



SILICON TRANSISTOR

μ PA811T

HIGH-FREQUENCY LOW NOISE AMPLIFIER NPN SILICON EPITAXIAL TRANSISTOR (WITH BUILT-IN 2 $\times$ 2SC4228) SMALL MINI MOLD

The μ PA811T 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 = 1.9 dB TYP. @ f = 2 GHz, $V_{CE} = 1$ V, $I_C = 3$ mA
- High Gain
 $|S_{21e}|^2 = 6.5$ dB TYP. @ f = 2 GHz, $V_{CE} = 1$ V, $I_C = 3$ mA
- A Small Mini Mold Package Adopted
- Built-in 2 Transistors (2 $\times$ 2SC4228)

ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
μ PA811T	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 PA811T-T1	Taping products (3 KPCS/Reel)	

Remark To order evaluation samples, please contact your nearby sales office.
Part number for sample order: μ PA811T-A (Unit sample quantity is 50 pcs.)

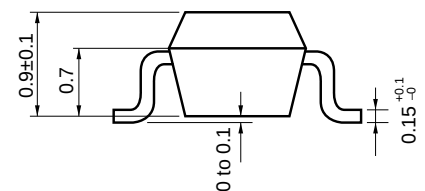
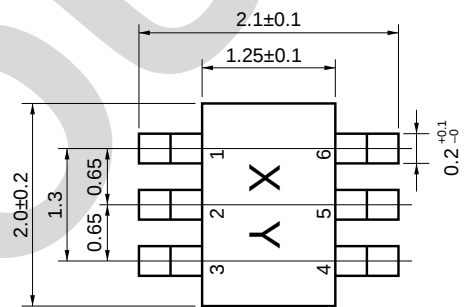
ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$)

PARAMETER	SYMBOL	RATING	UNIT
Collector to Base Voltage	V_{CBO}	20	V
Collector to Emitter Voltage	V_{CEO}	10	V
Emitter to Base Voltage	V_{EBO}	1.5	V
Collector Current	I_C	35	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	$^\circ\text{C}$

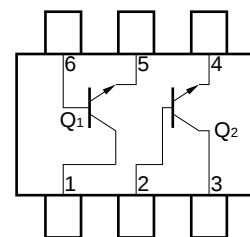
Note 110 mW must not be exceeded in 1 element.

PACKAGE DRAWINGS

(Unit: mm)



PIN CONFIGURATION (Top View)



