

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

The  $\mu$ 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 × 2SC4228)

**ORDERING INFORMATION**

PART NUMBER	QUANTITY	PACKING STYLE
$\mu$ 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.
$\mu$ PA811T-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.)

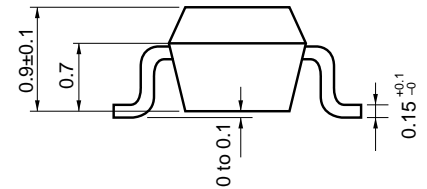
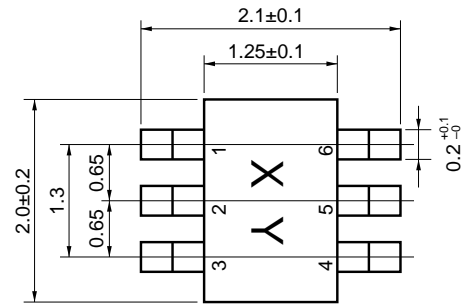
**ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C)**

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 <sup>Note</sup>	mW
Junction Temperature	$T_j$	150	°C
Storage Temperature	$T_{stg}$	-65 to +150	°C

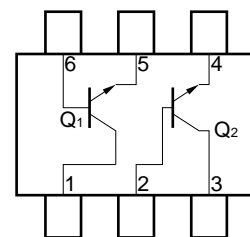
**Note** 110 mW must not be exceeded in 1 element.

**PACKAGE DRAWINGS**

(Unit: mm)



**PIN CONFIGURATION (Top View)**



**PIN CONNECTIONS**

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

**ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)**

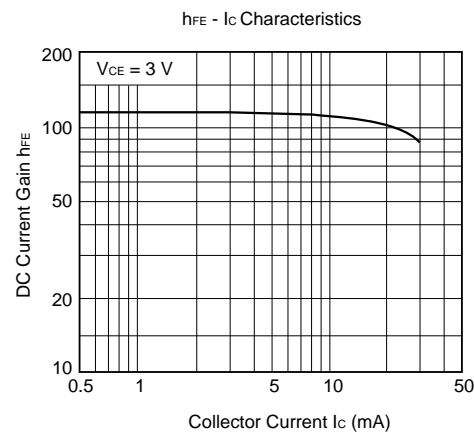
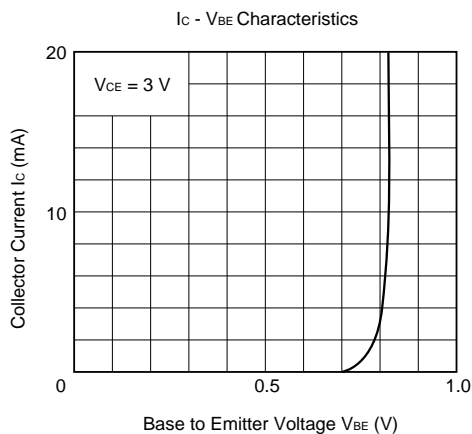
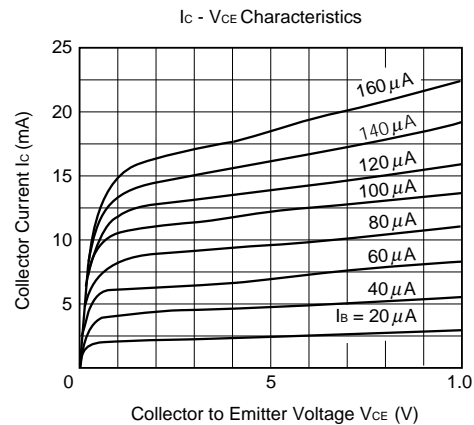
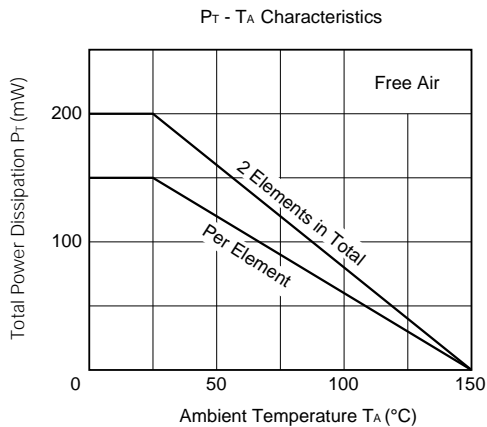
PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cutoff Current	I <sub>CBO</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0			1.0	μA
Emitter Cutoff Current	I <sub>EB0</sub>	V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0			1.0	μA
DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 5 mA <sup>Note 1</sup>	80		200	
Gain Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 5 mA	5.5	8.0		GHz
Feed-back Capacitance	C <sub>re</sub>	V <sub>CB</sub> = 3 V, I <sub>E</sub> = 0, f = 1 MHz <sup>Note 2</sup>			0.7	pF
Insertion Power Gain	S <sub>21e</sub>   <sup>2</sup>	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 5 mA, f = 2 GHz	5.5	7.5		dB
Noise Figure	NF	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 5 mA, f = 2 GHz		1.9	3.2	dB
h <sub>FE</sub> Ratio	h <sub>FE1</sub> /h <sub>FE2</sub>	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 5 mA A smaller value among h <sub>FE</sub> of h <sub>FE1</sub> = Q1, Q2 A Larger value among h <sub>FE</sub> of h <sub>FE2</sub> = Q1, Q2	0.85			

