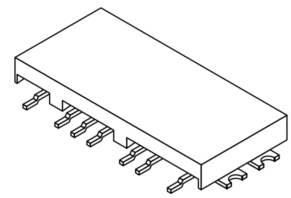
The RF Line
Microwave GaAs FET Power Amplifier

MHW9014

33.2 dBm
1710 – 1785 MHz
RF POWER AMPLIFIER

Designed for applications in the Personal Communication Network System (PCN). The MHW9014 was designed specifically for a digital, 1 Watt, hand–held radio. This power amplifier is capable of wide power range control, operates from a 6 Volt supply and requires only 1.0 mW of RF input power.

- Specified 6 Volt Characteristics:
  RF Input Power: 1.0 mW (0 dBm)
  RF Output Power: 33.2 dBm
  Minimum Gain: 33.2 dB
  Harmonics: –33 dBc Max @ 2 f_0
- New Biasing and Control Techniques Providing Dynamic Range and Control Circuit Bandwidth Ideal for PCN
- Low Control Current
- 50 Ω Input / Output Impedances
- Guaranteed Stability and Ruggedness



CASE 420 – 01, STYLE 1

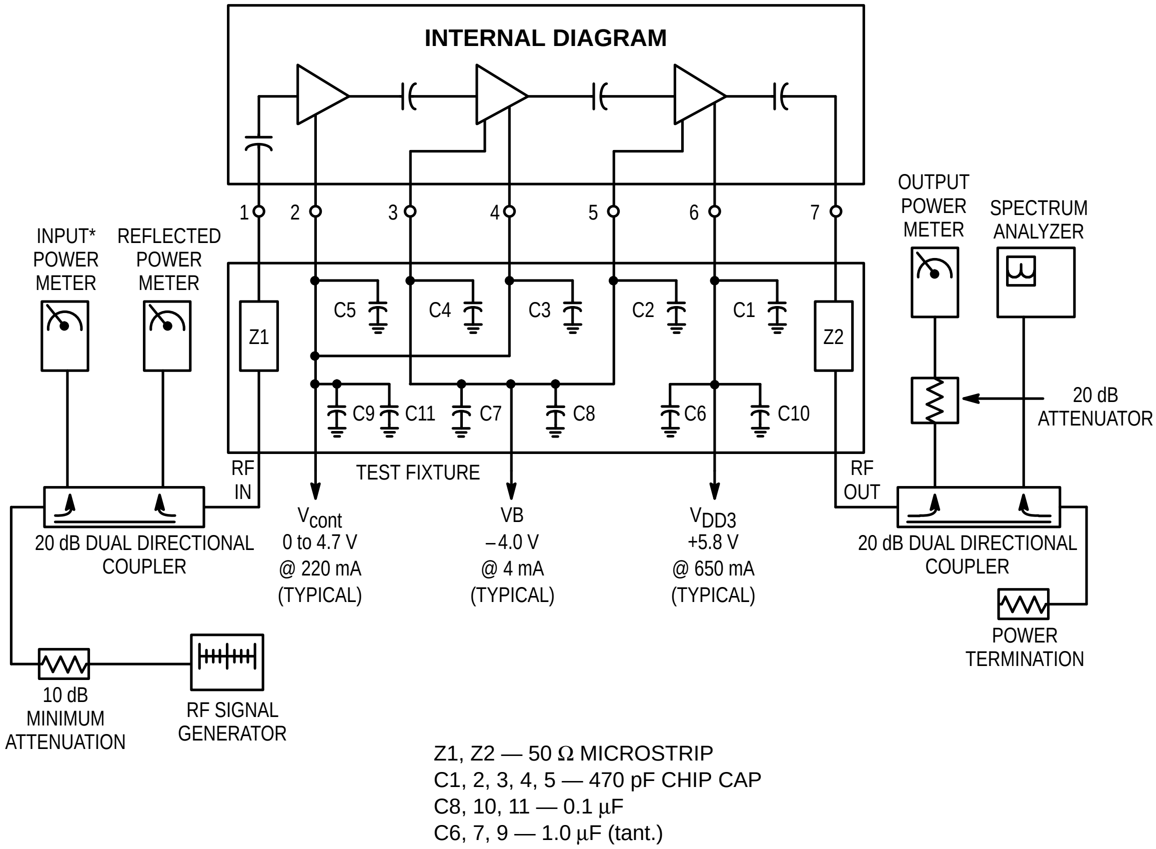
MAXIMUM RATINGS

Rating	Symbol	Value	Unit
DC Supply Voltage (No RF Applied)	V_{S3}	10	Vdc
DC Bias Voltage	V_B	–4.7	Vdc
DC Control Voltage (No RF Applied)	V_{cont}	10	Vdc
RF Input Power	P_{in}	2	mW
RF Output Power	P_{out}	3	W
Operating Case Temperature Range	T_C	–30 to +100	°C
Storage Temperature Range	T_{stg}	–30 to +100	°C

