MRF571
MRF572
MRFC572

The RF Line

NPN SILICON HIGH FREQUENCY TRANSISTORS

. . . designed for low-noise, wide dynamic range front end amplifiers, low-noise VCO's, and microwave power multipliers.

- Low Noise
- High Gain
- Available in Low Cost Plastic, High Reliability Ceramic or Die
- State-of-the-Art Technology
  - Fine Line Geometry
  - Ion Implanted Arsenic Emitters
  - Gold Top Metallization and Wires
  - Silicon Nitride Passivation
- Fully Characterized

f_T = 8.0 GHz @ 50 mA
NF = 1.0 dB @ 500 MHz
NF = 1.5 dB @ 1.0 GHz
NF = 2.5 dB @ 2.0 GHz

HIGH FREQUENCY TRANSISTORS

NPN SILICON

3

MAXIMUM RATINGS

Ratings	Symbol	MRFC572 Chip	MRF571 Macro-X Case 317-01	MRF572 Case 303-01	Unit
Collector-Emitter Voltage	V_{CEO}	10	10	10	Vdc
Collector-Base Voltage	V_{CBO}	20	20	20	Vdc
Emitter-Base Voltage	V_{EBO}	3.0	3.0	3.0	Vdc
Collector Current — Continuous	I_C	70	70	70	mAdc
Total Device Dissipation @ T_C = 50°C(1) Derate above T_C = 50°C	P_D	0.75 T_J = 200°C max	1.0 10	0.75 5.0	Watts mW/°C
Storage Temperature	T_{stg}	−65 to +200	−65 to +150	−65 to +200	°C

NOTE 1. Case temperature measured on collector lead immediately adjacent to body of package.

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 1.0 mAdc, I_E = 0)	$V_{(BR)CEO}$	10	12	—	Vdc
Collector-Base Breakdown Voltage (I_C = 0.1 mAdc, I_B = 0)	$V_{(BR)CBO}$	20	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 50 μAdc, I_C = 0)	$V_{(BR)EBO}$	2.5	—	—	Vdc
Collector Cutoff Current (V_{CB} = 8.0 Vdc, I_E = 0)	I_{CBO}	—	—	10	μAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 30 mAdc, V_{CE} = 5.0 Vdc)	h_{FE}	50	—	300	—
DYNAMIC CHARACTERISTICS					
Collector-Base Capacitance (V_{CB} = 6.0 Vdc, I_E = 0, f = 1.0 MHz)	C_{cb}	—	0.7	1.0	pF
Current Gain — Bandwidth Product (V_{CE} = 8.0 Vdc, I_C = 50 mA, f = 1.0 GHz)	f_T	—	8.0	—	GHz
FUNCTIONAL TESTS					
Gain @ Noise Figure (I_C = 5.0 mAdc, V_{CE} = 6.0 Vdc) f = 0.5 GHz	G_{NF}	—	16.5	—	dB
f = 1.0 GHz		10	12	—	
Noise Figure (I_C = 5.0 mAdc, V_{CE} = 6.0 Vdc) f = 0.5 GHz	NF	—	1.0	—	dB
f = 1.0 GHz		—	1.5	2.0	
MRF571 f = 2.0 GHz		—	2.8	—	
MRF572 f = 2.0 GHz		—	2.5	—	

3

FIGURE 1 — C_{cb}, COLLECTOR-BASE CAPACITANCE versus VOLTAGE

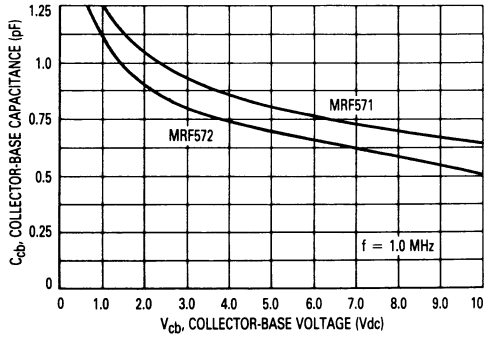

FIGURE 2 — C_{ib}, INPUT CAPACITANCE versus EMITTER BASE VOLTAGE

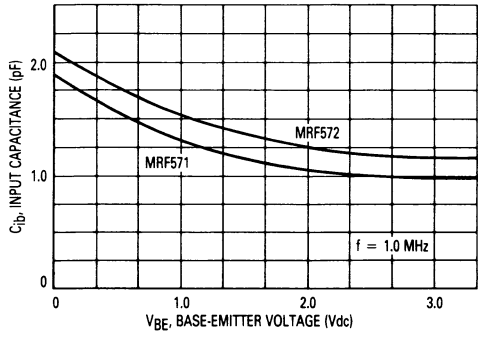

FIGURE 3 — MRF571 — GAIN AT NOISE FIGURE AND NOISE FIGURE versus FREQUENCY

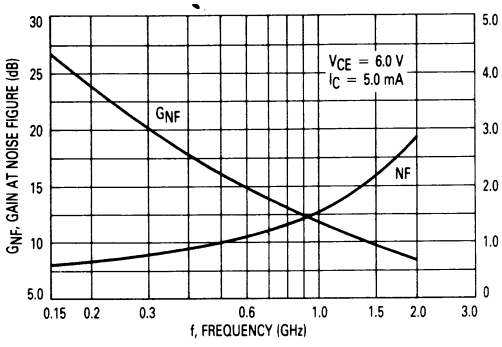

FIGURE 4 — MRF572 — GAIN AT NOISE FIGURE AND NOISE FIGURE versus FREQUENCY

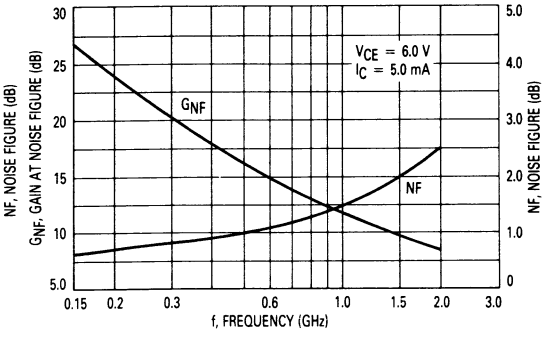

FIGURE 5 — MRF571 and MRF572 — GAIN AT NOISE FIGURE AND NOISE FIGURE versus COLLECTOR CURRENT

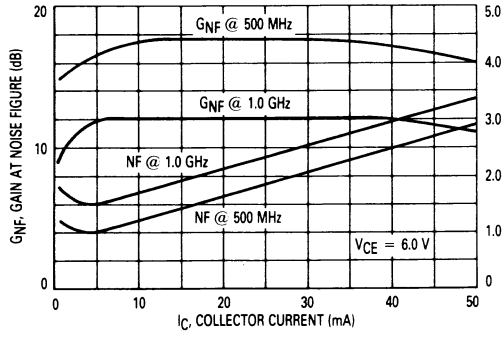

FIGURE 6 — f_T, CURRENT GAIN-BANDWIDTH PRODUCT versus COLLECTOR CURRENT

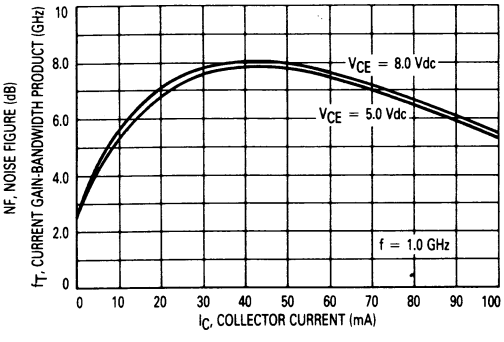

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FIGURE 7 — G_{Amax}, MAXIMUM AVAILABLE GAIN versus FREQUENCY

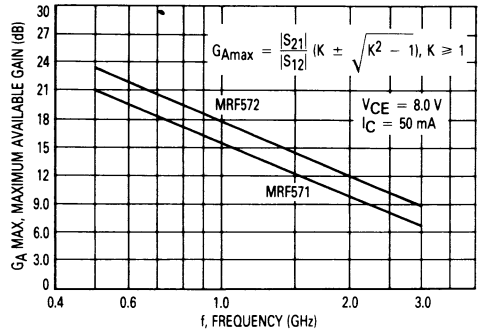


FIGURE 8 — 1.0 dB COMPRESSION PT. AND THIRD ORDER INTERCEPT

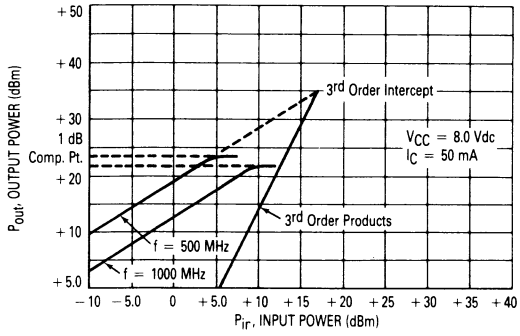


FIGURE 9 — MRF571 — G_{Umax} and $|S_{21}|^2$ versus FREQUENCY

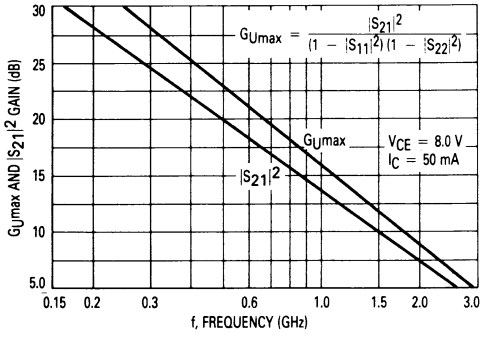
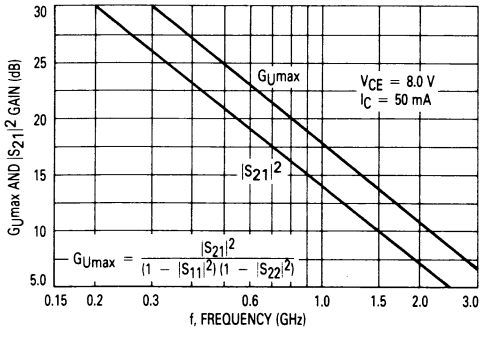
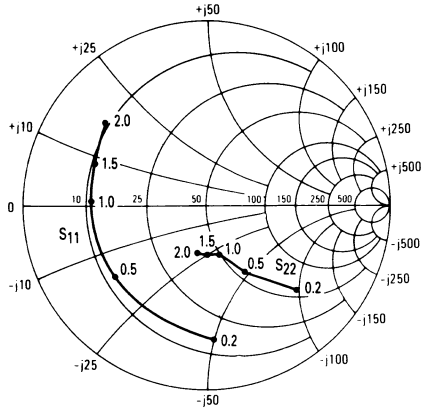


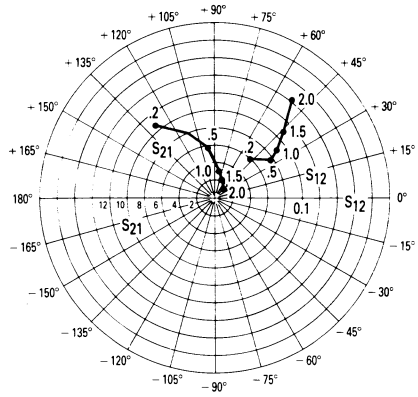
FIGURE 10 — MRF572 — G_{Umax} and $|S_{21}|^2$ versus FREQUENCY



MRF571
INPUT/OUTPUT REFLECTION COEFFICIENTS versus FREQUENCY (GHz)
V_{CE} = 6.0 V, I_C = 5.0 mA



MRF571
FORWARD/REVERSE TRANSMISSION COEFFICIENTS versus FREQUENCY (GHz)
V_{CE} = 6.0 V, I_C = 5.0 mA



MRF571 COMMON EMITTER S-PARAMETERS

V_{CE} (Volts)	I_C (mA)	f (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
			$\|S_{11}\|$	$\angle\phi$	$\|S_{21}\|$	$\angle\phi$	$\|S_{12}\|$	$\angle\phi$	$\|S_{22}\|$	$\angle\phi$
6.0	5.0	200	0.74	−86	10.5	129	0.06	48	0.69	−42
		500	0.62	−143	5.5	97	0.08	33	0.41	−59
		1000	0.61	178	3.0	78	0.09	37	0.28	−69
		1500	0.65	158	2.0	62	0.11	44	0.26	−88
		2000	0.70	140	1.6	51	0.14	51	0.27	−99
	10	200	0.64	−111	15	118	0.04	44	0.53	−59
		500	0.58	−160	6.9	93	0.06	42	0.27	−77
		1000	0.59	168	3.7	77	0.09	52	0.16	−91
		1500	0.63	151	2.5	64	0.12	56	0.16	−113
		2000	0.67	134	2.0	53	0.16	57	0.16	−118
	50	200	0.56	−160	20.4	102	0.02	57	0.27	−98
		500	0.57	176	8.4	86	0.05	67	0.14	−130
		1000	0.60	156	4.4	75	0.09	70	0.11	−164
		1500	0.62	152	2.9	64	0.13	68	0.13	−175
		2000	0.66	127	2.4	53	0.18	62	0.11	−178
8.0	5.0	200	0.75	−83	10.7	129	0.06	49	0.71	−39
		500	0.62	−140	5.1	98	0.08	34	0.43	−54
		1000	0.60	−179	3.7	78	0.09	38	0.31	−62
		1500	0.64	159	2.1	62	0.10	45	0.29	−80
		2000	0.69	141	1.7	52	0.13	52	0.29	−91
	10	200	0.64	−99	15.1	120	0.05	46	0.54	−60
		500	0.52	−152	7.1	94	0.07	45	0.32	−75
		1000	0.52	170	3.7	76	0.10	54	0.15	−82
		1500	0.52	150	2.5	62	0.13	56	0.16	−108
		2000	0.57	133	2.0	51	0.18	55	0.16	−107
	50	200	0.52	−153	19.6	102	0.03	56	0.28	−92
		500	0.52	178	8.1	86	0.05	67	0.16	−98
		1000	0.56	157	4.1	73	0.10	70	0.06	−130
		1500	0.54	139	2.8	62	0.13	68	0.11	−146
		2000	0.59	126	2.2	52	0.19	63	0.10	−137

