

**HIGH-FREQUENCY LOW NOISE AMPLIFIER
NPN SILICON EPITAXIAL TRANSISTOR
(WITH BUILT-IN 6-PIN 2 × 2SC4226) SMALL MINI MOLD**

The μPA810T 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 Small Mini Mold Package Adopted
- Built-in 2 Transistors (2 × 2SC4226)

ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
μPA810T	Loose products (50 PCS)	Embossed tape 8 mm wide. Pin 6 (Q1 Base), Pin 5 (Q1 Emitter), Pin 4 (Q2 Emitter) face to perforation side of the tape.
μPA810T-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.)

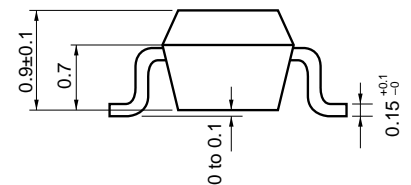
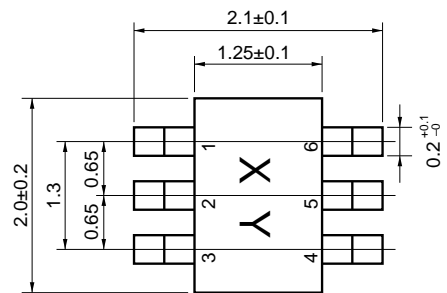
ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

PARAMETER	SYMBOL	RATING	UNIT
Collector to Base Voltage	V _{CB0}	20	V
Collector to Emitter Voltage	V _{CE0}	12	V
Emitter to Base Voltage	V _{EB0}	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	°C
Storage Temperature	T _{stg}	-65 to +150	°C

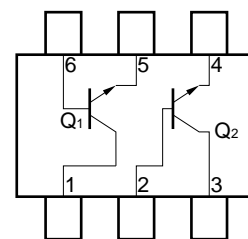
Note 110 mW must not be exceeded in 1 element.

PACKAGE DRAWINGS

(Unit: mm)



PIN CONFIGURATION (Top View)



PIN CONNECTIONS

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

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

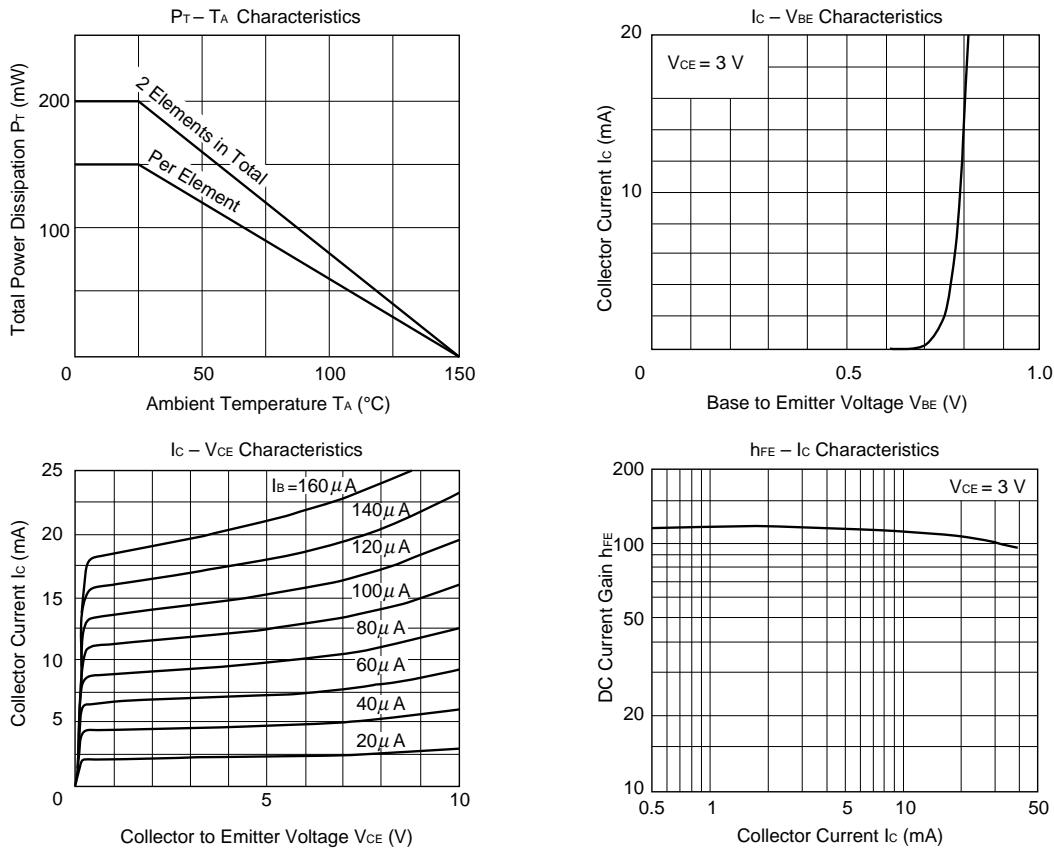
PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cutoff Current	I _{CBO}	V _{CB} = 10 V, I _E = 0			1	μA
Emitter Cutoff Current	I _{EBO}	V _{EB} = 1 V, I _C = 0			1	μA
DC Current Gain	h _{FE}	V _{CE} = 3 V, I _C = 7 mA ^{Note 1}	70		250	
Gain Bandwidth Product	f _T	V _{CE} = 3 V, I _C = 7 mA	3.0	4.5		GHz
Feed-back Capacitance	C _{re}	V _{CB} = 3 V, I _E = 0, f = 1 MHz ^{Note 2}		0.7	1.5	pF
Insertion Power Gain	S _{21e} ²	V _{CE} = 3 V, I _C = 7 mA, f = 1 GHz	7	9		dB
Noise Figure	NF	V _{CE} = 3 V, I _C = 7 mA, f = 1 GHz		1.2	2.5	dB
h _{FE} Ratio	h _{FE1} /h _{FE2}	V _{CE} = 3 V, I _C = 7 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			

