

Device Type	P <sub>out</sub> Output Power Watts	GPE Power Gain dB Min.	VCC Supply Voltage Volts	Package
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**106-175 MHz, VHF AM TRANSISTORS**

2N3866	1.0	10	28	TO-39
2N3553	2.5	10	28	TO-39
2N5641	7.0	8.4	28	144B-04
2N5642	20	8.2	28	145A-07
2N5643	40	7.6	28	145A-07
2N6166	100	6.0	28	211-10

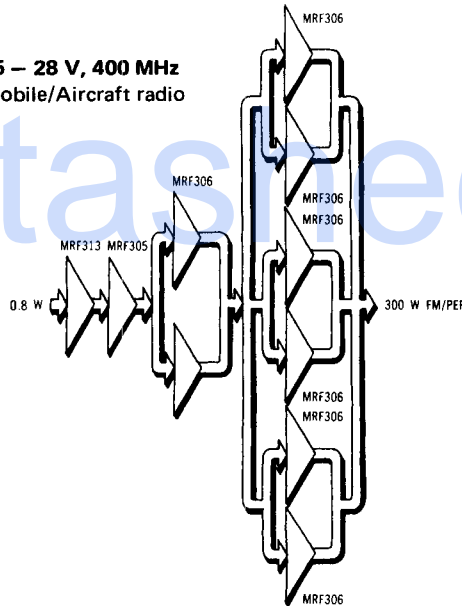
**225-400 MHz, UHF AM TRANSISTORS**

MRF509	1.0	10	28	207A-01
2N3866	1.0	10	28	TO-39
MRF313	1.0	16 (Typ)	28	305-01
MRF313A	1.0	16 (Typ)	28	305A-01
MRF517A	2.0	12	28	244-04
2N5635	2.5	6.2	28	144B-04
MRF5175	5.0	11	28	244-04
2N5636	7.5	5.7	28	144B-04
MRF304*	10	9.0	28	278-06
MRF5176	15	10	28	244-04
2N5637	20	4.6	28	154A-07
MRF5177	30	6.0	28	215-01
MRF5177A	30	6.0	28	145A-07
MRF325*	30	8.0	28	278-06
MRF306**	60	8.0	28	278-06

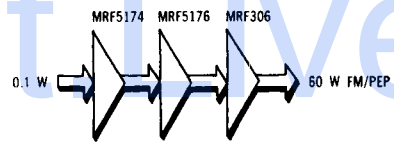
\*Controlled "Q" transistor. See EB-19.

\*\*Gold metallization, double matched controlled "Q" transistor. See EB-26, EB-19.

**Chain 15 – 28 V, 400 MHz**  
Fixed/Mobile/Aircraft radio



**Chain 16 – 28 V, 400 MHz**  
Aircraft radio



## UHF and Microwave Oscillators

The Transistors listed below are for UHF and microwave applications as initial signal sources or as output stages of limited range transmitters. Devices are listed in order of increasing test frequency.

Device Type	Test Conditions		P <sub>out</sub> mW Typ* Min.	f <sub>T</sub> MHz Typ* Min.	Package
	f MHz	VCC Volts			
2N3866	400	15	1000	500	TO-39
2N5179	500	10	20	900	TO-72
2N2857	500	10	30	1000	TO-72
2N3839	500	6.0	30	1000	TO-72
MM8009	1680	20	200	1000	TO-39
2N5108	1680	20	300	1200	TO-39
MRF905	1680	20	500*	2200*	TO-46

# Low-Noise

The low-noise devices listed are produced with carefully controlled  $r_b$  and  $f_T$  to optimize device noise performance. Devices listed in the matrix are classified according to noise figure performance versus frequency.

NF dB	FREQUENCY MHz						Polarity
	60	100	200	450	1000	2000	
1.5	2N5829	2N5829	MRF904				PNP
	2N5031	2N5031					
2.0	2N4957	2N4957	2N5829	MRF904	MRF901		PNP
	2N5032	2N5032	2N5031				
2.5	2N4958	2N4958	2N4957	2N5829	MRF901		PNP
	2N5032	2N5032	2N5032	2N5031			
3.0	2N4959	2N4959	2N4958	2N4957	2N5829	MRF902	PNP
	2N2857	2N2857	2N5032	2N5032	MRF901		
3.5	2N4959	2N4959	2N4959	2N4958	2N4957	MRF902	PNP
	2N5179	2N5179	2N2857	2N5032	2N5031		
4.0	2N4959	2N4959	2N4959	2N4959	2N4958	MRF911	PNP
	2N5179	2N5179	2N5179	2N2857	2N5031		
4.5	2N4959	2N4959	2N4959	2N4959	2N4959		PNP
	2N5179	2N5179	2N5179	2N2857	2N5032		

# General-Purpose Amplifier

The behaviour of  $f_T$  as a function of  $I_C$  is critical in most Class A amplifier applications. The devices listed in the matrix form below are classified according to  $f_T$  versus  $I_C$ .

