



AT-01610

Up to 4 GHz General Purpose Silicon Bipolar Transistor

Features

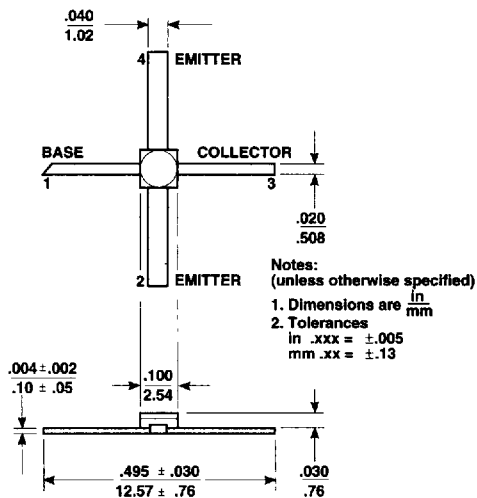
- 22.0 dBm typical $P_{1\text{ dB}}$ at 2.0 GHz
- 9.5 dB typical $G_{1\text{ dB}}$ at 2.0 GHz
- High Gain-Bandwidth Product: 7.0 GHz typical f_T
- Hermetic Gold-ceramic Microstrip Package

Description

The AT-01610 is a high performance NPN silicon bipolar transistor housed in a hermetic, high reliability package. This device is designed for use in medium power, wide band amplifier 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.

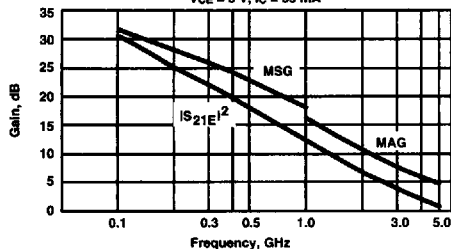
100 mil Package



Outline 10A

INSERTION POWER GAIN, MAXIMUM AVAILABLE
GAIN AND MAXIMUM STABLE GAIN
vs. FREQUENCY

$V_{CE} = 8\text{ V}$, $I_C = 35\text{ mA}$



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

Symbol	Parameters and Test Conditions	Units	Min.	Typ.	Max.
IS_{21E}^2	Insertion Power Gain: $V_{CE} = 8\text{ V}$, $I_C = 35\text{ mA}$ $f = 1.0\text{ GHz}$ $f = 2.0\text{ GHz}$	dB	11.0	12.5 6.5	
$P_{1\text{ dB}}$	Power Output @ 1 dB Gain Compression: $V_{CE} = 8\text{ V}$, $I_C = 60\text{ mA}$ $f = 2.0\text{ GHz}$	dBm		22.0	
$G_{1\text{ dB}}$	1 dB Compressed Gain: $V_{CE} = 8\text{ V}$, $I_C = 60\text{ mA}$ $f = 2.0\text{ GHz}$	dB		9.5	
NFO	Optimum Noise Figure: $V_{CE} = 8\text{ V}$, $I_C = 35\text{ mA}$ $f = 2.0\text{ GHz}$	dB		3.0	
GA	Gain @ NFO: $V_{CE} = 8\text{ V}$, $I_C = 35\text{ mA}$ $f = 2.0\text{ GHz}$	dB		10.0	
f_T	Gain Bandwidth Product: $V_{CE} = 8\text{ V}$, $I_C = 35\text{ mA}$	GHz		7.0	
h_{FE}	Forward Current Transfer Ratio: $V_{CE} = 8\text{ V}$, $I_C = 35\text{ mA}$		30	150	300
ICBO	Collector Cutoff Current: $V_{CB} = 8\text{ V}$	μA			0.2
IEBO	Emitter Cutoff Current: $V_{EB} = 1\text{ V}$	μA			2.0
CCB	Collector Base Capacitance ¹ : $V_{CB} = 8\text{ V}$, $f = 1\text{ MHz}$	pF		0.8	

Note: 1. For this test, the emitter is grounded.

