

Ultra High Frequency Transistor Arrays

The HFA3046, HFA3096, HFA3127 and the HFA3128 are Ultra High Frequency Transistor Arrays that are fabricated from Intersil Corporation's complementary bipolar UHF-1 process. Each array consists of five dielectrically isolated transistors on a common monolithic substrate. The NPN transistors exhibit a f_T of 8GHz while the PNP transistors provide a f_T of 5.5GHz. Both types exhibit low noise (3.5dB), making them ideal for high frequency amplifier and mixer applications.

The HFA3046 and HFA3127 are all NPN arrays while the HFA3128 has all PNP transistors. The HFA3096 is an NPN-PNP combination. Access is provided to each of the terminals for the individual transistors for maximum application flexibility. Monolithic construction of these transistor arrays provides close electrical and thermal matching of the five transistors.

For PSPICE models, please request AnswerFAX document number 663046. Intersil also provides an Application Note illustrating the use of these devices as RF amplifiers (request AnswerFAX document 99315).

Ordering Information

PART NUMBER	TEMP. RANGE (°C)	PACKAGE	PKG. NO.
HFA3046B	-55 to 125	14 Ld SOIC	M14.15
HFA3096B	-55 to 125	16 Ld SOIC	M16.15
HFA3127B	-55 to 125	16 Ld SOIC	M16.15
HFA3128B	-55 to 125	16 Ld SOIC	M16.15

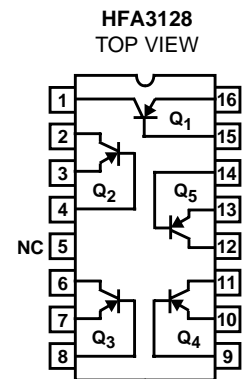
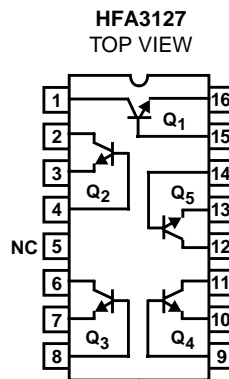
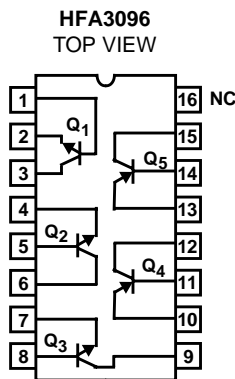
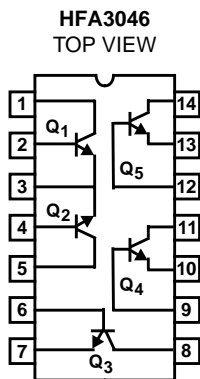
Features

- NPN Transistor (f_T) 8GHz
- NPN Current Gain (h_{FE}) 130
- NPN Early Voltage (V_A) 50V
- PNP Transistor (f_T) 5.5GHz
- PNP Current Gain (h_{FE}) 60
- PNP Early Voltage (V_A) 20V
- Noise Figure (50Ω) at 1.0GHz 3.5dB
- Collector to Collector Leakage <1pA
- Complete Isolation Between Transistors
- Pin Compatible with Industry Standard 3XXX Series Arrays

Applications

- VHF/UHF Amplifiers
- VHF/UHF Mixers
- IF Converters
- Synchronous Detectors

Pinouts



HFA3046, HFA3096, HFA3127, HFA3128

Absolute Maximum Ratings

Collector to Emitter Voltage (Open Base)	8V
Collector to Base Voltage (Open Emitter)	12V
Emitter to Base Voltage (Reverse Bias)	5.5V
Collector Current (100% Duty Cycle)	18.5mA at $T_J = 150^{\circ}\text{C}$
34mA at $T_J = 125^{\circ}\text{C}$	
37mA at $T_J = 110^{\circ}\text{C}$	
Peak Collector Current (Any Condition)	65mA

Operating Information

Temperature Range

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTE:

- θ_{JA} is measured with the component mounted on an evaluation PC board in free air.

Thermal Information

Thermal Resistance (Typical, Note 1)	θ_{JA} ($^{\circ}\text{C}/\text{W}$)
14 Ld SOIC Package	120
16 Ld SOIC Package	115
Maximum Power Dissipation (Any One Transistor)	0.15W
Maximum Junction Temperature (Die)	175 $^{\circ}\text{C}$
Maximum Junction Temperature (Plastic Package)	150 $^{\circ}\text{C}$
Maximum Storage Temperature Range	-65 $^{\circ}\text{C}$ to 150 $^{\circ}\text{C}$
Maximum Lead Temperature (Soldering 10s)	300 $^{\circ}\text{C}$
(SOIC - Lead Tips Only)	

