

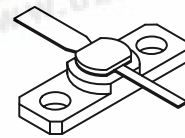
## The RF Line Microwave Linear Power Transistors

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	$I_C$	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
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### OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ( $I_C = 10\text{ mA}$ )	MRF3094, MRF3095	$V_{(BR)CES}$	50	—	—	Vdc
Emitter Base Breakdown Voltage ( $I_E = 0.25\text{ mA}$ )	MRF3094, MRF3095	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector Base Breakdown Voltage ( $I_C = 1.0\text{ mA}$ )	MRF3094, MRF3095	$V_{(BR)CBO}$	45	—	—	Vdc
Collector–Emitter Breakdown Voltage ( $I_C = 10\text{ mA}$ )	MRF3094, MRF3095	$V_{(BR)CEO}$	22	—	—	Vdc
Collector Cutoff Current ( $V_{CB} = 28\text{ V}$ )	MRF3094, MRF3095	$I_{CBO}$	—	—	0.25	mAdc

### ON CHARACTERISTICS

DC Current Gain ( $V_{CE} = 5.0\text{ V}$ , $I_C = 100\text{ mA}$ )	MRF3094, MRF3095	$h_{fe}$	20	35	120	—
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### DYNAMIC CHARACTERISTICS

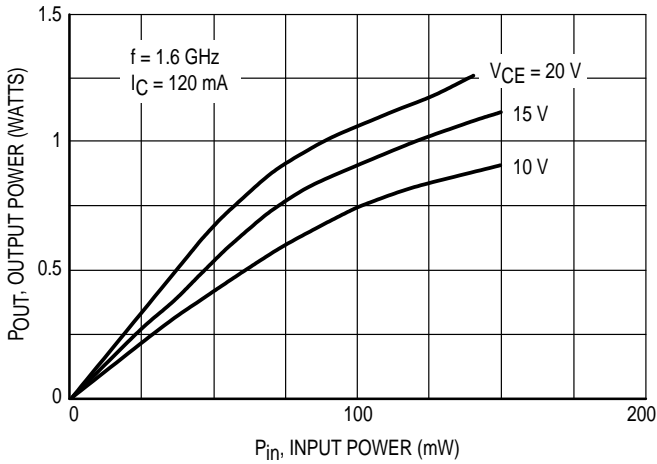
Output Capacitance ( $V_{CB} = 28\text{ V}$ , $f = 1.0\text{ MHz}$ )	MRF3094, MRF3095	$C_{ob}$	—	—	3.5	pF
Functional Tests ( $V_{CE} = 20\text{ V}$ , $I_C = 120\text{ mA}$ , $P_O = 0.5\text{ W}$ , $f = 1.6\text{ GHz}$ ) ( $V_{CE} = 20\text{ V}$ , $I_C = 120\text{ mA}$ , $P_O = 0.8\text{ W}$ , $f = 1.6\text{ GHz}$ )	MRF3094 MRF3095	$G_{PE}$	10.5 9.0	11.5 10	— —	dB
Output Load Mismatch ( $V_{CE} = 20\text{ V}$ , $I_C = 120\text{ mA}$ , $P_O = 0.5\text{ W}$ , $f = 1.6\text{ GHz}$ , Load VSWR = $\infty:1$ ) ( $V_{CE} = 20\text{ V}$ , $I_C = 120\text{ mA}$ , $P_O = 0.8\text{ W}$ , $f = 1.6\text{ GHz}$ , Load VSWR = $\infty:1$ )	MRF3094 MRF3095	$\psi$	No degradation in output power			
Gain Linearity ( $V_{CE} = 20\text{ V}$ , $I_C = 120\text{ mA}$ , $f = 1.6\text{ GHz}$ , $P_{O1} = 0.5\text{ W}$ , $P_{O2} = 0.5\text{ mW}$ ) ( $V_{CE} = 20\text{ V}$ , $I_C = 120\text{ mA}$ , $f = 1.6\text{ GHz}$ , $P_{O1} = 0.8\text{ W}$ , $P_{O2} = 0.8\text{ mW}$ )	MRF3094 MRF3095	$L_G$	— —	— —	–0.2 to +1.0 –0.2 to +1.0	dB

## TYPICAL CHARACTERISTICS

V <sub>CE</sub> (Volts)	I <sub>C</sub> (mA)	f (MHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
			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**

### MRF3094



**Figure 1. Output Power versus Input Power**

f GHz	Z <sub>in</sub> Ohms		Z <sub>OL</sub> * 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<sub>OL</sub> = Conjugate of the optimum load impedance into which the device output operates at a given output power, voltage and power.

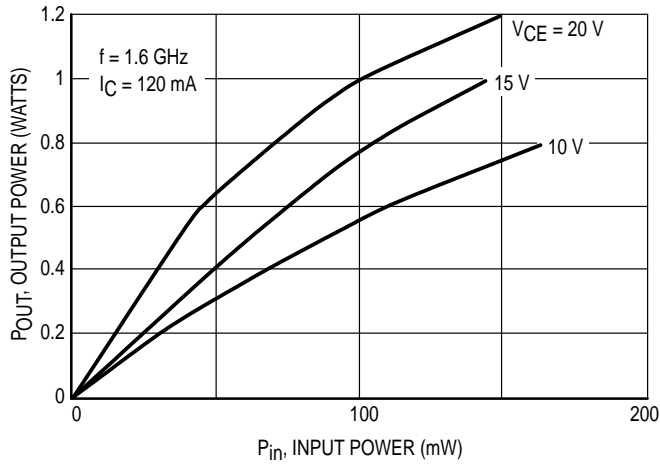
**Figure 2. Series Equivalent Input and Output Impedance**

## TYPICAL CHARACTERISTICS

V <sub>CE</sub> (Volts)	I <sub>C</sub> (mA)	f (MHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
			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



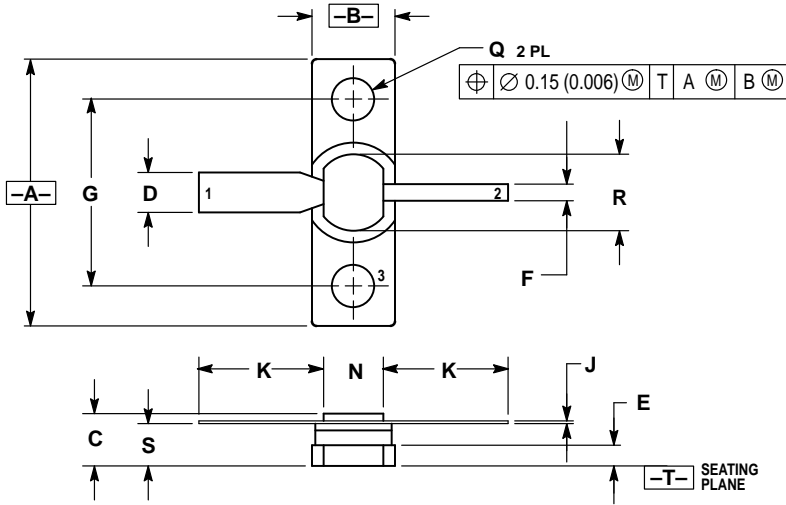
**Figure 3. Output Power versus Input Power**

f GHz	Z <sub>in</sub> Ohms		Z <sub>OL</sub> * 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<sub>OL</sub> = 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.

DIM	INCHES		MILLIMETERS	
	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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