

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.

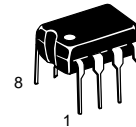
- Power Gain: 50 dB Typ at 45 MHz
50 dB Typ at 58 MHz
- AGC Range: 60 dB Min, DC to 45 MHz
- Nearly Constant Input & Output Admittance over the Entire AGC Range
- γ_{21} Constant (-3.0 dB) to 90 MHz
- Low Reverse Transfer Admittance: $<< 1.0 \mu\text{mho}$ Typ
- 12 V Operation, Single-Polarity Power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

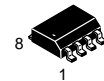
IF AMPLIFIER

SEMICONDUCTOR TECHNICAL DATA



P SUFFIX
PLASTIC PACKAGE
CASE 626

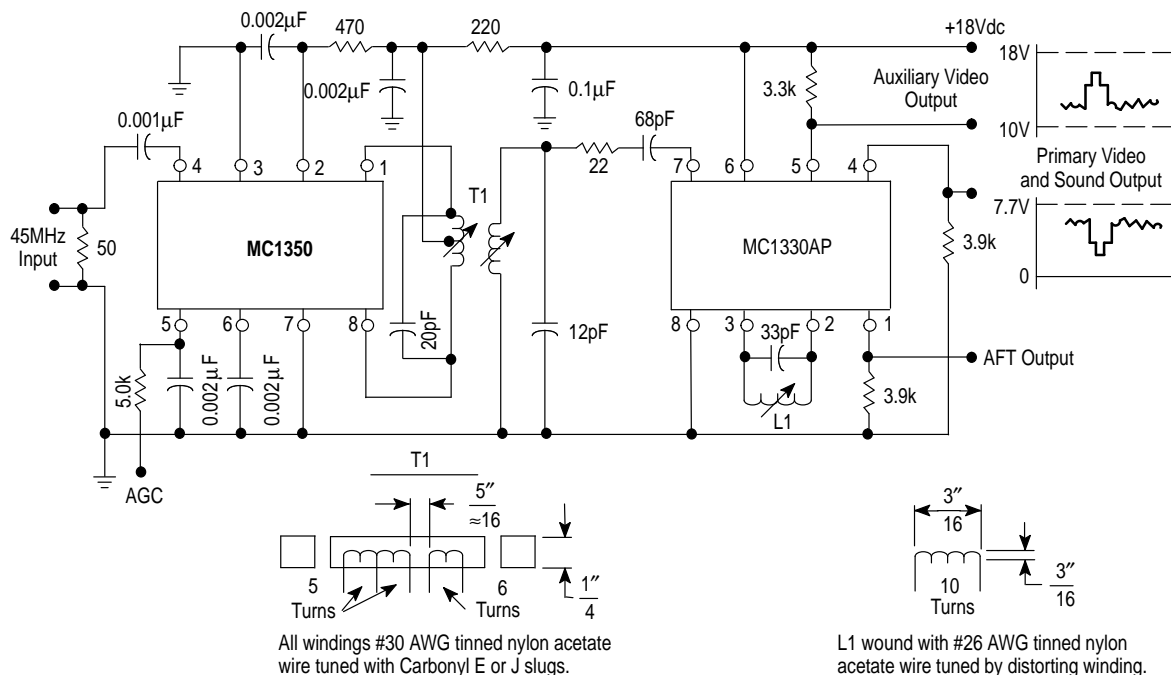
D SUFFIX
PLASTIC PACKAGE
CASE 751
(SO-8)



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



MC1350

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

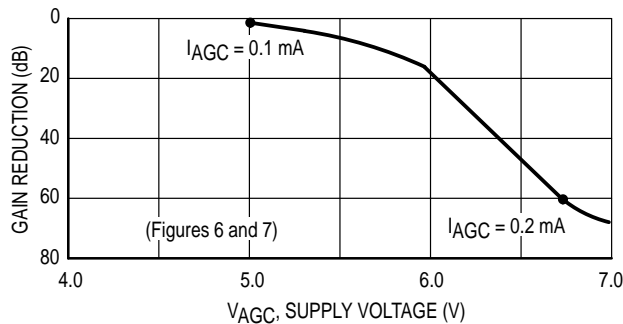
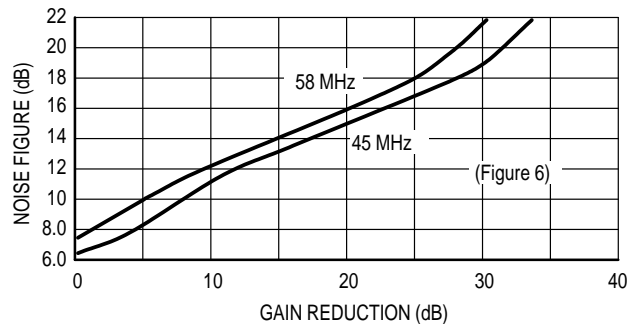
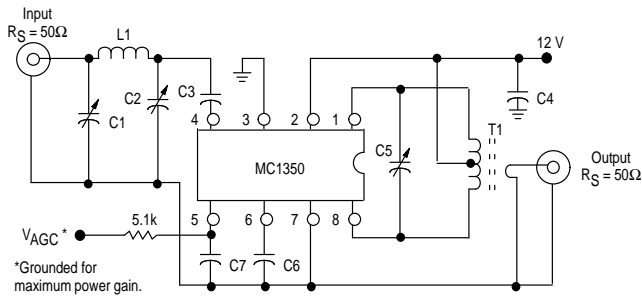


Figure 3. Noise Figure versus Gain Reduction



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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 μF |
| 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

