

# TV VIDEO IF AMPLIFIER WITH AGC AND KEYER CIRCUIT

SN76650N



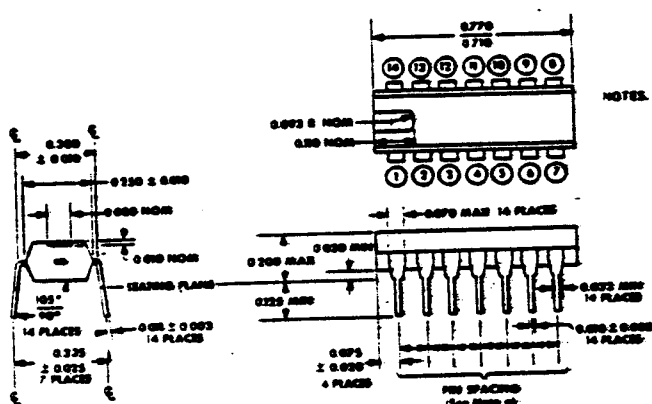
A monolithic IF amplifier with a complete gated wide-range AGC system for use as the 1st and 2nd IF stages and AGC keyer and amplifier in color or monochrome TV receivers.

## FEATURES:

- 0.3dB output change for 60dB IF Input Signal change.
- Power Gain at 45 MHz...53dB (Typ)
- AGC Range >65 dB (Min)
- Nearly Constant Input and Output Admittance over AGC Range.
- High Gain Gated AGC System for either Positive or Negative Going Video Signals.
- Control Signal Available for Delayed Forward AGC or Tuner.

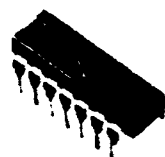
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## 14-PIN PLASTIC DUAL-IN-LINE N-PACKAGE OUTLINE



NOTES: a. The maximum pin spacing is 0.100 between center pins. Each pin extends a maximum of 0.010 at its distal longitudinal position relative to pins 4 and 11.  
b. All dimensions are in inches unless otherwise noted.

Falls Within JEDEC TO-116  
and MO-001AA Dimensions.



96

002939

ORIG

11

2939

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MAXIMUM RATINGS (Voltages referenced to pin 4, ground;  $T_A = +25^\circ\text{C}$  unless otherwise noted)

| RATING                                                   | SYMBOL          | VALUE       | UNIT                 |
|----------------------------------------------------------|-----------------|-------------|----------------------|
| Power Supply (Pin 11)                                    | $V^+$           | +18         | Vdc                  |
| Output Supply (Pins 7&8)                                 | $V_7, V_8$      | +18         | Vdc                  |
| Signal Input Voltage (Pin 1 or 2, other pin ac grounded) | $V_1, V_2$      | 10          | Vp-p                 |
| AGC Input Voltage (Pin 6 or 10, other pin ac grounded)   | $V_6, V_{10}$   | +6.0        | Vdc                  |
| Gating Voltage, Pin 5                                    | $V_5$           | +10, -20    | Vdc                  |
| Power Dissipation                                        | $P_D$           | 625         | mW                   |
| Derate above $T_A = +25^\circ\text{C}$                   | $1/\theta_{JA}$ | 5.0         | mW/ $^\circ\text{C}$ |
| Operating Temperature Range                              | $T_A$           | 0 to +70    | $^\circ\text{C}$     |
| Storage Temperature Range                                | $T_{stg}$       | -55 to +150 | $^\circ\text{C}$     |

ELECTRICAL CHARACTERISTICS ( $V^+ = 12$  Vdc, Voltages referenced to pin 4, ground;  $T_A = +25^\circ\text{C}$  unless otherwise noted)

| CHARACTERISTIC                                                                                  | SYMBOL   | MIN           | TYP        | MAX       | UNIT             |
|-------------------------------------------------------------------------------------------------|----------|---------------|------------|-----------|------------------|
| AGC Range, $f=45\text{MHz}$ , 5.0 Vdc to 7.0 Vdc                                                |          | 65            | 68         | -         | dB               |
| Power Gain, $f=45\text{ MHz}$ (see figure 2)                                                    | $A_p$    | 45            | 53         | -         | dB               |
| Noise Figure<br>$f=60\text{ MHz}, R_s 50\text{ ohms}$<br>$f=30\text{ MHz}, R_s 200\text{ ohms}$ | $N_f$    | -<br>-<br>-   | 8.5<br>8.0 | -<br>-    | dB               |
| Voltage Range for RF-AGC at Pin 12<br>Maximum<br>Minimum                                        | $V_{12}$ | 6.5<br>-<br>- | 8.3<br>0.1 | -<br>0.50 | Vdc              |
| Output Change for 60 dB IF Signal Change                                                        |          | -             | 0.3        | -         | dB               |
| IF Gain Change Over RF-AGC Range                                                                |          | -             | 10         | -         | dB               |
| Output Stage Current ( $I_7 + I_8$ )                                                            | $I_o$    | -             | 6.0        | -         | mA <sub>dc</sub> |
| Total Supply Current ( $I_7 + I_8 + I_{11}$ )                                                   | $I_s$    | 15            | 25         | 35        | mA <sub>dc</sub> |
| Total Power Dissipation                                                                         | $P_D$    | 180           | 310        | 420       | mW               |

