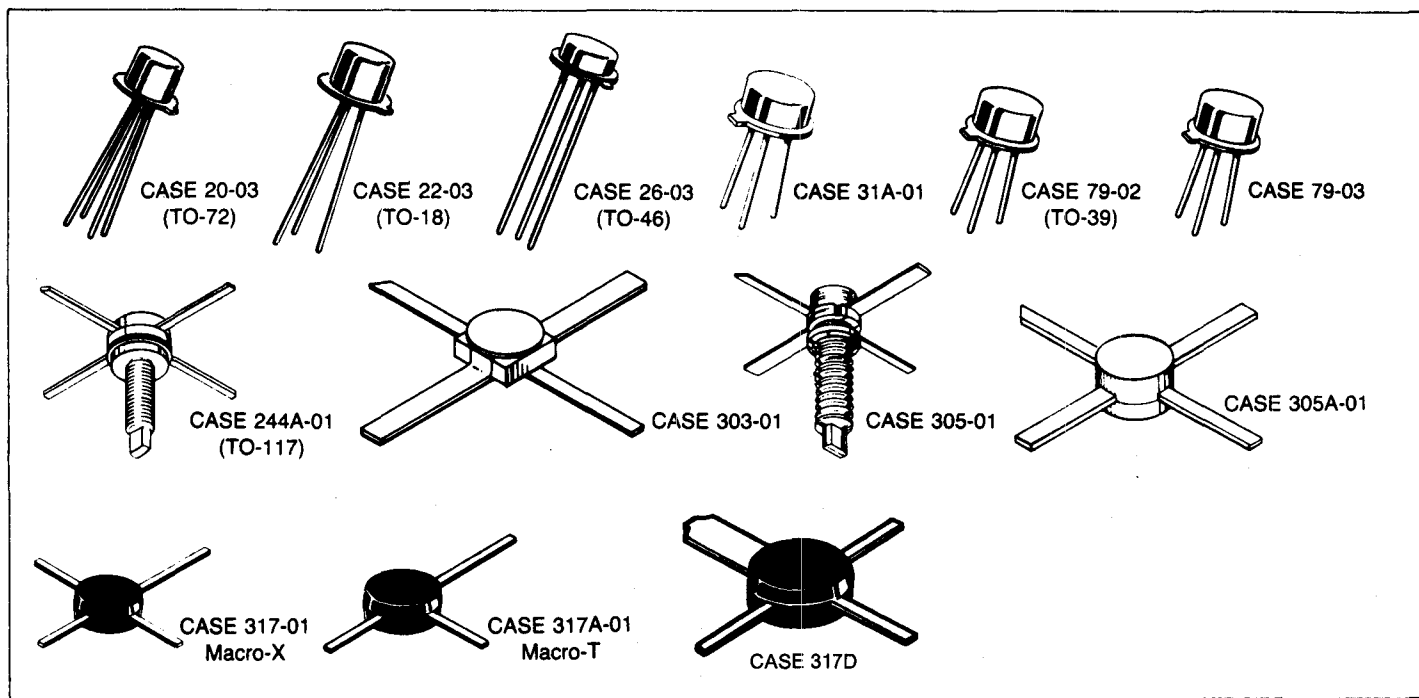


RF Small-Signal Transistors

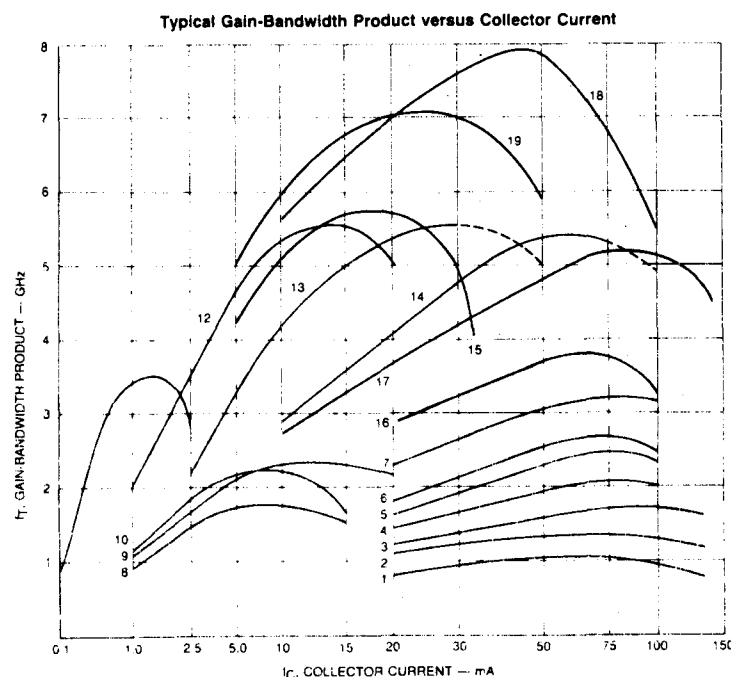
3



Motorola's small-signal, low power RF transistor product range includes transistors with gain-bandwidths of 1.0 GHz to 8.0 GHz operating at currents of 0.25 mA to over 140 mA.

These devices are available in a wide variety of package types; metal can, plastic Macro-X and Macro-T, hermetic ceramic and microminiature. Most of these transistors are fully

characterized with y or s parameters; and in addition, there are non-saturated switching characteristics, low power driver specifications, and noise figure limits. QPL types with JAN, JTX and JTXV processing levels are available as well as Hi Rel processing to meet unique customer requirements.



RF Small-Signal Transistors

Motorola small-signal and medium power RF transistors with gain-bandwidth products from 1.0 GHz to 8.0 GHz operate with currents from 0.25 mA to over 140 mA. The following chart, combined with the tables of package options, enables the circuit designer to select the optimum device from Motorola's wide range of transistor/package combinations.

- | | |
|--|-----------------------------------|
| 1 2N3866, 2N3866A | 10 2N4957, 2N4958, 2N4959, PNP |
| 2 2N5160, MM4018, PNP | 12 2N6603, BFR90, MRF901, MRF904 |
| 3 2N3948, 2N4427, MRF207 | 13 2N6604, BFR91, MRF911, MRF914 |
| 4 2N5109, 2N5943 | 14 BFR96, MRF961, MRF962, MRF965 |
| 5 2N5583, PNP | 15 BFW92A |
| 6 2N5836, 2N5837 | 16 MRF559 |
| 7 MRF511, MRF517, MRF525 | 17 MRF580, MRF581, MRF586, MRF587 |
