

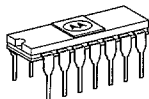
## DUAL SENSE AMPLIFIERS

**MC1414 L** (0 to +75°C)

**MC1514 L** (-55 to +125°C)

... the MC1414 and MC1514 are monolithic dual differential voltage comparators designed for use in level detection, low-level sensing, and memory applications.

- Two Separate Outputs
- Strobe Capability
- High Output Sink Current — 2.8 mA min Each Comparator
- Differential Input Characteristics:  
Input Offset Voltage = 1.0 mV  
Offset Voltage Drift = 3.0  $\mu\text{V}/^\circ\text{C}$
- Short Propagation Delay Time — 40 ns
- Output Compatible with All Saturating Logic Forms  
 $V_{\text{out}} = +3.2 \text{ V to } -0.5 \text{ V typical}$



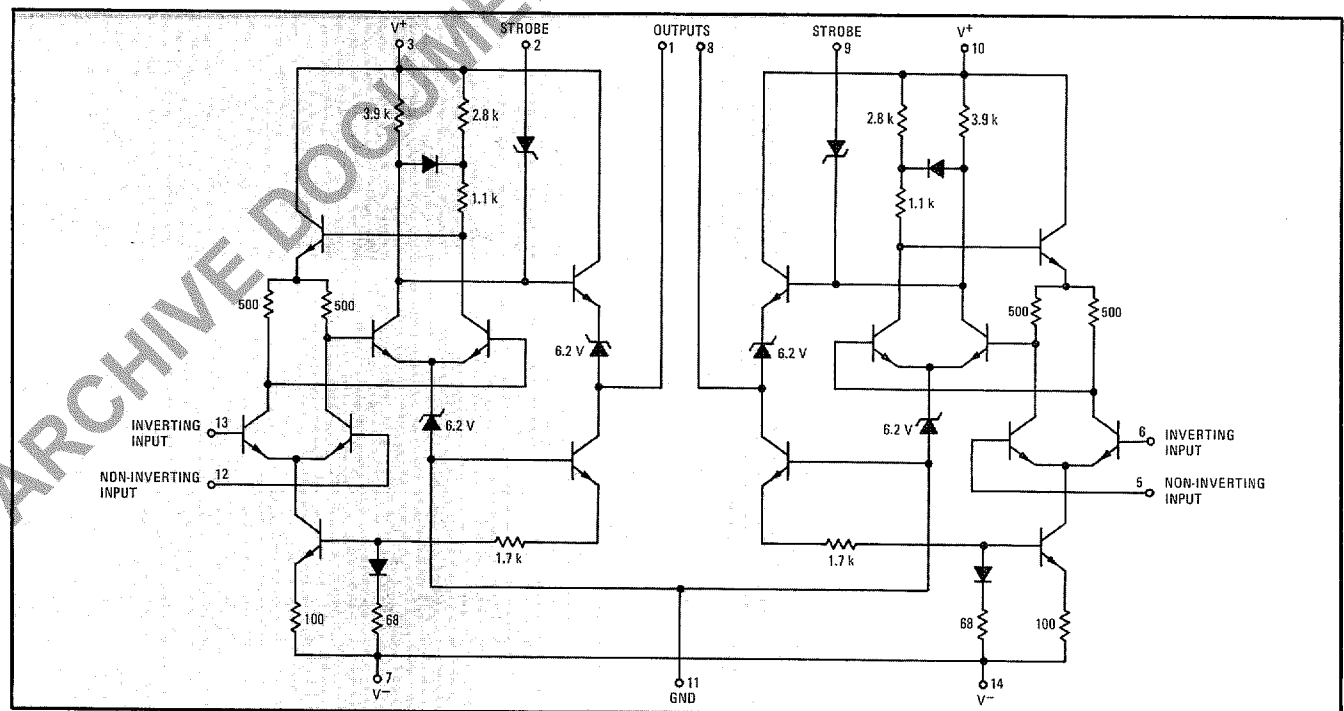
**L SUFFIX**  
CERAMIC PACKAGE  
CASE 605C  
TO-116

### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

| RATING                                                                                                          | SYMBOL         | VALUE                   | UNIT                       |
|-----------------------------------------------------------------------------------------------------------------|----------------|-------------------------|----------------------------|
| Power Supply Voltage                                                                                            | $V^+$<br>$V^-$ | +14<br>-7.0             | Vdc<br>Vdc                 |
| Differential Input Signal                                                                                       | $V_{in}$       | $\pm 5.0$               | Volts                      |
| Common Mode Input Swing                                                                                         | $CMV_{in}$     | $\pm 7.0$               | Volts                      |
| Peak Load Current                                                                                               | $I_L$          | 10                      | mA                         |
| Power Dissipation (package limitation)<br>Ceramic Dual In-Line Package<br>Derate above $T_A = 50^\circ\text{C}$ | $P_D$          | 750<br>6.0              | mW<br>mW/ $^\circ\text{C}$ |
| Operating Temperature Range                                                                                     | $T_A$          | 0 to +75<br>-55 to +125 | $^\circ\text{C}$           |
| Storage Temperature Range                                                                                       | $T_{stg}$      | -65 to +150             | $^\circ\text{C}$           |

