BAB IV

KESIMPULAN

6.1 Kesimpulan

Dari hasil perancangan dan pengukuran maka dapat disimpulkan :

1. Dari percobaan pemancar sinyal FM, ternyata pada penerima di dapatkan hasil yang baik. Ini menunjukan bahwa penguat daya untuk FM broadcast cukup dikerjakan pada penguat kelas C, karena sinyal RF FM tidak membawa informasi dalam bentuk perubahan amplitudo sehingga tidak memerlukan penguat dengan linieritas yang besar.

2. Hasil pengukuran penguat daya yang dibuat tidak sama dengan yang direncanakan, diantaranya daya output hanya didapat 11 Watt dari 30 Watt yang direncanakan pada masukan 50 mWatt. Bandwidth penguat yang didapat lebih kecil 0,5 MHz dari 4 MHz yang direncanakan.

3. Respon perubahan daya output dari penguat terhadap perubahan frekuensi, sangat curam. Hal ini disebabkan karena tiap tingkat penguat (tiap rangkaian tuning) ditala pada frekuensi tengah yang sama (synchoronous tuned) seperti yang direncanakan.

4. Efisiensi total sistem didapat adalah 48,7 % dari 65 % yang direncanakan. Hal ini menyangkut keadaan mismatch yang terjadi serta kemampuan transistor itu sendiri dalam mengubah daya dc menjadi daya RF.

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4. Smith, Jack, Modern Communication Circuit, Mc. Graw Hill, Singapore, 1986.
5. Taub & Schilling, Principles of Communication System, Mc. Graw Hill, Tokyo, 1982

LAMPIRAN

LAMPIRAN I : DATA TRANSISTOR 1

形 名	メーカー	用 途	構 造	最大定格 (Ta = 25℃)					電気的特性 (Ta = 25℃)													外形	備 考
				V_{CBO} (V)	V_{EBO} (V)	I_C (mA)	P_C (mW)	T_j (℃)	I_{CBO} (μA)	V_{CB} (V)	h_{FE}	V_{CE} (V)	I_C (mA)	V_{CE} (V)	I_E (mA)	h_{fe}*	h_{ie}* (Ω)	h_{re}*	h_{oe} (μU)	f_T (MHz)	C_{ob} (pF)	$r_{bb'}C_c$* (ps)		
2SC2052																								
〃 2053	[illegible]		Si.EP	30	6					15	50	44	44			[illegible]							212	
〃 2054																								
〃 2055	[illegible]	RF	Si.EP	18	4	300	300	125	30	10	50	7	50			[illegible]							212	
〃 2056			〃	18	4	600	900	175	100	10	20	7	300			[illegible]							64B	[illegible]
〃 2057	[illegible]	RF, LN	Si.TP	30	3	20	250	125	1	25	40~200	6	2	6	-2					300*	[illegible]	[illegible]	13C	
〃 2058	[illegible]	RF Conv Osc	Si.EP	44	5	50	250	125	0.5	24	35~270	6	1	6	-1					300*	1.6		136	
〃 2059	〃	RF Conv Osc Fmc	〃	35	6	30	150	125	0.5	20	30~100	3	1	3	-1					300	1.4		225	
〃 2060	〃	AF	〃	44	5	700	750	125	0.5	30	82~390	3	100	5	50					150*	30		334	[illegible]
〃 2061	〃	〃	〃	60	5	700	750	125	0.5	50	82~390	3	100	30	30					120*	10		334	
〃 2062	〃	〃	〃	60	12	300	300	125	0.1	30	>1000	3	100	5	-10					300*	15		138	[illegible]
〃 2063	〃	RF Conv Osc	〃	30	5	50	750	125	0.5	24	35~270	6	1	3	-1					300*	1.0		225	
〃 2064																								
〃 2065	[illegible]	PA	Si.E	35	3	250	6 W Tc=25℃	200	30	30	100	10	80	10	30	[illegible]				1200*	2		179	
〃 2066	〃	〃	〃	35	1	450	7 W Tc=25℃	200	30	18	15~200	7	100	7	-100					2000*	<35		179	
〃 2067	[illegible]	AF RF	Si.EP	35	5	1 A	500	150	0.5	25	150	1	300	10	-30					150*	<25	<50*	130	
〃 2068	[illegible]	PA	Si.T	300	3	50	1.5 W	150	1	240	30~200	90	20	20	-20					95*	<4	10	176	
〃 2069	[illegible]	Sw	Si.EP	30	1	300	350	175	0.5	30	80	1	10			[illegible]							49C	
〃 2070	〃	〃	〃	40	5	300	300	175	0.1	20	50	1	20			[illegible]							49C	
〃 2071	〃	AF RF	〃	250	5	50	1 W	150	1	300	150	5	10	5	-10					100*	2	70*	221	
〃 2072	[illegible]	IF	[illegible]	50	4	100	150	85	0.2	25	90	3	1			[illegible]					2	[illegible]	130	
〃 2073	[illegible]	RF PA	Si.T	150	5	1.5A	[illegible]	150	10	120	75	30	500	10	-500					4*	35	25	204	
〃 2074																								
〃 2075	[illegible]	PA	Si.E	80	4	4 A	10 W Tc=25℃	150	10	30	>25	5	500	5	-500	[illegible]				100*	60		204	
〃 2076	[illegible]	RF	Si.EP	35	4	30	200	125	1	30	150	64	1	10	2					150*	2.5		130	
〃 2077																								
〃 2078	[illegible]	RF PA	Si.EP	80	5	3 A	10 W Tc=25℃	150	10	60	25~	5	200	30	100	[illegible]				150*	45		204	
〃 2079	〃	〃	〃	100	5	700	1 W	125	1	30	60~200	5	50	10	30					100*	10		64	
〃 2080	[illegible]	Sw	〃	60	5	1 A	1 W	150	0.5	80	30	1	300			[illegible]					8		221	
〃 2081	[illegible]	RF PA	Si.E	30	1	750	10 W Tc=25℃	175	250	30	100	10	300	10	-300	[illegible]				1200*	[illegible]		179	

