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The RF Line

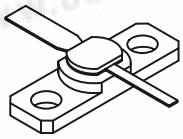
Microwave Linear Power Transistors

Designed for Class A, common emitter linear power amplifiers.

- Specified 20 Volt, 1.6 GHz Characteristics
  Output Power — 0.5, 0.8, 1.6 Watts
  Gain — 9.0–12 dB
- Low Parasitic Microwave Stripline Package
- Gold Metallization Diffused Emitter Ballast Resistors
- Circuit board photomaster available upon request by contacting RF Tactical Marketing in Phoenix, AZ.

MRF3094
MRF3095

9.0–12 dB
1.55–1.65 GHz
0.5–1.6 WATTS
MICROWAVE LINEAR
POWER TRANSISTORS



CASE 328A–03, STYLE 2

MAXIMUM RATINGS

Rating		Symbol	Limit	Unit
Collector Base Voltage		V_{CES}	50	Vdc
Emitter Base Voltage		V_{EBO}	3.5	Vdc
Collector Emitter Voltage		V_{CEO}	22	Vdc
Collector Current	MRF3094, 3095	I_C	0.4	Adc
Operating Junction Temperature		T_J	200	°C
Storage Temperature		T_{stg}	–65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max		Unit
		MRF3094	MRF3095	
Thermal Resistance, Junction to Case	$R_{\theta JC}$	40	35	°C/W

ELECTRICAL CHARACTERISTICS

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector–Emitter Breakdown Voltage (I_C = 10 mA)	MRF3094, MRF3095	$V_{(BR)CES}$	50	—	—	Vdc
Emitter Base Breakdown Voltage (I_E = 0.25 mA)	MRF3094, MRF3095	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector Base Breakdown Voltage (I_C = 1.0 mA)	MRF3094, MRF3095	$V_{(BR)CBO}$	45	—	—	Vdc
Collector–Emitter Breakdown Voltage (I_C = 10 mA)	MRF3094, MRF3095	$V_{(BR)CEO}$	22	—	—	Vdc
Collector Cutoff Current (V_{CB} = 28 V)	MRF3094, MRF3095	I_{CBO}	—	—	0.25	mAdc
ON CHARACTERISTICS						
DC Current Gain (V_{CE} = 5.0 V, I_C = 100 mA)	MRF3094, MRF3095	h_{fe}	20	35	120	—
DYNAMIC CHARACTERISTICS						
Output Capacitance (V_{CB} = 28 V, f = 1.0 MHz)	MRF3094, MRF3095	C_{ob}	—	—	3.5	pF
Functional Tests		G_{PE}				dB
(V_{CE} = 20 V, I_C = 120 mA, P_o = 0.5 W, f = 1.6 GHz)	MRF3094		10.5	11.5	—	
(V_{CE} = 20 V, I_C = 120 mA, P_o = 0.8 W, f = 1.6 GHz)	MRF3095		9.0	10	—	
Output Load Mismatch		ψ	No degradation in output power			
(V_{CE} = 20 V, I_C = 120 mA, P_o = 0.5 W, f = 1.6 GHz, Load VSWR = ∞:1)	MRF3094					
(V_{CE} = 20 V, I_C = 120 mA, P_o = 0.8 W, f = 1.6 GHz, Load VSWR = ∞:1)	MRF3095					
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)	MRF3094		—	—	–0.2 to +1.0	
(V_{CE} = 20 V, I_C = 120 mA, f = 1.6 GHz, P_{o1} = 0.8 W, P_{o2} = 0.8 mW)	MRF3095		—	—	–0.2 to +1.0	

