To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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RENESAS

SILICON TRANSISTOR
μPA800T

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

The μPA800T 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 Mini Mold Package Adopted
- Built-in 2 Transistors (2 × 2SC4228)

ORDERING INFORMATION

PART NUMBER	QUANTITY	PACKING STYLE
μPA800T	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.
μPA800T-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.)

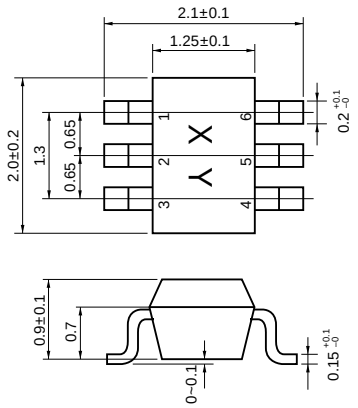
ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

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

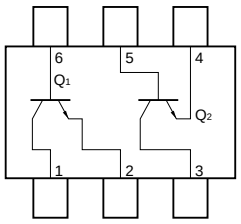
Note 110 mW must not be exceeded in 1 element.

PACKAGE DRAWINGS

(Unit: mm)



PIN CONFIGURATION (Top View)



PIN CONNECTIONS

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

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ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Collector Cutoff Current	I_{CBO}	V_{CB} = 10 V, I_E = 0			1.0	μA
Emitter Cutoff Current	I_{EBO}	V_{EB} = 1 V, I_C = 0			1.0	μA
DC Current Gain	h_{FE}	V_{CE} = 3 V, I_C = 5 mA **Note 1**	80		200	
Gain Bandwidth Product	f_T	V_{CE} = 3 V, I_C = 5 mA	5.5	80		GHz
Feed-back Capacitance	C_{re}	V_{CB} = 3 V, I_E = 0, f = 1 MHz **Note 2**			0.7	pF
Insertion Power Gain (1)	$\|S_{21e}\|^2$	V_{CE} = 1 V, I_C = 3 mA, f = 2 GHz	4.5	6.5		dB
Insertion Power Gain (2)	$\|S_{21e}\|^2$	V_{CE} = 3 V, I_C = 5 mA, f = 2 GHz	5.5	7.5		dB
Noise Figure (1)	NF	V_{CE} = 1 V, I_C = 3 mA, f = 2 GHz		1.9	3.2	dB
Noise Figure (2)	NF	V_{CE} = 3 V, I_C = 5 mA, f = 2 GHz		1.9	3.2	dB

Notes 1. Pulse Measurement: Pw ≤ 350 μs, Duty cycle ≤ 2 %

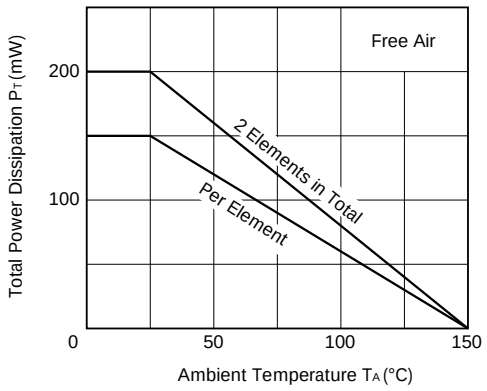
2. Measured with 3-pin bridge, emitter and case should be connected to guard pin of bridge.

h_{FE} CLASSIFICATION

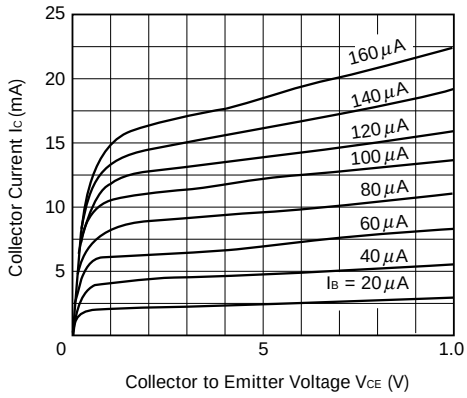
Rank	KB
Marking	RL
h_{FE} Value	80 to 200

TYPICAL CHARACTERISTICS (T_A = 25 °C)

