

SILICON TRANSISTOR

2SC3587

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.

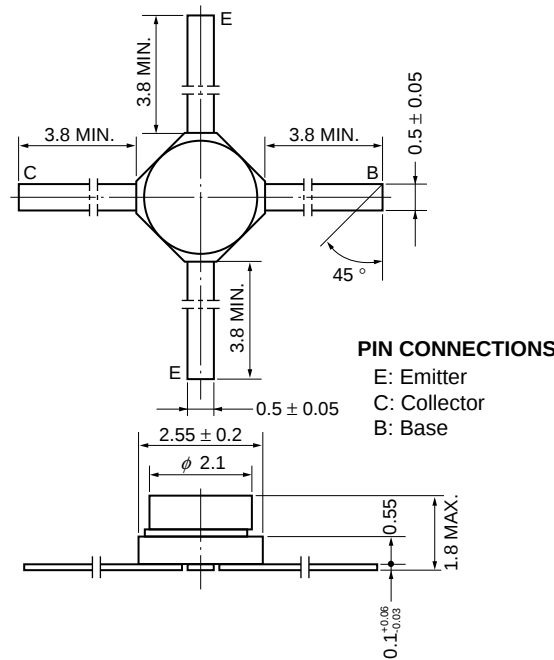
FEATURES

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

ABSOLUTE MAXIMUM RATINGS ($T_A = 25\text{ }^\circ\text{C}$)

PARAMETER	SYMBOL	RATING	UNIT
Collector to Base Voltage	V_{CBO}	20	V
Collector to Emitter Voltage	V_{CEO}	10	V
Emitter to Base Voltage	V_{EBO}	1.5	V
Collector Current	I_C	35	mA
Total Power Dissipation	P_T ($T_C = 25\text{ }^\circ\text{C}$)	580	mW
Junction Temperature	T_J	200	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

PACKAGE DIMENSIONS (in mm)



