

MC1350

Monolithic IF Amplifier

The MC1350 is an integrated circuit featuring wide range AGC for use as an IF amplifier in radio and TV over an operating temperature range of 0° to +75°C.

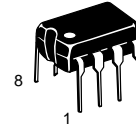
- Power Gain: 50 dB Typ at 45 MHz
50 dB Typ at 58 MHz
- AGC Range: 60 dB Min, DC to 45 MHz
- Nearly Constant Input & Output Admittance over the Entire AGC Range
- γ_{21} Constant (-3.0 dB) to 90 MHz
- Low Reverse Transfer Admittance: $<< 1.0 \mu\text{mho}$ Typ
- 12 V Operation, Single-Polarity Power Supply

MAXIMUM RATINGS ($T_A = +25^\circ\text{C}$, unless otherwise noted.)

Rating	Symbol	Value	Unit
Power Supply Voltage	V^+	+18	Vdc
Output Supply Voltage	V_1, V_8	+18	Vdc
AGC Supply Voltage	V_{AGC}	V^+	Vdc
Differential Input Voltage	V_{in}	5.0	Vdc
Power Dissipation (Package Limitation)	P_D	625	mW
Plastic Package		5.0	mW/°C
Derate above 25°C			
Operating Temperature Range	T_A	0 to +75	°C

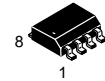
IF AMPLIFIER

SEMICONDUCTOR TECHNICAL DATA



P SUFFIX
PLASTIC PACKAGE
CASE 626

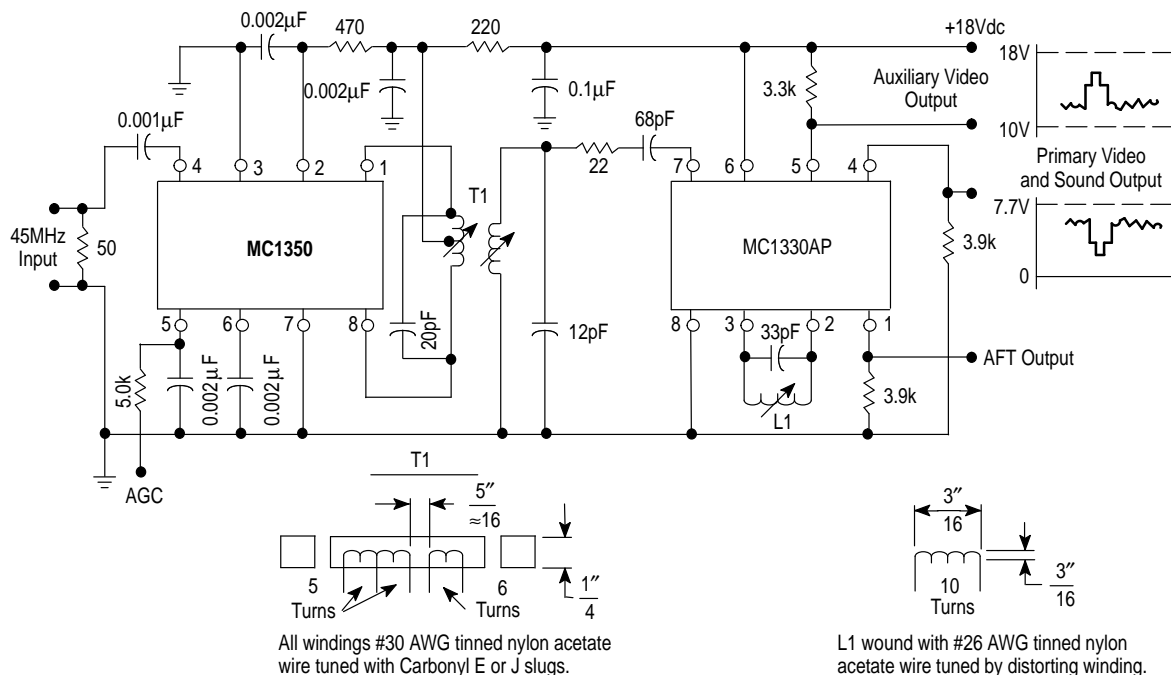
D SUFFIX
PLASTIC PACKAGE
CASE 751
(SO-8)



ORDERING INFORMATION

Device	Operating Temperature Range	Package
MC1350P	$T_A = 0^\circ$ to $+75^\circ\text{C}$	Plastic DIP
MC1350D		SO-8

Figure 1. Typical MC1350 Video IF Amplifier and MC1330 Low-Level Video Detector Circuit



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ELECTRICAL CHARACTERISTICS ($V^+ = +12$ Vdc, $T_A = +25^\circ\text{C}$, unless otherwise noted.)