形名	社名	用途	構造	最大定格 (Ta = 25°C)					電気的特性 (Ta = 25°C)														外形	備考
				VCBO (V)	VEBO (V)	IC (mA)	PC (mW)	Tj (°C)	ICBO最大値 (μA)	VCB(V)	直流又はパルスhFE	VCE(V)	IC(mA)	バイアス VCE(V)	IE(mA)	hfe hfe*	hie hie* (Ω)	hre hre* (×10⁻⁴)	hoe hoe* (μ℧)	fαb/fT* (MHz)	Cob (pF)	rbb' (Ω)	図	
2SC1931	富士通	Osc	Si.EP	16	3	30	150/min	175	0.1	10	20 hFE1/hFE2=1.0~1.2		10	6	-20	ΔVBE<3mV, ΔVBE<4mV/°C (3V, 3mA)				6000*	0.65	30*	303	
〃 1932	〃	〃	〃	16	3	30	200/min	175	0.1	10	20 hFE1/hFE2=1.0~1.2		10	6	-30	ΔVBE<3mV, ΔVBE<4mV/°C (3V, 3mA)				6000*	0.65	30*	304A	
〃 1933	〃	〃	〃	15	3	60	200/min	175	0.1	10	20 hFE1/hFE2=1.0~1.2		10	6	-20	ΔVBE<3mV, ΔVBE<4mV/°C (6V, 3mA)				6000*	0.65	30*	303	
〃 1934	〃	〃	〃	20	3	80	300/min	175	0.1	10	20 hFE1/hFE2=1.0~1.2		20	6	-30	ΔVBE<3mV, ΔVBE<4mV/°C (6V, 3mA)				6000*	0.8	30*	305	
〃 1935	〃	RF	〃	15	3	30	250	175	0.1	10	60	9	10	6	-20					6000*	0.8	25*	304	
〃 1936	〃	Osc	〃	15	3	30	200/min	175	0.1	10	20 hFE1/hFE2=1.0~1.2		10	6	-30	ΔVBE<3mV, ΔVBE<4mV/°C (6V, 3mA)				6000*	0.6	30*	303	
〃 1937	〃	RF	〃	15	3	70	200	175	0.1	10	30	6	30	6	-40		—			6000*	0.7	20*	304	
〃 1938	〃	Osc	〃	15	3	30	200/min	175	0.1	10	20 hFE1/hFE2=1.0~1.2		10	6	-20	ΔVBE<3mV, ΔVBE<4mV/°C (6V, 3mA)				6000*	0.8	30*	304B	
〃 1939	〃	〃	〃	15	3	30	200/min	175	0.1	10	20 hFE1/hFE2=1.0~1.2		10	6	-20	ΔVBE<3mV, ΔVBE<4mV/°C (6V, 3mA)				6000*	0.6	30*	304A	
〃 1940	日 電	PA	Si.E	120	5	50	1 W	150	0.2	120	200	10	10	10	-10					120*	2.3		275	2SA[illegible] コンプリ
〃 1941	〃	〃	〃	100	5	50	1 W	150	0.1	100	200	10	10	10	-10					120*	2.3		275	2SA[illegible] コンプリ
〃 1942	日 立	SW	Si.T	1500	6	3 A	50W (Tc=25°C)	150	10	800	*			5	-200	tf<1μS				5*	30	15	304	[illegible]
〃 1943	三 菱	PA	Si.EP	25	4	400	2 W (Tc=25°C)	175	100	15	30	10	100			Po=0.4W (f=175MHz, VCC=13.5V, Pi=30mW)							126	
〃 1944	〃	〃	〃	40	5	4 A	20W (Tc=25°C)	150	100	20	30	10	100			Po=15W (VCC=12V, f=27MHz, Pi=1W)							301B	
〃 1945	〃	〃	〃	60	5	6 A	30W (Tc=25°C)	150	100	20	30	10	100			Po=15W, η=70% (f=27MHz, VCC=12V, Pi=0.5W)							304A	
〃 1946	〃	〃	〃	35	4	7 A	50W (Tc=25°C)	175	2mA	25	30	10				Po=35W, η=70% (f=175MHz, VCC=13.5V, Pi=8W)							272	
〃 1947	〃	〃	〃	25	4	1 A	10W (Tc=25°C)	175	500	25	30	10	200			Po=4W, η=60% (f=175MHz, VCC=13.5V, Pi=0.5W)							04B	[illegible]
〃 1948	沖 電	RF.LN	Si.E	15	3	30	150	200	1	6	80	6	100	6	-10	Gpe=9.5dB (6V, 10mA, 4GHz)				6000*	Cre 0.3		120	
〃 1949	〃	〃	〃	30	3	130	500	200	0.1	20	100	5	30	5	-30	|S21e|²=9.5dB (5V, 10mA, 1GHz)				700*	Cre 1		306	
〃 1950	〃	RF.PA	〃	20	3	300	5 W (Tc=25°C)	200	0.5	25	40	6	100	6	-100	|S21e|²=6dB (f=1GHz, VCE=6V, IC=100mA)				6000*	Cre 1.5	25*	311	
〃 1951	ソニー	IF	〃	120	5	100	750	150	0.2	100	150	5	30	10	-30	Gpe=30dB (f=100MHz)					2.4	Cc·rbb' [illegible]	220	2SA[illegible] コンプリ
〃 1952	日 電	RF.LN	〃	45	3	300	600	200	0.1	30	80	10	10	15	-30	Gpe=15dB (15V, 30mA, 200MHz)				2000*	2		04B	
〃 1953	松 下	AF.PA	Si.EP	150	5	100	1 W	150	1	100	60~450	5	10	10	-10					>70*	<3		222	2SA[illegible] コンプリ
〃 1954	富士通	RF	〃	25	3	150	450	150	1	25	100	10	25	10	-25					1500*	2	25*	130	
〃 1955	東 芝	PA	〃	35	3.5	800	7.5W (Tc=25°C)	175	1mA	15	>10	5	500			Po=3.5W (f=175MHz, VCC=12.5V, Pi=0.15W)					<15		04B	
〃 1956	〃	〃	〃	35	3.5	3.5A	25W (Tc=25°C)	175	1mA	15	10	5	1 A			Po=17W (f=175MHz, VCC=12.5V, Pi=1.5W)							123	
〃 1957	日 電	〃	Si.E	75	4	1 A	750	150	1	40	80	10	300	10	-150	Po=1.5W, η>55% (VCC=12V, f=27MHz, Pi=8mW)				250*	14	14	225	
〃 1958				〃																				
〃 1959	東 芝	AF.SW	Si.E	35	5	500	500	150	0.1	25	70~300	1	100	6	-10					300*	7		131	2SA[illegible] コンプリ
〃 1960	富士通	SW	Si.EP	30	4	300	[illegible]	150	0.4	15	40	1	10			ton=4nS, toff=8nS							275	

