



SILICON TRANSISTOR

μ PA810T

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

The μ PA810T 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
μ PA810T	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.
μ PA810T-T1	Taping products (3 KPCS/Reel)	

Remark To order evaluation samples, please contact your nearby sales office.
Part number for sample: μ PA810T-A (Unit sample quantity is 50 pcs.)

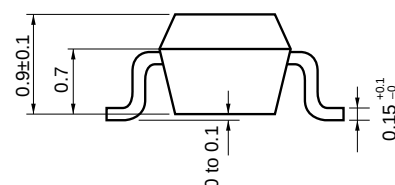
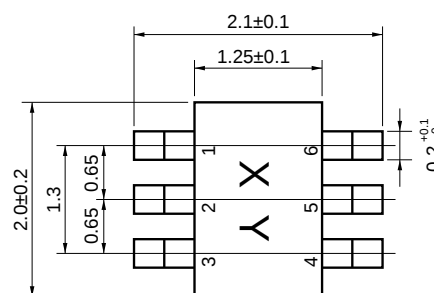
ABSOLUTE MAXIMUM RATINGS ($T_A = 25$ °C)

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	°C
Storage Temperature	T_{stg}	−65 to +150	°C

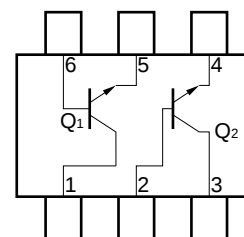
Note 110 mW must not be exceeded in 1 element.

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

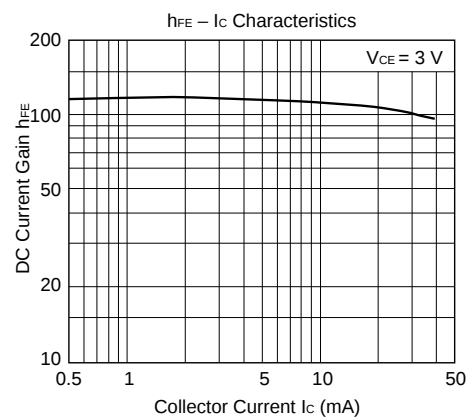
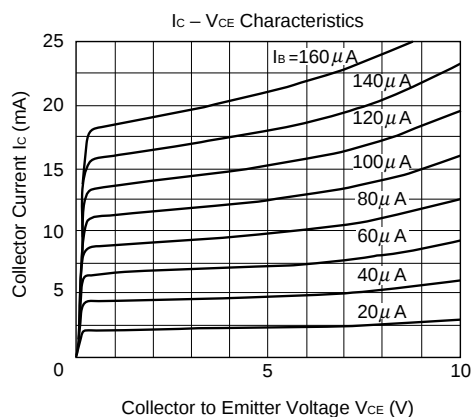
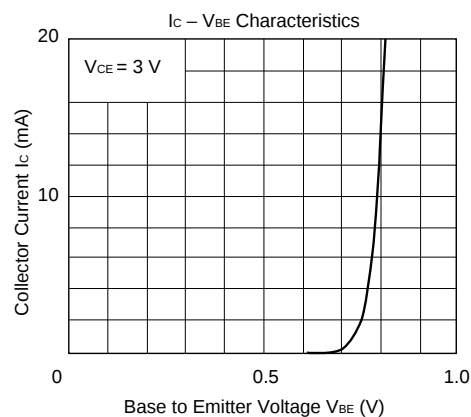
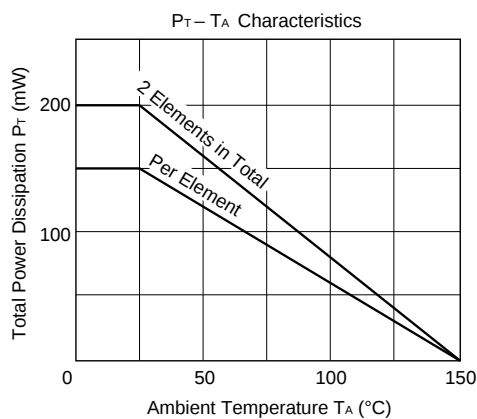
PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cutoff Current	I_{CBO}	$V_{CB} = 10\text{ V}, I_E = 0$			1	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 1\text{ V}, I_C = 0$			1	μA
DC Current Gain	h_{FE}	$V_{CE} = 3\text{ V}, I_C = 7\text{ mA}$ ^{Note 1}	70		250	
Gain Bandwidth Product	f_T	$V_{CE} = 3\text{ V}, I_C = 7\text{ mA}$	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_{21e} ^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			

