

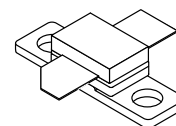
The RF Line Microwave Linear Power Transistor

Designed primarily for wideband, large signal output and driver amplifier stages in the 1.0 to 2.0 GHz frequency range.

- Designed for Class A or AB, Common Emitter Power Amplifiers
- Specified 20 Volt, 2.0 GHz Characteristic Power Gain —
7.0 dB Min @ 5.0 W P_{out}
- Built In Matching Network for Broadband Operation
- Gold Metallization for Improved Reliability
- Diffused Ballast Resistors
- Circuit board photomaster available upon request by contacting
RF Tactical Marketing in Phoenix, AZ.

MRF2000-5L

**7.0–8.0 dB GAIN
USABLE 1.0–2.0 GHz
5.0 WATTS
MICROWAVE
LINEAR POWER TRANSISTOR**



CASE 360A-01, STYLE 2

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector–Emitter Voltage	V_{CEO}	22	Vdc
Collector–Base Voltage	V_{CES}	50	Vdc
Emitter–Base Voltage	V_{EBO}	3.5	Vdc
Collector Current — Continuous	I_C	2.0	Adc
Operating Junction Temperature	T_J	200	°C
Storage Temperature Range	T_{stg}	– 65 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case, DC	$R_{\theta JC}$ (DC)	12	°C/W
Thermal Resistance, Junction to Case, RF	$R_{\theta JC}$ (RF)	10	°C/W

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector–Emitter Breakdown Voltage ($I_C = 50$ mA, $I_E = 0$)	$V_{(BR)CEO}$	22	—	—	Vdc
Collector–Emitter Breakdown Voltage ($I_C = 50$ mA, $V_{BE} = 0$)	$V_{(BR)CES}$	50	—	—	Vdc
Emitter–Base Breakdown Voltage ($I_E = 1.25$ mA, $I_C = 0$)	$V_{(BR)EBO}$	3.5	—	—	Vdc
Collector–Emitter Breakdown Voltage ($I_C = 50$ mA, $R_{BE} = 10$ Ohms)	$V_{(BR)CER}$	35	—	—	Vdc
Collector Cutoff Current ($V_{CE} = 20$ V, $I_E = 0$)	I_{CBO}	—	—	1.25	mAdc

ON CHARACTERISTICS

DC Current Gain ($I_C = 0.5$ A, $V_{CE} = 5.0$ V)	h_{FE}	20	35	100	—
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(continued)

ELECTRICAL CHARACTERISTICS — continued

Characteristic	Symbol	Min	Typ	Max	Unit
FUNCTIONAL TESTS					
Common-Emitter Amplifier Power Gain ($V_{CE} = 20\text{ V}$, $P_{out} = 5.0\text{ W}$, $f = 2.0\text{ GHz}$, $I_C = 600\text{ mA}$)	G_{PE1}	7.0	—	—	dB
Collector Efficiency ($V_{CE} = 20\text{ V}$, $P_{out} = 5.0\text{ W}$, $f = 2.0\text{ GHz}$, $I_C = 600\text{ mA}$)	η_c	39	—	—	%
Typical Class AB Performance					
Common-Emitter Amplifier Power Gain ($V_{CE} = 20\text{ V}$, $P_{out} = 6.0\text{ W}$, $f = 2.0\text{ GHz}$, $I_{CQ} = 100\text{ mA}$)	G_{PE2}	—	5.0	—	dB
Collector Efficiency ($V_{CE} = 20\text{ V}$, $P_O = 6.0\text{ W}$, $f = 2.0\text{ GHz}$, $I_{CQ} = 100\text{ mA}$)	η_c	—	48	—	%
Common-Emitter Amplifier Power Gain ($V_{CE} = 24\text{ V}$, $P_{out} = 8.0\text{ W}$, $f = 2.0\text{ GHz}$, $I_{CQ} = 100\text{ mA}$)	G_{PE3}	—	6.5	—	dB
Collector Efficiency ($V_{CE} = 24\text{ V}$, $P_O = 8.0\text{ W}$, $f = 2.0\text{ GHz}$, $I_{CQ} = 100\text{ mA}$)	η_c	—	50	—	%

