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MOTOROLA

MHW2723

Advance Information

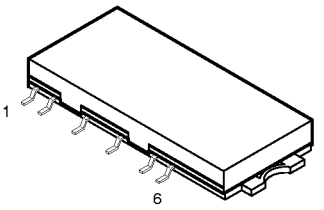
UHF Silicon FET Power Amplifier

This device is designed specifically for TETRA digital 3.0 W mobile radios, operates from a 12.5 V supply and features 28 dB minimum gain.

- Specified 12.5 V Characteristics:
  - RF Input Power: 9.0 dBm
  - RF Output Power: 5.0 W
  - Power Gain: 28 dB Min
  - Harmonics: –30 dBc Max @ 2 f_o
- Metal Case Low Profile Gives Consistent Performance and Reliability
- 50 Ω Input/Output Impedances
- Guaranteed Stability and Ruggedness

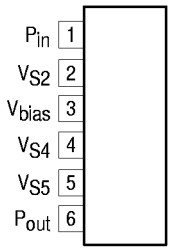
UHF POWER AMPLIFIER
5.0 W, 380 to 470 MHz

SEMICONDUCTOR TECHNICAL DATA



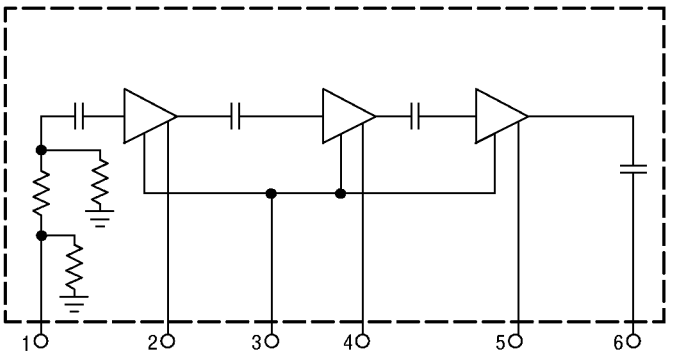
CASE 420Z

PIN CONNECTIONS



(Top View)

Simplified Block Diagram



This device contains 3 active transistors.

ORDERING INFORMATION

Device	Operating Temperature Range	Package
MHW2723	T_C = –30 to 90°C	Power Module

MAXIMUM RATINGS (T_C = 25°C, unless otherwise noted.)

Rating	Symbol	Value	Unit
DC Supply Voltage (Pins 2, 4, 5)	$V_{S2, 4, 5}$	16	Vdc
DC Bias Voltage (Pin 3)	V_{bias}	5.0	Vdc
RF Input Power	P_{in}	14	dBm
RF Output Power ($V_{S2, 4, 5}$ = 16 V)	P_{out}	12	W
Operating Case Temperature Range	T_C	–30 to 90	°C
Storage Temperature Range	T_{stg}	–30 to 100	°C