ELECTRICAL CHARACTERISTICS
(V_{cont} = 5 V; V_{S3} = 5.8 Vdc; V_B = –4 Vdc; P_{in} = 0 dBm; T_C = +25°C, 50 ohm system, unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
Frequency Range	BW	1710	1785	MHz
Output Power (V_{cont} = 5.0 V)	P_{out}	33.2	—	dBm
Gate Current (P_{out} = 33.2 dBm) (1)	I_G	—	5	mA
Supply Current (1)	I_S	—	300	mA
Efficiency (P_{out} = 33.2 dBm) (1)	η	40	—	%
Input Return Loss (P_{out} = 33.2 dBm) (1)	IRL	10	—	dB
Harmonics (P_{out} = 33.2 dBm) (1) 2 f_0 3 f_0, 4 f_0, 5 f_0	— —	— —	–33 –43	dBc
Noise Power (In 30 KHz Bandwidth, 95 MHz above f_0, P_{out} = 33.2 dBm) (1)	—	—	–80	dBm
Load Mismatch Stress (V_{S3} = 7 V, P_{out} = 33.2 dBm; for 1700 MHz < f < 1800 MHz, Load Return Loss = 10 dB, All Phase Angles at Frequency of Test) (2)	—	No Degradation in Output Power Before and After Test		
Stability (V_{S3} = 5 to 7 V; P_{out} = 7 to 33.2 dBm; for 1700 MHz < f < 1800 MHz, Load VSWR = 6:1, All Phase Angles at Frequency of Test. For frequencies < 1700 MHz or > 1800 MHz, Load VSWR = 10:1, All Phase Angles at Frequency of Test) (1)	—	All Spurious Outputs More than 60 dB Below Desired Signal		
Output Power, Over Temperature (V_{cont} = V_{S3} = 5 V; P_{in} = 0 dBm, T_C = –30°C to +90°C)	—	32	—	dBm
V_{cont} Low Output Power (P_{out} = 0 dBm)	V_{cont}	—	0.75	V

(1) Adjust V_{cont} for Specified P_{out}; V_{cont} is 5 V Max. Duty Cycle = 10%, Period = 600 μs.
(2) Adjust V_{cont} for Specified P_{out}; V_{cont} is 7 V Max. Duty Cycle = 10%, Period = 600 μs.



NOTE:
The above circuit layout is used for performance verification. A layout intended for use in a particular application should be thoroughly evaluated. When the device is surface mounted on a microstrip substrate, the ground plane pattern must be electrically and thermally grounded to the actual microstrip backplane. The drain bias pins should be individually bypassed using separate ground return paths.

*Module input power is forward power as sampled by the directional coupler and read on the input power meter.

