

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

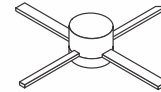
- Low Parasitic Microwave Stripline Package
- Gold Metalization for Improved Reliability
- Diffused Ballast Resistors

**MRF3104
MRF3105
MRF3106**

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

MAXIMUM RATINGS (T_A = 25°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	°C
Storage Temperature	T _{stg}	–65 to +125	°C



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

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case, DC	MRF3104 MRF3105 MRF3106	R _{θJC} (DC) 40 35 22	°C/W

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage (I _C = 10 mA, I _B = 0)	BV _{CEO}	22	—	—	Vdc
Collector–Emitter Breakdown Voltage (I _C = 10 mA, V _{BE} = 0)	BV _{CES}	50	—	—	Vdc
Collector–Base Breakdown Voltage (I _C = 1 mA, I _E = 0)	BV _{CBO}	45	—	—	Vdc
Emitter–Base Breakdown Voltage (I _E = 0.25 mA, I _C = 0)	BV _{EBO}	3.5	—	—	Vdc
Collector Cutoff Current (V _{CB} = 28 V, I _E = 0)	MRF3104, MRF3105 MRF3106	I _{CBO} — —	— — —	0.25 0.5	mAdc

ON CHARACTERISTICS

DC Current Gain (V _{CE} = 5.0 V, I _C = 100 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	C_{OB}	—	—	1.5	pF
	MRF3105		—	—	3.5	
	MRF3106		—	—	5.5	

FUNCTIONAL TESTS

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

TYPICAL CHARACTERISTICS

MRF3104

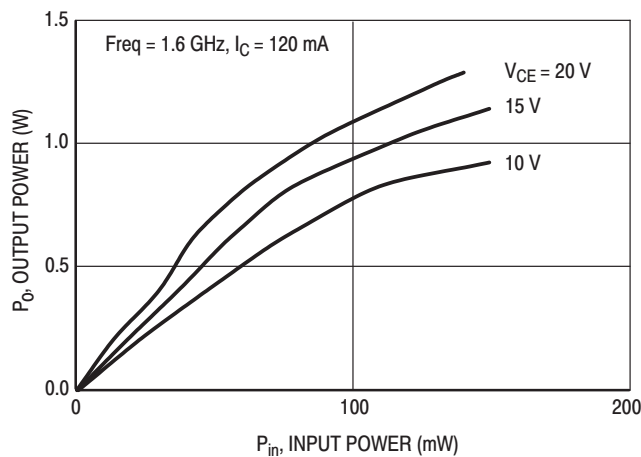


Figure 1. Output Power versus Input Power

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

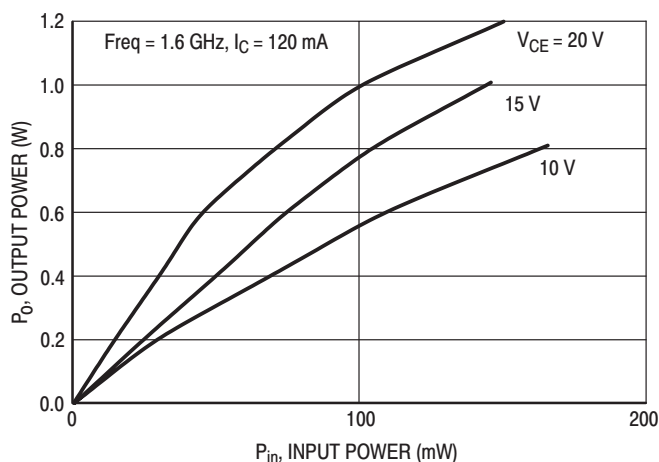


Figure 2. Output Power versus Input Power

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

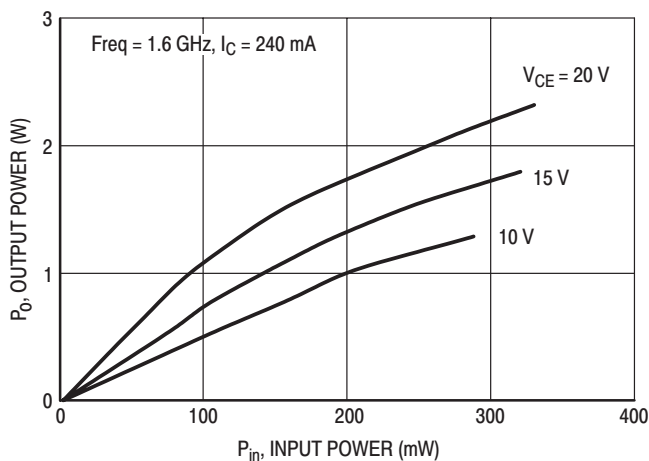
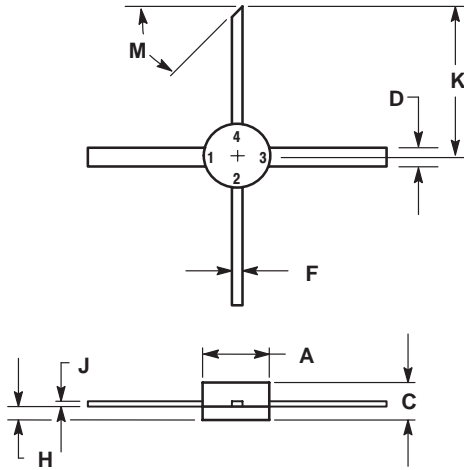


Figure 3. Output Power versus Input Power

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**

Specifications subject to change without notice.

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