



AT-64023
Up to 4 GHz Linear Power
Silicon Bipolar Transistor

T-33-05

Features

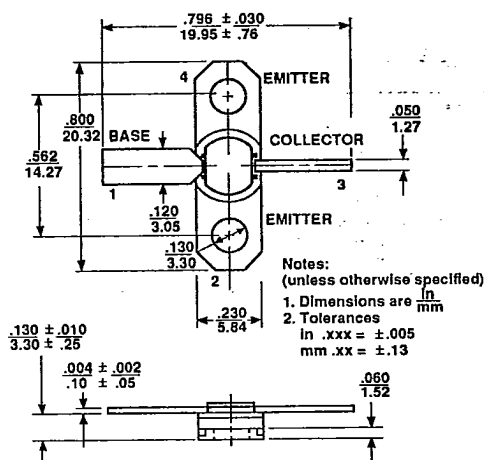
- High Output Power:
28.0 dBm typical $P_{1\text{ dB}}$ at 2.0 GHz
27.0 dBm typical $P_{1\text{ dB}}$ at 4.0 GHz
- High Gain at 1 dB Compression:
12.5 dB typical $G_{1\text{ dB}}$ at 2.0 GHz
9.5 dB typical $G_{1\text{ dB}}$ at 4.0 GHz
- 35% Total Efficiency
- Emitter Ballast Resistors
- Hermetic, Metal/Beryllia Stripline Package

Description

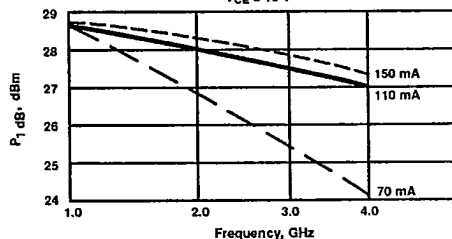
Avantek's AT-64023 is a high performance NPN silicon bipolar transistor housed in a hermetic BeO flange package for good thermal characteristics. This device is designed for use in medium power, wide band amplifier and oscillator applications operating over VHF, UHF and microwave frequencies.

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. The use of ion-implanted ballast resistors ensures uniform current distribution through the multiple emitter fingers.

Avantek 230 mil BeO Flange Package



POWER OUTPUT @ 1 dB GAIN COMPRESSION
vs. FREQUENCY AND COLLECTOR CURRENT
 $V_{CE} = 16\text{ V}$

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

Symbol	Parameters and Test Conditions	Units	Min.	Typ.	Max.
$P_{1\text{ dB}}$	Power Output @ 1 dB Gain Compression: $V_{CE} = 16\text{ V}$, $I_C = 110\text{ mA}$	dBm		28.0 27.0	
$G_{1\text{ dB}}$	1 dB Compressed Gain: $V_{CE} = 16\text{ V}$, $I_C = 110\text{ mA}$	dB		12.5 9.5	
η_T	Total Efficiency ¹ at 1 dB Compression: $V_{CE} = 16\text{ V}$, $I_C = 110\text{ mA}$	%		35.0	
$ S_{21E} ^2$	Insertion Power Gain: $V_{CE} = 16\text{ V}$, $I_C = 110\text{ mA}$	dB		6.5 2.0	
h_{FE}	Forward Current Transfer Ratio: $V_{CE} = 8\text{ V}$, $I_C = 110\text{ mA}$		20	50	200
I_{CBO}	Collector Cutoff Current: $V_{CB} = 16\text{ V}$	μA			100
I_{EBO}	Emitter Cutoff Current: $V_{EB} = 1\text{ V}$	μA			5.0

Note: 1. $\eta_T = \frac{\text{RF Output Power}}{\text{RF Input Power} + V_{CE}I_C}$

AVANTEK INC T-33-05

Linear Power Silicon Bipolar Transistor

Absolute Maximum Ratings

Parameter	Symbol	Absolute Maximum ¹
Emitter-Base Voltage	VEBO	2.2 V
Collector-Base Voltage	VCBO	40 V
Collector-Emitter Voltage	VCEO	20 V
Collector Current	IC	200 mA
Power Dissipation ^{2,3}	PT	3 W
Junction Temperature	Tj	200°C
Storage Temperature	TSTG	-65°C to 200°C

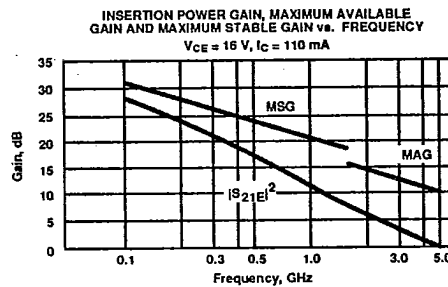
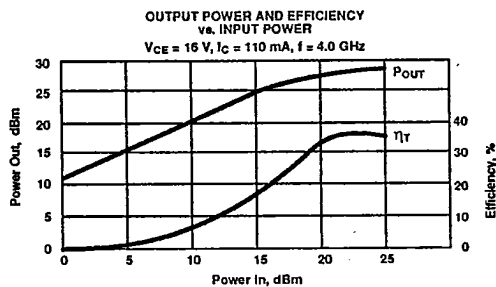
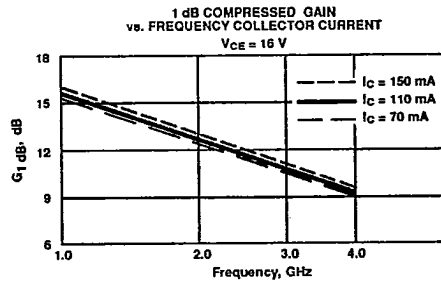
Thermal Resistance^{2,4}: $\theta_{JC} = 40^\circ\text{C/W}$

Notes:

- Operation of this device above any one of these parameters may cause permanent damage.
- TCASE = 25°C.
- Derate at 25 mW/°C for $T_C > 80^\circ\text{C}$.
- 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, $Z_0 = 50\ \Omega$ $T_A = 25^\circ\text{C}, V_{CE} = 16\text{ V}, I_C = 110\text{ mA}$

Freq. GHz	S_{11}		S_{21}			S_{12}			S_{22}	
	Mag	Ang	dB	Mag	Ang	dB	Mag	Ang	Mag	Ang
0.1	.54	-124	28.2	25.71	135	-33.3	.022	42	.72	-51
0.5	.80	-178	17.6	7.57	78	-29.5	.034	18	.33	-119
1.0	.80	162	11.9	3.92	47	-28.6	.037	10	.33	-142
1.5	.80	147	8.6	2.70	21	-27.9	.040	12	.40	-156
2.0	.78	133	6.3	2.07	-4	-27.6	.042	1	.48	-169
2.5	.77	127	5.1	1.80	-24	-25.5	.053	-5	.58	-178
3.0	.73	116	3.8	1.56	-51	-25.0	.056	-20	.67	170
3.5	.66	106	2.9	1.40	-79	-25.8	.051	-28	.78	156
4.0	.60	99	2.2	1.28	-109	-27.2	.044	-49	.86	142
4.5	.55	98	1.4	1.18	-141	-31.2	.028	-70	.93	127
5.0	.54	99	0.6	1.07	-175	-40.9	.009	-144	.93	112

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