



# SILICON TRANSISTOR

## $\mu$ PA806T

### MICROWAVE LOW NOISE AMPLIFIER NPN SILICON EPITAXIAL TRANSISTOR (WITH BUILT-IN 2 ELEMENTS) MINI MOLD

#### FEATURES

- Low Noise, High Gain
- Operable at Low Voltage
- Small Feed-back Capacitance  
 $C_{re} = 0.4 \text{ pF TYP.}$
- Built-in 2 Transistors ( $2 \times 2\text{SC}4959$ )

#### ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
$\mu$ PA806T	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.
$\mu$ PA806T-T1	Taping products (3 KPCS/Reel)	

**Remark** Factory address: 1-1-1, Saitama, Saitama Prefecture, Japan.  
Part number for sample order:  $\mu$ PA806T-A (Unit sample quantity is 50 pcs.)

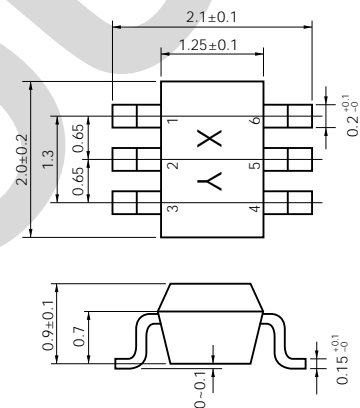
#### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25 \text{ }^\circ\text{C}$ )

PARAMETER	SYMBOL	RATING	UNIT
Collector to Base Voltage	$V_{CBO}$	9	V
Collector to Emitter Voltage	$V_{CEO}$	6	V
Emitter to Base Voltage	$V_{EBO}$	2	V
Collector Current	$I_c$	30	mA
Total Power Dissipation	$P_T$	150 in 1 element 200 in 2 elements <sup>Note</sup>	mW
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-65 to +150	$^\circ\text{C}$

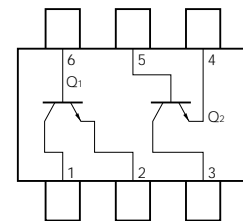
**Note** 110 mW must not be exceeded in 1 element.

#### 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<sub>A</sub> = 25 °C)**

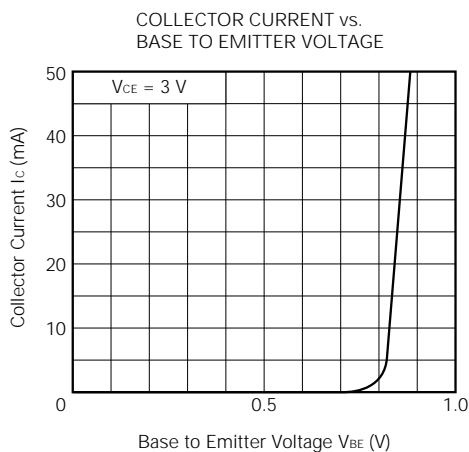
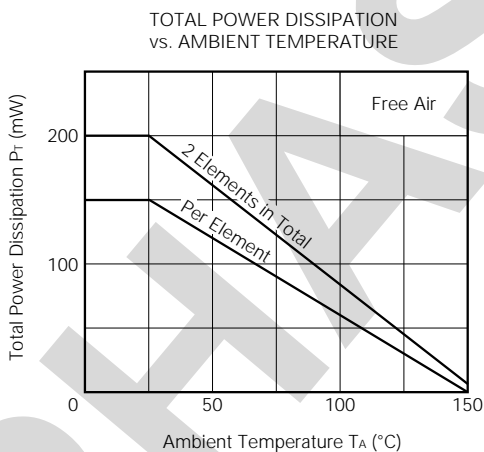
PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cutoff Current	I <sub>CB0</sub>	V <sub>CB</sub> = 5 V, I <sub>E</sub> = 0			0.1	μA
Emitter Cutoff Current	I <sub>EB0</sub>	V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0			0.1	μA
DC Current Gain	h <sub>FE</sub>	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 10 mA <sup>Note 1</sup>	75		150	
Gain Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 10 mA, f = 2 GHz		12		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>		0.4	0.7	pF
Insertion Power Gain	S <sub>21</sub>   <sup>2</sup>	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 10 mA, f = 2 GHz	7	8.5		dB
Noise Figure	NF	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 3 mA, f = 2 GHz		1.5	2.5	dB
h <sub>FE</sub> Ratio	h <sub>FE1</sub> /h <sub>FE2</sub>	V <sub>CE</sub> = 3 V, I <sub>C</sub> = 10 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			

