

HIGH-FREQUENCY LOW NOISE AMPLIFIER

NPN SILICON EPITAXIAL TRANSISTOR

(WITH BUILT-IN 6-PIN 2 ELEMENTS) MINI MOLD

The μ PA801T has built-in 2 low-voltage transistors which are designed to amplify low noise in the VHF band to the UHF band.

FEATURES

- Low Noise
NF = 1.2 dB TYP. @ f = 1 GHz, $V_{CE} = 3$ V, $I_C = 7$ mA
- High Gain
 $|S_{21e}|^2 = 9.0$ dB TYP. @ f = 1 GHz, $V_{CE} = 3$ V, $I_C = 7$ mA
- A Mini Mold Package Adopted
- Built-in 2 Transistors ($2 \times 2SC4226$)

ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
μ PA801T	Loose products (50 PCS)	Embossed tape 8 mm wide. Pin 6 (Q1 Base), Pin 5 (Q2 Base), Pin 4 (Q2 Emitter) face to perforation side of the tape.
μ PA801T-T1	Taping products (3 KPCS/Reel)	

Remark If you require an evaluation sample, please contact an NEC Sales Representative. (Unit sample quantity is 50 pcs.)

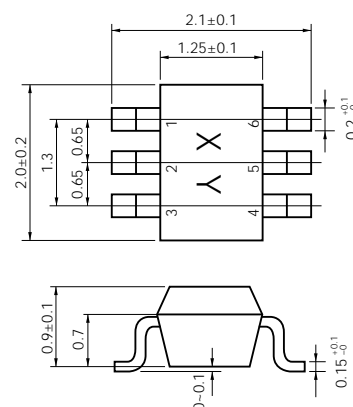
ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

PARAMETER	SYMBOL	RATING	UNIT
Collector to Base Voltage	V_{CBO}	20	V
Collector to Emitter Voltage	V_{CEO}	12	V
Emitter to Base Voltage	V_{EBO}	3	V
Collector Current	I_C	100	mA
Total Power Dissipation	P_T	150 in 1 element 200 in 2 elements ^{Note}	mW
Junction Temperature	T_J	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

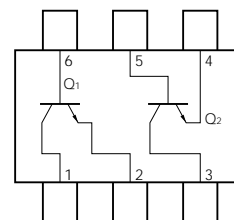
Note 110 mW must not be exceeded in 1 element.

PACKAGE DRAWINGS

(Unit: mm)



PIN CONFIGURATION (Top View)



PIN CONNECTIONS

- | | |
|-------------------|-----------------|
| 1. Collector (Q1) | 4. Emitter (Q2) |
| 2. Emitter (Q1) | 5. Base (Q2) |
| 3. Collector (Q2) | 6. Base (Q1) |

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)

