NEW

HEWLETT hp PACKARD

COMPONENTS

GENERAL PURPOSE TRANSISTOR

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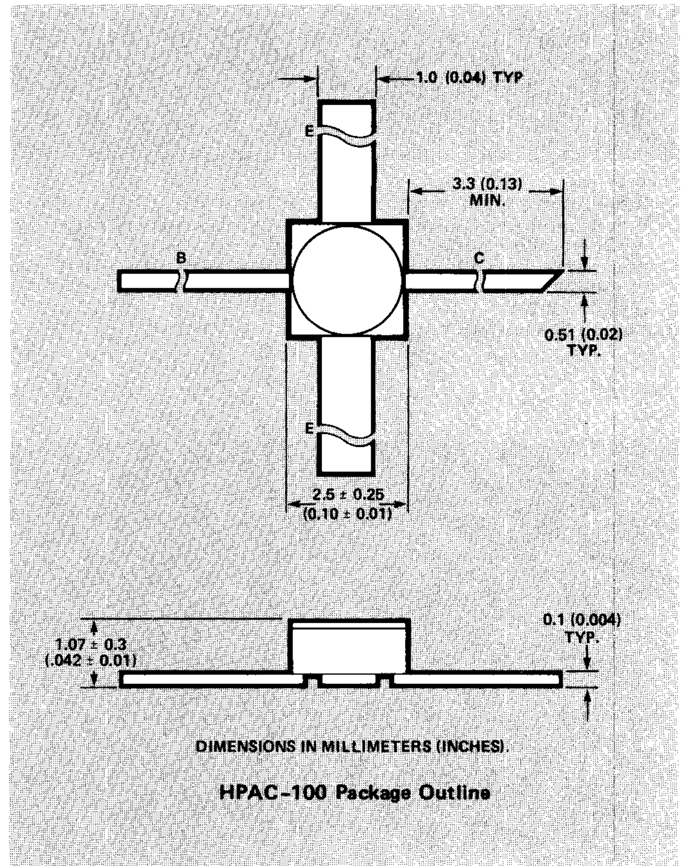
2N6679
(HXTR-2101)

Features

HIGH GAIN
10.5 dB Typical at 4 GHz

WIDE DYNAMIC RANGE

RUGGED HERMETIC PACKAGE



DIMENSIONS IN MILLIMETERS (INCHES).

HPAC-100 Package Outline

Description

The 2N6679 (HXTR-2101) is an NPN bipolar transistor designed for high gain and output power at 4 GHz. The device utilizes ion implantation techniques and Ti/Pt/Au metallization in its manufacture. The chip is provided with a dielectric scratch protection over its active area.

The 2N6679 is supplied in the HPAC-100, a rugged metal/ceramic hermetic package, and is capable of meeting the environmental requirements of MIL-S-19500 and the test requirements of MIL-STD-750/883.

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Electrical Specifications at $T_{CASE}=25°C$

Symbol	Parameters and Test Conditions	MIL-STD-750 Test Method	Units	Min.	Typ.	Max.
BV_{CES}	Collector-Emitter Breakdown Voltage $I_C=100\mu A$	3011.1*	V	30		
I_{CEO}	Collector-Emitter Leakage Current at $V_{CE}=15V$	3041.1	nA			500
I_{CBO}	Collector Cutoff Current at $V_{CB}=15V$	3036.1	nA			100
h_{FE}	Forward Current Transfer Ratio $V_{CE}=15V, I_C=15mA$	3076.1*	–	50	120	220
G_T	Tuned Gain		dB	9.0	10.5	
P_{1dB}	Power Output at 1 dB Compression Bias Conditions for Above: $V_{CE}=15V, I_C=25mA$, Frequency = 4 GHz		dBm		18.5	

*300 µs wide pulse measurement ≤2% duty cycle.

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Recommended Maximum Continuous Operating Conditions [1]

Symbol	Parameter	Value
V_{CBO}	Collector to Base Voltage[2]	25V
V_{CEO}	Collector to Emitter Voltage[2]	16V
V_{EBO}	Emitter to Base Voltage[2]	1.0V
I_C	DC Collector Current[2]	35mA
P_T	Total Device Dissipation[3]	450 mW
T_J	Junction Temperature	200°C
T_{STG}	Storage Temperature	-65°C to +200°C

Notes:
1. Operation of this device in excess of any one of these conditions is likely to result in a reduction in device mean time between failure (MTBF) to below the design goal of 1 x 10^7 hours at T_J = 175°C (assumed Activation Energy = 1.5 eV). Corresponds to maximum rating for 2N6679.
2. T_{CASE} = 25°C.
3. Derate at 4.8 mW/°C, $T_C \geq$ 106°C.