PIN CONNECTIONS

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

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

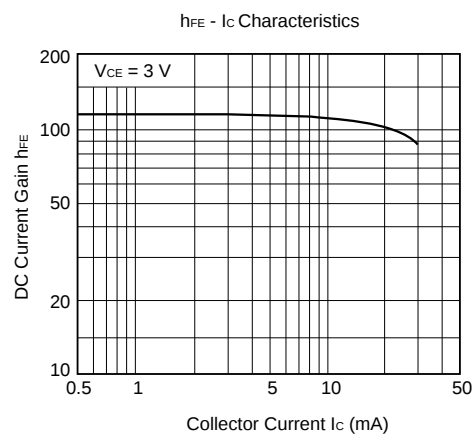
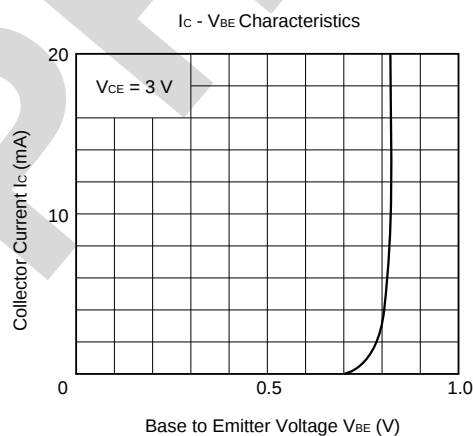
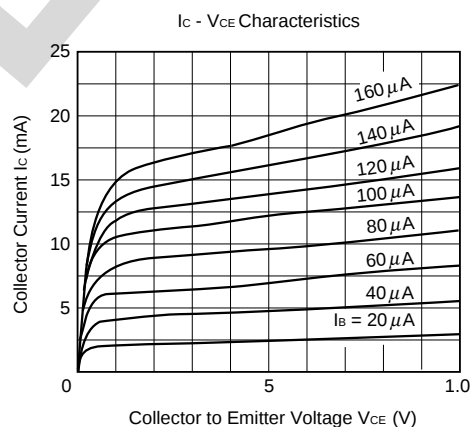
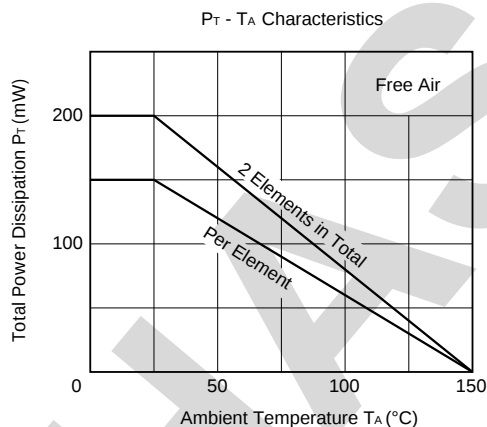
PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cutoff Current	I_{CBO}	$V_{CB} = 10\text{ V}, I_E = 0$			1.0	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB} = 1\text{ V}, I_C = 0$			1.0	μA
DC Current Gain	h_{FE}	$V_{CE} = 3\text{ V}, I_C = 5\text{ mA}$ ^{Note 1}	80		200	
Gain Bandwidth Product	f_T	$V_{CE} = 3\text{ V}, I_C = 5\text{ mA}$	5.5	8.0		GHz
Feed-back Capacitance	C_{re}	$V_{CB} = 3\text{ V}, I_E = 0, f = 1\text{ MHz}$ ^{Note 2}			0.7	pF
Insertion Power Gain	$ S_{21e} ^2$	$V_{CE} = 3\text{ V}, I_C = 5\text{ mA}, f = 2\text{ GHz}$	5.5	7.5		dB
Noise Figure	NF	$V_{CE} = 3\text{ V}, I_C = 5\text{ mA}, f = 2\text{ GHz}$		1.9	3.2	dB
h_{FE} Ratio	h_{FE1}/h_{FE2}	$V_{CE} = 3\text{ V}, I_C = 5\text{ mA}$ A smaller value among h_{FE} of $h_{FE1} = Q1, Q2$ A Larger value among h_{FE} of $h_{FE2} = Q1, Q2$	0.85			