2N3375 (SILICON)
2N3553
2N3632
2N3961

*CASE 79
(TO-39)

2N3553

**CASE 24
(TO-102)

2N3961

***CASE 36
(TO-60)

2N3375
2N3632

*Collector connected to case

**Emitter connected to case and stud

***Collector isolated from case and stud electrically

NPN silicon RF Power transistors, optimized for large-signal power amplifier and driver applications to 400MHz, provide wide choice of power levels and guaranteed safe operating areas.

MAXIMUM RATINGS

Rating	Symbol	2N3375	2N3553	2N3632	2N3961	Unit
Collector-Emitter Voltage	V_{CEO}	← 40 →				Vdc
Collector-Base Voltage	V_{CB}	← 65 →				Vdc
Emitter-Base Voltage	V_{EB}	← 4.0 →				Vdc
Collector Current	I_C	1.5	1.0	3.0	1.0	Adc
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	11.6 66.4	7.0 40	23 131	10 57.2	Watts mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	← -65 to +200 →				°C

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

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector-Emitter Sustaining Voltage* (I_C = 200 mAdc, I_B = 0) 2N3375, 2N3553, 2N3632 (I_C = 400 mAdc, I_B = 0) 2N3961	$BV_{CEO(sus)}$*	40 40	- -	Vdc
Emitter-Base Breakdown Voltage (I_E = 0.25 mAdc, I_C = 0) 2N3632 (I_E = 0.1 mAdc, I_C = 0) 2N3375, 2N3553 (I_E = 1.0 mAdc, I_C = 0) 2N3961	BV_{EBO}	4.0 4.0 4.0	- - -	Vdc
Collector Cutoff Current (V_{CE} = 30 Vdc, I_B = 0) 2N3375, 2N3553 2N3632	I_{CEO}	- -	0.1 0.25	mAdc
Collector Cutoff Current (V_{CE} = 30 Vdc, $V_{BE(off)}$ = 1.5 Vdc, T_C = 200°C) 2N3375, 2N3553 2N3632 (V_{CE} = 65 Vdc, $V_{BE(off)}$ = 1.5 Vdc) 2N3375, 2N3553 2N3632	I_{CEX}	- - - -	5.0 10 1.0 5.0	mAdc
Collector Cutoff Current (V_{CB} = 28 Vdc, I_E = 0, T_A = 150°C) 2N3961 (V_{CB} = 65 Vdc, I_E = 0) 2N3632 2N3961	I_{CBO}	- - -	5.0 0.5 1.0	mAdc
Emitter Cutoff Current (V_{BE} = 4.0 Vdc, I_C = 0) 2N3375, 2N3553 2N3632	I_{EBO}	- -	0.1 0.25	mAdc

* Pulsed thru 25mH inductor (See Figures 5 and 6).

2N3375, 2N3553, 2N3632, 2N3961 (continued)

ELECTRICAL CHARACTERISTICS (continued)

Characteristic		Symbol	Min	Typ	Max	Unit
ON CHARACTERISTICS						
DC Current Gain (I_C = 250 mAdc, V_{CE} = 5.0 Vdc) (I_C = 1.0 Adc, V_{CE} = 5.0 Vdc)	 2N3375, 2N3553, 2N3632 2N3632	h_{FE}	 10 5.0	 - -	 - -	-
Collector-Emitter Saturation Voltage (I_C = 250 mAdc, I_B = 50 mAdc) (I_C = 500 mAdc, I_B = 100 mAdc)	 2N3553 2N3375, 2N3632	$V_{CE(sat)}$	 - -	 - -	 1.0 1.0	Vdc
Base-Emitter Saturation Voltage (I_C = 1.0 Adc, I_B = 5.0 Adc)	 2N3632	$V_{BE(sat)}$	-	-	1.5	Vdc
DYNAMIC CHARACTERISTICS						
Current-Gain—Bandwidth Product (I_C = 100 mAdc, V_{CE} = 28 Vdc, f = 100 MHz) (I_C = 150 mAdc, V_{CE} = 28 Vdc, f = 100 MHz)	 2N3553, 2N3961 2N3375 2N3632	f_T	 - - -	 500 500 400	 - - -	MHz
Output Capacitance (V_{CB} = 28 Vdc, I_E = 0, f = 100 kHz) (V_{CB} = 30 Vdc, I_E = 0, f = 100 kHz)	 2N3961 2N3375, 2N3553 2N3632	C_{ob}	 - - -	 8.0 8.0 16	 10 10 20	pF