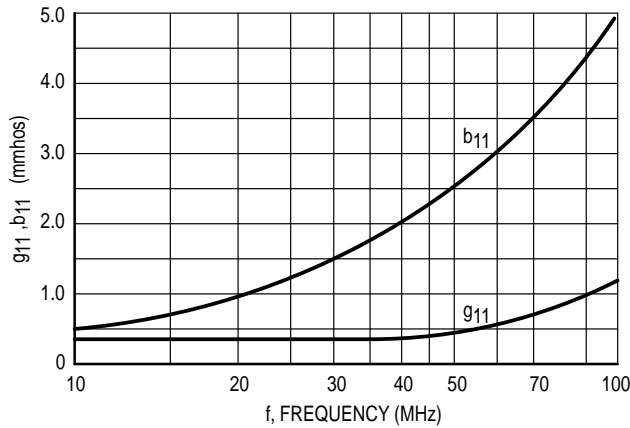


Figure 9. Forward Transfer Admittance

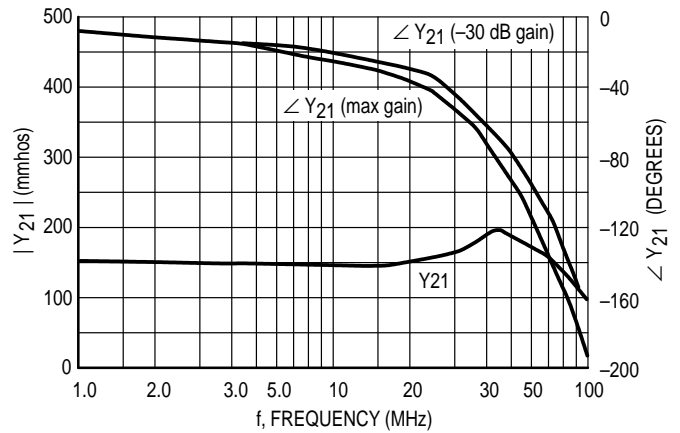


Figure 10. Differential Output Admittance

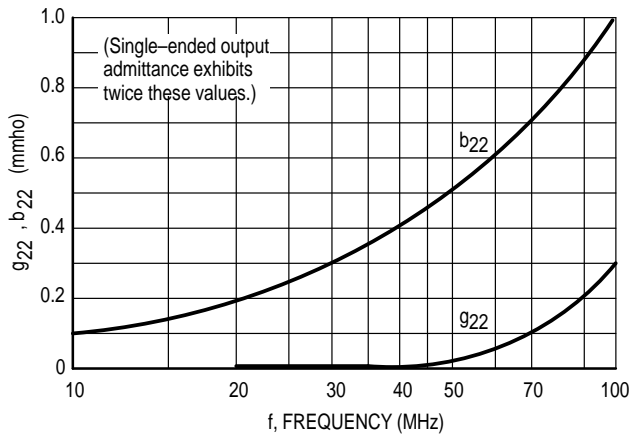
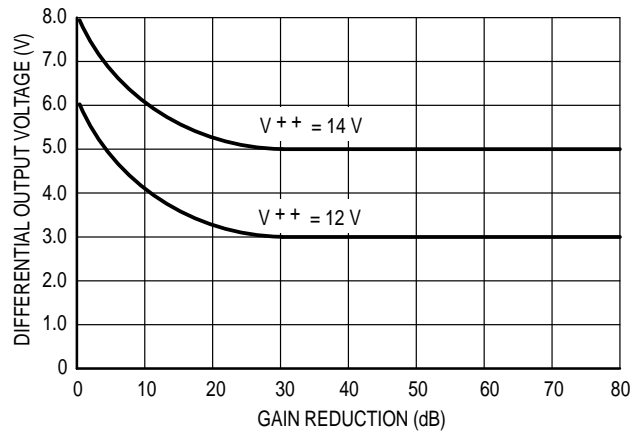


Figure 11. Differential Output Voltage



MC1350

OUTLINE DIMENSIONS

P SUFFIX
PLASTIC PACKAGE
CASE 626-05
ISSUE K

NOTE 2

⊕ ∅ 0.13 (0.005) (M) T A (M) B (M)

NOTES:

1. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
2. PACKAGE CONTOUR OPTIONAL (ROUND OR SQUARE CORNERS).
3. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|-------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 9.40 | 10.16 | 0.370 | 0.400 |
| B | 6.10 | 6.60 | 0.240 | 0.260 |
| C | 3.94 | 4.45 | 0.155 | 0.175 |
| D | 0.38 | 0.51 | 0.015 | 0.020 |
| F | 1.02 | 1.78 | 0.040 | 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 |
| K | 2.92 | 3.43 | 0.115 | 0.135 |
| L | 7.62 BSC | | 0.300 BSC | |
| M | — 10° | | — 10° | |
| N | 0.76 | 1.01 | 0.030 | 0.040 |

D SUFFIX
PLASTIC PACKAGE
CASE 751-05
(SO-8)
ISSUE N

⊕ 0.25 (0.010) (M) B (M)


⊕ 0.25 (0.010) (M) T B (S) A (S)

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 4.80 | 5.00 | 0.189 | 0.196 |
| B | 3.80 | 4.00 | 0.150 | 0.157 |
| C | 1.35 | 1.75 | 0.054 | 0.068 |
| D | 0.35 | 0.49 | 0.014 | 0.019 |
| F | 0.40 | 1.25 | 0.016 | 0.049 |
| G | 1.27 BSC | | 0.050 BSC | |
| J | 0.18 | 0.25 | 0.007 | 0.009 |
| K | 0.10 | 0.25 | 0.004 | 0.009 |
| M | 0° 7° | | 0° 7° | |
| P | 5.80 | 6.20 | 0.229 | 0.244 |
| R | 0.25 | 0.50 | 0.010 | 0.019 |

MC1350

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MC1350/D

