

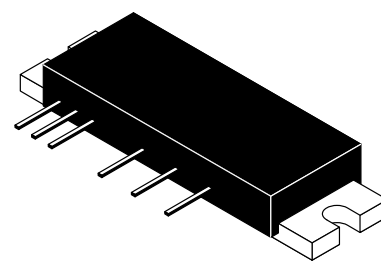
## The RF Line UHF Silicon FET Power Amplifier

Designed for 7.5 volt UHF power amplifier applications in industrial and commercial equipment primarily for hand portable radios.

- Specified 7.5 Volt Characteristics:
  - RF Input Power: 1 mW (0 dBm)
  - RF Output Power: 7 W
  - Minimum Gain ( $V_{cont} = 7 V$ ): 38.5 dB
  - Harmonics: -40 dBc Max @  $2 f_0$
- Meets European Transient Specification (ETS 300 113)
- Epoxy Glass PCB Construction Gives Consistent Performance and Reliability
- 50  $\Omega$  Input/Output Impedances
- Guaranteed Stability and Ruggedness

**MHW2707-1**

**7 W**  
**403-440 MHz**  
**UHF POWER AMPLIFIER**



**CASE 301AL-01, STYLE 1**

### MAXIMUM RATINGS (Flange Temperature = 25°C)

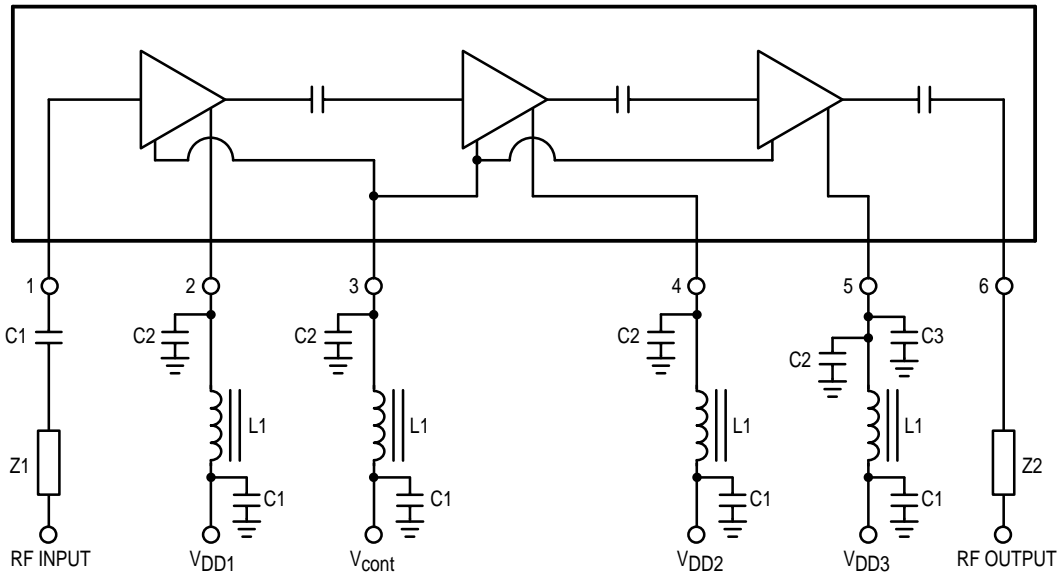
Rating	Symbol	Value	Unit
DC Supply Voltage (Pins 2, 4, 5)	$V_{DD1, 2, 3}$	9	Vdc
DC Control Voltage (Pin 3)	$V_{cont}$	7	Vdc
RF Input Power	$P_{in}$	2	mW
RF Output Power ( $V_{DD1, 2, 3} = 9 V$ )	$P_{out}$	9	W
Operating Case Temperature Range	$T_C$	-30 to +80	°C
Storage Temperature Range	$T_{stg}$	-30 to +80	°C