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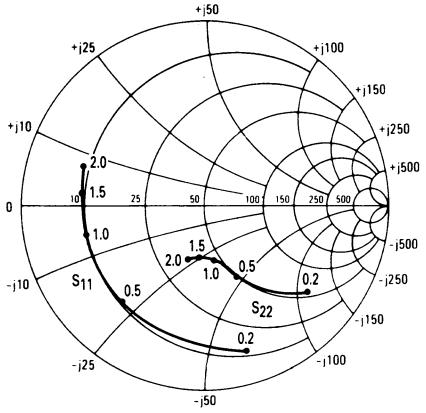
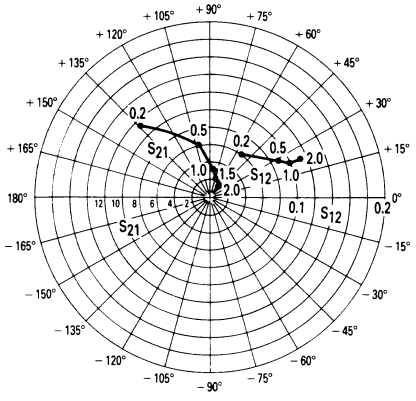
MRF572
INPUT/OUTPUT REFLECTION COEFFICIENTS versus FREQUENCY (GHz)
V_{CE} = 6.0 V, I_C = 5.0 mA



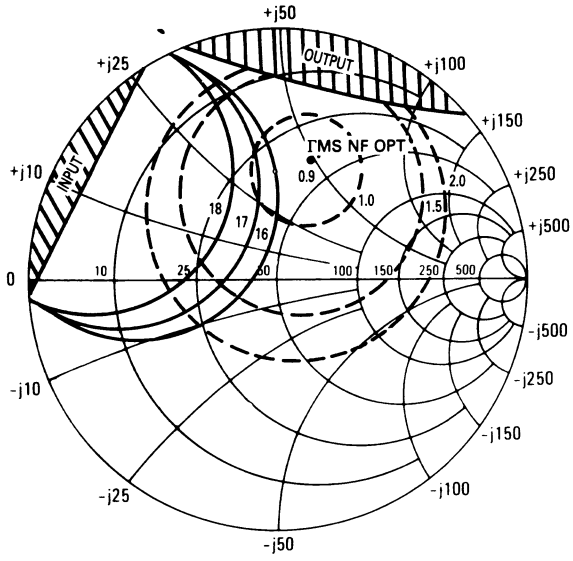
MRF572
FORWARD/REVERSE COEFFICIENTS versus FREQUENCY (GHz)
V_{CE} = 6.0 V, I_C = 5.0 mA



MRF572 COMMON EMITTER S-PARAMETERS

V_{CE} (Volts)	I_C (mA)	f (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
			$\|S_{11}\|$	$\angle\phi$	$\|S_{21}\|$	$\angle\phi$	$\|S_{12}\|$	$\angle\phi$	$\|S_{22}\|$	$\angle\phi$
6.0	5.0	200	0.81	−73	10.9	134	0.06	50	0.74	−40
		500	0.68	−130	6.1	102	0.09	29	0.43	−64
		1000	0.66	−167	3.3	79	0.10	22	0.29	−77
		1500	0.66	174	2.3	63	0.10	22	0.27	−94
		2000	0.68	161	1.8	49	0.11	23	0.29	−104
	10	200	0.72	−101	15.9	123	0.05	43	0.57	−58
		500	0.66	−150	7.7	95	0.06	30	0.29	−86
		1000	0.66	−178	4.0	77	0.08	33	0.19	−103
		1500	0.67	166	2.7	63	0.09	36	0.19	−122
		2000	0.69	155	2.1	51	0.10	37	0.20	−129
	50	200	0.67	−154	21.8	104	0.02	43	0.30	−94
		500	0.68	−177	9.0	87	0.03	52	0.17	−129
		1000	0.70	167	4.5	74	0.06	58	0.14	−151
		1500	0.71	157	3.0	62	0.08	59	0.16	−160
		2000	0.73	148	2.3	51	0.10	55	0.17	−161
8.0	5.0	200	0.83	−69	10.9	136	0.06	52	0.75	−36
		500	0.71	−125	6.3	103	0.08	30	0.46	−57
		1000	0.64	−164	3.5	80	0.09	24	0.31	−68
		1500	0.65	176	2.4	63	0.10	23	0.29	−84
		2000	0.66	163	1.8	49	0.11	24	0.30	−94
	10	200	0.74	−94	16.2	125	0.05	45	0.60	−51
		500	0.65	−146	7.9	96	0.06	32	0.31	−74
		1000	0.64	−176	4.2	77	0.07	33	0.20	−87
		1500	0.65	168	2.8	63	0.09	36	0.19	−104
		2000	0.67	156	2.2	50	0.10	37	0.20	−111
	50	200	0.62	−150	22.7	104	0.02	43	0.30	−81
		500	0.64	−174	9.4	86	0.03	51	0.15	−107
		1000	0.68	167	4.8	74	0.05	58	0.10	−126
		1500	0.69	160	3.2	61	0.07	58	0.13	−140
		2000	0.70	147	2.4	50	0.09	55	0.15	−140

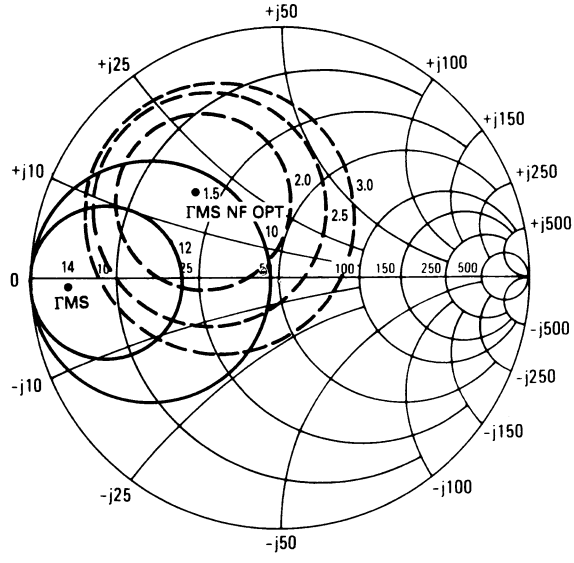
MRF571 — CONSTANT GAIN and NOISE FIGURE CONTOURS



V_{CE} = 6.0 V, I_C = 5.0 mA
f = 500 MHz
▨ — REGION OF INSTABILITY

f(GHz)	NF OPT(dB)	Rn (Ω)	NF50 Ω (dB)
0.5	0.9	9.3	1.3

ΓMS NF OPT	K
0.49 ∠74°	0.58

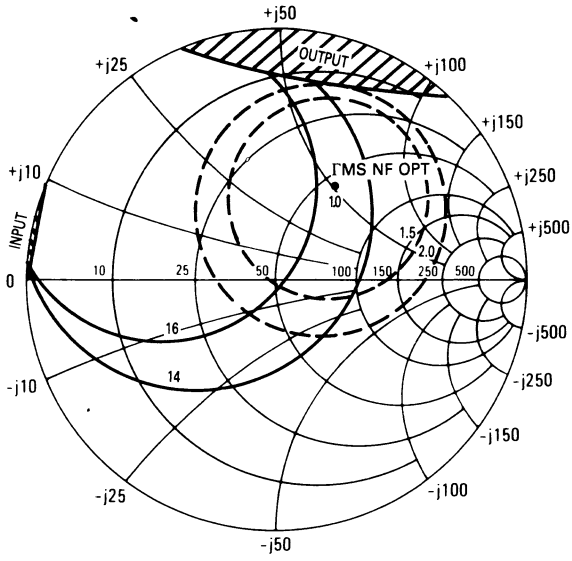


V_{CE} = 6.0 V, I_C = 5.0 mA
f = 1.0 GHz

f(GHz)	NF OPT(dB)	Rn (Ω)	NF50 Ω (dB)	ΓMS NF OPT
1.0	1.5	7.5	2.2	0.48 ∠134°

ΓMS	ΓML
0.89 ∠ − 179°	0.81 ∠66°

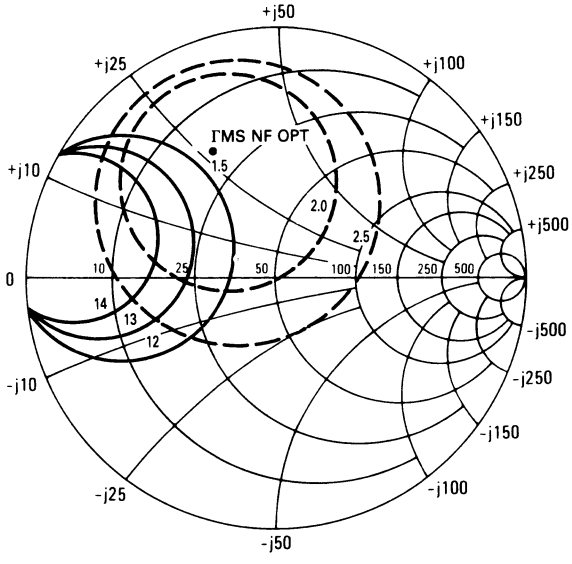
MRF572 CONSTANT GAIN and NOISE FIGURE CONTOURS



V_{CE} = 6.0 V, I = 5.0 mA
f = 500 MHz
▨ — REGION OF INSTABILITY

f(GHz)	Rn (Ω)	NF (50Ω)	ΓMS NF OPT
0.5	17.1	1.5	0.43 ∠ 57°

K	NF OPT
0.55	1.0

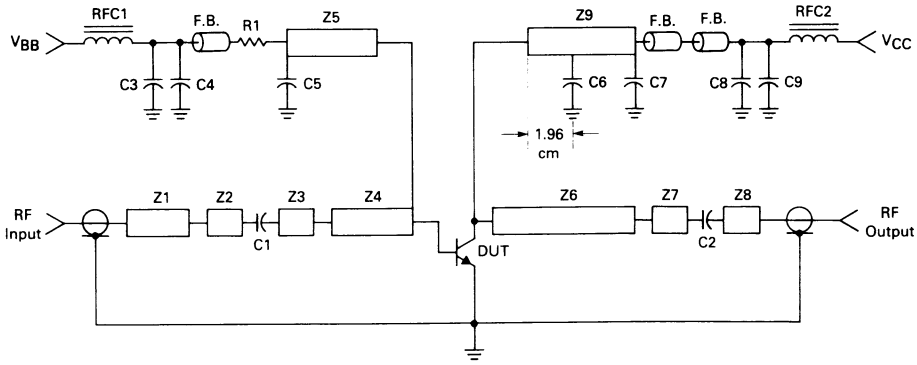


V_{CE} = 6.0 V, I_C = 5.0 mA
f = 1.0 GHz

f(GHz)	NF OPT	Rn (Ω)	NF50 (Ω) (dB)
1.0	1.5	6.0	2.0

ΓMS NF OPT	K
0.56 ∠ 116°	0.93

MRF571 1.0 GHz TEST CIRCUIT



C1, C2, C6	560 pF Chip Capacitor	RFC1, RFC2	VK-200, Ferroxcube
C5, C7	0.018 μF Chip Capacitor	Z1–Z9	Microstrip, See Photomaster
C3, C8	0.1 μF Mylar Capacitor	Bead	Ferrite Bead, Ferroxcube 56-590-65/3B
C4, C9	1.0 μF Electrolytic Capacitor	Board Material	0.0625" Teflon Fiberglass ϵ_r = 2.5 ± 0.05
R1	2.7 kΩ		

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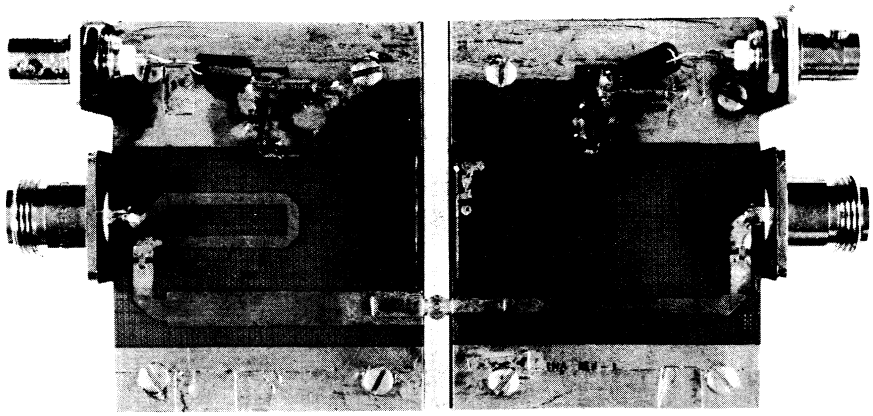
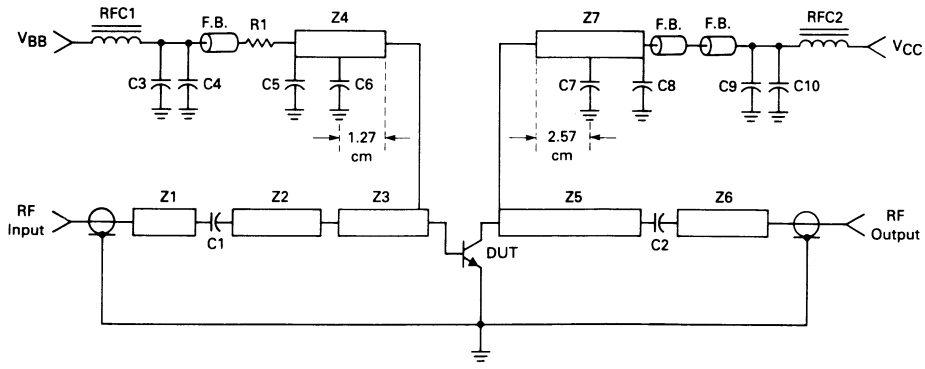
MRF571 TEST CIRCUIT