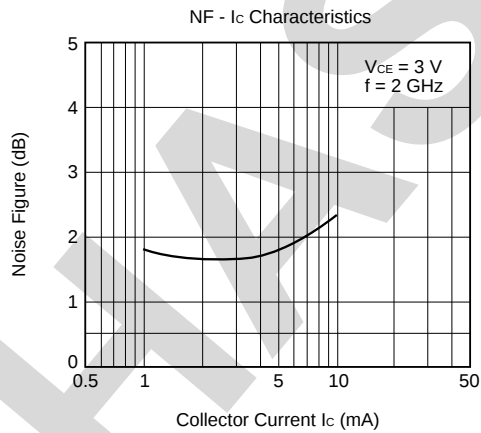
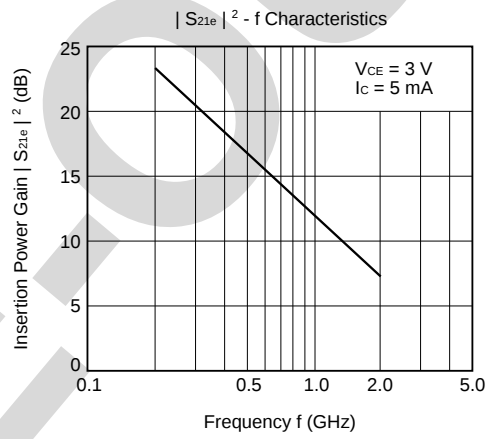
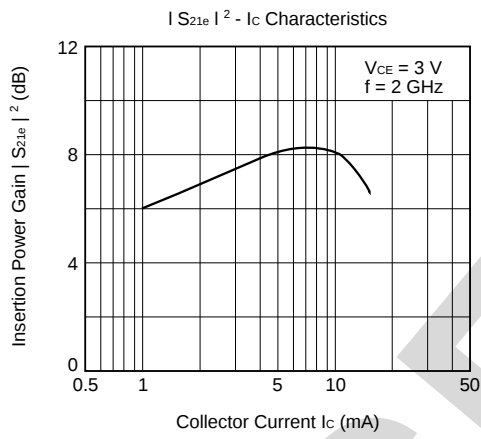
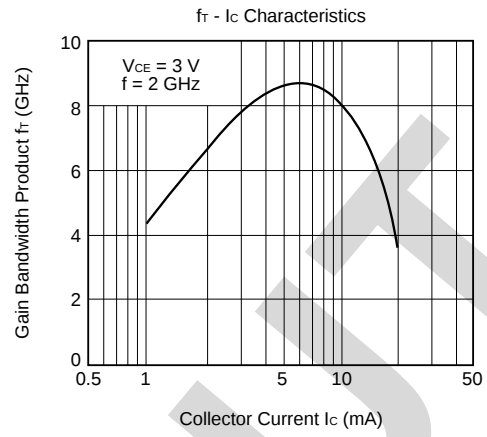
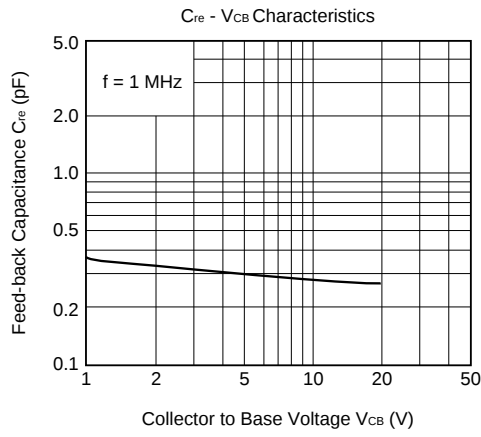
Notes 1. Pulse Measurement: $P_w \leq 350\text{ }\mu\text{s}$, Duty cycle $\leq 2\%$

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

 h_{FE} CLASSIFICATION

Rank	FB	GB
Marking	44R	45R
h_{FE} Value	80 to 160	125 to 250

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



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

FREQUENCY	S ₁₁		S ₂₁		S ₁₂		S ₂₂		
	MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.969	-7.9	3.625	172.0	0.016	85.0	0.999	-3.6	
200.00	0.957	-14.7	3.405	165.9	0.031	80.7	0.989	-6.4	
300.00	0.909	-21.2	3.366	156.4	0.046	73.3	0.961	-10.4	
400.00	0.909	-27.4	3.218	153.3	0.059	70.9	0.955	-12.4	
500.00	0.895	-33.5	3.147	144.8	0.071	66.4	0.913	-14.2	
600.00	0.876	-42.4	3.150	141.2	0.083	65.6	0.913	-16.7	
700.00	0.821	-49.4	3.040	132.0	0.092	60.7	0.896	-18.0	
800.00	0.750	-56.0	2.966	126.2	0.105	58.0	0.888	-21.1	
900.00	0.710	-60.5	2.779	119.6	0.110	55.8	0.869	-23.3	
1000.00	0.673	-65.3	2.640	114.1	0.119	51.5	0.840	-27.3	
1100.00	0.658	-72.2	2.532	110.6	0.124	51.0	0.805	-28.9	
1200.00	0.625	-78.4	2.504	105.6	0.129	48.2	0.758	-30.8	
1300.00	0.573	-85.4	2.427	102.7	0.138	46.2	0.738	-31.1	
1400.00	0.537	-91.2	2.350	96.2	0.137	44.5	0.706	-31.5	
1500.00	0.505	-97.1	2.305	92.3	0.143	42.0	0.709	-32.1	
1600.00	0.479	-103.2	2.210	88.3	0.142	43.8	0.693	-32.6	
1700.00	0.448	-110.2	2.152	83.6	0.148	41.9	0.689	-35.3	
1800.00	0.424	-115.4	2.101	81.0	0.155	42.9	0.678	-36.5	
1900.00	0.399	-120.9	2.034	75.9	0.157	40.4	0.650	-39.1	
2000.00	0.389	-127.2	1.987	71.7	0.165	38.1	0.631	-40.5	