$f_T$ GHz Min.	COLLECTOR CURRENT mA							Polarity
	2.0	5.0	10	20	50	100	200	
5.0			BFR90	BFR91	BFR96			NPN
4.5			BFR90	MM4049 BFR91	BFR96	BFR96		PNP NPN
4.0			MM4049 BFR90	MM4049 BFR91				PNP NPN
3.5		MM4049 BFR90	MM4049 BFR90	MM4049 BFR91	BFR91			PNP NPN
2.5	MFR901	MRF901	2N5835	2N5835	2N5836			PNP NPN
2.0		2N5031	2N5841	2N5841	2N5836	2N5837	2N5837	PNP NPN
1.5	2N5031	2N4957 2N3960	2N6304	2N6304	2N5583 2N5943	2N5583 2N5109	2N5837	PNP NPN
1.2	2N4957	2N4959 2N2857	2N6305	2N6305	2N5583 2N5943	2N5583 2N5109	2N5583	PNP NPN
1.0	2N5179	2N5179	2N2857	2N5583 2N5943	2N5160 MM8001	2N5160 2N5108	2N5583	PNP NPN
0.8	MRF502	MRF502	MRF502	2N5160 2N3866	2N5160 2N3866	2N5160 2N4428	2N5583	PNP NPN
0.6	MRF501	MRF501	MRF501	2N3866	2N4073	MM4019 2N3553	MM4019 2N3553	PNP NPN
0.5				MRF532* MRF531**	MRF532* MRF531**			PNP NPN

\* $BV_{CEO} = 80$  Vdc  
\*\* $BV_{CEO} = 100$  Vdc.

# CATV, MATV, and Class A Linear

The devices listed below are excellent for Class A linear CATV/MATV applications. The new MRF511 is gaining wide industry acceptance. The devices are listed according to increasing Current Gain ( $f_T$ ). More information concerning the device for your specific linear design needs can be obtained through your local Motorola Sales Office or Motorola distributor.

Device Type	Nominal Test Conditions $V_{CE}/I_C$ Volts/mA	$f_T$ MHz Min. Typ*	Noise Figure		Distortion Specifications				Package
			Max. or / Freq. Typ* MHz		2 nd Order IMD	3 rd Order IMD	12 ch. Cross- Mod.	Output Level dBmV	
MRF501	6/2-5	600	4.5*/200						TO72
MRF502	6/2-5	800	4.0*/200						TO72
2N5179	6/1.5-2	900	4.5/200						TO72
BFY90	5/2	1000	5.0/500						TO72
2N6305	5/2-10	1200	5.5/450						TO72
BFX89	-	1200	6.5/500						TO72
2N5109	15/10-50	1200	3.0*/200						TO39
2N5943	15/30-50	1200	6.8*/200	-50		-42	-50		TO39
2N6304	5/2-10	1400	4.5/450						TO72
MRF511	20/50-80	1500	7.3*/200	-50	-65	-57	-50		144D-04
MRF517	15/25-60	2200	7.5/300	-60	-72	-57	-45		TO39
MRF519	20/50-80	2200	8.0/300	-50	-68	-57	-50		TO39 <sup>1</sup>
BFR90	10/14	5000*	2.4*/500						302
BFR91	5/35	5000*	1.9*/500						302
BFR96	10/50	5000*	3.3*/500						302

<sup>1</sup> Grounded Emitter TO39 (Case 79-05)

## Hybrid Amplifier Modules

The Hybrid Modules listed are specified for amplifier applications in CATV distribution equipment but are applicable wherever broadband (HF/VHF) low distortion, low-noise amplification is required. These devices can also be used for Broadband Medium Power (0.5 W) Driver Amplifiers.

Device Type	Gain 40-300 MHz Min. Typ	Maximum Distortion Specifications				Noise Figure @ 300 MHz dB
		Output Level Note 1 dB mV	2nd Order Test Note 2 / Frequency dB/ MHz	3 rd Order Test Note 2 / Frequency dB/ MHz	Cross-Modulation / Bo. of dB/ Channels	
MHW559	15.5/16	-50	-64/chs (2-13) @ ch R	-70/chs(4-5-A) @ ch R	-54/21	8.5
MHW562	15.5/16	-50	-69/chs(2-13) @ ch R	-78/chs(4-5-A) @ ch R	-57/21	10
MHW570	16/16.7	-50	-64/chs(2-13) @ ch R	-76/chs(4-5-A) @ ch R	-54/30	7.5
MHW572	16/16.7	-50	-70/chs(2-13) @ ch R	-79/chs(4-5-A) @ ch R	-57-30	9.0
MHW580	33/24	-48	-65/chs(3-M) @ ch W	-72/chs(U-V-W) @ ch W	-57/35	7.0

1. 1.0 Millivolt Referenced to 75 Ohms.

2. Channel Frequency

ch 2 = 55 MHz, ch 3 = 61 MHz, ch 4 = 67 MHz, ch 5 = 77 MHz, ch 4 = 121 MHz,

ch 13 = 211 MHz, ch M = 325 MHz, ch R = 265 MHz, ch U = 283 MHz,

ch V = 289 MHz, ch W = 295 MHz.