MRF572, 1.0 GHz TEST CIRCUIT



C1, C2, C6, C7	560 pF Chip Capacitor	RFC1, RFC2	VK-200, Ferroxcube
C5, C8	0.018 μF Chip Capacitor	Z1–Z7	Microstrip, See Photomaster
C3, C9	0.1 μF Mylar Capacitor	Bead	Ferrite Bead, Ferroxcube 56-590-65/3B
C4, C10	1.0 μF Electrolytic Capacitor	Board Material	0.031" Teflon Fiberglass ϵ_r = 2.5 ± 0.05
R1	2.7 kΩ		

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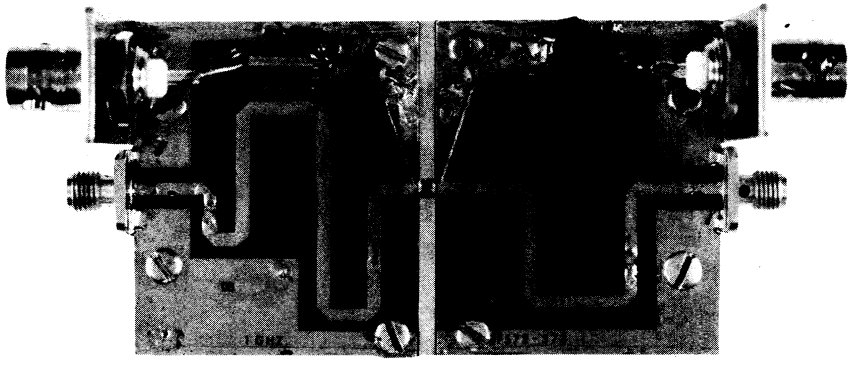
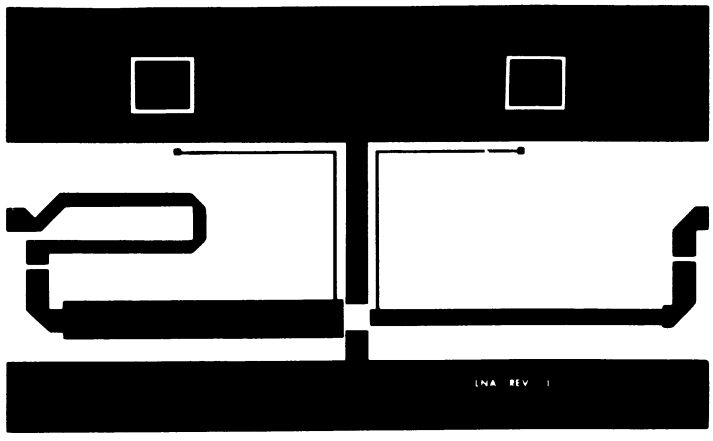
MRF572 TEST CIRCUIT

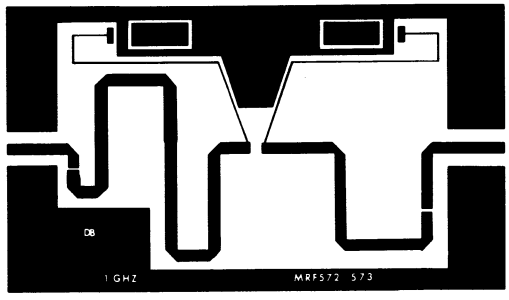


PHOTOMASTER OF MRF571 CIRCUIT LAYOUT

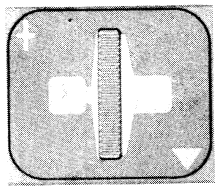


NOTE: The Printed Circuit Board shown is 75% of the original.

PHOTOMASTER OF MRF572 CIRCUIT LAYOUT



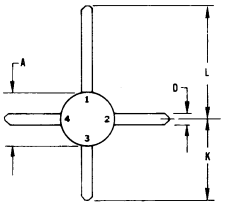
MRFC572 CHIP TOPOGRAPHY

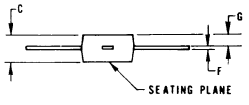


Nominal Chip Size: 0.015" x 0.016" x 0.005"
Front Metallization: Gold
Back Metallization: Gold
Emitter/Base Bond Pad: 2.2 x 2.2 mil
#Emitter Fingers: 22
#Base Fingers: 23
Emitter Diffusion: Ion-Implanted Arsenic

OUTLINE DIMENSIONS

4-LEAD PLASTIC MACRO-X



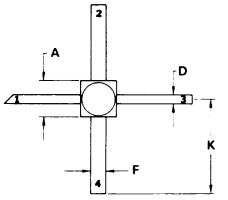


DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	4.44	5.21	0.175	0.205
C	1.90	2.54	0.075	0.100
D	0.84	0.99	0.033	0.039
F	0.20	0.30	0.008	0.012
G	0.76	1.14	0.030	0.045
K	7.24	8.13	0.285	0.320
L	10.54	11.43	0.415	0.450

STYLE 2:
PIN 1. COLLECTOR
2. EMITTER
3. BASE
4. EMITTER

CASE 317-01

0.100" CERAMIC STRIPLINE



DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	2.29	2.67	0.090	0.105
C	0.89	1.40	0.035	0.055
D	0.41	0.61	0.016	0.024
F	0.89	1.09	0.035	0.043
J	0.08	0.15	0.003	0.006
K	4.45	5.84	0.175	0.230

NOTE:
1. DIMENSION K APPLIES TO ALL LEADS.

STYLE 1:
PIN 1. COLLECTOR
2. EMITTER
3. BASE
4. EMITTER

CASE 303-1

MRF580,A
MRF581,A
MRFC581,A

The RF Line

NPN SILICON HIGH FREQUENCY TRANSISTORS

. . . designed for high current low power amplifiers up to 1.0 GHz.

- Low Noise
- Low Intermodulation Distortion
- High Gain
- State-of-the-Art Technology
  - Fine Line Geometry
  - Arsenic Emitters
  - Gold Top Metallization
  - Nicrome Thin-Film Ballasting Resistors
- Excellent Dynamic Range
- Fully Characterized

f_T = 5.0 GHz @ 75 mA
NF = 2.0 dB @ 500 MHz

HIGH FREQUENCY TRANSISTORS

NPN SILICON

MAXIMUM RATINGS		MRFC581,A Chip		MRF580,A Case 317A-01		MRF581,A Case 317-01		
Ratings	**Symbol**	**MRFC581**	**MRFC581A**	**MRF580**	**MRF580A**	**MRF581**	**MRF581A**	**Unit**
Collector-Emitter Voltage	V_{CEO}	18	15	18	15	18	15	Vdc
Collector-Base Voltage	V_{CBO}	36	30	36	30	36	30	Vdc
Emitter-Base Voltage	V_{EBO}	2.5		2.5		2.5		Vdc
Collector Current — Continuous	I_C	200		200		200		mAdc
Total Device Dissipation @ T_C = 50°C(1) Derate above T_C = 50°C	P_D	2.5 T_J = 200°C max		2.5 25		2.5 25		Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−65 to +200		−65 to +150		−65 to +150		°C

NOTE 1. Case temperature measured on collector lead immediately adjacent to body of package.

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted.)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (I_C = 1.0 mAdc, I_B = 0)	MRF580/581 MRF580A/581A	$V_{(BR)CEO}$	18 15	— —	— —	Vdc
Collector-Base Breakdown Voltage (I_C = 1.0 mAdc, I_E = 0)	MRF580/581 MRF580A/581A	$V_{(BR)CBO}$	36 30	— —	— —	Vdc
Emitter-Base Breakdown Voltage (I_E = 0.10 mAdc, I_C = 0)		$V_{(BR)EBO}$	2.5	—	—	Vdc
Emitter Cutoff Current (V_{EB} = 2.0 Vdc, V_{BE} = 0)		I_{EBO}	—	—	100	μAdc
Collector Cutoff Current (V_{CB} = 15 Vdc, I_E = 0)		I_{CBO}	—	—	100	μAdc
ON CHARACTERISTICS						
DC Current Gain(1) (I_C = 50 mAdc, V_{CE} = 5.0 Vdc)	MRF580/581 MRF580A/581A	h_{FE}	50 90	— —	200 250	—
DYNAMIC CHARACTERISTICS						
Collector Base Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 1.0 MHz)		C_{cb}	—	1.4	2.0	pF
Current-Gain Bandwidth Product(2) (I_C = 75 mAdc, V_{CE} = 10 Vdc, f = 1.0 GHz)		f_T	—	5.0	—	GHz
FUNCTIONAL TESTS						
Noise Figure, Figure 19 (I_C = 50 mAdc, V_{CE} = 10 Vdc, f = 0.5 GHz)	MRF580/581 MRF580A/581A	NF	— —	2.0 1.8	3.0 2.5	dB
Power Gain at Optimum Noise Figure, Figure 19 (I_C = 50 mAdc, V_{CE} = 10 Vdc, f = 0.5 GHz)	MRF580,A	G_{NF}	11	14	—	dB
Power Gain at Optimum Noise Figure, Figure 19 (I_C = 50 mAdc, V_{CE} = 10 Vdc, f = 0.5 GHz)	MRF581,A	G_{NF}	13	15.5	—	dB
Maximum Unilateral Gain (I_C = 75 mAdc, V_{CE} = 10 Vdc, f = 0.5 GHz)	MRF580,A(2)	$G_{U\ max}$	—	15	—	dB
Maximum Unilateral Gain (I_C = 75 mAdc, V_{CE} = 10 Vdc, f = 0.5 GHz)	MRF581,A(2)	$G_{U\ max}$	—	17	—	dB
Intermodulation Distortion, Figure 18 (V_{CE} = 10 V, I_C = 75 mA, V_{out} = +50 dBmV)	MRF581,A(3)	IMD(d3)	—	−65	—	dB

NOTES:
1. 300 μs pulse on Tektronix 576 or equivalent.
2. Characterized on HP8542 Automatic Network Analyzer.
3. 2 Tones, f1 = 497 MHz, f2 = 503 MHz, 3rd Order Single Tone reference.

$$G_{Umax} = \frac{|S_{21}|^2}{(1 - |S_{11}|^2)(1 - |S_{22}|^2)}$$

FIGURE 1 — C_{ib} INPUT CAPACITANCE versus VOLTAGE

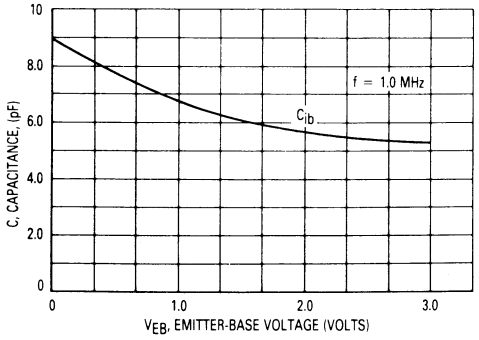


FIGURE 2 — C_{cb}, C_{ob} COLLECTOR-BASE CAPACITANCE versus VOLTAGE

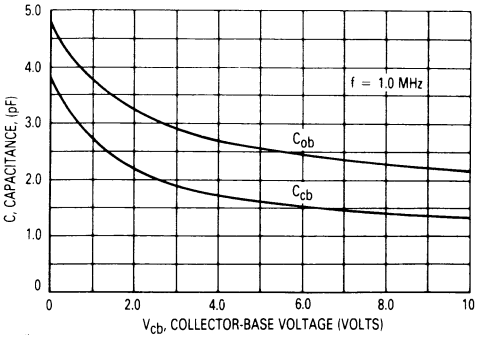


FIGURE 3 — GAIN-BANDWIDTH PRODUCT versus COLLECTOR CURRENT

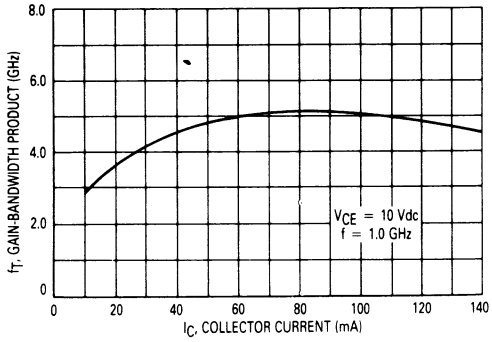
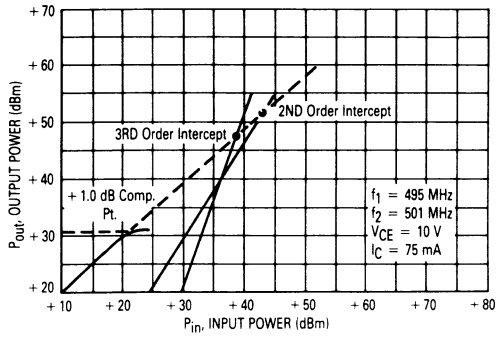


