2SC3603

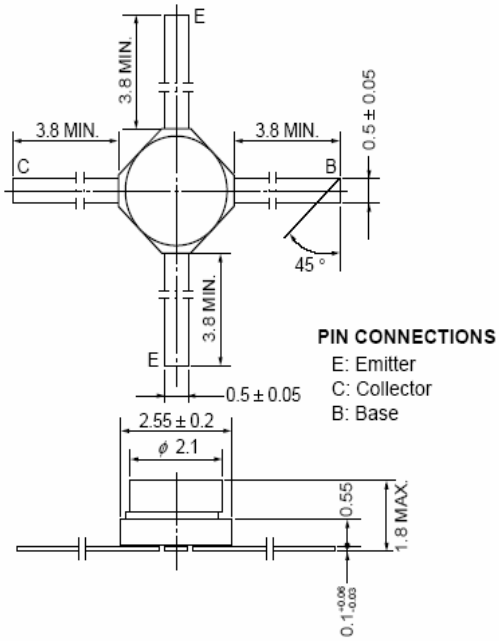
NPN EPITAXIAL SILICON TRANSISTOR FOR MICROWAVE LOW-NOISE AMPLIFICATION

The 2SC3603 is an NPN epitaxial transistor designed for low-noise amplification at 0.5 to 4.0 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 = 2.1 dB TYP. @ f = 2.0 GHz
- High power gain : G_A = 10 dB TYP. @ f = 2.0 GHz

PACKAGE DIMENSIONS (in mm)



PIN CONNECTIONS
E: Emitter
C: Collector
B: Base

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

PARAMETER	SYMBOL	RATING	UNIT
Collector to Base Voltage	V_{CBO}	20	V
Collector to Emitter Voltage	V_{CEO}	12	V
Emitter to Base Voltage	V_{EBO}	3	V
Collector Current	I_C	100	mA
Total Power Dissipation	$P_{T\ (T_C = 25\ °C)}$	580	mW
Junction Temperature	T_j	200	°C
Storage Temperature	T_{stg}	-65 to +150	°C

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Collector Cut-off Current	I_{CBO}	V_{CB} = 10 V, I_E = 0			1.0	μA
Emitter Cut-off Current	I_{EBO}	V_{EB} = 1 V, I_C = 0			1.0	μA
DC Current Gain	h_{FE}	V_{CE} = 10 V, I_C = 20 mA Pulse	50	120	300	
Gain Bandwidth Product	f_T	V_{CE} = 10 V, I_C = 20 mA		7		GHz
Reverse Transfer Capacitance	C_{re}	V_{CB} = 10 V, I_E = 0, f = 1 MHz		0.5	1.0	pF
Noise Figure	NF^{Note}	V_{CE} = 10 V, I_C = 7 mA, f = 2 GHz		2.1	3.4	dB
Insertion Gain	$\|S_{21e}\|^2$	V_{CE} = 10 V, I_C = 20 mA, f = 2 GHz	7.0	9.0		dB
Maximum Available Gain	MAG	V_{CE} = 10 V, I_C = 20 mA, f = 2 GHz	10.0	12.0		dB
Power Gain	G_A	V_{CE} = 10 V, I_C = 7 mA, f = 2 GHz		10		dB

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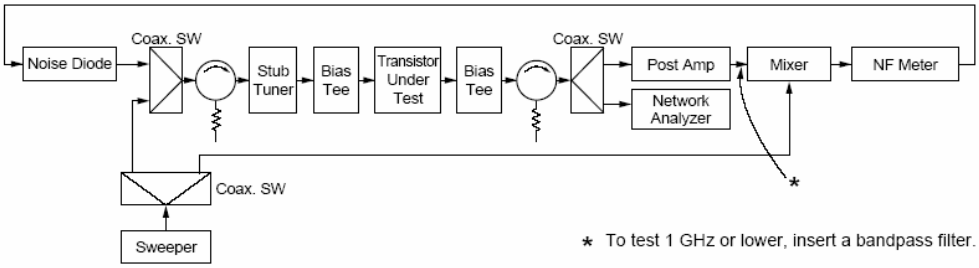
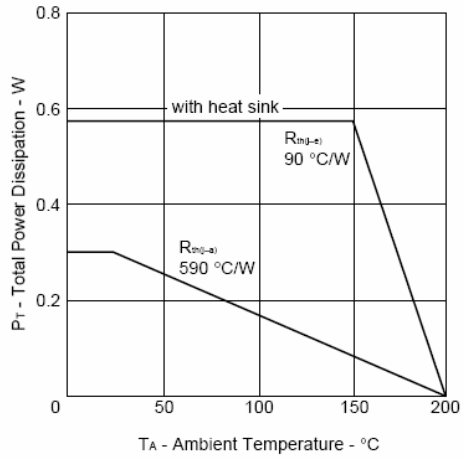
Note Test block diagram