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

FREQUENCY	S ₁₁		S ₂₁		S ₁₂		S ₂₂		
	MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.903	-14.0	8.928	165.7	0.016	89.5	0.985	-6.5	
200.00	0.856	-25.6	8.248	154.2	0.028	74.6	0.951	-11.2	
300.00	0.763	-36.2	7.535	141.5	0.042	68.0	0.889	-16.4	
400.00	0.713	-44.7	6.882	135.1	0.051	65.0	0.851	-18.6	
500.00	0.656	-52.3	6.233	125.9	0.058	61.2	0.785	-20.1	
600.00	0.602	-62.4	5.854	121.4	0.067	61.4	0.764	-21.7	
700.00	0.536	-70.5	5.342	112.1	0.072	58.8	0.733	-21.9	
800.00	0.466	-77.7	4.989	106.9	0.080	57.9	0.717	-23.8	
900.00	0.412	-82.8	4.471	100.4	0.084	58.0	0.696	-25.0	
1000.00	0.374	-87.8	4.123	95.3	0.091	55.7	0.669	-27.6	
1100.00	0.346	-93.4	3.871	92.3	0.095	56.9	0.639	-28.3	
1200.00	0.315	-100.2	3.667	88.1	0.100	55.9	0.603	-29.2	
1300.00	0.285	-106.7	3.575	86.0	0.108	55.8	0.587	-28.7	
1400.00	0.263	-112.8	3.367	81.3	0.111	55.6	0.566	-28.3	
1500.00	0.245	-119.7	3.214	78.3	0.118	54.5	0.570	-28.2	
1600.00	0.230	-126.7	3.038	75.5	0.121	57.3	0.561	-28.3	
1700.00	0.214	-135.0	2.918	72.3	0.129	55.9	0.559	-30.5	
1800.00	0.202	-141.2	2.821	69.9	0.137	57.2	0.553	-31.5	
1900.00	0.192	-147.9	2.696	65.8	0.143	54.8	0.532	-33.7	
2000.00	0.193	-154.2	2.613	61.8	0.152	53.2	0.515	-34.7	

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

FREQUENCY	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	0.848	-18.5	12.800	161.3	0.015	78.5	0.974	-8.3
200.00	0.766	-33.1	11.314	146.2	0.026	71.6	0.913	-14.0
300.00	0.647	-45.5	9.862	132.5	0.038	66.4	0.829	-19.0
400.00	0.575	-54.3	8.611	125.0	0.044	64.0	0.778	-20.4
500.00	0.506	-62.0	7.527	116.3	0.052	62.0	0.712	-20.9
600.00	0.450	-71.5	6.847	112.2	0.058	63.0	0.691	-21.5
700.00	0.393	-79.6	6.116	103.6	0.064	61.6	0.666	-21.0
800.00	0.335	-86.5	5.624	99.2	0.072	61.8	0.652	-22.2
900.00	0.290	-91.7	4.970	93.3	0.076	62.4	0.637	-23.1
1000.00	0.260	-97.0	4.521	88.7	0.084	60.4	0.616	-25.3
1100.00	0.236	-102.5	4.202	86.2	0.088	62.0	0.592	-25.7
1200.00	0.213	-109.7	3.947	82.4	0.094	61.2	0.561	-26.4
1300.00	0.193	-116.7	3.792	80.3	0.102	61.3	0.550	-25.7
1400.00	0.178	-123.3	3.468	76.1	0.106	61.1	0.532	-25.1
1500.00	0.168	-131.8	3.408	73.8	0.115	60.2	0.538	-25.1
1600.00	0.161	-139.7	3.218	71.4	0.118	62.3	0.533	-25.2
1700.00	0.153	-149.2	3.085	68.7	0.128	60.8	0.532	-27.5
1800.00	0.148	-156.1	2.980	66.4	0.137	61.9	0.527	-28.5
1900.00	0.143	-163.5	2.840	62.7	0.143	59.4	0.507	-30.7
2000.00	0.149	-169.9	2.752	58.8	0.153	57.6	0.492	-31.8

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