FIGURE 4 — 2ND AND 3RD ORDER INTERCEPT POINTS



MRF580,A TYPICAL PERFORMANCE

FIGURE 5 — $G_{U\ max}$-MAXIMUM UNILATERAL GAIN, $|S_{21}|^2$ versus FREQUENCY

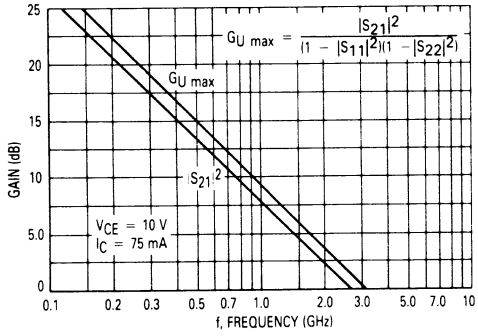


FIGURE 6 — $G_{A\ max}$, MAXIMUM AVAILABLE GAIN versus FREQUENCY

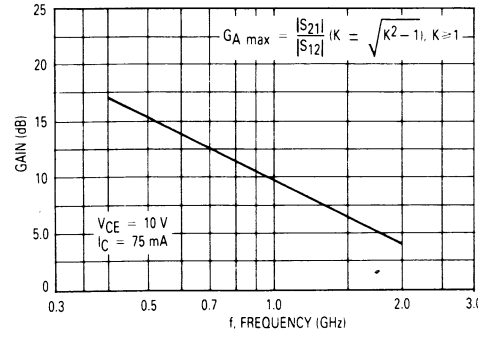


FIGURE 7 — NOISE FIGURE AND GAIN ASSOCIATED WITH NOISE FIGURE versus FREQUENCY

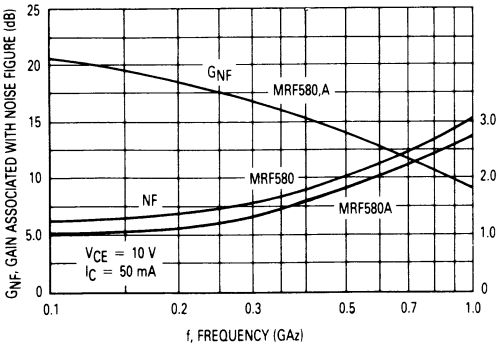


FIGURE 8 — NOISE FIGURE AND GAIN ASSOCIATED WITH NOISE FIGURE versus COLLECTOR CURRENT

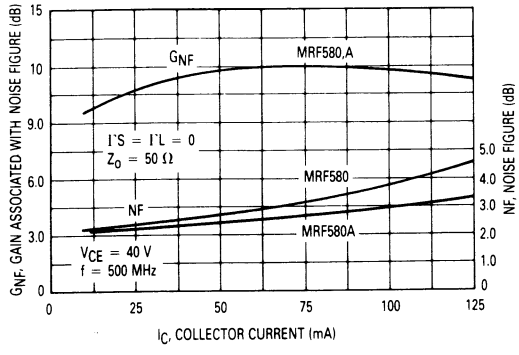
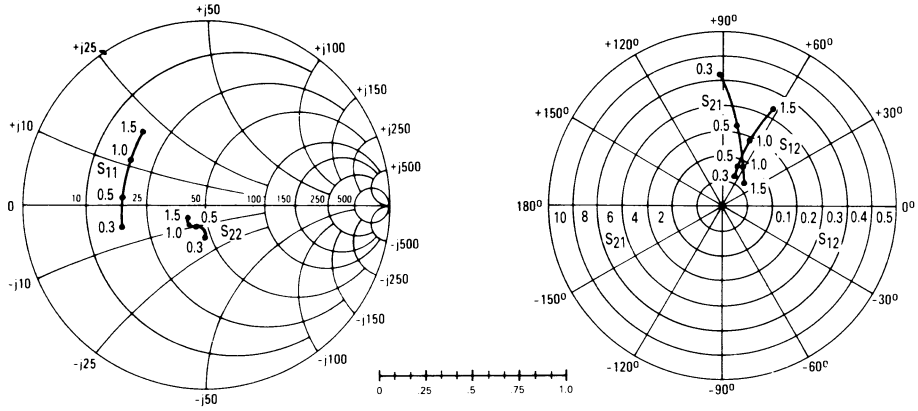


FIGURE 9 — MRF580,A COMMON EMITTER S-PARAMETERS

INPUT/OUTPUT REFLECTION COEFFICIENT versus FREQUENCY

V_{CE} = 10 V I_C = 50 mA

FORWARD/REVERSE TRANSMISSION COEFFICIENTS versus FREQUENCY



V_{CE} (Volts)	I_C (mA)	f (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
			S_{11}	$\angle\phi$	S_{21}	$\angle\phi$	S_{12}	$\angle\phi$	S_{22}	$\angle\phi$
5.0	25	300	0.49	− 170	5.97	91	0.083	60	0.24	− 108
		500	0.52	171	3.63	78	0.127	64	0.18	− 117
		1000	0.53	149	1.98	58	0.24	66	0.13	− 154
		1500	0.56	125	1.46	44	0.35	60	0.19	− 172
	50	300	0.48	− 175	6.35	90	0.08	64	0.24	− 126
		500	0.51	168	3.85	79	0.13	67	0.18	− 139
		1000	0.51	148	2.10	59	0.25	66	0.16	− 178
		1500	0.54	123	1.56	46	0.36	58	0.20	169
	75	300	0.48	− 177	6.42	90	0.08	65	0.24	− 132
		500	0.51	167	3.88	79	0.13	67	0.19	− 145
		1000	0.50	147	2.12	59	0.26	65	0.17	175
		1500	0.53	123	1.57	46	0.36	58	0.21	164
	100	300	0.48	− 177	6.41	89	0.08	66	0.24	− 134
		500	0.51	167	3.87	78	0.13	68	0.19	− 148
		1000	0.51	146	2.114	59	0.26	65	0.17	172
		1500	0.53	123	1.58	46	0.36	58	0.21	162
10	25	300	0.44	− 164	6.67	92	0.07	61	0.25	− 76
		500	0.47	175	4.08	79	0.11	66	0.19	− 75
		1000	0.48	152	2.2	60	0.21	68	0.12	− 91
		1500	0.52	126	1.56	45	0.32	64	0.15	− 129
	50	300	0.47	− 167	7.40	91	0.07	65	0.17	− 89
		500	0.47	174	4.53	79	0.11	68	0.12	− 112
		1000	0.50	149	2.38	62	0.20	67	0.13	− 126
		1500	0.53	131	1.71	47	0.31	63	0.11	− 147
	75	300	0.41	− 171	7.24	91	0.07	66	0.20	− 96
		500	0.45	171	4.39	79	0.12	69	0.13	− 99
		1000	0.45	150	2.36	61	0.23	67	0.07	− 130
		1500	0.48	125	1.72	47	0.33	61	0.12	− 157
	100	300	0.42	− 172	7.22	90	0.07	67	0.19	− 97
		500	0.45	170	4.38	78	0.12	69	0.14	− 98
		1000	0.45	149	2.35	60	0.23	67	0.07	− 129
		1500	0.49	125	1.71	46	0.33	62	0.11	− 158
15	25	300	0.48	− 159	7.28	93	0.06	60	0.24	− 55
		500	0.48	− 179	4.44	80	0.09	66	0.17	− 62
		1000	0.51	153	2.33	62	0.18	68	0.19	− 82
		1500	0.54	133	1.67	46	0.27	68	0.17	− 97
	50	300	0.39	− 165	7.49	0.92	0.07	65	0.23	− 71
		500	0.42	174	4.57	80	0.11	69	0.18	− 67
		1000	0.43	152	2.44	61	0.21	68	0.11	− 74
		1500	0.46	126	1.76	47	0.31	64	0.12	− 115
	75	300	0.39	− 167	7.57	91	0.07	66	0.21	− 74
		500	0.42	173	4.57	79	0.11	70	0.17	− 69
		1000	0.42	151	2.45	61	0.21	68	0.09	− 75
		1500	0.46	126	1.76	46	0.31	64	0.11	− 118
	100	300	0.39	− 168	7.46	90	0.07	67	0.20	− 72
		500	0.43	172	4.53	78	0.11	70	0.17	− 66
		1000	0.43	151	2.41	60	0.21	69	0.10	− 71
		1500	0.47	126	1.74	46	0.31	64	0.12	− 113

MRF581,A TYPICAL PERFORMANCE

FIGURE 10 — $G_{U\ max}$ — MAXIMUM UNILATERAL GAIN, $|S_{21}|^2$ versus FREQUENCY

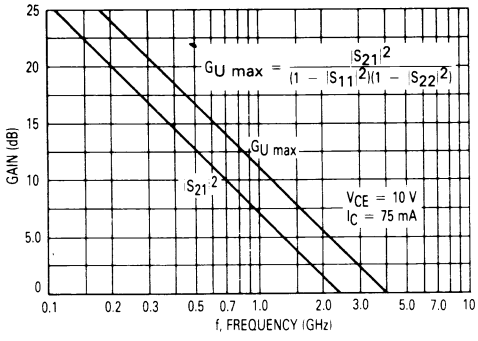


FIGURE 11 — $G_{A\ max}$, MAXIMUM AVAILABLE GAIN versus FREQUENCY

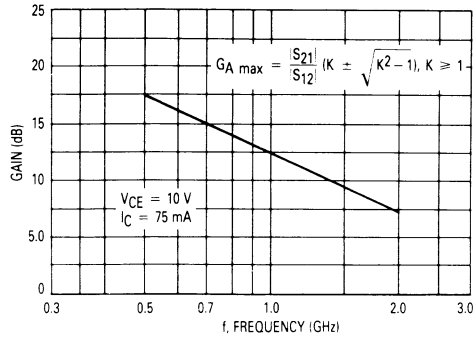


FIGURE 12 — NOISE FIGURE AND GAIN ASSOCIATED WITH NOISE FIGURE versus FREQUENCY

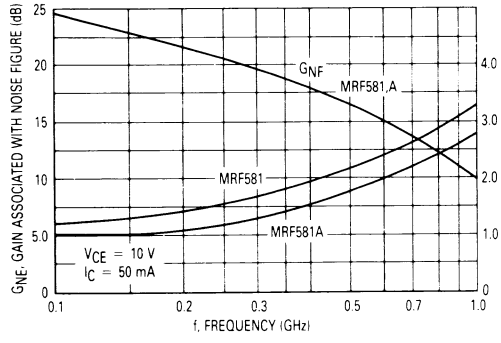


FIGURE 13 — NOISE FIGURE AND GAIN ASSOCIATED WITH NOISE FIGURE versus COLLECTOR CURRENT f = 500 MHz

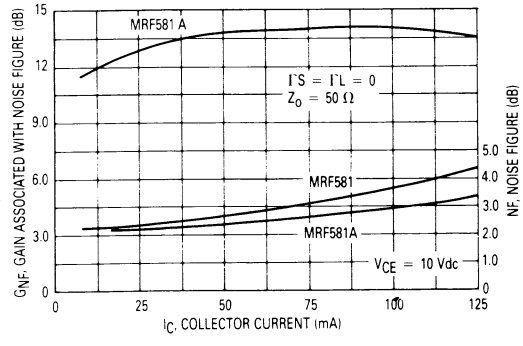


FIGURE 14 — NOISE FIGURE AND GAIN ASSOCIATED WITH NOISE FIGURE versus COLLECTOR CURRENT f = 200 MHz

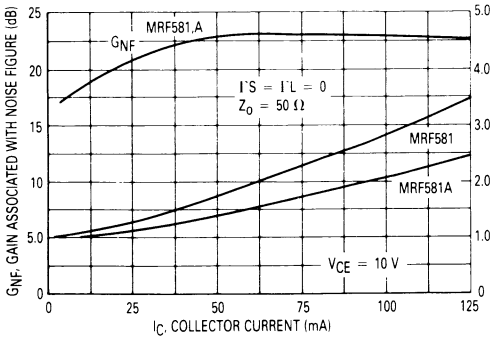
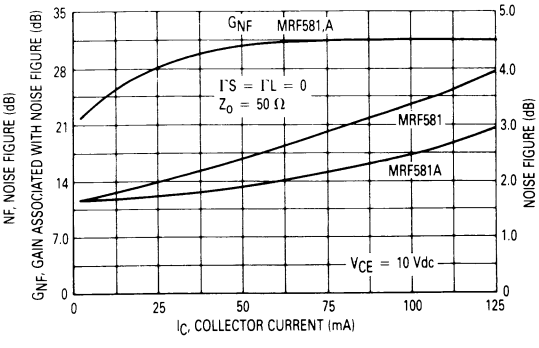


