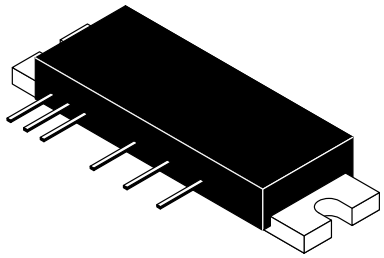
The RF Line
UHF Silicon FET Power Amplifier

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_o
- Meets European Transient Specification (ETS 300 113)
- Epoxy Glass PCB Construction Gives Consistent Performance and Reliability
- 50 Ω 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)

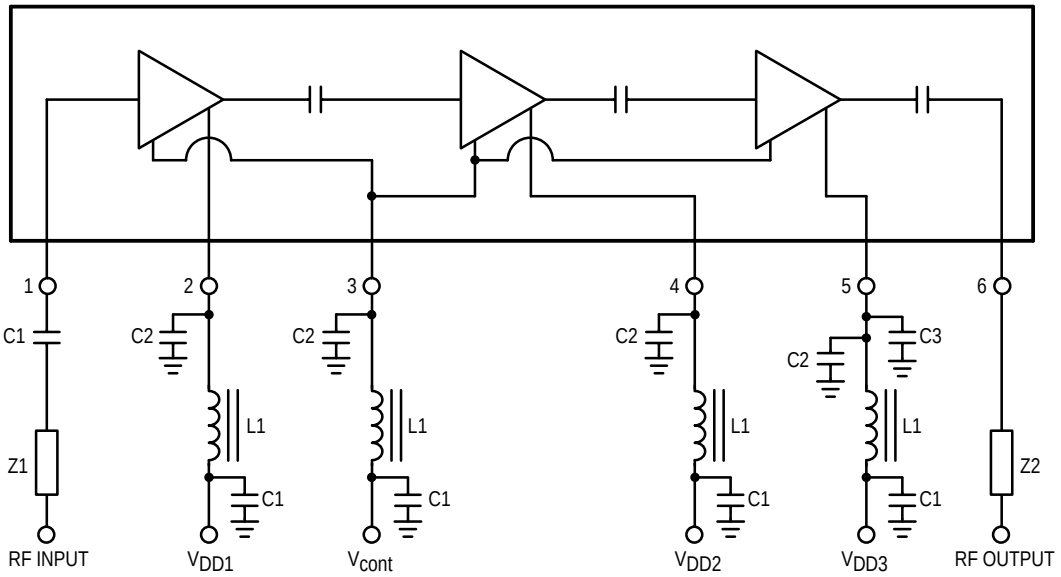
Rating	Symbol	Value	Unit
DC Supply Voltage (Pins 2, 4, 5)	$V_{DD1, 2, 3}$	9	Vdc
DC Control Voltage (Pin 3)	V_{cont}	7	Vdc
RF Input Power	P_{in}	2	mW
RF Output Power ($V_{DD1, 2, 3}$ = 9 V)	P_{out}	9	W
Operating Case Temperature Range	T_C	–30 to +80	°C
Storage Temperature Range	T_{stg}	–30 to +80	°C

ELECTRICAL CHARACTERISTICS (V_{DD1} = V_{DD2} = V_{DD3} = 7.5 Vdc (Pins 2, 4, 5); T_C = +25°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)	η	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 Ω 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)	ψ	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 µF
C2 = 0.1 µF
C3 = 3.3 µF
L1 = 0.22 µH CHOKE
Z1 = Z2 = 50 Ω Microstrip Line

