LT1001A

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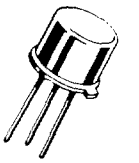
The RF Line
NPN Silicon High Frequency Transistor

I_C = 200 mA
HIGH FREQUENCY TRANSISTOR
NPN SILICON

. . . designed for ultra-linear communications or instrumentation applications. Low noise figure combined with high-output capability gives this device an exceptional dynamic range. Gold metallization and diffused emitter ballasting are combined to achieve the high reliability demanded by the most severe communications requirements. High gain makes this transistor ideal for broadband applications.

- Low Noise — 2.5 dB Typ @ f = 300 MHz
- High Gain — $|S_{21}|^2$ Typ = 13.5 dB @ f = 300 MHz
- Low Distortion — ITO = 45 dBm Typ @ f = 300 MHz
- Gold Metallization
- Diffused Ballast Resistors



CASE 79-04, STYLE 1
(TO-39)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	20	Vdc
Collector-Base Voltage	V_{CBO}	40	Vdc
Emitter-Base Voltage	V_{EBO}	3.5	Vdc
Collector Current — Continuous	I_C	200	mAdc
Operating Junction Temperature	T_J	200	°C
Storage Temperature Range	T_{stg}	65 to +200	°C

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 5 mA, I_B = 0)	$V_{(BR)CEO}$	20	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 1 mA, I_E = 0)	$V_{(BR)CBO}$	40	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 0.1 mA, I_C = 0)	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector Cutoff Current (V_{CB} = 10 V, I_E = 0)	I_{CBO}	—	50	—	μAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 50 mA, V_{CE} = 5 V)	h_{FE}	70	100	300	—
Collector-Emitter Saturation Voltage (I_C = 50 mA, I_B = 5 mA)	$V_{CE(sat)}$	—	500	—	mV
DYNAMIC CHARACTERISTICS					
Collector-Base Capacitance (V_{CB} = 10 V, I_E = 0, f = 1 MHz)	C_{cb}	—	1.6	—	pF

(continued)

ELECTRICAL CHARACTERISTICS — continued

Characteristic	Symbol	Min	Typ	Max	Unit
FUNCTIONAL TESTS					
Noise Figure, Minimum (V_{CE} = 8 V, I_C = 50 mA, f = 300 MHz)	NF_{MIN}	—	2.5	—	dB
Cutoff Frequency (V_{CE} = 14 V, I_C = 90 mA)	f_T	—	3	—	GHz
Maximum Unilateral Gain (V_{CE} = 14 V, I_C = 90 mA, f = 300 MHz)	GU_{MAX}	—	15	—	dB
Insertion Gain (V_{CE} = 14 V, I_C = 90 mA, f = 300 MHz)	$\|S_{21}\|^2$	—	13.5	—	dB
Output Power @ 1 dB Compression (V_{CE} = 14 V, I_C = 90 mA, f = 300 MHz)	$P_{o1\,dB}$	—	26	—	dBm
Third Order Intercept (V_{CE} = 14 V, I_C = 90 mA, f = 300 MHz)	ITO	—	45	—	dBm

