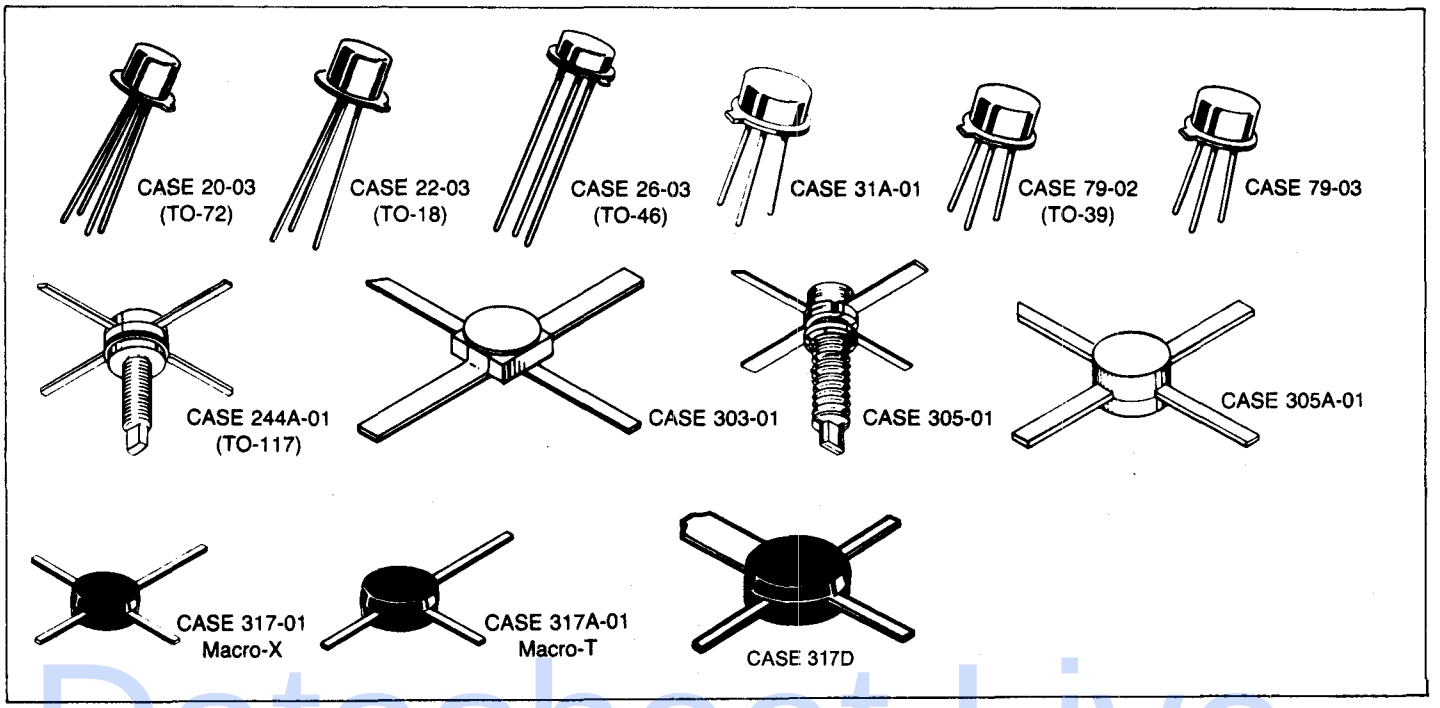
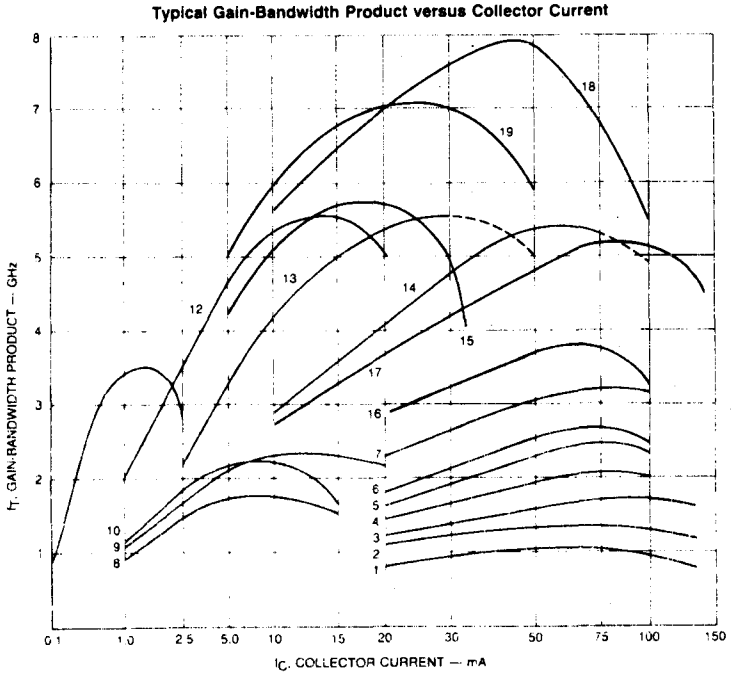


