电子元器件系列(中国.厦门)

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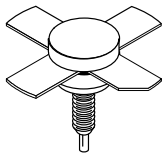
RF Discrete Transistors

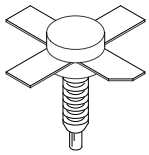
In the following pages, the reader will find the most extensive group of RF Discrete Transistors offered by any semiconductor manufacturer anywhere in the world today.

From Bipolar to FET, from Low Power to High Power, the user can choose from a variety of packages. They include plastic, metal can and ceramic that are microstrip circuit compatible or surface mountable. Many are designed for automated assembly equipment.

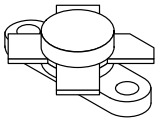
Major sub–headings are MOSFETs, Power Bipolar and Small Signal.



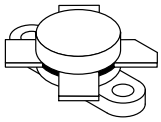
CASE 145A–09
STYLE 1
(.380″ STUD)



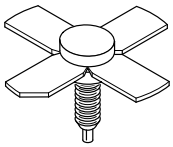
CASE 145D–02
STYLE 1
(.380″ SOE)



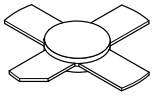
CASE 211–07
STYLE 1, 2
(.380″ FLANGE)



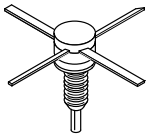
CASE 211–11
STYLE 1, 2
(.500″ FLANGE)



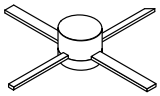
CASE 244
STYLE 1
(.280″ STUD)



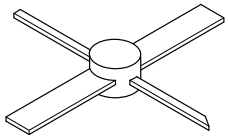
CASE 249
STYLE 1, 3
(.280″ PILL)



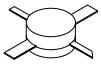
CASE 305
STYLE 1
(.204″ STUD)



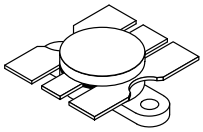
CASE 305A
STYLE 1, 2
(.204″ PILL)



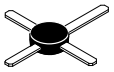
CASE 305C
STYLE 1



CASE 305D
STYLE 1

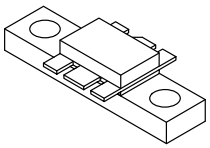


CASE 316–01
STYLE 1, 3
(.500″ CQ)

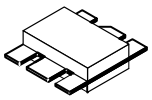


CASE 317
STYLE 1, 2
(MACRO–X)

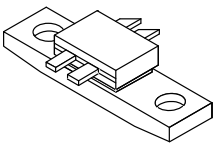
CASE 317D
STYLE 2



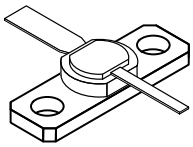
CASE 319
STYLE 1, 2, 3
(CS–12)



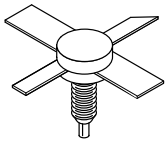
CASE 319A
STYLE 2



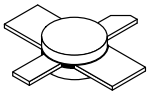
CASE 319B
STYLE 1



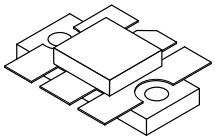
CASE 328A–03
STYLE 1, 2



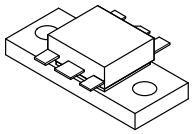
CASE 332–04
STYLE 1, 2
(.280″ STUD)



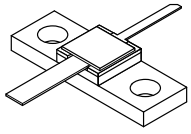
CASE 332A
STYLE 2
(.280″ PILL)



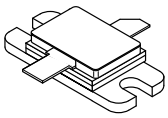
CASE 333
STYLE 1



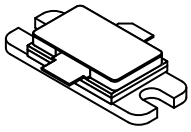
CASE 333A
STYLE 1, 2
(MAAC PAC)



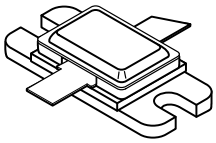
CASE 336E
STYLE 1



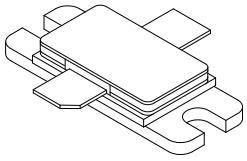
CASE 355C
STYLE 1



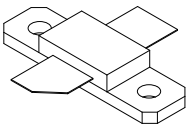
CASE 355D
STYLE 1



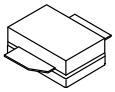
CASE 355E
STYLE 1



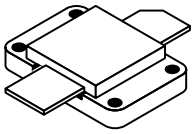
CASE 355H–01
STYLE 1



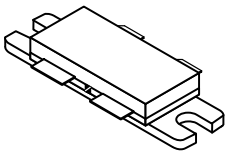
CASE 360B
STYLE 1
(Micro 250)



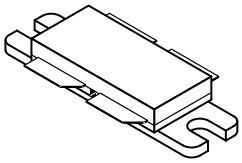
CASE 360C
STYLE 1



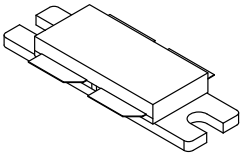
CASE 368
STYLE 2
(HOG PAC)



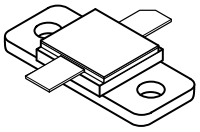
CASE 375
STYLE 2



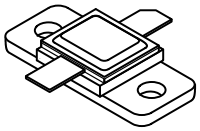
CASE 375A
STYLE 1



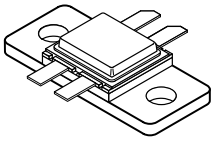
CASE 375B
STYLE 2
(Micro 860)



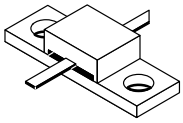
CASE 376B
STYLE 1



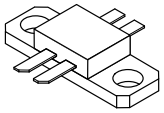
CASE 376C
STYLE 1



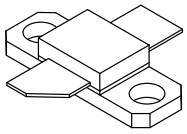
CASE 391
STYLE 1



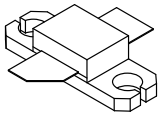
CASE 394
STYLE 1



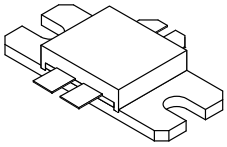
CASE 395B
STYLE 1



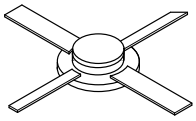
CASE 395C
STYLE 1, 2



CASE 395D
STYLE 1

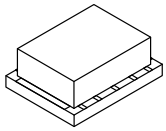


CASE 398
STYLE 1

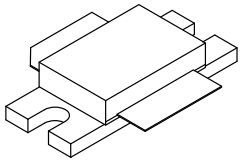


CASE 400
STYLE 1

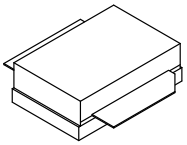
CASE 430
STYLE 2



CASE 430B
STYLE 1



CASE 451
STYLE 1

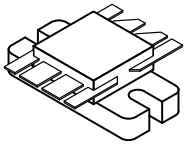


CASE 451A
STYLE 1

CASE 458
STYLE 1

CASE 458A
STYLE 1

CASE 466
STYLE 1
(PLD –1.5)



CASE 744A
STYLE 1, 2

CASE 751
STYLE 1
(SO–8)

RF Power MOSFETs

Motorola RF Power MOSFETs are constructed using a planar process to enhance manufacturing repeatability. They are *N–channel field effect transistors* with an oxide insulated gate which controls vertical current flow.

Compared with bipolar transistors, RF Power FETs exhibit higher gain, higher input impedance, enhanced thermal stability and lower noise. The FETs listed in this section are specified for operation in RF Power Amplifiers and are grouped by frequency range of operation and type of application. Arrangement within each group is first by order of voltage then by increasing output power.

Table 1. To 54 MHz

Designed for broadband HF/SSB commercial and industrial applications. The high gain, broadband performance and linear characterization of this device makes it ideal for large–signal, common–source amplifier applications in 12.5 volt mobile and amateur radio transmitters.

Device	P_{out} Output Power Watts	P_{in} Input Power Typical Watts	G_{ps} (Typ)/Freq. dB/MHz	η Eff., Typ %	Typical IMD d_3 dB	Typical IMD d_5 dB	θ_{JC} °C/W	Package/Style
V_{CC} = 12.5 Volts, Class AB								
MRF255	55	0.8	16/54	45	–30	–30	1.0	211–11/2

Table 2. To 150 MHz HF/SSB

For military and commercial HF/SSB fixed, mobile and marine transmitters.

Device	P_{out} Output Power Watts	P_{in} Input Power Typical Watts	G_{ps} Typical Gain dB @ 30 MHz	Typical IMD d_3 dB	Typical IMD d_{11} dB	θ_{JC} °C/W	Package/Style
V_{DD} = 28 Volts, Class AB							
MRF140	150	4.7	15	–30	–60	0.6	211–11/2
V_{DD} = 50 Volts, Class AB							
MRF148	30	0.5	18	–35	–60	1.5	211–07/2
MRF150	150	3	17	–32	–60	0.6	211–11/2
MRF154	600	12	17	–25	—	0.13	368/2
MRF157	600	6	20	–25	—	0.13	368/2

Table 3. To 225 MHz VHF AM/FM

For VHF military and commercial aircraft radio transmitters.

Device	P_{out} Output Power Watts	P_{in} Input Power Typical Watts	G_{ps} (Typ)/Freq. dB/MHz	η Efficiency Typical %	θ_{JC} °C/W	Package/Style
V_{DD} = 28 Volts, Class AB						
MRF134	5	0.2	14/150	55	10	211–07/2
MRF136	15	0.38	16/150	60	3.2	211–07/2
MRF136Y	30	1.2	14/150	54	1.8	319B/1
MRF137	30	0.75	16/150	60	1.8	211–07/2
MRF173	80	4	13/150	65	0.8	211–11/2
MRF173CQ	80	4	13/150	65	0.8	316–01/2
MRF175LV	100	4	14/225	65	0.65	333/1
MRF174	125	8.3	11.8/150	60	0.65	211–11/2
MRF141	150	15	10/175	55	0.6	211–11/2
MRF175GV	200	8	14/225	65	0.44	375/2
MRF141G	300	30	10/175	55	0.35	375/2
V_{DD} = 50 Volts, Class AB						
MRF151	150	7.5	13/175	45	0.6	211–11/2
MRF176GV	200	4	17/225	55	0.44	375/2
MRF151G	300	7.5	16/175	55	0.35	375/2

Table 4. To 500 MHz VHF/UHF AM/FM

For VHF/UHF military and commercial aircraft radio transmitters.

Device	P_{out} Output Power Watts	P_{in} Input Power Typical Watts	G_{ps} (Typ)/Freq. dB/MHz	η Eff., Typ %	θ_{JC} °C/W	Package/Style
V_{DD} = 28 Volts, Class AB						
MRF158	2	0.02	20/400	55	13.2	305A/2
MRF160	4	0.08	17/400	50	7.2	249/3
MRF166C	20	0.4	17/400	55	2.5	319/3
MRF175LU	100	10	10/400	55	0.65	333/1
MRF177	100	6.4	12/400	60	0.65	744A/2
MRF175GU	150	9.5	12/400	55	0.44	375/2
MRF275L(46a)	100	12.5	9/500	55	0.65	333/1
MRF275G(46a)	150	11.9	11/500	55	0.44	375/2
V_{DD} = 50 Volts, Class AB						
MRF176GU	150	6	14/400	50	0.44	375/2

Table 5. To 520 MHz

Designed for broadband VHF & UHF commercial and industrial applications. The high gain and broadband performance of these devices make them ideal for large–signal, common–source amplifier applications in 12.5/7.5 volt mobile, portable and base station operation.

Device	P_{out} Output Power Watts	P_{in} Input Power Typical Watts	G_{ps} (Typ)/Freq. dB/MHz	η Eff., Typ %	θ_{JC} °C/W	Package/Style
V_{DD} = 7.5 Volts, Class AB – LDMOS Die						
MRF1507 (46b)	8	0.630	11	65	2.0	PLD–1.5
V_{CC} = 7.5 Volts, Class AB						
MRF5003(18a)	3	0.27	10.5/512	50	14	430/2
MRF5007(18a)	7	0.5	11.5/512	55	5	430B/1
V_{CC} = 12.5 Volts, Class AB						
MRF5015	15	1.1	11.5/512	55	3.5	319/3
MRF5035	35	6.3	7.5/512	55	1.8	316–01/3
520 MHz, V_{DD} = 48 Volts, VHF/UHF for Conventional FM, Class AB – LDMOS Die						
MRF190S (46c)	15 CW	0.75	13/520	55	2.5	458/1
MRF191 (46c)	30 CW	1.5	13/520	55	2.2	360B/1
MRF191S (46c)	30 CW	1.5	13/520	55	2.2	360C/1
MRF192 (46c)	60 CW	3.0	13/520	55	1.2	360B/1
MRF192S (46c)	60 CW	3.0	13/520	55	1.2	360B/1
MRF193 (46e)	120 CW	6.0	13/520	55	0.6	Similar to 375B/2
MRF194 (46e)	150 CW	7.5	13/520	55	0.55	Single–ended Device

(18)Tape and Reel Packaging Option Available by adding suffix: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units.