**ELECTRICAL CHARACTERISTICS** ( $V_{DD1} = V_{DD2} = V_{DD3} = 7.5$  Vdc (Pins 2, 4, 5);  $T_C = +25^\circ\text{C}$ , 50 ohm system unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
Frequency Range	BW	403	440	MHz
Control Voltage ( $P_{out} = 7$ W; $P_{in} = 1$ mW) (1)	$V_{cont}$	0	7	Vdc
Quiescent Current ( $V_{DD1} = V_{DD2} = V_{DD3} = 7.5$ Vdc; $P_{in} = 0$ mW, $V_{cont} = 0$ Vdc)	—	—	1	mA
Power Gain ( $P_{out} = 7$ W, $V_{cont} = 7$ Vdc)	$G_p$	38.5	—	dB
Efficiency ( $P_{out} = 7$ W; $P_{in} = 1$ mW) (1)	$\eta$	40	—	%
Harmonics ( $P_{out} = 7$ W; $P_{in} = 1$ mW) (1) $2 f_o$	—	—	-40	dBc
Input VSWR ( $P_{out} = 7$ W; $P_{in} = 1$ mW, 50 $\Omega$ Ref.) (1)	$VSWR_{in}$	—	2:1	—
Control Current ( $V_{DD1} = V_{DD2} = V_{DD3} = 7.5$ Vdc; $P_{in} = 1$ mW) (1)	$I_{cont}$	—	2	mA
Load Mismatch Stress ( $V_{DD1} = V_{DD2} = V_{DD3} = 9$ Vdc; $P_{in} = 2$ mW; $P_{out} = 9$ W; Load VSWR = 10:1, All Phase Angles at Frequency of Test) (1)	$\psi$	No Degradation in Output Power Before & After Test		
Stability ( $P_{in} = 1-2$ mW; $V_{DD1} = V_{DD2} = V_{DD3} = 6-9$ Vdc; $P_{out}$ = between 0.1 mW and 9 W; Load VSWR = 8:1, All Phase Angles at Frequency of Test) (1)	—	All Spurious Outputs More Than 60 dB Below Desired Signal		

(1) Adjust  $V_{cont}$  for Specified  $P_{out}$ .

### MHW2707-1 CIRCUIT BLOCK DIAGRAM



#### Pin Designations:

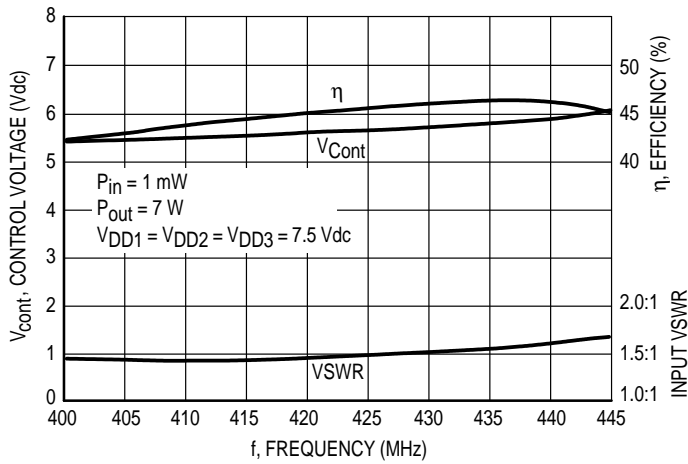
Pin 1 — RF Input Power (0 dBm)  
 Pin 2 —  $V_{DD1}$  (7.5 Vdc)  
 Pin 3 —  $V_{cont}$  (0 – 7 Vdc)  
 Pin 4 —  $V_{DD2}$  (7.5 Vdc)  
 Pin 5 —  $V_{DD3}$  (7.5 Vdc)  
 Pin 6 — RF OUT (7 Watts nom.)