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

TYPICAL CHARACTERISTICS

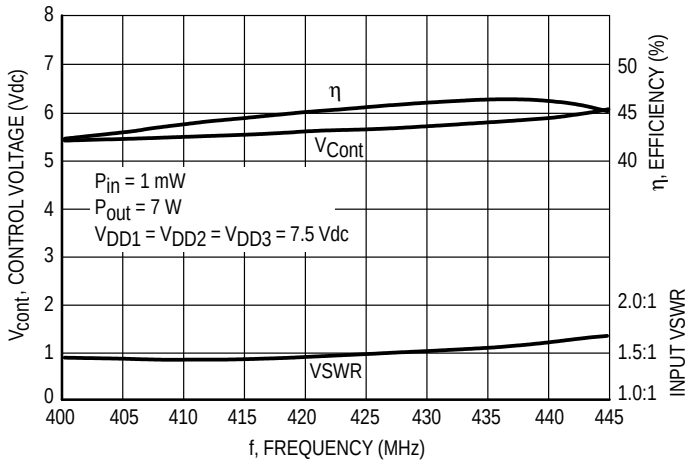


Figure 2. Control Voltage, Efficiency and VSWR versus Frequency

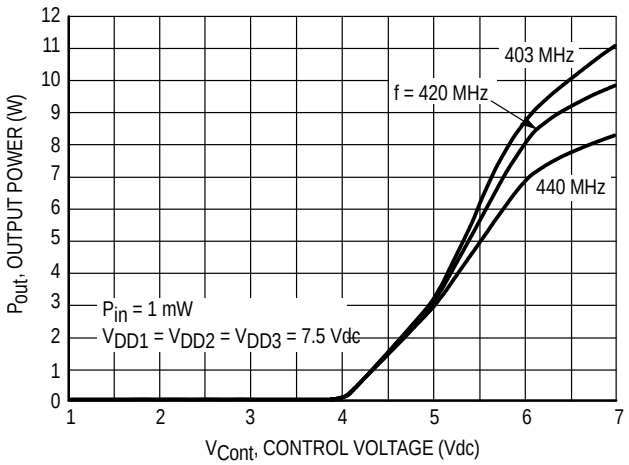


Figure 3. Output Power versus Control Voltage

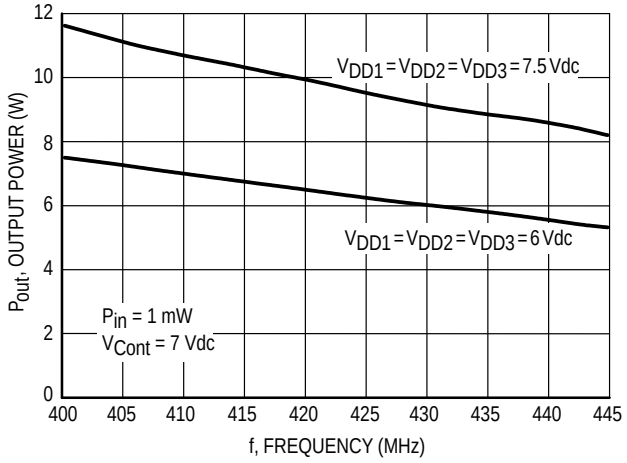


Figure 4. Output Power versus Frequency

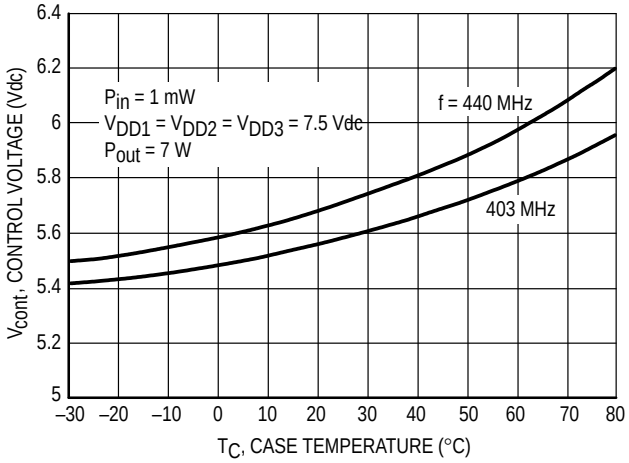


Figure 5. Control Voltage versus Case Temperature

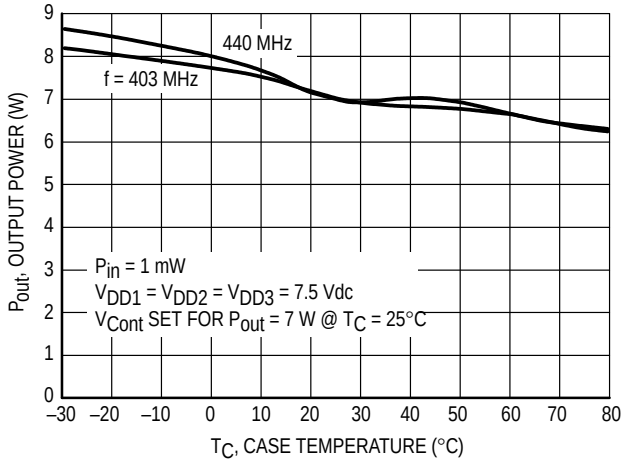


Figure 6. Output Power versus Case Temperature

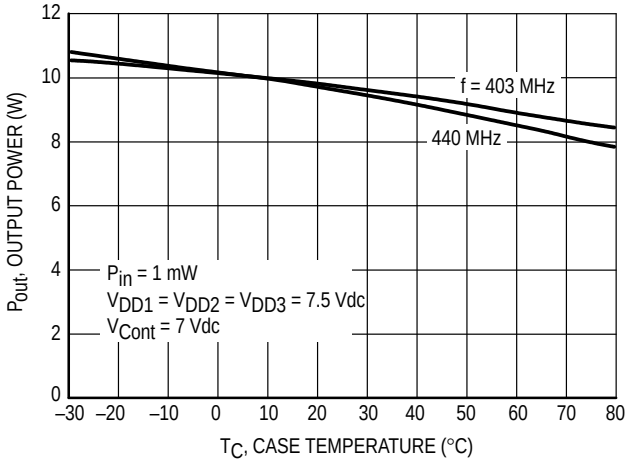
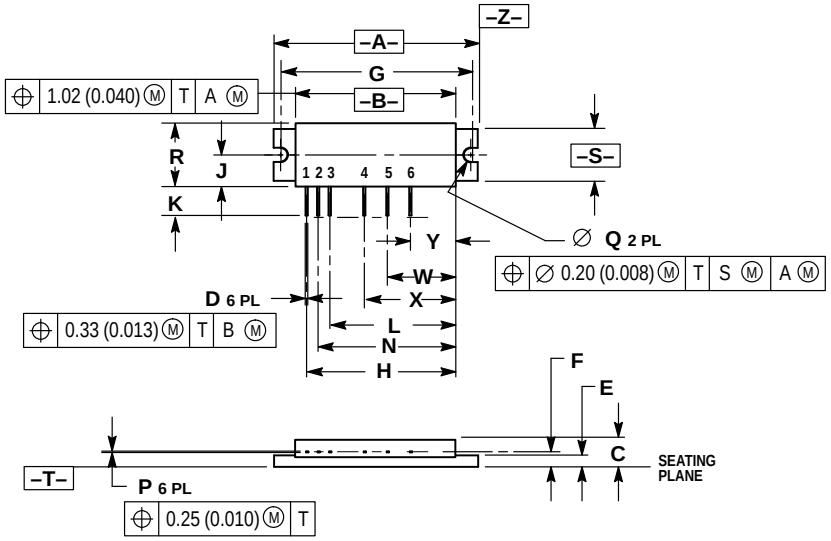


Figure 7. Output Power versus Case Temperature at Maximum Control Voltage

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.

	INCHES		MILLIMETERS	
DIM	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 O

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