

Chapter Five

RF Discrete Transistors

Section One **5.1–0**

RF Discrete Transistors – Selector Guide

Section Two **5.2–0**

RF Discrete Transistors – Data Sheets

Section One Selector Guide

Motorola RF Discrete Transistors

Motorola offers 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 and ceramic that are microstrip circuit compatible or surface mountable. Many are designed for automated assembly equipment.

Major sub-headings are Small Signal, Medium Power, Power MOSFETs and Bipolar Transistors.

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Motorola RF Small Signal Transistors

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

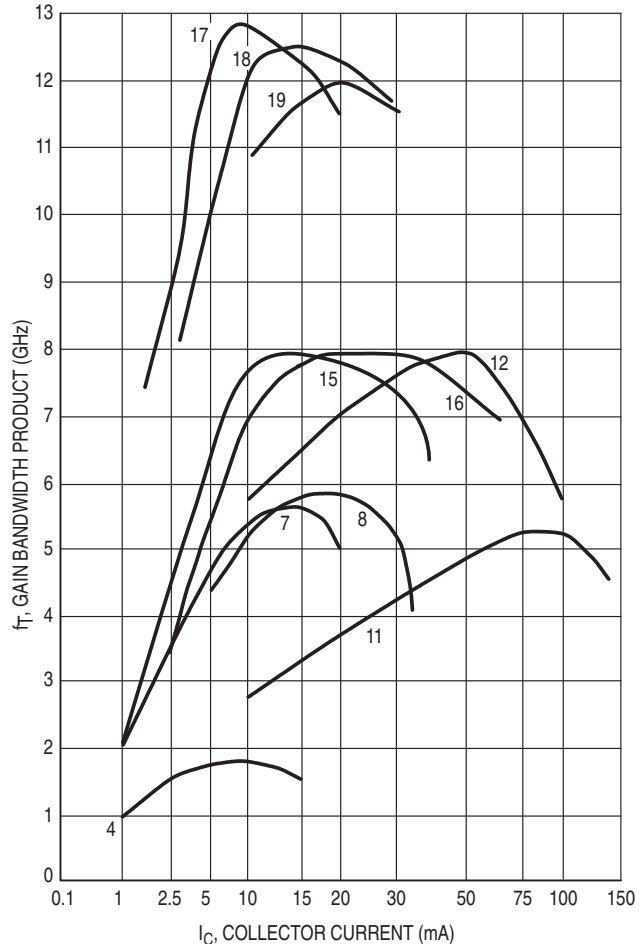
These devices are available in a wide variety of package types. Most of these transistors are fully characterized with s-parameters.

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.

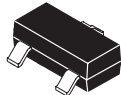


Plastic Packages

Table 1. Plastic

Device	Gain-Bandwidth @		Curve No. Page 5.1-2	NF _{min} @ f		Gain @ f		Maximum Ratings		Package
	f _T Typ GHz	I _C mA		Typ dB	MHz	Typ dB	MHz	V _{(BR)CEO} Volts	I _C mA	

Case 318-08/6 — SOT-23

MMBR5031LT1 ^(18c)	1.0	5	—	2.5	450	17	450	10	20	
BFS17LT1 ^(18c)	1.3	25	—	—	—	—	—	15	—	
BFR92ALT1 ^(18c)	4.5	14	—	—	—	15	—	15	25	
MMBR901LT1 ^(18c)	4.0	15	7	1.9	1000	12	1000	15	30	
MMBR901LT3 ^(18d)	4.0	15	7	1.9	1000	12	1000	15	30	
BFR93ALT1 ^(18c)	3.4	30	—	2.5	30	—	—	12	35	
MMBR5179LT1 ^(18c)	1.4	5.0	4	—	—	15	200	12	50	

⁽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; g) R2 = 4,000 units; h) R1 = 1,000 units.