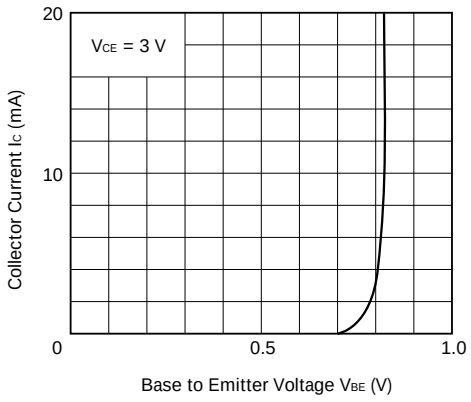
P_T - T_A Characteristics



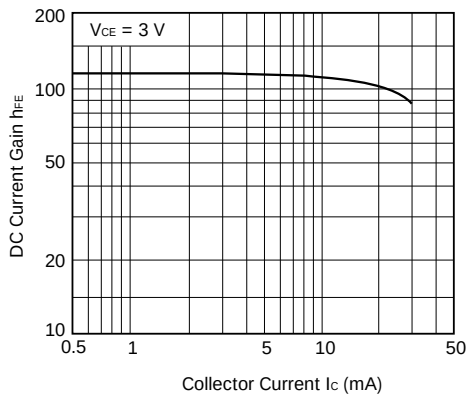
I_C - V_{CE} Characteristics



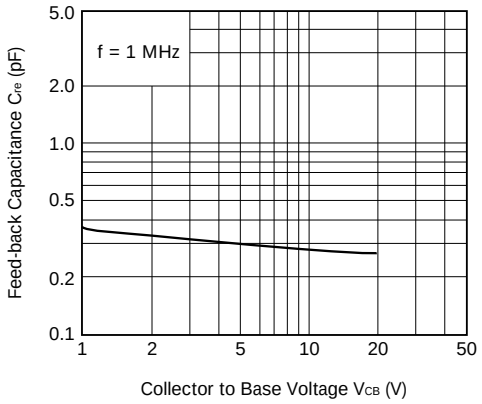
I_C - V_{BE} Characteristics



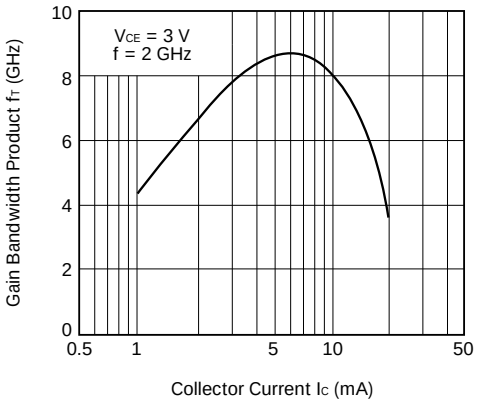
h_{FE} - I_C Characteristics



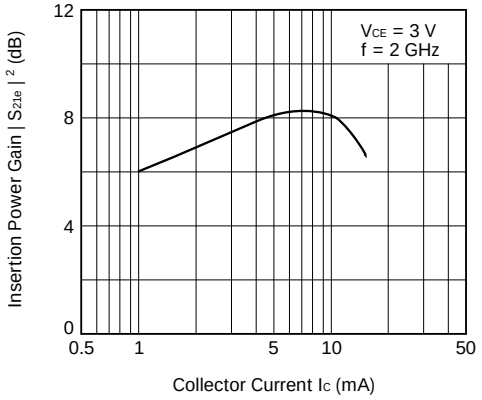
C_{re} - V_{CB} Characteristics



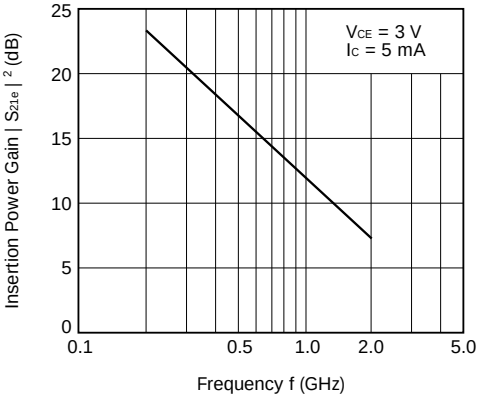
f_T - I_C Characteristics



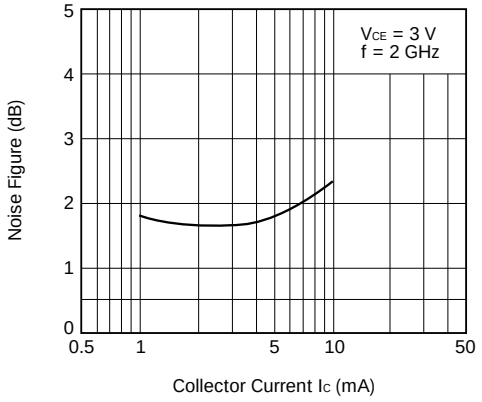
$|S_{21e}|^2$ - I_C Characteristics



$|S_{21e}|^2$ - f Characteristics



NF - I_C Characteristics



S-PARAMETERS

V_{CE} = 3 V, I_C = 5 mA, Z_O = 50 Ω

FREQUENCY	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.875	–18.6	14.087	161.1	.018	78.2	.958	–10.1
200.00	.762	–35.0	12.290	145.1	.034	68.6	.888	–17.7
300.00	.677	–47.2	10.888	133.6	.048	66.6	.800	–24.4
400.00	.565	–59.4	9.275	123.6	.055	65.8	.719	–26.7
500.00	.495	–67.5	8.300	115.7	.063	63.5	.669	–28.7
600.00	.425	–76.1	7.184	108.9	.074	61.1	.610	–30.3
700.00	.372	–81.6	6.454	104.8	.084	63.8	.600	–30.6
800.00	.327	–88.5	5.818	99.5	.089	62.7	.560	–31.3
900.00	.289	–93.6	5.231	95.5	.092	64.6	.543	–30.1
1000.00	.255	–100.5	4.820	92.0	.104	62.8	.519	–33.4
1100.00	.236	–105.2	4.444	88.8	.105	64.2	.512	–31.8
1200.00	.214	–112.2	4.142	85.3	.113	64.2	.497	–33.4
1300.00	.195	–117.6	3.842	83.2	.122	63.6	.476	–33.2
1400.00	.182	–123.8	3.554	79.3	.127	65.0	.481	–34.2
1500.00	.165	–129.9	3.343	77.4	.139	64.1	.467	–34.6
1600.00	.153	–137.4	3.218	75.3	.140	64.5	.466	–34.8
1700.00	.145	–144.3	3.091	73.6	.152	65.4	.458	–37.2
1800.00	.139	–151.8	2.857	70.4	.162	64.3	.456	–36.1
1900.00	.134	–157.0	2.764	68.7	.168	62.3	.451	–38.4
2000.00	.129	–164.7	2.624	66.4	.176	64.8	.445	–39.0

V_{CE} = 3 V, I_C = 3 mA, Z_O = 50 Ω

FREQUENCY	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	.943	–13.4	9.384	165.9	.020	84.1	.969	–7.7
200.00	.868	–26.6	8.668	152.8	.038	77.2	.936	–13.8
300.00	.815	–37.7	8.165	142.9	.051	67.9	.876	–20.9
400.00	.717	–48.9	7.279	132.9	.062	63.9	.804	–23.5
500.00	.655	–56.8	6.780	125.5	.075	63.9	.764	–26.7
600.00	.577	–65.5	6.061	118.0	.084	60.0	.708	–29.7