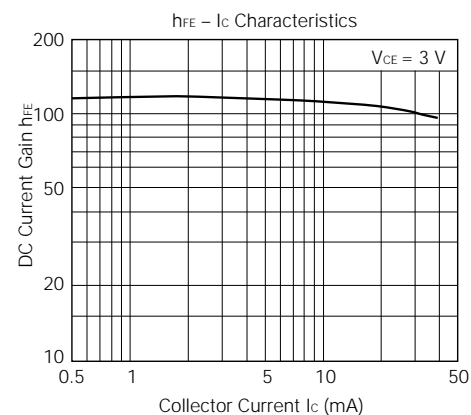
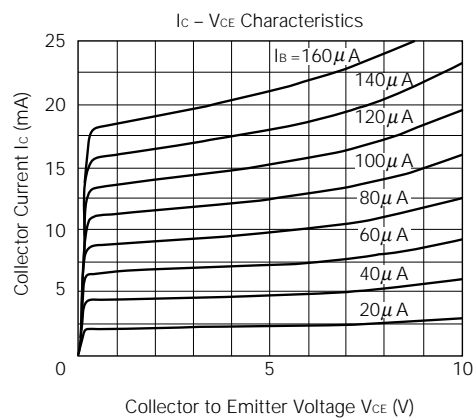
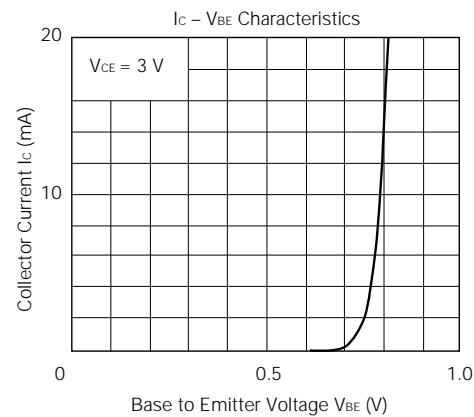
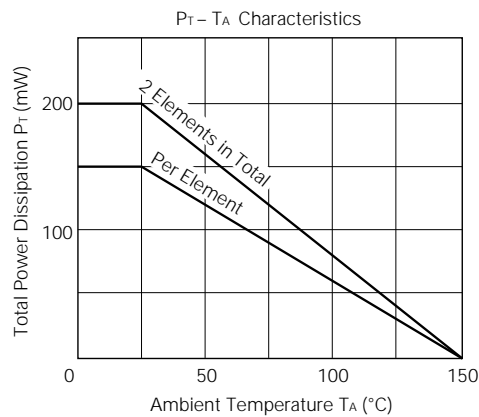
PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cutoff Current	I_{CBO}	$V_{CB} = 10\text{ V}, I_E = 0$			1	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 1\text{ V}, I_C = 0$			1	μA
DC Current Gain	h_{FE}	$V_{CE} = 3\text{ V}, I_C = 7\text{ mA}$ ^{Note 1}	70		250	
Gain Bandwidth Product	f_T	$V_{CE} = 3\text{ V}, I_C = 7\text{ mA}$	3.0	4.5		GHz
Feed-back Capacitance	C_{re}	$V_{CB} = 3\text{ V}, I_E = 0, f = 1\text{ MHz}$ ^{Note 2}		0.7	1.5	pF
Insertion Power Gain	$ S_{21} ^2$	$V_{CE} = 3\text{ V}, I_C = 7\text{ mA}, f = 1\text{ GHz}$	7	9		dB
Noise Figure	NF	$V_{CE} = 3\text{ V}, I_C = 7\text{ mA}, f = 1\text{ GHz}$		1.2	2.5	dB
h_{FE} Ratio	h_{FE1}/h_{FE2}	$V_{CE} = 3\text{ V}, I_C = 7\text{ mA}$ A smaller value among h_{FE} of $h_{FE1} = Q1, Q2$ A larger value among h_{FE} of $h_{FE2} = Q1, Q2$	0.85			

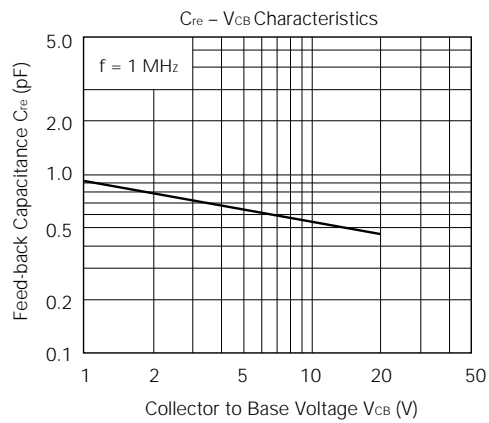
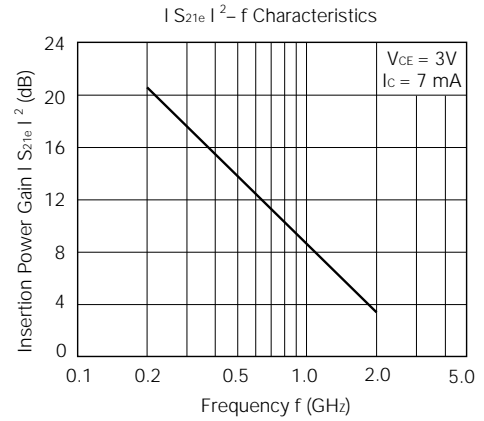
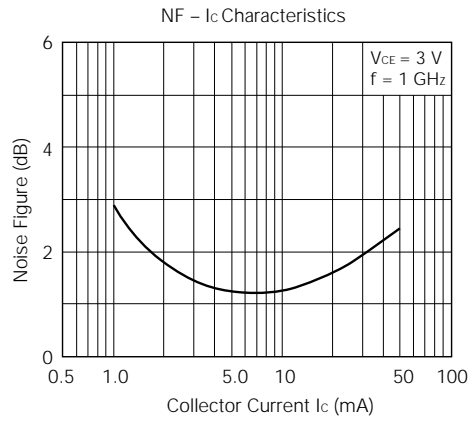
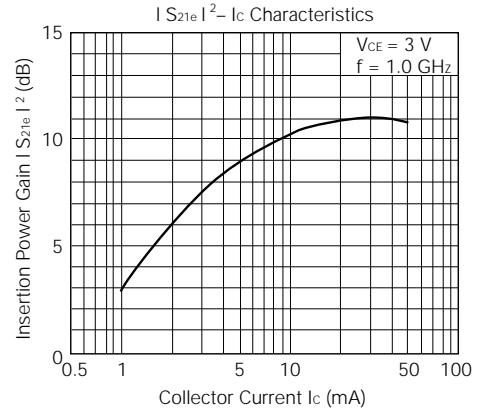
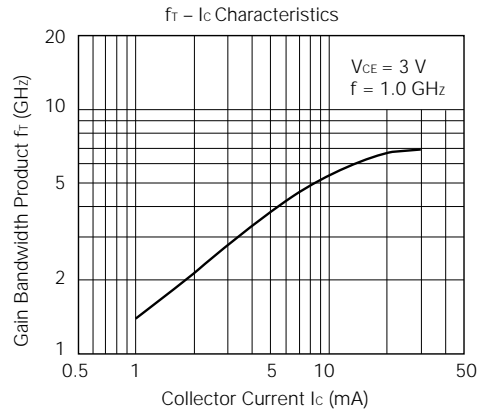
Notes 1. Pulse Measurement: $P_w \leq 350\text{ }\mu\text{s}$, Duty cycle $\leq 2\%$