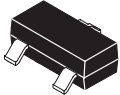
★New Product

Selection by Package (continued)

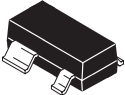
Table 1. Plastic (continued)

Device	Gain-Bandwidth @		Curve No. Page 5.1-2	NF _{min} @ f		Gain @ f		Maximum Ratings		Package
	f _T Typ GHz	I _C mA		Typ dB	MHz	Typ dB	MHz	V _{(BR)CEO} Volts	I _C mA	


Case 318-08/6 — SOT-23 (continued)

MMBR941LT1(18c)	8.0	15	15	2.1	2000	8.5	2000	10	50	
MMBR941LT3(18d)	8.0	15	15	2.1	2000	8.5	2000	10	50	
MMBR941BLT1(18c)	8.0	15	15	2.1	2000	8.5	2000	10	50	
MMBR911LT1(18c)	6.0	30	8	2.0	500	17	500	12	60	
MMBR571LT1(18c)	8.0	50	12	2.0	500	16.5	500	10	80	


Case 318A/1 — SOT-143

MRF5711LT1(18c)	8.0	50	12	1.6	1000	13.5	1000	10	70	
MRF9411LT1(18c)	8.0	15	15	2.1	2000	9.5	2000	10	50	
MRF5811LT1(18c)	5.0	75	11	2.0	500	18.4	500	18	200	
MRF9511LT1(18c)	8.0	30	16	2.1	2000	9.0	2000	10	100	

Case 419/3 — SC-70/SOT-323

MRF917T1(18c)	6.0	20	8	2.3	1000	10	1000	12	60	
MRF577T1(18c)	7.0	40	12	1.5	1000	10	1000	10	80	
MRF927T1(18c)	8.0	5.0	14	1.7	1000	9.8	1000	10	10	
MRF927T3(18d)	8.0	5.0	14	1.7	1000	9.8	1000	10	10	
MRF947T1(18c,d)	8.0	15	15	2.1	2000	10.5	1500	10	50	
MRF947T3(18d)	8.0	15	15	2.1	2000	10.5	1500	10	50	
MRF947AT1(18c)	8.0	15	15	2.1	2000	10.5	1500	10	50	
MRF947BT1(18c,d)	8.0	15	15	2.1	2000	10.5	1500	10	50	
MRF957T1(18c)	9.0	30	16	2.0	2000	9.0	1500	10	100	
MRF1027T1(18c)	12	10	17	1.1	1000	14	1000	5.0	25	
MRF1047T1(18c)	12	15	18	1.0	1000	13	1000	5.0	45	
MRF1057T1(18c)	12	20	19	1.1	1000	12	1000	5.0	70	

Case 463/1 — SC-90/SC-75

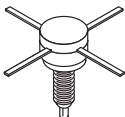
MRF579T1(18c)	8.0	40	12	1.5	1000	12	1000	—	80	
MRF949T1(18c)	9.0	15	15	1.5	1000	14	1000	—	50	
MRF959T1(18c)	9.0	30	15	1.6	1000	8.0	1000	—	100	

Ceramic SOE Case

Table 2. Ceramic SOE Case

Device	Gain-Bandwidth @		Curve No. Page 5.1-2	NF @ f		Gain @ f		Maximum Ratings		Package
	f _T Typ GHz	I _C mA		Typ dB	MHz	Typ dB	MHz	V _{(BR)CEO} Volts	I _C mA	

Case 244A/1

MRF587	5.5	90	11	3.0	500	13	500	15	200	
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(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; g) R2 = 4,000 units; h) R1 = 1,000 units.