FUNCTIONAL TESTS

2N3375

Characteristic	Test Conditions	Symbol	Min	Typ	Max	Unit
Power Input	Test Circuit Figure 7 (V_{CE} = 28 Vdc, P_{out} = 7.5 Watts, f = 100 MHz)	P_{in}	-	-	1.0	Watt
Common-Emitter Amplifier Power Gain		G_{pe}	8.75	-	-	dB
Collector Efficiency		η	65	-	-	%
Power Input	Test Circuit Figure 8 (V_{CE} = 28 Vdc, P_{out} = 3.0 Watts, f = 400 MHz)	P_{in}	-	-	1.0	Watt
Common-Emitter Amplifier Power Gain		G_{pe}	4.77	-	-	dB
Collector Efficiency		η	40	-	-	%

2N3553

Characteristic	Test Conditions	Symbol	Min	Typ	Max	Unit
Power Input	Test Circuit Figure 9 (V_{CE} = 28 Vdc, P_{out} = 2.5 Watts, f = 175 MHz)	P_{in}	-	-	0.25	Watt
Common-Emitter Amplifier Power Gain		G_{pe}	10	-	-	dB
Collector Efficiency		η	50	-	-	%

2N3632

Characteristic	Test Conditions	Symbol	Min	Typ	Max	Unit
Power Input	Test Circuit Figure 10 (V_{CE} = 28 Vdc, P_{out} = 13.5 Watts, f = 175 MHz)	P_{in}	-	-	3.5	Watts
Common-Emitter Amplifier Power Gain		G_{pe}	5.86	-	-	dB
Collector Efficiency		η	70	-	-	%

2N3961

Characteristic	Test Conditions	Symbol	Min	Typ	Max	Unit
Power Input	Test Circuit Figure 11 (V_{CE} = 8.5 Vdc, P_{out} = 2.0 Watts, R_S = 50 ohms, R_L = 5.0 ohms, f = 135 MHz)	P_{in}	-	-	0.5	Watt
Common-Emitter Amplifier Power Gain		G_{pe}	6.0	-	-	dB
Collector Efficiency		η	60	-	-	%
Power Input	Test Circuit Figure 12 (V_{CE} = 28 Vdc, P_{out} = 4.0 Watts, R_S = 50 ohms, R_L = 50 ohms, f = 175 MHz)	P_{in}	-	-	0.5	Watt
Common-Emitter Amplifier Power Gain		G_{pe}	9.0	-	-	dB
Collector Efficiency		η	60	-	-	%

2N3375, 2N3553, 2N3632, 2N3961 (continued)

POWER OUTPUT versus FREQUENCY

COMMON EMITTER — V_{CE} = 28 Vdc, T_C = 25°C

FIGURE 1 – 2N3375

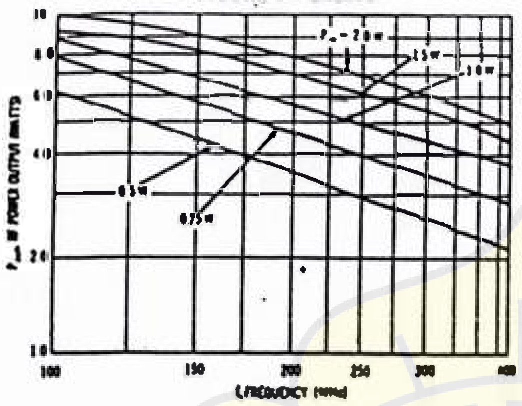


FIGURE 2 – 2N3553

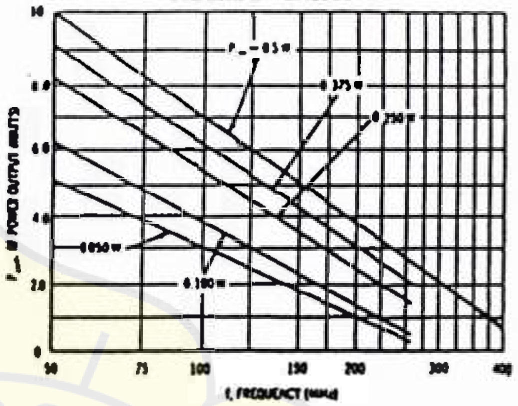


FIGURE 3 – 2N3632

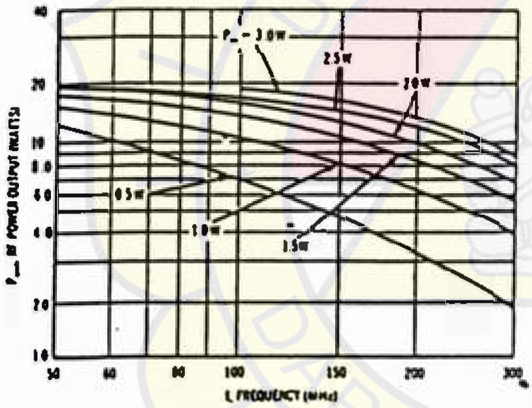
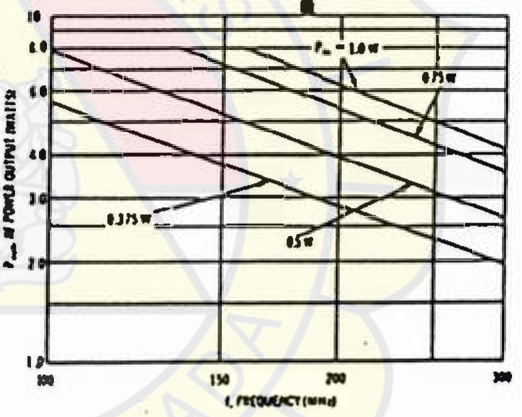