Electrical Specifications $T_A = 25^{\circ}\text{C}$

PARAMETER	TEST CONDITIONS	DIE			SOIC			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
DC NPN CHARACTERISTICS								
Collector to Base Breakdown Voltage, $V_{(BR)CBO}$	$I_C = 100\mu\text{A}$, $I_E = 0$	12	18	-	12	18	-	V
Collector to Emitter Breakdown Voltage, $V_{(BR)CEO}$	$I_C = 100\mu\text{A}$, $I_B = 0$	8	12	-	8	12	-	V
Collector to Emitter Breakdown Voltage, $V_{(BR)CES}$	$I_C = 100\mu\text{A}$, Base Shorted to Emitter	10	20	-	10	20	-	V
Emitter to Base Breakdown Voltage, $V_{(BR)EBO}$	$I_E = 10\mu\text{A}$, $I_C = 0$	5.5	6	-	5.5	6	-	V
Collector-Cutoff-Current, I_{CEO}	$V_{CE} = 6\text{V}$, $I_B = 0$	-	2	100	-	2	100	nA
Collector-Cutoff-Current, I_{CBO}	$V_{CB} = 8\text{V}$, $I_E = 0$	-	0.1	10	-	0.1	10	nA
Collector to Emitter Saturation Voltage, $V_{CE(SAT)}$	$I_C = 10\text{mA}$, $I_B = 1\text{mA}$	-	0.3	0.5	-	0.3	0.5	V
Base to Emitter Voltage, V_{BE}	$I_C = 10\text{mA}$	-	0.85	0.95	-	0.85	0.95	V
DC Forward-Current Transfer Ratio, h_{FE}	$I_C = 10\text{mA}$, $V_{CE} = 2\text{V}$	40	130	-	40	130	-	
Early Voltage, V_A	$I_C = 1\text{mA}$, $V_{CE} = 3.5\text{V}$	20	50	-	20	50	-	V
Base to Emitter Voltage Drift	$I_C = 10\text{mA}$	-	-1.5	-	-	-1.5	-	mV/ $^{\circ}\text{C}$
Collector to Collector Leakage		-	1	-	-	1	-	pA

Electrical Specifications $T_A = 25^{\circ}\text{C}$

PARAMETER	TEST CONDITIONS	DIE			SOIC			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
DYNAMIC NPN CHARACTERISTICS								
Noise Figure	$f = 1.0\text{GHz}$, $V_{CE} = 5\text{V}$, $I_C = 5\text{mA}$, $Z_S = 50\Omega$	-	3.5	-	-	3.5	-	dB
f_T Current Gain-Bandwidth Product	$I_C = 1\text{mA}$, $V_{CE} = 5\text{V}$	-	5.5	-	-	5.5	-	GHz
	$I_C = 10\text{mA}$, $V_{CE} = 5\text{V}$	-	8	-	-	8	-	GHz
Power Gain-Bandwidth Product, f_{MAX}	$I_C = 10\text{mA}$, $V_{CE} = 5\text{V}$	-	6	-	-	2.5	-	GHz

HFA3046, HFA3096, HFA3127, HFA3128

Electrical Specifications $T_A = 25^\circ\text{C}$ (Continued)

PARAMETER	TEST CONDITIONS	DIE			SOIC			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
Base to Emitter Capacitance	$V_{BE} = -3\text{V}$	-	200	-	-	500	-	fF
Collector to Base Capacitance	$V_{CB} = 3\text{V}$	-	200	-	-	500	-	fF

Electrical Specifications $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	DIE			SOIC			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
DC PNP CHARACTERISTICS								
Collector to Base Breakdown Voltage, $V_{(BR)CBO}$	$I_C = -100\mu\text{A}$, $I_E = 0$	10	15	-	10	15	-	V
Collector to Emitter Breakdown Voltage, $V_{(BR)CEO}$	$I_C = -100\mu\text{A}$, $I_B = 0$	8	15	-	8	15	-	V
Collector to Emitter Breakdown Voltage, $V_{(BR)CES}$	$I_C = -100\mu\text{A}$, Base Shorted to Emitter	10	15	-	10	15	-	V
Emitter to Base Breakdown Voltage, $V_{(BR)EBO}$	$I_E = -10\mu\text{A}$, $I_C = 0$	4.5	5	-	4.5	5	-	V
Collector Cutoff Current, I_{CEO}	$V_{CE} = -6\text{V}$, $I_B = 0$	-	2	100	-	2	100	nA
Collector Cutoff Current, I_{CBO}	$V_{CB} = -8\text{V}$, $I_E = 0$	-	0.1	10	-	0.1	10	nA
Collector to Emitter Saturation Voltage, $V_{CE(SAT)}$	$I_C = -10\text{mA}$, $I_B = -1\text{mA}$	-	0.3	0.5	-	0.3	0.5	V
Base to Emitter Voltage, V_{BE}	$I_C = -10\text{mA}$	-	0.85	0.95	-	0.85	0.95	V
DC Forward-Current Transfer Ratio, h_{FE}	$I_C = -10\text{mA}$, $V_{CE} = -2\text{V}$	20	60	-	20	60	-	
Early Voltage, V_A	$I_C = -1\text{mA}$, $V_{CE} = -3.5\text{V}$	10	20	-	10	20	-	V
Base to Emitter Voltage Drift	$I_C = -10\text{mA}$	-	-1.5	-	-	-1.5	-	$\text{mV}/^\circ\text{C}$
Collector to Collector Leakage		-	1	-	-	1	-	pA