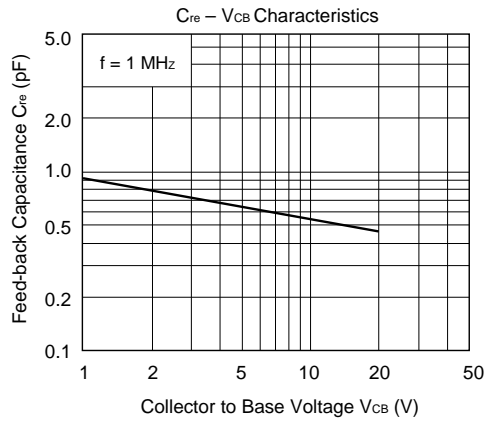
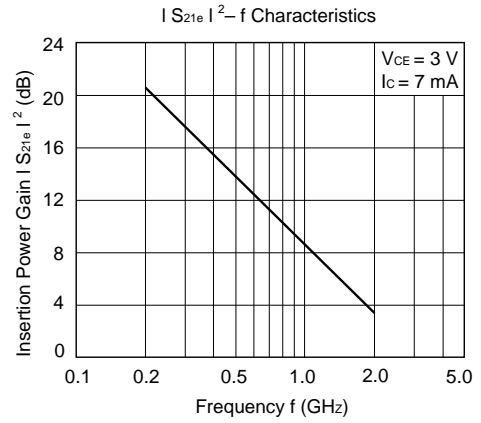
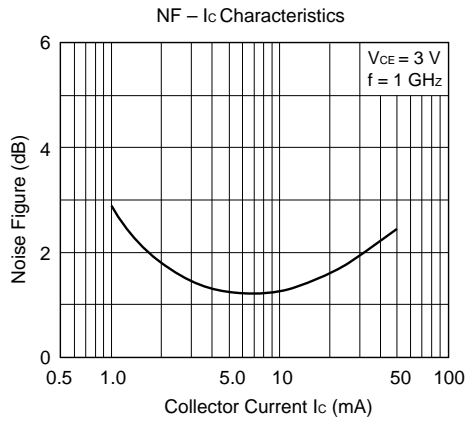
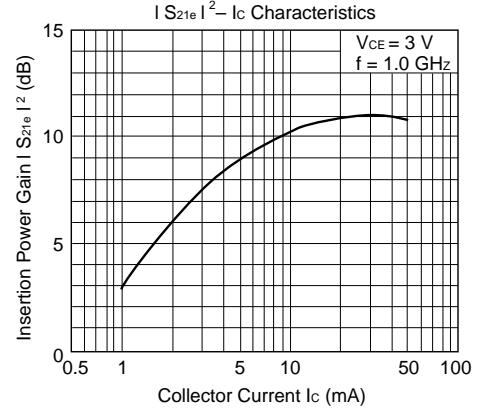
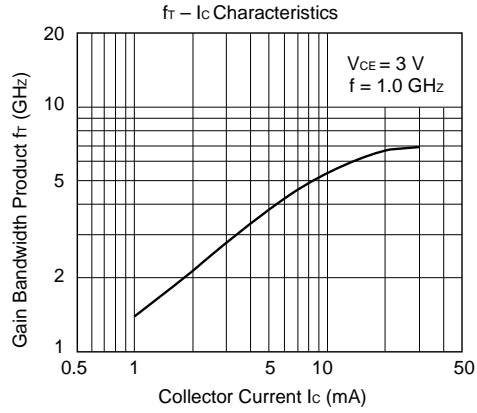
- Notes**
1. Pulse Measurement: P_w ≤ 350 μs, Duty cycle ≤ 2 %
 2. Measured with 3-pin bridge, emitter and case should be connected to guard pin of bridge.

