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MC1490

WIDEBAND AMPLIFIER

WITH AGC

SEMICONDUCTOR

TECHNICAL DATA

RF/IF/Audio Amplifier

The MC1490 is an integrated circuit featuring wide–range AGC for use in RF/IF amplifiers and audio amplifiers over the temperature range, -40° to $+85^{\circ}$ C.

- High Power Gain: 50 dB Typ at 10 MHz
 45 dB Typ at 60 MHz
 05 dB Typ at 60 MHz
 - 35 dB Typ at 100 MHz
- Wide Range AGC: 60 dB Min, DC to 60 MHz
- 6.0 V to 15 V Operation, Single Polarity Supply
- See MC1350D for Surface Mount

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

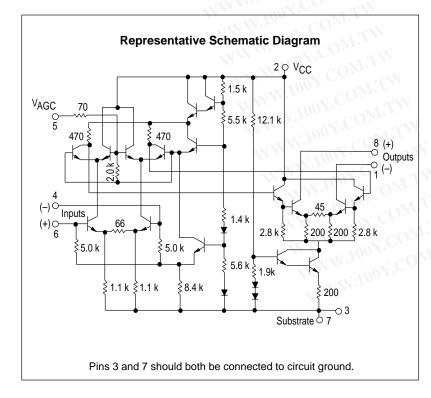
Rating	Symbol	Value	Unit	
Power Supply Voltage	Vcc	+18	Vdc	
AGC Supply	VAGC	Vcc	Vdc	
Input Differential Voltage	VID	5.0	Vdc	
Operating Temperature Range	TA	-40 to +85	°C	
Storage Temperature Range	T _{stg}	-65 to +150	°C	
Junction Temperature	J.FJ	+150	°C	

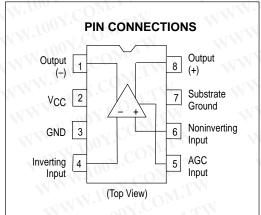


P SUFFIX PLASTIC PACKAGE CASE 626

ORDERING INFORMATION

Device	Operating Temperature Range	Package	
MC1490P	$T_A = -40^\circ$ to +85°C	Plastic	





SCATTERING PARAMETERS (V_{CC} = +12 Vdc, T_A = +25°C, Z_0 = 50 Ω)						
	WW.1	f = I Ty				
Parameter	Symbol	30	60	Unit		
Input Reflection Coefficient	S ₁₁ 011	0.95 -7.3	0.93 -16	_ deg		
Output Reflection S ₂₂ Coefficient θ22		0.99 -3.0	0.98 5.5	_ deg		
Forward Transmission S ₂₁ Coefficient 021		16.8 128	14.7 64.3	_ deg		
Reverse Transmission Coefficient	S ₁₂ θ12	0.00048 84.9	0.00092 79.2	_ deg		

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MC1490

	MC1490	
ELECTRICAL CHARACTERI	STICS ($V_{CC} = 12$ Vdc, f = 60 MHz, BW = 1.0 MHz	

Characteristic	Figure	Symbol	Min	Тур	Max	🔨 Unit
Power Supply Current Drain	NO. V. SV.CO	ICC	-wV	N	17	mA
AGC Range (AGC) 5.0 V Min to 7.0 V Max	19	MAGC	-60	NN-TO	A.COMP	dB
Output Stage Current (Sum of Pins 1 and 8)	W.100	0 10	4.0	WH.10	7.5	mA
Single–Ended Power Gain $R_S = R_L = 50 \Omega$	19	Gp	40	L.V.		dB
Noise Figure R _S = 50 Ohms	19	NF	-	6.0	007	dB
Power Dissipation	100 - NW	PD	N _	168	204	mW

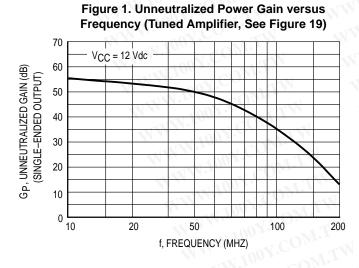


Figure 2. Voltage Gain versus Frequency (Video Amplifier, See Figure 20)