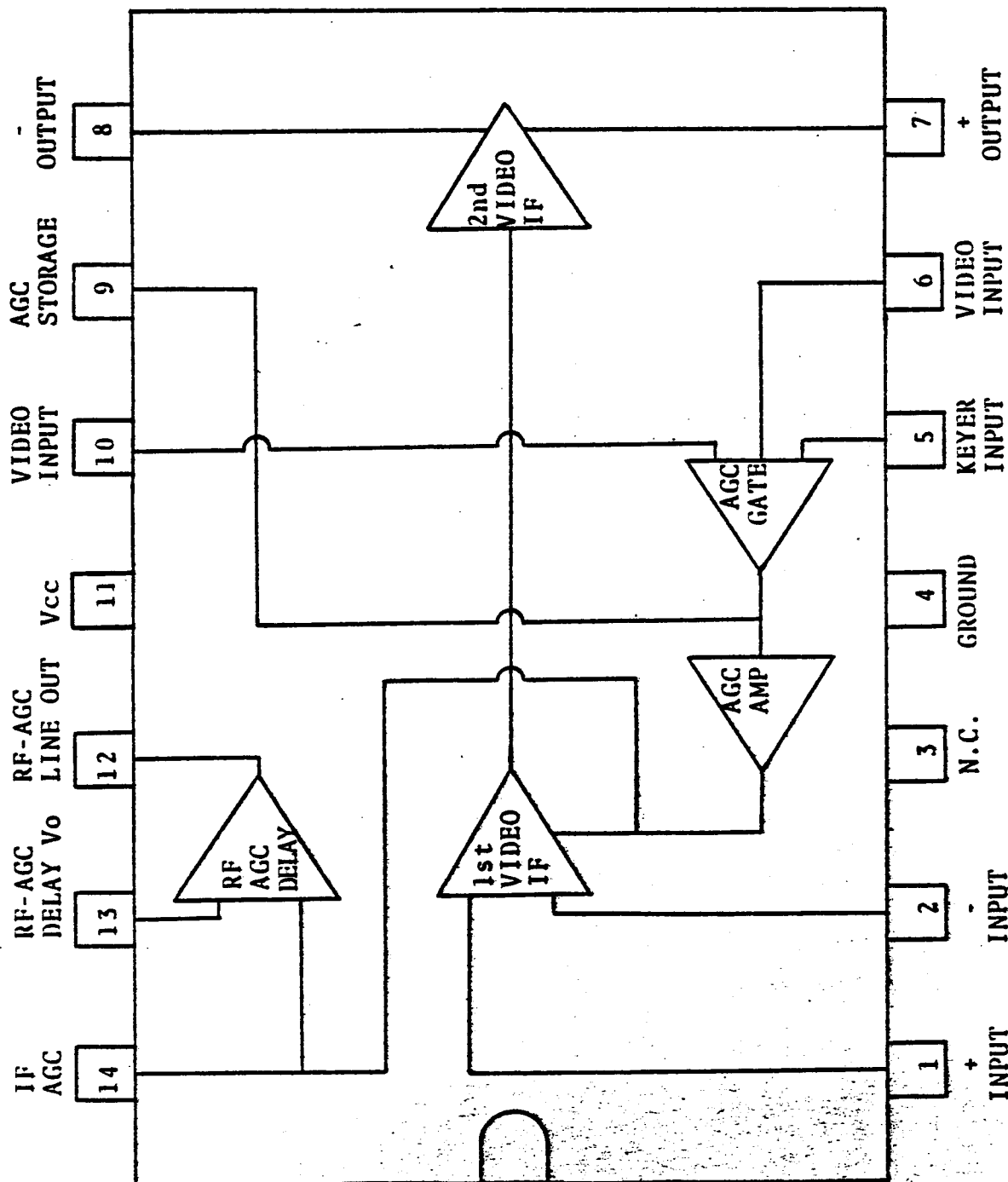
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MAXIMUM RATINGS (Voltages referenced to pin 4, ground;  $T_A = +25^\circ\text{C}$  unless otherwise noted)