Figure 1. MHW9014 Test Circuit Diagram

TYPICAL CHARACTERISTICS

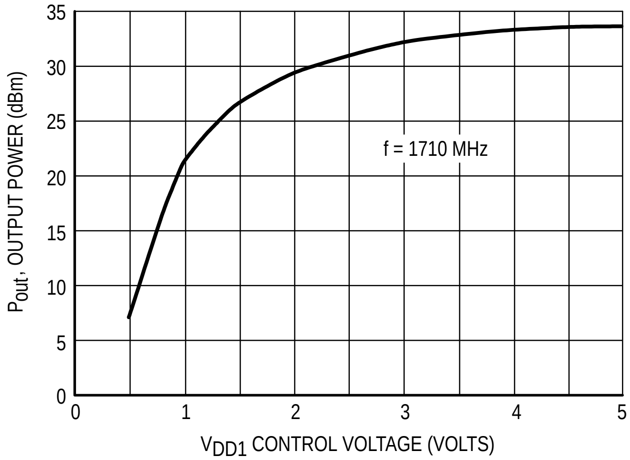


Figure 2. Output Power versus Control Voltage

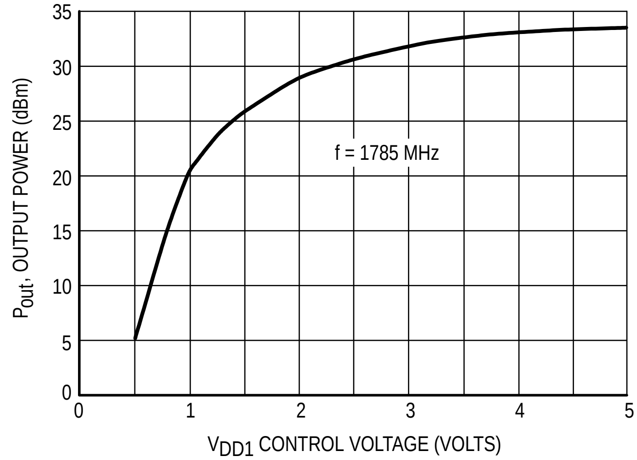


Figure 3. Output Power versus Control Voltage

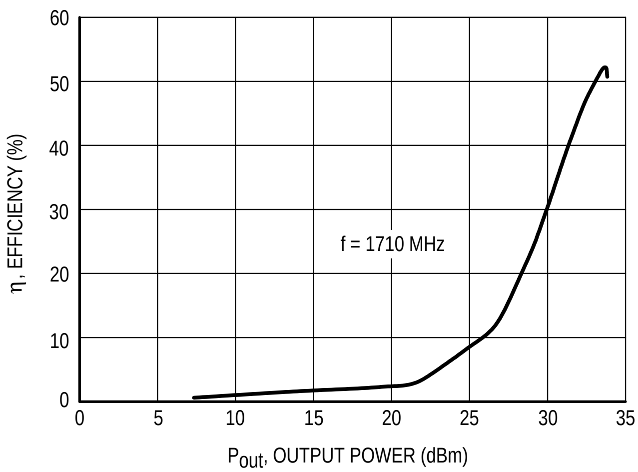


Figure 4. Efficiency versus Output Power

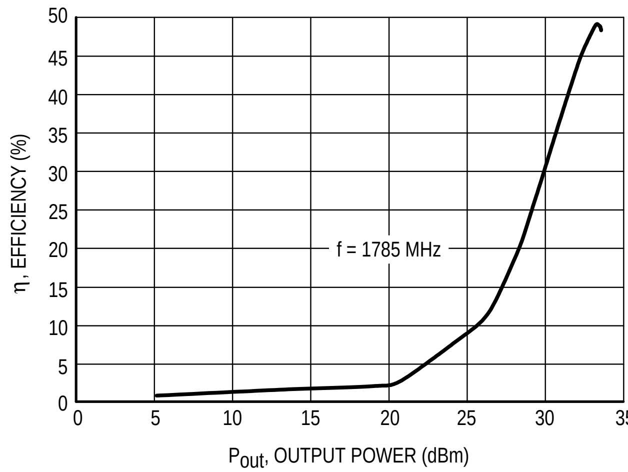


Figure 5. Efficiency versus Output Power

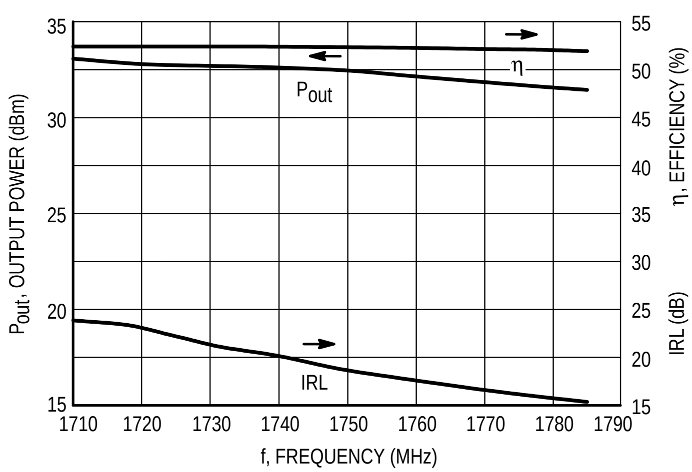
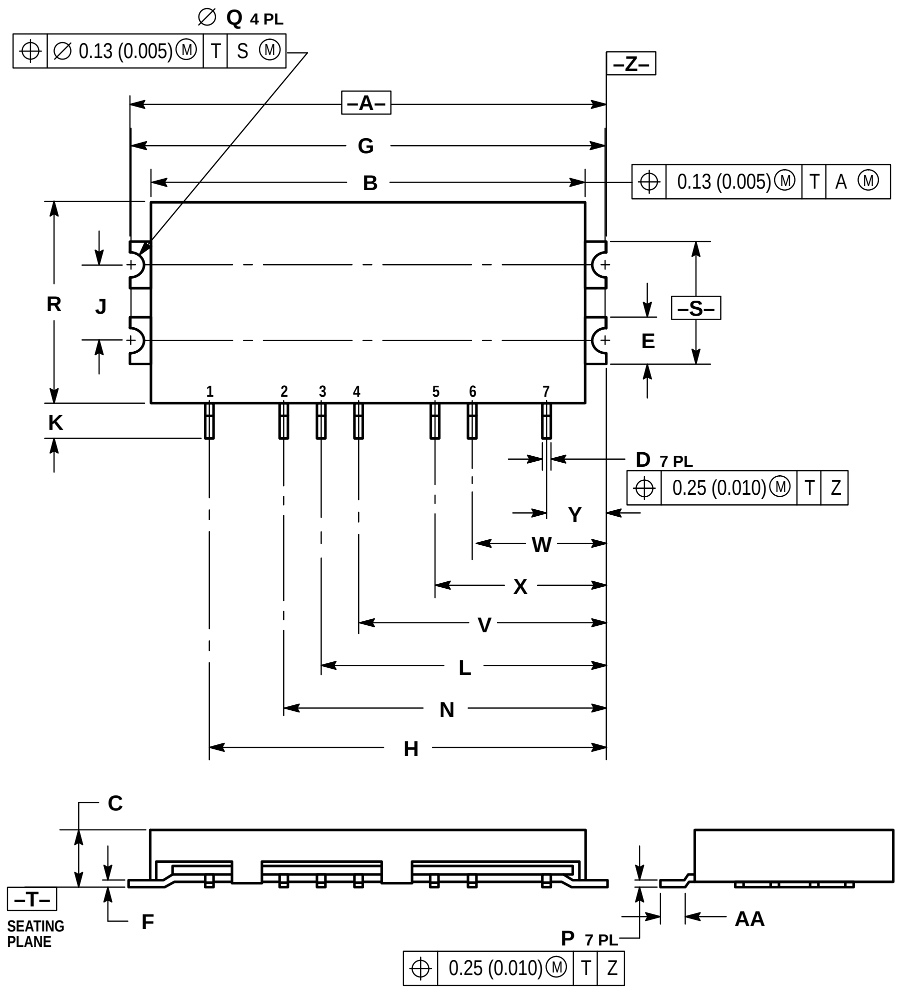


Figure 6. Output Power, Efficiency, Input Return Loss versus Frequency

PACKAGE DIMENSIONS



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

	MILLIMETERS		INCHES	
DIM	**MIN**	**MAX**	**MIN**	**MAX**
A	31.74	32.00	1.250	1.260
B	28.80	29.20	1.134	1.150
C	3.64	4.00	0.143	0.157
D	0.46	0.55	0.018	0.022
E	2.80	3.20	0.110	0.126
F	0.17	0.43	0.007	0.017
G	31.50 BSC		1.248 BSC	
H	26.50 BSC		1.043 BSC	
J	5.00 BSC		0.197 BSC	
K	2.20	2.48	0.087	0.097
L	19.08 BSC		0.748 BSC	
N	21.50 BSC		0.846 BSC	
P	0.21	0.30	0.008	0.012
Q	1.37	1.63	0.054	0.064
R	13.17	13.43	0.519	0.529
S	7.80	8.20	0.307	0.323
V	16.50 BSC		0.650 BSC	
W	9.00 BSC		0.354 BSC	
X	11.50 BSC		0.453 BSC	
Y	4.00 BSC		0.157 BSC	
AA	1.37	1.63	0.054	0.064

STYLE 1:
PIN 1. P IN
2. VDD1
3. VGG2
4. VDD2
5. VGG3
6. VDD3
7. P OUT

CASE 420–01
ISSUE B

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