

## The RF Line UHF Linear Power Amplifiers

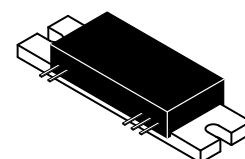
Designed specifically for the United States digital 3.0 W, mobile radio. The MHW927A/B are capable of wide power range control, operate from a 12.5 V supply and require 1.0 mW of RF input power.

- MHW927A Operates from a 9.5 Volt Bias Supply ( $V_B$ )  
MHW927B Operates from a 8.0 Volt Bias Supply ( $V_B$ )
- Specified 12.5 Volt Characteristics for MHW927A/B:  
RF Input Power — 1.0 mW (0 dBm) Max  
RF Output Power — 6.0 W  
Power Gain — 40 dB Typ  
Harmonics — -30 dBc Max @ 2  $f_0$
- Linearity (IMD) — -29 dBc Max for 3rd Order; -34 dBc Max for 5th Order
- New Biasing and Control Techniques Providing Dynamic Range and Control Circuit Bandwidth Ideal for USDC
- 50  $\Omega$  Input/Output Impedances
- Guaranteed Stability and Ruggedness

**MHW927A\***  
**MHW927B**

\*Motorola Preferred Device

**6.0 W**  
**824 to 849 MHz**  
**RF LINEAR**  
**POWER AMPLIFIERS**



CASE 301AA-01, STYLE 1

### MAXIMUM RATINGS (Recommended Values for Safe Operation — Not Guaranteed Performance)

Rating	Symbol	Value	Unit
DC Supply Voltage	$V_{S2}, V_{S3}$	16.5	Vdc
DC Bias Voltage	$V_B$	10	Vdc
RF Input Power	$P_{in}$	3.0	mW
RF Output Power	$P_{out}$	13	W
Operating Case Temperature Range	$T_C$	-30 to +100	$^{\circ}C$
Storage Temperature Range	$T_{stg}$	-30 to +100	$^{\circ}C$

**ELECTRICAL CHARACTERISTICS** ( $V_{S2} = V_{S3} = 12.5$  Vdc;  $V_B = 9.5$  Vdc (MHW927A);  $V_B = 8.0$  Vdc (MHW927B);  $P_{in} \leq 1.0$  mW (MHW927A/B);  $T_C = +25^{\circ}C$ , 50 ohm system, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	824	—	849	MHz
Input Power ( $P_{out} = 6.0$ W) (1)	$P_{in}$	—	—	1.0	mW
Efficiency ( $P_{out} = 6.0$ W) (1)	$\eta_1$	28	30	—	%
Efficiency, Two Tone ( $P_{out}$ (Avg.) = 6.0 W; $f_1$ & $f_2$ 10 kHz apart) (1)	$\eta_2$	28	30	—	%
Input VSWR ( $P_{out} = 6.0$ W) (1)	VSWR <sub>in</sub>	—	—	2.5:1	—
Harmonics ( $P_{out} = 6.0$ W) (1)					
	2 $f_0$	—	—	-30	dBc
	3 $f_0$	—	—	-45	dBc
Noise Power (In 30 kHz Bandwidth, 45 MHz Above $f_0$ ; $T_C = +25^{\circ}C$ to $T_C = +100^{\circ}C$ ; $P_{out} = 6.0$ W) (1)	—	—	—	-82	dBm
Linearity ( $P_{out}$ (Avg.) = 6.0 W; $f_1$ & $f_2$ are 10 kHz apart) (1)					
	3rd Order IMD	—	-31	-29	dBc
	5th Order IMD	—	-36	-34	dBc
Load Mismatch Stress ( $V_{S2} = V_{S3} = 16$ Vdc; $P_{out} = 12.5$ W; Pulsed at 50% Duty Cycle; Load VSWR = 20:1, All Phase Angles At Frequency of Test) (1)	$\psi$	No Degradation In Output Power Between Before and After Test			
Stability ( $V_{S2} = V_{S3} = 10$ to 16 Vdc; $P_{out} = 0.012$ to 12 W; Load VSWR = 4:1, All Phase Angles At Frequency of Test) (1)	—	All Spurious Outputs More Than 70 dB Below Desired Signal			