FIGURE 4 – 2N3961



$BV_{CEO(sus)}$ PULSE TEST CIRCUITS

FIGURE 5 – 2N3375, 2N3553, 2N3632

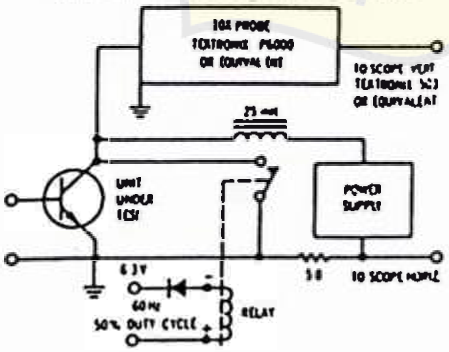
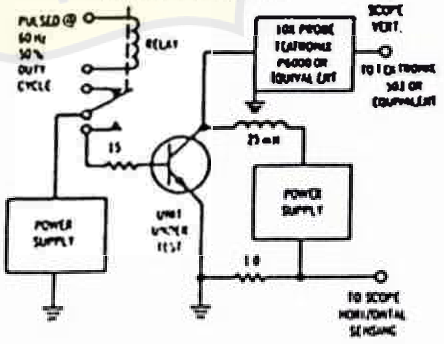


FIGURE 6 – 2N3961

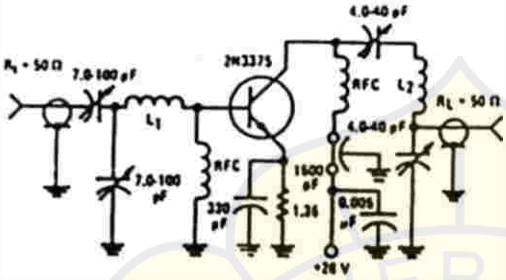


2N3375, 2N3553, 2N3632, 2N3961 (continued)

TEST CIRCUITS

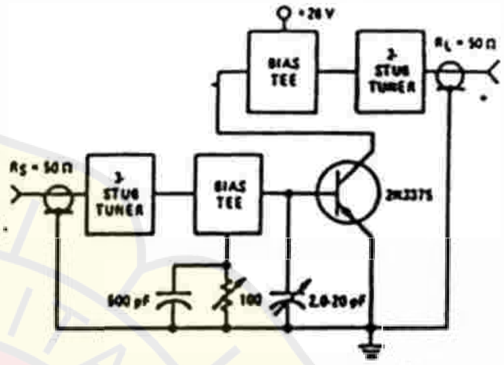
2N3375

FIGURE 7 – 100 MHz



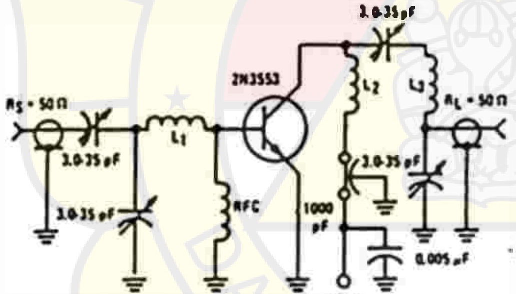
L1: 3 turns No. 16 AWG wire ¼" I.D., 5/16" long
L2: 5 turns No. 16 AWG wire 5/16" I.D., 7/16" long

FIGURE 8 – 400 MHz



2N3553

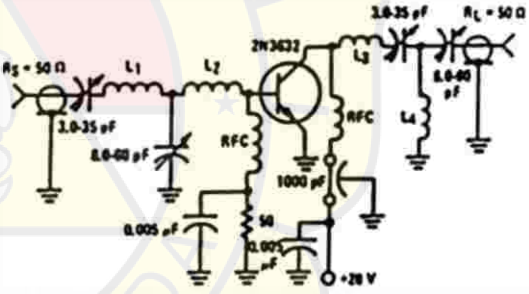
FIGURE 9 – 175 MHz



L1: 2 turns No. 16 AWG wire 3/16" I.D., ¼" long
L2: 2 turns No. 16 AWG wire 3/16" I.D., ¼" long
L3: 3 turns No. 16 AWG wire 3/8" I.D., 3/8" long

2N3632

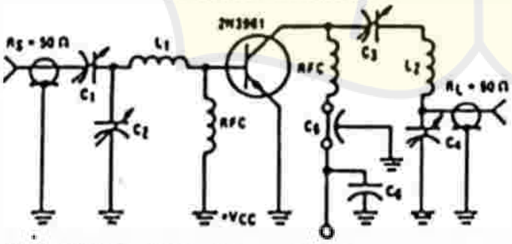
FIGURE 10 – 175 MHz



L1, L3: 4 turns No. 18 AWG wire ¼" I.D., 3/16" long
L2: 1 turn No. 16 AWG wire ¼" I.D., 3/16" long
L4: 2 ½ turns No. 16 AWG wire ¼" I.D., ¼" long

