

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 ($2 \times 2\text{SC4959}$)

ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
μ 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.
μ PA806T-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.)

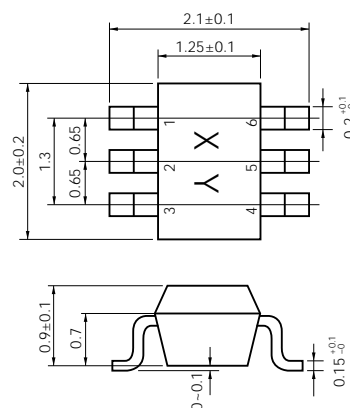
ABSOLUTE MAXIMUM RATINGS ($T_A = 25 \text{ }^\circ\text{C}$)

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 ^{Note}	mW
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

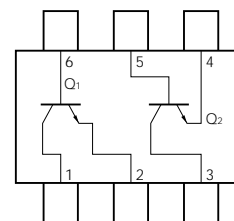
Note 110 mW must not be exceeded in 1 element.

PACKAGE DRAWINGS

(Unit: mm)



PIN CONFIGURATION (Top View)



PIN CONNECTIONS

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

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

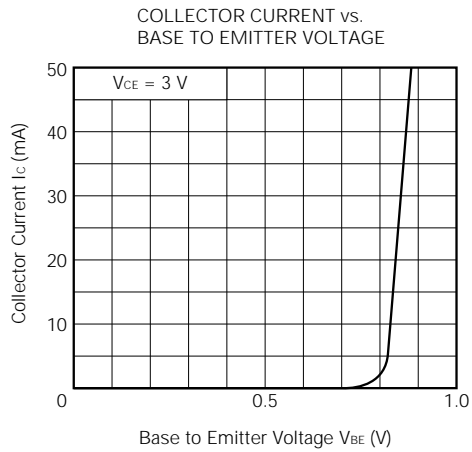
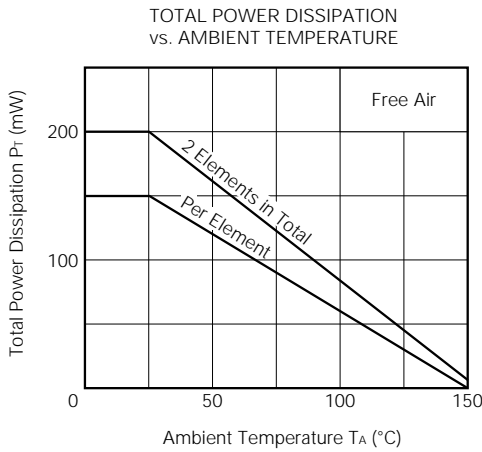
PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cutoff Current	I _{CB0}	V _{CB} = 5 V, I _E = 0			0.1	μA
Emitter Cutoff Current	I _{EB0}	V _{EB} = 1 V, I _C = 0			0.1	μA
DC Current Gain	h _{FE}	V _{CE} = 3 V, I _C = 10 mA ^{Note 1}	75		150	
Gain Bandwidth Product	f _T	V _{CE} = 3 V, I _C = 10 mA, f = 2 GHz		12		GHz
Feed-back Capacitance	C _{re}	V _{CB} = 3 V, I _E = 0, f = 1 MHz ^{Note 2}		0.4	0.7	pF
Insertion Power Gain	S ₂₁ ²	V _{CE} = 3 V, I _C = 10 mA, f = 2 GHz	7	8.5		dB
Noise Figure	NF	V _{CE} = 3 V, I _C = 3 mA, f = 2 GHz		1.5	2.5	dB
h _{FE} Ratio	h _{FE1} /h _{FE2}	V _{CE} = 3 V, I _C = 10 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.