(46)To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97

Table 6. To 900 MHz

Device	P_{out} Output Power Watts	P_{in} Input Power Typical Watts	G_{PS} (Typ)/Freq. dB/MHz	η Eff., Typ %	θ_{JC} °C/W	Package/Style
900 MHz, V_{DD} = 48 Volts, Class AB – LDMOS Die						
MRF195S (46c)	15 PEP	0.75	13/900	33	2.5	458/1
MRF196 (46e)	30 PEP	1.5	13/900	33	2.2	360B/1
MRF196S (46e)	30 PEP	1.5	13/900	33	2.2	360C/1
MRF197 (46c)	60 PEP	3.0	13/900	33	1.2	360B/1
MRF197S (46c)	60 PEP	3.0	13/900	33	1.2	360C/1
MRF198 (46e)	90 PEP	4.5	13/900	33	1.0	Single–ended Device
MRF199 (46e)	150 PEP	15	10/900	33	0.55	Single–ended Device

Table 7. To 1.0 GHz

For HF/VHF/UHF commercial and military radio transmitters.

Device	P_{out} Output Power Watts	P_{in} Input Power Typical Watts	G_{PS} (Typ)/Freq. dB/MHz	η Eff., Typ %	θ_{JC} °C/W	Package/Style
1.0 GHz, V_{DD} = 26 Volts, Class AB – LDMOS Die						
MRF6522–5 (46b)	5	0.08	18/960	55	10	458A/1
MRF6522–10 (46b)	10	0.20	17/960	55	6.0	458A/1
1.0 GHz, V_{DD} = 28 Volts, Class AB – LDMOS Die						
MRF181S (46a)	4	0.16	14/1000	40	3.6	458/1
MRF181Z (46b)	4	0.16	14/1000	40	3.6	458A/1
MRF182★	30	1.2	14/1000	60	1.75	360B/1
MRF182S★	30	1.2	14/1000	60	1.75	360C/1
MRF183★	45	1.8	14/1000	60	1.5	360B/1
MRF183S★	45	1.8	14/1000	60	1.5	360C/1
MRF184★	60	1.9	15/1000	60	1.1	360B/1
MRF184S★	60	1.9	15/1000	60	1.1	360C/1
MRF185 (3)★	85	3.4	14/1000	55	0.7	375B/2
MRF186 (3,46b)	120	7.6	12/1000	55	0.6	375B/2

Table 8. To 1.6 GHz

1.6 GHz, V_{DD} = 28 Volts, Class AB, Characterized for INMARSAT Uplinks–LDMOS Die						
MRF3010 (46b)	10	0.95	11/1600	57	3.6	360B/1

(3)Internal Impedance Matched Push-Pull Transistors

(46)To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97

★New Product

RF Power Bipolar Transistors

Motorola's broad line of bipolar RF power transistors are characterized for operation in RF power amplifiers. Typical applications are in base stations, military and commercial landmobile, avionics and marine radio transmitters. Groupings are by frequency band and type of application. Within each group, the arrangement of devices is by major supply voltage rating, then in the order of increasing output power. All devices are NPN polarity except where otherwise noted.

HF Transistors

Table 1. 1.5 – 30 MHz, HF/SSB

Designed for broadband operation, these devices feature specified Intermodulation Distortion at rated power output. Applications include mobile, marine, fixed station, and amateur HF/SSB equipment, operating from 12.5, 13.6, 28, or 50 volt supplies.

Device	P_{out} Output Power Watts	P_{in} (Max) Input Power Watts	G_{PE} (Min) Gain @ 30 MHz dB	θ_{JC} °C/W	Package/Style
V_{CC} = 12.5 or 13.6 Volts, Class AB					
MRF421	100 PEP/CW	10	10	0.6	211–11/1
V_{CC} = 28 Volts, Class AB					
MRF426	25 PEP/CW	0.16	22	2.5	211–07/1
MRF422	150 PEP/CW	15	10	0.6	211–11/1
V_{CC} = 50 Volts, Class AB					
MRF429	150 PEP/CW	7.5	13	0.8	211–11/1
MRF448	250 PEP/CW	15.7	12	0.6	211–11/1

Table 2. 14 – 30 MHz, CB/Amateur Band

These HF transistors are designed for economical, high–volume use in CW, AM and SSB applications.

Device	P_{out} Output Power Watts	P_{in} (Max) Input Power Watts	G_{PE} (Min) Gain @ 50 MHz dB	θ_{JC} °C/W	Package/Style
V_{CC} = 12.5 or 13.6 Volts, Class AB					
MRF455	60	3	13	1	211–07/1
MRF454	80	5	12	0.7	211–11/1

Table 3. 27 – 50 MHz, Low–Band FM Band

For use in the FM "Low–Band," for Mobile communications.

Device	P_{out} Output Power Watts	P_{in} (Max) Input Power Watts	G_{PE} (Min) Gain @ 50 MHz dB	θ_{JC} °C/W	Package/Style
V_{CC} = 12.5 or 13.6 Volts, Class AB					
MRF492	70	5.6	11	0.7	211–11/1

VHF Transistors

Table 4. 30 – 200 MHz Band

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

Device	P_{out} Output Power Watts	P_{in} (Max) Input Power Watts	G_{PE} (Min)/Freq. Power Gain dB/MHz	θ_{JC} °C/W	Package/Style
V_{CC} = 28 Volts, Class AB					
MRF314	30	3	10/150	2.2	211–07/1
MRF316(2)	80	8	10/150	0.8	316–01/1
MRF317(2)	100	12.5	9/150	0.65	316–01/1

(2)Internal Impedance Matched

VHF Transistors (continued)

Table 5. 136 – 174 MHz High Band

The “workhorse” VHF FM High–Band is served by Motorola with the broadest range of devices and package combinations in the industry.

Device	P_{out} Output Power Watts	P_{in} (Max) Input Power Watts	G_{PE} (Min) Gain @ 175 MHz dB	θ_{JC} °C/W	Package/Style
V_{CC} = 12.5 Volts, Class C					
MRF4427(18b)	1	0.016	18(19)	125(1)	751/1
MRF553	1.5	0.11	11.5	25	317D/2
MRF2628	15	0.95	12	4	244/1
MRF1946	30	3	10	1.6	211–07/1
MRF1946A	30	3	10	1.8	145A–09/1
MRF224	40	14.3	4.5	2.2	211–07/1
MRF240	40	5	9	2.2	145A–09/1
MRF247(2)	75	15	7	0.7	316–01/1

UHF Transistors

Table 6. 100 – 400 MHz Band

Stringent requirements of the UHF Military band are met by MRF325, 326, 327, 329 and 2N6439 types, with all–gold metal systems, specified ruggedness and programmed wirebond construction, to assure consistent input impedances for internally matched parts.

Device	P_{out} Output Power Watts	P_{in} (Max) Input Power Watts	G_{PE} (Min) Gain @ 400 MHz dB	θ_{JC} °C/W	Package/Style
V_{CC} = 28 Volts, Class C					
MRF325(2)	30	4.3	8.5	2.2	316–01/1
MRF326(2)	40	5	9	1.6	316–01/1
MRF327(2)	80	14.9	7.3	0.7	316–01/1
MRF329(2)	100	20	7	0.7	333/1
MRF392(3)	125	19.8	8	0.7	744A/1

Table 7. 400 – 500 MHz Band

Similar to the 100–400 MHz transistors, these devices have bandwidth capabilities operating up to 500 MHz. All have nitride passivated die, gold metal systems, specified ruggedness and controlled wirebond construction to meet the stringent requirements of military space applications.

Device	P_{out} Output Power Watts	P_{in} (Max) Input Power Watts	G_{PE} (Min)/Freq. Power Gain dB/MHz	θ_{JC} °C/W	Package/Style
V_{CC} = 28 Volts, Class C					
MRF313	1	0.03	15/400	28.5	305A/1
MRF321	10	0.62	12/400	6.4	244/1
MRF323	20	2	10/400	3.2	244/1
MRF393(3)	100	18	7.5/500	0.7	744A/1

(1)$R_{\theta JA}$. Thermal Resistance Junction to Ambient.
(2)Internal Impedance Matched
(3)Internal Impedance Matched Push-Pull Transistors
(18)Tape and Reel Packaging Option Available by adding suffix: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units.
(19)Typical

UHF Transistors (continued)

Table 8. 470 – 512 MHz Band

Higher power output devices in this UHF power transistor series feature internally input–matched construction, are designed for broadband operation, and have guaranteed ruggedness under output mismatch and RF overdrive conditions. Devices are specified for handheld, mobile and base station operation.

Device	P_{out} Output Power Watts	P_{in} (Max) Input Power Watts	G_{PE} (Min)/Freq. Power Gain dB/MHz	θ_{JC} °C/W	Package/Style
V_{CC} = 12.5 Volts, Class C					
MRF581(4)	0.6	0.03	13/500	40	317/2
MRF555	1.5	0.15	10/470	25	317D/2
MRF652	5	0.5	10/512	7	244/1
MRF652S	5	0.5	10/512	7	249/1
MRF653	10	2	7/512	4	244/1
MRF653S	10	2	7/512	4	249/1
MRF641(2)	15	2.5	7.8/470	4	316–01/1
MRF654(2)	15	2.5	7.8/512	4	244/1
MRF644(2)	25	5.9	6.2/470	1.7	316–01/1
MRF650(2)	50	15.8	5.0/512	1.3	316–01/1
MRF658(2)	65	25	4.15/512	1	316–01/1

Device	P_{out} Output Power Watts	Class	P_{in} (Max) Input Power Watts	G_{PE} (Min)/Freq. Power Gain dB/MHz	θ_{JC} °C/W	Package/Style
V_{CC} = 24 Volts						
TP5002S	1.5	A	0.075	13/470	21	249/1
TP5015	15	AB	1.2	11/470	7.0	319/2
TP5051	50	AB	6	9/470	1.2	333A/2

900 MHz Transistors

Table 9. 870 – 960 MHz Band

Designed specifically for the 900 MHz mobile radio band, MRF840 through MRF847 devices offer superior gain and ruggedness, using the unique CS–12 package, which minimizes common–element impedance, and thus maximizes gain and stability. Devices are listed for mobile and base station applications.

Device	P_{out} Output Power Watts	P_{in} (Max) Input Power Watts	G_{PE} (Min)/Freq. Power Gain dB/MHz	θ_{JC} °C/W	Package/Style
V_{CC} = 12.5 Volts — Class C — Si Bipolar					
MRF559(5)	0.5	0.08	8/870	50	317/2
MRF581(5)	0.6	0.06	10(19)/870	40	317/2
MRF837(5)	0.75	0.11	8/870	40	317/1
MRF8372R1(5) (18a,b)	0.75	0.11	8/870	45	751/1
MRF557(5)	1.5	0.23	8/870	25	317D/2
MRF840(2)(6)	10	2.5	6/870	3.1	319/1
MRF842(2)(6)	20	5	6/870	1.5	319/1
MRF847(2)(6)	45	16	4.5/870	1	319/1

(2)Internal Impedance Matched

(4)Small signal gain. P_O is Typ.

(5)Common Emitter Configuration

(6)Common Base Configuration

(18)Tape and Reel Packaging Option Available by adding suffix: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units.

(19)Typical

Table 9. 870 – 960 MHz Band (continued)

Device	P_{out} Output Power Watts	Class	P_{in}(Max) Input Power Watts	Gp (Min)/Freq. Power Gain dB/MHz	θ_{JC} °C/W	Package/Style
V_{CC} = 24 Volts — Si Bipolar						
TP3007S	2	AB	0.25	9/960	21	305C/1
MRF896	3	AB	0.3	10/900	7	305E/1
TP3008	4	AB	0.28	11.5/960	5	319/2
MRF891	5	AB	0.63	9/900	7	319/2
MRF891S	5	AB	0.63	9/900	7	319A/2
TP3021	10	AB	1.0	10/960	5.0	319/2
MRF892(2)	14	C	2	8.5/900	3.5	319/1
MRF894(2)	30	C	6	7/900	1.5	319/1
MRF897(3)	30	AB	3	10/900	1.7	395B/1
MRF897R(3)	30	AB	3	10.5/900	1.7	395B/1
TP3034	35	AB	7	7/960	2.3	319/2
MRF898(2)	60	C	12	7/900	1	333A/1
V_{CC} = 26 Volts — Si Bipolar						
MRF6409(46a)	20	AB	26/50	10/960	3.8	319/2
MRF6414	50	AB	26/200	8.5/960	1.3	333A/2
TP3069	100	AB	18	7.5/960	0.7	375A/1
MRF899(3)	150	AB	24	8/900	0.8	375A/1

1.5 GHz Transistors

Table 10. 1400 – 1640 MHz Band

Device	P_{out} Output Power Watts	Class	η Eff. (Min) %	Gp (Min)/Freq. Power Gain dB/MHz	θ_{JC} °C/W	Package/Style
MRA1600–002	2	C	40	8.4/1600	15	394/1
MRF16006	6	C	40	7.4/1600	6.8	395C/2
MRF16030	30	C	40	7.5/1600	1.7	395C/2

Microwave Transistors

Table 11. L–Band Pulse Power

These products are designed to operate in short pulse width, 10 µs, low duty cycle, 1%, power amplifiers operating in the 960–1215 MHz band. All devices have internal impedance matching. The prime application is avionics equipment for distance measuring (DME), area navigation (TACAN) and interrogation (IFF).

