NEC

SILICON TRANSISTOR
2SC3582

MICROWAVE LOW NOISE AMPLIFIER
NPN SILICON EPITAXIAL TRANSISTOR

DESCRIPTION

The 2SC3582 is an NPN epitaxial silicon transistor designed for use in low-noise and small signal amplifiers from VHF band to UHF band. Low-noise figure, high gain, and high current capability achieve a very wide dynamic range and excellent linearity. This is achieved by direct nitride passivated base surface process (DNP process) which is an NEC proprietary new fabrication technique.

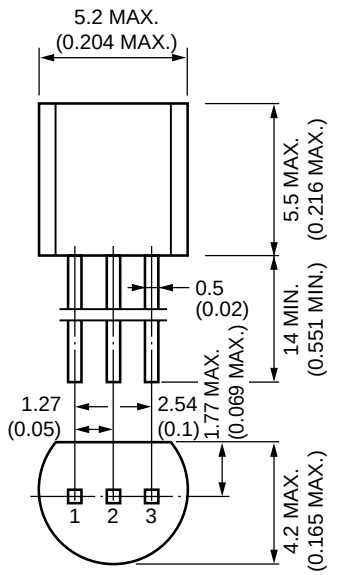
FEATURES

- NF 1.2 dB TYP. @f = 1.0 GHz
- Ga 12 dB TYP. @f = 1.0 GHz

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

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	65	mA
Total Power Dissipation	P_T	600	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	–65 to +150	°C

PACKAFE DIMENSIONS
in millimeters (inches)



1. Base
2. Emitter
3. Collector

EIAJ : SC-43B
JEDEC: TO-92
IEC : PA33

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I_{CBO}			1.0	μA	V_{CB} = 10 V, I_E = 0
Emitter Cutoff Current	I_{EBO}			1.0	μA	V_{EB} = 1 V, I_C = 0
DC Current Gain	h_{FE}	50	100	250		V_{CE} = 8 V, I_C = 20 mA
Gain Bandwidth Product	f_T		8		GHz	V_{CE} = 8 V, I_C = 20 mA
Feed-Back Capacitance	C_{re}		0.4	0.9	pF	V_{CB} = 10 V, I_E = 0, f = 1.0 MHz
Insertion Power Gain	$\|S_{21e}\|^2$	9	11		dB	V_{CE} = 8 V, I_C = 20 mA, f = 1.0 GHz
Maximum Available Gain	MAG		13		dB	V_{CE} = 8 V, I_C = 20 mA, f = 1.0 GHz
Noise Figure	NF		1.2	2.5	dB	V_{CE} = 8 V, I_E = 7 mA, f = 1.0 GHz

h_{FE} Classification

Class	K
Marking	K
h_{FE}	50 to 250

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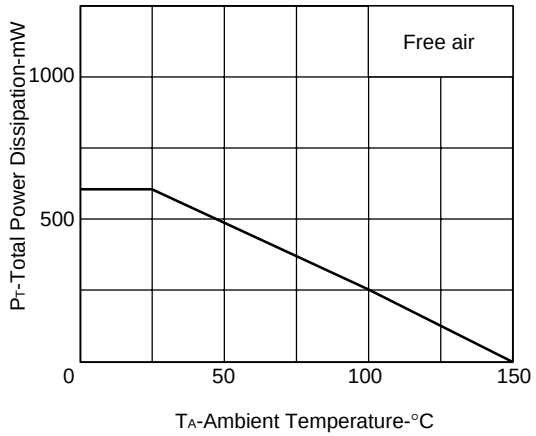
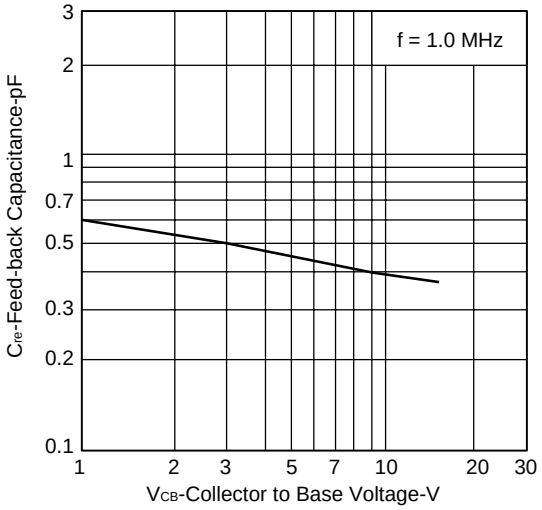
TYPICAL CHARACTERISTICS (T_A = 25 °C)