Electrical Specifications $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	DIE			SOIC			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
DYNAMIC PNP CHARACTERISTICS								
Noise Figure	$f = 1.0\text{GHz}$, $V_{CE} = -5\text{V}$, $I_C = -5\text{mA}$, $Z_S = 50\Omega$	-	3.5	-	-	3.5	-	dB
f_T Current Gain-Bandwidth Product	$I_C = -1\text{mA}$, $V_{CE} = -5\text{V}$	-	2	-	-	2	-	GHz
	$I_C = -10\text{mA}$, $V_{CE} = -5\text{V}$	-	5.5	-	-	5.5	-	GHz
Power Gain-Bandwidth Product	$I_C = -10\text{mA}$, $V_{CE} = -5\text{V}$	-	3	-	-	2	-	GHz
Base to Emitter Capacitance	$V_{BE} = 3\text{V}$	-	200	-	-	500	-	fF
Collector to Base Capacitance	$V_{CB} = -3\text{V}$	-	300	-	-	600	-	fF

HFA3046, HFA3096, HFA3127, HFA3128

Electrical Specifications $T_A = 25^\circ\text{C}$ (Continued)

PARAMETER	TEST CONDITIONS	DIE			SOIC			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
DIFFERENTIAL PAIR MATCHING CHARACTERISTICS FOR THE HFA3046								
Input Offset Voltage	$I_C = 10\text{mA}$, $V_{CE} = 5\text{V}$	-	1.5	5.0	-	1.5	5.0	mV
Input Offset Current	$I_C = 10\text{mA}$, $V_{CE} = 5\text{V}$	-	5	25	-	5	25	μA
Input Offset Voltage TC	$I_C = 10\text{mA}$, $V_{CE} = 5\text{V}$	-	0.5	-	-	0.5	-	$\mu\text{V}/^\circ\text{C}$

S-Parameter and PSPICE model data is available from Intersil Sales Offices, and Intersil Corporation's web site.

Common Emitter S-Parameters of NPN $3\mu\text{m} \times 50\mu\text{m}$ Transistor

FREQ. (Hz)	$ S_{11} $	PHASE(S_{11})	$ S_{21} $	PHASE(S_{21})	$ S_{12} $	PHASE(S_{12})	$ S_{22} $	PHASE(S_{22})
$V_{CE} = 5\text{V}$ and $I_C = 5\text{mA}$								
1.0E+08	0.83	-11.78	11.07	168.57	1.41E-02	78.88	0.97	-11.05
2.0E+08	0.79	-22.82	10.51	157.89	2.69E-02	68.63	0.93	-21.35
3.0E+08	0.73	-32.64	9.75	148.44	3.75E-02	59.58	0.86	-30.44
4.0E+08	0.67	-41.08	8.91	140.36	4.57E-02	51.90	0.79	-38.16
5.0E+08	0.61	-48.23	8.10	133.56	5.19E-02	45.50	0.73	-44.59
6.0E+08	0.55	-54.27	7.35	127.88	5.65E-02	40.21	0.67	-49.93
7.0E+08	0.50	-59.41	6.69	123.10	6.00E-02	35.82	0.62	-54.37
8.0E+08	0.46	-63.81	6.11	119.04	6.27E-02	32.15	0.57	-58.10
9.0E+08	0.42	-67.63	5.61	115.57	6.47E-02	29.07	0.53	-61.25
1.0E+09	0.39	-70.98	5.17	112.55	6.63E-02	26.45	0.50	-63.96
1.1E+09	0.36	-73.95	4.79	109.91	6.75E-02	24.19	0.47	-66.31
1.2E+09	0.34	-76.62	4.45	107.57	6.85E-02	22.24	0.45	-68.37
1.3E+09	0.32	-79.04	4.15	105.47	6.93E-02	20.53	0.43	-70.19
1.4E+09	0.30	-81.25	3.89	103.57	7.00E-02	19.02	0.41	-71.83
1.5E+09	0.28	-83.28	3.66	101.84	7.05E-02	17.69	0.40	-73.31
1.6E+09	0.27	-85.17	3.45	100.26	7.10E-02	16.49	0.39	-74.66
1.7E+09	0.25	-86.92	3.27	98.79	7.13E-02	15.41	0.38	-75.90
1.8E+09	0.24	-88.57	3.10	97.43	7.17E-02	14.43	0.37	-77.05
1.9E+09	0.23	-90.12	2.94	96.15	7.19E-02	13.54	0.36	-78.12
2.0E+09	0.22	-91.59	2.80	94.95	7.21E-02	12.73	0.35	-79.13
2.1E+09	0.21	-92.98	2.68	93.81	7.23E-02	11.98	0.35	-80.09
2.2E+09	0.20	-94.30	2.56	92.73	7.25E-02	11.29	0.34	-80.99
2.3E+09	0.20	-95.57	2.45	91.70	7.27E-02	10.64	0.34	-81.85
2.4E+09	0.19	-96.78	2.35	90.72	7.28E-02	10.05	0.33	-82.68
2.5E+09	0.18	-97.93	2.26	89.78	7.29E-02	9.49	0.33	-83.47
2.6E+09	0.18	-99.05	2.18	88.87	7.30E-02	8.96	0.33	-84.23
2.7E+09	0.17	-100.12	2.10	88.00	7.31E-02	8.47	0.33	-84.97
2.8E+09	0.17	-101.15	2.02	87.15	7.31E-02	8.01	0.33	-85.68
2.9E+09	0.16	-102.15	1.96	86.33	7.32E-02	7.57	0.33	-86.37