| RATING                                                   | SYMBOL          | VALUE       | UNIT                 |
|----------------------------------------------------------|-----------------|-------------|----------------------|
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| AGC Input Voltage (Pin 6 or 10, other pin ac grounded)   | $V_6, V_{10}$   | +6.0        | Vdc                  |
| Gating Voltage, Pin 5                                    | $V_5$           | +10, -20    | Vdc                  |
| Power Dissipation                                        | $P_D$           | 625         | mW                   |
| Derate above $T_A = +25^\circ\text{C}$                   | $1/\theta_{JA}$ | 5.0         | mW/ $^\circ\text{C}$ |
| Operating Temperature Range                              | $T_A$           | 0 to +70    | $^\circ\text{C}$     |
| Storage Temperature Range                                | $T_{stg}$       | -55 to +150 | $^\circ\text{C}$     |

ELECTRICAL CHARACTERISTICS ( $V^+ = 12\text{ Vdc}$ , Voltages referenced to pin 4, ground;  $T_A = +25^\circ\text{C}$  unless otherwise noted)

| CHARACTERISTIC                                                                                  | SYMBOL   | MIN      | TYP        | MAX       | UNIT             |
|-------------------------------------------------------------------------------------------------|----------|----------|------------|-----------|------------------|
| AGC Range, $f=45\text{MHz}$ , 5.0 Vdc to 7.0 Vdc                                                |          | 65       | 68         | -         | dB               |
| Power Gain, $f=45\text{ MHz}$ (see figure 2)                                                    | $A_p$    | 45       | 53         | -         | dB               |
| Noise Figure<br>$f=60\text{ MHz}, R_s 50\text{ ohms}$<br>$f=30\text{ MHz}, R_s 200\text{ ohms}$ | $N_f$    | -        | 8.5<br>8.0 | -         | dB               |
| Voltage Range for RF-AGC at Pin 12<br>Maximum<br>Minimum                                        | $V_{12}$ | 6.5<br>- | 8.3<br>0.1 | -<br>0.50 | Vdc              |
| Output Change for 60 dB IF Signal Change                                                        |          | -        | 0.3        | -         | dB               |
| IF Gain Change Over RF-AGC Range                                                                |          | -        | 10         | -         | dB               |
| Output Stage Current ( $I_7 + I_8$ )                                                            | $I_o$    | -        | 6.0        | -         | mA <sub>dc</sub> |
| Total Supply Current ( $I_7 + I_8 + I_{11}$ )                                                   | $I_s$    | 15       | 25         | 35        | mA <sub>dc</sub> |
| Total Power Dissipation                                                                         | $P_D$    | 180      | 310        | 420       | mW               |

