GHz	2.6		dB
Insertion Gain	S <sub>21e</sub>   <sup>2</sup>	V <sub>CE</sub> = 6 V, I <sub>c</sub> = 10 mA	f = 2 GHz	10.5	12.5	dB
			f = 4 GHz	7.5		dB
Maximum Available Gain	MAG	V <sub>CE</sub> = 6 V, I <sub>c</sub> = 10 mA, f = 4 GHz		10		dB
Power Gain	G <sub>A</sub>	V <sub>CE</sub> = 6 V, I <sub>c</sub> = 5 mA	f = 2 GHz	12.5		dB
			f = 4 GHz	8.0		dB

**Note** Test block diagram



**TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)**





**S PARAMETER**

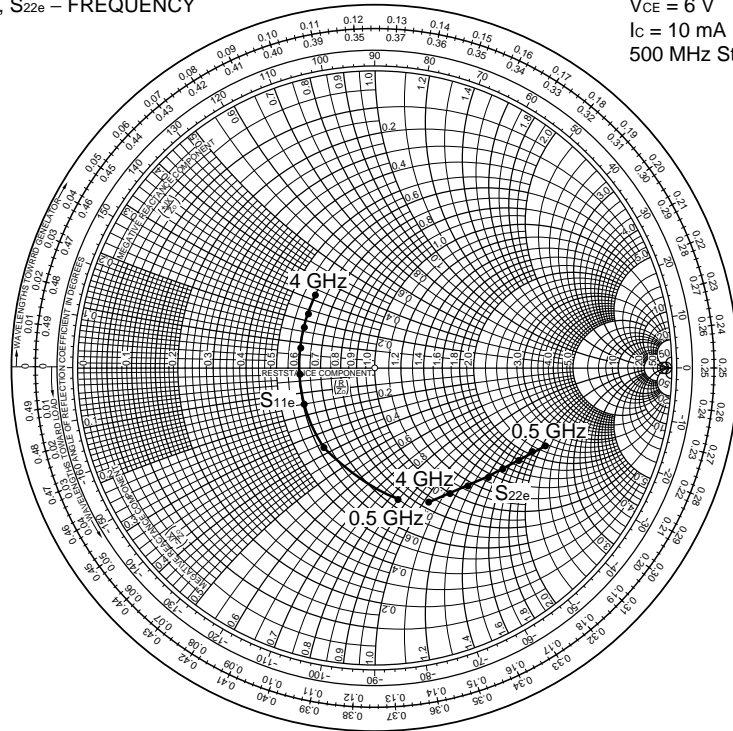
$V_{CE} = 6\text{ V}$ ,  $I_C = 10\text{ mA}$ ,  $Z_O = 50\ \Omega$

f (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
500	.466	-82.1	13.209	120.8	.0288	50.9	.634	-25.0
1000	.322	-123.8	8.371	95.7	.0424	54.2	.610	-29.4
1500	.271	-153.7	5.672	78.7	.0561	54.5	.579	-33.5
2000	.256	-176.6	4.304	66.9	.0697	54.1	.549	-38.7
2500	.262	167.3	3.456	58.6	.0848	51.9	.531	-46.2
3000	.270	152.0	3.095	46.1	.0955	48.0	.507	-52.8
3500	.294	142.0	2.595	35.0	.106	43.2	.498	-61.0
4000	.327	129.7	2.231	27.6	.127	35.2	.500	-68.4

S PARAMETER

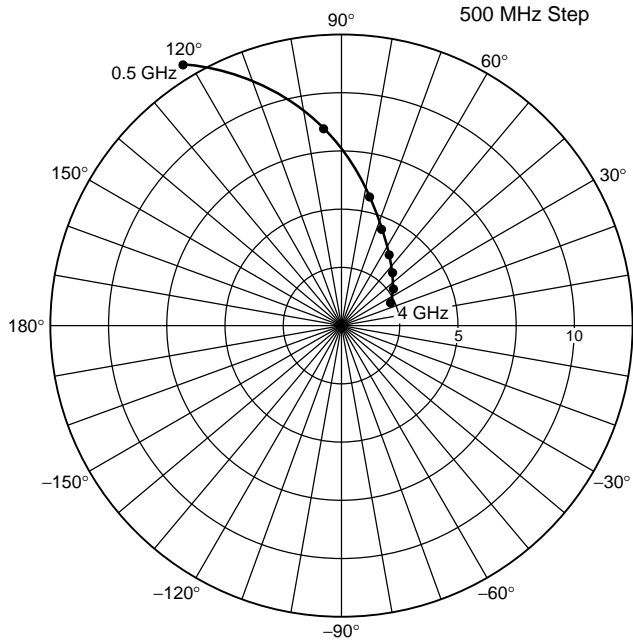
S<sub>11e</sub>, S<sub>22e</sub> – FREQUENCY

V<sub>CE</sub> = 6 V  
I<sub>c</sub> = 10 mA  
500 MHz Step



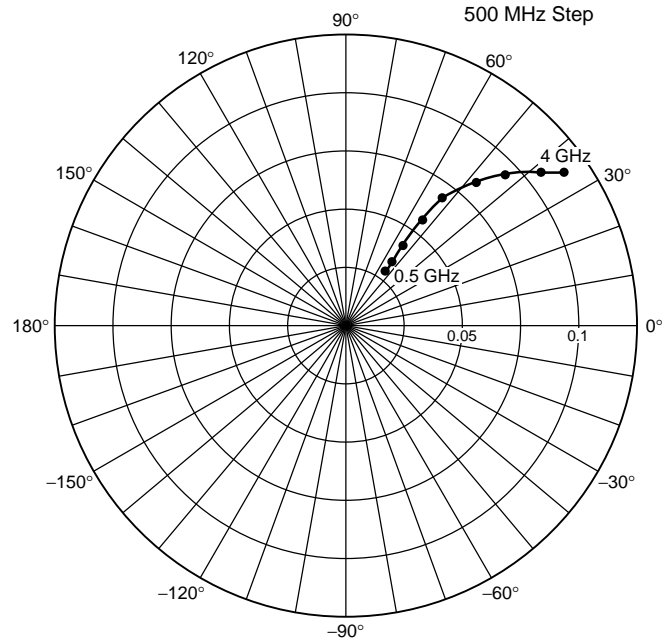
S<sub>21</sub> – FREQUENCY

V<sub>CE</sub> = 6 V  
I<sub>c</sub> = 10 mA  
500 MHz Step



S<sub>12</sub> – FREQUENCY

V<sub>CE</sub> = 6 V  
I<sub>c</sub> = 10 mA  
500 MHz Step



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Anti-radioactive design is not implemented in this product.