HFA3046, HFA3096, HFA3127, HFA3128

Common Emitter S-Parameters of NPN 3 μ m x 50 μ m Transistor (Continued)

FREQ. (Hz)	S ₁₁	PHASE(S ₁₁)	S ₂₁	PHASE(S ₂₁)	S ₁₂	PHASE(S ₁₂)	S ₂₂	PHASE(S ₂₂)
3.0E+09	0.16	-103.11	1.89	85.54	7.32E-02	7.16	0.33	-87.05
V_{CE} = 5V and I_C = 10mA								
1.0E+08	0.72	-16.43	15.12	165.22	1.27E-02	75.41	0.95	-14.26
2.0E+08	0.67	-31.26	13.90	152.04	2.34E-02	62.89	0.88	-26.95
3.0E+08	0.60	-43.76	12.39	141.18	3.13E-02	52.58	0.79	-37.31
4.0E+08	0.53	-54.00	10.92	132.57	3.68E-02	44.50	0.70	-45.45
5.0E+08	0.47	-62.38	9.62	125.78	4.05E-02	38.23	0.63	-51.77
6.0E+08	0.42	-69.35	8.53	120.37	4.31E-02	33.34	0.57	-56.72
7.0E+08	0.37	-75.26	7.62	116.00	4.49E-02	29.47	0.51	-60.65
8.0E+08	0.34	-80.36	6.86	112.39	4.63E-02	26.37	0.47	-63.85
9.0E+08	0.31	-84.84	6.22	109.36	4.72E-02	23.84	0.44	-66.49
1.0E+09	0.29	-88.83	5.69	106.77	4.80E-02	21.75	0.41	-68.71
1.1E+09	0.27	-92.44	5.23	104.51	4.86E-02	20.00	0.39	-70.62
1.2E+09	0.25	-95.73	4.83	102.53	4.90E-02	18.52	0.37	-72.28
1.3E+09	0.24	-98.75	4.49	100.75	4.94E-02	17.25	0.35	-73.76
1.4E+09	0.22	-101.55	4.19	99.16	4.97E-02	16.15	0.34	-75.08
1.5E+09	0.21	-104.15	3.93	97.70	4.99E-02	15.19	0.33	-76.28
1.6E+09	0.20	-106.57	3.70	96.36	5.01E-02	14.34	0.32	-77.38
1.7E+09	0.20	-108.85	3.49	95.12	5.03E-02	13.60	0.31	-78.41
1.8E+09	0.19	-110.98	3.30	93.96	5.05E-02	12.94	0.31	-79.37
1.9E+09	0.18	-113.00	3.13	92.87	5.06E-02	12.34	0.30	-80.27
2.0E+09	0.18	-114.90	2.98	91.85	5.07E-02	11.81	0.30	-81.13
2.1E+09	0.17	-116.69	2.84	90.87	5.08E-02	11.33	0.30	-81.95
2.2E+09	0.17	-118.39	2.72	89.94	5.09E-02	10.89	0.29	-82.74
2.3E+09	0.16	-120.01	2.60	89.06	5.10E-02	10.50	0.29	-83.50
2.4E+09	0.16	-121.54	2.49	88.21	5.11E-02	10.13	0.29	-84.24
2.5E+09	0.16	-122.99	2.39	87.39	5.12E-02	9.80	0.29	-84.95
2.6E+09	0.15	-124.37	2.30	86.60	5.12E-02	9.49	0.29	-85.64
2.7E+09	0.15	-125.69	2.22	85.83	5.13E-02	9.21	0.29	-86.32
2.8E+09	0.15	-126.94	2.14	85.09	5.13E-02	8.95	0.29	-86.98
2.9E+09	0.15	-128.14	2.06	84.36	5.14E-02	8.71	0.29	-87.62
3.0E+09	0.14	-129.27	1.99	83.66	5.15E-02	8.49	0.29	-88.25