2. Measured with 3-pin bridge, emitter and case should be connected to guard pin of bridge.

 h_{FE} CLASSIFICATION

Rank	FB	GB
Marking	R24	R25
h_{FE} Value	70 to 140	125 to 250

TYPICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$)



S-PARAMETERS

 $V_{CE} = 3 \text{ V}$, $I_C = 7 \text{ mA}$, $Z_O = 50 \Omega$

FREQUENCY	S11		S21		S12		S22		
	MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.750	-45.7	11.858	144.0	.035	63.3	.816	-28.5	
200.00	.618	-84.9	10.093	122.3	.053	53.2	.609	-41.8	
300.00	.528	-114.5	8.219	107.7	.064	50.6	.481	-46.7	
400.00	.483	-134.3	6.684	97.9	.073	50.6	.411	-49.1	
500.00	.459	-148.5	5.565	90.5	.081	50.7	.365	-50.5	
600.00	.447	-158.8	4.737	84.6	.089	52.3	.337	-51.5	
700.00	.441	-167.4	4.134	79.7	.098	53.5	.316	-52.6	
800.00	.439	-174.4	3.653	75.2	.107	54.2	.300	-54.2	
900.00	.437	179.2	3.283	71.1	.117	54.9	.290	-55.9	
1000.00	.437	173.7	2.978	67.2	.126	55.6	.281	-57.9	
1100.00	.440	168.6	2.732	63.7	.136	55.8	.275	-59.6	
1200.00	.443	163.9	2.533	60.0	.147	55.3	.270	-62.3	
1300.00	.444	159.6	2.357	56.6	.158	55.4	.267	-64.7	
1400.00	.449	155.5	2.216	53.4	.169	55.3	.264	-67.5	
1500.00	.450	151.6	2.077	50.3	.180	54.7	.259	-70.6	
1600.00	.455	147.9	1.972	47.4	.192	54.5	.258	-73.3	
1700.00	.459	144.3	1.868	44.3	.202	53.9	.256	-76.3	
1800.00	.462	140.9	1.789	41.3	.214	53.0	.255	-79.6	
1900.00	.466	137.5	1.702	38.4	.226	52.3	.253	-83.0	
2000.00	.470	134.4	1.635	36.1	.238	51.5	.253	-86.4	

 $V_{CE} = 3 \text{ V}$, $I_C = 5 \text{ mA}$, $Z_O = 50 \Omega$

FREQUENCY	S11		S21		S12		S22		
	MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.819	-38.9	8.934	148.0	.038	65.8	.868	-23.6	
200.00	.701	-73.4	8.007	127.6	.060	53.1	.687	-36.7	
300.00	.608	-102.3	6.898	112.6	.072	47.6	.560	-42.4	
400.00	.549	-123.6	5.819	101.8	.079	45.2	.483	-45.4	
500.00	.511	-139.6	4.970	93.5	.086	45.7	.434	-47.2	
600.00	.494	-151.0	4.255	86.9	.093	46.5	.402	-48.6	
700.00	.481	-160.8	3.750	81.4	.099	47.2	.379	-49.9	
800.00	.475	-168.6	3.328	76.3	.107	48.9	.361	-51.5	
900.00	.472	-175.7	3.004	72.0	.113	49.7	.350	-53.4	
1000.00	.471	178.2	2.734	67.7	.122	50.9	.340	-55.4	
1100.00	.473	172.8	2.522	64.0	.130	51.6	.332	-57.3	
1200.00	.474	167.6	2.355	60.2	.139	52.3	.328	-59.7	
1300.00	.474	162.9	2.176	56.7	.148	53.1	.322	-62.3	
1400.00	.477	158.4	2.038	53.2	.158	53.3	.319	-65.2	
1500.00	.481	154.4	1.921	49.8	.168	53.7	.315	-68.2	
1600.00	.484	150.3	1.818	46.7	.177	53.3	.313	-70.9	
1700.00	.489	146.5	1.726	43.9	.190	53.3	.312	-73.9	
1800.00	.490	142.9	1.647	40.6	.200	53.0	.312	-77.2	
1900.00	.495	139.3	1.578	37.6	.212	52.7	.309	-80.8	
2000.00	.501	136.0	1.505	35.0	.223	52.0	.309	-84.0	