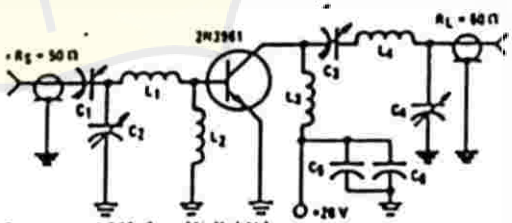
2N3961

FIGURE 11 – 135 MHz



C1, C3 = 5.0-50 pF (Air Variable)
C2 = 8.0-100 pF (Air Variable)
C4 = 4.0-30 pF (Air Variable)
C5 = 1000 pF (Disc Ceramic)
C6 = 0.02 µF (Disc Ceramic)
L1 = [illegible] turns No. 16 AWG wire, 5/16" I.D., 5/16" long
L2 = 5 turns No. 16 AWG wire, 7/16" I.D., 5/8" long

FIGURE 12 – 175 MHz



C1 ———— 1.0-12 pF (Air Variable)
C2 ———— 1.0-30 pF (Air Variable)
C3 ———— 5.0-50 pF (Air Variable)
C4 ———— 7.0-75 pF (Air Variable)
C5 ———— 470 pF (Disc Ceramic)
C6 ———— 0.001 µF (Disc Ceramic)
L1, L3, L4 ———— 2 turns No. 18 AWG enameled wire ¼" I.D., air wound 3/16" long
L2 ———— RFC, QM < 1

LAMPIRAN IV : DATA TRANSISTOR 4

MOTOROLA

MRF314
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The RF Line

NPN SILICON RF POWER TRANSISTOR

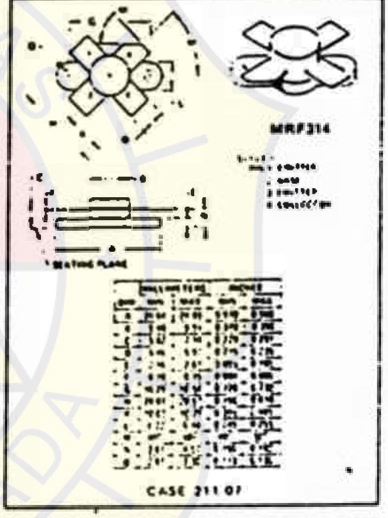
. . . designed primarily for wideband large-signal driver and output amplifier stages in the 30 – 200 MHz frequency range.

- Guaranteed Performance at 150 MHz, 28 Vdc
  Output Power = 30 Watts
  Minimum Gain = 10 dB
- 100% Tested for Load Mismatch at All Phase Angles with 30:1 VSWR
- Gold Metallization System for High Reliability Applications

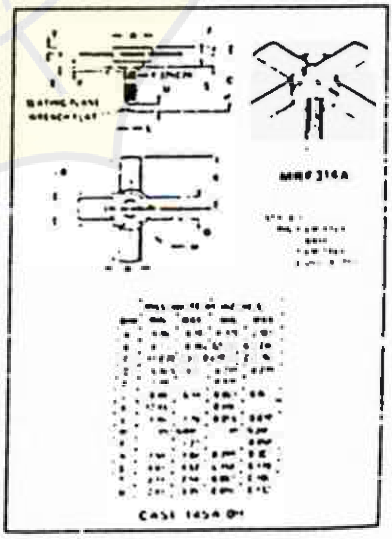
30 W – 30-200 MHz

RF POWER
TRANSISTOR

NPN SILICON



CASE 211-07



CASE 145A-09

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	35	Vdc
Collector-Base Voltage	V_{CBO}	65	Vdc
Emitter-Base Voltage	V_{EBO}	4.0	Vdc
Collector Current — Continuous	I_C	3.4	Adc
Total Device Dissipation @ T_C = 25°C (1) Derate above 25°C	P_D	82 0.47	Watts W/°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	2.13	°C/W

(1) These devices are designed for RF operation. The total device dissipation rating applies only when the devices are operated as RF amplifiers.

LAMPIRAN IV : DATA TRANSISTOR 4

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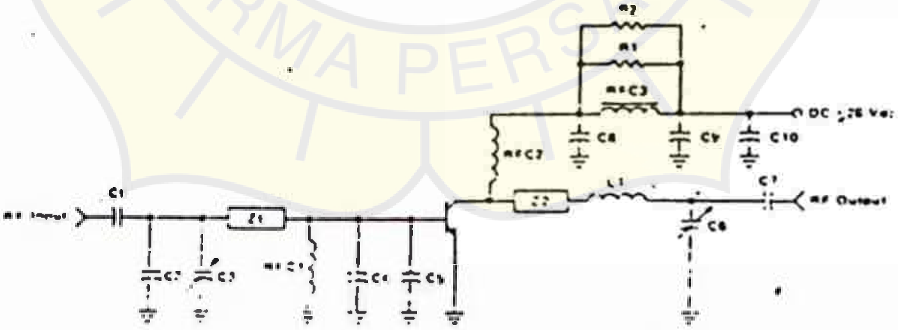
ELECTRICAL CHARACTERISTICS (TC = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Emitter Breakdown Voltage (IC = 30 mAdc, IB = 0)	BV_{CEO}	35	–	–	Vdc
Collector–Emitter Breakdown Voltage (IC = 30 mAdc, VBE = 0)	BV_{CES}	65	–	–	Vdc
Collector–Base Breakdown Voltage (IC = 30 mAdc, IE = 0)	BV_{CBO}	65	–	–	Vdc
Emitter–Base Breakdown Voltage (IE = 3.0 mAdc, IC = 0)	BV_{EBO}	4.0	–	–	Vdc
Collector Cutoff Current (VCB = 30 Vdc, IE = 0)	I_{CBO}	–	–	3.0	mAdc
ON CHARACTERISTICS					
DC Current Gain (IC = 1.5 Adc, VCE = 5.0 Vdc)	h_{FE}	20	–	80	–
DYNAMIC CHARACTERISTICS					
Output Capacitance (VCB = 30 Vdc, IE = 0, f = 1.0 MHz)	C_{ob}	–	33	40	pF
FUNCTIONAL TESTS (Figure 1)					
Common-Emitter Amplifier Power Gain (VCC = 28 Vdc, Pout = 30 W, f = 150 MHz)	G_{PE}	10	13.5	–	dB
Collector Efficiency (VCC = 28 Vdc, Pout = 30 W, f = 150 MHz)	η	50	–	–	%
Load Mismatch (VCC = 28 Vdc, Pout = 30 W, f = 150 MHz, VSWR = 30:1 all phase angles)	–	No Degradation in Power Output			