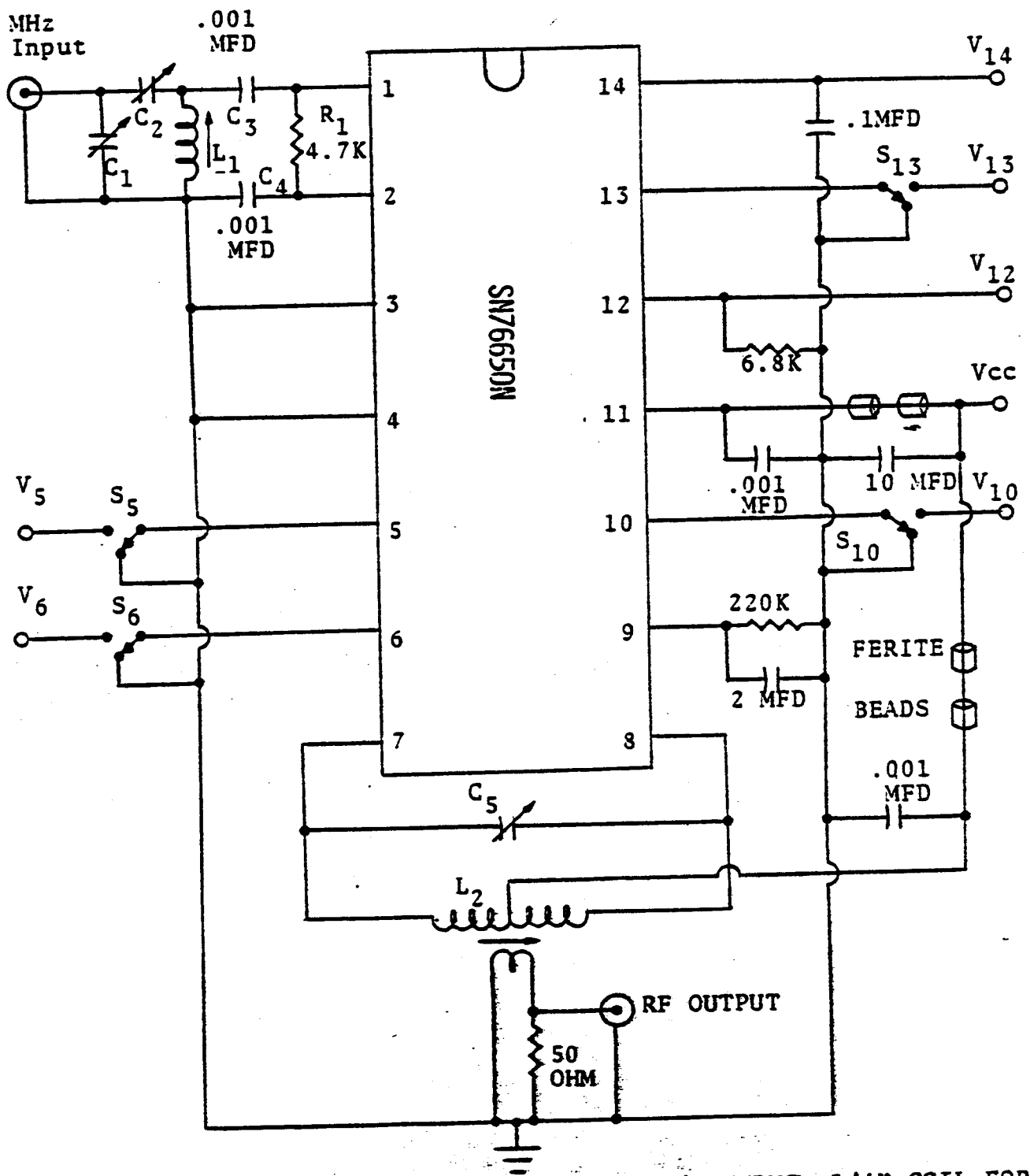


14 PIN PLASTIC PACKAGE

( TOP VIEW )

SN76650N

45 MHz  
RF Input



$C_1$  = 48-100 PF  
 $C_2$  = 8-60 PF  
 $C_5$  = 1.5-20 PF

$L_1$  = 7 1/4 TURNS - 1/4" COIL FORM  
 - # 26 AWG

$L_2$  = PRIMARY - 18 TURNS CENTER TAPED  
 - 1/4" COIL FORM - #26 AWG  
 SECONDARY - 2 TURNS WOUND EVENLY  
 OVER PRIMARY - # 26 AWG

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DESIGN PARAMETERS, TYPICAL VALUES ( $V_{+}=12$  Vdc,  $T_A = + 25^{\circ}\text{C}$  unless otherwise noted)

| PARAMETER                                             | SYMBOL                             | f=35MHz      | f=45MHz      | UNIT             |
|-------------------------------------------------------|------------------------------------|--------------|--------------|------------------|
| Single-Ended Input Admittance                         | $g_{11}$<br>$b_{11}$               | 0.55<br>1.70 | 0.70<br>2.80 | mmhos            |
| Input Admittance Variations<br>with AGC (0 to 60 dB)  | $\Delta g_{11}$<br>$\Delta b_{11}$ | 50<br>0      | 60<br>0      | $\mu\text{mhos}$ |
| Differential Output Admittance                        | $g_{22}$<br>$b_{22}$               | 40<br>430    | 90<br>570    | $\mu\text{mhos}$ |
| Output Admittance Variations<br>with AGC (0 to 60 dB) | $g_{22}$<br>$b_{22}$               | 3.0<br>80    | 4.0<br>100   | $\mu\text{mhos}$ |
| Reverse Transfer Admittance<br>(Magnitude)            | $ y_{12} $                         | $\leq 1.0$   | $\leq 1.0$   | $\mu\text{mhos}$ |
| Forward Transfer Admittance<br>Magnitude              | $ y_{21} $                         | 280          | 260          | mmhos            |
| Angle (0 dB AGC)                                      | $\angle y_{21}$                    | -73          | -100         | degrees          |
| Angle (-30 dB AGC)                                    | $\angle y_{21}$                    | -52          | -70          |                  |
| Single-Ended Input Capacitance                        | $C_{in}$                           | 9.5          | 10           | pF               |
| Differential Output Capacitance                       | $C_o$                              | 2.0          | 2.0          | pF               |