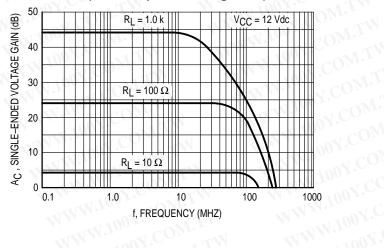
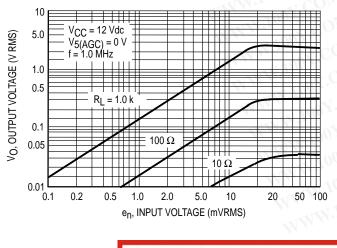
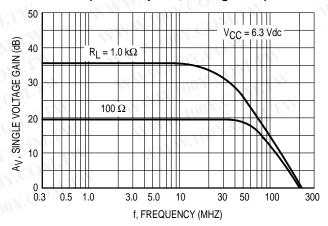


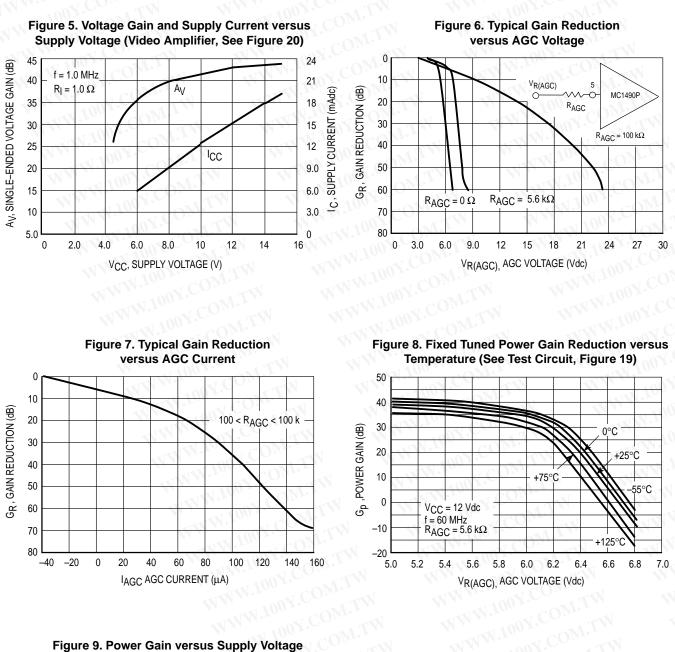
Figure 3. Dynamic Range: Output Voltage versus Input Voltage (Video Amplifier, See Figure 20)

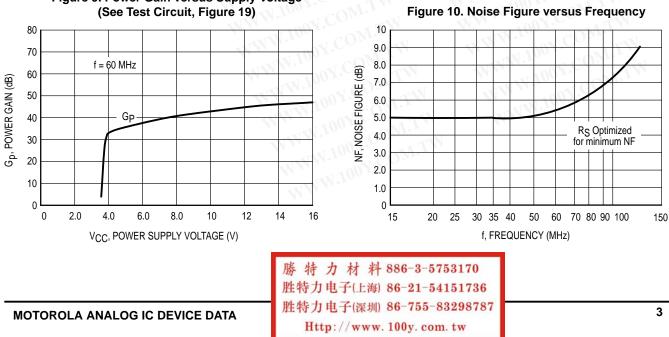


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Figure 4. Voltage Gain versus Frequency (Video Amplifier, See Figure 20)







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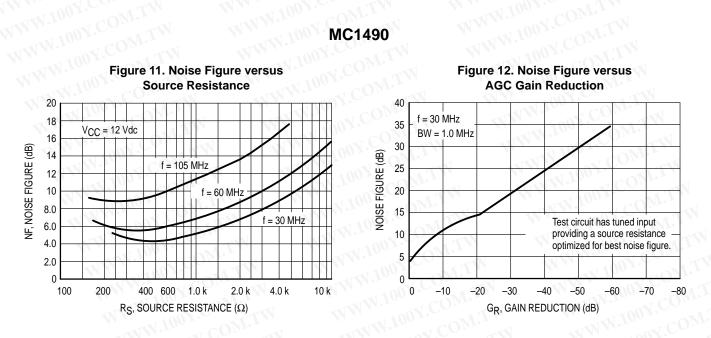


Figure 13. Harmonic Distortion versus AGC Gain Reduction for AM Carrier (For Test Circuit, See Figure 14)