Absolute Maximum Ratings*

Symbol	Parameter	Limit
V_{CBO}	Collector to Base Voltage	30V
V_{CEO}	Collector to Emitter Voltage	20V
V_{EBO}	Emitter to Base Voltage	1.5V
I_C	DC Collector Current	70 mA
P_T	Total Device Dissipation	900 mW
T_J	Junction Temperature	300°C
$T_{STG(MAX)}$	Maximum Storage Temperature	250°C
—	Lead Temperature (Soldering 10 seconds each lead)	+250°C

*Operation in excess of any one of these conditions may result in permanent damage to this device.

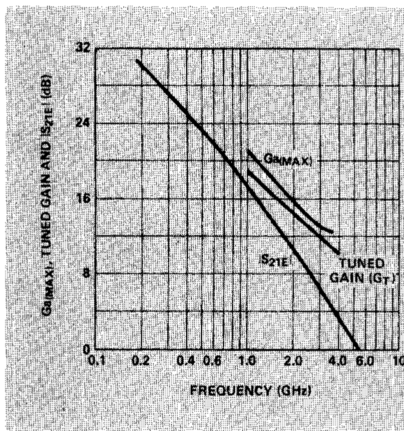

Figure 1. Typical $G_{a(MAX)}$ and Tuned Gain vs. Frequency at V_{CE}=15V, I_C=25 mA

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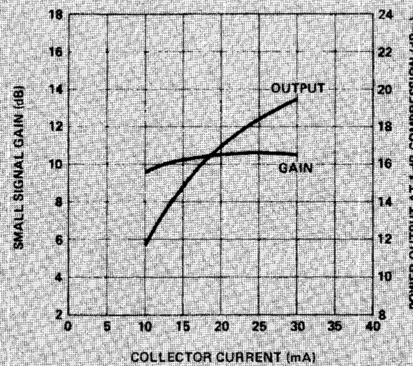

Figure 2. Typical Power Output at 1 dB Compression and Small Signal Gain vs. Collector Current at 4 GHz for V_{CE} = 15V.

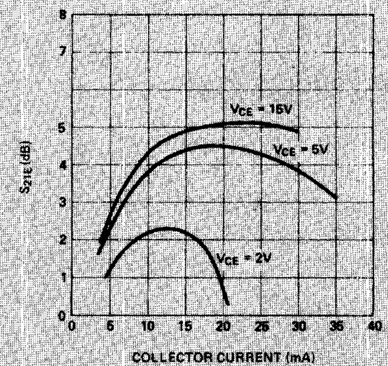

Figure 3. Typical $|S_{21E}|^2$ vs. Bias at 4 GHz.

Typical S-Parameters V_{CE} = 15V, I_C = 25mA

	S_{11}		S_{21}			S_{12}			S_{22}	
Freq. (MHz)	Mag.	Ang.	(dB)	Mag.	Ang.	(dB)	Mag.	Ang.	Mag.	Ang.
100	0.59	-66	30.8	34.6	146	-40.0	0.01	69	0.86	-18
500	0.58	-150	22.1	12.7	96	-33.2	0.02	44	0.51	-27
1000	0.59	-175	16.7	6.86	78	-30.5	0.03	51	0.44	-32
1500	0.59	173	13.3	4.61	64	-28.0	0.04	55	0.45	-39
2000	0.60	162	11.0	3.53	53	-25.7	0.05	55	0.44	-49
2500	0.61	156	8.9	2.79	43	-24.2	0.06	55	0.47	-60
3000	0.62	146	7.3	2.32	33	-22.6	0.07	56	0.48	-67
3500	0.63	139	5.9	1.96	22	-21.2	0.09	53	0.52	-79
4000	0.62	131	4.8	1.73	11	-19.7	0.10	50	0.55	-84
4500	0.61	123	3.5	1.50	1	-18.8	0.12	48	0.59	-93
5000	0.60	116	2.6	1.35	-9	-17.0	0.14	44	0.65	-102
5500	0.62	109	1.8	1.23	-19	-15.9	0.16	36	0.66	-113
6000	0.62	103	0.9	1.11	-28	-15.6	0.17	32	0.66	-123
6500	0.62	93	0.0	1.02	-37	-13.7	0.20	28	0.67	-131