★New Product

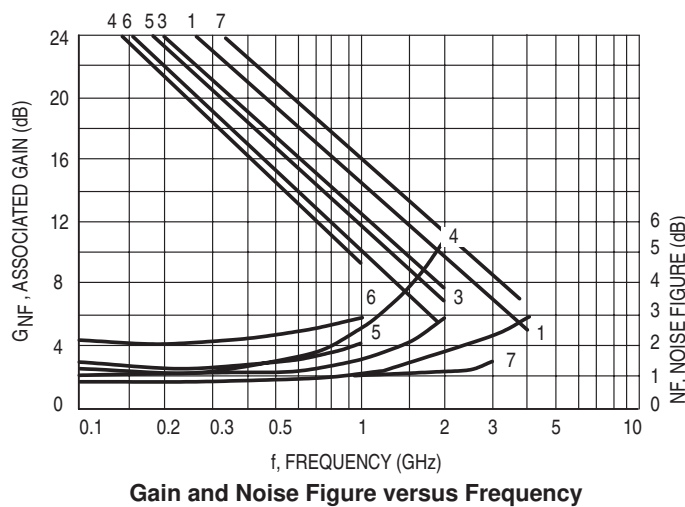
Selection by Application

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	3	4	5	6	7	
	SOT-23	318-08/6	MMBR941LT1 MMBR941LT3 MMBR941BLT1 MMBR951LT1	MMBR571LT1	—	MMBR901LT1 MMBR901LT3	MMBR911LT1	MMBR911LT1	
	SC-70/ SOT-323	419/3	MRF917T1 MRF577T1 MRF927T1 MRF927T3 MRF947AT1 MRF947T1 MRF947T3 MRF947BT1 MRF957T1	—	—	—	—	MRF1027T1 MRF1047T1 MRF1057T1	
	SC-70ML/ SOT-363	419B/ 16, 17	MRF2947AT1 MRF2947RAT1	—	—	—	—	—	
	SC-90/ SC-75	463/1	MRF579T1 MRF949T1 MRF959T1	—	—	—	—	—	
	SOT-143	318A/1	MRF9411LT1 MRF9511LT1	MRF5711LT1	MRF5811LT1	—	—	—	

(17)PNP



Selection by Application (continued)

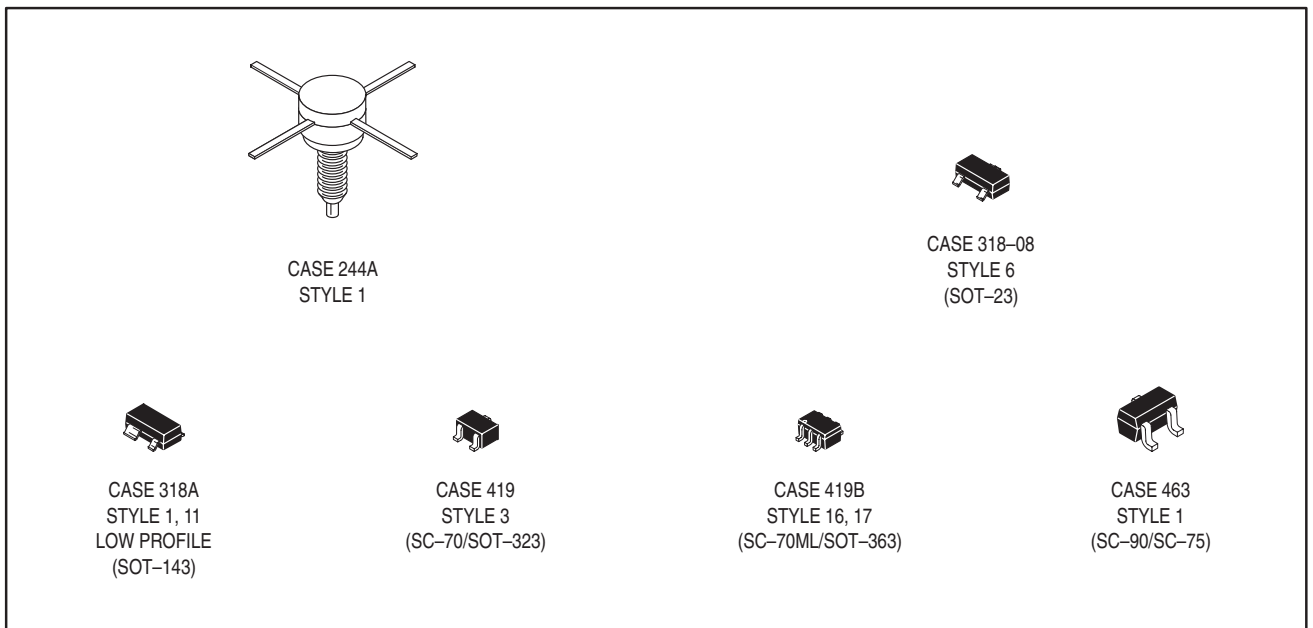
Table 4. CATV, MATV and Class A Linear

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	3rd Order IMD dBc	Output Level dBmV		
MMBR5179LT1 ^(18c)	6/5	1500	4/450			12	318-08/6
MMBR5031LT1 ^(18c,d)	6/5	2000	1.9/450			10	318-08/6
MRF587	15/90	5500	3/500	-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; g) R2 = 4,000 units; h) R1 = 1,000 units.

RF Small Signal Transistors Packages



Motorola 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 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.

Discrete Wireless Transmitter Devices

Device	Freq. MHz	V _{DD} V	Typical Output Power dBm	Typical Drain Eff. %	Typical Gain dB	Semiconductor Technology	Package
MRF9382T1 (18f, 46a)	900	6.0	36.5	65	10.5	LDMOS	PLD-1
MRF9482T1 (18f, 46a)	900	4.8	36.0	65	10	LDMOS	PLD-1

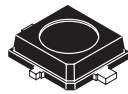
(18)Tape and Reel Packaging Option Available by adding suffix: a) R1 = 500 units; b) R2 = 2,500 units; c) T1 = 3,000 units; d) T3 = 10,000 units; e) R2 = 1,500 units;

f) T1 = 1,000 units; g) R2 = 4,000 units; h) R1 = 1,000 units.