S-PARAMETERS

 $V_{CE} = 3 \text{ V}$, $I_C = 3 \text{ mA}$, $Z_O = 50 \Omega$

FREQUENCY		S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	
100.00	.899	-30.6	5.578	153.7	.042	69.0	.923	-17.3	
200.00	.808	-60.6	5.327	134.4	.069	54.5	.793	-29.2	
300.00	.723	-86.7	4.877	119.6	.084	46.0	.679	-35.4	
400.00	.660	-108.2	4.341	108.1	.093	41.1	.604	-39.5	
500.00	.610	-125.9	3.883	98.5	.098	38.8	.550	-42.0	
600.00	.583	-138.6	3.388	90.9	.102	37.4	.513	-44.2	
700.00	.560	-150.0	3.046	84.3	.106	37.8	.487	-45.9	
800.00	.547	-159.4	2.741	78.5	.108	38.1	.468	-47.9	
900.00	.538	-167.4	2.498	73.4	.112	39.5	.455	-49.9	
1000.00	.535	-174.4	2.287	68.9	.116	41.0	.444	-52.3	
1100.00	.534	179.3	2.111	64.6	.120	43.0	.435	-54.7	
1200.00	.533	173.4	1.965	60.2	.125	45.1	.429	-57.2	
1300.00	.533	168.3	1.830	56.3	.131	46.7	.424	-59.9	
1400.00	.534	163.2	1.721	52.7	.139	48.3	.422	-62.8	
1500.00	.538	158.7	1.620	49.2	.146	49.8	.417	-65.7	
1600.00	.542	154.3	1.544	45.7	.155	51.3	.414	-68.8	
1700.00	.545	150.0	1.464	42.7	.164	52.4	.415	-72.0	
1800.00	.548	146.1	1.396	39.5	.174	53.0	.412	-75.3	
1900.00	.552	142.0	1.336	36.6	.187	53.7	.411	-78.8	
2000.00	.556	138.3	1.280	33.6	.199	54.1	.411	-82.3	

 $V_{CE} = 3 \text{ V}$, $I_C = 1 \text{ mA}$, $Z_O = 50 \Omega$

FREQUENCY		S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG	
100.00	.967	-22.9	1.935	159.9	.045	74.0	.978	-9.2	
200.00	.930	-45.8	1.968	143.1	.083	60.1	.931	-17.4	
300.00	.884	-67.1	1.938	129.1	.108	48.9	.870	-23.2	
400.00	.842	-85.9	1.827	117.2	.125	39.4	.822	-28.0	
500.00	.801	-103.1	1.748	106.7	.134	32.6	.779	-31.9	
600.00	.771	-117.0	1.576	97.4	.137	27.1	.749	-35.3	
700.00	.742	-130.0	1.498	89.2	.137	22.9	.722	-38.4	
800.00	.722	-141.2	1.403	81.9	.134	20.0	.702	-41.3	
900.00	.706	-151.1	1.326	75.6	.129	18.5	.690	-44.4	
1000.00	.695	-159.9	1.242	69.6	.124	17.8	.680	-47.4	
1100.00	.689	-167.7	1.169	64.5	.118	18.1	.671	-50.4	
1200.00	.685	-174.9	1.102	59.6	.112	19.8	.666	-53.6	
1300.00	.681	178.7	1.030	55.3	.106	23.5	.660	-56.9	
1400.00	.681	172.6	.979	50.9	.103	28.0	.658	-60.4	
1500.00	.683	166.8	.925	47.2	.100	33.6	.654	-64.0	
1600.00	.684	161.4	.884	43.6	.102	40.4	.651	-67.6	
1700.00	.684	156.1	.842	40.4	.107	47.5	.651	-71.5	
1800.00	.686	151.4	.804	37.3	.115	53.5	.649	-75.1	
1900.00	.689	146.6	.773	34.6	.127	57.9	.646	-79.2	
2000.00	.690	142.1	.738	32.3	.141	62.1	.646	-83.0	

[MEMO]

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