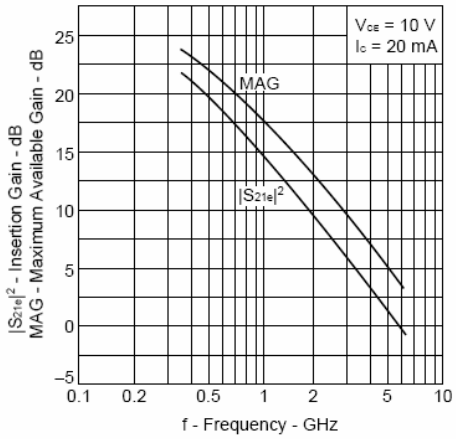


TYPICAL CHARACTERISTICS (T_A = 25 °C)

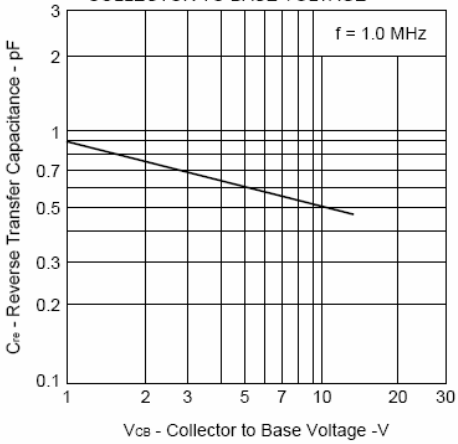
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



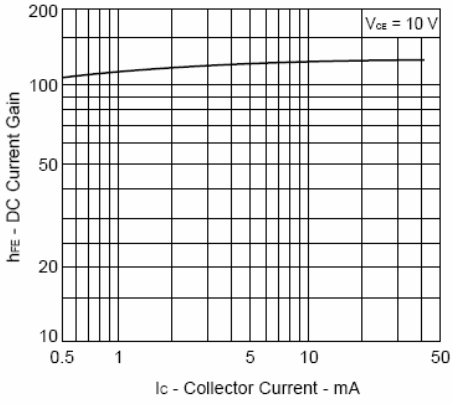
MAG AND INSERTION GAIN vs. FREQUENCY



REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



DC CURRENT GAIN vs. COLLECTOR CURRENT



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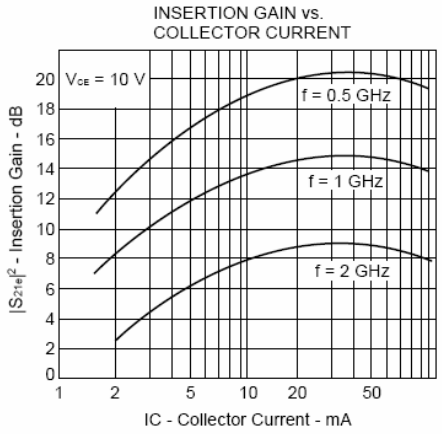

