

MICROWAVE LOW NOISE AMPLIFIER  
NPN SILICON EPITAXIAL TRANSISTOR

DESCRIPTION

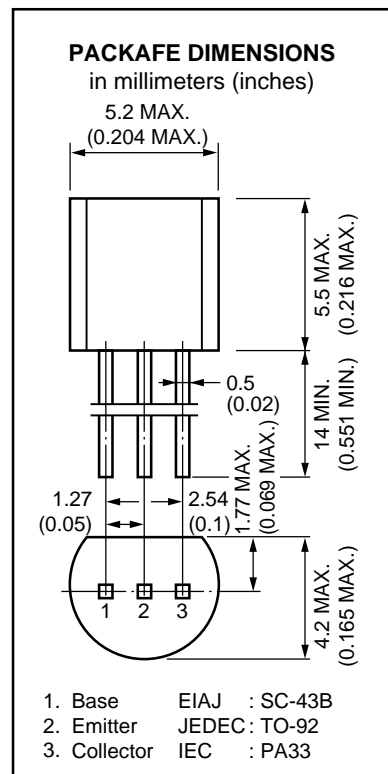
The 2SC3582 is an NPN epitaxial silicon transistor designed for use in low-noise and small signal amplifiers from VHF band to UHF band. Low-noise figure, high gain, and high current capability achieve a very wide dynamic range and excellent linearity. This is achieved by direct nitride passivated base 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 (TA = 25 °C)

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>	65	mA
Total Power Dissipation	P <sub>T</sub>	600	mW
Junction Temperature	T <sub>j</sub>	150	°C
Storage Temperature	T <sub>stg</sub>	-65 to +150	°C