Common Emitter S-Parameters of PNP 3 μ m x 50 μ m Transistor

FREQ. (Hz)	S ₁₁	PHASE(S ₁₁)	S ₂₁	PHASE(S ₂₁)	S ₁₂	PHASE(S ₁₂)	S ₂₂	PHASE(S ₂₂)
V_{CE} = -5V and I_C = -5mA								
1.0E+08	0.72	-16.65	10.11	166.77	1.66E-02	77.18	0.96	-10.76
2.0E+08	0.68	-32.12	9.44	154.69	3.10E-02	65.94	0.90	-20.38
3.0E+08	0.62	-45.73	8.57	144.40	4.23E-02	56.39	0.82	-28.25
4.0E+08	0.57	-57.39	7.68	135.95	5.05E-02	48.66	0.74	-34.31

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Common Emitter S-Parameters of PNP 3 μ m x 50 μ m Transistor (Continued)

FREQ. (Hz)	S ₁₁	PHASE(S ₁₁)	S ₂₁	PHASE(S ₂₁)	S ₁₂	PHASE(S ₁₂)	S ₂₂	PHASE(S ₂₂)
5.0E+08	0.52	-67.32	6.86	129.11	5.64E-02	42.52	0.67	-38.81
6.0E+08	0.47	-75.83	6.14	123.55	6.07E-02	37.66	0.61	-42.10
7.0E+08	0.43	-83.18	5.53	118.98	6.37E-02	33.79	0.55	-44.47
8.0E+08	0.40	-89.60	5.01	115.17	6.60E-02	30.67	0.51	-46.15
9.0E+08	0.38	-95.26	4.56	111.94	6.77E-02	28.14	0.47	-47.33
1.0E+09	0.36	-100.29	4.18	109.17	6.91E-02	26.06	0.44	-48.15
1.1E+09	0.34	-104.80	3.86	106.76	7.01E-02	24.33	0.41	-48.69
1.2E+09	0.33	-108.86	3.58	104.63	7.09E-02	22.89	0.39	-49.05
1.3E+09	0.32	-112.53	3.33	102.72	7.16E-02	21.67	0.37	-49.26
1.4E+09	0.30	-115.86	3.12	101.01	7.22E-02	20.64	0.36	-49.38
1.5E+09	0.30	-118.90	2.92	99.44	7.27E-02	19.76	0.34	-49.43
1.6E+09	0.29	-121.69	2.75	98.01	7.32E-02	19.00	0.33	-49.44
1.7E+09	0.28	-124.24	2.60	96.68	7.35E-02	18.35	0.32	-49.43
1.8E+09	0.28	-126.59	2.47	95.44	7.39E-02	17.79	0.31	-49.40
1.9E+09	0.27	-128.76	2.34	94.29	7.42E-02	17.30	0.30	-49.38
2.0E+09	0.27	-130.77	2.23	93.19	7.45E-02	16.88	0.30	-49.36
2.1E+09	0.26	-132.63	2.13	92.16	7.47E-02	16.52	0.29	-49.35
2.2E+09	0.26	-134.35	2.04	91.18	7.50E-02	16.20	0.28	-49.35
2.3E+09	0.26	-135.96	1.95	90.24	7.52E-02	15.92	0.28	-49.38
2.4E+09	0.25	-137.46	1.87	89.34	7.55E-02	15.68	0.28	-49.42
2.5E+09	0.25	-138.86	1.80	88.48	7.57E-02	15.48	0.27	-49.49
2.6E+09	0.25	-140.17	1.73	87.65	7.59E-02	15.30	0.27	-49.56
2.7E+09	0.25	-141.39	1.67	86.85	7.61E-02	15.15	0.26	-49.67
2.8E+09	0.25	-142.54	1.61	86.07	7.63E-02	15.01	0.26	-49.81
2.9E+09	0.24	-143.62	1.56	85.31	7.65E-02	14.90	0.26	-49.96
3.0E+09	0.24	-144.64	1.51	84.58	7.67E-02	14.81	0.26	-50.13
V_{CE} = -5V, I_C = -10mA								
1.0E+08	0.58	-23.24	13.03	163.45	1.43E-02	73.38	0.93	-13.46
2.0E+08	0.53	-44.07	11.75	149.11	2.58E-02	60.43	0.85	-24.76
3.0E+08	0.48	-61.50	10.25	137.78	3.38E-02	50.16	0.74	-33.10
4.0E+08	0.43	-75.73	8.88	129.12	3.90E-02	42.49	0.65	-38.83
5.0E+08	0.40	-87.36	7.72	122.49	4.25E-02	36.81	0.58	-42.63
6.0E+08	0.37	-96.94	6.78	117.33	4.48E-02	32.59	0.51	-45.07
7.0E+08	0.35	-104.92	6.01	113.22	4.64E-02	29.39	0.47	-46.60
8.0E+08	0.33	-111.64	5.39	109.85	4.76E-02	26.94	0.43	-47.49
9.0E+08	0.32	-117.36	4.87	107.05	4.85E-02	25.04	0.40	-47.97
1.0E+09	0.31	-122.27	4.44	104.66	4.92E-02	23.55	0.37	-48.18
1.1E+09	0.30	-126.51	4.07	102.59	4.97E-02	22.37	0.35	-48.20