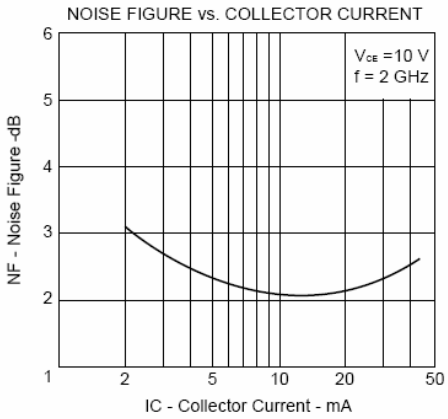

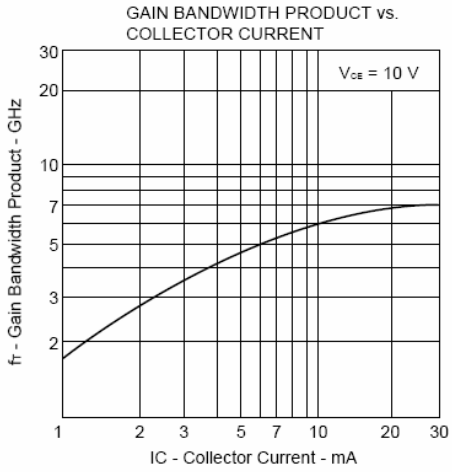

S PARAMETER

V_{CE} = 10 V, I_C = 20 mA, Z_O = 50 Ω

f (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
500	.629	−160.8	10.100	92.6	.040	41.5	.256	−49.0
1000	.631	175.8	5.411	75.1	.048	51.4	.244	−57.2
1500	.628	162.5	3.565	60.6	.070	59.2	.232	−66.8
2000	.646	152.2	2.720	48.4	.086	56.0	.22	−77.4
2500	.659	142.1	2.161	38.8	.105	52.2	.213	−89.1
3000	.677	132.0	1.916	25.7	.127	45.1	.217	−103.1
3500	.695	123.8	1.585	14.3	.151	39.7	.232	−119.5
4000	.713	116.5	1.392	5.3	.168	34.8	.254	−134.0

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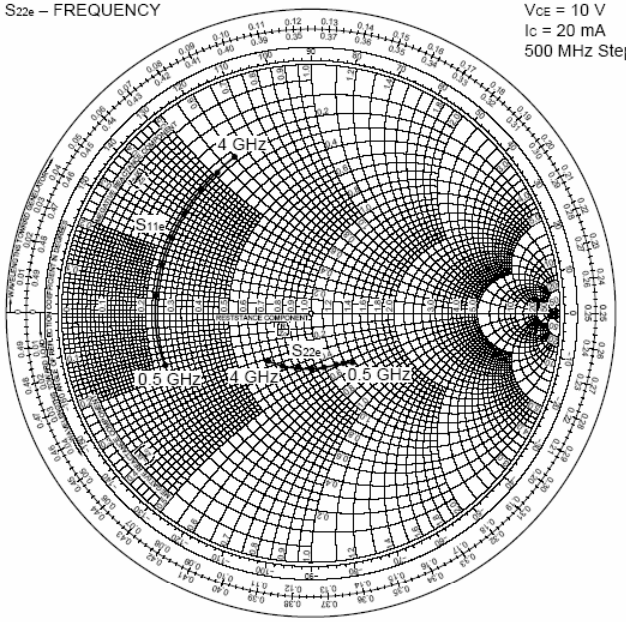
S PARAMETER

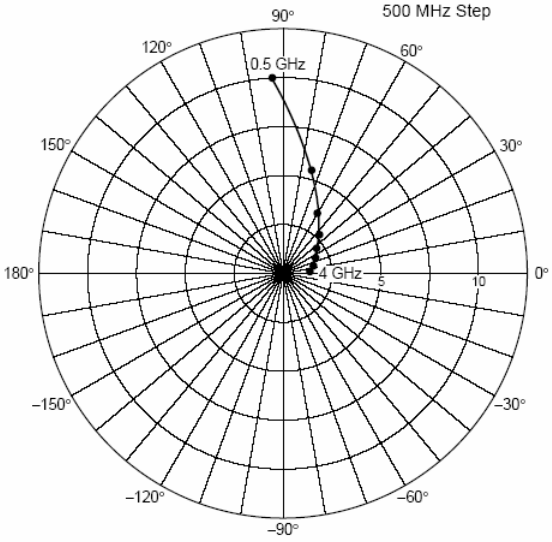
S_{11e}, S_{22e} – FREQUENCY

V_{CE} = 10 V
I_C = 20 mA
500 MHz Step



S_{21} – FREQUENCY

V_{CC} = 10 V
I_C = 20 mA
500 MHz Step



S_{12} – FREQUENCY

V_{CE} = 10 V
I_C = 20 mA
500 MHz Step