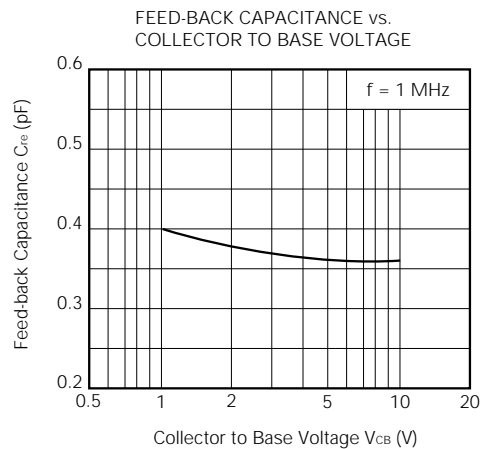
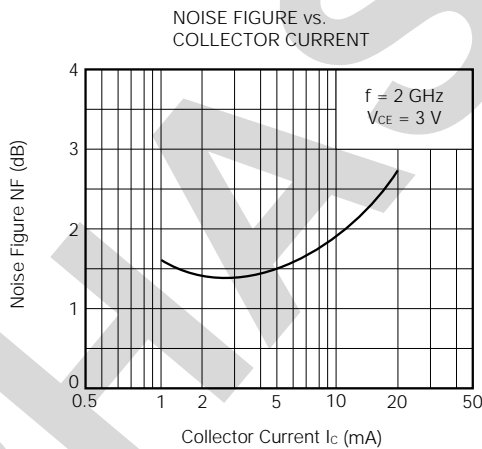
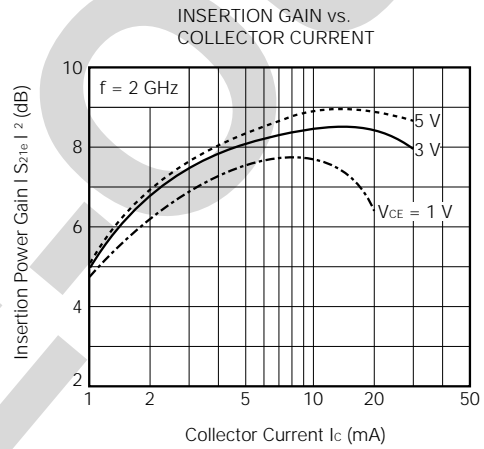
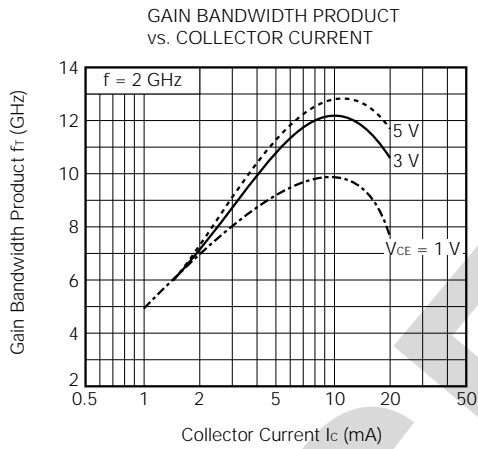
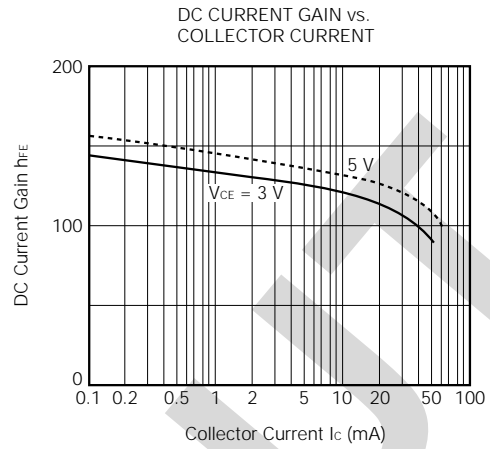
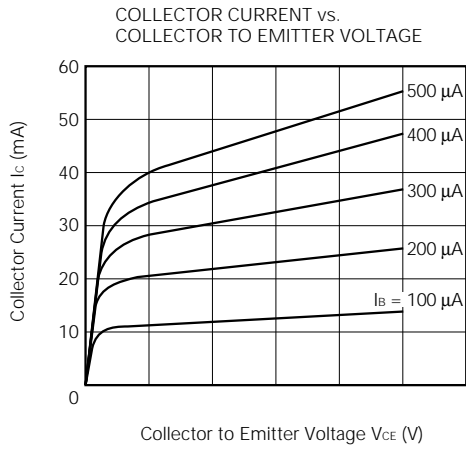
- Notes**
1. Pulse Measurement: P<sub>w</sub> ≤ 350 μs, Duty cycle ≤ 2 %
  2. Measured with 3-pin bridge, emitter and case should be connected to guard pin of bridge.