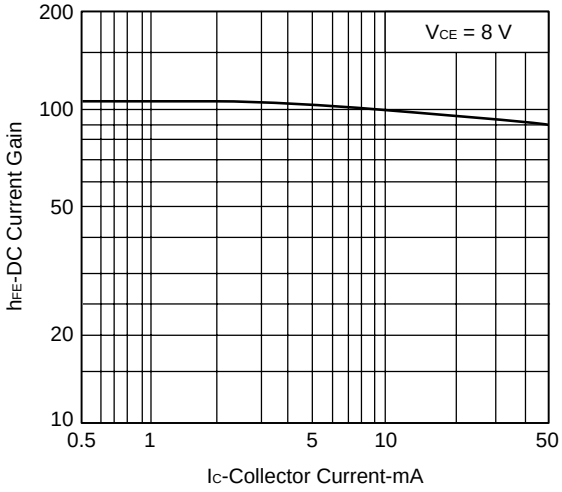
TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE



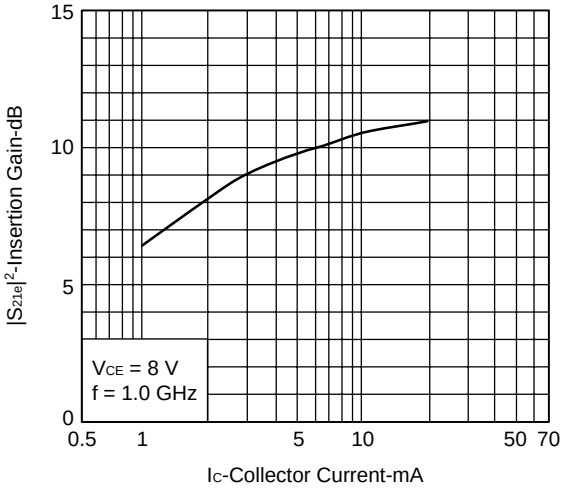
FEED-BACK CAPACITANCE vs.
COLLECTOR TO BASE VOLTAGE