TYPICAL CHARACTERISTICS

V_{CE} (Volts)	I_C (mA)	f (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
			Mag	∠ϕ	Mag	∠ϕ	Mag	∠ϕ	Mag	∠ϕ
20	100	500	0.77	−177.9	6.16	83.7	0.36	31.9	0.32	−57.1
		600	0.78	176.7	5.20	77.2	0.38	32.2	0.30	−60.3
		700	0.78	171.8	4.48	71.1	0.40	33.4	0.29	−62.6
		800	0.78	167.4	3.90	66.3	0.41	35.0	0.29	−67.3
		900	0.79	163.3	3.46	61.2	0.42	36.6	0.28	−70.8
		1000	0.79	159.3	3.11	56.4	0.46	38.1	0.29	−74.5
		1100	0.80	155.7	2.81	52.0	0.48	39.2	0.29	−79.3
		1200	0.80	152.4	2.60	47.5	0.50	40.1	0.29	−83.3
		1300	0.80	149.3	2.40	43.5	0.53	40.7	0.30	−88.3
		1400	0.80	147.1	2.18	40.6	0.57	42.2	0.30	−93.3
		1500	0.81	143.6	2.06	34.3	0.59	41.0	0.30	−97.7
		1600	0.81	140.8	1.92	30.8	0.62	41.9	0.30	−103.4
		1700	0.82	137.9	1.81	27.9	0.66	42.5	0.31	−107.6
		1800	0.82	135.2	1.67	22.7	0.68	41.9	0.32	−112.7
		1900	0.83	132.7	1.61	19.4	0.71	41.9	0.33	−117.8
		2000	0.83	130.2	1.52	16.3	0.75	41.8	0.34	−121.3

Table 1. MRF3094 Common Emitter S–Parameters

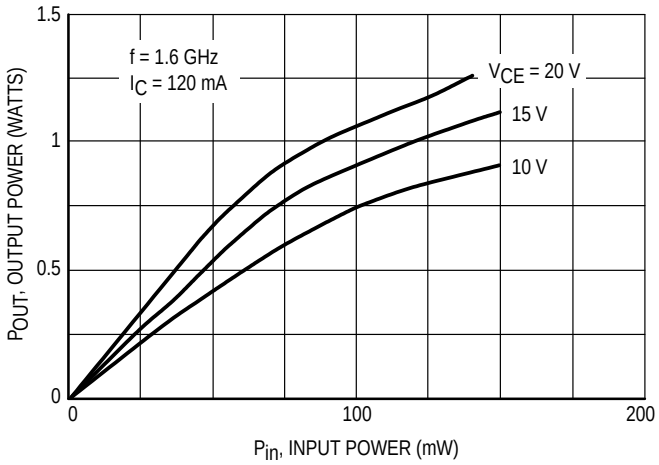


Figure 1. Output Power versus Input Power

f GHz	Z_{in} Ohms		Z_{OL}* Ohms	
	R	jx	R	jx
1.55	5.9	11.9	10.2	0.23
1.60	5.8	11.3	11.3	−2.4
1.65	5.6	10.6	12.4	−6.0

*Z_{OL} = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and power.

Figure 2. Series Equivalent Input and Output Impedance

TYPICAL CHARACTERISTICS

V_{CE} (Volts)	I_C (mA)	f (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
			Mag	∠ϕ	Mag	∠ϕ	Mag	∠ϕ	Mag	∠ϕ
20	120	500	0.83	−177.4	4.90	71.1	0.29	21.7	0.36	−81.6
		600	0.83	179.6	4.08	64.4	0.30	22.1	0.37	−87.2
		700	0.83	176.9	3.48	59.3	0.31	23.6	0.39	−92.3
		800	0.83	175.0	3.20	52.8	0.34	23.2	0.42	−96.4
		900	0.82	171.6	2.70	48.6	0.33	25.0	0.43	−103.2
		1000	0.82	169.5	2.49	42.3	0.36	24.9	0.46	−107.6
		1100	0.83	167.4	2.26	37.0	0.38	25.2	0.48	−112.5
		1200	0.80	164.3	2.10	29.4	0.39	22.1	0.51	−117.7
		1300	0.81	162.2	1.87	27.9	0.41	25.9	0.54	−121.6
		1400	0.81	160.1	1.77	21.7	0.44	24.4	0.57	−125.3
		1500	0.80	157.8	1.63	15.2	0.45	22.4	0.58	−129.3
		1600	0.80	155.2	1.46	11.1	0.46	22.6	0.61	−131.7
		1700	0.80	152.3	1.42	9.6	0.48	23.9	0.66	−133.9
		1800	0.78	148.5	1.36	2.5	0.53	21.6	0.66	−136.6
		1900	0.77	144.5	1.25	−3.1	0.54	19.7	0.66	−139.3
		2000	0.78	141.0	1.17	−5.6	0.58	20.3	0.67	−141.9