Characteristics	Symbol	Min	Typ	Max	Unit
AGC Range, 45 MHz (5.0 V to 7.0 V) (Figure 1)		60	68	–	dB
Power Gain (Pin 5 grounded via a 5.1 k Ω resistor) f = 58 MHz, BW = 4.5 MHz See Figure 6(a) f = 45 MHz, BW = 4.5 MHz See Figure 6(a), (b) f = 10.7 MHz, BW = 350 kHz See Figure 7 f = 455 kHz, BW = 20 kHz	A_p	– 46 – –	48 50 58 62	– – – –	dB
Maximum Differential Voltage Swing 0 dB AGC –30 dB AGC	V_O	– –	20 8.0	– –	V_{pp}
Output Stage Current (Pins 1 and 8)	$I_1 + I_8$	–	5.6	–	mA
Total Supply Current (Pins 1, 2 and 8)	I_S	–	14	17	mAdc
Power Dissipation	P_D	–	168	204	mW

DESIGN PARAMETERS, Typical Values ($V^+ = +12$ Vdc, $T_A = +25^\circ\text{C}$, unless otherwise noted.)

Parameter	Symbol	Frequency				Unit
		455 kHz	10.7 MHz	45 MHz	58 MHz	
Single-Ended Input Admittance	g_{11} b_{11}	0.31 0.022	0.36 0.50	0.39 2.30	0.5 2.75	mmho
Input Admittance Variations with AGC (0 dB to 60 dB)	Δg_{11} Δb_{11}	– –	– –	60 0	– –	μmho
Differential Output Admittance	g_{22} b_{22}	4.0 3.0	4.4 110	30 390	60 510	μmho
Output Admittance Variations with AGC (0 dB to 60 dB)	Δg_{22} Δb_{22}	– –	– –	4.0 90	– –	μmho
Reverse Transfer Admittance (Magnitude)	$ y_{12} $	$\ll 1.0$	$\ll 1.0$	$\ll 1.0$	$\ll 1.0$	μmho
Forward Transfer Admittance Magnitude Angle (0 dB AGC) Angle (–30 dB AGC)	$ y_{21} $ $\angle y_{21}$ $\angle y_{21}$	160 –5.0 –3.0	160 –20 –18	200 –80 –69	180 –105 –90	mmho Degrees Degrees
Single-Ended Input Capacitance	C_{in}	7.2	7.2	7.4	7.6	pF
Differential Output Capacitance	C_O	1.2	1.2	1.3	1.6	pF

Figure 2. Typical Gain Reduction

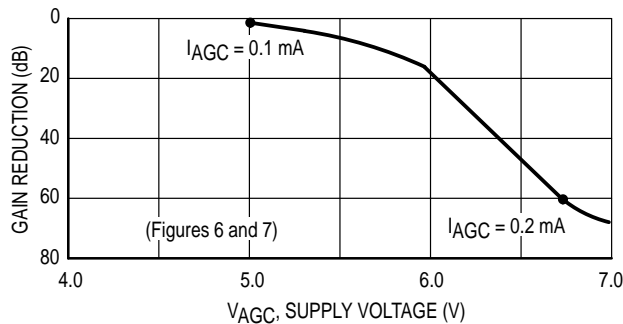
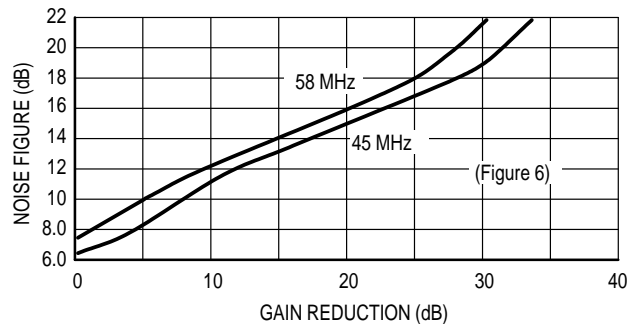
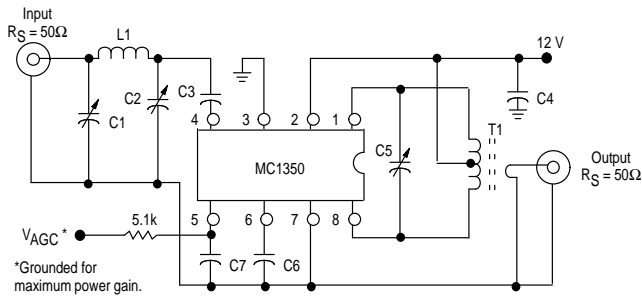


