

The RF Line

Microwave Linear Power Transistors

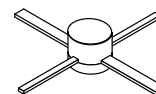
- Designed for Class A, Common Emitter Linear Power Amplifiers.
- Specified 20 Volt, 1.6 GHz Characteristics:

	MRF3104	MRF3105	MRF3106
Output Power	0.5 W	0.8 W	1.6 W
Power Gain	10.5 dB	9 dB	8 dB

- Low Parasitic Microwave Stripline Package
- Gold Metalization for Improved Reliability
- Diffused Ballast Resistors
- Circuit board photomaster available upon request by contacting RF Tactical Marketing in Phoenix, AZ.

MRF3104
MRF3105
MRF3106

8.0–12 dB GAIN
1.55–1.65 GHz
MICROWAVE LINEAR
POWER TRANSISTORS



CASE 305A-01, STYLE 1
(.204" PILL)

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	22	Vdc
Collector–Emitter Voltage	V_{CES}	50	Vdc
Emitter–Base Voltage	V_{EBO}	3.5	Vdc
Collector Current MRF3104, MRF3105 MRF3106	I_C	0.4 0.8	Adc
Operating Junction Temperature	T_j	200	$^\circ\text{C}$
Storage Temperature	T_{stg}	–65 to +125	$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case, DC MRF3104 MRF3105 MRF3106	$R_{\theta JC}$ (DC)	40 35 22	$^\circ\text{C/W}$

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ($I_C = 10\text{ mA}$, $I_B = 0$)	BV_{CEO}	22	—	—	Vdc
Collector–Emitter Breakdown Voltage ($I_C = 10\text{ mA}$, $V_{BE} = 0$)	BV_{CES}	50	—	—	Vdc
Collector–Base Breakdown Voltage ($I_C = 1\text{ mA}$, $I_E = 0$)	BV_{CBO}	45	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 0.25\text{ mA}$, $I_C = 0$)	BV_{EBO}	3.5	—	—	Vdc
Collector Cutoff Current ($V_{CB} = 28\text{ V}$, $I_E = 0$) MRF3104, MRF3105 MRF3106	I_{CBO}	— —	— —	0.25 0.5	mAdc

ON CHARACTERISTICS

DC Current Gain ($V_{CE} = 5.0\text{ V}$, $I_C = 100\text{ mA}$)	h_{FE}	20	35	120	—
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(continued)



ELECTRICAL CHARACTERISTICS — continued

Characteristic		Symbol	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS						
Output Capacitance ($V_{CB} = 28\text{ V}$, $I_E = 0$, $f = 1.0\text{ MHz}$)	MRF3104 MRF3105 MRF3106	C_{OB}	— — —	— — —	1.5 3.5 5.5	pF

FUNCTIONAL TESTS

Common Emitter Amplifier Gain ($V_{CE} = 20\text{ V}$, $I_C = 120\text{ mA}$, $P_{out} = 0.5\text{ W}$, $f = 1.6\text{ GHz}$) ($V_{CE} = 20\text{ V}$, $I_C = 120\text{ mA}$, $P_{out} = 0.8\text{ W}$, $f = 1.6\text{ GHz}$) ($V_{CE} = 20\text{ V}$, $I_C = 240\text{ mA}$, $P_{out} = 1.6\text{ W}$, $f = 1.6\text{ GHz}$)	MRF3104 MRF3105 MRF3106	G_{pe}	10.5 9.0 8.0	11.5 10.0 9.0	— — —	dB
Output Load Mismatch ($V_{CE} = 20\text{ V}$, $I_C = 120\text{ mA}$, $P_{out} = 0.5\text{ W}$, $f = 1.6\text{ GHz}$) ($V_{CE} = 20\text{ V}$, $I_C = 120\text{ mA}$, $P_{out} = 0.8\text{ W}$, $f = 1.6\text{ GHz}$) ($V_{CE} = 20\text{ V}$, $I_C = 240\text{ mA}$, $P_{out} = 1.6\text{ W}$, $f = 1.6\text{ GHz}$)	MRF3104 MRF3105 MRF3106	No Degradation in Output Power				— — —
Gain Linearity ($V_{CE} = 20\text{ V}$, $I_C = 120\text{ mA}$, $f = 1.6\text{ GHz}$, $P_{o1} = 0.5\text{ W}$, $P_{o2} = 0.5\text{ mW}$) ($V_{CE} = 20\text{ V}$, $I_C = 120\text{ mA}$, $f = 1.6\text{ GHz}$, $P_{o1} = 0.8\text{ W}$, $P_{o2} = 0.5\text{ mW}$) ($V_{CE} = 20\text{ V}$, $I_C = 240\text{ mA}$, $f = 1.6\text{ GHz}$, $P_{o1} = 1.6\text{ W}$, $P_{o2} = 0.5\text{ mW}$)	MRF3104 MRF3105 MRF3106	L_G	— — —	— — —	−0.2 to 1.0 −0.2 to 1.0 −0.2 to 1.0	dB