Absolute Maximum Ratings

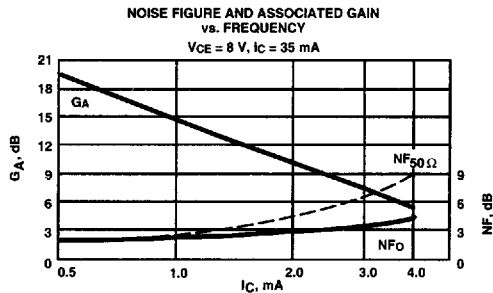
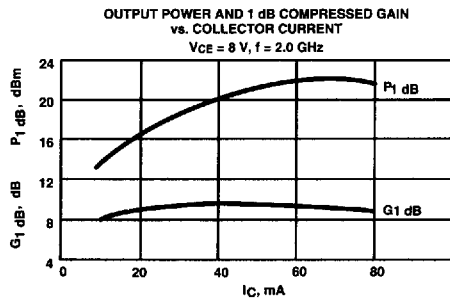
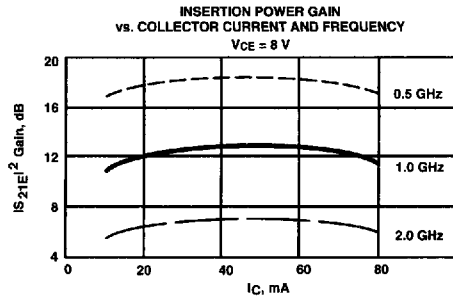
Parameter	Symbol	Absolute Maximum ¹
Emitter-Base Voltage	VEBO	1.5 V
Collector-Base Voltage	VCBO	20 V
Collector-Emitter Voltage	VCEO	12 V
Collector Current	IC	150 mA
Power Dissipation ^{2,3}	PT	1000 mW
Junction Temperature	T _J	200°C
Storage Temperature	T _{STG}	-65°C to 200°C

Thermal Resistance^{2,4}: $\theta_{JC} = 115^\circ\text{C/W}$

Notes:

- Operation of this device above any one of these parameters may cause permanent damage.
- TCASE = 25°C.
- Derate at 8.7 mW/°C for T_C > 85°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°C
(unless otherwise noted)



Typical Scattering Parameters: Common Emitter, Z₀ = 50 Ω

T_A = 25°C, V_{CE} = 8 V, I_C = 35 mA

Freq. GHz	S ₁₁		S ₂₁			S ₁₂			S ₂₂	
	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	Mag	Ang
0.1	.69	-125	30.9	35.08	119	-33.6	.021	44	.53	-80
0.5	.72	-175	18.3	8.22	86	-28.4	.038	45	.28	-146
1.0	.71	171	12.4	4.17	72	-24.6	.059	50	.26	-162
1.5	.71	160	9.1	2.85	60	-21.8	.081	56	.24	-169
2.0	.72	151	6.7	2.16	49	-19.4	.107	50	.24	-174
2.5	.72	147	5.1	1.80	42	-17.8	.129	51	.25	-175
3.0	.73	140	3.8	1.55	32	-16.7	.147	47	.25	179
3.5	.73	132	2.8	1.37	22	-15.5	.168	41	.27	176
4.0	.72	124	1.8	1.23	11	-14.6	.187	36	.28	173
4.5	.72	114	0.9	1.11	1	-13.5	.211	30	.29	169
5.0	.73	103	0.1	1.01	-9	-12.9	.226	23	.30	163

T_A = 25°C, V_{CE} = 8 V, I_C = 60 mA

0.1	.69	-138	31.5	37.69	114	-34.4	.019	42	.46	-92
0.5	.72	-178	18.4	8.34	85	-30.4	.030	60	.28	-154
1.0	.72	169	12.6	4.25	71	-24.6	.059	59	.25	-167
1.5	.72	159	9.3	2.91	60	-21.8	.081	59	.25	-173
2.0	.72	150	6.9	2.22	49	-19.3	.109	52	.24	-177
2.5	.72	146	5.2	1.83	42	-17.5	.133	54	.25	-179
3.0	.73	139	3.8	1.55	33	-16.6	.148	49	.26	176
3.5	.73	132	2.7	1.37	22	-15.4	.169	44	.27	174
4.0	.73	123	1.7	1.21	12	-14.4	.191	37	.29	171
4.5	.73	114	0.8	1.10	2	-13.5	.212	30	.30	166
5.0	.73	103	0.0	1.00	-8	-12.8	.228	24	.31	160

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