Common Emitter S-Parameters of PNP 3 μ m x 50 μ m Transistor (Continued)

FREQ. (Hz)	S ₁₁	PHASE(S ₁₁)	S ₂₁	PHASE(S ₂₁)	S ₁₂	PHASE(S ₁₂)	S ₂₂	PHASE(S ₂₂)
1.2E+09	0.30	-130.21	3.76	100.76	5.02E-02	21.44	0.33	-48.11
1.3E+09	0.29	-133.46	3.49	99.14	5.06E-02	20.70	0.32	-47.95
1.4E+09	0.29	-136.33	3.25	97.67	5.09E-02	20.11	0.31	-47.77
1.5E+09	0.28	-138.89	3.05	96.33	5.12E-02	19.65	0.30	-47.58
1.6E+09	0.28	-141.17	2.87	95.10	5.15E-02	19.29	0.29	-47.39
1.7E+09	0.28	-143.21	2.70	93.96	5.18E-02	19.01	0.28	-47.23
1.8E+09	0.28	-145.06	2.56	92.90	5.21E-02	18.80	0.27	-47.09
1.9E+09	0.27	-146.73	2.43	91.90	5.23E-02	18.65	0.27	-46.98
2.0E+09	0.27	-148.26	2.31	90.95	5.26E-02	18.55	0.26	-46.91
2.1E+09	0.27	-149.65	2.20	90.05	5.28E-02	18.49	0.26	-46.87
2.2E+09	0.27	-150.92	2.10	89.20	5.30E-02	18.46	0.25	-46.87
2.3E+09	0.27	-152.10	2.01	88.37	5.33E-02	18.47	0.25	-46.90
2.4E+09	0.27	-153.18	1.93	87.59	5.35E-02	18.50	0.25	-46.97
2.5E+09	0.27	-154.17	1.86	86.82	5.38E-02	18.55	0.24	-47.07
2.6E+09	0.26	-155.10	1.79	86.09	5.40E-02	18.62	0.24	-47.18
2.7E+09	0.26	-155.96	1.72	85.38	5.42E-02	18.71	0.24	-47.34
2.8E+09	0.26	-156.76	1.66	84.68	5.45E-02	18.80	0.24	-47.55
2.9E+09	0.26	-157.51	1.60	84.01	5.47E-02	18.91	0.24	-47.76
3.0E+09	0.26	-158.21	1.55	83.35	5.50E-02	19.03	0.23	-48.00