Device	P_{out} Output Power Watts	P_{in}(Max) Input Power Watts	G_P (Min) Gain @ 1090 MHz dB	θ_{JC} °C/W	Package/Style
V_{CC} = 18 Volts — Class A & AB Common Emitter					
MRF1000MA	0.2	0.02	10	25	332–04/2
MRF1000MB	0.2	0.02	10	25	332A/2
V_{CC} = 35 Volts — Class B & C Common Base					
MRF1002MA	2	0.2	10	25	332–04/1
MRF1002MB	2	0.2	10	25	332A/1
MRF1004MA	4	0.4	10	25	332–04/1
MRF1004MB	4	0.4	10	25	332A/1

(2)Internal Impedance Matched

(3)Internal Impedance Matched Push-Pull Transistors

(46)To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97

Table 11. L–Band Pulse Power (continued)

Device	P_{out} Output Power Watts	P_{in}(Max) Input Power Watts	G_P (Min) Gain @ 1090 MHz dB	θ_{JC} °C/W	Package/Style
V_{CC} = 50 Volts — Class C Common Base					
MRF1015MA	15	1.5	10	10	332–04/1
MRF1015MB	15	1.5	10	10	332A/1
MRF1035MA	35	3.5	10	5	332–04/1
MRF1035MB	35	3.5	10	5	332A/1
MRF1090MA	90	9	10	0.6	332–04/1
MRF1090MB	90	9	10	0.6	332A/1
MRF1150MA	150	25	7.8	0.3	332–04/1
MRF1150MB	150	25	7.8	0.3	332A/1

Table 12. L–Band Long Pulse Power

These products are designed for pulse power amplifier applications in the 960–1215 MHz frequency range. They are capable of handling up to 10 μs pulses in long pulse trains resulting in up to a 50% duty cycle over a 3.5 millisecond interval. Overall duty cycle is limited to 25% maximum. The primary applications for devices of this type are military systems, specifically JTIDS and commercial systems, specifically Mode S. Package types are hermetic.

Device	P_{out} Output Power Watts	P_{in}(Max) Input Power Watts	G_{PB} (Min) Gain @ 1215 MHz dB	θ_{JC} °C/W	Package/Style
V_{CC} = 28 Volts — Class C Common Base					
MRF10005	5	0.71	8.5	8	336E/1
V_{CC} = 36 Volts — Class C Common Base					
MRF10031	30	3	10	3	376B/1
MRF10120	120	19	8	0.6	355C/1
V_{CC} = 50 Volts					
MRF10070	70	7	10[7]	0.4	376C/1
MRF10150	150	15	10[7]	0.25	376B/1
MRF10350	350	44	9[7]	0.11	355E/1
MRF10500	500	63	9[7]	0.12	355D/1
MRF10501	500	63	9[7]	0.12	355H/1

[7]Typical @ 1090 MHz

Linear Transistors

The following sections describe a wide variety of devices specifically characterized for linear amplification. Included are medium power and high power parts covering frequencies from 100 MHz – 4 GHz.

Table 13. To 1 GHz, Class A

These devices offer a selection of performance and price for linear amplification to 1 GHz. The “MRA” prefix parts are input matched and feature high overdrive and extreme ruggedness capability.

Device	P_o @ 1 dB Comp. Point Watts	G_{SS} (Min)/Freq. Small Signal Gain dB/MHz	Bias Point (Vdc/A)	θ_{JC} °C/W	Package/Style
V_{CC} = 19 Volts					
MRA1000–3.5L	3.5	10/1000	19/0.6	8	145A–09/1
MRA1000–7L	7	9/1000	19/1.2	4	145D–02/1
MRA1000–14L	14	8/1000	19/2.4	2.1	145D–02/1

Device	P_{out} Output Power Watts	Gp (Min)/Freq. Power Gain dB/MHz	Bias Point Per Side (Vdc/MA)	θ_{JC} °C/W	Package/Style
V_{CC} = 28 Volts					
MRA0510–50H	50	7/1000	28/120	1.4	391–01/1

Table 14. UHF Ultra Linear For TV Applications

The following devices have been characterized for ultra–linear applications such as low–power TV transmitters in Band IV and Band V. Each features diffused ballast resistors and an all–gold metal system to provide enhanced reliability and ruggedness.

Device	P_{ref}(Min) Watts	G_P (Min)/Freq. Small Signal Gain dB/MHz	3 Tone IMD(8) dB	θ_{JC} °C/W	Package/Style
V_{CC} = 20 Volts, Class A					
TPV596A	0.5	11.5/860	–58	20	244/1
TPV597	1	10.5/860	–58	9	244/1
TPV598	4	7/860	–60	5	244/1

Device	P_{out} Output Power Watts	Class	P_{in}(Max) Input Power Watts	Gp (Min)/Freq. Power Gain dB/MHz	θ_{JC} °C/W	Package/Style
V_{CE} = 24 Volts — Class A						
MRF857S	2.1 (CW)	A	0.4	12.5/900	8.4	305D/1
MRF858	3.6 (CW)	A	0.29	11/900	6.9	319/2
MRF858S	3.6 (CW)	A	0.29	11/900	6.9	319A/2
MRF859	6.5 W (CW)	A	0.46	11.5/900	3.9	319/2
MRF859S	6.5 W (CW)	A	0.46	11.5/900	3.9	319A/2
MRF861	27 (CW)	A	8	9.5/900	0.92	375A/1
MRF862	36 (CW)	A	4.5	9/900	0.75	375A/1

(8)Vision Carrier: – 8 dB; Sound Carrier: – 7 dB; Sideband Carrier: – 16 dB

Table 14. UHF Ultra Linear For TV Applications (continued)

Device	P_{ref}(Min) Watts	G_P (Min)/Freq. Small Signal Gain dB/MHz	3 Tone IMD(8) dB	θ_{JC} °C/W	Package/Style
V_{CC} = 25 Volts, Class A					
TPV695A	14	9.5/860	–47	2.5	395B/1
TPV7025	25	8.5/860	–45	1.5	398/1
TPV6030	20/35(11)	9.5/860	–51/–	1.1	375A/1
V_{CC} = 28 Volts, Class AB					
TPV8100B	100(11)	8.5/860	—	0.7	398/1

Table 15. Microwave Linear for PCN Applications

The following devices have been developed for linear amplifiers in the 1.5–2 GHz region and have characteristics particularly suitable for PDC, PCS or DCS1800 base station applications.

Device	P_{out} Watts	Class	Bias Point Vdc/mA	Gain (Typ)/Freq dB/MHz	θ_{JC} °C/W	Package/Style
V_{CC} = 20 Volts–Bipolar Die						
MRF6401(12)	0.5	A	20/80	10/1880	30	305C/1
V_{CC} = 26 Volts–Bipolar Die						
MRF6402(13)	4.5	AB	26/40	10/1880	5	319/2
MRF6404(16)	30	AB	26/150	8.5/1880	1.4	395C/1
MRF6408	12	AB	26/100	8.8/1880	2.8	395C/1
MRF15030	30	A, AB	26/125	9/1490	1.4	395C/1
MRF15060★	60	A, AB	26/200	10/1490	0.7	451/1
MRF15060S★	60	A, AB	26/200	10/1490	0.7	451A/1
MRF15090	90	A, AB	26/250	7.5/1490	0.7	375A/1
MRF20030(46a)	30	A, AB	26/	—	—	395D/1
MRF20060★	60	A, AB	26/200	9/2000	0.7	451/1
MRF20060S★	60	A, AB	26/200	9/2000	0.7	451A/1
MRF20120(46b)	120	AB	26/400	9/2000	.35	TBD
V_{DD} = 26 Volts–LDMOS Die						
MRF280S(46b)	2	A, AB	26/	16/2000	10	458/1
MRF280Z(46b)	2	A, AB	26/	16/2000	10	458A/1
MRF281S(46b)	4	A, AB	26/	13.6/2000	8.75	458/1
MRF281Z(46b)	4	A, AB	26/	13.6/2000	8.75	458A/1
MRF6525–5(46b)	5	AB	26/70	12/2000	10	458A/1
MRF6525–10(46b)	10	AB	26/130	11/2000	6.0	458A/1
MRF282S(46a)	10	A, AB	26/75	13/2000	2.9	458/1
MRF282Z(46a)	10	A, AB	26/75	13/2000	2.9	458A/1
MRF284 (46b)	30	A, AB	26/200	11.5/2000	2.0	360B/1
MRF284S(46b)	30	A, AB	26/200	11.5/2000	2.0	360C/1
MRF286(46b)	60	A, AB	26/500	11.4/2000	.73	465/1
MRF286S(46b)	60	A, AB	26/500	11.4/2000	.73	465A/1

(8)Vision Carrier: – 8 dB; Sound Carrier: – 7 dB; Sideband Carrier: – 16 dB

(11)Output power at 1 dB compression in Class AB

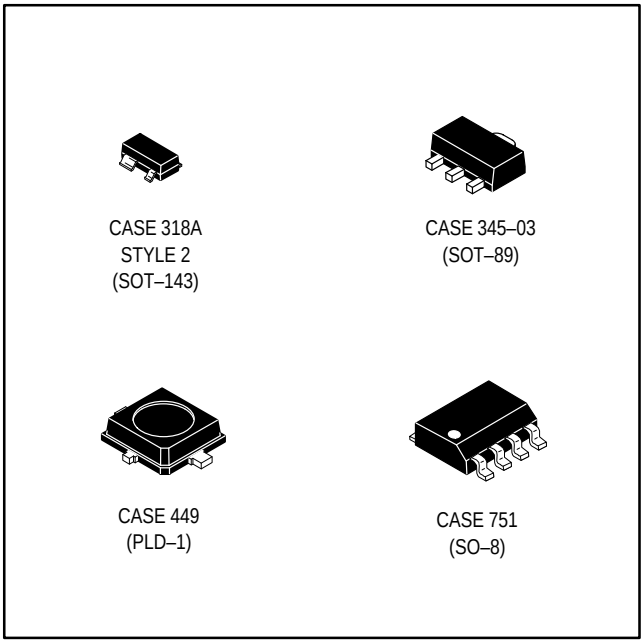
(12)Formerly known as “TP4001S”

(13)Formerly known as “TP4004”

(16)Formerly known as “TP4035”

(46)To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97

★New Product



RF Medium Power Transistors

RF Medium Power Transistors are used in portable transmitter applications and low voltage drivers for higher power devices. They can be used for analog cellular, GSM and the newer digital handheld cellular phones. GaAs, LDMOS and Bipolar devices are available. RF Medium Power Transistors are supplied in industry standard SOT packages as well as Motorola's high performance PLD line of surface mount power RF packages. Other applications include talkback pagers, wireless modems and LANs, cable modems, highspeed drivers and instrumentation.

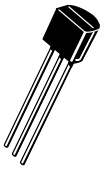
RF Medium Power Transistors

Discrete Wireless Transmitter Devices

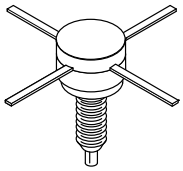
Device	Freq. MHz	V_{DD} V	Typical Output Power dBm	Typical Drain Eff. %	Typical Gain dB	Semiconductor Technology	Package
3.5 V Applications							
MRF9822T1(18f,46a)	850	3.5	31.0	70	11	GaAs PHEMT	PLD–1
4.8 V Applications							
MRF9242T1(18f,46b)	900	4.8	31.5	65	9.5	LDMOS	PLD–1
MRF9282T1(18f,46b)	900	4.8	34.0	60	8	LDMOS	PLD–1
5.8 V Applications							
MXR9745T1(18f,46a)	850	5.8	31.5	60	8.5	LDMOS	SOT–89
MRF9251T1(18c,46b)	900	5.8	23.5	60	10.5	LDMOS	SOT–143
MRF9811T1(18c,46b)	900	5.8	22	60	15	GaAs MAFET	SOT–143
MRF9742(18a,b,46b)	900	5.8	30	60	11	LDMOS	SO–8
MRF9745T1(18f,46a)	900	5.8	30	55	10	LDMOS	PLD–1
MRF9762(18a,b, 46b)	900	5.8	31.5	60	11	LDMOS	SO–8

(18)Tape and Reel Packaging Option Available by adding suffix: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units.