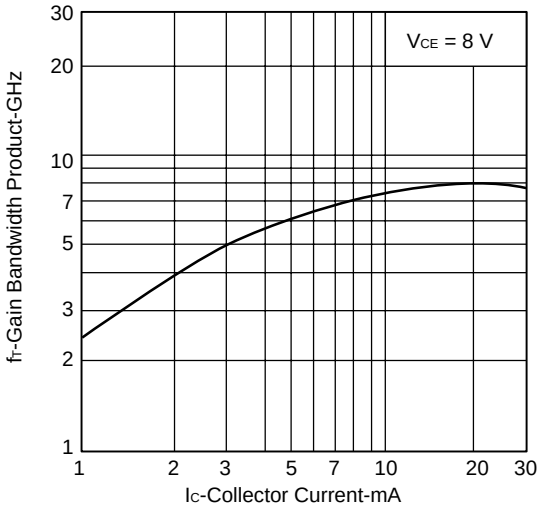
DC CURRENT GAIN vs.
COLLECTOR CURRENT



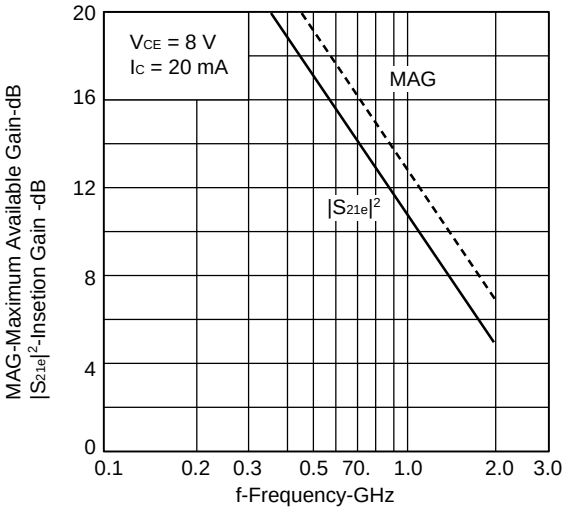
INSERTION GAIN vs.
COLLECTOR CURRENT

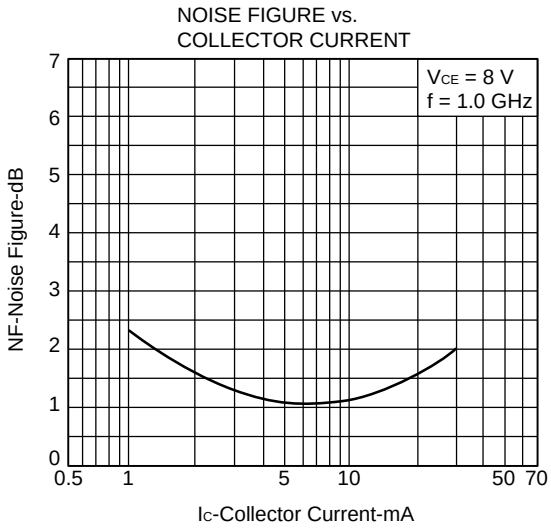


GAIN BANDWIDTH PRODUUT vs.
COLLECTOR CURRENT



INSERTION GAIN, MAXIMUM AVAILABLE
GAIN vs. FREQUENCY





S-PARAMETER

V_{CE} = 8.0 V, I_C = 5.0 mA, Z_O = 50 Ω

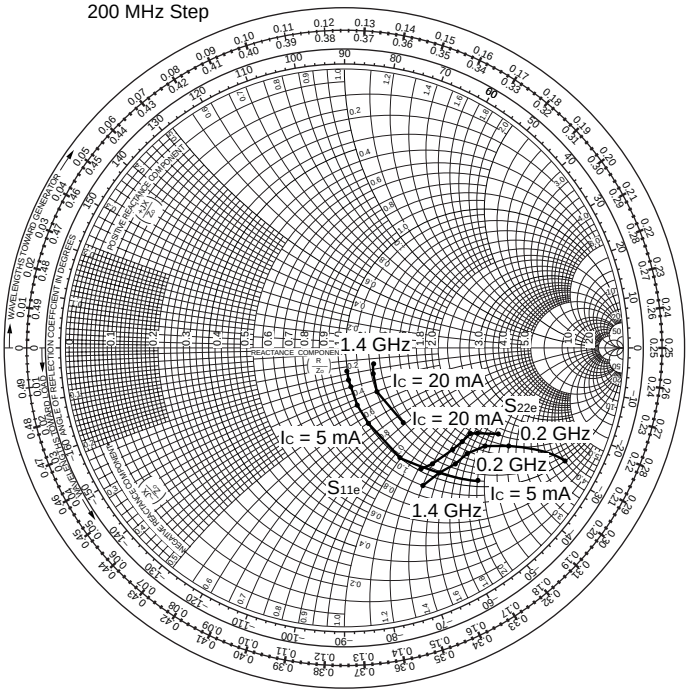
f (MHz)	$\lvert S_{11} \rvert$	$\angle S_{11}$	$\lvert S_{21} \rvert$	$\angle S_{21}$	$\lvert S_{12} \rvert$	$\angle S_{12}$	$\lvert S_{22} \rvert$	$\angle S_{22}$
200	0.668	−45.8	11.385	128.9	0.049	83.5	0.833	−26.9
400	0.425	−61.5	7.014	103.7	0.063	76.3	0.681	−31.1
600	0.294	−73.2	5.189	88.6	0.088	68.5	0.620	−36.0
800	0.214	−79.4	3.967	75.4	0.103	64.5	0.580	−40.8
1000	0.167	−79.5	3.485	64.7	0.123	60.8	0.561	−46.3
1200	0.132	−79.8	2.831	57.0	0.147	55.9	0.549	−53.4
1400	0.098	−75.2	2.604	48.5	0.175	50.7	0.561	−60.3
1600	0.073	−72.0	2.182	39.1	0.192	47.9	0.573	−69.1
1800	0.071	−63.7	2.135	31.0	0.215	44.2	0.595	−71.8
2000	0.070	−60.6	1.879	21.6	0.221	38.0	0.617	−78.0