FIGURE 1 – 150 MHz TEST CIRCUIT



C1, C[illegible] – 16 pF 100 mil ATC
C2 – 68 pF 100 mil ATC
C3, C6 – Johanson # JMC 5501
C4 – 270 pF 100 mil ATC
C5 – 240 pF 100 mil ATC
C7, C9 – 100 pF Underwood
C10 – 1.0 µF Tantalum

L1 – 2 Turns 2.5 #20 Wire ID = 0.275

R1, R2 – 10 Ω 1/2 W

RFC1 – 15 µH Molded Choke
RFC2 – 2 Turns 2.5 #20 Wire ID 0.2
RFC3 – Ferroxcube VK200 19/4B

Z1 – Microstrip 0.[illegible] 1.6
Z2 – Microstrip 0.16" [illegible] 1.2

Board – Glass Teflon, ϵ_r = 2.5

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TYPICAL PERFORMANCE CURVES

FIGURE 2 – OUTPUT POWER versus INPUT POWER

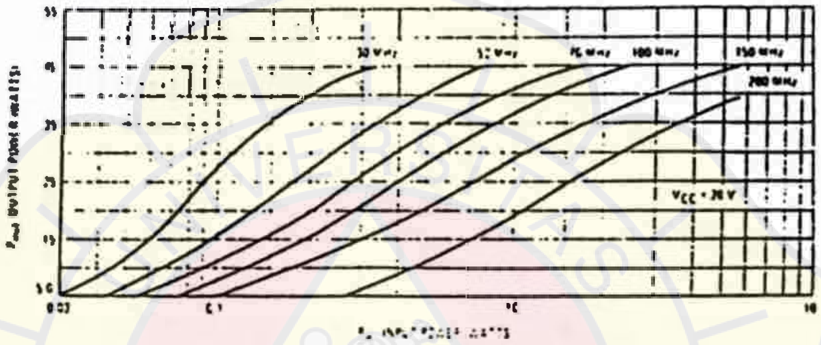

FIGURE 3 – OUTPUT POWER versus INPUT POWER

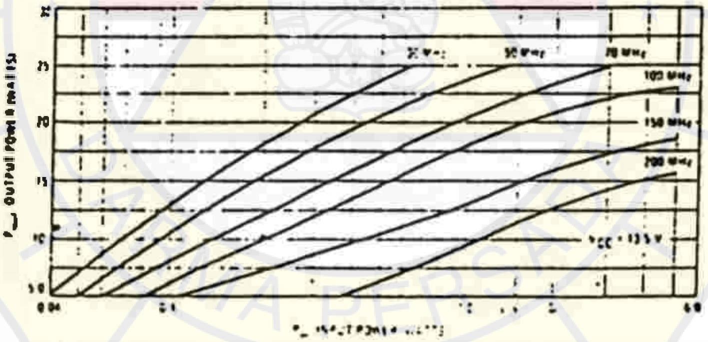

FIGURE 4 – POWER GAIN versus FREQUENCY