#### Element Values:

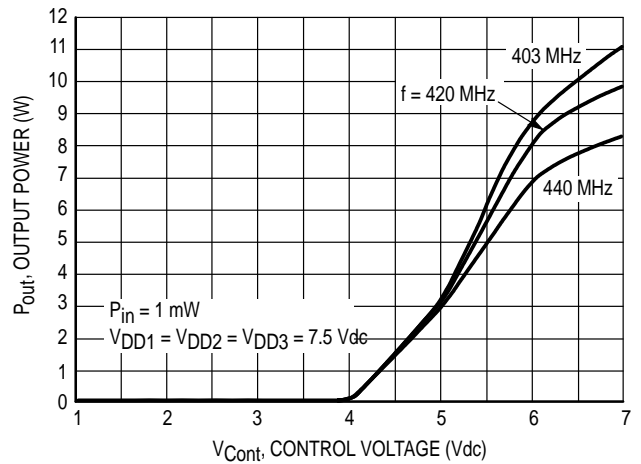
$C1 = 0.018 \mu\text{F}$   
 $C2 = 0.1 \mu\text{F}$   
 $C3 = 3.3 \mu\text{F}$   
 $L1 = 0.22 \mu\text{H}$  CHOKE  
 $Z1 = Z2 = 50 \Omega$  Microstrip Line

Figure 1. UHF Power Module Test Circuit Schematic and Device Block Diagram

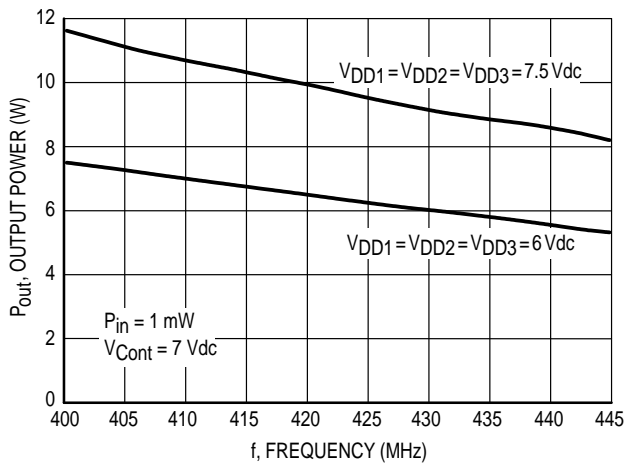
## TYPICAL CHARACTERISTICS



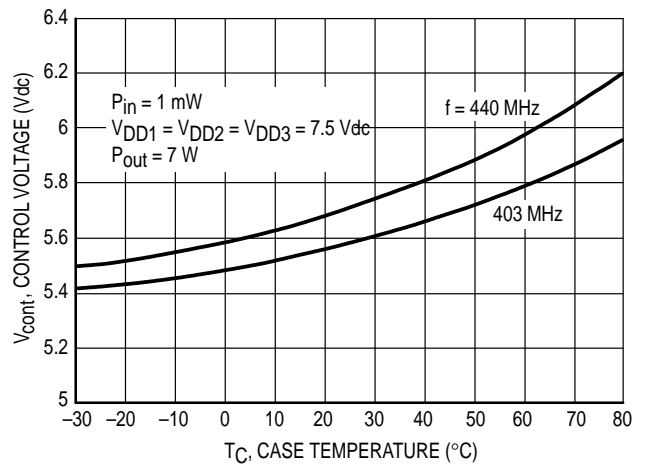
**Figure 2. Control Voltage, Efficiency and VSWR versus Frequency**



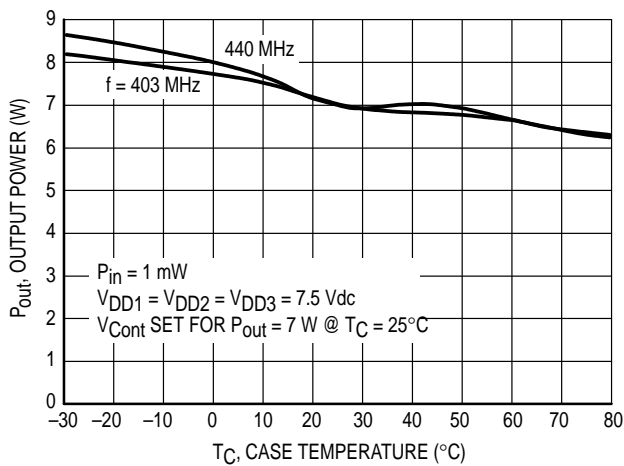
**Figure 3. Output Power versus Control Voltage**