(46)To be introduced: a) 4Q98; b) 1Q99; c) 2Q99

★New Product

RF Medium Power Transistors Packages



CASE 449
(PLD-1)

Motorola RF High Power Transistors

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 150 MHz HF/SSB – Vertical MOSFETs

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		θ _{JC} °C/W	Package/Style
				d ₃ dB	d ₁₁ dB		
V_{DD} = 28 Volts, Class AB							
MRF171A★	30	0.45	20	-32	—	1.52	211-07/2
MRF140	150	4.7	15	-30	-60	0.6	211-11/2
V_{DD} = 50 Volts, Class AB							
MRF148A	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 2. To 225 MHz VHF AM/FM – Vertical MOSFETs

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
MRF171A★	45	0.56	20/150	65	1.52	211-07/2
MRF173	80	4	13/150	65	0.8	211-11/2
MRF174	125	8.3	11.8/150	60	0.65	211-11/2
MRF141	150	15	10/175	55	0.6	211-11/2
MRF141G	300	15	13/175	55	0.35	375/2
V_{DD} = 50 Volts, Class AB						
MRF151	150	7.5	13/175	45	0.6	211-11/2
MRF151G	300	7.5	16/175	55	0.35	375/2

★New Product

RF Power MOSFETs (continued)

Table 3. 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 – Vertical MOSFETs						
MRF158	2	0.035	17.5/500	52	13.2	305A/2
MRF160	4	0.08	17/500	55	7.2	249/3
MRF166C	20	0.62	16/500	55	2.5	319/3
MRF166W	40	1	13/500	50	1.0	412/1
MRF177	100	6.4	12/400	60	0.65	744A/2
MRF275L★	100	13.2	8.8/500	55	0.65	333/2
MRF275G	150	10.7	11.2/500	55	0.44	375/2

Table 4. 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
VHF & UHF, V_{DD} = 7.5 Volts, Class AB, Land Mobile Radio – LDMOS Die						
MRF1512 ^(46a)	3	0.3	10.5/520	55	10	449/1
MRF1512T1 ^(18f,46a)	3	0.3	10.5/520	55	10	449/1
MRF1517 ^(46a)	8	0.6	11/520	55	2.0	466/1
MRF1517T1 ^(18f,46a)	8	0.6	11/520	55	2.0	466/1
VHF & UHF, V_{DD} = 7.5/12.5 Volts, Class AB, Land Mobile Radio – LDMOS Die						
MRF1513 ^(46a)	3	0.3	11/520	55	2.0	466/1
MRF1513T1 ^(18f,46a)	3	0.3	11/520	55	2.0	466/1
MRF1511 ^(46a)	8	0.6	11.5/175	55	2.0	466/1
MRF1511T1 ^(18f,46a)	8	0.6	11.5/175	55	2.0	466/1
VHF & UHF, V_{DD} = 12.5 Volts, Class AB, Land Mobile Radio – LDMOS Die						
MRF1518 ^(46a)	8	0.3	11/520	55	2.0	466/1
MRF1518T1 ^(18f,46a)	8	0.3	11/520	55	2.0	466/1

Table 5. To 1.0 GHz – Lateral MOSFETs

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
470 – 1000 MHz, V_{DD} = 28 Volts, Class AB – LDMOS Die						
MRF373★	60	2.7	14.7/860	56	1.0	360B/1
MRF373S★	60	2.7	14.7/860	56	0.75	360C/1
MRF374 ^(46a)	120	5.5	13.5/860	60	0.5	375F/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; g) R2 = 4,000 units; h) R1 = 1,000 units.

