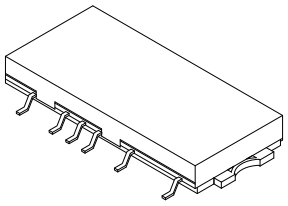
The RF Line
UHF Linear Power Amplifier

Designed for the North American Digital Cellular (NADC), specifically for a digital, 1 watt, handheld radio. The MHW920 power amplifier is capable of wide power range control, operates from a 6 volt supply and requires only 1 mW of RF input power.

- Specified 6 Volt Characteristics:
  RF Input Power: 1 mW (0 dBm)
  RF Output Power: 0.8 W Avg.
  Minimum Gain: 29 dB
  Harmonics: –30 dBc Max @ 2 f_o
- 50 Ohm Input/Output Impedances
- Guaranteed Stability and Ruggedness

MHW920

0 dBm, 0.8 W Avg.
824–849 MHz
RF LINEAR
POWER AMPLIFIER



CASE 420U–02, Style 1

MAXIMUM RATINGS (Flange Temperature = 25°C)

Rating	Symbol	Value	Unit
DC Supply Voltage (No RF Applied)	V_{S1}, V_{S2}, V_{S3}	9	Vdc
DC Bias Voltage	V_B	5.25	Vdc
RF Input Power	P_{in}	2	mW
RF Output Power (V_S = 9 Vdc)	P_{out}	4.5	W
Operating Case Temperature Range	T_C	–30 to +80	°C
Storage Temperature Range	T_{stg}	–30 to +100	°C