h_{FE} CLASSIFICATION

Rank	FB	GB
Marking	24R	25R
h _{FE} Value	70 to 140	125 to 250

TYPICAL CHARACTERISTICS (T_A = 25 °C)





S-PARAMETERS

V_{CE} = 3 V, I_c = 1 mA

FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.959	-26.1	3.680	162.0	0.045	77.2	0.983	-9.0
200.00	0.920	-48.3	3.305	146.4	0.080	63.8	0.937	-15.8
300.00	0.838	-69.2	2.972	131.3	0.111	50.1	0.863	-23.0
400.00	0.810	-85.6	2.612	121.4	0.128	43.5	0.815	-26.3
500.00	0.775	-100.0	2.367	110.9	0.137	34.7	0.745	-29.1
600.00	0.767	-115.0	2.149	104.1	0.147	30.8	0.724	-31.7
700.00	0.745	-127.0	1.986	93.8	0.147	25.1	0.693	-33.2
800.00	0.722	-137.7	1.854	87.9	0.150	21.5	0.682	-36.5
900.00	0.711	-146.4	1.655	80.0	0.143	20.5	0.668	-39.2
1000.00	0.715	-155.0	1.541	74.0	0.140	17.1	0.644	-43.7
1100.00	0.708	-163.2	1.414	69.2	0.136	19.0	0.623	-46.8
1200.00	0.697	-171.9	1.340	63.3	0.134	18.0	0.594	-50.1
1300.00	0.688	-177.1	1.271	59.5	0.132	18.5	0.577	-52.7
1400.00	0.675	178.8	1.174	54.4	0.122	20.1	0.559	-55.3
1500.00	0.706	173.6	1.119	49.8	0.118	21.9	0.559	-58.3
1600.00	0.725	168.7	1.058	47.5	0.111	29.5	0.549	-61.9
1700.00	0.723	161.1	1.007	43.9	0.114	33.2	0.547	-66.8
1800.00	0.718	156.4	0.998	40.8	0.119	40.8	0.537	-71.6
1900.00	0.702	152.5	0.957	36.2	0.126	44.1	0.526	-76.8
2000.00	0.716	149.8	0.943	31.1	0.137	47.1	0.514	-81.8

V_{CE} = 3 V, I_c = 3 mA

FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.878	-39.3	9.289	153.2	0.041	71.5	0.941	-17.3
200.00	0.788	-69.5	7.675	133.1	0.068	55.9	0.807	-28.4
300.00	0.685	-93.9	6.222	117.5	0.087	44.8	0.674	-36.5
400.00	0.634	-111.2	5.151	108.1	0.094	41.7	0.588	-39.0
500.00	0.603	-125.2	4.360	99.6	0.100	37.3	0.511	-40.5
600.00	0.591	-137.9	3.838	94.6	0.105	37.7	0.475	-41.3
700.00	0.573	-148.5	3.378	86.0	0.107	36.4	0.443	-41.5
800.00	0.566	-156.8	3.215	82.1	0.113	36.7	0.425	-43.2
900.00	0.563	-163.4	2.821	75.6	0.114	38.8	0.408	-45.0
1000.00	0.573	-170.3	2.594	70.7	0.118	38.3	0.385	-48.2
1100.00	0.577	-177.2	2.359	67.2	0.122	41.5	0.365	-50.7
1200.00	0.572	175.4	2.200	62.2	0.128	41.7	0.343	-53.3
1300.00	0.563	171.4	2.084	58.8	0.136	42.9	0.326	-55.1
1400.00	0.555	168.5	1.904	54.8	0.138	43.8	0.309	-57.1
1500.00	0.584	164.9	1.803	50.5	0.146	44.3	0.301	-59.6
1600.00	0.603	161.2	1.700	48.7	0.150	48.4	0.290	-62.8
1700.00	0.608	154.7	1.616	45.4	0.161	47.8	0.281	-67.3
1800.00	0.607	150.8	1.591	42.4	0.173	50.0	0.268	-72.3
1900.00	0.598	147.7	1.523	38.1	0.183	48.8	0.255	-77.4
2000.00	0.612	145.8	1.488	32.8	0.197	47.7	0.244	-82.6