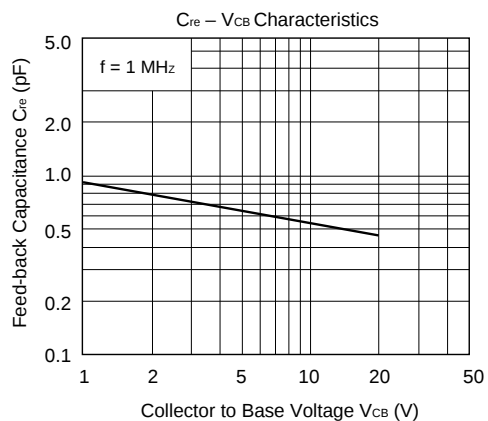
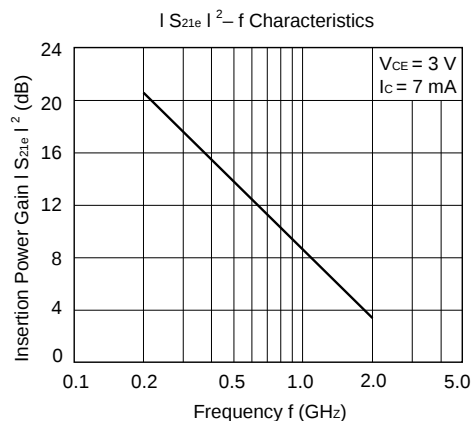
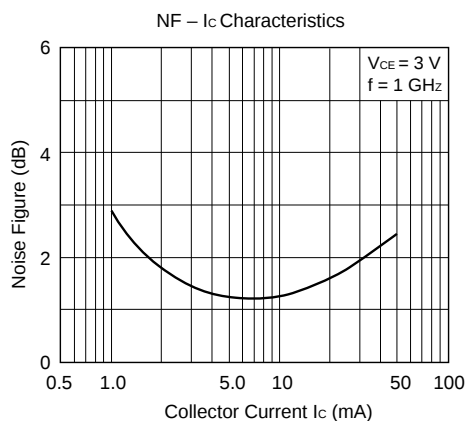
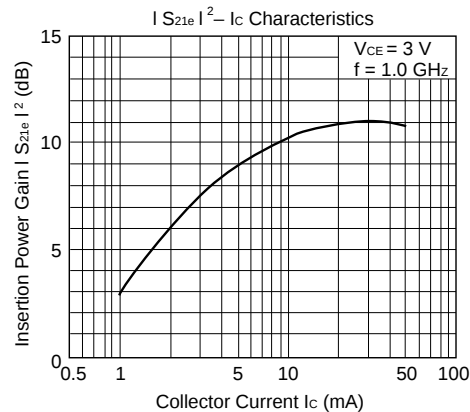
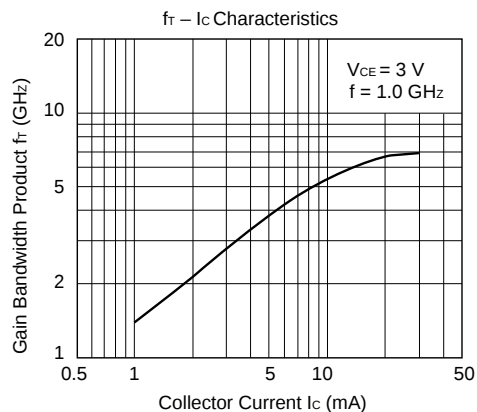
Notes 1. Pulse Measurement: $P_w \leq 350\text{ }\mu\text{s}$, Duty cycle $\leq 2\%$

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

 h_{FE} CLASSIFICATION

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

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



S-PARAMETERS $V_{CE} = 3\text{ V}$, $I_C = 1\text{ mA}$

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

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

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

FREQUENCY	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG
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

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

FREQUENCY	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG
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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