**NOTE:**

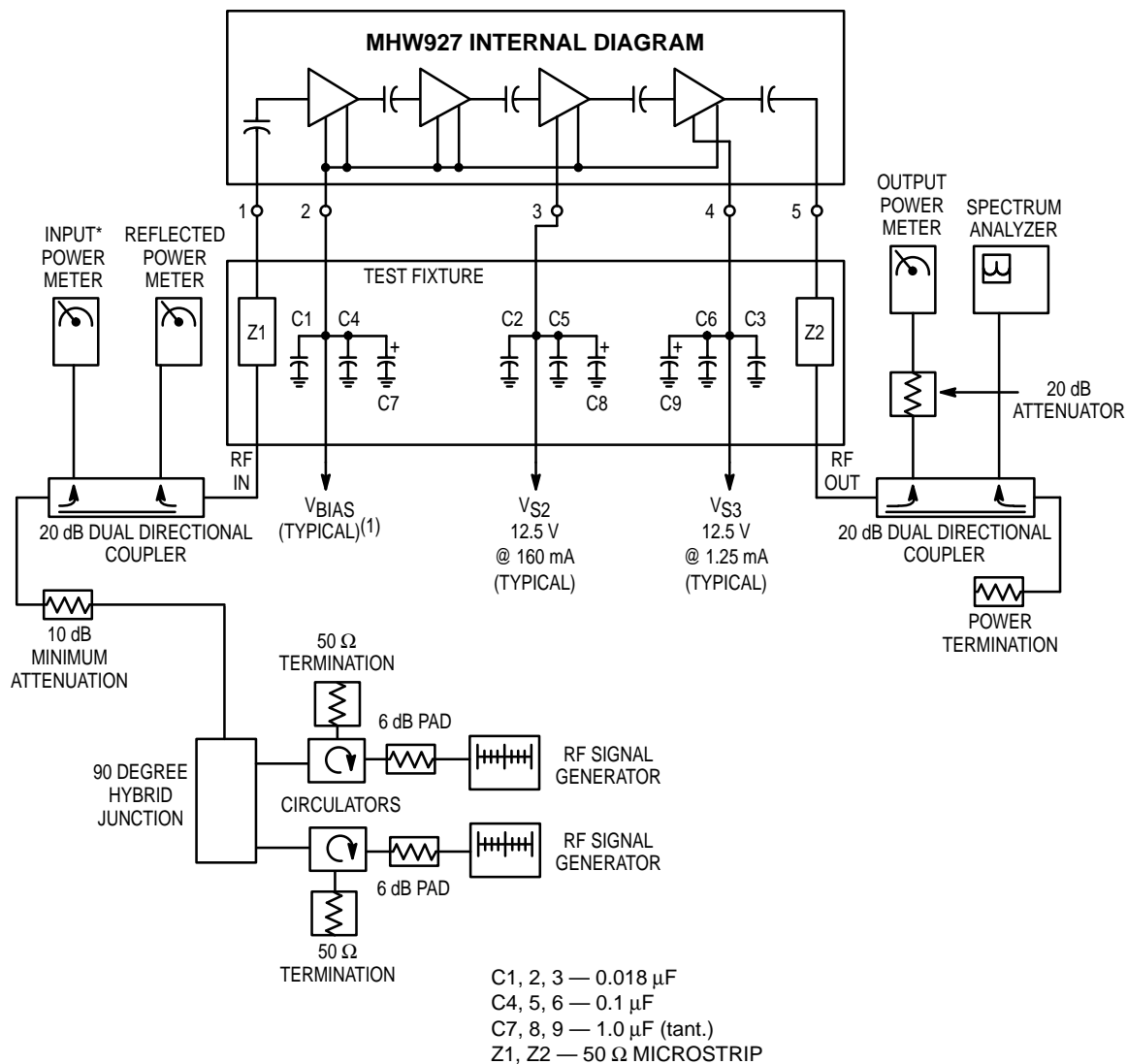
1. Adjust  $P_{in}$  for Specified  $P_{out}$ .