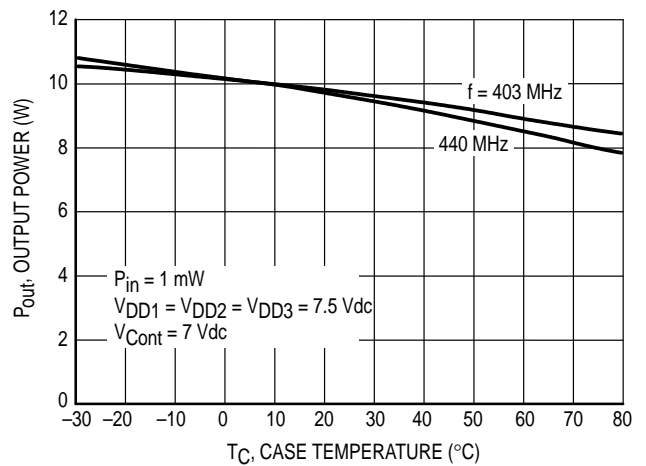
**Figure 4. Output Power versus Frequency**



**Figure 5. Control Voltage versus Case Temperature**

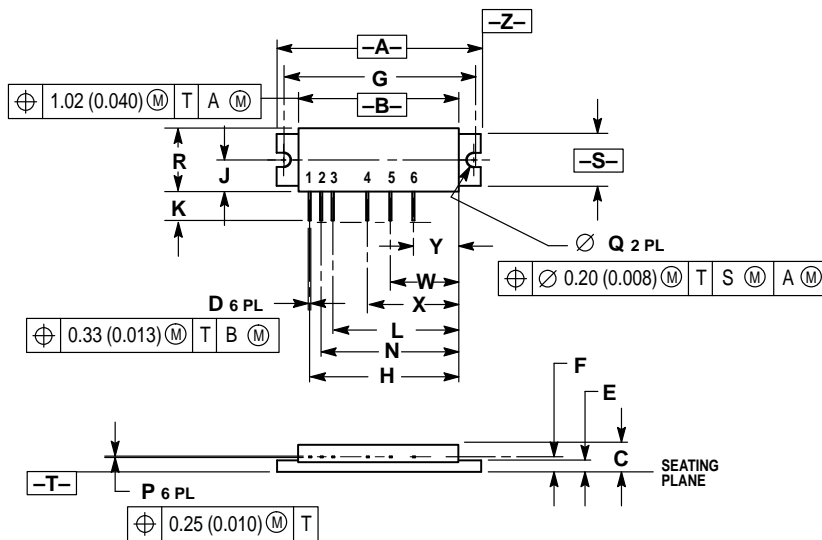


**Figure 6. Output Power versus Case Temperature**



**Figure 7. Output Power versus Case Temperature at Maximum Control Voltage**

# PACKAGE DIMENSIONS



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION F TO CENTER OF LEADS.
  4. REF INDICATES NON-CONTROLLED DIMENSION FOR REFERENCE USE ONLY.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.760	1.780	44.70	45.21
B	1.370	1.390	34.80	35.31
C	0.245	0.265	6.22	6.73
D	0.017	0.023	0.43	0.58
E	0.080	0.100	2.03	2.54
F	0.132 BSC		3.35 BSC	
G	1.650 BSC		41.91 BSC	
H	1.290 BSC		32.77 BSC	
J	0.266	0.280	6.76	7.11
K	0.230	0.300	5.84	7.62
L	1.090 BSC		27.69 BSC	
N	1.190 BSC		30.25 BSC	
P	0.010 REF		0.25 REF	
Q	0.118	0.132	3.00	3.35
R	0.535	0.555	13.59	14.10
S	0.445	0.465	11.30	11.81
V	0.590 BSC		14.99 BSC	
X	0.790 BSC		20.07 BSC	
X	0.390 BSC		9.91 BSC	

- STYLE 1:  
 PIN 1: RF INPUT  
 2. VDD1  
 3. VCONT  
 4. VDD2  
 5. VDD3  
 6. RF OUTPUT  
 CASE: GROUND

## CASE 301AL-01 ISSUE 0

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 51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852-26629298

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