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The RF Line

Microwave Linear Power Transistors

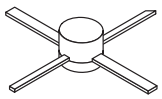
MRF3104
MRF3105
MRF3106

- 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

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°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

THERMAL CHARACTERISTICS

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

ELECTRICAL CHARACTERISTICS

Characteristic		Symbol	Min	Typ	Max	Unit
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	—

(continued)

ELECTRICAL CHARACTERISTICS — continued

Characteristic		Symbol	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS						
Output Capacitance (V_{CB} = 28 V, I_E = 0, f = 1.0 MHz)	MRF3104	C_{OB}	—	—	1.5	pF
	MRF3105		—	—	3.5	
	MRF3106		—	—	5.5	
FUNCTIONAL TESTS						
Common Emitter Amplifier Gain		Gpe				dB
(V_{CE} = 20 V, I_C = 120 mA, P_{out} = 0.5 W, f = 1.6 GHz)	MRF3104		10.5	11.5	—	
(V_{CE} = 20 V, I_C = 120 mA, P_{out} = 0.8 W, f = 1.6 GHz)	MRF3105		9.0	10.0	—	
(V_{CE} = 20 V, I_C = 240 mA, P_{out} = 1.6 W, f = 1.6 GHz)	MRF3106		8.0	9.0	—	
Output Load Mismatch						
(V_{CE} = 20 V, I_C = 120 mA, P_{out} = 0.5 W, f = 1.6 GHz)	MRF3104		No Degradation in Output Power			—
(V_{CE} = 20 V, I_C = 120 mA, P_{out} = 0.8 W, f = 1.6 GHz)	MRF3105					—
(V_{CE} = 20 V, I_C = 240 mA, P_{out} = 1.6 W, f = 1.6 GHz)	MRF3106					—
Gain Linearity		L_G				dB
(V_{CE} = 20 V, I_C = 120 mA, f = 1.6 GHz, P_{o1} = 0.5 W, P_{o2} = 0.5 mW)	MRF3104		—	—	–0.2 to 1.0	
(V_{CE} = 20 V, I_C = 120 mA, f = 1.6 GHz, P_{o1} = 0.8 W, P_{o2} = 0.5 mW)	MRF3105		—	—	–0.2 to 1.0	
(V_{CE} = 20 V, I_C = 240 mA, f = 1.6 GHz, P_{o1} = 1.6 W, P_{o2} = 0.5 mW)	MRF3106		—	—	–0.2 to 1.0	

TYPICAL CHARACTERISTICS

MRF3104

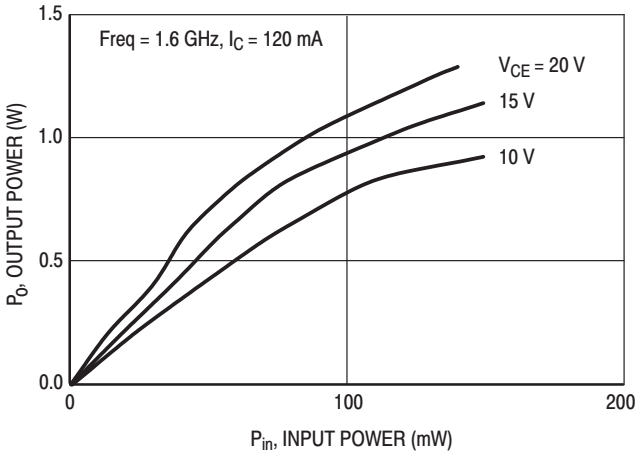


Figure 1. Output Power versus Input Power

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

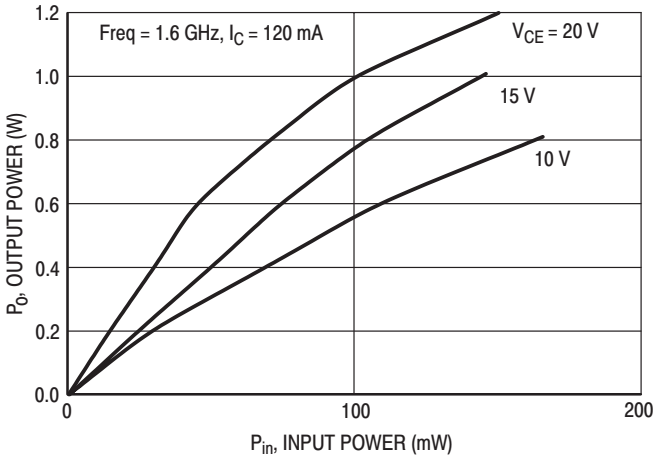


Figure 2. Output Power versus Input Power

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

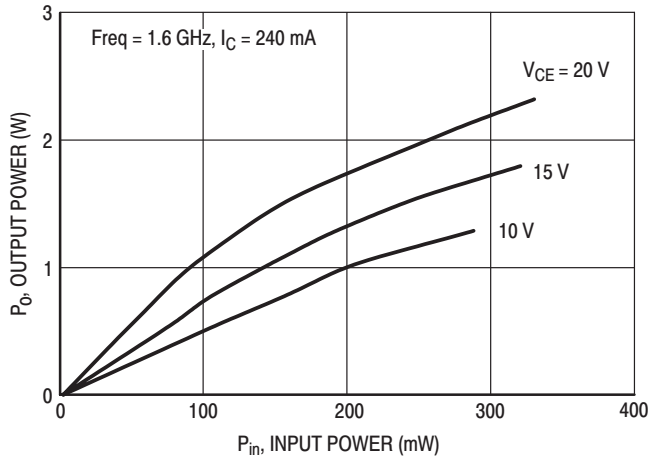
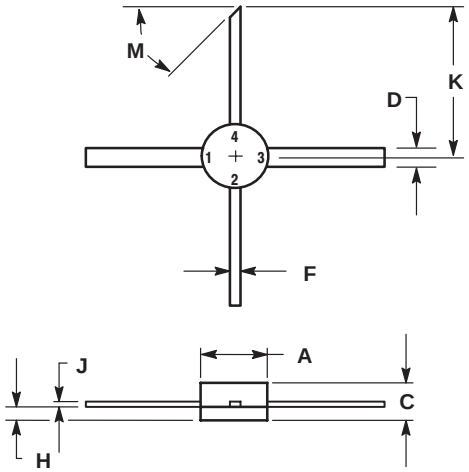


Figure 3. Output Power versus Input Power

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.

	INCHES		MILLIMETERS	
DIM	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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