Datasheet Live

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.

Typical Gain-Bandwidth Product versus Collector Current



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
2 2N5160, MM4018, PNP
3 2N3948, 2N4427, MRF207
4 2N5109, 2N5943
5 2N5583, PNP
6 2N5836, 2N5837
7 MRF511, MRF517, MRF525
8 2N2857, 2N3339, 2N5179, MRF501, MRF502
9 BFX89, BFY90
10 2N4957, 2N4958, 2N4959, PNP
12 2N6603, BFR90, MRF901, MRF904
13 2N6604, BFR91, MRF911, MRF914
14 BFR96, MRF961, MRF962, MRF965
15 BFW92A
16 MRF559
17 MRF580, MRF581, MRF586, MRF587
18 MRF571, MRF572
19 MRF536, MRF534, MM4049, PNP

UHF and Microwave Oscillators

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

Device Type	Test Conditions		P_{out} mW Min	f_T MHz Typ	Package
	f MHz	V_{CC} Volts			
2N5179	500	10	20	1800	TO-72
2N2857	500	10	30	1800	TO-72
2N3839	500	6.0	30	1800	TO-72
MM8009	1680	20	200	1400	TO-39
2N5108	1680	20	300	1400	TO-39
2N3866	400	15	1000	1000	TO-39

*Typical

Low-Noise Transistors

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 2N5031	2N5829 2N5031	MRF904	MRF571	MRF572/MRF2369		PNP NPN
2.0	2N4957	2N4957	2N5829 2N5031	MRF904	MRF901		PNP NPN
2.5	2N4958	2N4958	2N4957 2N5032	2N5829 2N5031	MRF901 2N6603	MRF572	PNP NPN NPN
3.0	2N4959 2N2857	2N4959 2N2857	2N4958	2N4957	2N5829 MRF901 2N6604	2N6603	PNP NPN NPN
3.5	2N4959 2N5179	2N4959 2N5179	2N4959 2N2857	2N4958 2N5032	2N4957 2N5031	MRF901	PNP NPN
4.0	2N4959 2N5179	2N4959 2N5179	2N4959 2N5179	2N4959 2N2857	2N4958 2N5031	2N6604	PNP NPN
4.5	2N4959 2N5179	2N4959 2N5179	2N4959 2N5179	2N4959 2N2857	2N4959 2N5032		PNP NPN