Typical Performance Curves

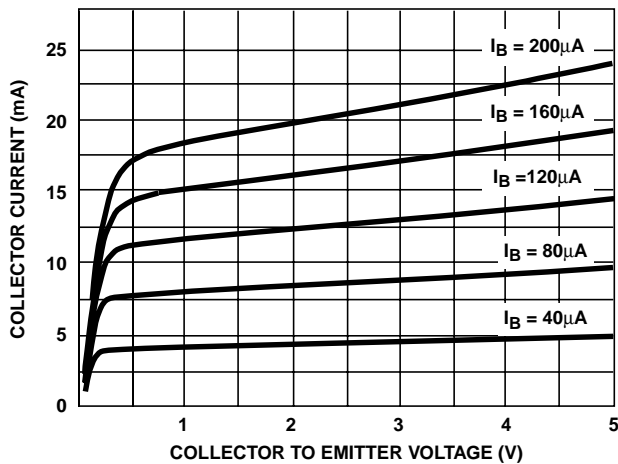


FIGURE 1. NPN COLLECTOR CURRENT vs COLLECTOR TO EMITTER VOLTAGE

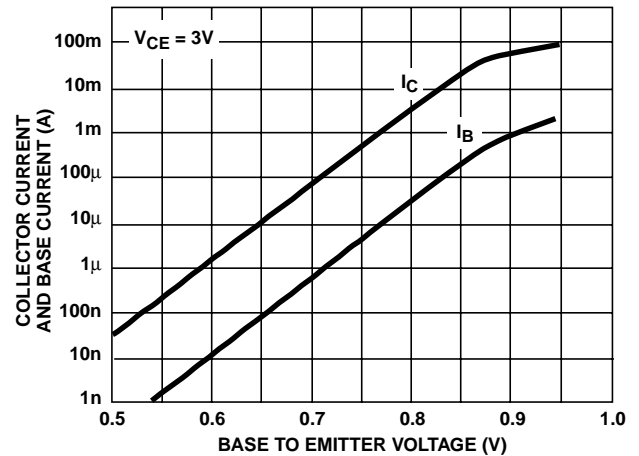


FIGURE 2. NPN COLLECTOR CURRENT AND BASE CURRENT vs BASE TO EMITTER VOLTAGE

Typical Performance Curves (Continued)

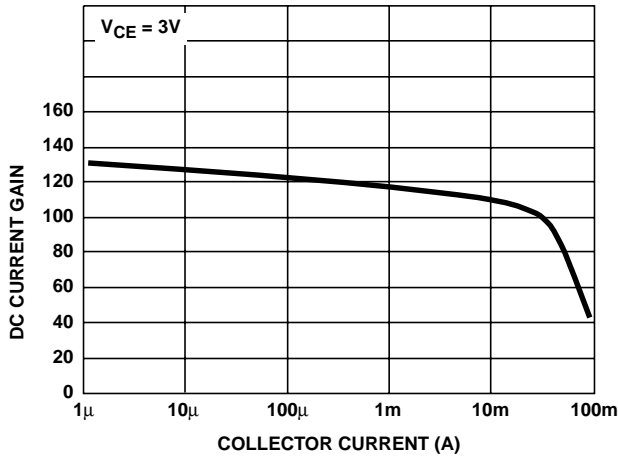


FIGURE 3. NPN DC CURRENT GAIN vs COLLECTOR CURRENT

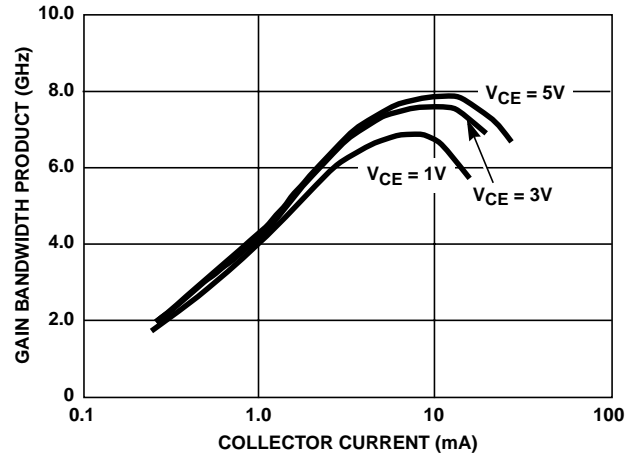


FIGURE 4. NPN GAIN BANDWIDTH PRODUCT vs COLLECTOR CURRENT (UHF 3 x 50 WITH BOND PADS)