⁽⁴⁶⁾ To be introduced: a) 1Q99; b) 2Q99; c) 3Q99

★ New Product

RF Power MOSFETs (continued)

Table 5. To 1.0 GHz – Lateral MOSFETs (continued)

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
800 – 1.0 GHz, V_{DD} = 26 Volts, Class AB – LDMOS Die						
MRF6522–5R1 ^(18a,46b)	5	0.06	18/960	53	15	458A/1
MRF6522–10R1 ^(18a,46b)	10	0.16	17.5/960	55	6.0	458A/1
MRF6522–70 ^(46a)	70	1.8	16/921–960	55	1.1	465D/1
MRF187 ^(25,46a)	85	4.3	13/880	33	0.7	465/1
MRF187S ^(25,46a)	85	4.3	13/880	33	0.7	465A/1
MRF188 ^(25,46a)	170	8.52	13/880	34	0.35	375D/2
MRF188S ^(25,46a)	170	8.52	13/880	34	0.35	375E/2
800 – 1.0 GHz, V_{DD} = 28 Volts, Class AB – LDMOS Die						
MRF181SR1 ^(18a,25,46b)	15	0.16	17/945	35	3.6	458/1
MRF181ZR1 ^(18a,25,46b)	15	0.16	17/945	35	3.6	458A/1
MRF182	30	1.2	14/945	58	1.75	360B/1
MRF182S ^(18a)	30	1.2	14/945	58	1.75	360C/1
MRF183 ⁽²⁵⁾	45	2.3	13.5/945	38	1.5	360B/1
MRF183S ^(18a,25)	45	2.3	13.5/945	38	1.5	360C/1
MRF184	60	1.9	13.5/945	60	1.1	360B/1
MRF184S ^(18a)	60	1.9	13.5/945	60	1.1	360C/1
MRF6522–60 ^(46a)	60	2.0	14/960	60	1.1	360B/1
MRF185 ⁽³⁾	85	3.4	14/960	53	0.7	375B/2
MRF186 ^(3,25,46a)	120	7.6	12/945	53	0.6	375B/2

Table 6. To 2.1 GHz – Lateral MOSFETs

Device	P _{out} Watts	Class	Bias Point Vdc/mA	Gain (Typ)/Freq dB/MHz	θ _{JC} °C/W	Package/Style
1805 – 1990 MHz, V_{DD} = 26 Volts – LDMOS Die (GSM1800, PCS1900 CDMA)						
MRF18060A ^(46b,52a)	60	AB	26/500	12/1805–1880	0.75	465/1
MRF18060B ^(46b,52a)	60	AB	26/500	11/1930–1990	0.75	465/1
MRF18090A ^(46b,52a)	90	AB	26/750	12/1805–1880	0.7	465B/1
MRF18090B ^(46b,52a)	90	AB	26/750	11/1930–1990	0.7	465B/1
1.9 GHz, V_{DD} = 26 Volts – LDMOS Die						
MRF19090 ^(25,46a)	90	AB	26/750	11.5/1990	0.7	465B/1
MRF19090S ^(18a,25,46a)	90	AB	26/750	11.5/1990	0.7	465C/1
1.9 GHz, V_{DD} = 28 Volts – LDMOS Die						
MRF19030 ^(25,46b,52a)	30	AB	28/250	12/1990	2.0	465E/1
MRF19030S ^(25,46b,52a)	30	AB	28/250	12/1990	2.0	465F/1
MRF19060 ^(25,46a)	60	AB	28/500	13/1990	0.75	465/1
MRF19060S ^(25,46a)	60	AB	28/500	13/1990	0.75	465A/1
MRF19120 ^(3,25,46a)	120	AB	28/1000	11.5/1990	0.55	375D/2
MRF19120S ^(3,25,46a)	120	AB	28/1000	11.5/1990	0.55	375E/2

⁽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; g) R2 = 4,000 units; h) R1 = 1,000 units.

⁽²⁵⁾Two-tone Performance, Power is PEP

⁽⁴⁶⁾To be introduced: a) 1Q99; b) 2Q99; c) 3Q99

⁽⁵²⁾Engineering samples available: a) 1Q99; b) 2Q99

RF Power MOSFETs (continued)

Table 6. To 2.1 GHz – Lateral MOSFETs (continued)