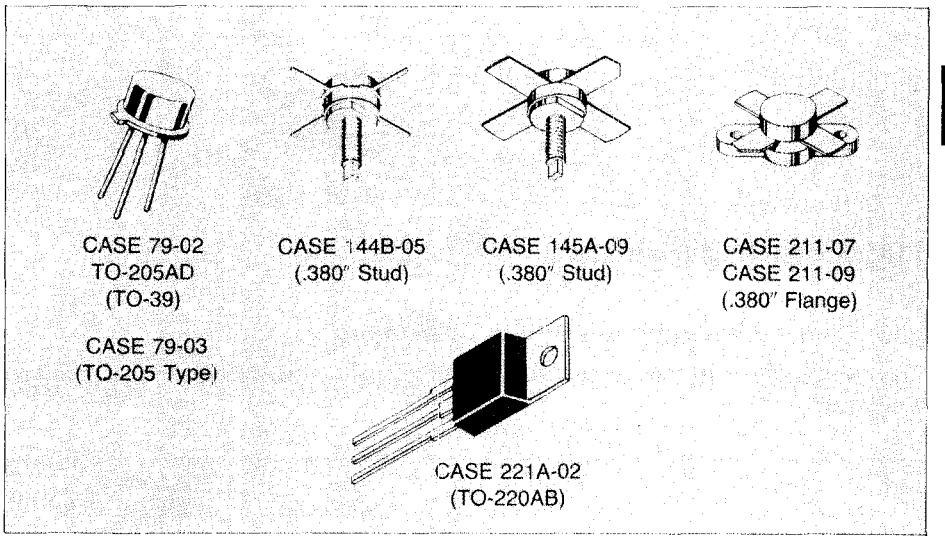
Class C Amplifiers

The transistors listed in these tables are specified for operation in Class C RF power amplifier circuits. The tables are arranged by increasing frequency of operation first, then by increasing output power.

Class C Amplifiers

Device Type	Frequency (MHz)	P_{in} (w)	P_{out} (w)	G_{pe} dB	Voltage (V)	Case Outline
MRF229	90	0.15	1.5	10.0	12.5	TO-39
MRF604	175	0.1	1.0	10.0	12.5	TO-46
2N4427	175	0.1	1.0	10.0	12.5	TO-39
MRF553	175	0.1	1.5	11.5	12.5	317D-01
MRF607	175	0.12	1.75	11.5	12.5	TO-39
2N6255	175	0.5	3.0	7.8	12.5	TO-39
2N3553	175	0.25	2.5	10.0	28.0	TO-39
MRF237*	175	0.25	4.0	12.0	12.5	TO-39
MRF207	220	0.15	1.0	8.2	12.5	TO-39
MRF227*	225	0.13	3.0	13.5	12.5	TO-39
MRF525*	400	0.001	0.02	13.0	26.0	TO-39
2N3866	400	0.1	1.0	10.0	28.0	TO-39
2N5160†	400	0.16	1.0	8.0	28.0	TO-39
MRF313	400	0.03	1.0	15.0	28.0	305A-1
2N3948	400	0.25	1.0	6.0	13.6	TO-39
MRF515	470	0.12	0.75	8.0	12.5	TO-39
MRF581	470	0.05	1.2	13.8	12.5	317-1
MRF629*	470	0.32	2.0	8.0	12.5	TO-39
MRF627	470	0.05	0.5	10.0	12.5	305A-1
MRF628	470	0.05	0.5	10.0	12.5	249-5
MRF630	470	0.25	3.0	10.8	12.5	TO-39
MRF559	870	0.063	0.5	9.0	12.5	317-1
MRF837	870	0.125	0.75	8.0	12.5	317-01
MRF581	870	0.12	1.0	9.2	12.5	317-1
MRF557	870	0.25	1.5	8.0	12.5	317D-01

*Grounded Emitter TO-39
†PNP



For VHF Applications

30–200 MHz VHF AM/FM Transistors

Designed for Military Radio and Commercial Aircraft VHF bands, these 28-volt devices include the all-gold metalized MRF314/15/16/17 high-reliability series.

Device	P_{out} Output Power Watts	P_{in} Input Power Watts	G_{PE} Power Gain dB Min	V_{CC} Supply Voltage Volts	Package
MRF340	8.0	0.4	13	27	TO-220AB
MRF344	60	15	6.0	27	TO-220AB
2N3866	1.0	0.1	10	28	TO-205AD
2N3553	2.5	0.25	10	28	TO-205AD
2N5641	7.0	1.0	8.4	28	144B-05
2N5642	20	3.0	8.2	28	145A-09
MRF314	30	3.0	10	28	211-07
MRF314A	30	3.0	10	28	145A-09
2N5643	40	6.9	7.6	28	145A-09
MRF315	45	5.7	9.0	28	211-07
MRF315A	45	5.7	9.0	28	145A-09
MRF316**	80	8.0	10	28	316-01
MRF317**	100	12.5	9.0	28	316-01

