HEWLETT PACKARD

AT-01610
Up to 4 GHz General Purpose Silicon Bipolar Transistor

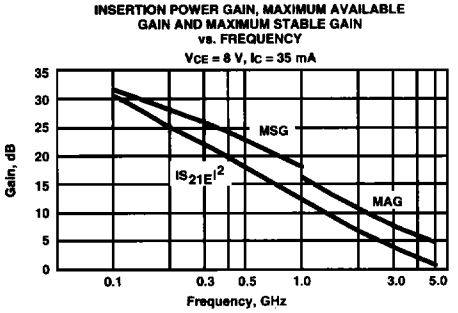
Features

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

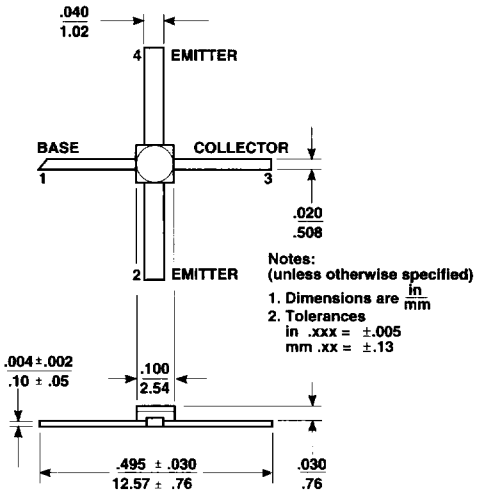
Description

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

Electrical Specifications, T_A = 25°C

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

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

Absolute Maximum Ratings

Parameter	Symbol	Absolute Maximum[1]
Emitter-Base Voltage	V_{EBO}	1.5 V
Collector-Base Voltage	V_{CBO}	20 V
Collector-Emitter Voltage	V_{CEO}	12 V
Collector Current	I_C	150 mA
Power Dissipation[2,3]	P_T	1000 mW
Junction Temperature	T_j	200°C
Storage Temperature	T_{STG}	–65°C to 200°C

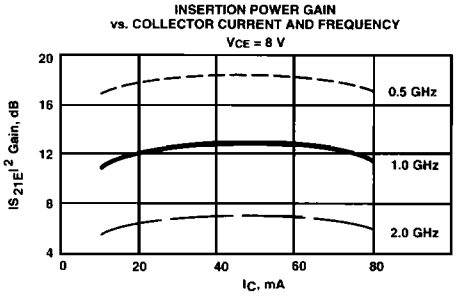
Thermal Resistance[2,4]: θ_{jc} = 115°C/W

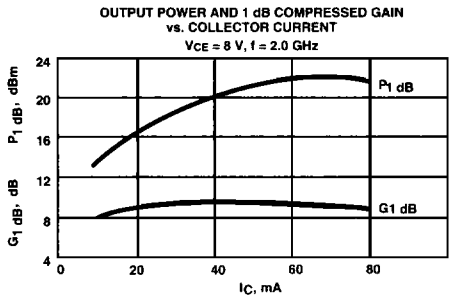
Notes:

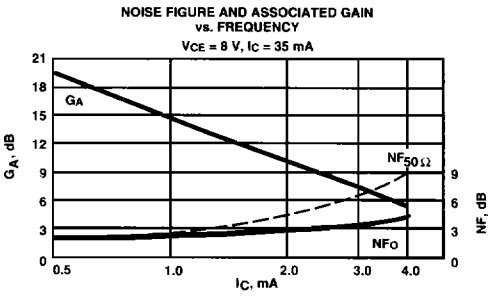
1. Operation of this device above any one of these parameters may cause permanent damage.
2. T_{CASE} = 25°C.
3. Derate at 8.7 mW/°C for T_C > 85°C.
4. The small spot size of this technique results in a higher, though more accurate determination of θ_{jc} than do alternate methods. See MEASUREMENTS section "Thermal Resistance" for more information.

Typical Performance, T_A = 25°C

(unless otherwise noted)







Typical Scattering Parameters: Common Emitter, Z_O = 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.