Device	P _{out} Watts	Class	Bias Point V _{dc} /mA	Gain (Typ)/Freq dB/MHz	θ _{JC} °C/W	Package/Style
2.0 GHz, V_{DD} = 26 Volts – LDMOS Die						
MRF281S ^(25,46b)	4	A, AB	26/25	13.6/2000	8.75	458/1
MRF281Z ^(25,46b)	4	A, AB	26/25	13.6/2000	8.75	458A/1
MRF282S ⁽²⁵⁾	10	A, AB	26/75	12.5/2000	2.9	458/1
MRF282Z ⁽²⁵⁾	10	A, AB	26/75	12.5/2000	2.9	458A/1
MRF284R1 ^(18a,25)	30	A, AB	26/200	10.5/2000	2.0	360B/1
MRF284SR1 ^(18a,25)	30	A, AB	26/200	10.5/2000	2.0	360C/1
MRF286 ^(25,46a)	60	A, AB	26/500	10.6/2000	.73	465/1
MRF286S ^(25,46a)	60	A, AB	26/500	10.6/2000	.73	465A/1
2.1 GHz, V_{DD} = 28 Volts – LDMOS Die						
MRF21030 ^(25,46b)	30	AB	28/250	12/2170	2.0	465E/1
MRF21030S ^(25,46b)	30	AB	28/250	12/2170	2.0	465F/1
MRF21060 ^(25,46a)	60	AB	28/500	13/2170	0.75	465/1
MRF21060S ^(25,46a)	60	AB	28/500	13/2170	0.75	465A/1
MRF21090 ^(25,46a)	90	AB	28/800	10.5/2170	0.7	465B/1
MRF21090S ^(25,46a)	90	AB	28/800	10.5/2170	0.7	465C/1
MRF21120 ^(3,25,46a)	120	AB	28/1000	11.5/2170	0.55	375D/2
MRF21120S ^(3,25,46a)	120	AB	28/1000	11.5/2170	0.55	375E/2

⁽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; g) R2 = 4,000 units; h) R1 = 1,000 units.

⁽²⁵⁾Two-tone Performance, Power is PEP

⁽⁴⁶⁾To be introduced: a) 1Q99; b) 2Q99; c) 3Q99

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.

UHF Transistors

Table 1. 100 – 500 MHz Band

Designed for UHF military and commercial aircraft radio transmitters.

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					
MRF392 ⁽³⁾	125	19.8	8/400	0.7	744A/1
MRF393 ⁽³⁾	100	18	7.5/500	0.7	744A/1

900 MHz Transistors

Table 2. 900 – 960 MHz Band

Designed specifically for the 900 MHz mobile radio band, these devices offer superior gain, ruggedness, stability and broadband operation. Devices are for mobile and base station applications.

Device	P _{out} Output Power Watts	Class	P _{in} (Max) Input Power Watts	G _p (Min)/Freq. Power Gain dB/MHz	θ _{JC} °C/W	Package/Style
V_{CC} = 24 Volts — Si Bipolar						
MRF857S	2.1 (CW)	A	0.4	12.5/900	8.4	305D/1
MRF858S	3.6 (CW)	A	0.29	11/900	6.9	319A/2
MRF891S	5	AB	0.63	9/900	7	319A/2
MRF859S	6.5 W (CW)	A	0.46	11.5/900	3.9	319A/2
MRF897 ⁽³⁾	30	AB	3	10/900	1.7	395B/1
MRF897R ⁽³⁾	30	AB	3	10.5/900	1.7	395E/1
MRF898 ⁽²⁾	60 (CW)	C	12	7/900	1	333A/1
V_{CC} = 26 Volts — Si Bipolar						
MRF6409	20	AB	26/50	10/960	3.8	319/2
MRF6414	50	AB	26/200	8.5/960	1.3	333A/2
MRF899 ⁽³⁾	150	AB	24	8/900	0.8	375A/1

1.5 GHz Transistors

Table 3. 1600 – 1640 MHz Band

Device	P _{out} Output Power Watts	Class	η Eff. (Min) %	G _p (Min)/Freq. Power Gain dB/MHz	θ _{JC} °C/W	Package/Style
MRF16006	6	C	40	7.4/1600	6.8	395C/2
MRF3010	10	AB	45	9.5/1600	3.6	360B/1 (LDMOS)
MRF16030	30	C	40	7.5/1600	1.7	395C/2

⁽²⁾Internal Impedance Matched

⁽³⁾Internal Impedance Matched Push-Pull Transistors

Microwave Transistors

Table 4. 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					
MRF10150	150	15	10 ⁽⁷⁾	0.25	376B/1
MRF10350	350	44	9 ⁽⁷⁾	0.11	355E/1
MRF10502★	500	63	9 ⁽⁷⁾	0.12	355J/1

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 to 2.0 GHz.