**Preferred** devices are Motorola recommended choices for future use and best overall value.

REV 6

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(1)  $V_{BIAS} = 9.5 \text{ V @ } 140 \text{ mA}$  (MHW927A) or  $8.0 \text{ V @ } 140 \text{ mA}$  (MHW927B)

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

**Figure 1. MHW927A/B Test Circuit Diagram**

# TYPICAL CHARACTERISTICS

(MHW927A)

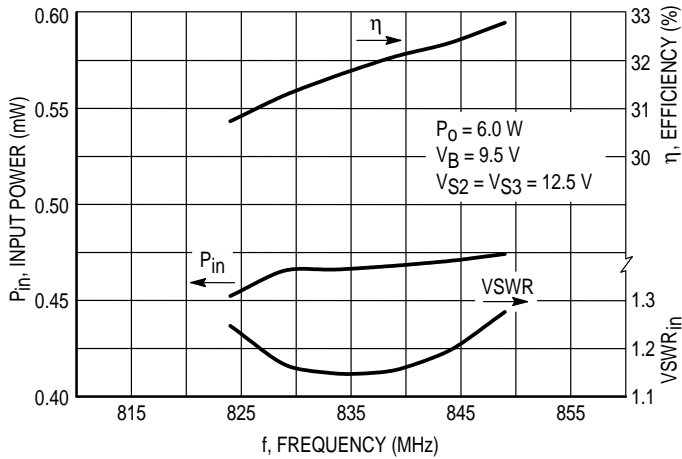


Figure 2. Input Power, Efficiency and VSWR versus Frequency