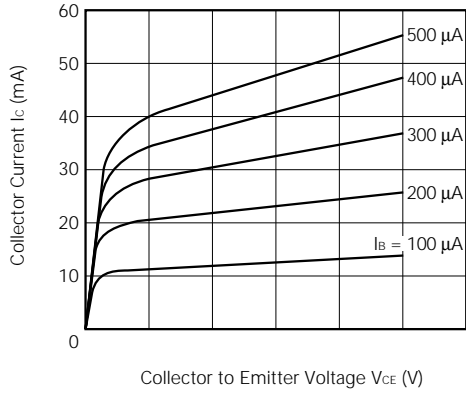
h_{FE} CLASSIFICATION

Rank	KB
Marking	T83
h _{FE} Value	75 to 150

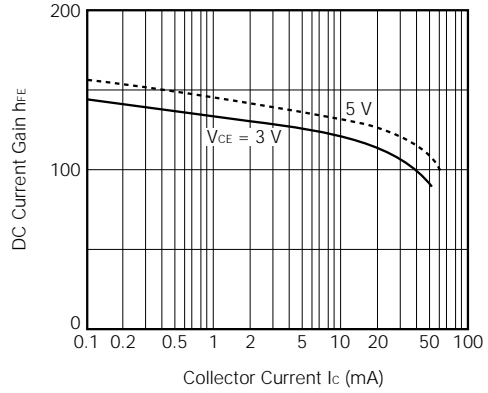
TYPICAL CHARACTERISTICS (T_A = 25 °C)



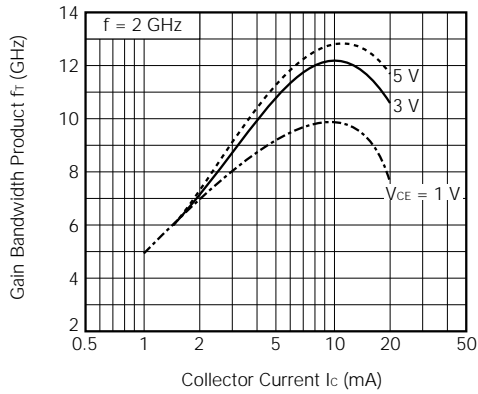
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



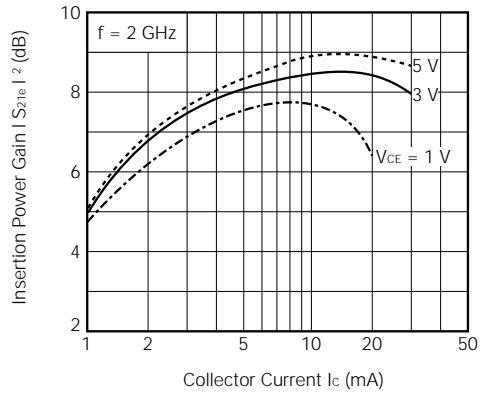
DC CURRENT GAIN vs. COLLECTOR CURRENT



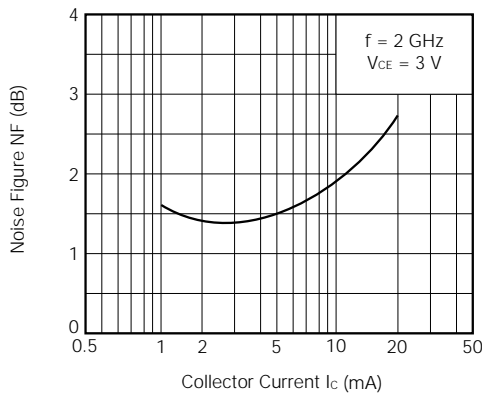
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



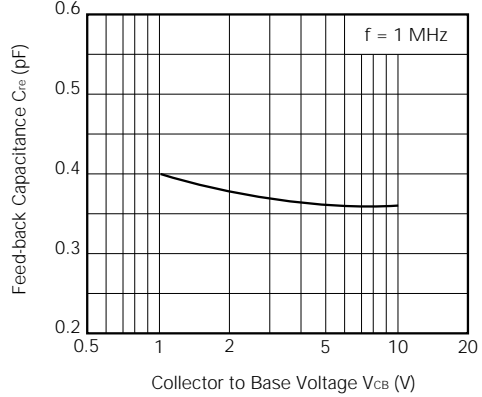
INSERTION GAIN vs. COLLECTOR CURRENT



NOISE FIGURE vs. COLLECTOR CURRENT



FEED-BACK CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



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_{CE} = 3 V, I_c = 5 mA, Z_O = 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_{CE} = 3 V, I_c = 10 mA, Z_O = 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

[MEMO]

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