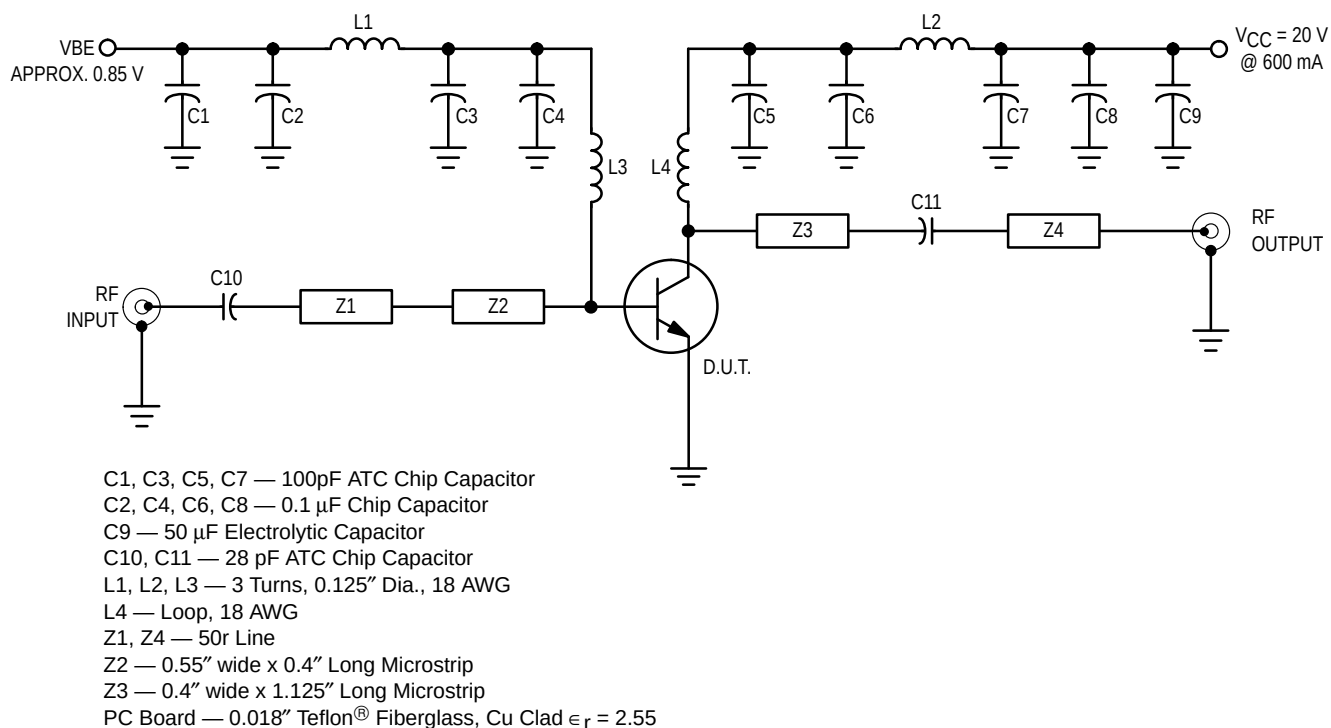


Figure 1. 2.0 GHz Test Circuit

TYPICAL CHARACTERISTICS

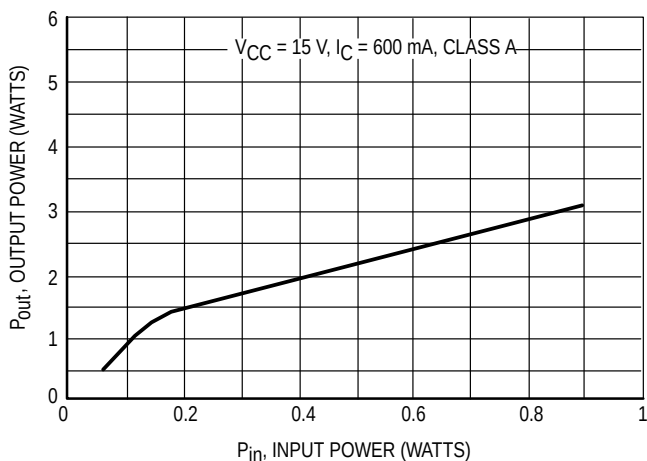


Figure 2. Output Power versus Input Power