TYPICAL CHARACTERISTICS

MRF3104

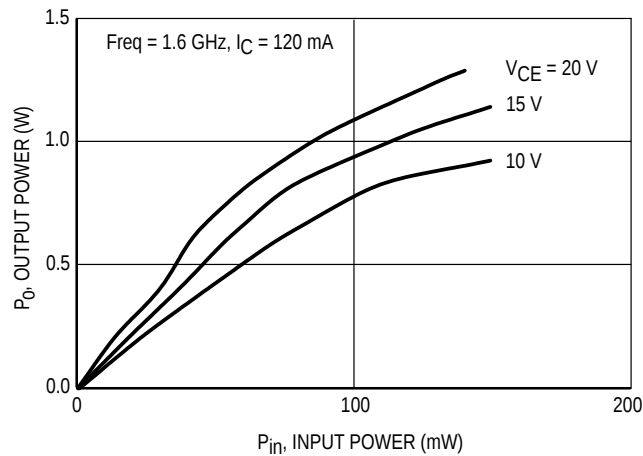


Figure 1. Output Power versus Input Power

V_{CE} (V)	I_C (mA)	f (MHz)	S11		S21		S12		S22	
			Mag	Deg	Mag	Deg	Mag	Deg	Mag	Deg
20	120	1550	0.75	123	1.97	21	0.08	44	0.31	−113
		1575	0.76	123	1.93	20	0.09	44	0.32	−115
		1600	0.76	122	1.91	19	0.09	43	0.32	−116
		1625	0.76	122	1.80	18	0.09	42	0.32	−117
		1650	0.76	121	1.85	17	0.09	42	0.33	−119

Table 1. Common Emitter S-Parameters

TYPICAL CHARACTERISTICS — continued

MRF3105

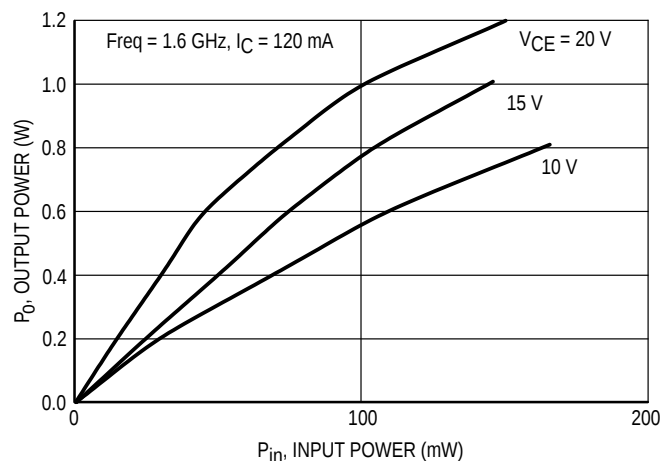


Figure 2. Output Power versus Input Power

V_{CE} (V)	I_C (mA)	f (MHz)	S11		S21		S12		S22	
			Mag	Deg	Mag	Deg	Mag	Deg	Mag	Deg
20	120	1550	0.75	139	1.49	19	0.09	44	0.42	-124
		1575	0.75	138	1.46	18	0.10	43	0.42	-126
		1600	0.75	137	1.44	17	0.10	43	0.43	-127
		1625	0.75	137	1.42	15	0.10	43	0.43	-129
		1650	0.75	136	1.39	14	0.10	42	0.44	-130

Table 2. Common Emitter S-Parameters

MRF3106

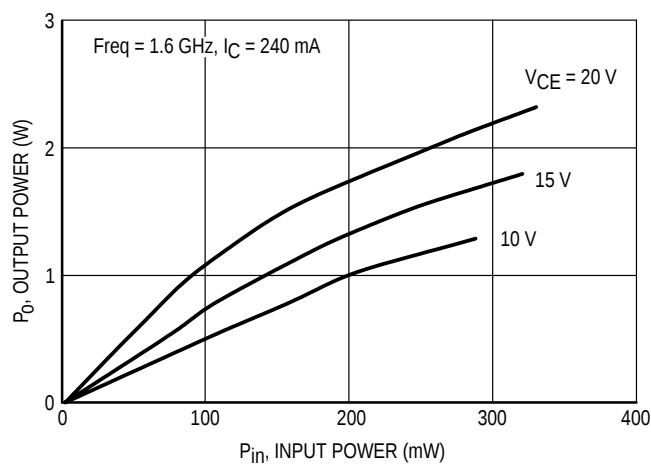
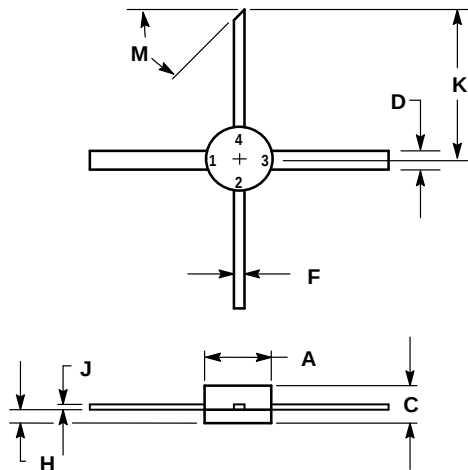


Figure 3. Output Power versus Input Power

V_{CE} (V)	I_C (mA)	f (MHz)	S11		S21		S12		S22	
			Mag	Deg	Mag	Deg	Mag	Deg	Mag	Deg
20	240	1550	0.97	145	0.78	11	0.20	-130	0.56	169
		1575	0.97	143	0.78	10	0.17	-104	0.56	168
		1600	0.96	142	0.77	9	0.16	-104	0.56	166
		1625	0.96	140	0.76	8	0.14	-104	0.56	165
		1650	0.95	139	0.75	7	0.12	-104	0.56	164

Table 3. Common Emitter S-Parameters

PACKAGE DIMENSIONS



- NOTES:
- 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 - 2. CONTROLLING DIMENSION: INCH.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.200	0.220	5.08	5.59
C	0.095	0.130	2.41	3.30
D	0.055	0.065	1.40	1.65
F	0.025	0.035	0.64	0.89
H	0.040	0.050	1.02	1.27
J	0.003	0.007	0.08	0.18
K	0.435	—	11.05	—
M	45 °REF	—	45 °REF	—

- STYLE 1:
- PIN 1. EMITTER
 - 2. BASE
 - 3. EMITTER
 - 4. COLLECTOR

CASE 305A-01
ISSUE A

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