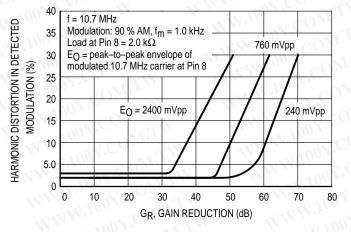
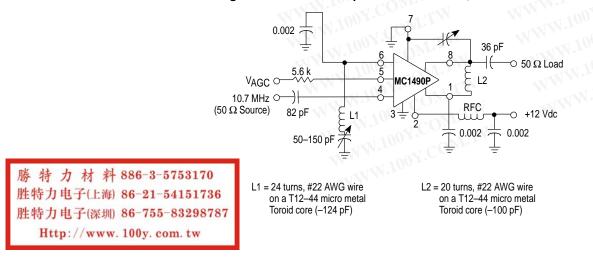
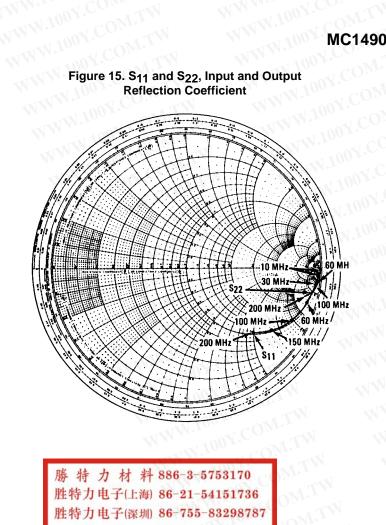
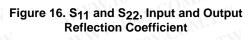


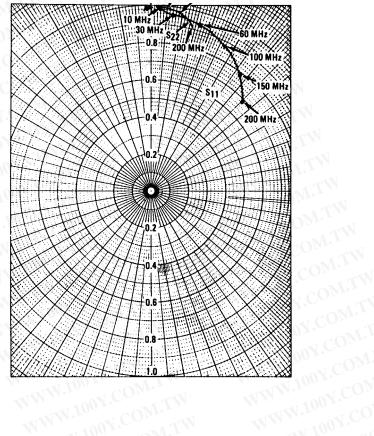
Figure 14. 10.7 MHz Amplifier Gain ~ 55 dB, BW ~ 100 kHz











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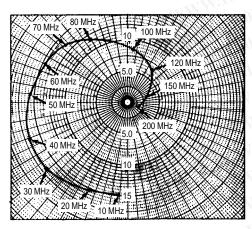
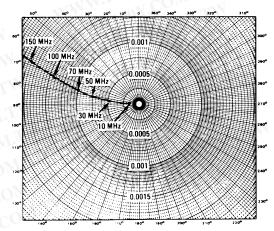
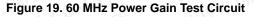
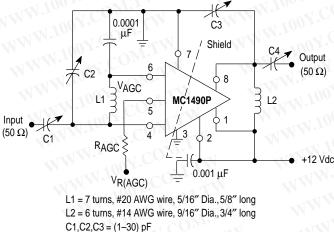


Figure 18. S₁₂, Reverse Transmission **Coefficient (Feedback)**

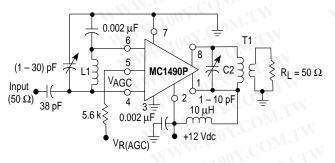






C4 = (1–10) pF

Figure 21. 30 MHz Amplifier (Power Gain = 50 dB, BW \approx 1.0 MHz)



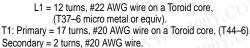
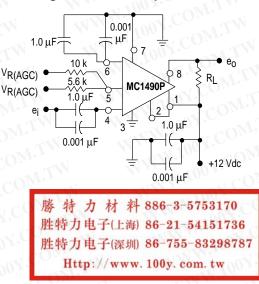
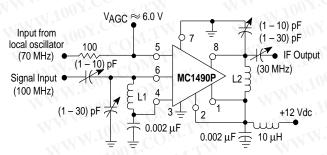


Figure 20. Video Amplifier







L1 = 5 turns, #16 AWG wire, 1/4", ID Dia., 5/8" long L2 = 16 turns, #20 AWG wire on a Toroid core, (T44–6).

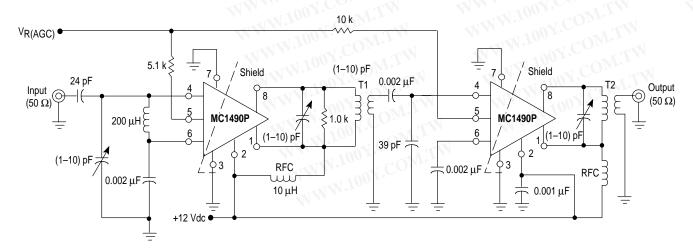


Figure 23. Two–Stage 60 MHz IF Amplifier (Power Gain \approx 80 dB, BW \approx 1.5 MHz)

T1: Primary Winding = 15 turns, #22 AWG wire, 1/4" ID Air Core Secondary Winding = 4 turns, #22 AWG wire, Coefficient of Coupling ≈ 1.0