FIGURE 15 — NOISE FIGURE AND GAIN ASSOCIATED WITH NOISE FIGURE versus COLLECTOR CURRENT f = 50 MHz



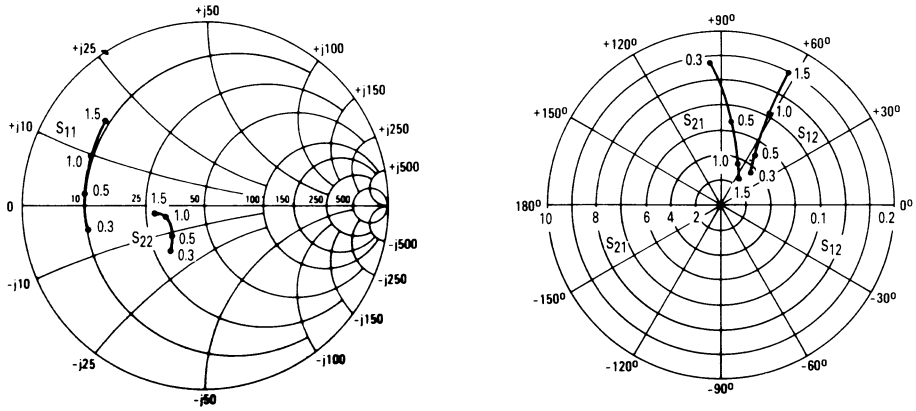
3

FIGURE 16 — MRF581,A COMMON EMITTER S-PARAMETERS

INPUT/OUTPUT REFLECTION COEFFICIENT versus FREQUENCY

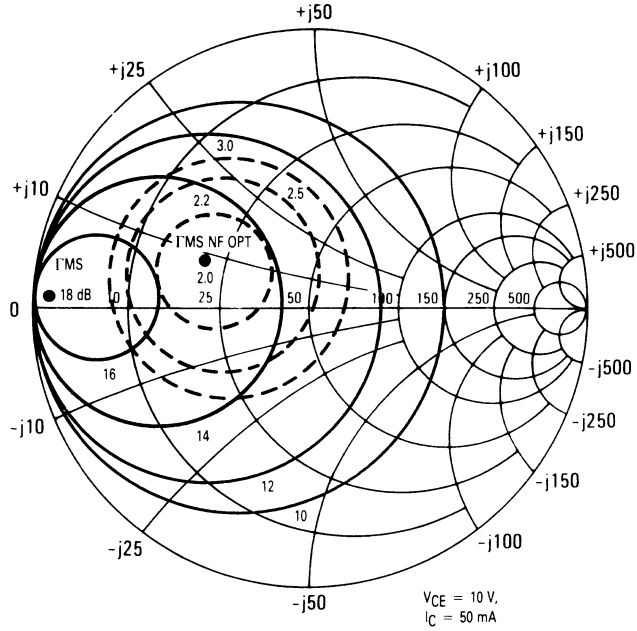
V_{CE} = 10 V, I_C = 50 mA

FORWARD/REVERSE TRANSMISSION COEFFICIENTS versus FREQUENCY



V_{CE} (Volts)	I_C (mA)	f (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
			S_{11}	$\angle\phi$	S_{21}	$\angle\phi$	S_{12}	$\angle\phi$	S_{22}	$\angle\phi$
5.0	25	300	0.69	−169	6.57	93	0.06	39	0.34	−129
		500	0.72	176	3.95	82	0.07	47	0.29	−142
		1000	0.73	157	2.10	62	0.12	60	0.27	−165
		1500	0.76	139	1.47	50	0.17	61	0.33	−172
	50	300	0.70	−173	7.14	93	0.05	45	0.38	−144
		500	0.72	173	4.27	82	0.07	53	0.34	−157
		1000	0.72	157	2.24	65	0.13	62	0.33	179
		1500	0.76	138	1.61	53	0.18	61	0.37	173
	75	300	0.70	−175	7.26	92	0.05	48	0.40	−148
		500	0.72	172	4.33	82	0.07	55	0.36	−161
		1000	0.72	155	2.28	65	0.13	63	0.35	176
		1500	0.76	138	1.64	53	0.19	61	0.39	170
	100	300	0.70	−176	7.30	92	0.05	48	0.40	−151
		500	0.72	172	4.34	82	0.07	56	0.37	−163
		1000	0.72	155	2.28	65	0.13	63	0.362	175
		1500	0.75	137	1.64	53	0.19	61	0.39	168
10	25	300	0.66	−165	7.58	95	0.05	40	0.29	−106
		500	0.69	178	4.56	82	0.07	48	0.23	−116
		1000	0.70	159	2.39	64	0.11	61	0.19	−141
		1500	0.74	141	1.65	50	0.16	64	0.26	−153
	50	300	0.65	−169	8.25	94	0.05	46	0.30	−126
		500	0.68	175	4.96	82	0.07	54	0.24	−138
		1000	0.69	157	2.60	65	0.12	63	0.22	−164
		1500	0.72	139	1.82	52	0.17	63	0.27	−171
	75	300	0.66	−171	8.49	93	0.05	48	0.30	−132
		500	0.68	175	5.06	82	0.07	55	0.25	−145
		1000	0.69	157	2.64	65	0.12	64	0.23	−170
		1500	0.72	139	1.86	53	0.17	63	0.27	−176
	100	300	0.66	−172	8.46	93	0.05	49	0.30	−134
		500	0.68	174	5.06	82	0.07	56	0.25	−147
		1000	0.68	157	2.64	65	0.12	64	0.23	−172
		1500	0.72	139	1.86	52	0.17	63	0.27	−177
15	25	300	0.65	−163	7.96	95	0.05	40	0.28	−92
		500	0.67	179	4.82	82	0.06	48	0.21	−98
		1000	0.68	160	2.51	63	0.10	62	0.17	−119
		1500	0.72	141	1.73	49	0.16	65	0.24	−137
	50	300	0.64	−167	8.76	94	0.0	46	0.26	−112
		500	0.66	177	5.37	82	0.06	54	0.20	−122
		1000	0.67	159	2.75	65	0.11	64	0.16	−148
		1500	0.71	141	1.91	51	0.16	64	0.22	−157
	75	300	0.64	−168	8.93	93	0.05	47	0.25	−117
		500	0.66	176	5.34	82	0.06	55	0.20	−128
		1000	0.69	158	2.78	65	0.11	65	0.16	−154
		1500	0.70	140	1.93	51	0.16	64	0.22	−162
	100	300	0.64	−169	8.91	93	0.05	48	0.25	−117
		500	0.66	176	5.33	82	0.6	56	0.19	−129
		1000	0.67	158	2.78	64	0.11	65	0.16	−154
		1500	0.70	140	1.93	51	0.16	64	0.21	−160

FIGURE 17 — MRF581 CONSTANT GAIN CONTOURS NOISE FIGURE CONTOURS

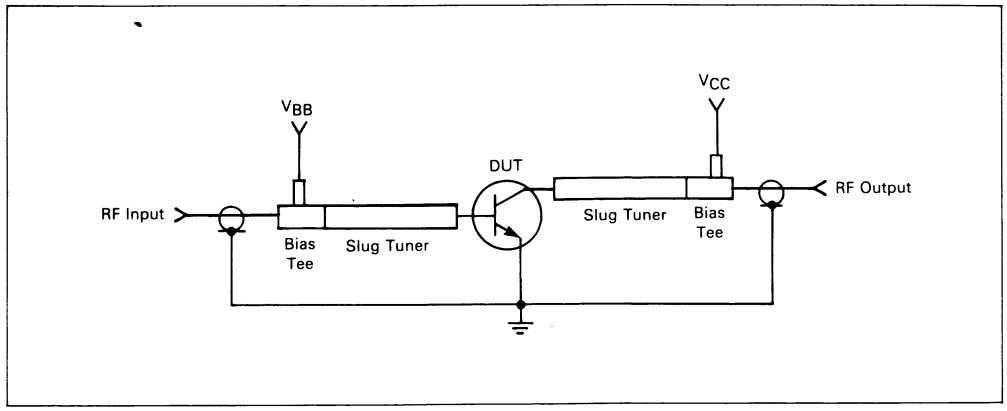


f(MHz)	ΓMS	ΓML	ΓMS NF OPT	$G_{A}MAX$ (dB)	Rn (Ω)	NF OPT	NF (50 Ω)
500	0.91/176°	0.78/77°	0.39/159°	18	10.5	2.0	2.5

Circuit Per Figure 19

3

FIGURE 18 — FUNCTIONAL CIRCUIT SCHEMATIC



3

MRF580,A/581,A TEST CIRCUIT

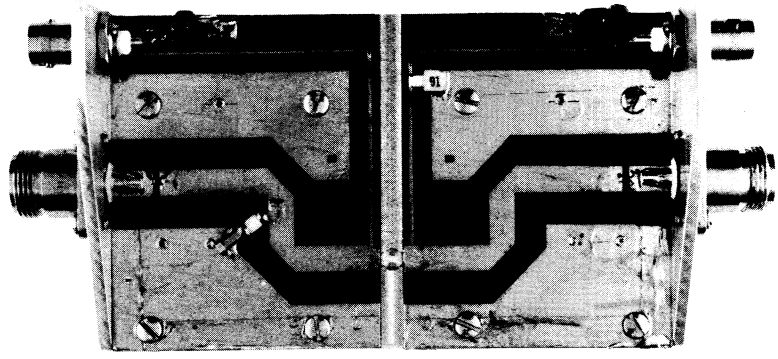
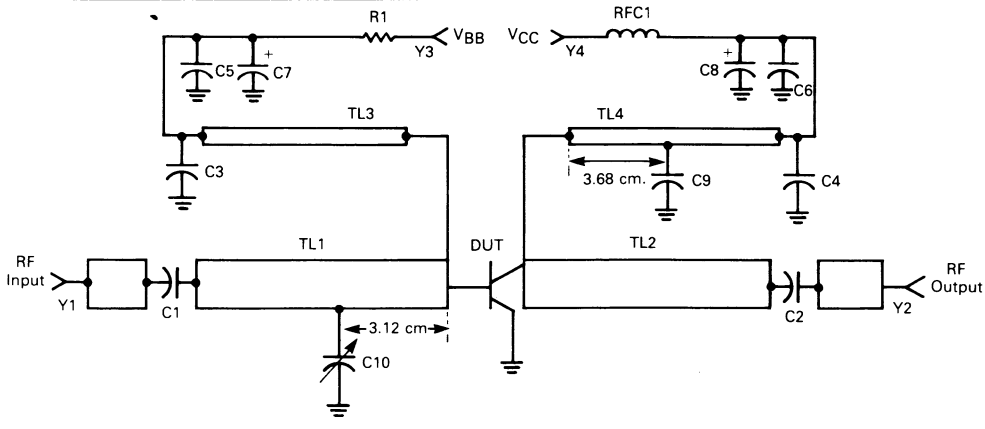


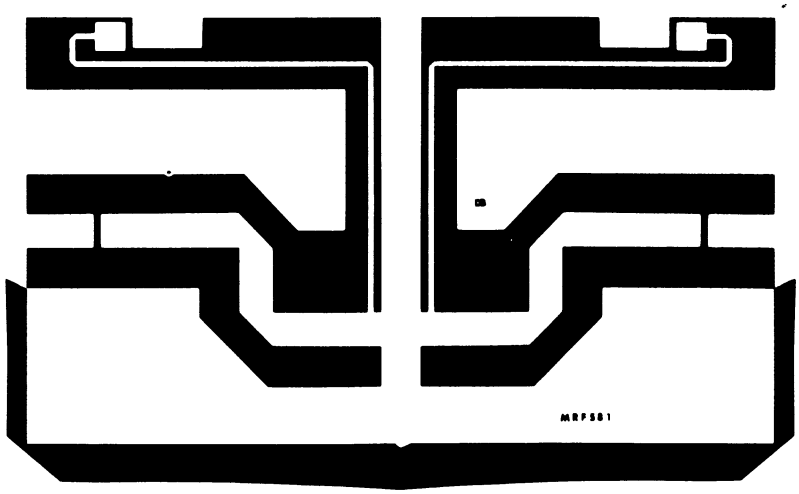
FIGURE 19 — MRF580,A/581,A TEST FIXTURE SCHEMATIC
500 MHz



C1, C2 — 470 pF Chip (Ceramic)
C3, C4 — 0.018 μF Chip Capacitor
C5, C6 — 0.1 μF Mylar
C7, C8 — 1.0 μF, 25 Vdc Electrolytic
C9 — 91 pF Mini-Unelco (C9 Taped 3.68 cm from Collector Connection on TL4 as shown)
C10 — 35–45 pF Johanson Ceramic Capacitor, JMC 5801 or Equivalent (C10 Taped 3.12 cm from Base Connection on TL1)

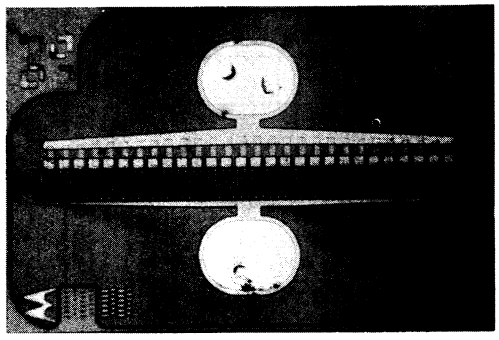
R1 — 2.7 kΩ, 1½ W
RFC1 — 0.15 μH Molded Choke
TL1, TL2 — Z_O = 26 Ω, 0.0625 TFG as shown in Photomaster
TL3, TL4 — λ/4 Microstrip, Z_0 = 100 Ω
Y1, Y2 — N-Type Connection (Female)
Y3, Y4 — BNC-Type Connector (Female)
Board Material — 0.0625" Thick Glass Teflon ϵ_r = 2.5

FIGURE 20 — PC BOARD PHOTOMASTER



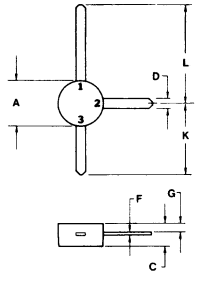
NOTE: The Printed Circuit Board shown is 75% of the original.