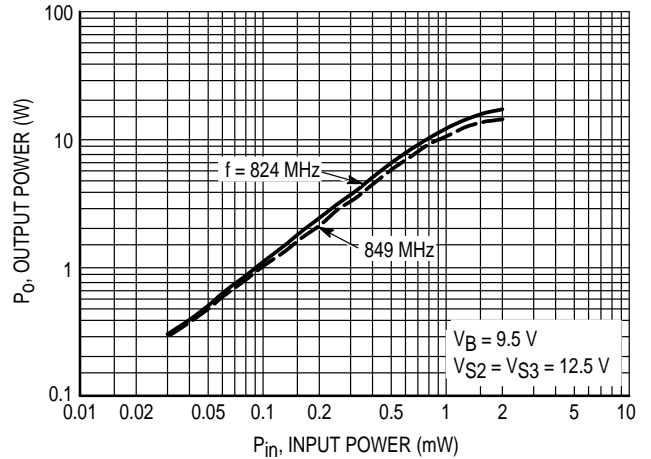


Figure 3. Output Power versus Input Power

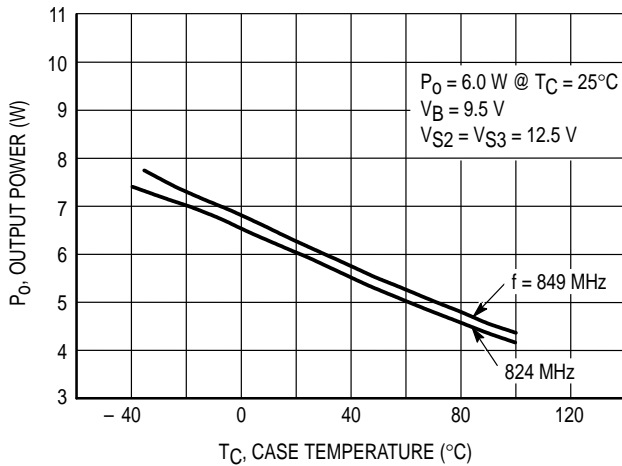


Figure 4. Output Power versus Case Temperature

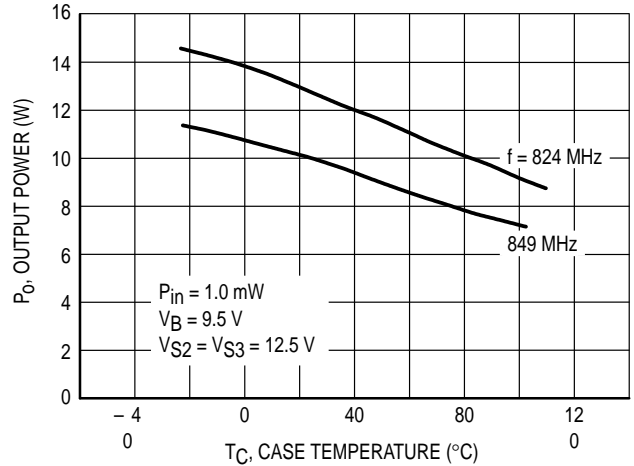


Figure 5. Output Power versus Case Temperature at Maximum Input Power

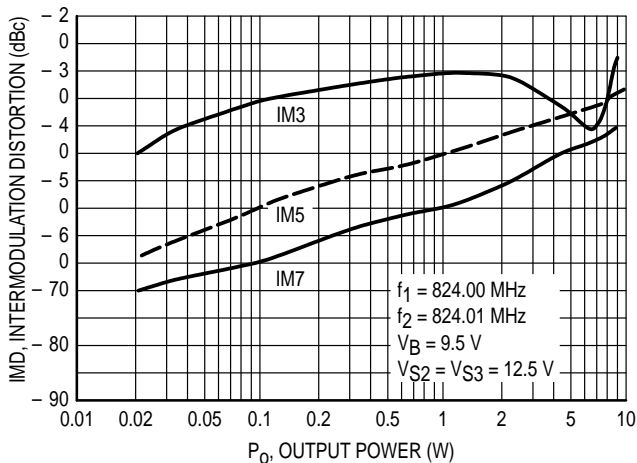


Figure 6. Intermodulation versus Output Power

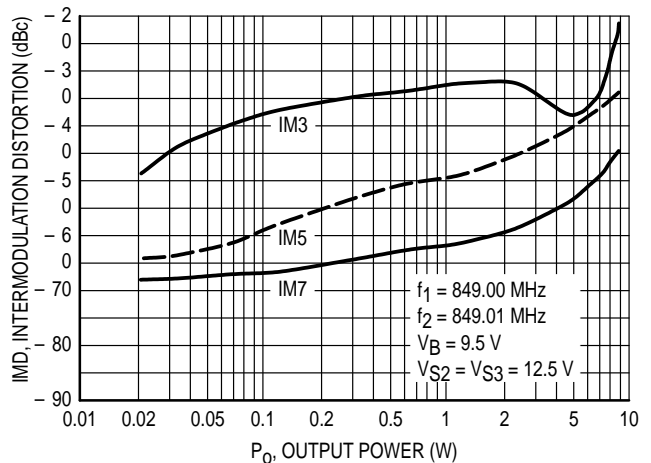


Figure 7. Intermodulation versus Output Power

# TYPICAL CHARACTERISTICS

(MHW927B)