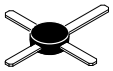
(46)To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97



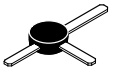
CASE 29–04
STYLE 2
(TO–226AA)



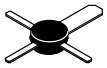
CASE 244A
STYLE 1



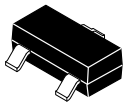
CASE 317
STYLE 2
(MACRO–X)



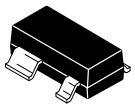
CASE 317A
STYLE 2
(MACRO–T)



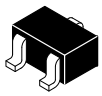
CASE 317D
STYLE 2
(POWER MACRO)



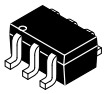
CASE 318–08
STYLE 6
(SOT–23)



CASE 318A
STYLE 1
LOW PROFILE
(SOT–143)



CASE 419
STYLE 3, 6
(SC–70/SOT–323)



CASE 419B
STYLE 16, 17
(SC–70ML/SOT–323)

CASE 751
STYLE 1
(SO–8)

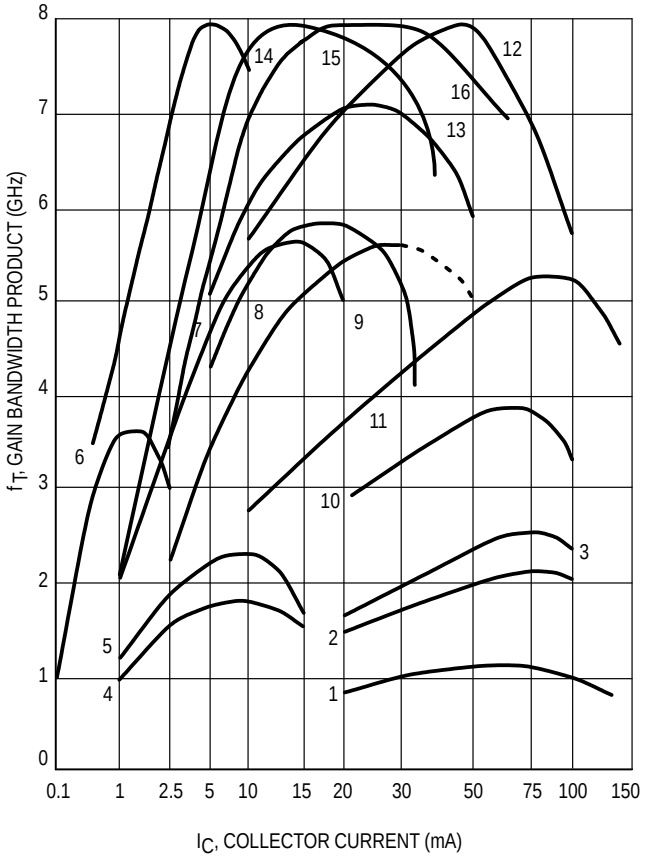
RF Small Signal Transistors

Motorola's broad line of RF Small Signal Transistors includes NPN and PNP Silicon Bipolar Transistors characterized for low noise amplifiers, mixers, oscillators, multipliers, non–saturated switches and low–power drivers.

These devices are available in a wide variety of package types: plastic Macro–X and Macro–T, ceramic and surface mounted. Most of these transistors are fully characterized with s–parameters.

RF Small Signal Transistors

RF Small Signal Transistor Gain Characteristics



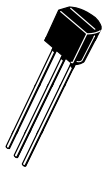
Curve numbers apply to transistors listed in the subsequent tables.

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, the Motorola broad range of RF small–signal amplifier transistors is organized by package. Devices for other applications such as oscillators or switches are shown in the appropriate preceding tables. **These devices are NPN polarity unless otherwise designated.**

Plastic SOE Case

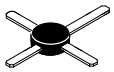
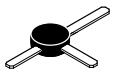
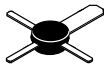
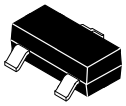
Table 1. Plastic SOE Case

Device	Gain–Bandwidth @ f_T Typ GHz	@ I_C mA	Curve No. Page 5.10–17	NF_{min} @ f Typ dB	MHz	Gain @ f Typ dB	MHz	Maximum Ratings $V_{(BR)CEO}$ Volts	I_C mA	Package
Case 29–04/1,2, TO–226AA										
LP1001	5	10	—	2.7	500	12.5	1000	15	—	
LP1001A	5	10	—	3.2	1000	12.5	1000	15	—	
MPS911[29]	7	30	8	1.7	500	16.5	500	12	40	
MPS571	8	50	12	2	500	14	500	10	80	

[29]Packaging Options Available in Tape and Reel and Fan Fold Box

Selection by Package (continued)

Table 1. Plastic SOE Case (continued)

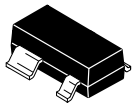
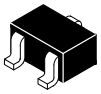
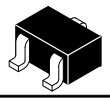
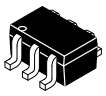
Device	Gain–Bandwidth @ f_T Typ GHz	Gain–Bandwidth @ I_C mA	Curve No. Page 5.10–17	NF_{min} @ f Typ dB	NF_{min} @ f MHz	Gain @ f Typ dB	Gain @ f MHz	Maximum Ratings $V_{(BR)CEO}$ Volts	Maximum Ratings I_C mA	Package
Case 317/2 — MACRO–X										
MRF901	4.5	15	7	2	1000	12	1000	15	30	
MRF571	8	50	12	1.5	1000	12	1000	10	70	
MRF951	8	30	16	2.1	2000	12.5	2000	10	100	
MRF559	3	100	10	—	—	13	512	18	150	
MRF581	5	75	11	2	500	15.5	500	18	200	
MRF581A	5	75	11	1.8	500	15.5	500	15	200	
MRF837	5	75	11	—	—	10	870	16	200	
Case 317A/2 — MACRO–T										
BFR90	5	14	7	2.4	500	18	500	15	30	
BFR96	4.5	50	9	2	500	14.5	500	15	100	
Case 317D/2										
MRF553	—	—	—	—	—	13	175	16	500	
MRF555	—	—	—	—	—	12.5	470	16	400	
MRF557	—	—	—	—	—	9	870	16	400	
Case 318–08/6 — SOT–23										
MMBR521LT1[17][18c]	3.4	–35	—	1.5	500	15	500	–10	–70	
MMBR931LT1[18c]	3	1	6	4.3	1000	10	1000	5	5	
MMBR5031LT1[18c]	1	5	—	2.5	450	17	450	10	20	
BFS17LT1[18c]	1.3	25	—	—	—	—	—	15	—	
BFR92ALT1[18c]	4.5	14	—	—	—	15	—	15	25	
MMBR901LT1[18c]	4	15	7	1.9	1000	12	1000	15	30	
BFR93ALT1[18c]	3.4	30	—	2.5	30	—	—	12	35	
MMBR920LT1[18c]	4.5	14	—	2.4	500	15	500	15	35	
MMBR5179LT1[18c]	1.4	5	4	—	—	15	200	12	50	
MMBR941LT1[18c,d]	8	15	15	2.1	2000	8.5	2000	10	50	
MMBR911LT1[18c]	6	30	8	2	500	17	500	12	60	
MMBR571LT1[18c]	8	50	12	2	500	16.5	500	10	80	
MMBR951LT1[18c]	8	30	16	2.1	2000	7.5	2000	10	100	
MMBR951ALT1[18c]	8	30	16	2.1	2000	7.5	2000	10	100	

[17] PNP

[18] Tape and Reel Packaging Option Available by adding suffix: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units.

Selection by Package (continued)

Table 1. Plastic SOE Case (continued)

Device	Gain–Bandwidth @ f_T Typ GHz	Gain–Bandwidth @ I_C mA	Curve No. Page 5.10–17	NF_{min} @ f Typ dB	NF_{min} @ f MHz	Gain @ f Typ dB	Gain @ f MHz	Maximum Ratings $V_{(BR)CEO}$ Volts	Maximum Ratings I_C mA	Package
Case 318A/1 — SOT–143										
MRF5711LT1(18c)	8	50	12	1.6	1000	13.5	1000	10	70	
MRF5211LT1(17)(18c)	4.2	–50	—	2.8	1000	11	1000	–10	–70	
MRF9331LT1(18c)	5	1	—	2.5	1000	12.5	1000	8	2	
MRF9011LT1(18c)	3.8	15	7	2.3	1000	10.2	1000	15	30	
MRF9411LT1(18c)	8	15	15	2.1	2000	9.5	2000	10	50	
MRF9411BLT1(18c)	8	15	15	2.1	2000	9.5	2000	10	50	
MRF5811LT1(18c)★	5	75	11	2.0	500	18.4	500	18	200	
MRF9511LT1(18c)	8	30	16	2.1	2000	9	2000	10	100	
MRF9511ALT1(18c)	8	30	16	2.1	2000	9	2000	10	100	
Case 419/3 — SC–70/SOT–323										
MRF917T1(18c)★	6	20	8	2.3	1000	10	1000	12	60	
MRF577T1(18c)★	7	40	12	1.5	1000	10	1000	10	80	
MRF927T1(18c)★	8	5	14	1.7	1000	9.8	1000	10	10	
MRF947T1(18c,d)	8	15	15	2.1	2000	10.5	1500	10	50	
MRF947AT1(18c)	8	15	15	2.1	2000	10.5	1500	10	50	
MRF947BT1(18c,d)	8	15	15	2.1	2000	10.5	1500	10	50	
MRF957T1(18c)	8	30	16	2.0	2000	9	1500	10	100	
Case 419/6 — SC–70/SOT–323										
MRF947RT3(18d)	8	15	—	2.1	2000	10.5	1500	10	50	
Case 419B–01 — SC–70ML/SOT–363										
MRF2947AT1(18c)★	8	15	15	1.5	1000	14	1000	10	50	
MRF2947RAT1(18c)★	8	15	15	1.5	1000	14	1000	10	50	
Case 751/1 — SO–8										
MRF5943(18a,b)	1.5	35	2	3.4	200	12	250	30	400	
MRF3866R2(18b)	0.8	50	1	—	—	10.5	400	30	400	
MRF4427(18b)	1.6	50	1	—	—	18	175	20	400	
MRF5812(18a,b)	5.5	75	11	2	500	15.5	500	15	200	
MRF8372R1(18a,b)	5	75	11	—	—	10	870	16	200	

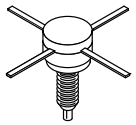
(17)PNP

(18)Tape and Reel Packaging Option Available by adding suffix: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units.

★New Product

Ceramic SOE Case

Table 2. Ceramic SOE Case

Device	Gain–Bandwidth @ f_T Typ GHz	Gain–Bandwidth @ I_C mA	Curve No. Page 5.10–17	N @ f Typ dB	N @ f MHz	Gain @ f Typ dB	Gain @ f MHz	Maximum Ratings $V_{(BR)CEO}$ Volts	Maximum Ratings I_C mA	Package
Case 244A/1										
MRF587	5.5	90	11	3	500	13	500	15	200	

(17)PNP

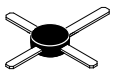
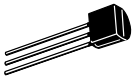
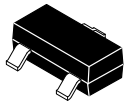
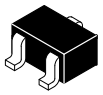
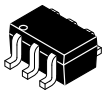
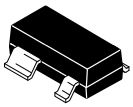
(18)Tape and Reel Packaging Option Available by adding suffix: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units.

★New Product

Selection by Application

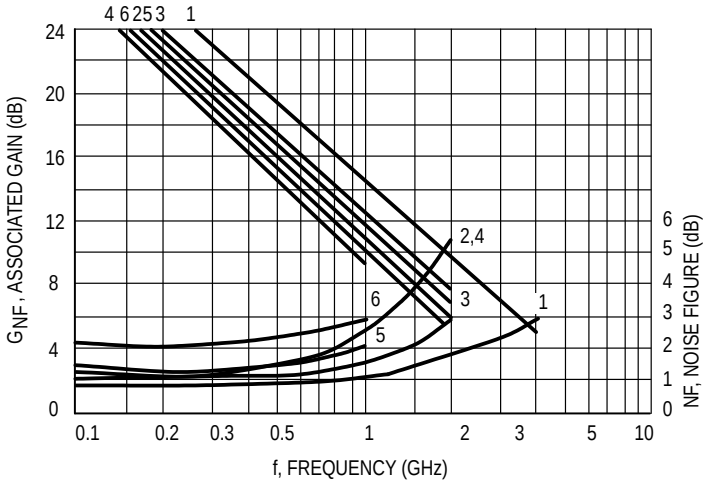
Table 3. Low Noise

The Small–Signal devices listed are designed for low noise and high gain amplifier mixer, and multiplier applications. Each transistor type is available in various packages. **Polarity is NPN unless otherwise noted.**

Package	Name	Case Number	Curve Number (See figure below)					
			1	2[17]	3	4	5	6
	MACRO–X	317/2	MRF951[20]	—	MRF571	MRF581	MRF901	—
	TO–226AA	29–04/2	—	—	MPS571	—	—	MPS911
	SOT–23	318–08/6	MMBR941LT1 MMBR951LT1[20]	MMBR521LT1	MMBR571LT1	—	MMBR901LT1	MMBR911LT1
	SC–70/ SOT–323	419/3, 6	MRF917T1 MRF577T1 MRF927T1 MRF947AT1 MRF947T1 MRF947BT1 MRF947RT3 MRF957T1[20]	—	—	—	—	—
	SC–70ML/ SOT–363	419B/ 16, 17	MRF2947AT1 MRF2947RAT1	—	—	—	—	—
	SOT–143	318A/1	MRF9411BLT1 MRF9411LT1 MRF9511LT1[20] MRF9511ALT1	MRF5211LT1	MRF5711LT1	MRF5811LT1	MRF9011LT1	—
	SO–8	751/1	—	—	—	MRF5812	—	—

[17]PNP

[20]Higher Current Version



Gain and Noise Figure versus Frequency

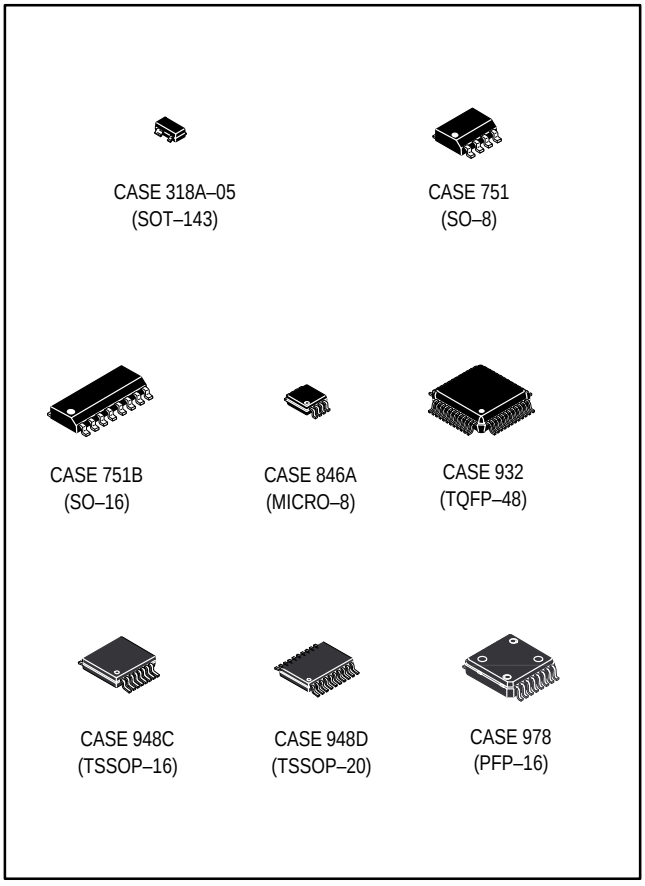
Selection by Application (continued)

Table 4. CATV, MATV and Class A Linear

For Class A linear CATV/MATV applications. Listed according to increasing gain bandwidth (f_T).