MRFC581,A CHIP TOPOGRAPHY



Nominal Chip Size: 0.017" X 0.027" X 0.005"
Front Metallization: Gold
Back Metallization: Gold
Emitter/Base Bond Pad: 0.003" X 0.004"
#Emitter Fingers: 56
#Base Fingers: 57
Emitter Diffusion: Ion-Implanted Arsenic
Fabrication: Fully Ion Implanted
Ballasting: NiCr Resistor
Passivation: Silicon Nitride

3-LEAD PLASTIC MACRO-T

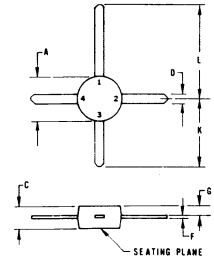


STYLE 2:
PIN 1. COLLECTOR
2. EMITTER
3. BASE

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	4.44	5.21	0.175	0.205
C	1.90	2.54	0.075	0.100
D	0.94	0.99	0.033	0.039
F	0.20	0.30	0.008	0.012
G	0.76	1.14	0.030	0.045
K	7.24	8.13	0.285	0.320
L	10.54	11.43	0.415	0.450

CASE 317A-01

4-LEAD PLASTIC MACRO-X



STYLE 2:
PIN 1. COLLECTOR
2. EMITTER
3. BASE
4. EMITTER

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	4.44	5.21	0.175	0.205
C	1.90	2.54	0.075	0.100
D	0.84	0.99	0.033	0.039
F	0.20	0.30	0.008	0.012
G	0.76	1.14	0.030	0.045
K	7.24	8.13	0.285	0.320
L	10.54	11.43	0.415	0.450

CASE 317-01

MRF586
MRF587

Designer's Data Sheet

The RF Line

NPN SILICON HIGH FREQUENCY TRANSISTORS

. . . designed for use in high-gain, low-noise, ultra-linear, tuned and wideband amplifiers. Ideal for use in CATV, MATV, and instrumentation applications.

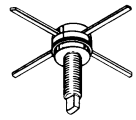
- Low Noise Figure —
  NF = 3.0 dB (Typ) @ f = 500 MHz, I_C = 90 mA
- High Power Gain —
  $G_{U(max)}$ = 16.5 dB (Typ) @ f = 500 MHz
- Ion Implanted
- All Gold Metal System
- High f_T–4.5 GHz MRF586
  5.5 GHz MRF587
- Low Intermodulation Distortion:
  TB_3 = -70 dB
  DIN = 125 dB μV

NF = 3.0 dB @ 0.5 GHz

HIGH FREQUENCY TRANSISTORS

NPN SILICON

3

MAXIMUM RATINGS		MRF586  Case 79-02	MRF587  Case 244A-01	
Ratings	**Symbol**	**Values**		**Unit**
Collector-Emitter Voltage	V_{CEO}	17	17	Vdc
Collector-Base Voltage	V_{CBO}	34	34	Vdc
Emitter-Base Voltage	V_{EBO}	2.5	2.5	Vdc
Collector Current — Continuous	I_C	200	200	mAdc
Total Device Dissipation @ T_C = 50°C Derate above T_C = 50°C	P_D	2.5 17	5.0 33	Watts mW/°C
Storage Temperature Range	T_{stg}	-65 to +200	-65 to +150	°C
Junction Temperature	T_J	200	200	°C

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (I_C = 5.0 mAdc, I_B = 0)		$V_{(BR)CEO}$	17	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 1.0 mAdc, I_E = 0)		$V_{(BR)CBO}$	34	—	—	Vdc
Emitter-Base Breakdown Voltage (I_C = 0, I_E = 0.1 mAdc)		$V_{(BR)EBO}$	2.5	—	—	Vdc
Collector Cutoff Current (V_{CB} = 10 Vdc, I_E = 0)		I_{CBO}	—	—	50	μAdc
ON CHARACTERISTICS						
DC Current Gain (1) (I_C = 50 mAdc, V_{CE} = 5.0 Vdc)		h_{FE}	50	—	200	—
DYNAMIC CHARACTERISTICS						
Current-Gain — Bandwidth Product (2) (I_C = 90 mAdc, V_{CE} = 15 Vdc, f = 0.5 GHz)	MRF586 MRF587	f_T	— —	4.5 5.5	— —	GHz
Collector-Base Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 1.0 MHz)		C_{cb}	—	1.7	2.2	pF
FUNCTIONAL TESTS						
Narrow Band — Figure 23 (I_C = 90 mA, V_{CC} = 15 V, f = 0.5 GHz)						dB
Noise Figure		NF	—	3.0	4.0	
Power Gain at Optimum Noise Figure	MRF586 MRF587	G_{NF}	9.0 11.0	11.0 13.0	— —	
Broad Band — Figures 24 and 25 (I_C = 90 mA, V_{CC} = 15 V, f = 0.3 GHz)						dB
Noise Figure	MRF586 MRF587	NF	— —	5.5 6.3	— —	
Power Gain at Optimum Noise Figure	MRF586 MRF587	G_{NF}	— —	10.0 11.0	— —	
Triple Beat Distortion (I_C = 50 mA, V_{CC} = 15 V, P_{Ref} = 50 dBmV) (I_C = 90 mA, V_{CC} = 15 V, P_{Ref} = 50 dBmV)	MRF586 MRF587	TB_3	— —	-65 -70	— —	dB
DIN 45004 (I_C = 90 mA, V_{CC} = 15 V) (I_C = 90 mA, V_{CC} = 15 V)	MRF586 MRF587	DIN	— —	120 125	— —	dBμV
Maximum Available Power Gain (3) (I_C = 90 mA, V_{CE} = 15 Vdc, f = 0.5 GHz)	MRF586 MRF587	G_{Umax}	— —	14.5 16.5	— —	dB

NOTES:
1. 300 μs pulse on Tektronix 576 or equivalent.
2. Characterized on HP8542 Automatic Network Analyzer.
3. $G_{Umax} = \frac{|S_{21}|^2}{(1-|S_{11}|^2)(1-|S_{22}|^2)}$

FIGURE 1 — TYPICAL NOISE FIGURE AND ASSOCIATED GAIN versus FREQUENCY

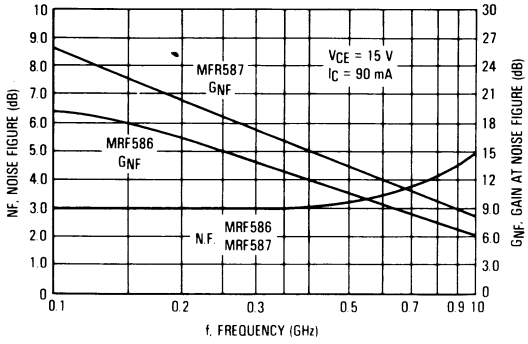


FIGURE 2 — NOISE FIGURE versus COLLECTOR CURRENT

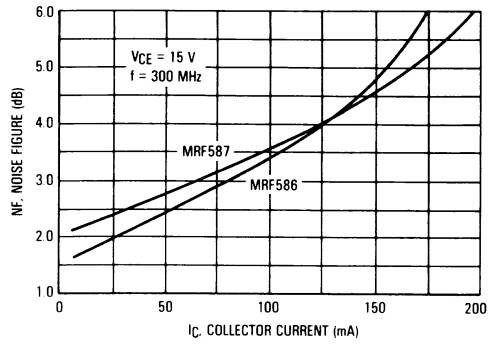


FIGURE 3 — G_{Umax} versus COLLECTOR CURRENT

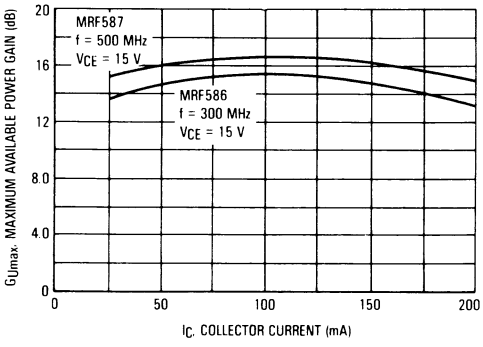
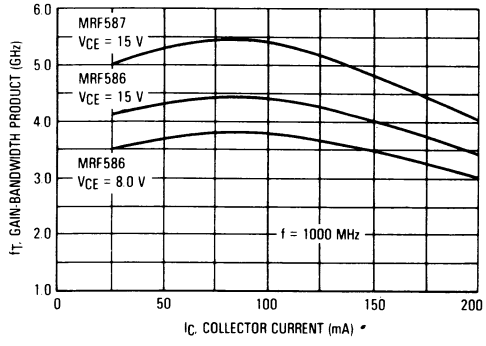


FIGURE 4 — GAIN-BANDWIDTH PRODUCT versus COLLECTOR CURRENT



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MRF586 TYPICAL PERFORMANCE

FIGURE 5 — BROADBAND NOISE FIGURE MRF586

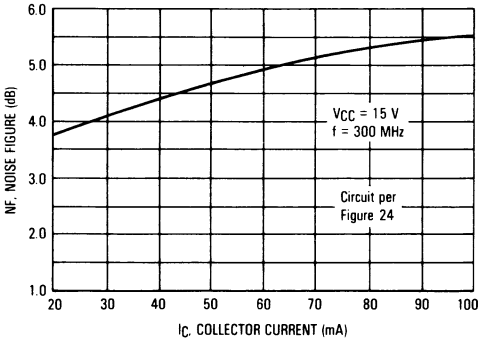
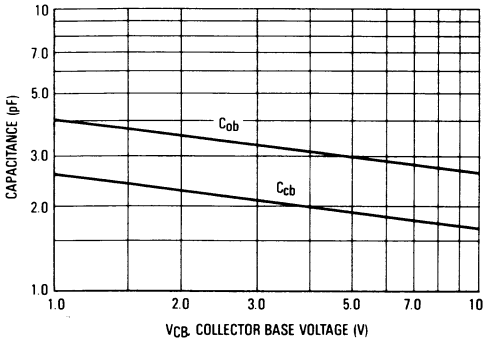


FIGURE 6 — JUNCTION CAPACITANCE versus VOLTAGE MRF586



MRF586 TYPICAL PERFORMANCE (continued)

