



AT-00535
Up to 4 GHz General Purpose
Silicon Bipolar Transistor

Features

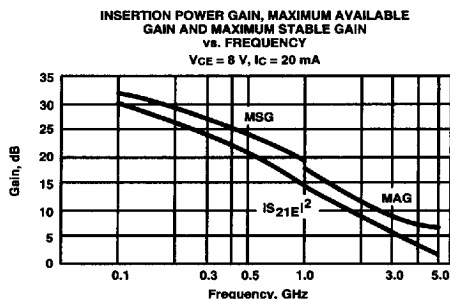
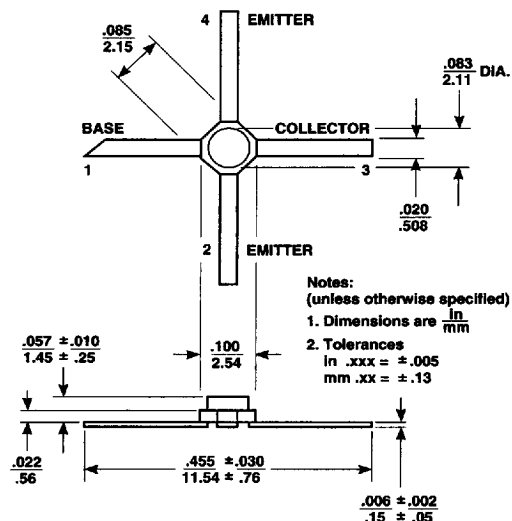
- 16.0 dBm typical P_1 dB at 2.0 GHz
- 10.5 dB typical G_1 dB at 2.0 GHz
- 2.5 dB typical NF_0 at 2.0 GHz
- High Gain-Bandwidth Product: 8.0 GHz typical f_T
- Cost Effective Ceramic Microstrip Package

Description

The AT-00535 is a high performance NPN silicon bipolar transistor housed in a cost effective, microstrip 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.

35 micro-X Package



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

Symbol	Parameters and Test Conditions	Units	Min.	Typ.	Max.
$IS_{21}EI^2$	Insertion Power Gain: $V_{CE} = 8\text{ V}$, $I_C = 20\text{ mA}$ $f = 1.0\text{ GHz}$ $f = 2.0\text{ GHz}$	dB	13.0	15.0 9.0	
P_1 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 dB	1 dB Compressed Gain: $V_{CE} = 8\text{ V}$, $I_C = 20\text{ mA}$ $f = 2.0\text{ GHz}$	dB		10.5	
NF_0	Optimum Noise Figure: $V_{CE} = 8\text{ V}$, $I_C = 5\text{ mA}$ $f = 2.0\text{ GHz}$	dB		2.5	
G_A	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.

Low Noise Silicon Bipolar Transistor

HEWLETT-PACKARD/ CMPNTS

61E D

Absolute Maximum Ratings

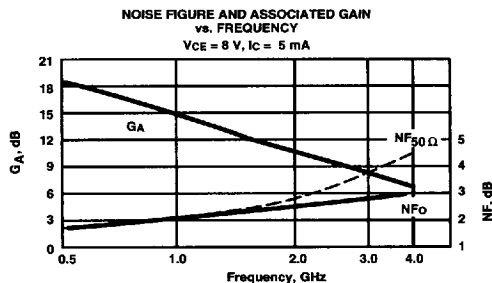
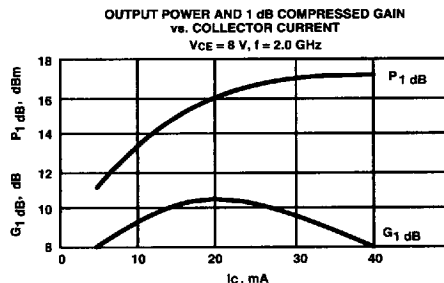
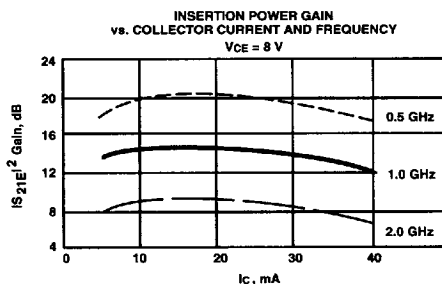
Parameter	Symbol	Absolute Maximum ¹
Emitter-Base Voltage	VEBO	1.5 V
Collector-Base Voltage	VCBO	20 V
Collector-Emitter Voltage	VCEO	12 V
Collector Current	IC	50 mA
Power Dissipation ^{2,3}	PT	500 mW
Junction Temperature	TJ	200°C
Storage Temperature ⁴	TSTG	-65°C to 200°C
Thermal Resistance ^{2,5} : $\theta_{JC} = 180^\circ\text{C/W}$		

Notes:

- Operation of this device above any one of these parameters may cause permanent damage.
- TCASE = 25°C.
- Derate at 5.6 mW/°C for TCASE > 110°C.
- Storage above 150°C may tarnish the leads of this package making it difficult to solder into a circuit. After a device has been soldered into a circuit, it may be safely stored up to 200°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, $Z_o = 50\ \Omega$ $T_A = 25^\circ\text{C}, V_{CE} = 8\text{ V}, I_C = 5\text{ mA}$

Freq. GHz	S_{11}		S_{21}		S_{12}		S_{22}	
	Mag	Ang	dB	Mag	dB	Mag	Mag	Ang
0.1	.82	-29	23.4	14.90	-33.1	.022	.95	-16
0.5	.58	-106	18.3	8.20	-23.4	.068	.58	-47
1.0	.49	-149	13.4	4.67	-20.9	.090	.41	-57
1.5	.48	-175	10.3	3.28	-19.6	.105	.35	-64
2.0	.49	167	8.1	2.53	-18.1	.125	.32	-74
2.5	.50	156	6.4	2.10	-17.0	.141	.31	-82
3.0	.53	144	5.0	1.78	-15.9	.160	.30	-97
3.5	.54	134	3.9	1.56	-15.0	.178	.34	-110
4.0	.54	124	2.8	1.38	-13.9	.202	.37	-120
4.5	.55	112	2.0	1.25	-12.8	.229	.39	-129
5.0	.56	98	1.2	1.15	-11.9	.253	.40	-139

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

Freq. GHz	Mag	Ang	dB	Mag	dB	Mag	Mag	Ang
0.1	.56	-63	29.6	30.24	-34.4	.019	.81	-28
0.5	.47	-150	20.3	10.37	-27.3	.043	.36	-52
1.0	.47	-178	14.7	5.43	-23.4	.068	.27	-54
1.5	.48	165	11.4	3.71	-20.4	.095	.24	-61
2.0	.50	152	9.1	2.84	-18.3	.121	.23	-72
2.5	.51	145	7.3	2.33	-16.7	.146	.21	-82
3.0	.54	135	5.9	1.96	-15.5	.167	.23	-98
3.5	.56	126	4.7	1.72	-14.2	.194	.26	-113
4.0	.56	116	3.7	1.53	-13.2	.219	.29	-123
4.5	.55	106	2.8	1.38	-12.2	.244	.32	-131
5.0	.57	93	2.1	1.27	-11.3	.273	.33	-141

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