Device	Nominal Test Conditions V_{CE}/I_C Volts/mA	f_T Typ MHz	Noise Figure	Distortion Specifications				$V_{(BR)CEO}$ V	Package/ Style
			Typ/Freq. dB/MHz	2nd Order IMD dBc	3rd Order IMD dBc	12 Ch. Cross–Mod. dBc	Output Level dBmV		
MMBR5179LT1(18c)	6/5	1500	4/450					12	318–08/6
MRF5943(18a,b)	15/50	1500	3.4/200					30	751/1
MMBR5031LT1(18c,d)	6/5	2000	1.9/450					10	318–08/6
MMBR920LT1(18c,d)	10/14	4500	2.4/500					15	318–08/6
BFR96	10/50	4500	2/500					15	317A/2
BFR90	10/14	5000	2.4/500					15	317A/2
MRF581	10/75	5000	2.7/300		–65		+50	18	317/2
MRF581A	10/75	5000	1.8/500		–65		+50	15	317/2
MRF5812(18a,b)	10/75	5000	1.8/500		–65		+50	15	751/1
LP1001		5000	2.7/500					15	29–04/2
LP1001A		5000	3.2/1000					15	29–04/2
MRF587	15/90	5500	3/500	–52	–72		+50	17	244A/1

(18)Tape and Reel Packaging Option Available by adding suffix: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units.



Monolithic Integrated Circuits

Motorola's RF monolithic integrated circuit devices provide an integrated solution for the personal communications market. These devices are available in plastic SOIC–8, SOIC–16, SOT–143, TSSOP–16, TSSOP–16HS, TSSOP–20, TSSOP–20HS, TQFP–48 or PFP–16 packages.

Evaluation Boards

Evaluation boards are available for RF Monolithic Integrated Circuits by adding a "TF" suffix to the device type. For a complete list of currently available boards and ones in development for newly introduced product, please contact your local Motorola Distributor or Sales Office.

RF Monolithic Integrated Circuits

Switching

Antenna Switches/Local Oscillator Switches

Device	Freq. Range MHz	Supply Volt. Range Vdc	Supply Current μA (Typ)	P_{in}, 1 dB Compression dBm (Typ)	TX Insertion Loss dB (Typ)	Isolation dB (Typ)	Package	System Applicability
MRFIC2003(18b)	100–1000	2.8–6.0	<10	21	0.5	20	SO–8	CT2, ISM
MRFIC1801(18b)	1500–2500	2.7–5.5	300	29	0.6	20	SO–8	DECT, PHS, PCS, ISM
MRFIC0903(18b)★	100–2000	2.7–5.0	60	35.5	0.65	21	SO–8	AMPS, Class 4&5 GSM, DCS1800, PHS, PCS
MRFIC0921(46b)	100–1000	2.7–5.5	300	16	0.6	22	Micro–8	AMPS, CT1, CT2, GSM, IS–54, ISM, DECT, PHS, PCS

Receiver Functions

General Purpose Integrated Circuits

General Purpose Cascode Amplifier

Device	Freq. Range MHz	Supply Volt. Range Vdc	Supply Current mA (Typ)	Small Signal Gain @ 900 MHz dB (Typ)	Noise Figure dB (Typ)	Reverse Isolation dB (Typ)	Package	System Applicability
MRFIC0915(18c,46b)	100–2000	2.7–5.0	2.2	16.5	1.9	38	SOT–143	AMPS, CT1, CT2, GSM, IS–54, ISM, DECT, PHS, PCS
MRFIC0916(18c)★	100–2000	2.7–5.0	4.7	18.5	1.9	44	SOT–143	AMPS, CT1, CT2, GSM, IS–54, ISM, DECT, PHS, PCS

900 MHz Front End

LNA + Mixer

Device	RF Freq. Range MHz	IF Freq. Range MHz	Supply Volt. Range Vdc	Supply Current mA (Typ)	Conv. Gain dB (Typ)	Output Level, 1 dB Comp. dBm (Typ)	Package	System Applicability
MRFIC2001(18b)	500–1000	0–250	2.7–5.0	4.7	23	–10	SO–8	CT2, ISM

1.5 – 2.2 GHz Front End

Integrated LNA

Device	Freq. Range MHz	Supply Volt. Range Vdc	Supply Current mA (Typ)	Small Signal Gain dB (Typ)	Noise Figure dB (Typ)	Reverse Isolation dB (Typ)	Package	System Applicability
MRFIC1501(18b)★	1000–2000	3–5	5.7	18	1.1	26	SO–8	DECT, PHS, PCS
MRFIC1808(18b)★	1700–2100	2.7–4.5	4.2	17	1.6	37	SO–8	DECT, PHS, PCS

GPS Receiver

MRFIC1502(46a)	1570–1580	4.5–5.5	50	65	9.5	—	TQFP–48	GPS

(18)Tape and Reel Packaging Option Available by adding suffix: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units.

(46)To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97

★New Product

Receiver Functions: 1.5 – 2.2 GHz Front End (continued)

Integrated LNA/Downconverter

Device	RF Freq. Range GHz	IF Freq. Range GHz	Supply Volt. Range Vdc	Supply Current RX Mode mA (Typ)	Mixer Conv. Gain dB (Typ)	LNA Gain dB (Typ)	LNA Noise Figure dB (Typ)	Package	System Applicability
MRFIC1804(18b)	1.8–2.0	70–325	2.7–3.3	10	4	14	2.3	SO–16	DECT,PHS,PCS
MRFIC1814(18b,46a)	1.8–2.0	70–300	2.7–4.5	10	9	17	2.5	TSSOP–16	DECT,PHS,PCS

2.4 GHz Front End

Integrated LNA/Downconverter

Device	RF Freq. Range MHz	IF Freq. Range MHz	Supply Volt. Range Vdc	Supply Current mA (Typ)	Conv. Gain dB (Typ)	LNA Noise Figure dB (Typ)	Isolation Lo to RF, Lo to IF dB (Typ)	Package	System Applicability
MRFIC2401(18b)	2400–2500	100–350	4.75–5.25	9.5	21	1.9	20	SO–16	WLAN, MMDS, ISM

Transmitter Functions

General Purpose Integrated Circuits

Quadrature Modulator

Device	Freq. Range MHz	Supply Volt. Range Vdc	Supply Current mA (Typ)	Gain Control dB (Typ)	Lo Leakage dBm (Typ)	SSB P_{out}, 1 dB Compression dBm (Typ)	Package	System Applicability
MRFIC0001(18b)	50–260	2.7–5.5	10	30	–55	–10	TSSOP–20	DCS1800, GSM, NADC PDC, PHS

General Purpose Cascode Amplifier

Device	Freq. Range MHz	Supply Volt. Range Vdc	Supply Current mA (Typ)	Small Signal Gain @ 900 MHz dB (Typ)	Noise Figure dB (Typ)	Reverse Isolation dB (Typ)	Package	System Applicability
MRFIC0915(18c,46a)	100–2000	2.7–5.0	2.2	16.5	1.9	38	SOT–143	AMPS,CT1,CT2,GSM,IS–54, ISM,DECT,PHS,PCS
MRFIC0916(18c)★	100–2000	2.7–5.0	4.7	18.5	1.9	44	SOT–143	AMPS,CT1,CT2,GSM,IS–54, ISM,DECT,PHS,PCS

(18)Tape and Reel Packaging Option Available by adding suffix: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units.

(46)To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97

★New Product

900 MHz Transmit Chain

Transmit Mixer

Device	RF Freq. Range MHz	IF Freq. Range MHz	Supply Volt. Range Vdc	Supply Current mA (Typ)	Standby Current μA (Typ)	Conv. Gain dB (Typ)	Output Level, 1 dB Comp. dBm (Typ)	Package	System Applicability
MRFIC2002(18b)	500–1000	0–250	2.7–5.0	5.5	0.1	10	–18	SO–8	AMPS,CT1,CT2, GSM, IS–54, ISM
MRFIC2101(18b)	800–1000	0–250	3–4.75	45	2	26.5	4.5	SO–16	AMPS,CT1,CT2, GSM, IS–54, ISM
MRFIC0931(18b, 46a)	500–2000	0–250	2.7–4.5	38	—	—	—	SO–8	AMPS,CT1,CT2, GSM, IS–54, ISM, USPCS, CDMA

Driver Amplifier

Device	Freq. Range MHz	Supply Volt. Range Vdc	Supply Current mA (Typ)	Standby Current mA (Typ)	Small Signal Gain dB (Typ)	Gain Control dB (Typ)	P_{out}, 1 dB Compression dBm (Typ)	Package	System Applicability
MRFIC2004(18b)	800–1000	2.7–4.0	11	0.7	21.5	34	–1	SO–16	AMPS,CT1,CT2, GSM,ISM
MRFIC2006(18b)	500–1000	1.8–4.0	46	—	23	—	15.5	SO–8	AMPS,CT1,CT2, GSM,ISM
MRFIC0904(18b) ★	800–1000	2.7–5.0(47)	280	0.05	27	24.5	25.5	SO–16	AMPS,GSM,ISM

Integrated Power Amplifiers

Low Power 900 MHz Power Amplifiers

Device	Freq. Range MHz	Supply Volt. Range Vdc	Supply Current mA (Typ)	Small Signal Gain dB (Typ)	Return Loss Input/Output dB (Typ)	P_{out}, 1 dB Compression dBm (Typ)	Package	Semiconductor Technology
MRFIC2006(18b)	500–1000	1.8–4.0	46	23	15	15.5	SO–8	Silicon

Device	Freq. Range MHz	Supply Volt. Range Vdc	Supply Current mA (Typ)	Standby Current mA (Typ)	Small Signal Gain dB (Typ)	P_{out}, 1 dB Compression dBm (Typ)	Package	Semiconductor Technology
MRFIC2101(18b)	800–1000	3 – 4.75	38	2	16	18	SO–16	Silicon

Analog Cellular

Device	Freq. Range MHz	Supply Volt. Vdc	Power Added Efficiency % (Min)	Power Gain dB (Min)	Harmonic Output 2fo dBc	P_{out}/P_{in} dBm (Min)	Package	Semiconductor Technology
MRFIC0910(18e,46a)	824–905	4.8	50	17.8	–40	30.8/13	PFP–16	LDMOS
MRFIC0912(18e) ★	824–905	4.6(47)	55	23.8	–25	30.8/7	PFP–16	GaAs
MRFIC0923(18e,46c)	824–905	3.6	50	17.8	–40	30.8/13	PFP–16	LDMOS

(18) Tape and Reel Packaging Option Available by adding suffix: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units.

(46) To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97

(47) Negative supply required

★New Product

Transmitter Functions: 900 MHz Transmit Chain: Integrated Power Amplifiers (continued)

GSM Cellular

Device	Freq. Range MHz	Supply Volt. Vdc	Power Added Efficiency % (Min)	Power Gain dB (Min)	Harmonic Output 2fo dBc	P_{out}/P_{in} dBm (Min)	Package	Semiconductor Technology
MRFIC0913(18e)★	880–915	4.8(47)	48	24.5	–30	34.5/10	PFP–16	GaAs
MRFIC0917(18e,46c)	880–915	3.6(47)	45	24.5	–30	34.5/10	PFP–16	GaAs

DCS1800, PCS1900

Device	Freq. Range MHz	Supply Volt. Vdc	Power Added Efficiency % (Min)	Power Gain dB (Min)	Harmonic Output 2fo dBc	P_{out}/P_{in} dBm (Min)	Package	Semiconductor Technology
MRFIC1818(18e,46a)	1.7–1.9	4.8(47)	35	30	–30	33/3	PFP–16	GaAs
MRFIC1817(18e,46d)	1.7–1.9	3.6(47)	35	27	–30	32/5	PFP–16	GaAs

Two–way Paging, ISM

Device	Freq. Range MHz	Supply Volt. Vdc	Power Added Efficiency % (Min)	Power Gain dB (Min)	Harmonic Output 2fo dBc	P_{out}/P_{in} dBm (Typ)	Package	Semiconductor Technology
MRFIC0914(18b)★	890–950	4.8	40	28	–45	30.5/2.5	SO–16	LDMOS
MRFIC0920(18b, 46b)	890–950	3.4	40	27.5	–45	30.5/3	TSSOP–16HS	LDMOS

1.5 – 2.2 GHz Transmit Chain

Upconverter

Device	RF Output Freq. Range GHz	Supply Volt. Range Vdc	Supply Current TX Mode mA (Typ)	Standby Current μA (Typ)	Conv. Gain dB (Typ)	Recommended IF Input MHz (Typ)	P_{out}, 1 dB Comp. dBm (Typ)	Package	System Applicability
MRFIC1803(18b)	1.7–2.5	2.7–3.3	28	100	10	70–350	–2	SO–16	DECT,PHS, PCS
MRFIC1813(18b)★	1.7–2.5	2.7–4.5	25	100	15	70–350	3	TSSOP–16	DECT,PHS, PCS

Power Amplifier

Device	RF Output Freq. Range GHz	Supply Volt. Range Vdc(47)	Supply Current mA (Typ)	Standby Current mA (Typ)	Small Signal Gain dB (Typ)	P_{out}/P_{in} dBm (Typ)	1 dB Comp. dBm (Typ)	Pkg	System Applicability
MRFIC1805(18b, 46a)	1.7–2.5	2.7–5.0	190	0.25	21	22/0	23	TSSOP–16	DECT,PHS, PCS
MRFIC1806(18b)	1.5–2.5	3.0–5.0	115	0.25	23	19.5/–3	21	SO–16	DECT,PHS, PCS
MRFIC1807(18b)	1.5–2.2	3.0–5.0	325	0.06	8	26.8/20	25	SO–16	DECT,PHS, PCS

(18)Tape and Reel Packaging Option Available by adding suffix: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units.