T2: Primary Winding = 10 turns, #22 AWG wire, 1/4" ID Air Core Secondary Winding = 2 turns, #22 AWG wire, Coefficient of Coupling ≈ 1.0

DESCRIPTION OF SPEECH COMPRESSOR

The amplifier drives the base of a PNP transistor operating common–emitter with a voltage gain of approximately 20. The control R1 varies the quiescent Q point of this transistor so that varying amounts of signal exceed the level V_r. Diode D1 rectifies the positive peaks of Q1's output only when these peaks are greater than V_r \approx 7.0 V. The resulting output is filtered by C_x, R_x.

 R_X controls the charging time constant or attack time. C_X is involved in both charge and discharge. R2 (the 150 k Ω and input resistance of the emitter–follower Q2) controls the decay time. Making the decay long and attack short is accomplished by making R_X small and R2 large. (A Darlington emitter–follower may be needed if extremely slow decay times are required.)

The emitter–follower Q2 drives the AGC Pin 5 of the MC1490P and reduces the gain. R3 controls the slope of signal compression.

Frequency	Dist	ortion	Distortion		
	10 mV e _i	100 mV e _i	10 mV e _i	100 mV e _i	
100 Hz	3.5%	12%	15%	27%	
300 Hz 2%		10%	6%	20%	
1.0 kHz	1.5%	8%	3%	9%	
10 kHz	1.5%	8%	1%	3%	
100 kHz 1.5%		8%	1%	3%	
COM	Notes 1 and 2		Notes	3 and 4	

Table 1. Distortion versus Frequency

Notes: (1) Decay = 300 ms

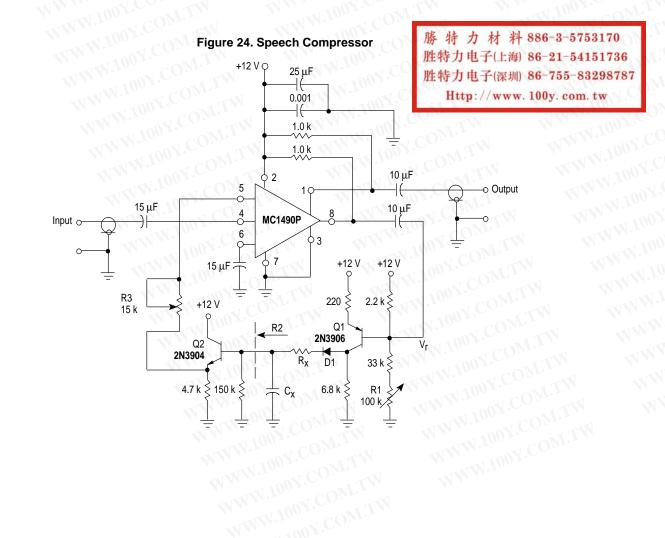
(2)

Attack = 20 ms

 $R_X = 0$ (Short)

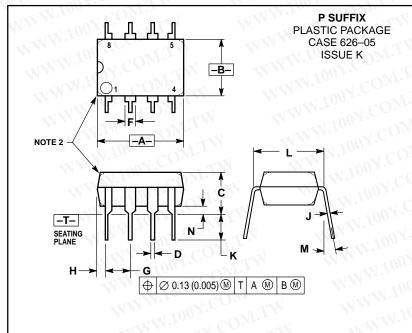
 $C_{X} = 7.5 \, \mu F$

(3) Decay = 20 ms Attack = 3.0 ms (4) $C_X = 0.68 \,\mu\text{F}$ $R_X = 1.5 \,k\Omega$



MC1490

OUTLINE DIMENSIONS



NOTES: 1. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL. 2. PACKAGE CONTOUR OPTIONAL (ROUND OR

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Y14.5M, 1982.

	MILLIMETERS		INC	HES	
DIM	MIN	MAX	MIN	MAX 0.400	
Α	9.40	10.16	0.370		
В	6.10	6.60	0.240	0.260	
С	3.94	4.45	5 0.155 0		
D	0.38 0.51		0.015	0.020	
F	1.02	1.02 1.78		0.070	
G	2.54 BSC		0.100	BSC	
H 0.76		1.27	0.030	0.050	
J	0.20	0.30	0.008	0.012	
Κ	2.92	3.43	0.115	0.135	
cL.	7.62 BSC		0.300	BSC	
М		10°		10°	
Ν	0.76	1.01	0.030	0.040	

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