



AT-00570 Up to 4 GHz General Purpose Silicon Bipolar Transistor

Features

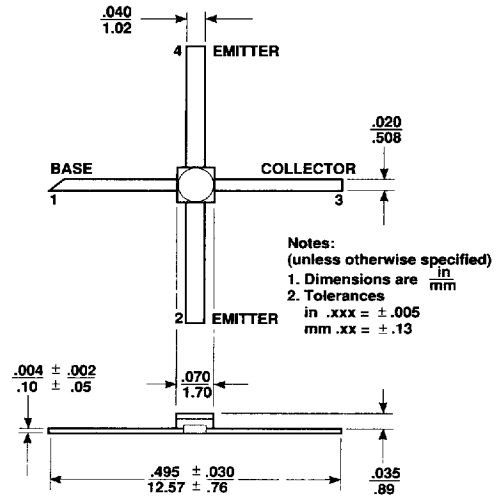
- 16.0 dBm typical $P_{1\text{ dB}}$ at 2.0 GHz
- 11.5 dB typical $G_{1\text{ dB}}$ at 2.0 GHz
- 2.5 dB typical NF_0 at 2.0 GHz
- High Gain-Bandwidth Product: 8.0 GHz typical f_T
- Hermetic Gold-ceramic Microstrip Package

Description

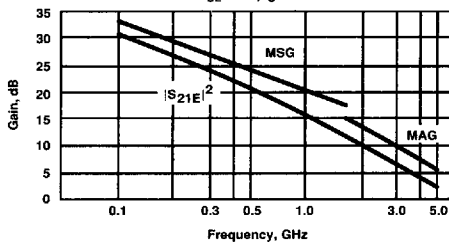
The AT-00570 is a high performance NPN silicon bipolar transistor housed in a hermetic, high reliability package. This device is designed for use in wide band amplifier and oscillator applications operating over VHF, UHF and microwave frequencies.

Excellent device uniformity, performance and reliability are produced by the use of ion-implantation, self-alignment techniques, and gold metallization in the fabrication of these devices.

70 mil Package



INSERTION POWER GAIN MAXIMUM AVAILABLE
GAIN AND MAXIMUM STABLE GAIN vs. FREQUENCY
 $V_{CE} = 8\text{ V}$, $I_C = 20\text{ mA}$



Electrical Specifications, $T_A = 25^\circ\text{C}$

Symbol	Parameters and Test Conditions	Units	Min.	Typ.	Max.
$ S_{21E} ^2$	Insertion Power Gain: $V_{CE} = 8\text{ V}$, $I_C = 20\text{ mA}$ $f = 1.0\text{ GHz}$ $f = 2.0\text{ GHz}$	dB	14.0	15.5 9.5	
$P_{1\text{ dB}}$	Power Output @ 1 dB Gain Compression: $V_{CE} = 8\text{ V}$, $I_C = 20\text{ mA}$ $f = 2.0\text{ GHz}$	dBm		16.0	
$G_{1\text{ dB}}$	1 dB Compressed Gain: $V_{CE} = 8\text{ V}$, $I_C = 20\text{ mA}$ $f = 2.0\text{ GHz}$	dB		11.5	
NF_0	Optimum Noise Figure: $V_{CE} = 8\text{ V}$, $I_C = 5\text{ mA}$ $f = 2.0\text{ GHz}$	dB		2.5	
GA	Gain @ NF_0 : $V_{CE} = 8\text{ V}$, $I_C = 5\text{ mA}$ $f = 2.0\text{ GHz}$	dB		10.5	
f_T	Gain Bandwidth Product: $V_{CE} = 8\text{ V}$, $I_C = 20\text{ mA}$	GHz		8.0	
h_{FE}	Forward Current Transfer Ratio: $V_{CE} = 8\text{ V}$, $I_C = 20\text{ mA}$		30	150	300
I_{CBO}	Collector Cutoff Current: $V_{CB} = 8\text{ V}$	μA			0.2
I_{EBO}	Emitter Cutoff Current: $V_{EB} = 1\text{ V}$	μA			1.0
CCB	Collector Base Capacitance: $V_{CB} = 8\text{ V}$, $f = 1\text{ MHz}$	pF		0.5	

Note 1 For this test, the emitter is grounded.