(46)To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97

(47) Negative supply required

★New Product

Transmitter Functions: 1.5 – 2.2 GHz Transmit Chain (continued)

Power Amplifier

Device	RF Output Freq. Range GHz	Supply Volt. Range Vdc	PA Supply Current TX Mode mA (Typ)	Standby Current mA (Typ)	Small Signal Gain dB (Typ)	Insertion Loss Rx Mode dB (Typ)	P_{out}, 1 dB Compression dBm (Typ)	Package	System Applicability
MRFIC1807(18b) (Including TX/RX Switch)	1.5–2.2	3.0–5.0	325	0.06	8	1	25	SO–16	DECT, PHS, PCS

2.4 GHz Transmit Chain

Exciter Amplifier

Device	Freq. Range GHz	Supply Volt. Range Vdc	Supply Current mA (Typ)	Small Signal Gain dB (Typ)	Noise Figure dB (Typ)	P_{out}, 1 dB Compression dBm (Typ)	Package	System Applicability
MRFIC2404(18b)	2.0–3.0	4.75–5.25	9	17	4.3	5	SO–8	WLAN, MMDS, ISM

Power Amplifier

Device	Freq. Range MHz	Supply Volt. Range Vdc	Supply Current mA (Typ)	Small Signal Gain dB (Typ)	Power Control Range dB (Typ)	P_{out}, 1 dB Compression dBm (Typ)	Package	System Applicability
MRFIC2403(18b)	2200–2700	4.75–5.25	95	23	20	19	SO–16	WLAN, MMDS, ISM
MRFIC2410(46b)	2200–2700	4.75–5.25	400	17.5	—	31.5	TSSOP–20HS	WLAN, MMDS, ISM

Upconverter

Device	RF Output Freq. Range GHz	Supply Volt. Range Vdc	Supply Current TX Mode mA (Typ)	Standby Current μA (Typ)	Conv. Gain dB (Typ)	Recommended IF Input MHz (Typ)	P_{out}, 1 dB Comp. dBm (Typ)	Package	System Applicability
MRFIC1803(18b)	1.7–2.5	2.7–3.3	28	100	10	70–350	–2	SO–16	WLAN, ISM
MRFIC1813(18b)★	1.7–2.5	2.7–4.5	25	100	15	70–350	3	TSSOP–16	WLAN, ISM
MRFIC2406(18b,46a)	2.4–2.5	3–5	15	.6	6	100–370	–10	SO–16	WLAN, MMDS, ISM

(18)Tape and Reel Packaging Option Available by adding suffix: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units; f) T1 = 1,000 units.

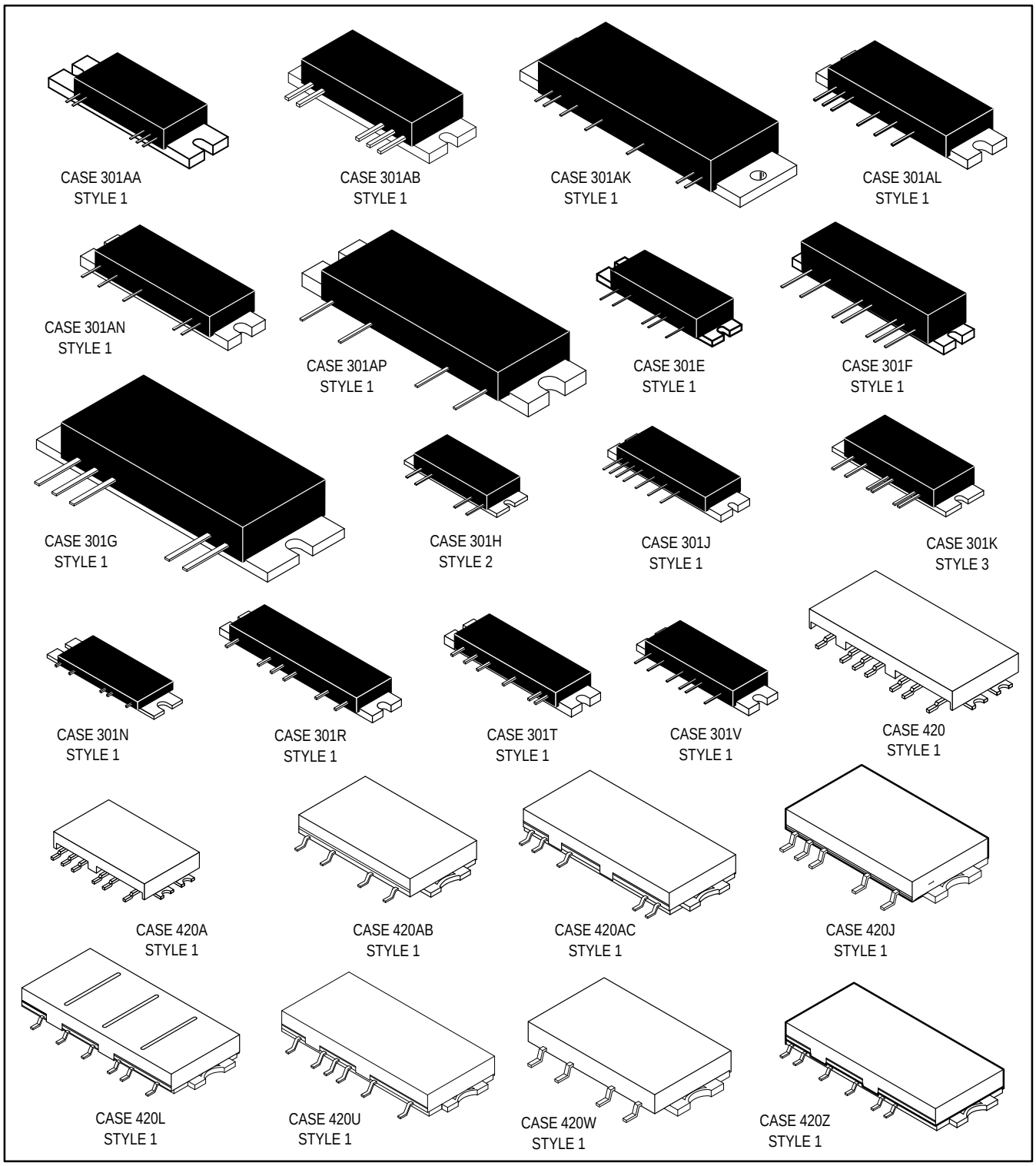
(46)To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97

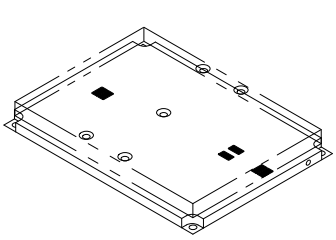
★New Product

RF Amplifiers

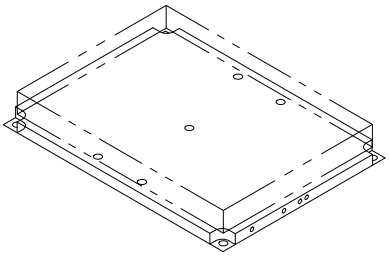
Motorola's line of RF amplifiers designed and specified for use in land mobile radios, CATV distribution systems and general purpose wideband amplification applications. They feature small size, matched inputs and outputs, high stability and guaranteed performance specifications. For the user, they offer the benefits of smaller and less complex system designs in less time and at lower overall cost.

Each amplifier uses modern transistor chips which are gold metallized and have silicon nitride passivation for increased reliability and long life. Chip and wire construction features MOS capacitors and laser trimmed nichrome resistors. Circuit substrates and metallization have been selected for optimum performance cost and reliablity.

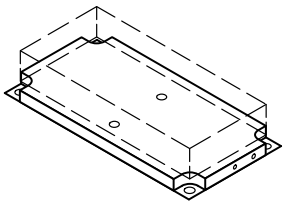




CASE 429A
STYLE 1



CASE 429C
STYLE 1



CASE 429E
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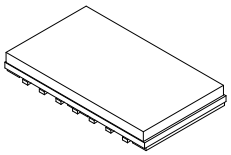

CASE 438A
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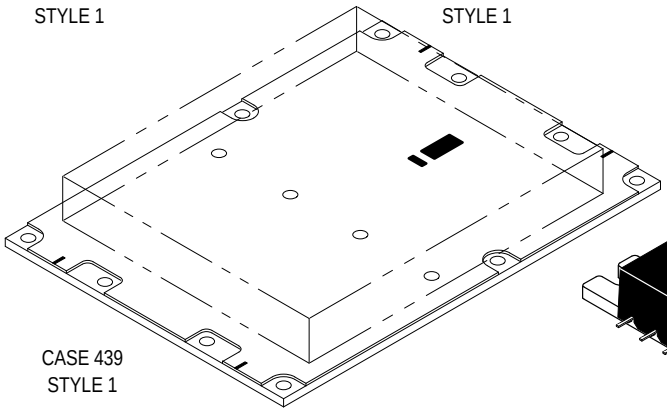
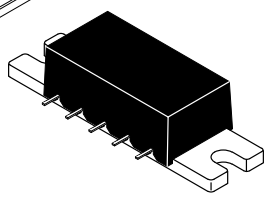
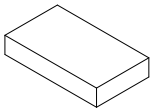


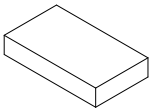
CASE 439
STYLE 1



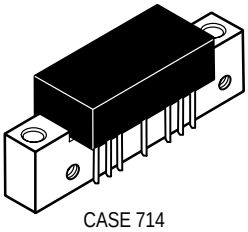
CASE 448
STYLE 1, 2



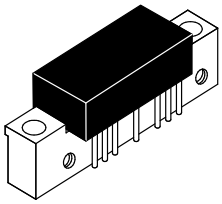
CASE 467
STYLE 1



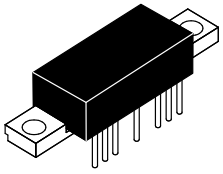
CASE 467A
STYLE 1



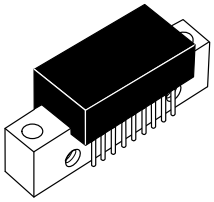
CASE 714
STYLE 1



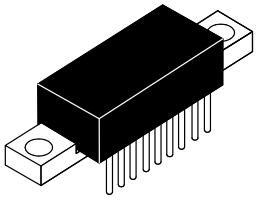
CASE 714F
STYLE 1



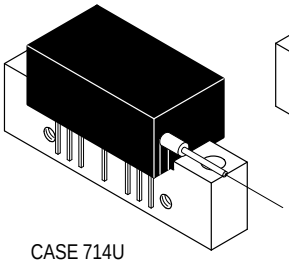
CASE 714G
STYLE 1



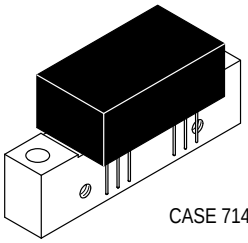
CASE 714P
STYLE 2



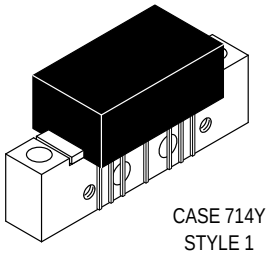
CASE 714T
STYLE 1, 2



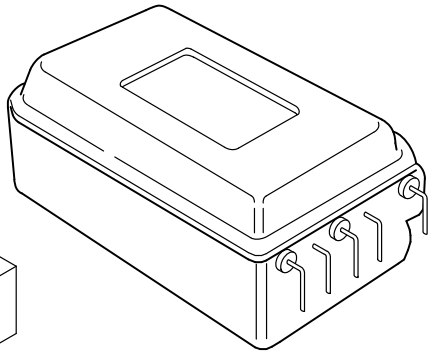
CASE 714U
STYLE 1



CASE 714V



CASE 714Y
STYLE 1



CASE 825A
STYLE 2

RF Amplifier Modules

Complete amplifiers with 50 ohm in/out impedances are available for a variety of applications including land mobile radios, base stations, TV transmitters and other uses requiring large–signal amplification, both linear and Class C. Frequencies covered range from 68–1990 MHz with power levels extending to 180 watts.

