AVANTEK

AT-01672
Up to 1 GHz General Purpose Silicon Bipolar Transistor

T-31-23

Features

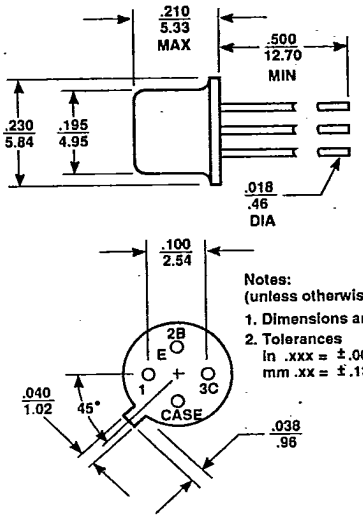
- 24.0 dBm typical $P_{1\,dB}$ at 1.0 GHz
- 5.5 dB typical $G_{1\,dB}$ at 1.0 GHz
- High Gain-Bandwidth Product: 5.5 GHz typical f_T
- Hermetic, Metal Package

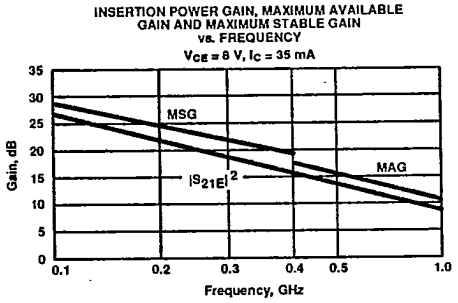
Description

Avantek's AT-01672 is a high performance NPN silicon bipolar transistor housed in a hermetic high reliability metal package. This device is designed for use in medium power 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.

Avantek TO-72 Package





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 = 0.5 GHz f = 1.0 GHz	dB	13.0	14.5 9.0	
$P_{1\,dB}$	Power Output @ 1 dB Gain Compression: V_{CE} = 8 V, I_C = 60 mA	f = 1.0 GHz	dBm		24.0	
$G_{1\,dB}$	1 dB Compressed Gain: V_{CE} = 8 V, I_C = 60 mA	f = 1.0 GHz	dB		5.5	
NF_O	Optimum Noise Figure: V_{CE} = 8 V, I_C = 35 mA	f = 0.5 GHz f = 1.0 GHz	dB		2.0 3.0	
G_A	Gain @ NF_O: V_{CE} = 8 V, I_C = 35 mA	f = 0.5 GHz f = 1.0 GHz	dB		10.5 6.5	
f_T	Gain Bandwidth Product: V_{CE} = 8 V, I_C = 10 mA		GHz		5.5	
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		1.0	

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

General Purpose Silicon Bipolar Transistor

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° to 200°C

Thermal Resistance[2,4]: θ_{jc} = 190°C/W

Notes:
1. Operation of this device above any one of these parameters may use permanent damage.
2. T_{CASE} = 25°C.
3. Derate at 5.3 mW/°C for T_C > 10°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)

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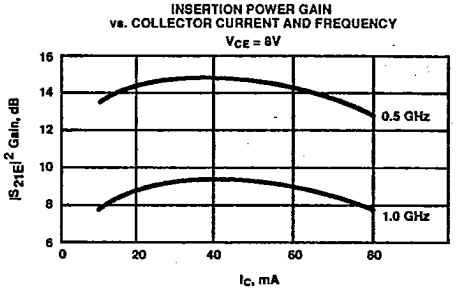

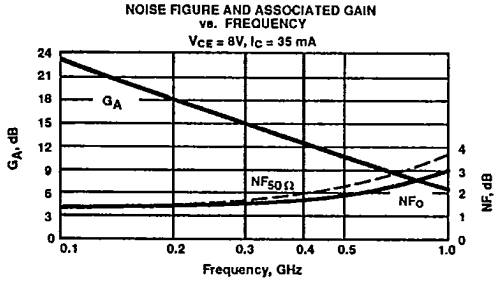

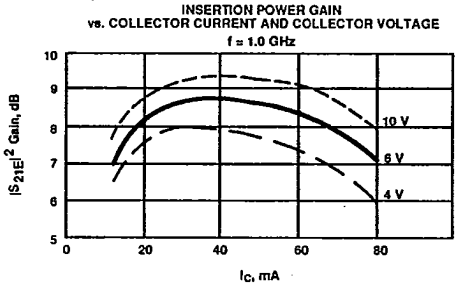

Typical Scattering Parameters: Common Emitter, Z_O = 50 Ω

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	.33	−81	26.7	21.73	114	−30.2	.031	72	.51	−36
0.2	.22	−112	21.8	12.28	98	−26.0	.050	75	.36	−36
0.3	.19	−134	18.7	8.61	92	−22.8	.072	74	.30	−37
0.4	.18	−148	16.4	6.58	83	−21.0	.090	72	.26	−34
0.5	.17	−159	14.6	5.35	79	−19.1	.111	70	.22	−33
0.6	.17	−171	13.1	4.51	77	−17.5	.133	71	.21	−38
0.7	.17	178	12.0	3.97	72	−16.2	.154	68	.19	−45
0.8	.18	171	11.1	3.61	68	−15.3	.172	66	.18	−53
0.9	.18	169	9.9	3.12	65	−14.3	.192	66	.20	−58
1.0	.19	164	9.2	2.89	61	−13.5	.212	63	.22	−60

T_A = 25°C, V_{CE} = 8 V, I_C = 60 mA

0.1	.30	−92	26.7	21.60	110	−30.4	.030	73	.47	−35
0.2	.22	−125	21.5	11.92	96	−26.2	.049	76	.33	−35
0.3	.21	−145	18.4	8.29	90	−23.0	.070	75	.28	−34
0.4	.20	−159	16.1	6.35	82	−21.0	.089	72	.26	−31
0.5	.19	−169	14.2	5.16	77	−19.3	.109	70	.23	−31
0.6	.20	−178	12.8	4.34	76	−17.7	.131	72	.21	−37
0.7	.20	173	11.6	3.81	71	−16.4	.152	68	.19	−43
0.8	.21	167	10.8	3.47	67	−15.4	.170	66	.19	−51
0.9	.21	165	9.5	2.99	64	−14.5	.189	67	.21	−58
1.0	.22	160	8.9	2.78	60	−13.6	.208	64	.23	−60

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