Table 2. MRF3095 Common Emitter S–Parameters

MRF3095

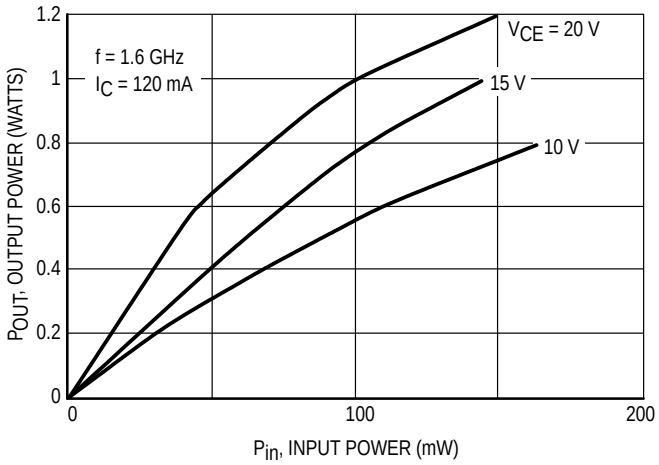


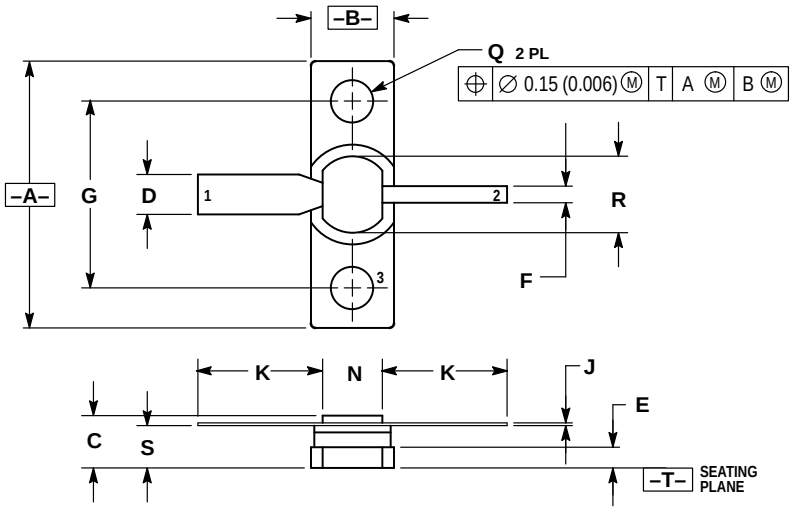
Figure 3. Output Power versus Input Power

f GHz	Z_{in} Ohms		Z_{OL}* Ohms	
	R	jx	R	jx
1.55	5.2	10.6	8.6	−22.4
1.60	4.9	9.9	9.6	−25.4
1.65	4.8	9.3	10.3	−27.8

*Z_{OL} = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and power.

Figure 4. Series Equivalent Input and Output Impedance

PACKAGE DIMENSIONS



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

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.795	0.805	20.20	20.45
B	0.245	0.255	6.23	6.47
C	0.145	0.170	3.69	4.31
D	0.115	0.125	2.93	3.17
E	0.055	0.065	1.40	1.65
F	0.045	0.055	1.15	1.39
G	0.562 BSC		14.27 BSC	
J	0.003	0.006	0.08	0.15
K	0.260	0.375	6.60	9.52
N	0.175	0.185	4.45	4.69
Q	0.120	0.135	3.05	3.42
R	0.225	0.235	5.72	5.97
S	0.120	0.130	3.05	3.30

STYLE 2:
1. BASE
2. COLLECTOR
3. EMITTER

CASE 328A–03
ISSUE E

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