MWA5121

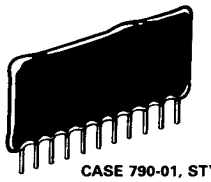
The RF Line

WIDEBAND HYBRID AMPLIFIER

. . . Three stage amplifier designed for broadband linear applications up to 900 MHz.

- Gain 27 dB Typ
- Complete Gain Block; Requires No External Components
- Thick Film Construction
- Low Noise Figure 4.0 dB Typ
- Low Intermodulation Distortion $IM_2 = -45$ dB, $IM_3 = -59$ dB

30–890 MHz WIDEBAND GENERAL-PURPOSE HYBRID AMPLIFIER



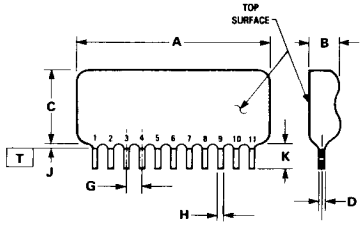
CASE 790-01, STYLE 1
PLASTIC

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C)

Parameters	Symbol	Ratings	Unit
Supply Voltage	V_{CC}	24	Vdc
Circuit Current	I_{CC}	50	mAdc
Input Voltage	$V_{I(RF)}$	0.5	Vdc
Input Voltage	$V_{I(DC)}$	±25	Vdc
Output Voltage	$V_{O(DC)}$	±25	Vdc
Total Dissipation	P_T	1.2	W
Operating Temperature	T_{op}	−30 to +65	°C
Storage Temperature	T_{stg}	−30 to +85	°C

RECOMMENDED OPERATING CONDITIONS

Parameters	Symbol	Ratings	Unit
Supply Voltage	V_{CC}	+18 to +22	V
Source Impedance	Z_S	50 to 75	Ω
Load Impedance	Z_L	50 to 75	Ω
Operating Temperature	T_{op}	−10 to +40	°C



STYLE 1:
PIN 1 — OUTPUT
7 — V_{CC}
11 — INPUT
2,3,4,5,6
8,9,10 — GROUND

NOTES:
1. T IS BOTH A SEATING PLANE AND DATUM SURFACE.
2. POSITIONAL TOLERANCE FOR LEADS (H DIMENSION):
   ⌖ | 0.15 (0.006) Ⓜ | T |
   POSITIONAL TOLERANCE FOR LEADS (D DIMENSION):
   ⌖ | 0.25 (0.010) Ⓜ | T |
3. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
4. CONTROLLING DIMENSION: INCH.

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	27.99	32.00	1.102	1.260
B	2.54	5.00	0.100	0.197
C	15.49	18.99	0.610	0.748
D	0.12	0.38	0.005	0.015
G	2.54 BSC		0.100 BSC	
H	0.38	0.63	0.015	0.025
J	—	0.99	—	0.039
K	3.99	5.06	0.157	0.200

CASE 790-01

ELECTRICAL CHARACTERISTICS (T_A = 25°C, V_{CC} = 20 V, Z_S = Z_L = 50 Ω)

Characteristic		Symbol	Min	Typ	Max	Unit
Operating Current		I_{CC}	35	40	45	mA
Gain (f = 100 MHz)		G	25	27	30	dB
Gain Flatness	(f = 30 to 890 MHz, Z_S = Z_L = 50 Ω) (f = 30 to 890 MHz, Z_S = Z_L = 75 Ω)	—	— —	2.0 2.0	5.0 5.0	dB
Input VSWR	(f = 30 to 890 MHz, Z_S = Z_L = 50 Ω) (f = 30 to 890 MHz, Z_S = Z_L = 75 Ω)	VSWRI	— —	2.1 2.0	3.0 3.0	— —
Output VSWR	(f = 30 to 890 MHz, Z_S = Z_L = 50 Ω) (f = 30 to 890 MHz, Z_S = Z_L = 75 Ω)	VSWRO	— —	1.5 2.0	3.0 3.0	—
Isolation	(f = 30 to 890 MHz)	I_{SO}	—	50	—	dB
Noise Figure	(f = 30 to 300 MHz) (f = 300 to 890 MHz)	NF	— —	3.5 4.0	7.0 8.0	dB