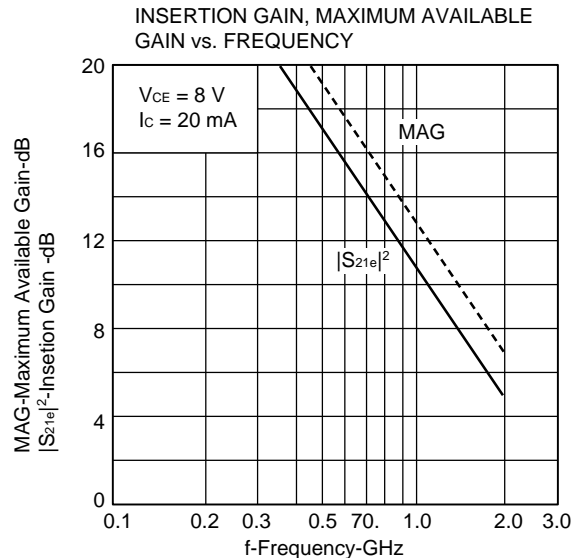
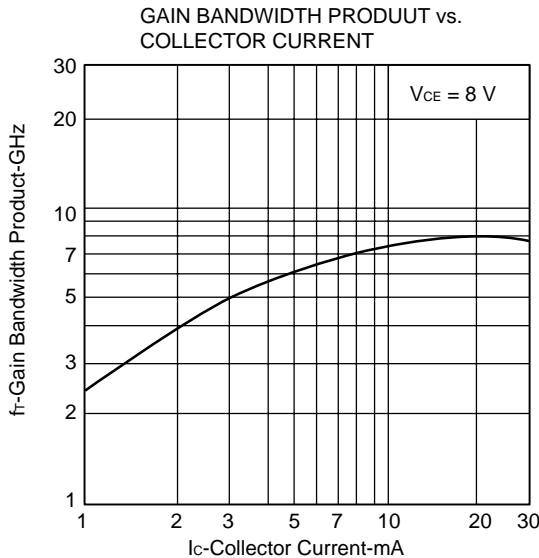
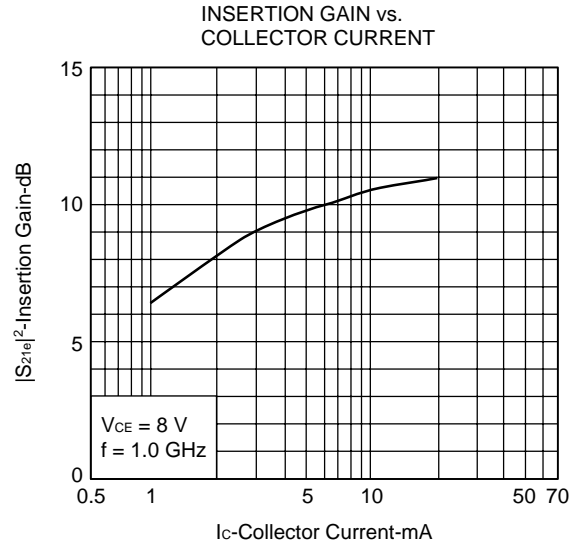
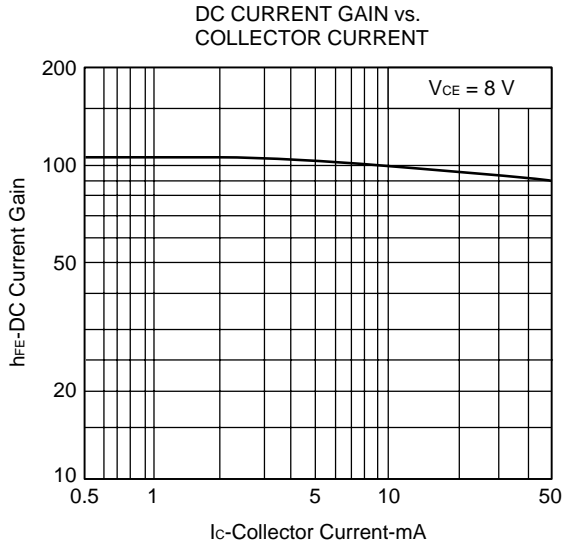
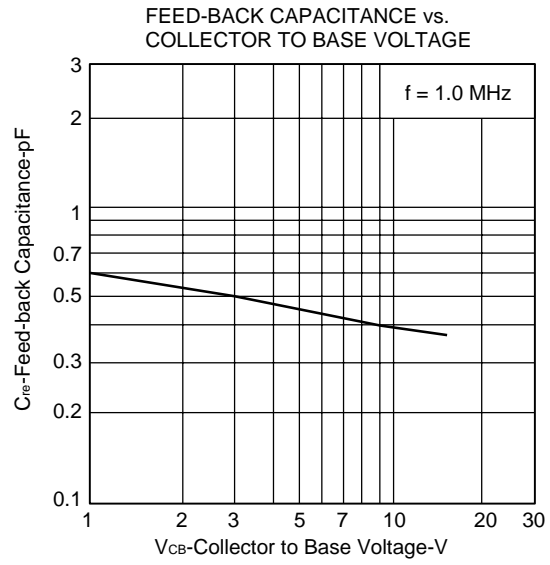
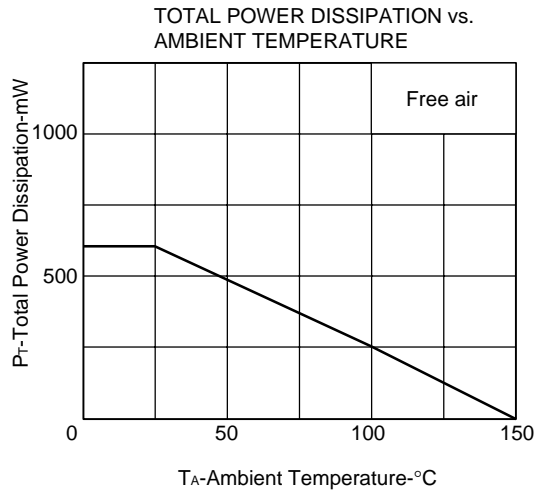
ELECTRICAL CHARACTERISTICS (TA = 25 °C)