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

Rank	KB
Marking	T83
h <sub>FE</sub> Value	75 to 150

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





## S-PARAMETERS

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

f GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.200	0.9340	-15.7	3.5100	164.8	0.0450	82.6	0.9850	-8.7
0.400	0.9040	-29.4	3.3520	150.7	0.0780	68.0	0.9410	-17.1
0.600	0.8150	-43.4	3.1060	138.0	0.1140	62.8	0.8960	-23.6
0.800	0.7530	-56.6	2.8840	126.3	0.1370	58.0	0.8260	-29.9
1.000	0.6540	-68.9	2.6050	115.1	0.1490	55.2	0.7830	-34.7
1.200	0.5900	-79.8	2.4490	105.4	0.1660	45.4	0.7220	-38.0
1.400	0.5160	-90.1	2.2610	96.8	0.1770	44.8	0.6790	-42.0
1.600	0.4590	-101.5	2.0780	89.4	0.1780	45.1	0.6430	-45.2
1.800	0.4230	-110.8	1.9250	83.7	0.1880	42.5	0.6290	-46.8
2.000	0.3670	-123.9	1.8700	76.3	0.1900	41.9	0.5880	-51.4
2.200	0.3370	-136.7	1.7790	69.9	0.2110	43.9	0.5630	-54.3
2.400	0.3150	-145.5	1.6600	64.1	0.2140	41.9	0.5520	-57.0
2.600	0.3080	-159.1	1.5690	59.4	0.2070	42.8	0.5450	-59.2
2.800	0.2930	-164.8	1.5190	55.3	0.2140	45.8	0.5220	-64.5
3.000	0.2950	-179.6	1.4610	50.7	0.2260	45.4	0.4960	-61.3

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

f GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.200	0.8020	-25.9	8.8990	154.2	0.0370	67.2	0.9420	-15.7
0.400	0.6780	-45.8	7.4880	134.4	0.0760	65.6	0.8040	-26.6
0.600	0.5440	-62.8	6.1260	119.6	0.0860	60.9	0.7060	-33.2
0.800	0.4430	-75.7	5.1230	108.1	0.1050	58.4	0.6250	-36.6
1.000	0.3540	-87.3	4.3050	99.1	0.1210	55.9	0.5660	-38.3
1.200	0.2930	-99.7	3.7880	91.3	0.1330	61.2	0.5190	-41.4
1.400	0.2360	-108.4	3.3560	84.8	0.1440	55.4	0.4950	-43.9
1.600	0.2000	-121.0	3.0100	79.1	0.1570	56.2	0.4660	-44.5
1.800	0.1820	-129.5	2.6960	74.4	0.1760	58.0	0.4560	-44.5
2.000	0.1480	-151.7	2.5340	69.4	0.1940	56.1	0.4310	-48.8
2.200	0.1370	-166.1	2.3820	64.0	0.2150	56.3	0.4050	-51.9
2.400	0.1340	175.2	2.1870	60.0	0.2130	57.8	0.3990	-52.8
2.600	0.1640	169.7	2.0530	55.8	0.2410	57.6	0.3950	-52.9
2.800	0.1500	170.9	1.9660	53.0	0.2490	55.2	0.3750	-59.2
3.000	0.1780	147.7	1.8710	49.6	0.2750	56.6	0.3740	-60.8

**S-PARAMETERS**

V<sub>CE</sub> = 3 V, I<sub>c</sub> = 5 mA, Z<sub>O</sub> = 50 Ω

f GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.200	0.6900	-33.3	12.2960	147.1	0.0320	74.8	0.8850	-19.7
0.400	0.5360	-54.7	9.4300	125.5	0.0610	66.3	0.7210	-30.3
0.600	0.4010	-70.0	7.2390	111.3	0.0700	59.6	0.6030	-34.5
0.800	0.3150	-82.4	5.8220	101.1	0.0950	63.8	0.5230	-36.7
1.000	0.2360	-93.8	4.7830	93.4	0.1090	62.3	0.4870	-38.0
1.200	0.1850	-105.4	4.1700	86.4	0.1260	61.9	0.4600	-38.8
1.400	0.1440	-115.8	3.6410	80.7	0.1350	65.9	0.4360	-40.4
1.600	0.1230	-134.4	3.2380	76.1	0.1560	61.2	0.4170	-42.6
1.800	0.1040	-144.6	2.8910	71.4	0.1770	62.4	0.4020	-43.9
2.000	0.1000	-170.6	2.7040	67.3	0.1930	60.7	0.3940	-45.8
2.200	0.1110	167.4	2.5330	62.6	0.2080	60.6	0.3710	-50.3
2.400	0.1040	158.2	2.3270	58.7	0.2260	61.6	0.3500	-50.2
2.600	0.1180	156.3	2.1850	54.9	0.2560	58.2	0.3560	-51.2
2.800	0.1190	150.0	2.0910	52.6	0.2560	56.8	0.3520	-58.1
3.000	0.1490	142.4	1.9760	49.0	0.2860	56.6	0.3410	-56.9