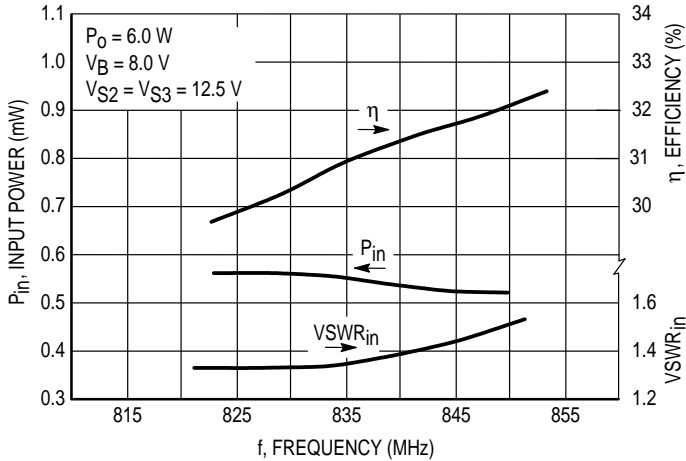


Figure 8. Input Power, Efficiency and VSWR versus Frequency

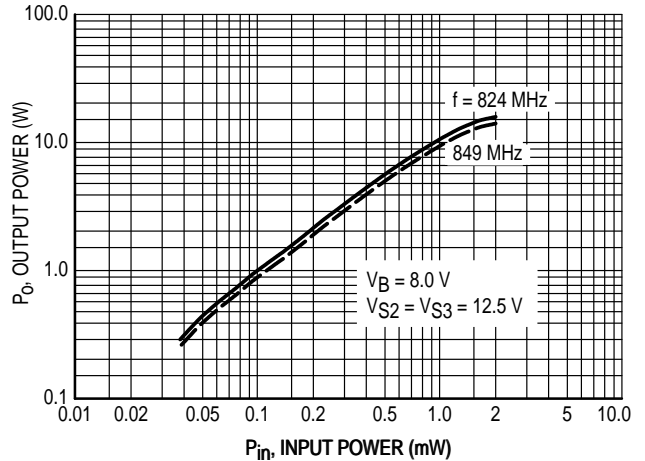


Figure 9. Output Power versus Input Power

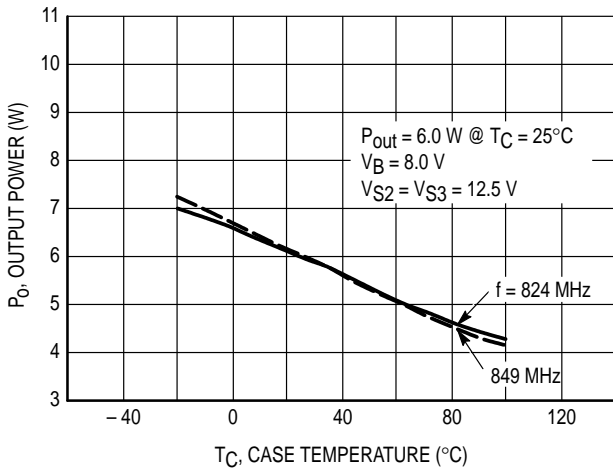


Figure 10. Output Power versus Case Temperature

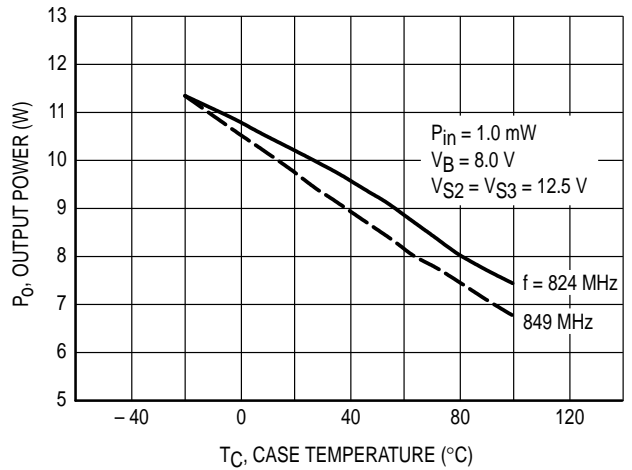


Figure 11. Output Power versus Case Temperature at Maximum Input Power

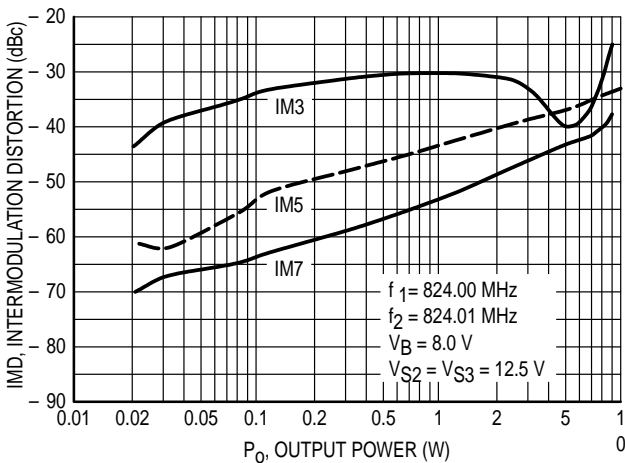


Figure 12. Intermodulation versus Output Power

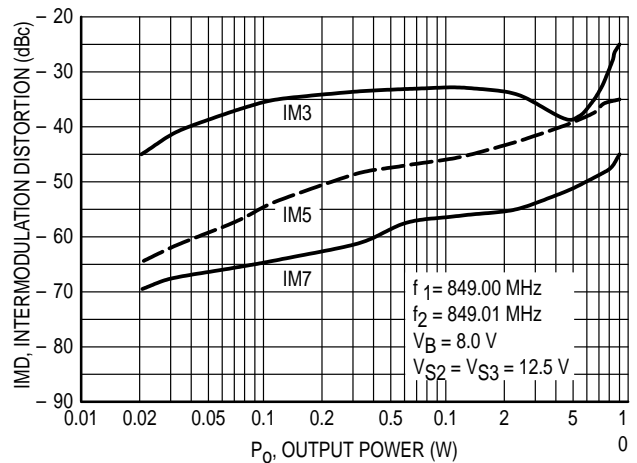
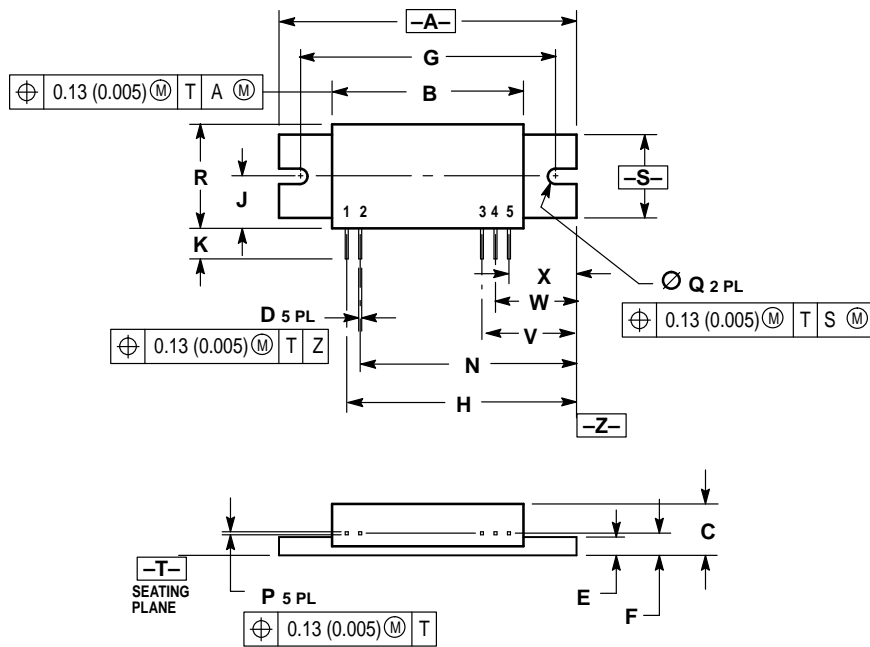


Figure 13. Intermodulation versus Output Power

# PACKAGE DIMENSIONS




- NOTES:  
 1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
 2. CONTROLLING DIMENSION: INCH.  
 3. DIMENSION F TO CENTER OF LEADS.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	2.190	2.210	55.63	56.13
B	1.395	1.415	35.44	35.94
C	0.355	0.380	9.02	9.65
D	0.018	0.022	0.46	0.55
E	0.120	0.135	3.05	3.42
F	0.164 BSC		4.16 BSC	
G	1.900 BSC		48.26 BSC	
H	1.700 BSC		43.18 BSC	
J	0.345	0.385	8.77	9.77
K	0.225	—	5.72	—
N	1.600 BSC		40.64 BSC	
P	0.008	0.012	0.21	0.30
Q	0.150	0.160	3.81	4.06
R	0.690	0.770	17.53	19.55
S	0.595	0.615	15.12	15.62
V	0.700 BSC		17.78 BSC	
W	0.600 BSC		15.24 BSC	
X	0.500 BSC		12.70 BSC	

- STYLE 1:  
 PIN 1. RF INPUT  
 2. V<sub>BIAS</sub> (8.0 V)  
 3. V<sub>CC2</sub> (12.5 V)  
 4. V<sub>CC3</sub> (12.5 V)  
 5. RF OUTPUT

CASE 301AA-01  
 ISSUE O

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MHW927A/D