| 8 2N2857, 2N3939, 2N5179, MRF501, MRF502 | 18 MRF571, MRF572 |
| 9 BFX89, BFY90 | 19 MRF536, MRF534, MM4049, PNP |

RF SMALL-SIGNAL TRANSISTORS (continued)

CATV, MATV, and Class A Linear Transistors

The devices listed below are excellent for Class A linear CATV/MATV applications and are listed according to increasing gain-bandwidth (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.

3

Device Type	Nominal Test Conditions V_{CE}/I_C Volts/mA	f_T MHz Min	Noise Figure	Distortion Specifications				Package
			Max/Freq. dB/MHz	2nd Order IMD	3rd Order IMD	12 Ch. Cross- Mod.	Output Level dBmV	
MRF501	6/5	600	4.5*/200					TO-72
MRF502	6/5	800	4.0*/200					TO-72
2N5179	6/5	900	4.5/200					TO-72
BFY90	5/2	1000	5.0/500					TO-72
BFX89	5/25	1200	6.5/500					TO-72
2N5109	15/50	1200	3.0*/200					TO-39
2N5943	15/50	1200	3.4/200	- 50		- 42	+ 50	TO-39
MRF511	20/80	1500	7.3*/200	- 50	- 65	- 57	+ 50	244A-01
MRF517	15/60	2200	7.5/300	- 60	- 72	- 57	+ 45	TO-39
BFW92A	5/2	4500*	3.0*/500					317A-01
MRF586	14/70	4500*	3.0/500	- 50	- 72		+ 50	TO-39
BFR90	10/14	5000*	2.4*/500					317A-01
BFR91	5/35	5000*	1.9*/500					317A-01
BFR96	10/50	5000*	3.0*/500					317A-01
MRF961	10/50	5000*	2.0*/500					317-01
MRF962	10/50	5000*	2.0*/500					303-01
MRF965	10/50	5000*	2.0*/500					TO-46
MRF581	10/75	5000*	3.0/500		- 65		+ 50	317-01
MRF587	14/70	5500*	3.0/500	- 52	- 72		+ 50	244A-01

*Typ

High-Speed Switches

The transistors listed below are for use as high-frequency current-mode switches. They are also suitable for RF amplifier and oscillator applications. The devices are listed in ascending order of collector current.