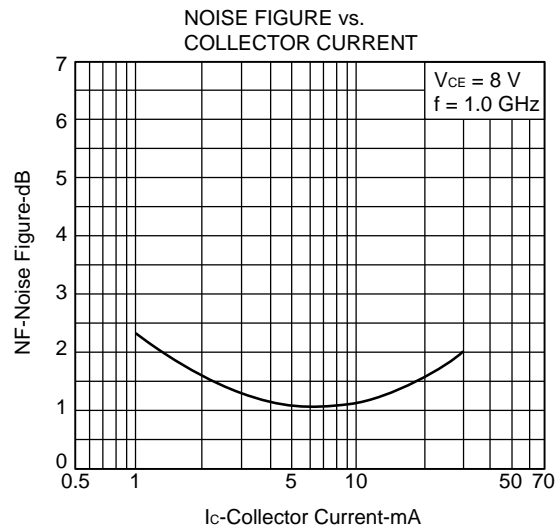
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I <sub>CB0</sub>			1.0	μA	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0
Emitter Cutoff Current	I <sub>EBO</sub>			1.0	μA	V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0
DC Current Gain	h <sub>FE</sub>	50	100	250		V <sub>CE</sub> = 8 V, I <sub>C</sub> = 20 mA
Gain Bandwidth Product	f <sub>T</sub>		8		GHz	V <sub>CE</sub> = 8 V, I <sub>C</sub> = 20 mA
Feed-Back Capacitance	C <sub>re</sub>		0.4	0.9	pF	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0, f = 1.0 MHz
Insertion Power Gain	S <sub>21e</sub>   <sup>2</sup>	9	11		dB	V <sub>CE</sub> = 8 V, I <sub>C</sub> = 20 mA, f = 1.0 GHz
Maximum Available Gain	MAG		13		dB	V <sub>CE</sub> = 8 V, I <sub>C</sub> = 20 mA, f = 1.0 GHz
Noise Figure	NF		1.2	2.5	dB	V <sub>CE</sub> = 8 V, I <sub>E</sub> = 7 mA, f = 1.0 GHz

h<sub>FE</sub> Classification

Class	K
Marking	K
h <sub>FE</sub>	50 to 250

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





**S-PARAMETER**

V<sub>CE</sub> = 8.0 V, I<sub>c</sub> = 5.0 mA, Z<sub>o</sub> = 50 Ω

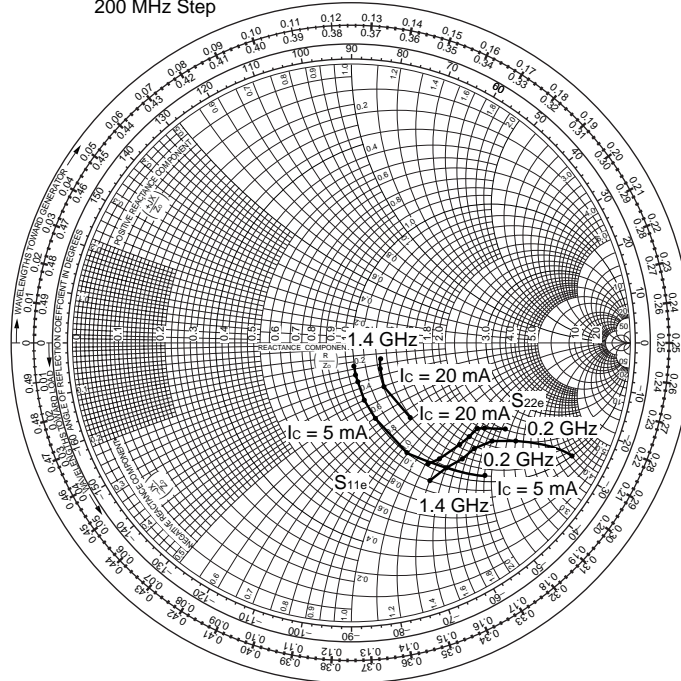
f (MHz)	S <sub>11</sub>	∠ S <sub>11</sub>	S <sub>21</sub>	∠ S <sub>21</sub>	S <sub>12</sub>	∠ S <sub>12</sub>	S <sub>22</sub>	∠ S <sub>22</sub>
200	0.668	-45.8	11.385	128.9	0.049	83.5	0.833	-26.9
400	0.425	-61.5	7.014	103.7	0.063	76.3	0.681	-31.1
600	0.294	-73.2	5.189	88.6	0.088	68.5	0.620	-36.0
800	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<sub>CE</sub> = 8.0 V, I<sub>c</sub> = 20 mA, Z<sub>o</sub> = 50 Ω