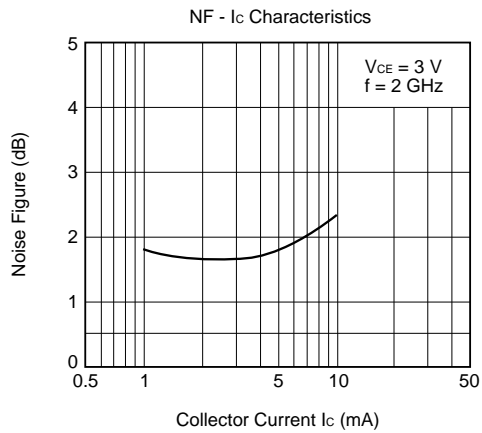
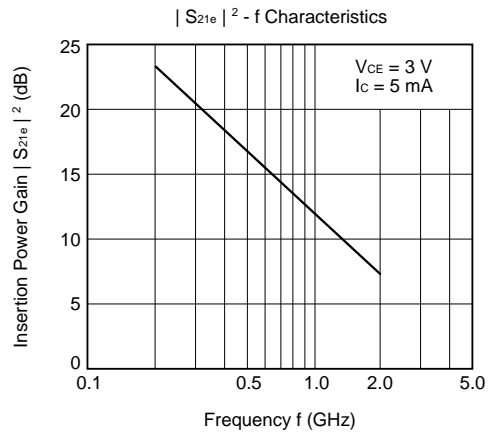
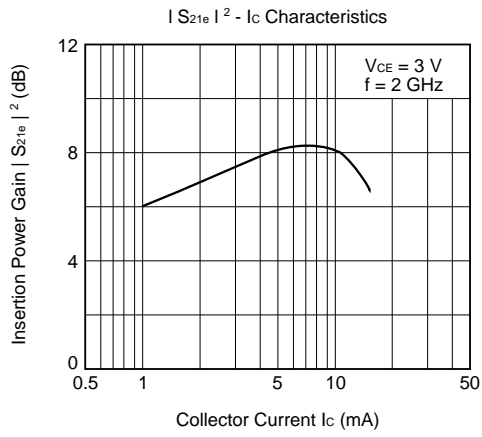
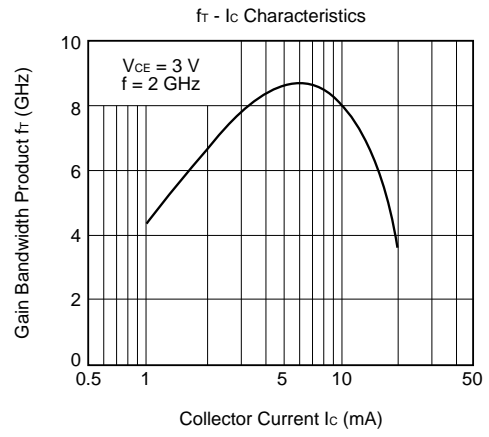
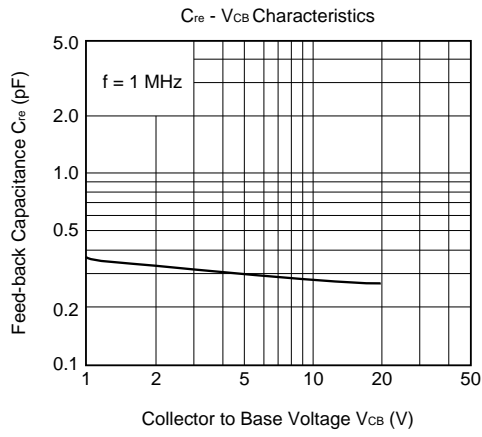
- Notes**
1. Pulse Measurement: P<sub>w</sub> ≤ 350 μs, Duty cycle ≤ 2 %
  2. Measured with 3-pin bridge, emitter and case should be connected to guard pin of bridge.

**h<sub>FE</sub> CLASSIFICATION**

Rank	FB	GB
Marking	44R	45R
h <sub>FE</sub> Value	80 to 160	125 to 250

**TYPICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)**





**S-PARAMETERS**

V<sub>CE</sub> = 3 V, I<sub>c</sub> = 1 mA

FREQUENCY MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	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<sub>CE</sub> = 3 V, I<sub>c</sub> = 3 mA

FREQUENCY MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	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<sub>CE</sub> = 3 V, I<sub>c</sub> = 5 mA

FREQUENCY MHz	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	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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