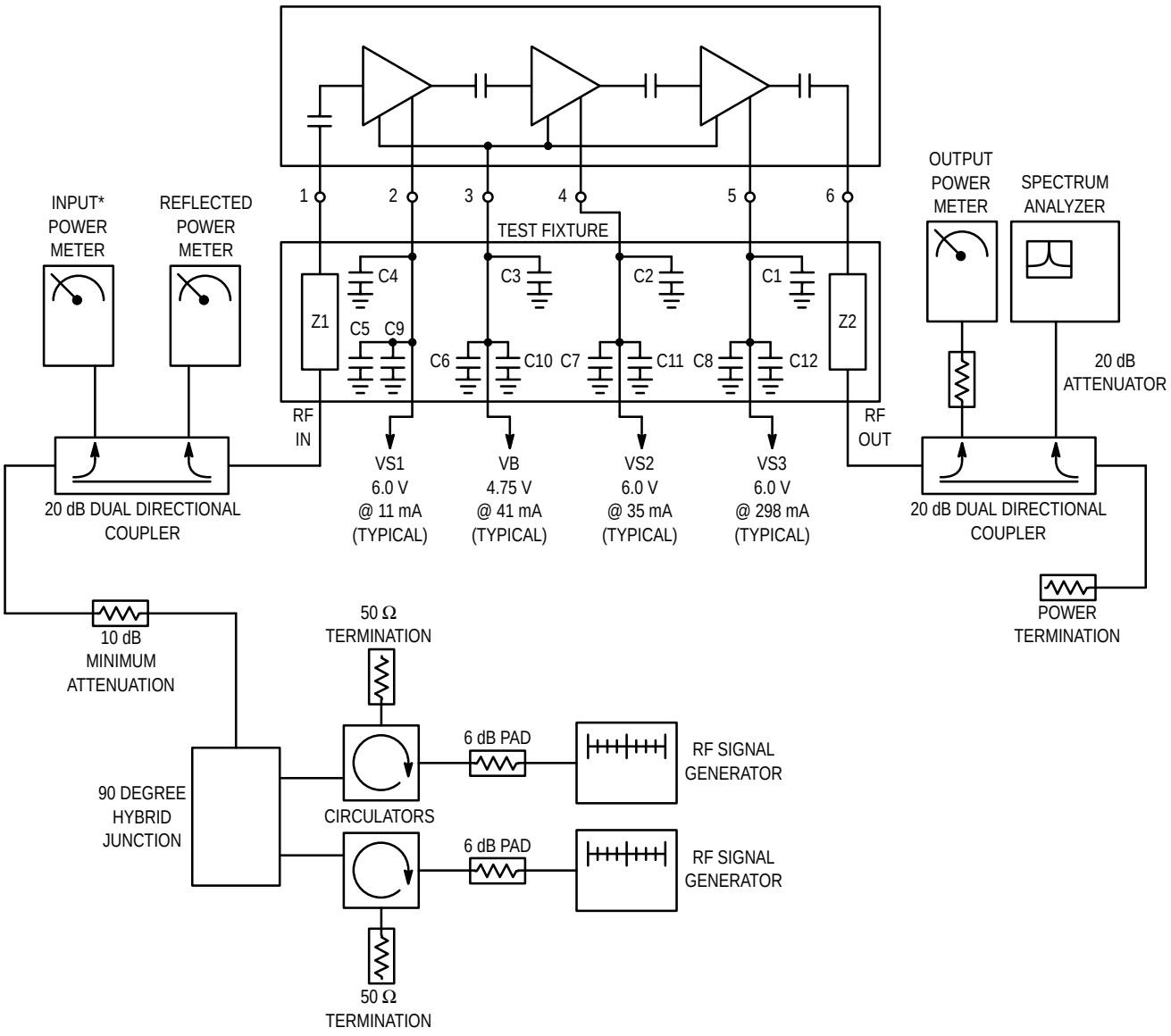
ELECTRICAL CHARACTERISTICS (V_{S1} = V_{S2} = V_{S3} = 6 Vdc; V_{BIAS} = 4.75 Vdc; T_C = +25°C; 50 ohm system, unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
Frequency Range		BW	824	849	MHz
Power Gain (P_{out} = 0.8 W Avg.) (1) (2)		G_P	29	—	dB
EFficiency (P_{out} = 0.8 W Avg.) (1) (2)		η	35	—	%
Input VSWR (P_{out} = 0.8 W) (1)		$VSWR_{IN}$	—	2:1	
Harmonics (P_{out} = 0.8 W) (1)	2 f_o 3 f_o	—	— —	–30 –45	dBc
Noise Power (In 30 kHz Bandwidth, 45 MHz above f_o, P_{out} = 0.8 W) (1)		P_N	—	–90	dBm
Linearity (P_{out} = 0.8 W Avg.) (1) (2)	3rd Order IMD 5th Order IMD 7th Order IMD	—	— — —	–26 –31 –35	dBc
Linearity Low Voltage (1) (2) (P_{out} = 0.42 W Avg.; T_C = –30°C to +80°C; V_{S1} = V_{S2} = V_{S3} = 5 V; V_{BIAS} = 4.75 V)	3rd Order IMD 5th Order IMD 7th Order IMD	—	— — —	–26 –31 –35	dBc
Load Mismatch Stress (V_{S1} = V_{S2} = V_{S3} = 9 Vdc; P_{out} = 0.8 W; Load VSWR = 20:1; All Phase Angles at Frequency of Test) (1)		ψ	No Degradation in Output Power Before and After Test		
Stability (V_{S1} = V_{S2} = V_{S3} = 5.4–7 Vdc; P_{in} = 0.05 – 1 mW: Load VSWR = 8:1, All Phase Angles at Frequency of Test)			All Spurious Outputs More than 60 dB Below Desired Signal		

(1) Adjust P_{in} for specified P_{out}. $P_{in} \leq 1$ mW.
(2) Measured under two tone test with tones 10 kHz apart.