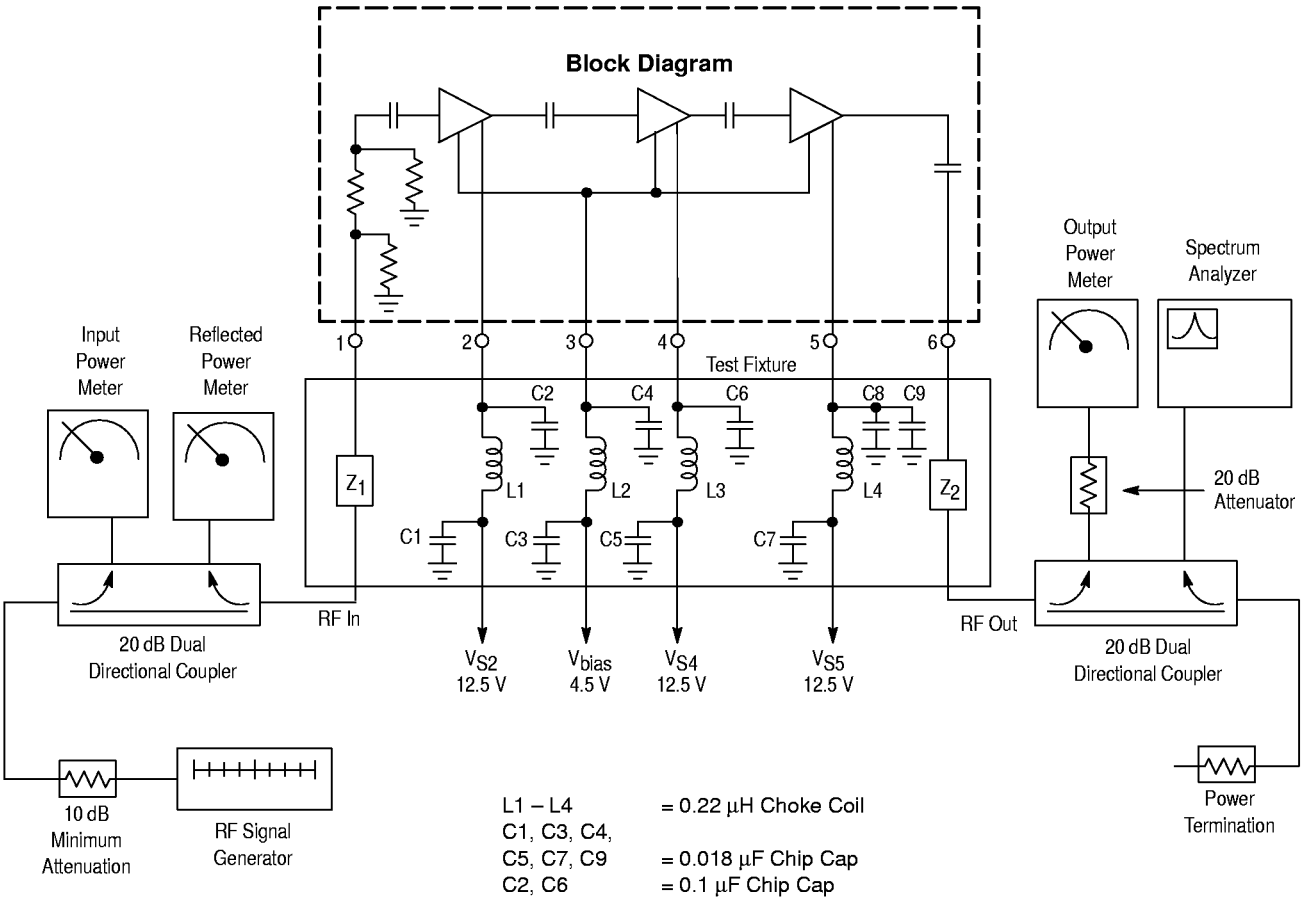
NOTES: 1. Meets Human Body Model (HBM) ≤3000 V.
2. ESD data available upon request.

ELECTRICAL CHARACTERISTICS (V_{bias} = 4.5 V; $V_{S2, 4, 5}$ = 12.5 Vdc; T_C = 25°C, 50 Ω system, unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	380	–	470	MHz
RF Input Power Range	P_{in}	–8.0	–	14	dBm
Saturated Output Power (P_{in} = 14 dBm) (Note 1)	P_{sat}	12	–	–	W
Power Gain (Adjust P_{in} for P_{out} = 5.0 W)	G_p	28	–	–	dB
Input Return Loss (P_{in} = –8 to 14 dBm: 50 Ω Ref.)	$VSWR_{in}$	–	–	2:1	–
Efficiency (P_{out} = 5.0 W)	η	18	–	–	%
Adjacent Channel Power (P_{out} = 5.0 W; f = f_o ± 25 KHz, 18 KHz Bandwidth, π/4 DQPSK Modulation 36 KBITS/S, On/Off Factor 0.35) (Note 2)	ACP	–30	–	–	dBc
Alternate Channel Power (P_{out} = 5.0 W; f = f_o ± 50 KHz, 18 KHz Bandwidth, π/4 DQPSK Modulation 36 KBITS/S, On/Off Factor 0.35) (Note 2)	ACP	–40	–	–	dBc
Bias Current (V_{bias} = 4.5 V)	I_{bias}	–	–	10	mA
Rise Time (P_{out} = 0.1 mW to 12 W) (Note 1)	t_r	–	–	20	μsec
Stability (P_{out} = –20 dBm Avg to 38 dBm Avg; V_{bias} = 4.5 V Pulse Pin; $V_{S2, 4, 5}$ = 10.8–16 Vdc; Load VSWR = 2:1, Source VSWR = 2:1, All Phase Angles at Frequency of Test)	–	All Spurious Outputs More Than 60 dB Below Desired Signal			
Harmonics (P_{out} = 5.0 W) 2 f_o	–	–	–	–30	dBc
Isolation (V_{bias} = 0 V; P_{in} = Nominal Drive Level for P_{out} = 12 W; $V_{S2, 4, 5}$ = 12.5 Vdc; Case Temperature = 25°C; Load Impedance and Source Impedance = 50 Ω)	–	–	–	60	dB
Load Mismatch Stress ($V_{S2, 4, 5}$ = 16 Vdc; V_{bias} = 4.5 V; P_{in} = 12 dBm; (25% Duty Cycle Period = 56.7 ms); Load VSWR = 2:1, All Phase Angles at Frequency of Test) (Note 1)	ψ	No Degradation in Output Power Before & After Test			
Noise Power (P_{out} = 5.0 W; f = f_o + 5.0 MHz; Bandwidth = 18 KHz)	P_N	–	–	–85	dBm

NOTES: 1. Pulsed V_{bias} or P_{in}; Duty Cycle = 25%, Period = 56.7 ms: On Time = 14.17 ms.
2. TETRA Signal Format – Continuous Wave.