700.00	.518	–71.2	5.504	112.8	.091	59.7	.685	–31.1
800.00	.468	–78.1	5.074	106.7	.098	57.0	.639	–32.0
900.00	.420	–83.7	4.632	102.8	.102	59.0	.611	–32.8
1000.00	.380	–90.6	4.340	98.3	.105	56.6	.592	–35.0
1100.00	.344	–94.8	3.951	94.8	.112	57.8	.579	–34.1
1200.00	.321	–101.6	3.717	90.5	.121	59.0	.551	–35.0
1300.00	.291	–105.9	3.485	87.6	.128	58.7	.532	–35.9
1400.00	.273	–111.7	3.306	84.3	.135	59.8	.535	–36.6
1500.00	.250	–117.2	3.134	80.7	.140	58.0	.511	–37.5
1600.00	.228	–122.4	2.959	79.0	.145	59.5	.516	–37.7
1700.00	.219	–128.5	2.819	76.0	.153	59.0	.504	–39.0
1800.00	.199	–135.3	2.699	73.9	.161	58.4	.493	–39.9
1900.00	.193	–139.6	2.572	71.9	.163	60.3	.489	–41.4
2000.00	.182	–146.9	2.474	68.3	.175	59.8	.482	–41.4

V_{CE} = 3 V, I_C = 1 mA, Z_O = 50 Ω

FREQUENCY	S11		S21		S12		S22	
MHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100.00	1.023	–7.6	3.505	172.1	.025	86.4	.995	–4.6
200.00	.983	–16.1	3.400	163.3	.039	79.3	.986	–7.8
300.00	.975	–22.4	3.368	157.3	.061	74.6	.976	–12.8
400.00	.922	–31.8	3.219	149.1	.075	70.7	.936	–15.1
500.00	.899	–36.9	3.186	143.3	.093	66.4	.922	–18.8
600.00	.849	–44.7	3.046	135.7	.105	62.2	.885	–22.5
700.00	.812	–50.6	2.905	131.1	.113	61.7	.880	–24.4
800.00	.774	–57.1	2.830	124.4	.128	55.7	.846	–27.2
900.00	.727	–62.9	2.694	119.2	.134	55.6	.808	–28.8
1000.00	.680	–69.3	2.597	114.1	.146	53.7	.790	–31.8
1100.00	.651	–74.1	2.479	109.3	.146	50.3	.766	–32.8
1200.00	.616	–79.8	2.392	104.8	.155	49.8	.741	–34.9
1300.00	.575	–85.2	2.302	101.1	.155	46.2	.714	–35.9
1400.00	.546	–90.6	2.207	96.0	.160	46.7	.708	–36.8
1500.00	.512	–95.8	2.110	92.1	.168	43.6	.685	–38.4
1600.00	.481	–100.6	2.034	88.8	.165	45.5	.676	–40.1
1700.00	.463	–106.3	1.989	85.5	.176	45.3	.667	–41.8
1800.00	.440	–111.8	1.903	82.2	.173	43.8	.649	–42.3
1900.00	.419	–116.4	1.854	78.9	.174	43.5	.633	–44.2
2000.00	.394	–121.2	1.779	75.5	.173	43.7	.630	–45.2

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- 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
- Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)
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M4 94.11