Table 5. UHF Ultra Linear For TV Applications

The following device has been characterized for ultra-linear applications such as low-power TV transmitters in Band IV and Band V and 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} = 28 Volts, Class AB					
TPV8100B	100 ⁽¹¹⁾	8.5/860	—	0.7	398/1

Table 6. 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 V _{dC} /mA	Gain (Typ)/Freq dB/MHz	θ _{JC} °C/W	Package/Style
V_{CC} = 26 Volts–Bipolar Die						
MRF6404 ⁽¹⁶⁾	30	AB	26/150	8.2/1880	1.4	395C/1
MRF6420 ^(46a)	60	AB	26/200	10/1880	0.7	451/1
MRF15060	60	AB	26/200	11/1490	0.7	451/1
MRF15060S	60	AB	26/200	11/1490	0.7	451A/1
MRF15090	90	A, AB	26/250	7.5/1490	0.7	375A/1
MRF20030R	30	AB	26/120	11/2000	1.4	395C/1
MRF20060R	60	AB	26/200	9.8/2000	0.7	451/1
MRF20060RS	60	AB	26/200	9.8/2000	0.7	451A/1

⁽⁷⁾Typical @ 1090 MHz

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

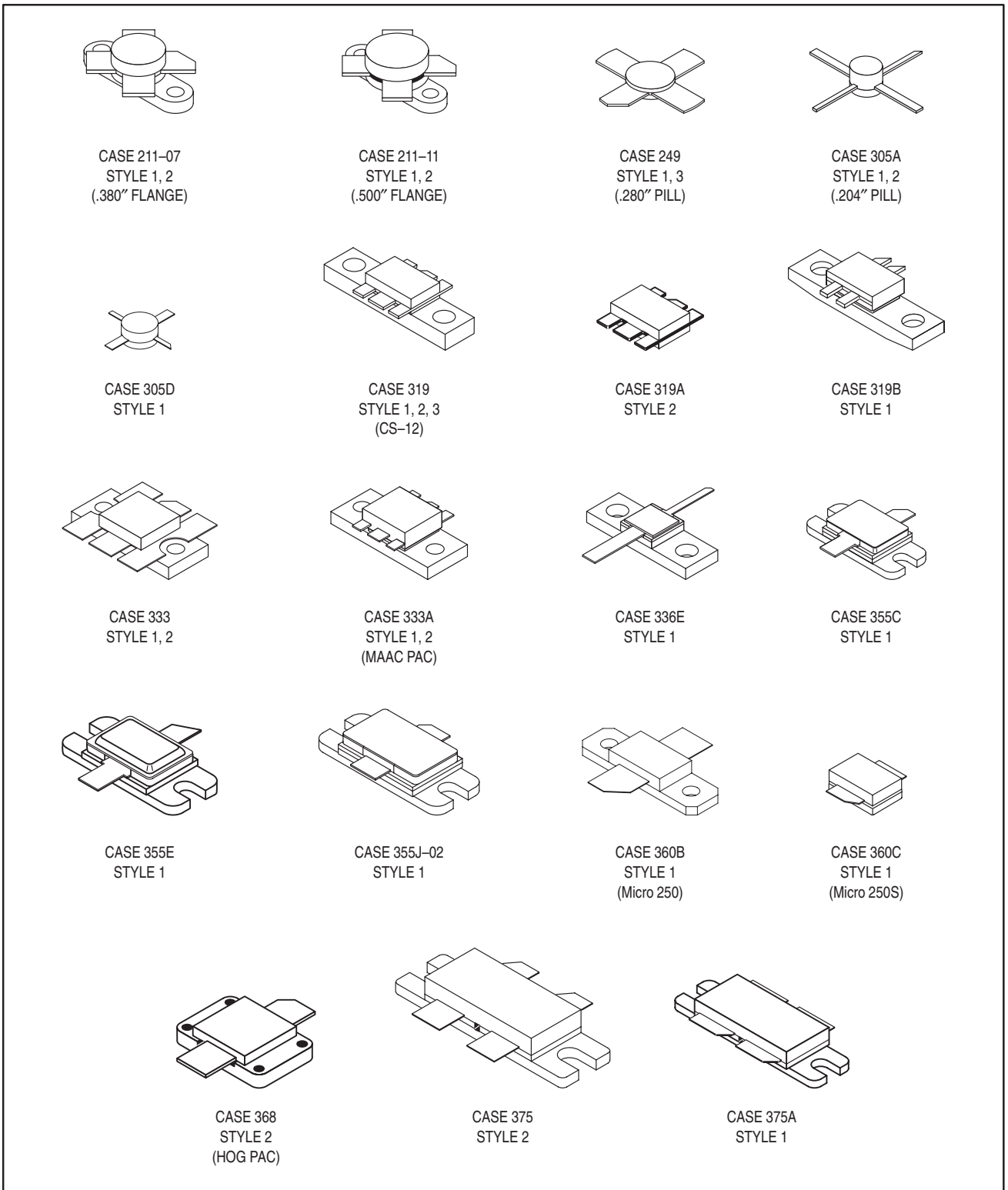
⁽¹¹⁾Output power at 1 dB compression in Class AB