S-PARAMETERS

V_{CE} = 3 V, I_c = 5 mA

FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.803	-48.9	13.450	147.0	0.040	65.9	0.892	-23.3
200.00	0.693	-83.5	10.285	124.9	0.059	54.1	0.705	-36.2
300.00	0.594	-108.3	7.895	110.2	0.073	45.6	0.557	-43.4
400.00	0.548	-125.1	6.305	101.7	0.080	44.7	0.468	-45.0
500.00	0.528	-138.0	5.237	94.4	0.086	42.6	0.398	-45.4
600.00	0.520	-149.3	4.554	90.4	0.092	45.2	0.363	-45.2
700.00	0.508	-158.7	3.961	82.8	0.097	45.4	0.334	-44.8
800.00	0.505	-165.6	3.624	79.1	0.106	46.4	0.317	-46.0
900.00	0.505	-171.1	3.283	73.6	0.112	48.6	0.301	-47.1
1000.00	0.519	-176.9	3.009	69.1	0.120	48.0	0.279	-49.9
1100.00	0.527	177.0	2.729	66.0	0.127	50.1	0.262	-52.2
1200.00	0.525	170.1	2.536	61.5	0.135	49.4	0.243	-54.7
1300.00	0.518	166.6	2.399	58.3	0.147	49.9	0.227	-56.2
1400.00	0.513	164.1	2.188	54.6	0.151	50.2	0.211	-57.7
1500.00	0.539	161.2	2.067	50.6	0.162	49.5	0.202	-60.2
1600.00	0.558	158.0	1.945	48.9	0.169	52.1	0.190	-63.7
1700.00	0.565	152.1	1.847	46.0	0.181	50.8	0.179	-68.3
1800.00	0.567	148.5	1.814	43.0	0.194	51.9	0.166	-74.4
1900.00	0.561	145.6	1.737	38.9	0.205	49.8	0.152	-80.5
2000.00	0.574	144.1	1.693	33.8	0.219	47.9	0.142	-86.6

V_{CE} = 3 V, I_c = 7 mA

FREQUENCY MHz	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.729	-58.5	17.087	141.0	0.037	66.1	0.838	-29.0
200.00	0.612	-95.4	12.153	118.7	0.052	52.6	0.618	-42.2
300.00	0.529	-119.9	9.023	105.1	0.064	47.7	0.467	-48.4
400.00	0.492	-135.6	7.052	97.4	0.072	48.8	0.382	-49.2
500.00	0.481	-147.4	5.805	91.0	0.078	49.2	0.321	-48.7
600.00	0.476	-157.4	4.986	87.6	0.087	51.9	0.291	-47.9
700.00	0.469	-166.0	4.341	80.7	0.094	52.3	0.265	-47.0
800.00	0.469	-171.8	3.951	77.3	0.106	53.1	0.248	-47.6
900.00	0.471	-176.4	3.408	71.8	0.112	54.6	0.233	-48.7
1000.00	0.487	178.6	3.268	68.1	0.123	53.4	0.213	-51.0
1100.00	0.497	172.9	2.959	65.2	0.132	55.1	0.197	-53.1
1200.00	0.496	166.5	2.748	60.9	0.142	53.9	0.179	-55.6
1300.00	0.490	163.3	2.598	57.8	0.155	54.0	0.164	-57.0
1400.00	0.485	161.2	2.365	54.4	0.161	53.4	0.149	-59.0
1500.00	0.513	158.7	2.230	50.5	0.172	52.0	0.140	-61.3
1600.00	0.531	155.9	2.100	49.0	0.180	54.1	0.127	-65.2
1700.00	0.539	150.3	1.990	46.2	0.194	52.2	0.115	-70.6
1800.00	0.543	146.9	1.955	43.4	0.207	52.8	0.102	-78.3
1900.00	0.539	144.2	1.867	39.4	0.218	50.2	0.088	-87.0
2000.00	0.552	142.6	1.820	34.3	0.233	47.9	0.080	-95.5

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