MOTOROLA

INTERNAL DIAGRAM



C1, C2, C3, C4	0.018 μF
C5, C6, C7, C8	0.1 μF
C9, C10, C11, C12	1.0 μF (tant.)
Z1, Z2	50 Ω Microstrip

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

Figure 1. Power Module Test Circuit Diagram

TYPICAL CHARACTERISTICS

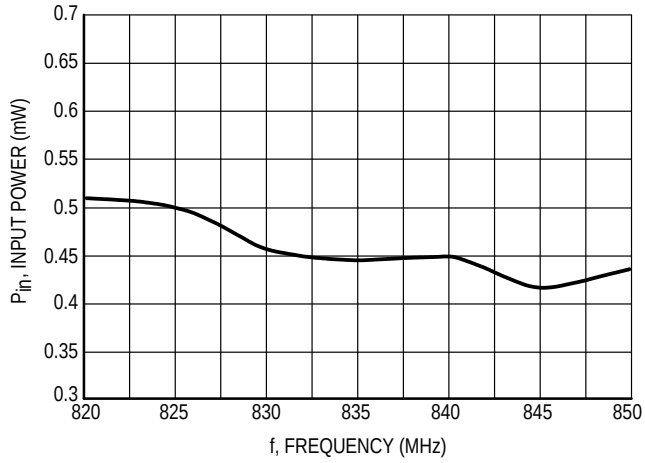


Figure 2. Input Power versus Frequency

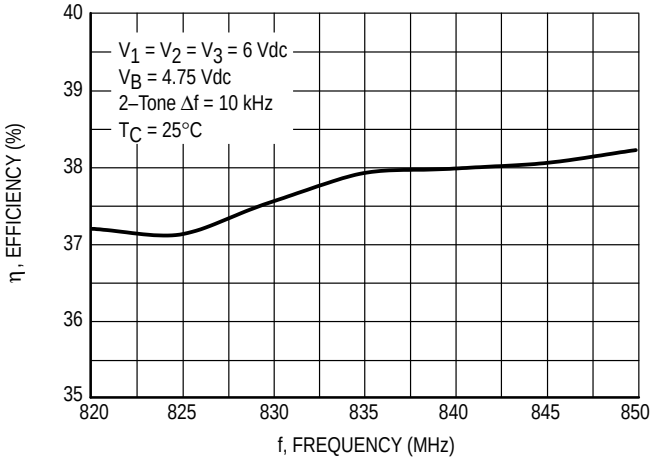


Figure 3. Efficiency versus Frequency

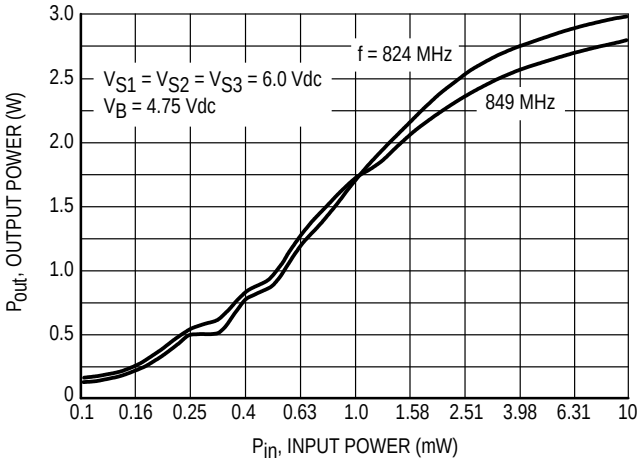


Figure 4. Input Power versus Output Power @ T = 25°C

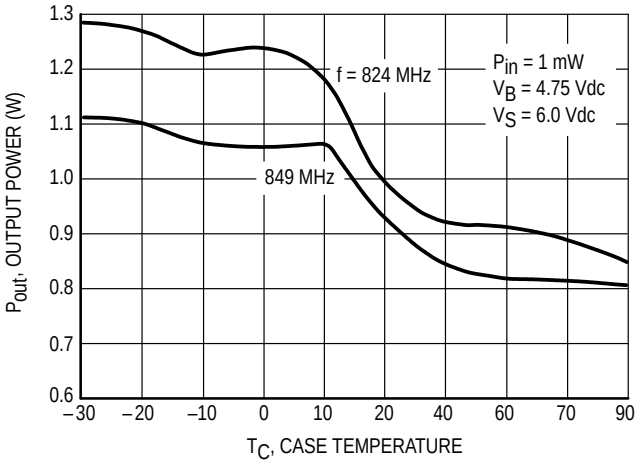


Figure 5. Output Power versus Case Temperature

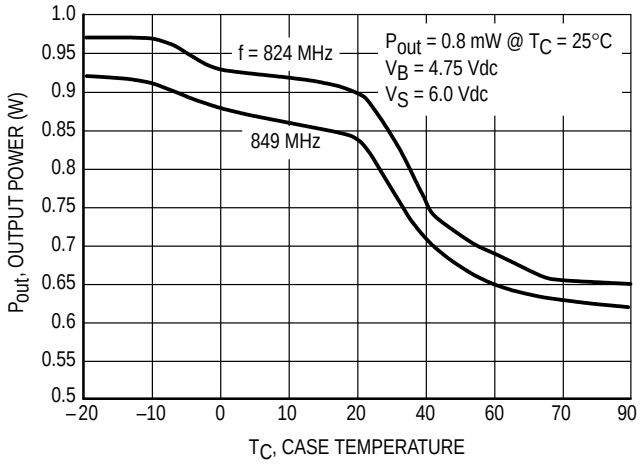