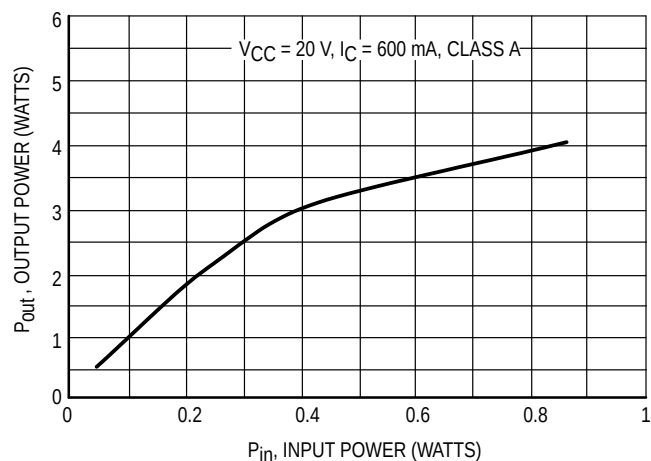


Figure 3. Output Power versus Input Power

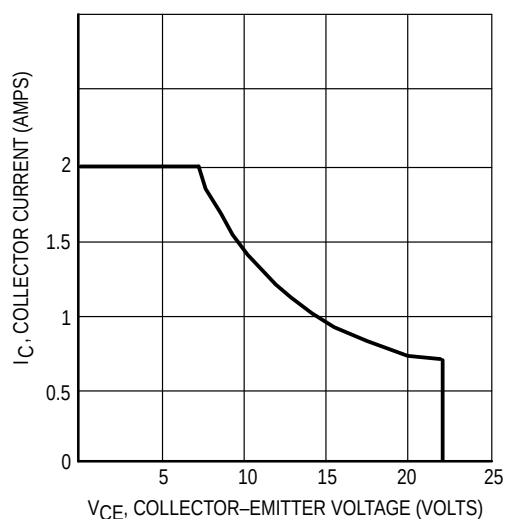
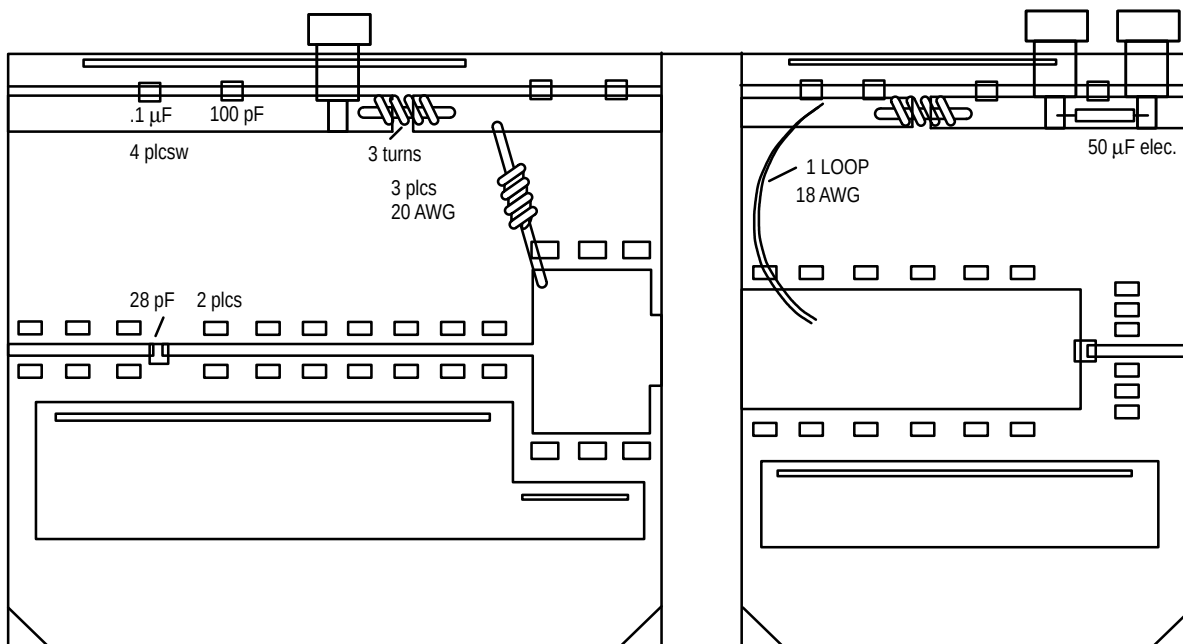