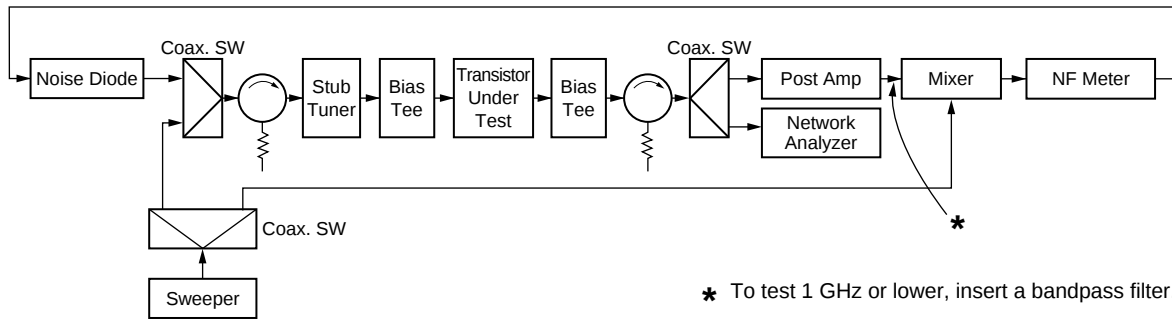
PIN CONNECTIONS

E: Emitter
C: Collector
B: Base

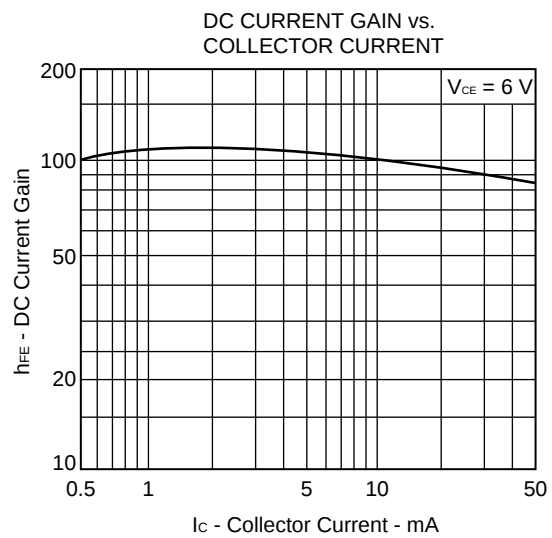
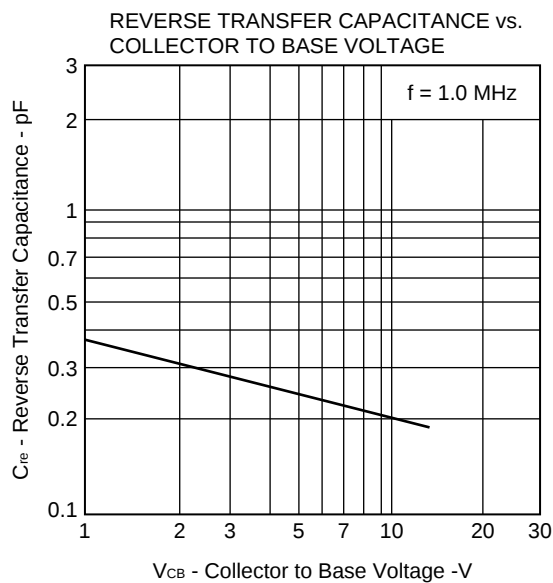
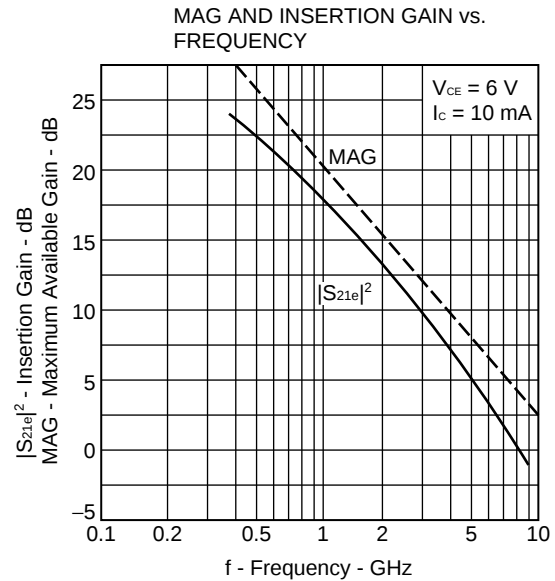
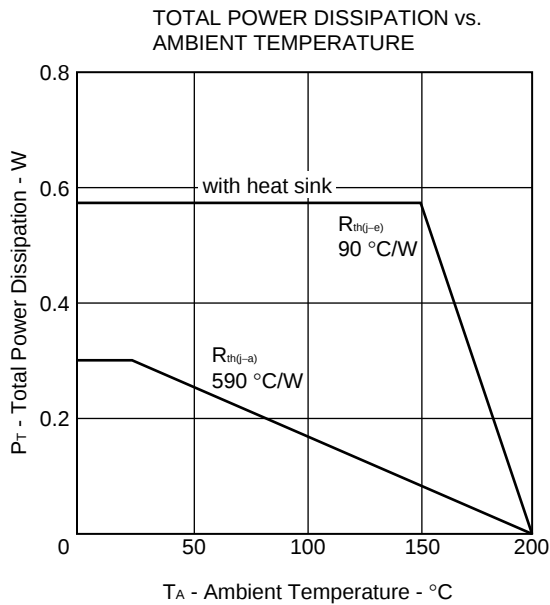
ELECTRICAL CHARACTERISTICS ($T_A = 25\text{ }^\circ\text{C}$)