Land Mobile/Portable

The advantages of small size, reproducibility and overall lower cost become more pronounced with increasing frequency of operation. These amplifiers offer a wide range in power levels and gain, with guaranteed performance specifications for bandwidth, stability and ruggedness.

Table 1. VHF/UHF, Class C

Device	P_{out} Output Power Watts	P_{in} Input Power Watts	f Frequency MHz	G_P Power Gain, Min dB	V_{CC} Supply Voltage Volts	Package/Style
68–210 MHz, VHF Band — Class C (Silicon Bipolar Die)						
MHW105	5	0.001	68–88	37	7.5	301K/3
MHW607–1	7	0.001	136–150	38.4	7.5	301K/3
MHW607–2	7	0.001	146–174	38.4	7.5	301K/3
MHW607–3	7	0.001	174–195	38.4	7.5	301K/3
MHW607–4	7	0.001	184–210	38.4	7.5	301K/3
136–174 MHz, VHF Band — (LDMOS Die)						
MHW2607–1(46a)	7	0.001	136–174	38.5	7.5	301AN/1
MHW2627–1(46a)	7	0.02	136–174	25.5	7.5	420AC/1
MHW2627–2 (46a)	7	0.02	216–234	25.5	7.5	420AC/1

Device	P_{sat} Watts	ACP (P_{out} = 1.6 W @ $f_o \pm 25$ kHz, 18 kHz BW) (dBc)	f Frequency MHz	G_P Power Gain, Min dB	V_{DD} Supply Voltage Volts	Package/Style
380–470 MHz, Land Mobile Linear (for TransEuropean Trunked Radio – TETRA) — Class AB — (LDMOS Die)						
MHW2701–1 (46a)	4.5	–30	380–430	28	7	420Z/1
MHW2701–2 (46a)	4.5	–30	420–470	28	7	420Z/1

Device	P_{sat} Watts	ACP (P_{out} = 5 W @ $f_o \pm 25$ kHz, 18 kHz BW) (dBc)	f Frequency MHz	G_P Power Gain, Min dB	V_{DD} Supply Voltage Volts	Package/Style
380–470 MHz, Land Mobile Linear (for TransEuropean Trunked Radio – TETRA) — Class AB — (LDMOS Die)						
MHW2703 (46a)	10	–30	380–400	28	7	420Z/1
MHW2723 (46a)	12	–30	380–470	30	12.5	420Z/1

Device	P_{out} Output Power Watts	P_{in} Input Power Watts	f Frequency MHz	G_P Power Gain, Min dB	V_{CC} Supply Voltage Volts	Package/Style
400–512 MHz, UHF Band — Class C (Silicon Bipolar Die)						
MHW704–1	3	0.001	400 – 440	34.8	6.0	301J/1
MHW704–2	3	0.001	440 – 470	34.8	6.0	301J/1
MHW707–1	7	0.001	403 – 440	38.4	7.5	301J/1
MHW707–2	7	0.001	440 – 470	38.4	7.5	301J/1
MHW707–3	7	0.001	470 – 500	38.4	7.5	301J/1
MHW707–4	7(23)	0.001	490 – 512	38.4(23)	7.5	301J/1

(23) P_O @ f = 490 MHz. P_O = 6.5 W @ f = 512 MHz

(46) To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97

Land Mobile/Portable (continued)

400–512 MHz, UHF Band — Class C (Silicon Bipolar Die) – continued

Device	P_{out} Output Power Watts	P_{in} Input Power Watts	f Frequency MHz	G_P Power Gain, Min dB	V_{CC} Supply Voltage Volts	Package/Style
MHW720A1(22)	20	0.15	400 – 440	21	12.5	700/2
MHW720A2(22)	20	0.15	440 – 470	21	12.5	700/2

400–520 MHz, UHF Band — Class D – A (Dynamic Bias via Gate Control) — (LDMOS Die)

Device	P_{out} Output Power Watts	P_{in} Input Power Watts	f Frequency MHz	G_P Power Gain, Min dB	V_{DD} Supply Voltage Volts	Package/Style
MHW2707–1 ★	7	0.001	400–440	38.5	7.5	301AL/1
MHW2707–2 ★	7	0.001	440–470	38.5	7.5	301AL/1
MHW2707A–1 (46a)	7	0.001	400–470	38.5	7.5	301AL/1
MHW2707A–2 (46a)	7	0.001	470–520	38.5	7.5	301AL/1
MHW2717–1 (46a)	7	0.02	400–470	25.5	7.5	420J/1
MHW2717–2 (46a)	7	0.02	450–520	25.5	7.5	420J/1
MHW2727–1 (46a)	7	0.02	400–470	25.5	7.5	420AC/1
MHW2727–2 (46a)	7	0.02	450–520	25.5	7.5	420AC/1

806–821 MHz, UHF Band (for Integrated Digital Enhanced Network – iDEN™)— Class AB — (LDMOS Die)

MHW2801 (46a)	0.8	0.00025	806–821	35	6	420L/1

806–960 MHz, UHF Band — Class C (Silicon Bipolar Die)

Device	P_{out} Output Power Watts	P_{in} Input Power Watts	f Frequency MHz	G_P Power Gain, Min dB	V_{CC} Supply Voltage Volts	Package/Style
MHW851–1	1.6	0.001	820–850	32	6	301N/1
MHW851–2	1.6	0.001	870–905	32	6	301N/1
MHW851–3	2	0.001	890–915	33	6	301N/1
MHW851–4	1.6	0.001	915–925	32	6	301N/1
MHW803–1	2	0.001	820–850	33	7.5	301E/1
MHW803–2	2	0.001	806–870	33	7.5	301E/1
MHW803–3	2	0.001	870–905	33	7.5	301E/1
MHW804–1	4	0.001	800–870	36	7.5	301F/1
MHW806A4(22)	6	0.04	870–950	21.7	12.5	301H/2

806 – 960 MHz, UHF Band — Class AB (LDMOS Die)

Device	P_{out} Output Power Watts	P_{in} Input Power Watts	f Frequency MHz	G_P Power Gain, Min dB	V_{DD} Supply Voltage Volts	Package/Style
MHW2803 (46a)	3.5	0.001	806–824	35.5	6	420L/1
MHW2805–1 (46a)	5	0.004	806–870	31	7.5	420AB/1
MHW2805–2 (46a)	5	0.004	890–950	31	7.5	420AB/1
MHW2820–1 (46a)	20	<0.250	806–870	19	12.5	301G/1(42)
MHW2820–2 (46a)	18	<0.300	890–950	17.9	12.5	301G/1(42)
MHW2821–1★	20	<0.250	806–870	19	12.5	301AB/1
MHW2821–2★	18	<0.300	890–950	17.9	12.5	301AB/1

1710 – 1785 MHz, UHF Band — (GaAs FET Die)

Device	P_{out} Output Power Watts	P_{in} Input Power Watts	f Frequency MHz	G_P Power Gain, Min dB	V_{CC} Supply Voltage Volts	Package/Style
MHW9014	2.1	0.001	1710–1785	33.2	6.0	420/1

(22)Designed for Wide Range P_{out} Level Control
(42)Drop–in for bipolar MHW820
(46)To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97
★New Product

Table 2. UHF, Linear

Device	P_{out} Output Power Watts	P_{in} Input Power Watts	f Frequency MHz	G_P Power Gain, Min dB	V_{CC} Supply Voltage Volts	Package/Style
800 MHz, (for CDMA and TDMA, Dual Mode) — (GaAs)						
MHW9005(46b)	1	0.004	824–849	24	5.8	438A/1
MHW9006(46b)	1.4/0.63(43)	0.004	824–849	25.5/22	5.8	438A/1
824–849 MHz, UHF Band — Class AB (Silicon Bipolar Die)						
MHW920★	0.8(24)	0.001	824–849	29	6	420U/1
MHW927B(22)	6(24)	0.001	824–849	37.8	12.5	301AA/1
880–960 MHz (for GSM) — Class AB (Silicon Bipolar Die)						
MHW953(22)	3.5	0.001	890–915	35.4	7.2	301V/1

880–960 MHz (for GSM) — Class AB (LDMOS Silicon FET)

Device	P_{out} Output Power Watts	P_{in} Input Power Watts	f Frequency MHz	G_P Power Gain, Min dB	V_{DD} Supply Voltage Volts	Package/Style
MIM2901 (46a)	1.41	0.004	824–849	25.5	3.6	TBD
MIM2906 (46a)	3.5	0.002	890–915	32.5	6	467A/1
MIM2908 (46a)	3.2	0.002	880–915	32	4.8	467/1
MHW2905★	3.2	0.002	890–915	32	6	420W/1
MHW910 (46a)	10	0.050	925–960	23	24	301AB/1
MHW913	14	0.1	880–915	21.5	12.5	301AB/1
MHW914(22)	14	0.001	890–915	41.4	12.5	301R/1
MHW916	16	0.036	925–960	26.5	26	301AB/1
MHW930 (46a)	30	0.050	925–960	27	26	301AB/1

1805–1880 MHz (for DCS1800) — Class AB (Silicon Bipolar Die)

Device	P_{out} Output Power Watts	P_{in} Input Power Watts	f Frequency MHz	G_P Power Gain, Min dB	V_{CC} Supply Voltage Volts	Package/Style
MHW1815★	14.5	0.005	1805–1880	34.6	26	301AK/1
1930–1990 MHz (for PCS1900) — Class AB (Silicon Bipolar Die)						
MHW1916★	15.0	0.005	1930–1990	34.8	26	301AK/1

(22)Designed for Wide Range P_{out} Level Control

(24)Average Power; Peak Power is twice average power

(43)Capacitive Load 8.5 pF, V_{out} = 40 V P-P

(46)To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97

★New Product

Wideband Linear Amplifiers

Table 1. General Purpose Wideband Amplifiers

Device	Frequency Range MHz	Gain Min/Typ dB	Supply Voltage Vdc	Output Level 1 dB Compression MW/@ MHz	Noise Figure @ 250 MHz dB	Package/ Style
50–100 Ω Hybrids						
MHW591	1 – 250	34.5/36.5	13.6	700/100	5	714/1
MHW592	1 – 250	33.5/35	24	900/100	5	714/1
MHW593	10 – 400	33/34.5	13.6	600/200	5	714/1
MHW590	10 – 400	31.5/34	24	800/200	5	714/1

Table 2. Cellular Base Station Pre–Drivers

These 50 ohm amplifiers are recommended for modern, multi–tone, CDMA and/or TDMA base–station pre–driver applications. Their high third–order intercept, tight phase control and excellent group delay characteristics make these amplifiers ideal for use in high–power feedforward loops.

Ultra–Linear – Class A (Silicon Bipolar Die)

Device	BW MHz	V_{CC} (Nom.) Volts	I_{CC} (Nom.) mA	Gain (Nom.) dB	Gain Flatness (Typ) ±dB	P_{1dB} (Typ) dBm	3rd Order Intercept (Typ) dBm/MHz	NF (Typ) dB	Case/ Style
MHL9125★	800–960	15	700	20	0.5	31	43	7.5	448/2
MHL9128★	800–960	28	400	20	0.5	31	43	7.5	448/1

Ultra–Linear – Class A (LDMOS Die)

Device	BW MHz	V_{DD} (Nom.) Volts	I_{DD} (Nom.) mA	Gain (Nom.) dB	Gain Flatness (Typ) ±dB	P_{1dB} (Typ) dBm	3rd Order Intercept (Typ) dBm/MHz	NF (Typ) dB	Case/ Style
MHL9236 (46b)	800–960	26	525	30	.1	34	47	4.5	301AP/1
MHL9232 (46c)	800–960	12.5	700	30	.1	34	47	5.0	301AP/1

Table 3. Standard 50 Ohm Linear Hybrids

This series of RF linear hybrid amplifiers have been optimized for wideband, 50 ohm applications. These amplifiers were designed for multi–purpose RF applications where linearity, dynamic range and wide bandwidth are of primary concern. Each amplifier is available in various package options. The MHL series utilizes a new case style that provides microstrip input and output connections.

Device	BW MHz	V_{CC} (Nom.) Volts	I_{CC} (Nom.) mA	Gain/Freq. (Typ) dB/MHz	Gain Flatness (Typ) ±dB	P_{1dB} (Typ) dBm	3rd Order Intercept Point/Freq. (Typ) dBm/MHz	NF/Freq. (Typ) dB/MHz	Case/ Style
CA2832C	1–200	28	435	35.5/100	0.5	33	47/200	5/200	714F/1
CA2830C	5–200	24	300	34.5/100	0.5	29	46/200	4.7/200	714F/1
CA2833C	5–200	24	300	34.5/100	0.5	29	46/200	4.7/200	714G/1
CA2818C	.35–400	24	205	18.5/50	0.5	30	45/200	5/200	714F/1
CA2842C	10–400	24	230	22/100	0.5	30	44/300	4/100	714F/1
CA2810C	10–450	24	310	34/50	1.5	30	43/300	5/300	714F/1
MHL8118★	40–1000	28	400	17.5/900	1	30	41.5/1000	8.5/1000	448/1
MHL8115★	40–1000	15	700	17.5/900	1	30	41.5/1000	8.5/1000	448/2
MHL8018★	40–1000	28	210	18.5/900	1	26	38.5/1000	7.5/1000	448/1
MHL8015★	40–1000	15	380	18.5/900	1	26	38.5/1000	7.5/1000	448/2

(46)To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97

★New Product

TV Transmitters

Table 4. UHF Ultra Linear for TV Applications

These amplifiers are characterized for ultra–linear applications in Band IV and Band V TV transmitters.