Figure 6. Output Power versus Case Temperature

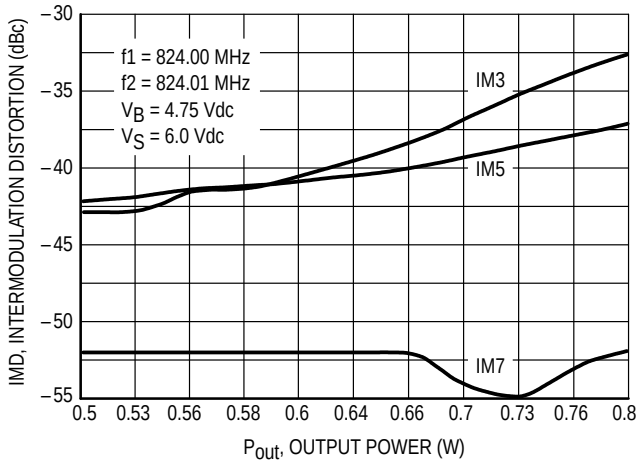


Figure 7. Intermodulation versus Output Power

TYPICAL CHARACTERISTICS

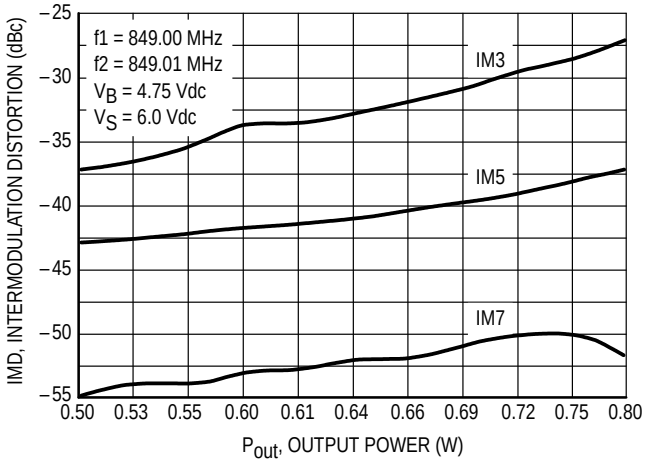
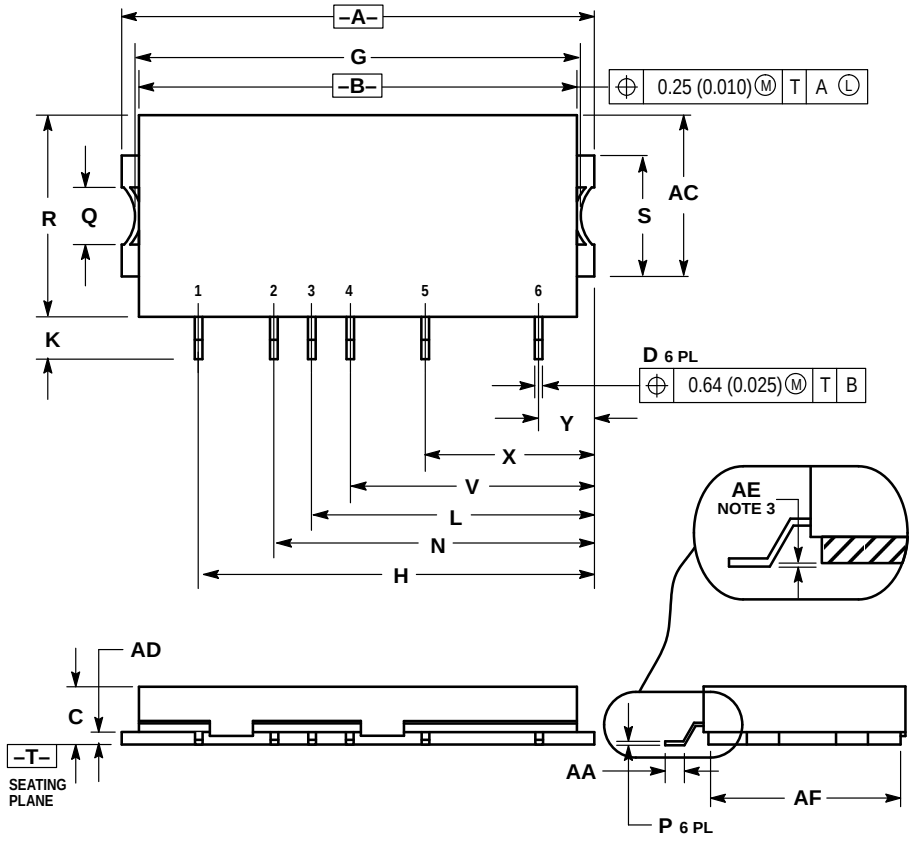


Figure 8. Intermodulation versus Output Power

PACKAGE DIMENSIONS



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION AE (PACKAGE COPLANARITY):THE BOTTOM OF THE DEVICE LEADS AND THE REFERENCE PLANE –T– MUST BE COPLANAR WITHIN THE DIMENSION AE.
4. REF INDICATES NON–CONTROLLED DIMENSION FOR REFERENCE USE ONLY.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	31.75	32.05	1.250	1.262
B	28.85	29.10	1.136	1.146
C	3.70	4.00	0.146	0.157
D	0.43	0.58	0.017	0.023
G	29.6 REF		1.165 REF	
H	25.03 BSC		0.985 BSC	
K	2.10	2.62	0.083	0.103
L	17.53 BSC		0.690 BSC	
N	20.03 BSC		0.789 BSC	
P	0.25 REF		0.010 REF	
Q	3.78 REF		0.149 REF	
R	13.15	13.45	0.518	0.530
S	8.00 REF		0.315 REF	
V	15.03 BSC		0.592 BSC	
X	10.03 BSC		0.395 BSC	
Y	2.53 BSC		0.100 BSC	
AA	1.35	1.70	0.053	0.067
AC	10.50 REF		0.413 REF	
AD	0.81 REF		0.032 REF	
AE	+0.050	–0.076	+0.002	–0.003
AF	12.80 REF		0.504 REF	

STYLE 1:
PIN 1. P IN
2. VCC1
3. VBIAS
4. VCC2
5. VCC3
6. P OUT

CASE 420U–02
ISSUE A

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