Device Type	Test Conditions I_C/V_{CE} mA/Volts	f_T MHz Min	$r_b' C_C$ Max	Package
2N3959	10/10	1300	25	TO-18
2N3960	10/10	1600	40	TO-18
2N5835	10/6.0	2500	5.0**	TO-72
MM4049*	20/5.0	4000	15	TO-72
MRF914	20/10	4500**	—	TO-72
2N5943	50/15	1200	5.5**	TO-39
2N5583*	50/10	1000	8.0**	TO-39
2N5836	50/6.0	2000	6.0**	TO-46
2N5837	100/3.0	1700	6.0**	TO-46

*PNP **Typ

RF SMALL-SIGNAL TRANSISTORS (continued)

Small-Signal Amplifier Transistor Selection by Package

In small-signal RF applications the package style is often determined by the end application, or circuit construction technique. To aid the circuit designer in device selection, below are listed the Motorola broad range of RF small-signal amplifier transistors organized by package. Devices for other applications such as oscillators or switches are shown in the appropriate preceding tables.

3

TO-39 METAL CAN

Device Type	Gain — BW		Noise Figure			Gain		Maximum Ratings		
	f _T GHz	I _C mA	NF dB	f MHz	I _C mA	dB Min	f MHz	V _{(BR)CEO} V	I _C mA	P _T mW
2N5109	1.2	50	3.0	200	10	11	216	20	400	2.50
2N5943	1.2	50	3.4	200	30	11.4*	200	30	400	3.50
MRF525†	2.5	50	4.0	400	—	13	400	35**	150	2.50
MRF517	2.7	60	7.5	300	50	10*	300	35**	150	2.50
MRF586	4.5	70	3.0	500	70	14*	500	17	200	2.50

†Grounded Emitter TO-39

*Typ

**V_{(BR)CBO}

Plastic — SOE — Case 317-01/317A-01

Device Type	Gain — BW		Noise Figure			Gain		Maximum Ratings		
	f _T GHz	I _C mA	NF dB	f MHz	I _C mA	dB Min	f MHz	V _{(BR)CEO} V	I _C mA	P _T mW
MRF931	3.0	1.0	3.8	500	0.25	16*	500	5.0	5.0	50
MRF559	3.0	100	—	—	—	13.0*	512	18	150	2000
BFW92A	4.0	25	2.5	500	2.0	16*	500	5.0	50	190
MRF901	4.5	15	2.0	1000	5.0	10	1000	15	30	375
BFR96	4.5	50	2.0*	500	10	12	500	15	100	500
MRF961	4.5	50	2.0*	500	10	13.5	500	15	100	500
MRF911	5.0	30	2.5	1000	5.0	12.5*	1000	12	40	400
BFR90	5.0	14	2.4	500	2.0	18*	500	15	30	180
BFR91	5.0	30	1.9	500	2.0	16*	500	12	35	180
MRF580	5.0	75	2.0*	500	50.0	11.0	500	18	200	2500
MRF581	5.0	75	2.0*	500	50.0	13.0	500	18	200	2500
MRF536**	5.0	20	4.5*	1000	3.0	8.5	1000	10	30	300
MRF2369	6.0	50	1.5	1000	5.0	10	1000	15	70	750
MRF571	8.0	5.0	1.0*	500	5.0	13.5	500	10	70	2500

*Typ

**PNP

Ceramic — SOE — Case 244A-01, 303-01

Device Type	Gain — BW		Noise Figure			Gain		Maximum Ratings		
	f _T GHz	I _C mA	NF dB	f MHz	I _C mA	dB Min	f MHz	V _{(BR)CEO} V	I _C mA	P _T mW
2N5947	1.5	75	3.8	200	50	10	250	30	400	5000
MRF511	2.1	80	7.3	200	50	10	250	25	250	5000
2N6603	4.5	15	2.0	1000	5.0	13*	1000	15	30	400
MRF962	4.5	50	2.0*	500	10	15	500	15	100	750
2N6604	5.0	30	2.5	1000	5.0	14	1000	12	50	500
MRF587	5.5	70	3.0	500	70	15*	500	17	200	5800
MRF572	8.0	50	2.0	1000	5.0	10	1000	10	70	2500

*Typ