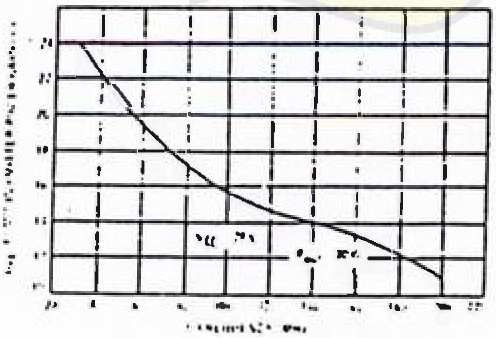

FIGURE 5 – EFFICIENCY (η%) versus FREQUENCY

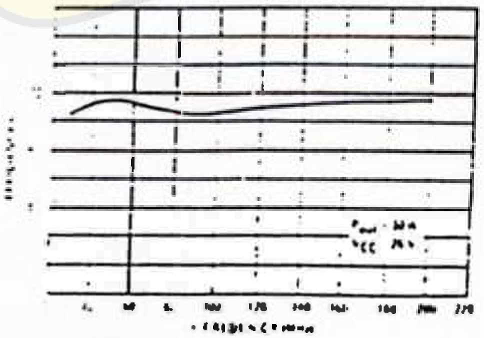

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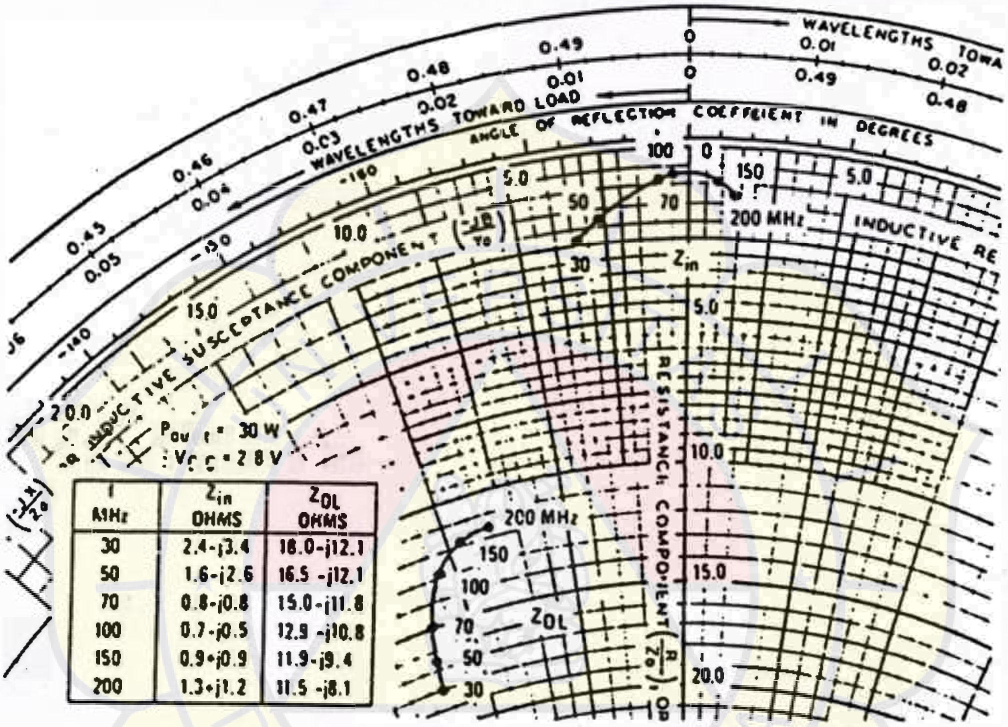
FIGURE 6 – SERIES EQUIVALENT INPUT/OUTPUT IMPEDANCE



f MHz	Zin OHMS	ZOL OHMS
30	2.4-j3.4	18.0-j12.1
50	1.6-j2.6	16.5 -j12.1
70	0.8-j0.8	15.0-j11.8
100	0.7-j0.5	12.9 -j10.8
150	0.9+j0.9	11.9-j9.4
200	1.3+j1.2	11.5 -j8.1

FIGURE 7 – TEST FIXTURE

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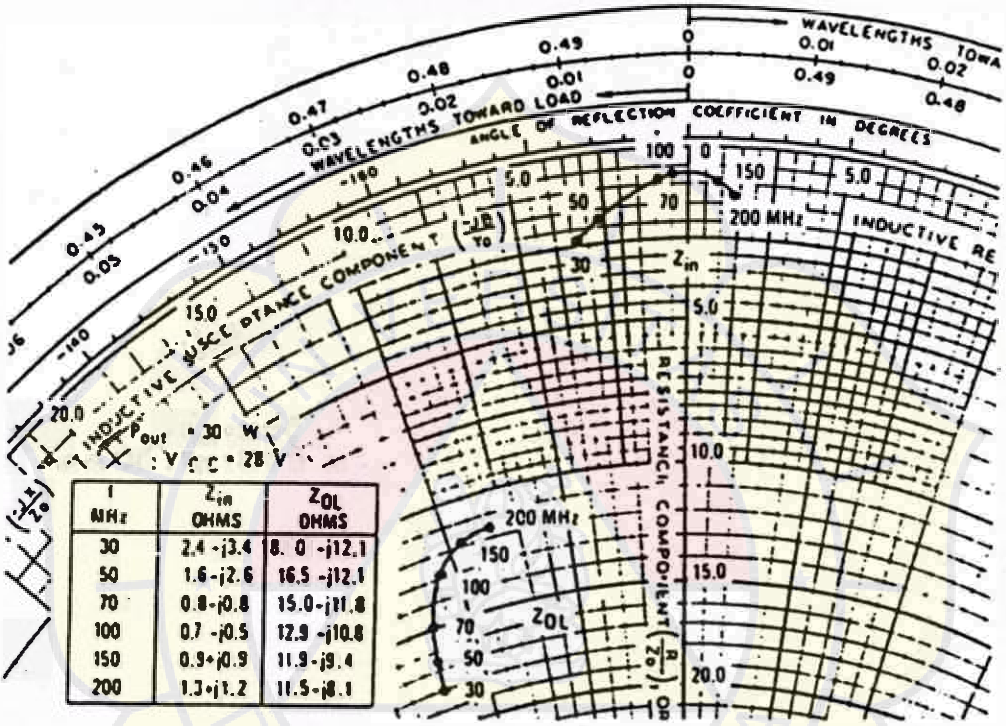
FIGURE 6 – SERIES EQUIVALENT INPUT/OUTPUT IMPEDANCE



f MHz	Zin OHMS	ZOL OHMS
30	2.4 -j3.4	18. 0 -j12.1
50	1.6-j2.6	16.5 -j12.1
70	0.8-j0.8	15.0-j11.8
100	0.7 -j0.5	12.9 -j10.8
150	0.9+j0.9	11.9-j9.4
200	1.3+j1.2	11.5-j8.1

FIGURE 7 – TEST FIXTURE