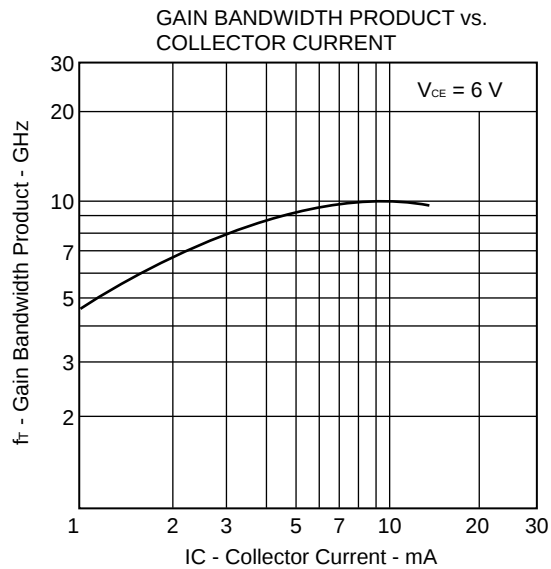
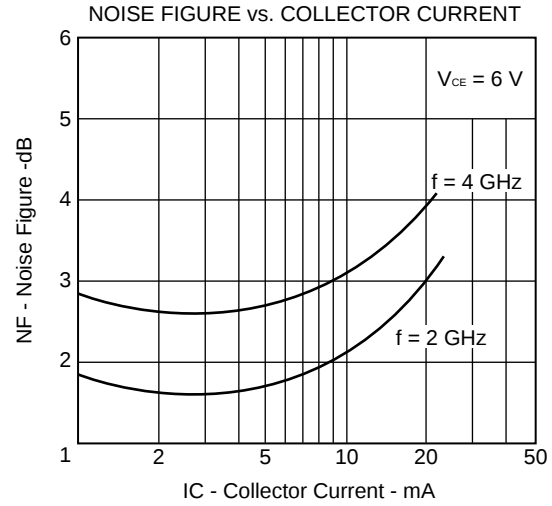
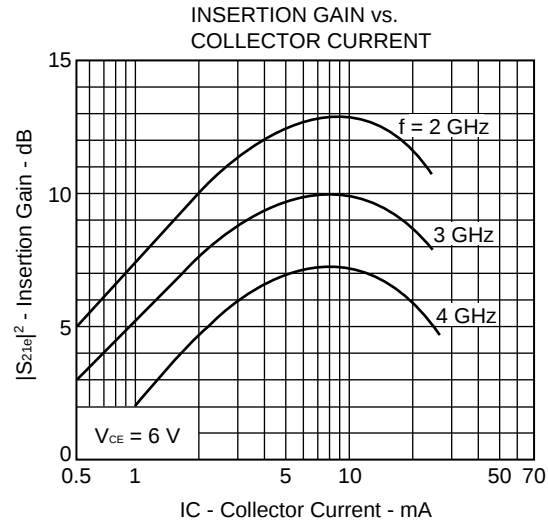
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	$V_{CB} = 10\text{ V}$			1.0	μA
Emitter Cut-off Current	I_{EBO}	$V_{EB} = 1\text{ V}$			1.0	μA
DC Current Gain	h_{FE}	$V_{CE} = 6\text{ V}$, $I_C = 10\text{ mA}$ Pulse	50	100	250	
Gain Bandwidth Product	f_T	$V_{CE} = 6\text{ V}$, $I_C = 10\text{ mA}$		10.0		GHz
Reverse Transfer Capacitance	C_{re}	$V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$		0.2	0.7	pF
Noise Figure	NF ^{Note}	$V_{CE} = 6\text{ V}$, $I_C = 5\text{ mA}$	f = 2 GHz	1.7	2.4	dB
			f = 4 GHz	2.6		dB
Insertion Gain	$ S_{21e} ^2$	$V_{CE} = 6\text{ V}$, $I_C = 10\text{ mA}$	f = 2 GHz	10.5	12.5	dB
			f = 4 GHz	7.5		dB
Maximum Available Gain	MAG	$V_{CE} = 6\text{ V}$, $I_C = 10\text{ mA}$, f = 4 GHz		10		dB
Power Gain	G_A	$V_{CE} = 6\text{ V}$, $I_C = 5\text{ mA}$	f = 2 GHz	12.5		dB
			f = 4 GHz	8.0		dB

Note Test block diagram



TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)