Absolute Maximum Ratings

Parameter	Symbol	Absolute Maximum ¹
Emitter-Base Voltage	VEBO	1.5 V
Collector-Base Voltage	VCEO	20 V
Collector-Emitter Voltage	VCE	12 V
Collector Current	IC	50 mA
Power Dissipation ^{2,3}	PT	500 mW
Junction Temperature	TJ	200°C
Storage Temperature	TSTG	-65°C to 200°C

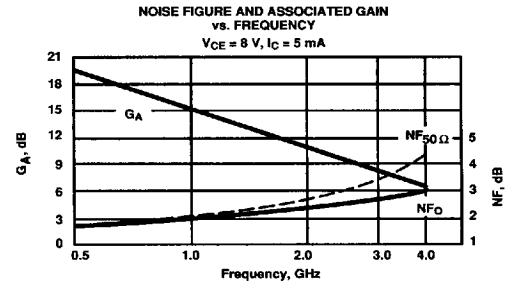
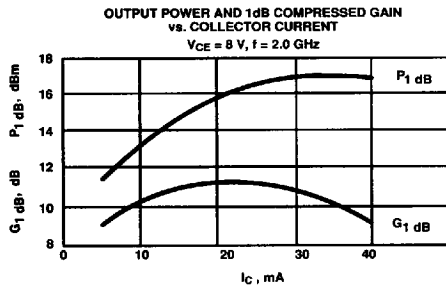
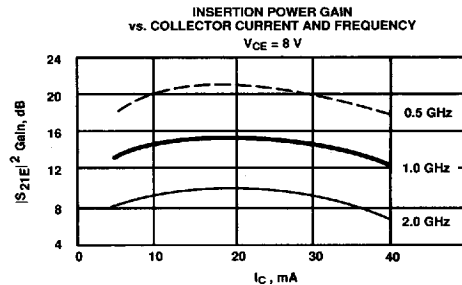
Thermal Resistance^{2,4}: $\theta_{JC} = 155^\circ\text{C/W}$

Notes:

- Operation of this device above any one of these parameters may cause permanent damage.
- TCASE = 25°C.
- Derate at 6.5 mW/°C for $T_C > 123^\circ\text{C}$.
- The small spot size of this technique results in a higher, though more accurate determination of θ_{JC} than do alternate methods. See MEASUREMENTS section "Thermal Resistance" for more information.

Typical Performance, $T_A = 25^\circ\text{C}$

(unless otherwise noted)



Typical Scattering Parameters: Common Emitter, $Z_0 = 50\ \Omega$

$T_A = 25^\circ\text{C}, V_{CE} = 8\text{ V}, I_C = 5\text{ mA}$

Freq. GHz	S_{11}		dB	S_{21}		dB	S_{12}		dB	S_{22}	
	Mag	Ang		Mag	Ang		Mag	Ang		Mag	Ang
0.1	.82	-29	23.4	14.78	160	-33.1	.022	83	.95	.15	-15
0.5	.64	-106	18.5	8.41	113	-23.5	.067	40	.59	.49	-49
1.0	.57	-144	13.6	4.79	88	-21.2	.087	33	.42	.60	-60
1.5	.55	-164	10.5	3.35	73	-20.4	.096	33	.38	.66	-66
2.0	.54	-178	8.2	2.57	60	-19.5	.106	32	.36	.74	-74
2.5	.54	175	6.6	2.13	53	-18.4	.120	35	.36	.78	-78
3.0	.54	167	5.0	1.79	43	-17.7	.130	36	.37	.87	-87
3.5	.54	159	3.8	1.56	32	-17.2	.138	33	.40	.97	-97
4.0	.53	153	2.8	1.38	22	-16.3	.153	31	.44	-104	
4.5	.52	145	1.9	1.24	13	-15.6	.166	28	.47	-110	
5.0	.50	135	1.1	1.13	4	-14.9	.180	24	.49	-117	

$T_A = 25^\circ\text{C}, V_{CE} = 8\text{ V}, I_C = 20\text{ mA}$

Freq. GHz	S_{11} Mag	S_{11} Ang	S_{21} dB	S_{21} Mag	S_{21} Ang	S_{12} dB	S_{12} Mag	S_{12} Ang	S_{22} dB	S_{22} Mag	S_{22} Ang
0.1	.57	-68	30.2	32.27	145	-37.1	.014	64	.82	.30	-30
0.5	.56	-151	21.0	11.22	98	-28.4	.038	47	.34	.62	-62
1.0	.55	-173	15.3	5.84	80	-24.7	.058	53	.26	.68	-68
1.5	.55	175	12.0	3.96	68	-22.6	.074	55	.25	.71	-71
2.0	.54	165	9.6	3.00	57	-20.9	.090	52	.26	.78	-78
2.5	.55	161	7.8	2.45	52	-19.0	.112	54	.27	.81	-81
3.0	.55	156	6.3	2.06	43	-18.2	.123	51	.29	.90	-90
3.5	.55	149	5.0	1.78	34	-17.0	.141	48	.33	.98	-98
4.0	.54	144	3.9	1.57	25	-16.0	.159	43	.36	-103	
4.5	.52	137	3.1	1.42	16	-15.1	.176	39	.40	-108	
5.0	.50	128	2.3	1.30	8	-14.3	.192	35	.41	-112	

A model for this device is available in the DEVICE MODELS section.