FIGURE 7 — 1.0 dB COMPRESSION POINT versus COLLECTOR CURRENT
MRF586

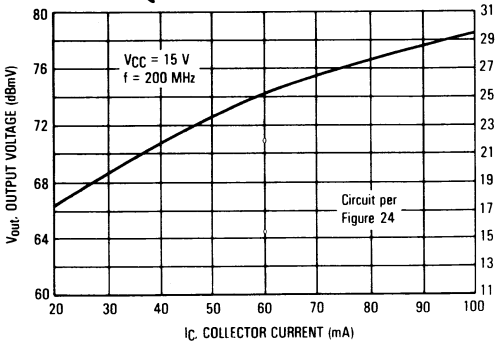


FIGURE 8 — THIRD ORDER INTERCEPT POINT
MRF586

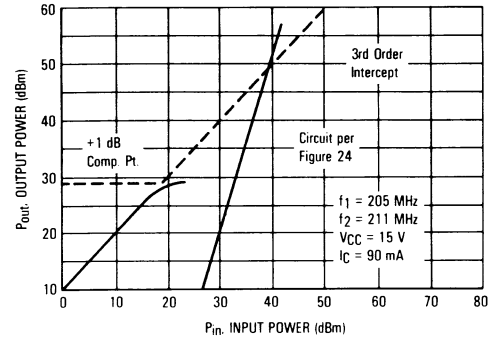


FIGURE 9 — SECOND ORDER DISTORTION versus COLLECTOR CURRENT
MRF586

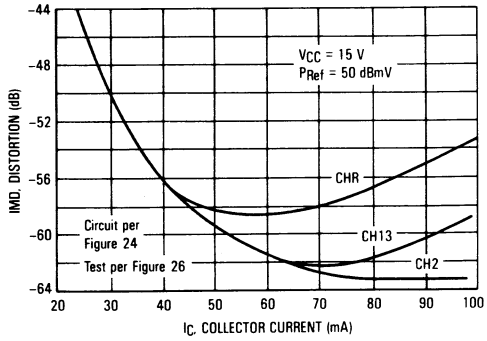


FIGURE 10 — TRIPLE BEAT DISTORTION versus COLLECTOR CURRENT
MRF586

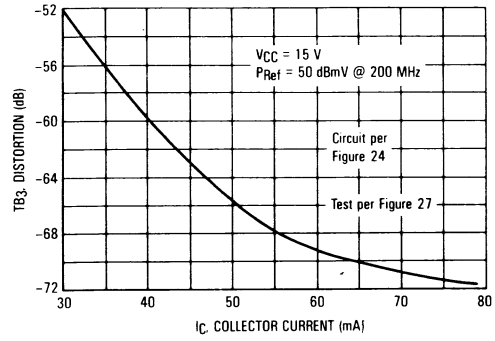


FIGURE 11 — 35-CHANNEL X-MODULATION DISTORTION versus COLLECTOR CURRENT
MRF586

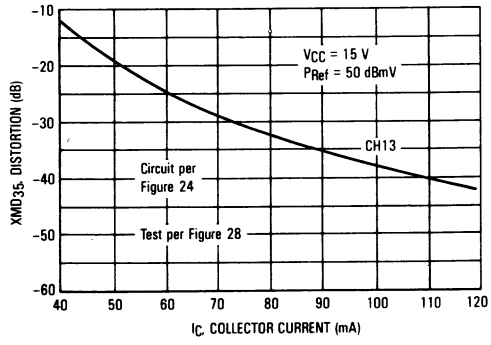


FIGURE 12 — DIN45004B versus COLLECTOR CURRENT
MRF586

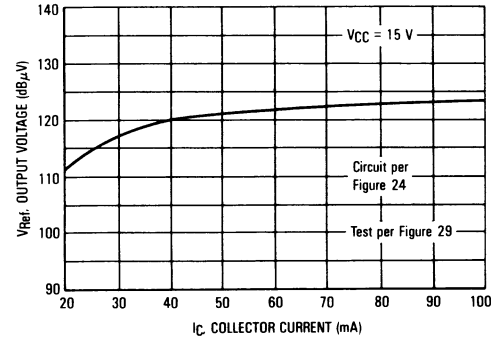
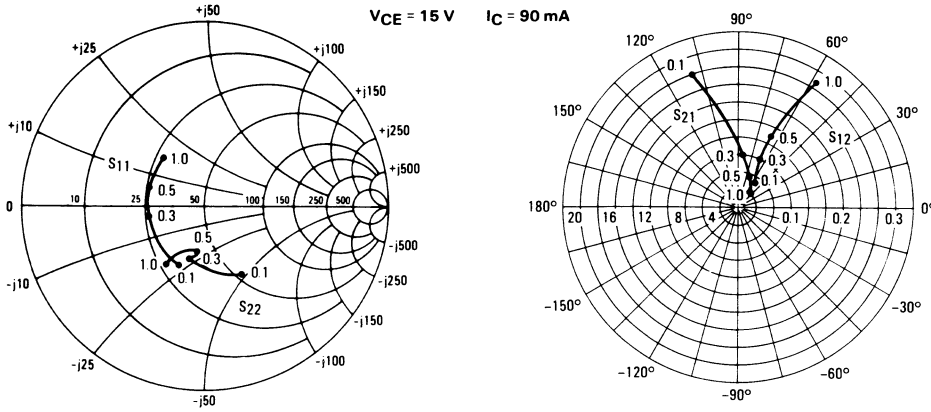


FIGURE 13 — MRF586 COMMON-EMITTER S-PARAMETERS

INPUT/OUTPUT REFLECTION COEFFICIENT versus FREQUENCY (GHz)

FORWARD/REVERSE TRANSMISSION COEFFICIENTS versus FREQUENCY (GHz)



V_{CE} (Volts)	I_C (mA)	f (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
			$\|S_{11}\|$	$\angle\phi$	$\|S_{21}\|$	$\angle\phi$	$\|S_{12}\|$	$\angle\phi$	$\|S_{22}\|$	$\angle\phi$
5.0	30	100	0.42	-122	13.45	109	0.05	54	0.45	-74
		300	0.39	-175	5.10	84	0.09	58	0.30	-105
		500	0.41	162	3.11	71	0.16	60	0.32	-125
		1000	0.42	131	1.68	47	0.28	56	0.38	-138
	60	100	0.39	-131	14.35	106	0.05	56	0.41	-84
		300	0.37	180	5.27	83	0.11	62	0.28	-130
		500	0.39	158	3.22	72	0.17	62	0.32	-134
		1000	0.39	127	1.75	49	0.29	55	0.36	-144
	90	100	0.39	-134	14.45	106	0.05	56	0.42	-87
		300	0.38	176	5.27	82	0.11	60	0.33	-132
		500	0.39	155	3.19	70	0.16	59	0.37	-136
		1000	0.36	120	1.70	43	0.28	49	0.45	-143
10	30	100	0.41	-112	14.40	111	0.05	55	0.48	-63
		300	0.35	-170	5.51	85	0.10	60	0.28	-100
		500	0.37	164	3.35	72	0.15	61	0.32	-109
		1000	0.38	132	1.79	47	0.26	58	0.40	-125
	60	100	0.37	-119	15.35	109	0.05	58	0.43	-70
		300	0.33	-174	5.76	84	0.10	62	0.26	-103
		500	0.35	160	3.50	73	0.16	62	0.31	-117
		1000	0.36	128	1.88	49	0.27	57	0.37	-130
	90	100	0.36	-123	15.68	107	0.05	57	0.44	-77
		300	0.33	180	5.78	83	0.10	61	0.32	-117
		500	0.34	154	3.44	70	0.15	59	0.39	-122
		1000	0.31	118	1.84	43	0.25	51	0.49	-133
15	30	100	0.42	-107	14.72	111	0.05	55	0.49	-58
		300	0.33	-167	5.64	85	0.09	60	0.28	-92
		500	0.35	166	3.48	73	0.14	61	0.32	-102
		1000	0.37	133	1.82	47	0.25	59	0.40	-119
	60	100	0.37	-112	15.80	109	0.05	57	0.45	-64
		300	0.31	-171	5.90	85	0.10	63	0.26	-100
		500	0.33	162	3.60	73	0.15	63	0.30	-108
		1000	0.35	130	1.92	49	0.27	58	0.38	-124
	90	100	0.37	-114	16.04	109	0.05	56	0.45	-67
		300	0.31	-173	5.96	84	0.10	61	0.30	-108
		500	0.32	155	3.56	70	0.15	61	0.35	-114
		1000	0.33	120	1.84	45	0.25	55	0.44	-127

MRF587 TYPICAL PERFORMANCE

FIGURE 14 — BROADBAND NOISE FIGURE
MRF587

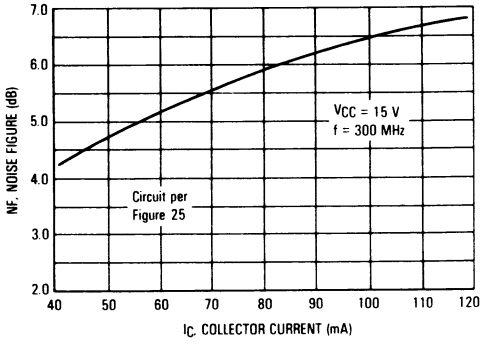


FIGURE 15 — JUNCTION CAPACITANCE versus VOLTAGE
MRF587

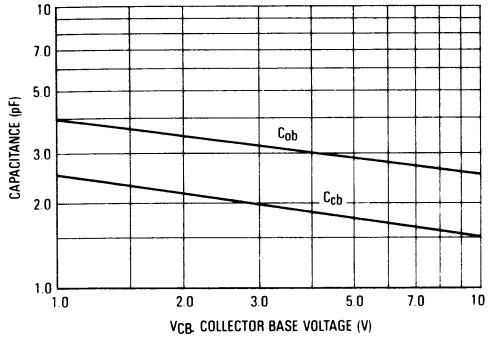


FIGURE 16 — 1.0 dB COMPRESSION POINT versus COLLECTOR CURRENT
MRF587

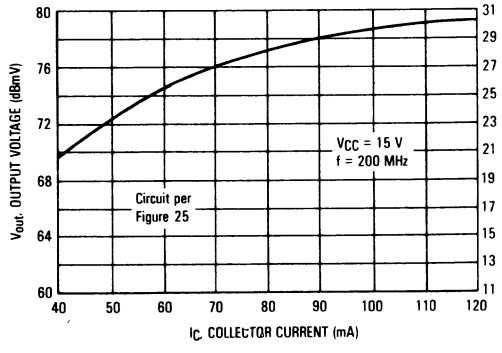
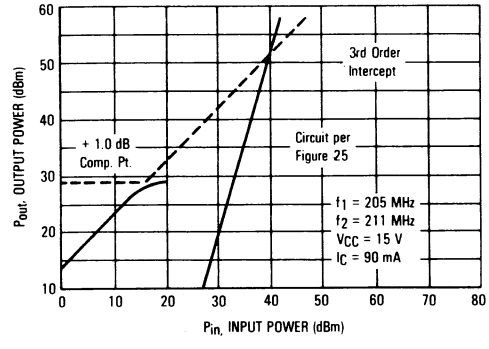


FIGURE 17 — THIRD ORDER INTERCEPT POINT
MRF587



MRF587 TYPICAL PERFORMANCE (continued)

FIGURE 18 — SECOND ORDER DISTORTION versus COLLECTOR CURRENT MRF587

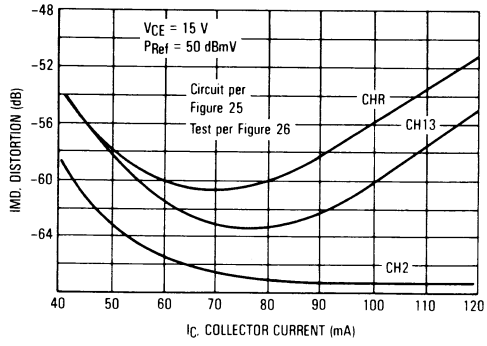


FIGURE 19 — TRIPLE BEAT DISTORTION versus COLLECTOR CURRENT MRF587

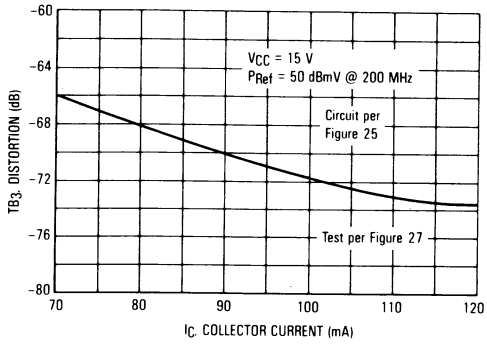


FIGURE 20 — 35-CHANNEL X-MODULATION DISTORTION versus COLLECTOR CURRENT MRF587

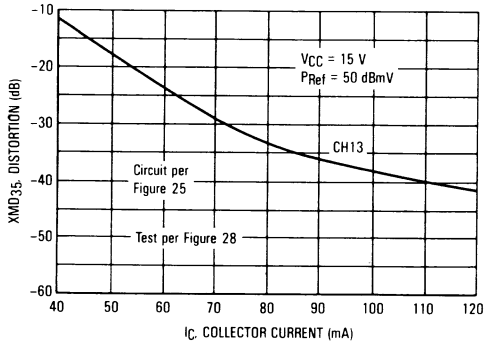


FIGURE 21 — DIN 45004B versus COLLECTOR CURRENT MRF587

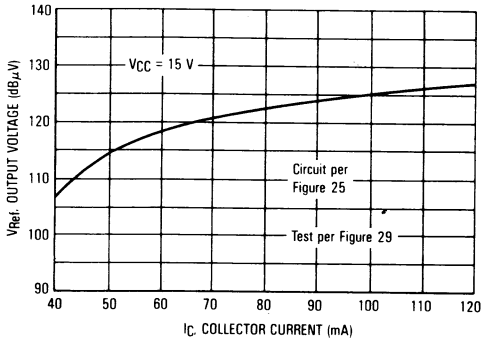


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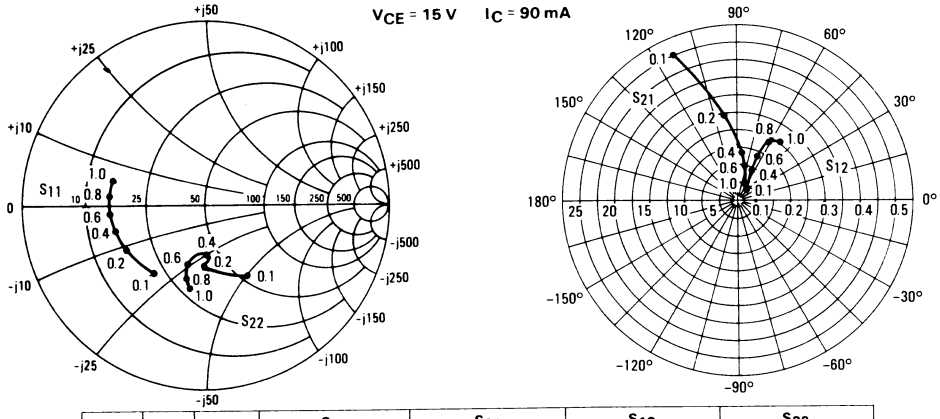
FIGURE 22 — MRF587 COMMON-EMITTER S-PARAMETERS

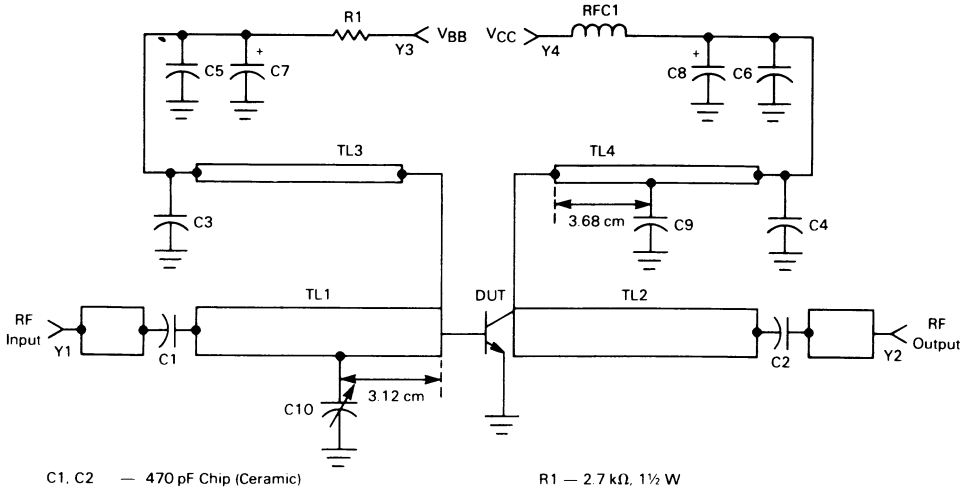
INPUT/OUTPUT REFLECTION COEFFICIENT versus FREQUENCY (GHz)