S PARAMETER

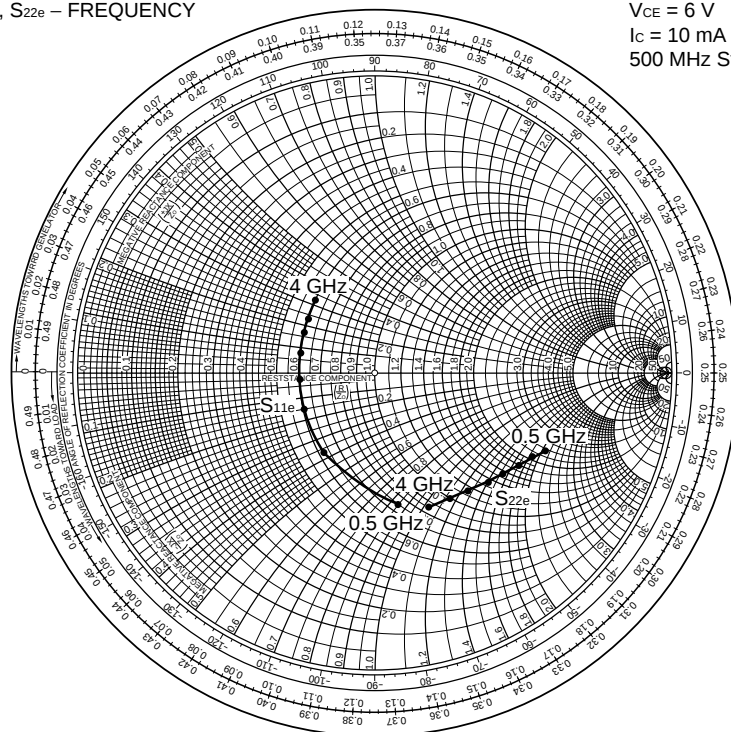
$V_{CE} = 6\text{ V}$, $I_C = 10\text{ mA}$, $Z_O = 50\ \Omega$

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

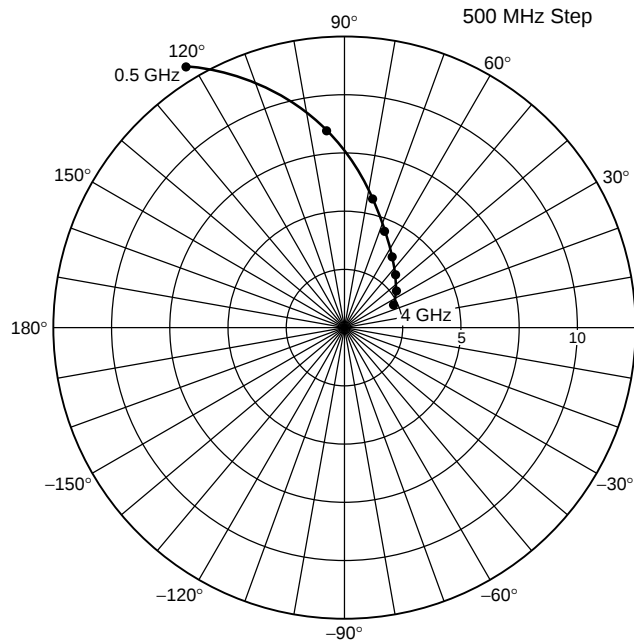
S_{11e} , S_{22e} – FREQUENCY

$V_{CE} = 6\text{ V}$
 $I_C = 10\text{ mA}$
 500 MHz Step



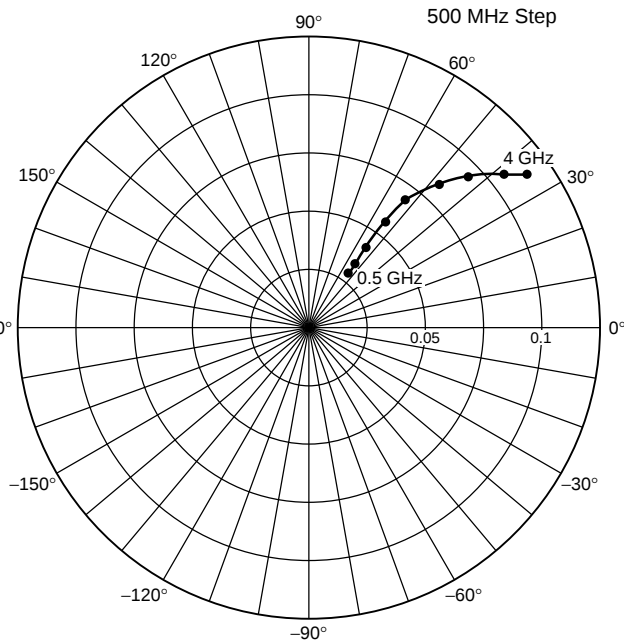
S_{21} – FREQUENCY

$V_{CE} = 6\text{ V}$
 $I_C = 10\text{ mA}$
 500 MHz Step



S_{12} – FREQUENCY

$V_{CE} = 6\text{ V}$
 $I_C = 10\text{ mA}$
 500 MHz Step



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Anti-radioactive design is not implemented in this product.