V<sub>CE</sub> = 3 V, I<sub>c</sub> = 10 mA, Z<sub>O</sub> = 50 Ω

f GHz	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.200	0.5080	-43.6	17.0900	135.9	0.0330	63.8	0.7930	-26.2
0.400	0.3410	-65.3	11.3980	114.2	0.0520	68.5	0.5910	-32.9
0.600	0.2320	-80.7	8.2250	102.0	0.0690	69.0	0.5130	-32.9
0.800	0.1770	-90.8	6.3950	93.8	0.0880	71.6	0.4480	-32.8
1.000	0.1220	-108.2	5.1870	87.2	0.1060	69.3	0.4180	-35.9
1.200	0.1010	-121.8	4.4390	81.6	0.1260	70.1	0.4030	-33.3
1.400	0.0670	-138.2	3.8770	76.9	0.1450	70.5	0.3930	-36.5
1.600	0.0620	-167.6	3.4350	72.4	0.1590	65.5	0.3680	-36.2
1.800	0.0660	-171.3	3.0650	68.8	0.1790	65.0	0.3610	-39.5
2.000	0.0770	146.7	2.8540	65.0	0.2060	63.9	0.3480	-42.3
2.200	0.0990	146.5	2.6590	60.5	0.2220	62.8	0.3360	-46.6
2.400	0.1140	128.1	2.4400	57.0	0.2420	60.9	0.3370	-48.8
2.600	0.1260	136.8	2.2790	53.5	0.2660	59.9	0.3170	-47.2
2.800	0.1020	129.6	2.1950	50.9	0.2770	59.6	0.3280	-55.1
3.000	0.1370	123.5	2.0800	47.9	0.2860	58.3	0.3100	-51.2

## NOTICE

1. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. California Eastern Laboratories and Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
2. California Eastern Laboratories has used reasonable care in preparing the information included in this document, but California Eastern Laboratories does not warrant that such information is error free. California Eastern Laboratories and Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
3. California Eastern Laboratories and Renesas Electronics do not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of California Eastern Laboratories or Renesas Electronics or others.
4. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part. California Eastern Laboratories and Renesas Electronics assume no responsibility for any losses incurred by you or third parties arising from such alteration, modification, copy or otherwise misappropriation of Renesas Electronics product.
5. Renesas Electronics products are classified according to the following two quality grades: "Standard" and "High Quality". The recommended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below. "Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots etc. "High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; and safety equipment etc. Renesas Electronics products are neither intended nor authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems, surgical implantations etc.), or may cause serious property damages (nuclear reactor control systems, military equipment etc.). You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application for which it is not intended. California Eastern Laboratories and Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for which the product is not intended by California Eastern Laboratories or Renesas Electronics.
6. You should use the Renesas Electronics products described in this document within the range specified by California Eastern Laboratories, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. California Eastern Laboratories shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
7. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or systems manufactured by you.
8. Please contact a California Eastern Laboratories sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. California Eastern Laboratories and Renesas Electronics assume no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
9. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You should not use Renesas Electronics products or technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. When exporting the Renesas Electronics products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations.
10. It is the responsibility of the buyer or distributor of California Eastern Laboratories, who distributes, disposes of, or otherwise places the Renesas Electronics product with a third party, to notify such third party in advance of the contents and conditions set forth in this document, California Eastern Laboratories and Renesas Electronics assume no responsibility for any losses incurred by you or third parties as a result of unauthorized use of Renesas Electronics products.
11. This document may not be reproduced or duplicated in any form, in whole or in part, without prior written consent of California Eastern Laboratories.
12. Please contact a California Eastern Laboratories sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.

**NOTE 1:** "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.

**NOTE 2:** "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.


**NOTE 3:** Products and product information are subject to change without notice.


**CEL Headquarters** • 4590 Patrick Henry Drive, Santa Clara, CA 95054 • Phone (408) 919-2500 • [www.cel.com](http://www.cel.com)

For a complete list of sales offices, representatives and distributors,  
Please visit our website: [www.cel.com/contactus](http://www.cel.com/contactus)

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

 [View UPA806T-T1-A on WIN SOURCE](#)

 [CEL Information](#)

## Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management