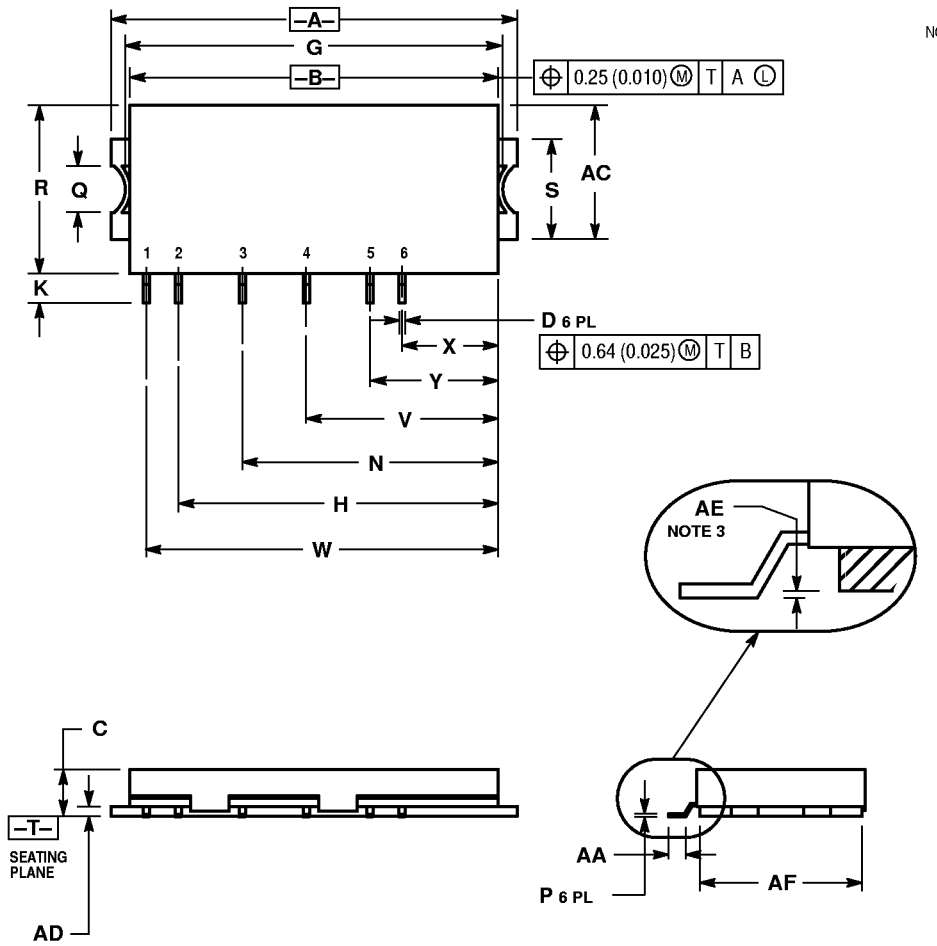
Figure 1. Test Circuit Diagram



L1 – L4	= 0.22 μH Choke Coil
C1, C3, C4, C5, C7, C9	= 0.018 μF Chip Cap
C2, C6	= 0.1 μF Chip Cap
C8	= 3.3 μF Chip Cap
Z1, Z2	= 50 Ω Microstrip

OUTLINE DIMENSIONS

POWER MODULE
CASE 420Z–02
ISSUE A



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 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	28.80	29.10	1.134	1.146
C	3.70	4.00	0.146	0.157
D	0.43	0.58	0.017	0.023
G	29.60 REF		1.165 REF	
H	25.03 BSC		0.985 BSC	
K	2.10	2.62	0.083	0.103
N	20.03 BSC		0.789 BSC	
P	0.25 REF		0.010 REF	
Q	3.78 REF		0.149 REF	
R	13.06	13.45	0.514	0.530
S	8.00 REF		0.315 REF	
V	15.03 BSC		0.592 BSC	
W	27.53 BSC		1.084 BSC	
X	7.53 BSC		0.297 BSC	
Y	10.03 BSC		0.395 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	

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