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TYPICAL CHARACTERISTICS

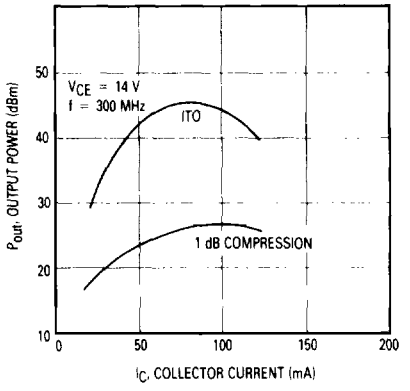

Figure 1. Third Order Intercept and 1 dB Compression versus Current

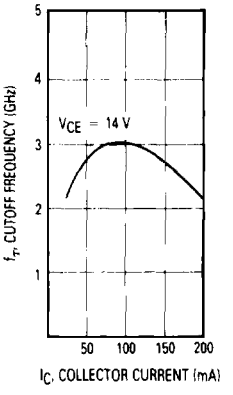

Figure 2. Gain-Bandwidth Product versus Collector Current

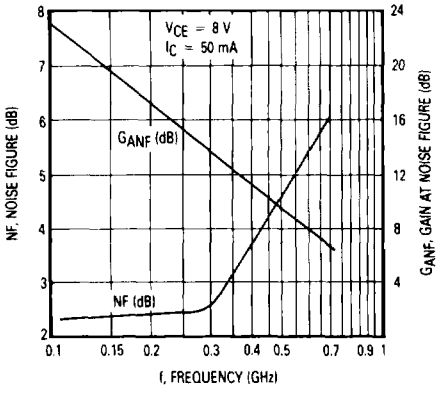

Figure 3. Noise Figure and Associated Gain versus Frequency

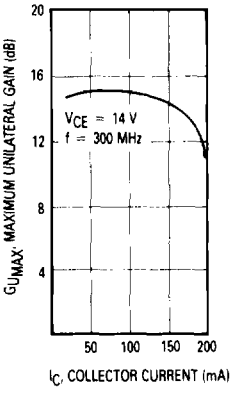

Figure 4. GU_{MAX} versus Collector Current

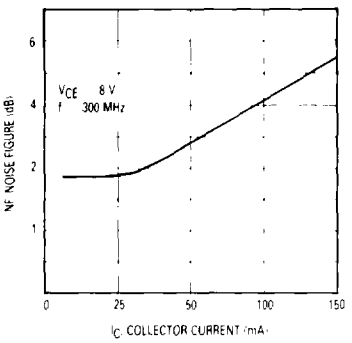

Figure 5. Noise Figure versus Collector Current

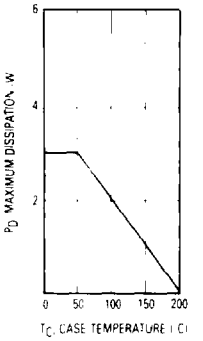

Figure 6. Dissipation versus Temperature

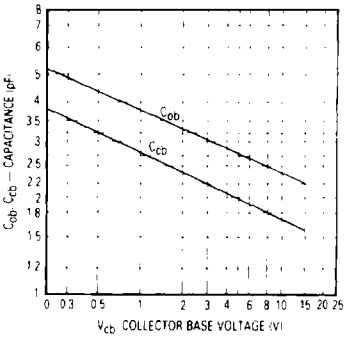

Figure 7. Junction Capacitance versus Voltage

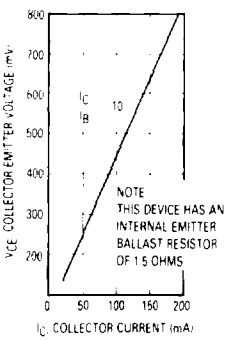

Figure 8. Collector Saturation Characteristics

VCE (Volts)	IC (mA)	f (GHz)	S11		S21		S12		S22	
			Mag	∠ φ	Mag	∠ φ	Mag	∠ φ	Mag	∠ φ
8	50	0.1	0.44	132	12.52	101	0.05	59	0.44	78
		0.2	0.35	168	6.32	85	0.08	66	0.26	86
		0.3	0.35	175	4.31	76	0.12	69	0.23	94
		0.4	0.36	161	3.28	68	0.15	70	0.23	103
		0.5	.036	146	2.67	61	0.19	70	0.24	110
		0.6	0.37	136	2.28	55	0.23	69	0.26	120
		0.7	0.37	124	2.02	50	0.27	68	0.29	127
		0.8	0.36	114	1.81	44	0.3	66	0.32	136
		0.9	0.36	105	1.64	39	0.34	65	0.34	144
		1	0.35	94	1.52	35	0.38	63	0.65	152
14	90	0.1	0.41	127	13.58	103	0.04	58	0.46	48
		0.2	0.38	158	7.14	86	0.06	63	0.38	57
		0.3	0.39	173	4.85	76	0.08	66	0.39	66
		0.4	0.38	178	3.65	67	0.1	67	0.42	75
		0.5	0.39	174	3.02	61	0.13	70	0.43	79
		0.6	0.39	168	2.54	56	0.15	71	0.46	85
		0.7	0.39	161	2.2	49	0.17	70	0.49	92
		0.8	0.39	156	1.91	44	0.19	71	0.53	96
		0.9	0.39	150	1.69	38	0.22	70	0.57	102
		1	0.4	144	1.53	34	0.24	70	0.59	105

Figure 9. Common Emitter S-Parameters