Device	Frequency MHz	P_{ref} Watts	G_P (Min)/Freq. Power Gain dB/MHz	3 Tone[8] IMD 1 dB	3 Tone[25] IMD 2 dB	V_{CC} Volts	Class	Package/Style
MRFA2600[26]	470–860	20	10.5/860	–50	–53	26.5	A	429A/1
MRFA2602[28]	470–860	40	9/860	–50	–53	25.5	A	429C/1
RFA8090B	470–860	95[11]	8/860	—	—	28	AB	429E/1
MRFA2604	470–860	180[11]	8/860	—	—	28	AB	439/1

[8]Vision Carrier: – 8 dB; Sound Carrier: – 7 dB; Sideband Carrier: – 16 dB

[11]Output power at 1 dB compression in Class AB

[25]Vision Carrier: – 8 dB; Sound Carrier: – 10 dB; Sideband Carrier: – 16 dB

[26]Formerly known as “RFA6031”

[28]Formerly known as “RFA6060”

CATV Distribution Amplifiers

Motorola Hybrids are manufactured using the latest generation technology which has set new standards for CATV system performance and reliability. These hybrids have been optimized to provide premium performance in all CATV systems up to 152 channels.

Fiber Optic Receivers for HFC

40–860 MHz Hybrids

Device	Hybrid Responsivity Min dB	Flatness dB	Maximum Distortion Specifications IMD 2(52) dB	Maximum Distortion Specifications IMD 3(52) dB	Equivalent Input Noise $pA/\sqrt{Hz}$ Max	Package/ Style
MHLW8000 ★	23.0	1.0	–70	–80	7.5	714U/1

Note: Please call your local Motorola Sales Office for information on optical connector options for this part.

Forward Amplifiers

40/1000 MHz Hybrids, V_{CC} = 24 Vdc, Class A

Device	Hybrid Gain (Nom.) dB	Channel Loading Capacity	Maximum Distortion Specifications Output Level dBmV	2nd Order Test dB	Composite Triple Beat dB 152 CH	Cross Modulation dB 152 CH	Noise Figure @ 860 MHz dB Max	Package/ Style
MHW9142	14	152	+38	–59(40)	–59	–63	8.5	714/1
MHW9182	18	152	+38	–59(40)	–59	–59	8.0	714/1
MHW9242 ★	24	152	+38	–59(40)	–58	–59	8	714/1

40 – 860 MHz Hybrids

Device	Gain dB Typ	Frequency MHz	V_{CC} Volts	2nd Order IMD @ V_{out} = 50 dBmV/ch Max	DIN45004B @ f=860 MHz dBμV Min	Noise Figure @ 860 MHz dB Max	Package/ Style
CA901	17	40 – 860	24	–60	120	8	714P/2
CA901A	17	40 – 860	24	–64	120	8	714P/2

(40)Composite 2nd Order; V_{out} = +38 dBmV/ch

(52)Two laser test with 0.5 mW optical power at 40% modulation index per laser; f1 = 373.25 MHz f2 = 415.25 MHz

★New Product

CATV Distribution: Forward Amplifiers (continued)

40 – 860 MHz Hybrids (continued)

Device	Gain dB Typ	Frequency MHz	V_{CC} Volts	2nd Order IMD @ V_{out} = 50 dBmV/ch Max	DIN45004B @ f=860 MHz dBμV Min	Noise Figure @ 860 MHz dB Max	Package/ Style
Power Doubling Hybrids							
CA922	17	40 – 860	24	–63	123	9.5	714P/2
CA922A	17	40 – 860	24	–67	123	9.5	714P/2
Hybrid Jumper							
CATHRU	0	1 – 1000	75 Ohm Broadband Hybrid Jumper				714V

40 – 860 MHz Hybrids, V_{CC} = 24 Vdc, Class A

Device	Hybrid Gain (Nom.) dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV	2nd Order Test dB	Composite Triple Beat dB 128 CH	Cross Modulation FM = 55.25 MHz dB 128 CH	Noise Figure @ 860 MHz dB Max	Package/ Style
MHW8142	14	128	+38	–60(40)	– 61	– 66	8.0	714/1
MHW8182	18	128	+38	–60(40)	– 60	– 60	7	714/1
MHW8222	22	128	+38	–60(40)	– 60	– 60	7.5	714/1
MHW8242 ★	24	128	+38	–60(40)	– 60	– 60	7.5	714/1
MHW8272 ★	27	128	+38	–60(40)	– 60	– 60	7.0	714/1
MHW8292 ★	29	128	+38	–56(40)	– 60	– 60	7.0	714/1
Power Doubling Hybrids								
MHW8185 (46a)	18.5	128	+40	–62(39)	– 64	– 64	8.0	714Y/1
MHW8205 (46a)	20	128	+40	–60(39)	– 63	– 64	8.0	714Y/1
Feedforward Hybrids								
MFF524B★	24	128	+44	–68(36)	– 66	—	13.0	825A/2

40 – 750 MHz Hybrids, V_{CC} = 24 Vdc, Class A

Device	Hybrid Gain (Nom.) dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV	2nd Order Test dB	Composite Triple Beat dB 110 CH	Cross Modulation FM = 55.25 MHz dB 110 CH	Noise Figure @ 750 MHz dB Max	Package/ Style
MHW7142	14	110	+40	–60(39)	– 62	– 66	8.0	714/1
MHW7182	18	110	+40	–62(39)	– 62	– 64	6.5	714/1
MHW7222	22	110	+40	–55(39)	– 60	– 60	7	714/1
MHW7242 ★	24	110	+40	–60(39)	– 60	– 60	7	714/1
MHW7272 ★	27	110	+40	–60(39)	– 60	– 60	6.5	714/1
MHW7292 ★	29	110	+40	–60(39)	– 60	– 60	6.5	714/1

(36)Composite 2nd order; V_{out} = + 44 dBmV/ch

(39)Composite 2nd order; V_{out} = +40 dBmV/ch

(40)Composite 2nd Order; V_{out} = + 38 dBmV/ch

(46)To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97

★New Product

CATV Distribution: Forward Amplifiers (continued)

40 – 750 MHz Hybrids, V_{CC} = 24 Vdc, Class A (continued)

Device	Hybrid Gain (Nom.) dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV	2nd Order Test dB	Composite Triple Beat dB 110 CH	Cross Modulation FM = 55.25 MHz dB 110 CH	Noise Figure @ 750 MHz dB Max	Package/ Style
Power Doubling Hybrids								
MHW7185A	18.5	110	+44	–58(36)	–58	–65	8.5	714/1
MHW7185B (46a)	18.5	110	+44	–58	–58	–65	8.5	714Y/1
MHW7185C (46a)	18.8	110	+44	–62	–62	–62	8.0	714Y/1
MHW7205A	20	110	+44	–56(36)	–57	–64	8.0	714/1
MHW7205B (46a)	20	110	+44	–58	–57	–64	8.0	714Y/1
MHW7205C (46a)	20	110	+44	–61	–61	–61	8.0	714Y/1
Feedforward Hybrids								
MFF424B	24	110	+44	–70(36)	–68	—	13	825A/2

40 – 600 MHz Hybrids, V_{CC} = 24 Vdc, Class A

Device	Hybrid Gain (Nom.) dB	Channel Loading Capacity	Maximum Distortion Specifications: Output Level dBmV	2nd Order Test dB	Composite Triple Beat dB 87 CH	Cross Modulation dB 87 CH	Noise Figure @ 600 MHz dB Max	Package/ Style
MHW6182–6	18	87	+44	–56(36)	–57	–55	6	714/1
MHW6222–6	22	87	+44	–56(36)	–56	–56	6	714/1
MHW6272–6 (46a)	27	87	+44	–63(36)	–57	–55	6.5	714/1
MHW6292–6 (46a)	29	87	+44	–63(36)	–57	–55	6.5	714/1
Power Doubling Hybrids								
MHW6185–6A ★	18	87	+44	–64(36)	–64	–66	7	714/1
MHW6205–6A ★	20	87	+44	–63(36)	–63	–65	6.5	714/1
Feedforward Hybrids								
MFF324B	24	85	+44	–86(38)	–73	–68	12.5	825A/2

(36) Composite 2nd order; V_{out} = +44 dBmV/ch

(38) Channels 2 and M39 @ M48

(46) To be introduced: a) 1Q97; b) 2Q97; c) 3Q97; d) 3Q97; e) 4Q97

★ New Product

CATV Distribution: Forward Amplifiers (continued)

40 – 550 MHz Hybrids, V_{CC} = 24 Vdc, Class A

Device	Hybrid Gain (Nom.) dB	Channel Loading Capacity	Maximum Distortion Specifications				Noise Figure @ 550 MHz dB	Package/ Style
			Output Level	2nd Order Test	Composite Triple Beat dB	Cross Modulation dB		
			dBmV	dB	77 CH	77 CH	Max	
MHW6142	14	77	+44	–72(35)	–59	–62	7.5	714/1
MHW6172	17	77	+44	–72(35)	–59	–62	7	714/1
MHW6182	18	77	+44	–72(35)	–58	–62	7	714/1
MHW6222	22	77	+44	–66(35)	–57	–57	6	714/1
MHW6272	27	77	+44	–64(35)	–57	–57	6.5	714/1
MHW6342	34	77	+44	–64(35)	–57	–57	6.5	714/1
Power Doubling Hybrids								
MHW6185B	18	77	+44	–65(36)	–65	–68	7.5	714/1
MHW6205	20	77	+44	–60(36)	–64	–67	7.5	714/1
MHW6225	22	77	+44	–55(36)	–62	–60	7.0	714/1
Feedforward Hybrids								
MFF224B	24	77	+44	–86(35)	–75	–70	11	825A/2

40 – 450 MHz Hybrids, V_{CC} = 24 Vdc, Class A

Device	Hybrid Gain (Nom.) dB	Channel Loading Capacity	Maximum Distortion Specifications				Noise Figure @ 450 MHz dB	Package/ Style
			Output Level	2nd Order Test	Composite Triple Beat dB	Cross Modulation dB		
			dBmV	dB	60 CH	60 CH	Max	
MHW5142A	14	60	+46	–74(31)	–61	–62	7	714/1
MHW5172A	17	60	+46	–74(31)	–60	–62	7	714/1
MHW5182A	18	60	+46	–72(31)	–61	–59	6.5	714/1
MHW5222A	22	60	+46	–72(31)	–60	–59	5.5	714/1
MHW5272A	27	60	+46	–68(31)	–59	–60	6.0	714/1
MHW5342A	34	60	+46	–68(31)	–59	–59	6.0	714/1
MHW5382A	38	60	+46	–64(31)	–59	–59	5.0	714/1
Power Doubling Hybrids								
MHW5185B	18	60	+46	–67(32)	–67	–67	7.0	714/1
MHW5225	22	60	+46	–69(31)	–62	–62	6.0	714/1
Feedforward Hybrids								
MFF124B	24	60	+46	–84(31)	–79	–75	10	825A/2

(31)Channels 2 and M13 @ M22

(32)Composite 2nd order; V_{out} = +46 dBmV/ch

(35)Channels 2 and M30 @ M39

(36)Composite 2nd order; V_{out} = +44 dBmV/ch

Reverse Amplifiers

5–200 MHz Hybrids, V_{CC} = 24 Vdc, Class A

Device	Hybrid Gain (Nom.) dB	Channel Loading Capacity	Maximum Distortion Specifications						Noise Figure @ 175 MHz dB Max	Package/ Style
			Output Level dBmV	2nd Order Test(30) dB	Composite Triple Beat dB		Cross Modulation dB			
					22 CH	26 CH	22 CH	26 CH		
MHW1134	13	22	+50	–72	–73	–71(19)	–65	–65(19)	7	714/1
MHW1184	18	22	+50	–72	–70	–70(19)	–64	–64(19)	5.5	714/1
MHW1224	22	22	+50	–72	–69	–68.5(19)	–62	–62(19)	5.5	714/1
MHW1244	24	22	+50	–72	–68	–67.5(19)	–61	–61(19)	5	714/1

Low Current Amplifiers — 5–50 MHz Hybrids, V_{CC} = 24 Vdc, Class A

Device	Hybrid Gain (Nom.) dB	Channel Loading Capacity	I_{DC} mA Max	Maximum Distortion Specifications				Noise Figure @ 50 MHz dB Max	Package/ Style
				Output Level dBmV	2nd Order Test(30) dB	Composite Triple Beat dB	Cross Modulation dB		
						4 CH	4 CH		
MHW1184L	18	4	135	+50	–70	–73	–64	5	714/1
MHW1224L	22	4	135	+50	–70	–72	–63	5	714/1
MHW1254L	25	4	135	+50	–70	–70	–62	4.5	714/1
MHW1304L	30	4	135	+50	–70	–66	–57	4.5	714/1

(19)Typical

(30)Channels 2 and A @ 7