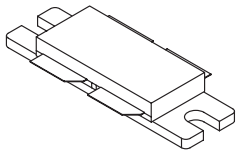
⁽¹⁶⁾Formerly known as “TP4035”

⁽⁴⁶⁾To be introduced: a) 1Q99; b) 2Q99; c) 3Q99

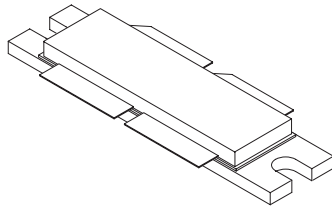
★New Product

RF Power MOSFETs and Bipolar Transistors Packages

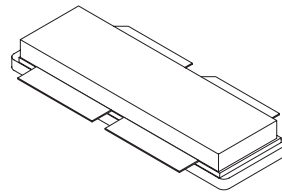




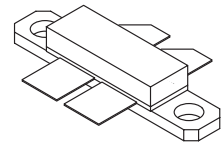
CASE 375B
STYLE 2
(Micro 860)



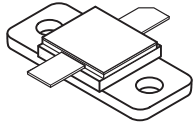
CASE 375D
STYLE 2



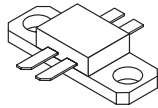
CASE 375E
STYLE 2



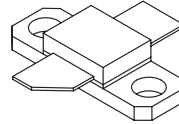
CASE 375F
STYLE 1



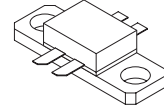
CASE 376B
STYLE 1



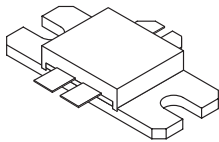
CASE 395B
STYLE 1



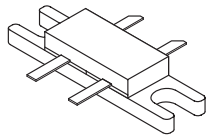
CASE 395C
STYLE 1, 2



CASE 395E
STYLE 1



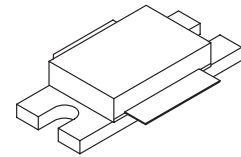
CASE 398
STYLE 1



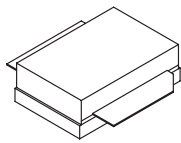
CASE 412
STYLE 1



CASE 449
STYLE 1
PLASTIC
(PLD 1)



CASE 451
STYLE 1



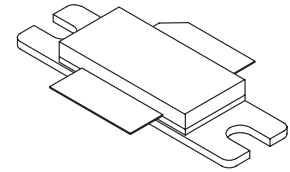
CASE 451A
STYLE 1



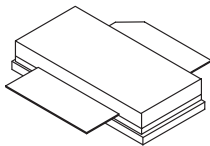
CASE 458
STYLE 1
(Micro 200S)



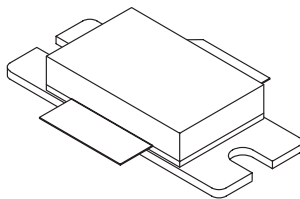
CASE 458A
STYLE 1
(Micro 200Z)



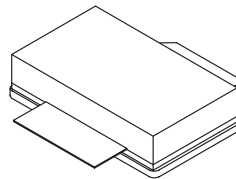
CASE 465
STYLE 1



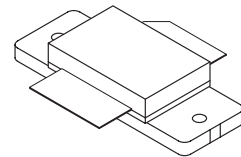
CASE 465A
STYLE 1



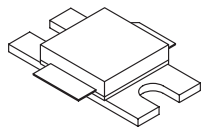
CASE 465B
STYLE 1



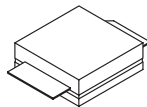
CASE 465C
STYLE 1



CASE 465D
STYLE 1



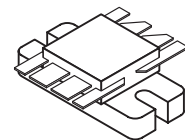
CASE 465E
STYLE 1



CASE 465F
STYLE 1



CASE 466
STYLE 1
PLASTIC
(PLD 1.5)



CASE 744A
STYLE 1, 2

Section Two

Motorola RF Discrete Transistors – Data Sheets

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MMBR911LT1	5.2-16	MRF187S	5.2-245
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