Figure 4. DC Safe Operating Area

V_{CE} (Vdc)	I_C (mA)	f MHz	S_{11}		S_{21}		S_{12}		S_{22}	
			$ S_{11} $	$\angle \phi$	$ S_{21} $	$\angle \phi$	$ S_{12} $	$\angle \phi$	$ S_{22} $	$\angle \phi$
20	500	500	0.94	174	1.95	-17	0.02	-63	0.57	-170
		600	0.94	172	1.65	-40	0.02	-78	0.59	-170
		700	0.94	171	1.44	-62	0.02	-93	0.61	-170
		800	0.93	170	1.28	-84	0.02	-107	0.63	-170
		900	0.92	169	1.16	-107	0.02	-121	0.65	-169
		1000	0.92	169	1.06	-129	0.02	-138	0.67	-169
		1100	0.91	169	0.99	-152	0.02	-155	0.70	-169
		1200	0.90	169	0.93	-175	0.02	-172	0.73	-169
		1300	0.89	169	0.88	161	0.02	171	0.75	-169
		1400	0.88	169	0.84	137	0.02	154	0.76	-170
		1500	0.88	170	0.81	113	0.02	141	0.80	-170
		1600	0.87	171	0.77	88	0.01	130	0.81	-171
		1700	0.87	172	0.73	62	0.01	120	0.83	-173
		1800	0.81	172	0.69	34	0.01	123	0.83	-174
		1900	0.89	173	0.64	8	0.01	125	0.83	-176
		2000	0.90	173	0.58	-18	0.01	127	0.83	-177
		2100	0.92	173	0.52	-46	0.01	122	0.82	-178
		2200	0.93	172	0.48	-73	0.02	110	0.81	-179
		2300	0.94	170	0.42	-99	0.02	95	0.80	-179
		2400	0.95	167	0.37	-126	0.02	82	0.80	-180
		2500	0.95	165	0.32	-153	0.03	67	0.81	-180

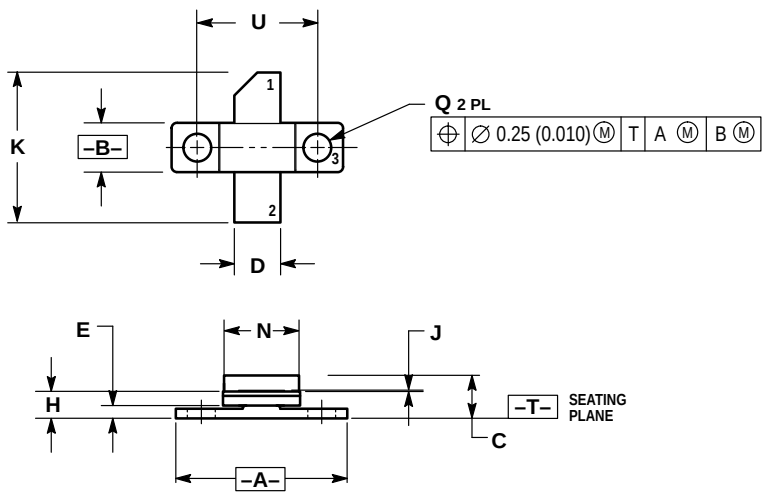
Table 1. Common Emitter S-Parameters



NOTE: MATERIAL IS TEFLON FIBERGLASS, 20 MIL THICK, Cu CLAD 2 SIDES

Figure 5. Test Circuit Board — Component Placement

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	20.19	20.45
B	0.225	0.235	5.71	5.97
C	0.184	0.216	4.67	5.49
D	0.210	0.220	5.33	5.59
E	0.055	0.065	1.40	1.65
H	0.115	0.135	2.92	3.43
J	0.004	0.006	0.10	0.15
K	0.670	0.730	17.02	18.54
N	0.345	0.355	8.76	9.02
Q	0.125	0.135	3.18	3.43
U	0.560 BSC		14.22 BSC	

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

CASE 360A-01
ISSUE A

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