FORWARD/REVERSE TRANSMISSION COEFFICIENTS versus FREQUENCY (GHz)



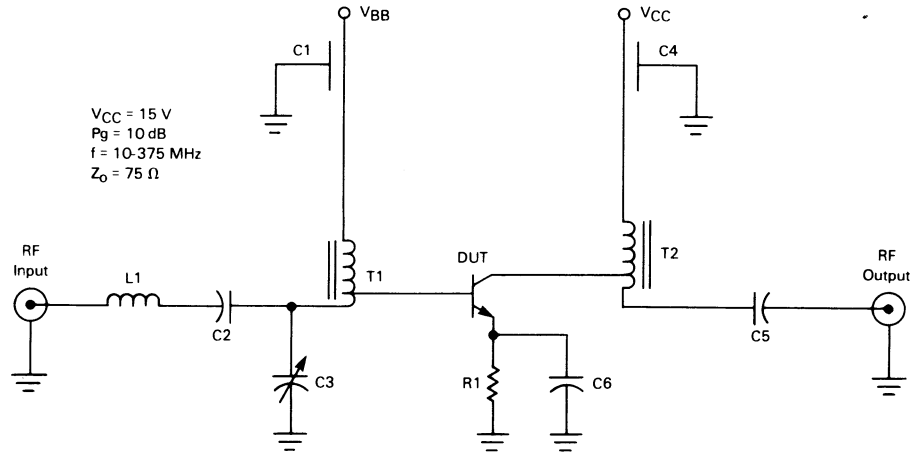
V_{CE} (Volts)	I_C (mA)	Freq (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
			$\|S_{11}\|$	$\angle\phi$	$\|S_{21}\|$	$\angle\phi$	$\|S_{12}\|$	$\angle\phi$	$\|S_{22}\|$	$\angle\phi$
5.0	30	100	0.56	-131	16.45	113	0.04	45	0.49	-91
		200	0.58	-159	9.42	98	0.06	49	0.38	-116
		400	0.60	-178	5.00	86	0.08	55	0.35	-132
		600	0.64	170	3.61	76	0.11	56	0.38	-138
		800	0.67	162	2.92	67	0.14	55	0.41	-144
		1000	0.70	155	2.55	58	0.17	54	0.44	-152
	60	100	0.53	-141	17.89	110	0.04	50	0.47	-102
		200	0.56	-164	10.05	97	0.05	55	0.39	-126
		400	0.59	178	5.31	85	0.09	60	0.38	-141
		600	0.63	169	3.82	76	0.12	59	0.40	-146
		800	0.66	161	3.09	67	0.15	57	0.44	-153
		1000	0.69	155	2.67	58	0.18	55	0.47	-160
	90	100	0.52	-145	18.26	109	0.04	52	0.47	-106
		200	0.56	-166	10.20	96	0.05	57	0.39	-130
		400	0.59	177	5.38	85	0.09	62	0.39	-144
		600	0.63	168	3.86	76	0.12	60	0.41	-149
		800	0.66	161	3.12	67	0.15	58	0.45	-155
		1000	0.69	155	2.70	58	0.19	55	0.48	-162
10	30	100	0.53	-122	18.36	115	0.04	48	0.50	-75
		200	0.53	-153	10.63	100	0.05	51	0.36	-96
		400	0.55	175	5.71	87	0.08	57	0.33	-112
		600	0.59	173	4.16	78	0.10	58	0.35	-119
		800	0.62	165	3.37	68	0.13	57	0.39	-127
		1000	0.65	158	2.95	59	0.15	55	0.42	-136
	60	100	0.49	-132	20.19	112	0.03	51	0.46	-85
		200	0.51	-158	11.54	99	0.05	57	0.35	-107
		400	0.53	-178	6.12	87	0.08	61	0.33	-123
		600	0.58	171	4.43	78	0.11	60	0.36	-129
		800	0.60	164	3.58	68	0.14	59	0.40	-136
		1000	0.63	157	3.12	60	0.16	57	0.44	-144
	90	100	0.48	-135	20.82	111	0.03	53	0.45	-88
		200	0.50	-160	11.77	98	0.05	59	0.34	-111
		400	0.53	-179	6.22	86	0.08	63	0.33	-126
		600	0.57	171	4.50	78	0.11	62	0.36	-131
		800	0.60	164	3.64	68	0.14	59	0.41	-139
		1000	0.63	157	3.18	60	0.17	57	0.44	-147
15	30	100	0.49	-112	20.34	118	0.04	54	0.51	-52
		200	0.52	-145	11.51	101	0.05	56	0.36	-77
		400	0.48	-164	6.12	87	0.09	63	0.32	-74
		600	0.52	-174	4.19	75	0.12	62	0.32	-90
		800	0.53	177	3.29	68	0.16	61	0.38	-90
		1000	0.53	168	2.76	61	0.20	56	0.47	-90
	60	100	0.45	-122	22.14	115	0.03	56	0.45	-60
		200	0.49	-150	12.24	99	0.05	60	0.33	-86
		400	0.45	-166	6.45	86	0.09	65	0.30	-83
		600	0.50	-175	4.42	75	0.13	63	0.32	-99
		800	0.51	177	3.47	68	0.16	61	0.38	-98
		1000	0.51	168	2.91	62	0.20	55	0.46	-96
	90	100	0.44	-127	22.76	114	0.03	58	0.43	-62
		200	0.48	-152	12.44	98	0.05	62	0.32	-89
		400	0.44	-167	6.55	85	0.09	66	0.29	-85
		600	0.50	-176	4.47	75	0.13	64	0.32	-102
		800	0.51	176	3.51	69	0.17	61	0.38	-100
		1000	0.51	168	2.95	62	0.20	55	0.46	-98

FIGURE 23 — MRF586/587 NARROW BAND TEST FIXTURE SCHEMATIC
500 MHz



C1, C2 — 470 pF Chip (Ceramic)
C3, C4 — 0.018 μF Chip Capacitor
C5, C6 — 0.1 μF Mylar
C7, C8 — 1.0 μF, 25 Vdc Electrolytic
C9 — 91 pF Mini-Unelco (C9 Taped 3.68 cm from Collector Connection on TL4 as shown)
C10 — 35-45 pF Johanson Ceramı Capacitor, JMC 5801 or Equivalent (C10 Taped 3.12 cm from Base Connection on TL1)
R1 — 2.7 kΩ, 1½ W
RFC1 — 0.15 μH Molded Choke
TL1, TL2 — Z_o = 26 Ω, 0.0625 TFG as shown in Photomaster
TL3, TL4 — λ/4 Microstrip, Z_o = 100 Ω
Y1, Y2 — N-Type Connection (Female)
Y3, Y4 — BNC-Type Connector (Female)
Board Material — 0.0625" Thick Glass Teflon ϵ_r = 2.5

FIGURE 24 — MRF586 BROADBAND TEST CIRCUIT SCHEMATIC



C1, C4 — 0.01 μF Feedthru
C2, C5 — 0.001 μF
C3 — 0.5-10 pF
C6 — 12 pF
L1 — 1 Turn ⅛" I.D. #20 AWG
R1 — 13 Ω ½ W
T1(1) — 12 Turns Tapped at 4 Turns #30 AWG
T2(1) — 10 Turns Tapped at 2 Turns #30 AWG

(1) Ferronics 12-340-k Core

3

FIGURE 25 — MRF587 BROADBAND TEST CIRCUIT SCHEMATIC

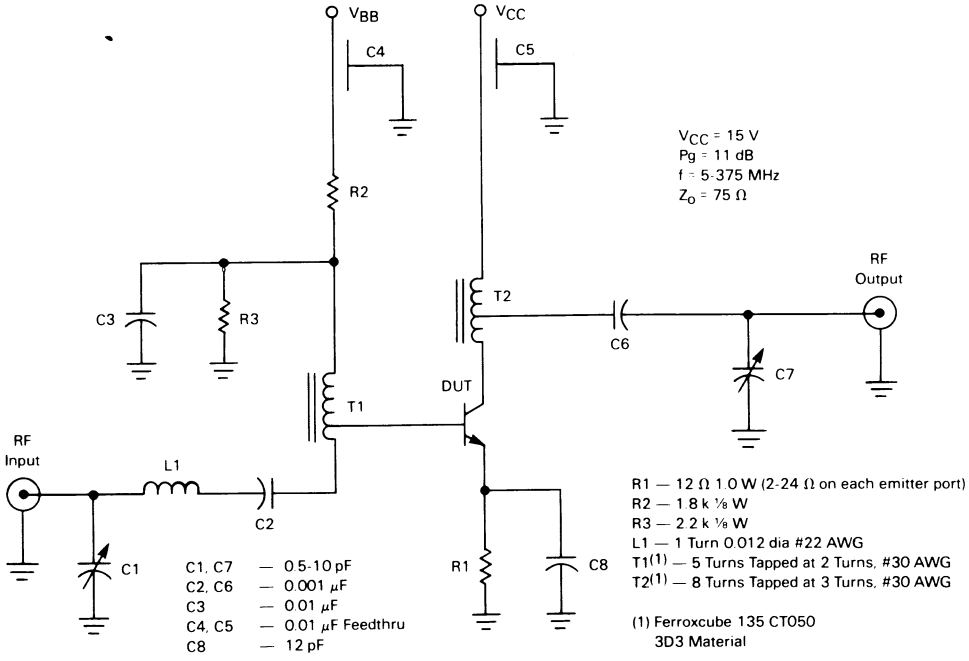


FIGURE 26 — SECOND ORDER DISTORTION TEST

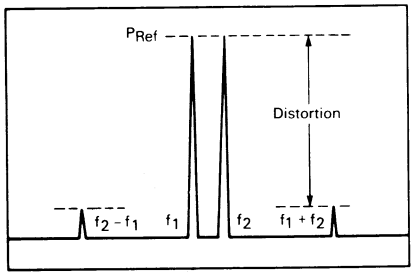


FIGURE 27 — TRIPLE BEAT DISTORTION TEST

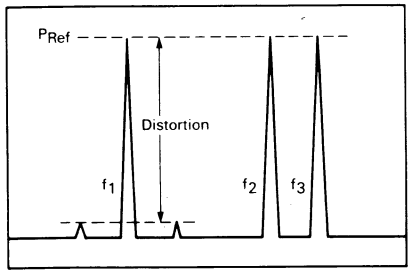


FIGURE 28 — CROSSMODULATION DISTORTION TEST

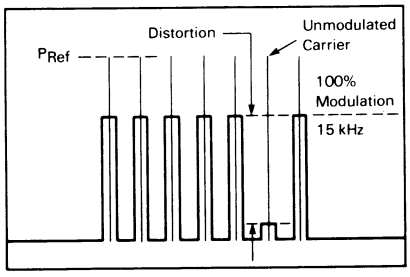
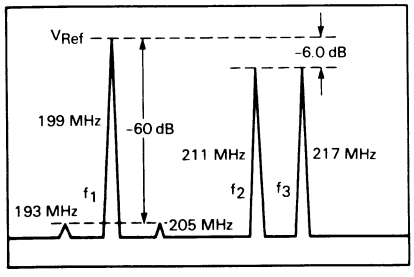
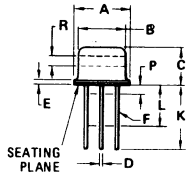
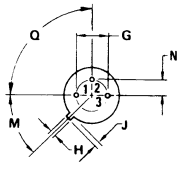


FIGURE 29 — DIN 45004B INTERMODULATION TEST



OUTLINE DIMENSIONS



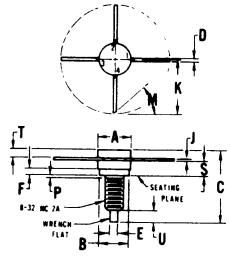


STYLE 1:
PIN 1. EMITTER
2. BASE
3. COLLECTOR

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	8.89	9.40	0.350	0.370
B	8.00	8.51	0.315	0.335
C	6.10	6.60	0.240	0.260
D	0.406	0.533	0.016	0.021
E	0.229	3.18	0.009	0.125
F	0.406	0.483	0.016	0.019
G	4.83	5.33	0.190	0.210
H	0.711	0.864	0.028	0.034
J	0.737	1.02	0.029	0.040
K	12.70	–	0.500	–
L	6.35	–	0.250	–
M	45° NOM		45° NOM	
P	–	1.27	–	0.050
Q	90° NOM		90° NOM	
R	2.54	–	0.100	–

All JEDEC dimensions and notes apply.

CASE 79-02



STYLE 1:
PIN 1. EMITTER
2. BASE
3. EMITTER
4. COLLECTOR

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	7.06	7.26	0.278	0.286
B	6.20	6.50	0.244	0.256
C	15.24	16.51	0.600	0.650
D	0.66	0.86	0.026	0.034
E	1.40	1.65	0.055	0.065
F	1.52	–	0.060	–
J	0.10	0.15	0.004	0.006
K	11.17	–	0.440	–
M	45° NOM		45° NOM	
P	–	1.27	–	0.050
S	2.74	3.35	0.108	0.132
T	1.40	1.78	0.055	0.070
U	2.92	3.68	0.115	0.145

CASE 244A-01

3