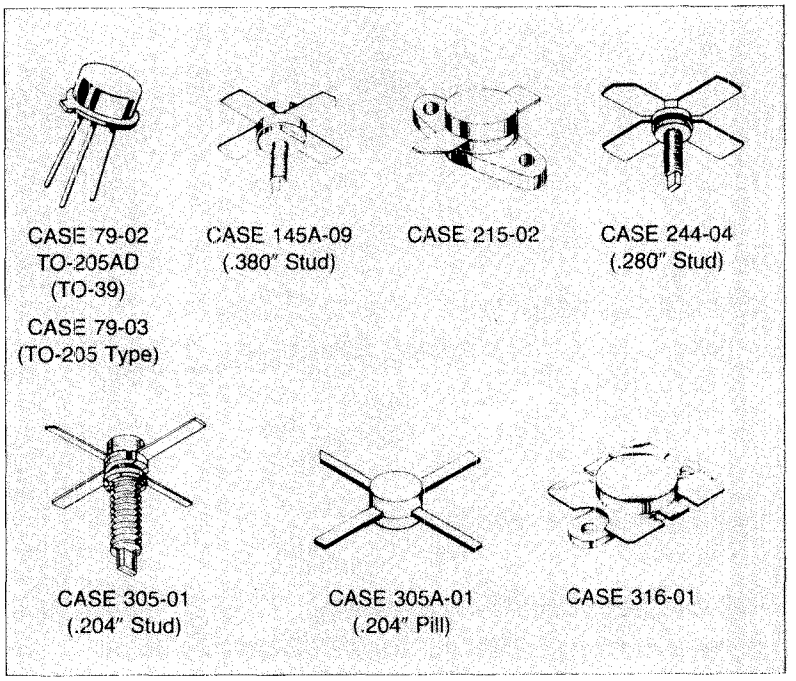
66–88 MHz, Midband FM Transistors

Power output chains up to 25 watts output are obtainable in the international VHF FM "Mid-Band" for which these transistors are optimized.

MRF229*	1.5	0.15	10	12.5	79-03
MRF232	7.5	0.95	9.0	12.5	145A-09
MRF233	15	1.5	10	12.5	145A-09
MRF234	25	2.8	9.5	12.5	145A-09

*Grounded Emitter CASE 79-03 (TO-205 Type)

**Internal Impedance Matched



For UHF Applications

225–400 MHz, AM Transistors

Stringent requirements of the UHF Military band are met by MRF313, 321, 331, 325, 326, 327, 329 and 2N6439 types, with all-gold metal systems, ruggedness, and "CQ" programmed wirebond construction, to assure consistent input impedances.

Device	P_{out} Output Power Watts	P_{in} Input Power Watts	G_{PE} Power Gain dB Min	V_{CC} Supply Voltage Volts	Package
MRF525*	0.02	0.001	13	26	79-03
2N4428	25	.075	10	28	TO-205AD
2N5160†	1.0	0.16	8.0	28	TO-205AD
2N3866	1.0	0.1	10	28	TO-205AD
MRF313	1.0	0.03	15	28	305A-01
MRF5174	2.0	0.125	12	28	244-04
MRF321**	10	0.62	12	28	244-04
MRF323**	20	2.0	10	28	244-04
MRF5177	30	7.5	6.0	28	215-02
MRF325**	30	4.3	8.5	28	316-01
MRF326**	40	8.0	9.0	28	316-01
MRF309	50	10	7.0	28	316-01
2N6439	60	10	7.8	28	316-01
MRF390***	60	6.8	9.5#	28	744-02
MRF327**	80	14.9	7.3	28	316-01
MRF329**	100	20	7.0	28	333-03
MRF392***	125	11	9.7#	28	744A-01

*Grounded Emitter CASE 79-03 (TO-205 Type)
**Internal Impedance Matched
***Internal Impedance Matched Push-Pull Transistors
†PNP
#Typical