V_{CE} = 8.0 V, I_C = 20 mA, Z_O = 50 Ω

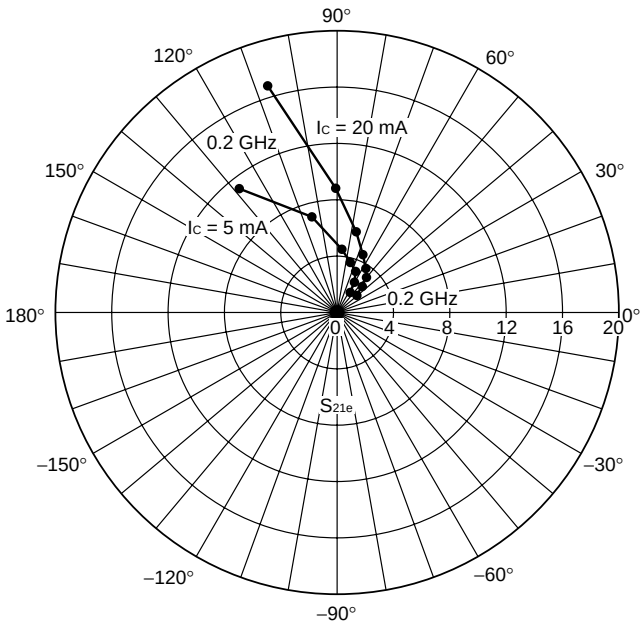
f (MHz)	$\lvert S_{11} \rvert$	$\angle S_{11}$	$\lvert S_{21} \rvert$	$\angle S_{21}$	$\lvert S_{12} \rvert$	$\angle S_{12}$	$\lvert S_{22} \rvert$	$\angle S_{22}$
200	0.333	−51.4	17.197	107.7	0.053	97.5	0.638	−29.7
400	0.195	−49.2	8.729	89.7	0.064	90.1	0.585	−31.8
600	0.158	−44.3	6.149	78.8	0.078	80.3	0.573	−35.0
800	0.156	−41.0	4.603	68.7	0.111	70.0	0.549	−38.2
1000	0.146	−35.8	3.997	60.4	0.136	64.2	0.537	−42.4
1200	0.143	−30.7	3.205	54.1	0.168	58.1	0.524	−57.1
1400	0.134	−25.8	2.939	46.7	0.185	53.2	0.524	−55.4
1600	0.132	−22.3	2.463	38.1	0.218	47.3	0.524	−62.0
1800	0.131	−20.0	2.396	30.7	0.234	41.3	0.557	−68.5
2000	0.130	−17.8	2.107	22.1	0.238	36.5	0.579	−74.8

S-PARAMETER

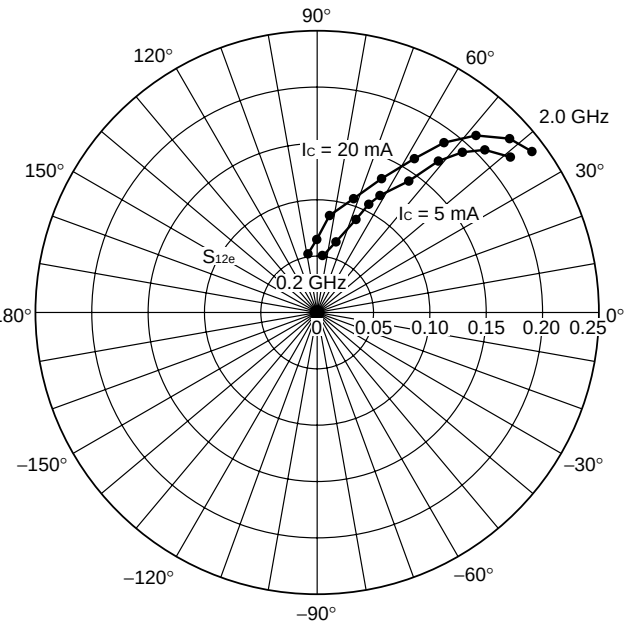
S_{11e}, S_{22e}-FREQUENCY CONDITION V_{CE} = 8 V
200 MHz Step



S_{21e}-FREQUENCY CONDITION V_{CE} = 8 V



S_{12e}-FREQUENCY CONDITION V_{CE} = 8 V



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