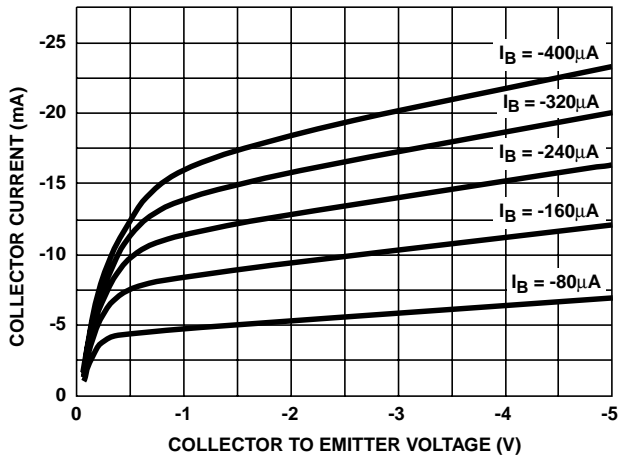


FIGURE 5. PNP COLLECTOR CURRENT vs COLLECTOR TO EMITTER VOLTAGE

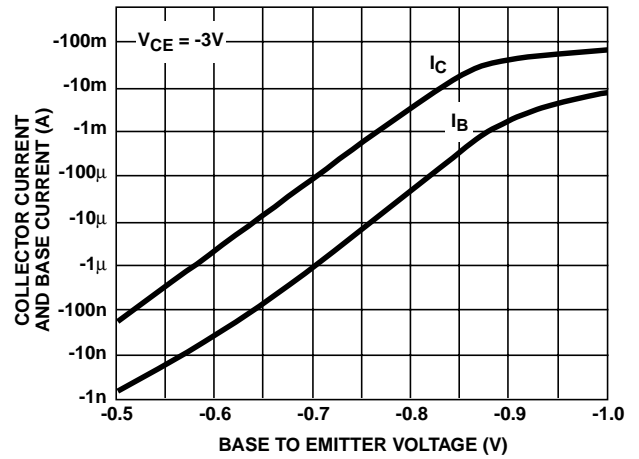


FIGURE 6. PNP COLLECTOR CURRENT AND BASE CURRENT vs BASE TO EMITTER VOLTAGE

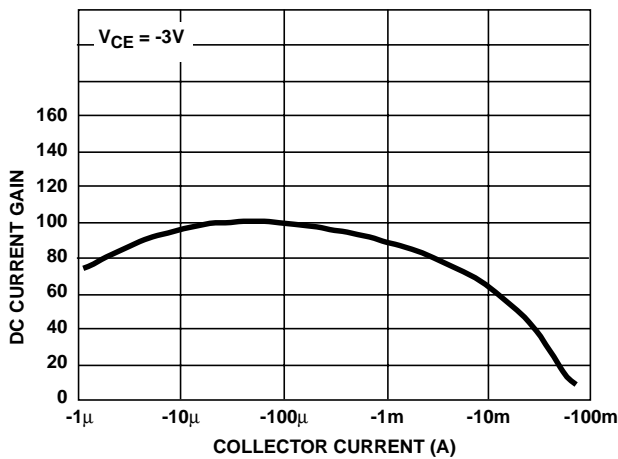


FIGURE 7. PNP DC CURRENT GAIN vs COLLECTOR CURRENT

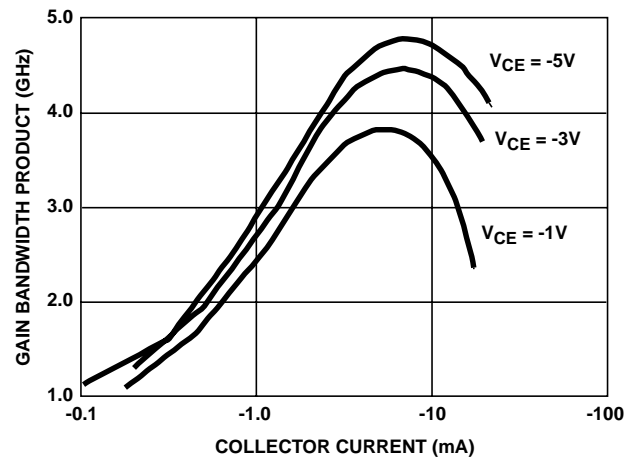


FIGURE 8. PNP GAIN BANDWIDTH PRODUCT vs COLLECTOR CURRENT (UHF 3 x 50 WITH BOND PADS)

Die Characteristics

DIE DIMENSIONS:

53 mils x 52 mils x 19 mils
 1340 μ m x 1320 μ m x 483 μ m

METALLIZATION:

Type: Metal 1: AlCu(2%)/TiW
 Thickness: Metal 1: 8k \AA \pm 0.4k \AA
 Type: Metal 2: AlCu(2%)
 Thickness: Metal 2: 16k \AA 0.8k \AA

PASSIVATION:

Type: Nitride
 Thickness: 4k \AA \pm 0.5k \AA

PROCESS:

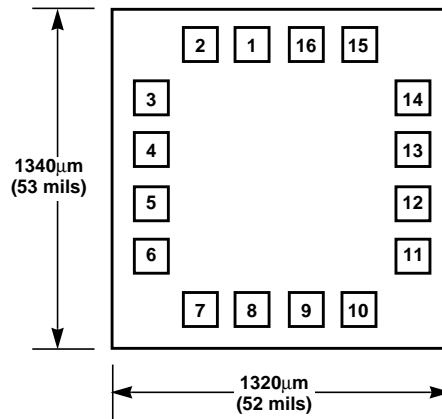
UHF-1

SUBSTRATE POTENTIAL: (POWERED UP)

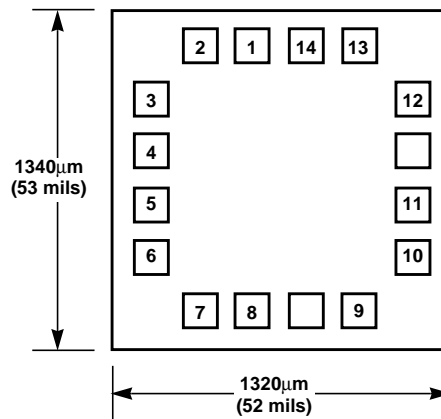
Unbiased

Metallization Mask Layout

HFA3096, HFA3127, HFA3128



HFA3046



Pad numbers correspond to SOIC pinout.

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