Figure 3. Noise Figure versus Gain Reduction



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Figure 7. Power Gain and AGC Test Circuit (455 kHz and 10.7 MHz)



Component	Frequency	
	455 kHz	10.7 MHz
C1	—	80–450 pF
C2	—	5.0–80 pF
C3	0.05 μF	0.001 μF
C4	0.05 μF	0.05 μF
C5	0.001 μF	36 pF
C8	0.05 μF	0.05 μF
C7	0.05 μF	0.05 μF
L1	—	4.6 μH
T1	Note 1	Note 2

NOTES: 1. Primary: 120 μH (center-tapped)
 $Q_U = 140$ at 455 kHz
 Primary: Secondary turns ratio ≈ 13
 2. Primary: 6.0 μH
 Primary winding = 24 turns #36 AWG (close-wound on 1/4" dia. form)
 Core = Carbonyl E or J
 Secondary winding = 1–1/2 turns #36 AWG, 1/4" dia. (wound over center-tap)

Figure 8. Single-Ended Input Admittance

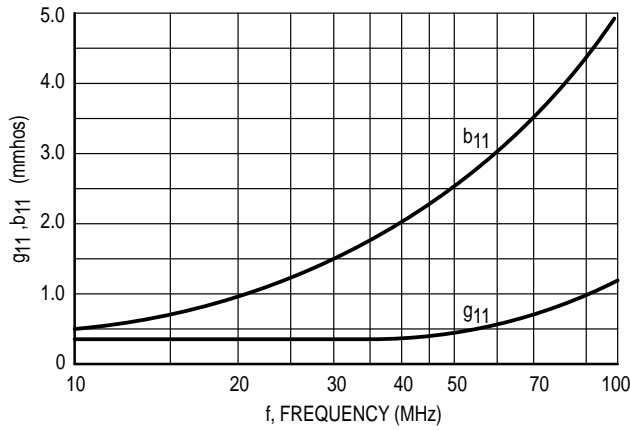


Figure 9. Forward Transfer Admittance

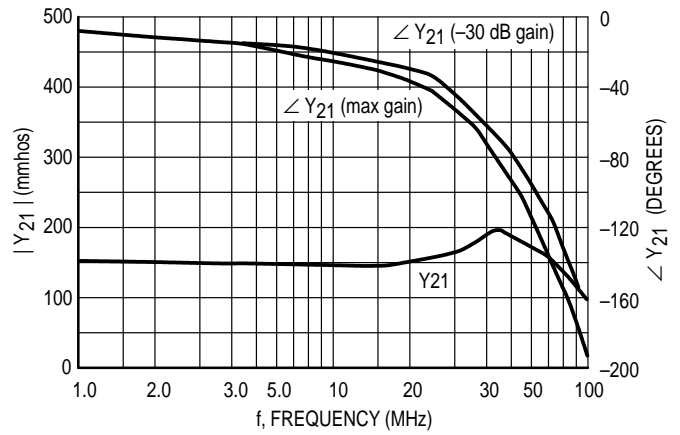


Figure 10. Differential Output Admittance

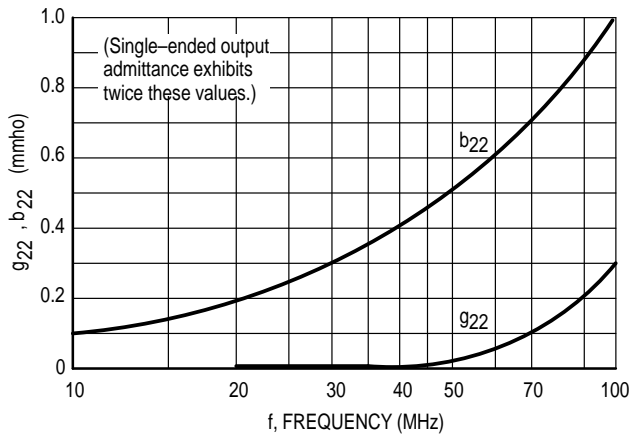
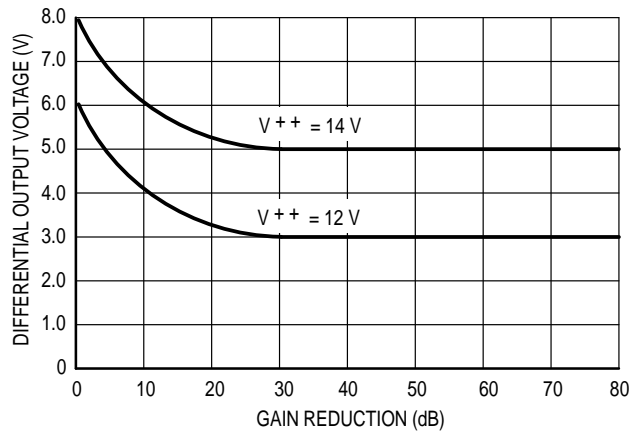
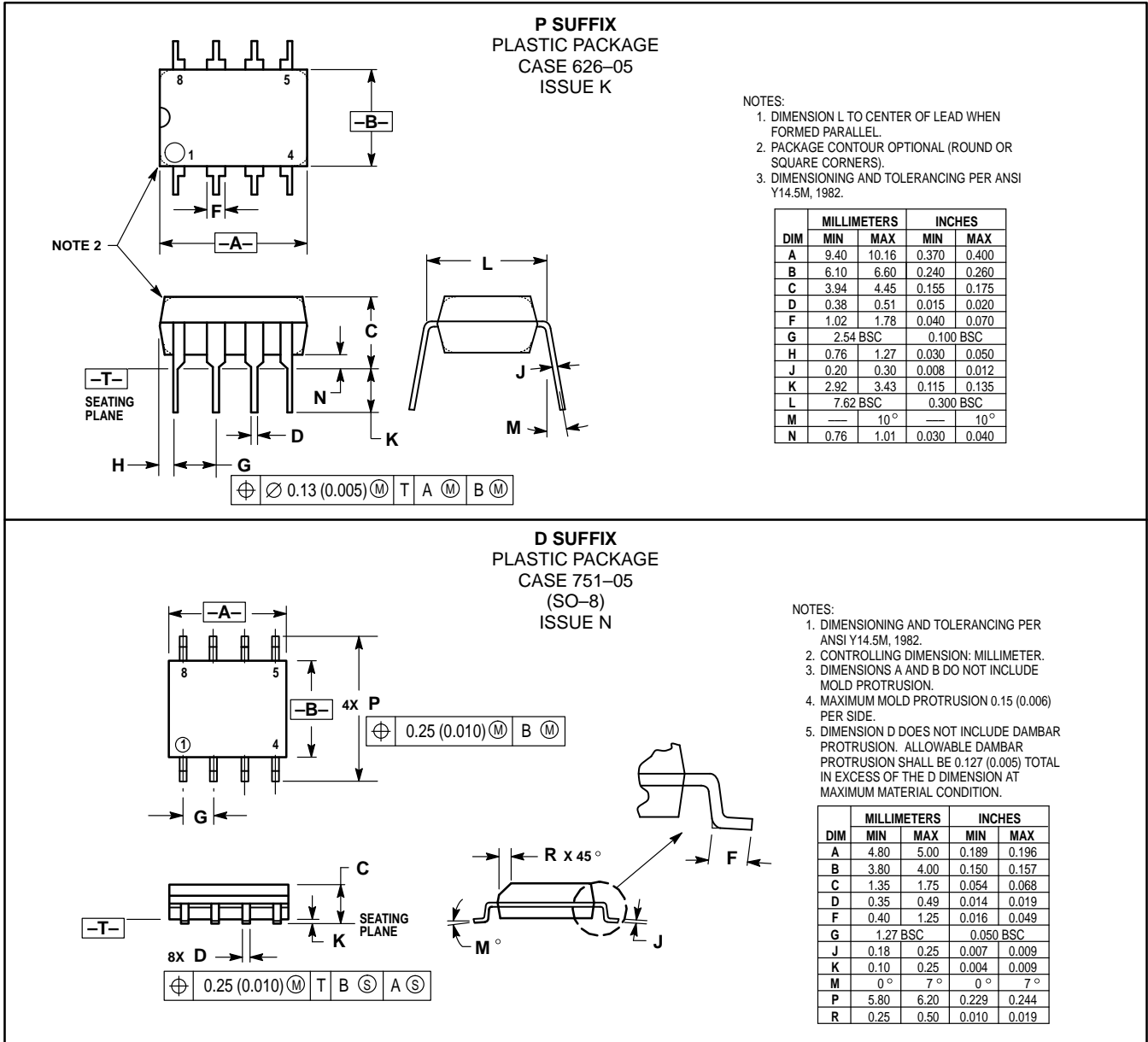


Figure 11. Differential Output Voltage




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OUTLINE DIMENSIONS



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