FIGURE 1 — GAIN AND NOISE FIGURE versus FREQUENCY

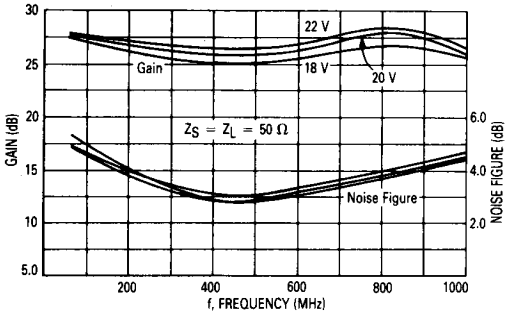


FIGURE 2 — GAIN AND NOISE FIGURE versus FREQUENCY

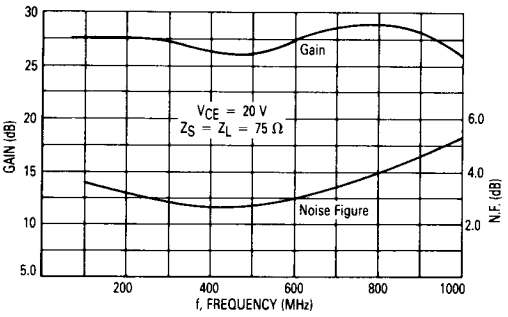


FIGURE 3 — OUTPUT POWER AT 1.0 dB GAIN COMPRESSION versus FREQUENCY

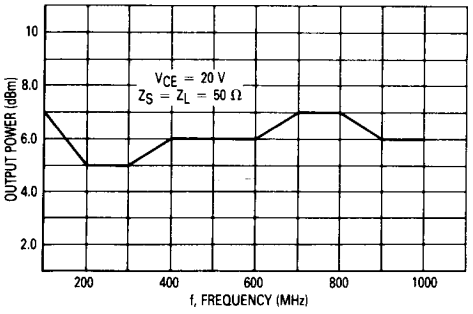


FIGURE 4 — OUTPUT POWER AT 1.0 dB GAIN COMPRESSION versus SUPPLY VOLTAGE

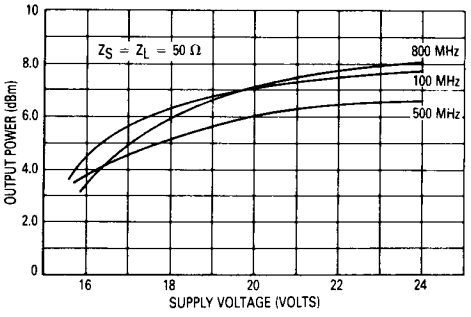


FIGURE 5 — GAIN versus SUPPLY VOLTAGE

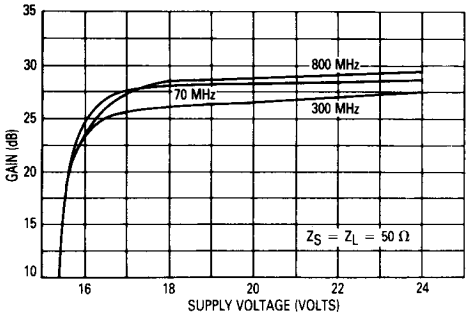


FIGURE 6 — CURRENT DRAIN versus SUPPLY VOLTAGE

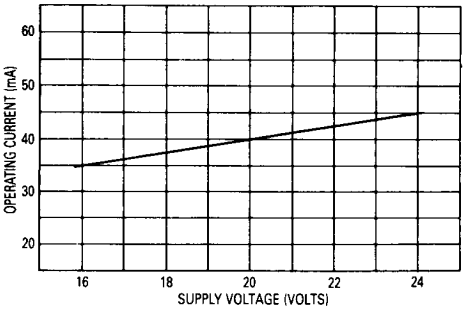


FIGURE 7 — INPUT AND OUTPUT VSWR versus FREQUENCY

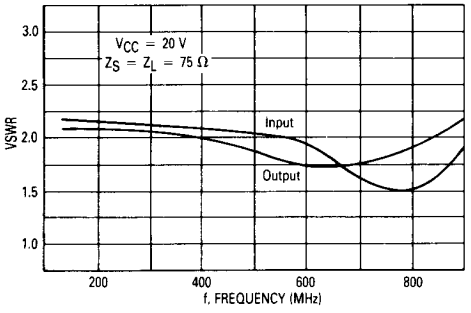


FIGURE 8 — TYPICAL INPUT AND OUTPUT VSWR CHARACTERISTICS

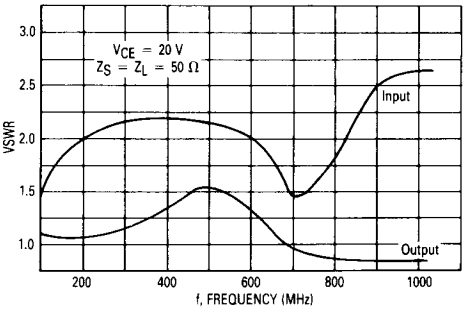


FIGURE 9 — SECOND ORDER INTERMODULATION DISTORTION
f_1 = 55.25 MHz (CH 2)
f_2 = 211.25 MHz (CH 13)
Dist = $f_1 + f_2$

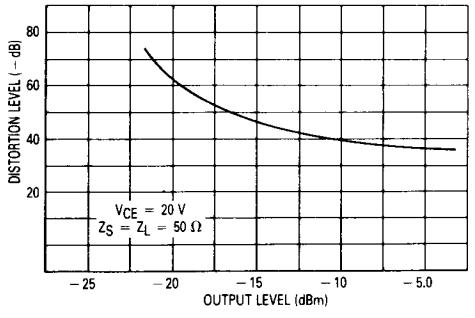
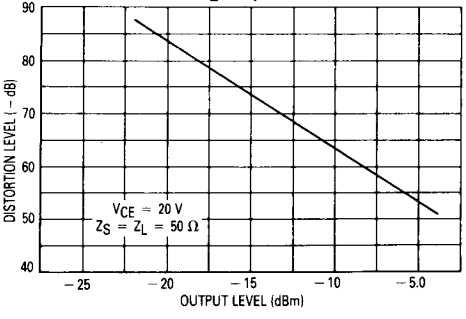


FIGURE 10 — THIRD ORDER INTERMODULATION DISTORTION
f_1 = 199.25 MHz (CH 11)
f_2 = 211.25 MHz (CH 13)
Dist = $2f_2 - f_1$



5

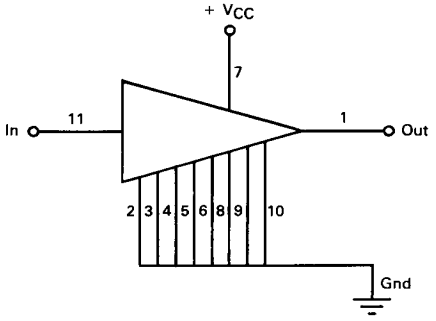
DESCRIPTION AND APPLICATIONS

The MWA5121 is a thick-film hybrid circuit designed for general purpose amplifier applications in the 30 to 890 MHz band. Features are low-noise, flat-gain and low-distortion. The MWA5121 is designed to serve as a broadband, linear gain block with excellent performance in both 50 and 75 ohm systems. The MWA5121 is a complete circuit that requires no additional components or adjustments. Reliability and performance uniformity are assured by gold metallized transistors and stringent quality control procedures.

THERMAL DESIGN CONSIDERATIONS

The MWA5121 does not require a thermal radiator; however, it is necessary to keep the ambient temperature between −30 to +85°C.

FIGURE 11 — AMPLIFIER CONFIGURATION



HANDLING PRECAUTIONS

Soldering must be performed under the following conditions:

- Hand soldering: 2.4 mm minimum from the root of the leads at 260°C maximum for 2 seconds (per line) maximum.
- Solder dip: 2.5 mm minimum from the root of the leads at 260°C maximum for 5 seconds (total) maximum.

If an unknown impedance is connected, caution should be exercised against oscillations. Be sure to isolate the input and output and adequate grounding must be provided. Remember, the MWA5121 is packaged in resin and unnecessary problems may occur when other circuit elements are allowed to couple through the unshielded IC.

5