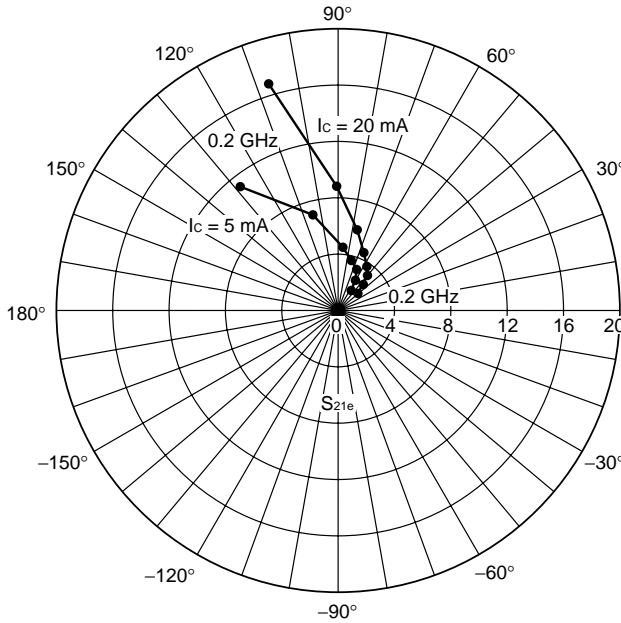
f (MHz)	S <sub>11</sub>	∠ S <sub>11</sub>	S <sub>21</sub>	∠ S <sub>21</sub>	S <sub>12</sub>	∠ S <sub>12</sub>	S <sub>22</sub>	∠ S <sub>22</sub>
200	0.333	-51.4	17.197	107.7	0.053	97.5	0.638	-29.7
400	0.195	-49.2	8.729	89.7	0.064	90.1	0.585	-31.8
600	0.158	-44.3	6.149	78.8	0.078	80.3	0.573	-35.0
800	0.156	-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

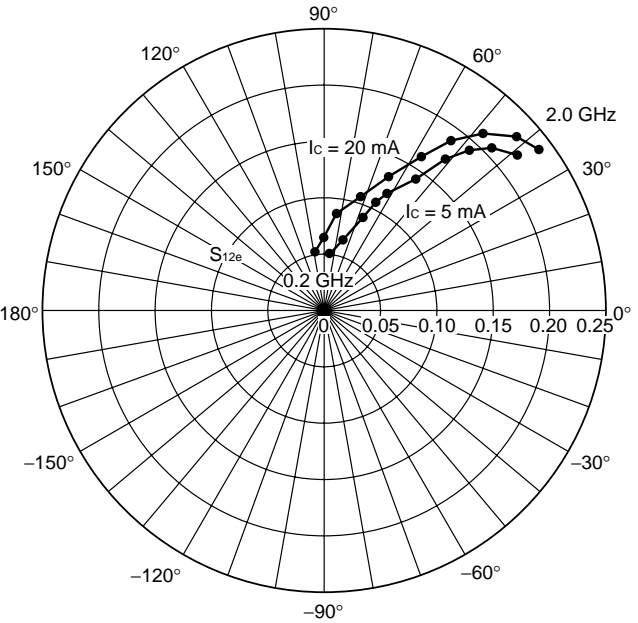
S<sub>11e</sub>, S<sub>22e</sub>-FREQUENCY CONDITION V<sub>CE</sub> = 8 V  
200 MHz Step



S<sub>21e</sub>-FREQUENCY CONDITION V<sub>CE</sub> = 8 V



S<sub>12e</sub>-FREQUENCY CONDITION V<sub>CE</sub> = 8 V



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Anti-radioactive design is not implemented in this product.