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

| TYPE   | $V^+$<br>(Vdc) | $V^-$<br>(Vdc) | $V_{io}$<br>(mV) | $A_{VOL}$<br>(V/V) | $V_{OH}$<br>(Vdc) | $V_{OL}$<br>(Vdc) | $t_{pd}$<br>(ns) | $CMV_{in}$<br>(Vdc) | $TCV_{io}$<br>( $\mu\text{V}/^\circ\text{C}$ ) |
|--------|----------------|----------------|------------------|--------------------|-------------------|-------------------|------------------|---------------------|------------------------------------------------|
| MC1414 | +12            | -6.0           | 1.5              | 1500               | 3.2               | -0.5              | 40               | $\pm 5.0$           | 5.0                                            |
| MC1514 | +12            | -6.0           | 1.0              | 1700               | 3.2               | -0.5              | 40               | $\pm 5.0$           | 3.0                                            |



## SENSE AMPLIFIERS

### MC1440F,G,L,P (0 to +75°C) MC1540F,G,L (-55 to +125°C)

... consisting of a wideband differential amplifier, a dc restoration circuit which also incorporates facilities to externally adjust the threshold, and an output gate which is strobed from saturated logic. It is designed to detect bipolar differential signals derived by a core memory with cycle times as low as 0.5  $\mu$ s. MC1440 and MC1540 are identical circuits specified over different temperature ranges.

- Differential Threshold Characteristics:  
Adjustable Threshold — 10-25 mV  
Nominal Threshold — 17 mV @  $V_6 = -6$  V  
Input Offset Voltage — 1 mV  
Threshold Drift — +10 V/°C
- Fast Response Time — 20 ns
- Short Recovery Time  
50 ns @  $e_{in} = 1.8$  V Common Mode  
50 ns @  $e_{in} = 400$  mV Differential Mode

#### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

| RATING                                 | SYMBOL         | VALUE                                  | UNIT       |
|----------------------------------------|----------------|----------------------------------------|------------|
| Power Supply Voltage                   | $V^+$<br>$V^-$ | +10<br>-10                             | Vdc<br>Vdc |
| Differential Input Signal              | $V_{in}$       | $\pm 5.0$                              | Volts      |
| Common Mode Input Swing                | $CMV_{in}$     | $\pm 5.0$                              | Volts      |
| Peak Load Current                      | $I_L$          | 25                                     | mA         |
| Power Dissipation (Package Limitation) | $P_D$          |                                        |            |
| Metal Can                              |                | 680                                    | mW         |
| Derate above 25°C                      |                | 4.6                                    | mW/°C      |
| Flat Package                           |                | 500                                    | mW         |
| Derate above 25°C                      |                | 3.3                                    | mW/°C      |
| Ceramic Dual In-Line Pkg.              |                | 625                                    | mW         |
| Derate above 25°C                      |                | 5.0                                    | mW/°C      |
| Plastic Package                        |                | 415                                    | mW         |
| Derate above 25°C                      |                | 3.3                                    | mW/°C      |
| Operating Temperature Range            | $T_A$          | 0 to +75<br>-55 to +100<br>-55 to +125 | °C         |
| Storage Temperature Range              | $T_{stg}$      | -65 to +150                            | °C         |

#### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

| TYPE   | $V^+$<br>(Vdc) | $V^-$<br>(Vdc) | $V_{th}^*$<br>(mV) | $A_v$<br>(V/V) | $V_{OH}$<br>(Vdc) | $V_{OL}$<br>(Vdc) | $t_{pd}$<br>(ns) | $t_r$<br>(ns) | $CMV_{in}$<br>(Vpk) | $TCV_{th}$<br>( $\mu$ V/°C) |
|--------|----------------|----------------|--------------------|----------------|-------------------|-------------------|------------------|---------------|---------------------|-----------------------------|
| MC1540 | +6.0           | -6.0           | 17                 | 85             | 5.9               | 0.35              | 10               | 20            | $\pm 5.0$           | 10                          |
| MC1440 | +6.0           | -6.0           | 17                 | 85             | 5.8               | 0.4               | 10               | 20            | $\pm 5.0$           | 10                          |

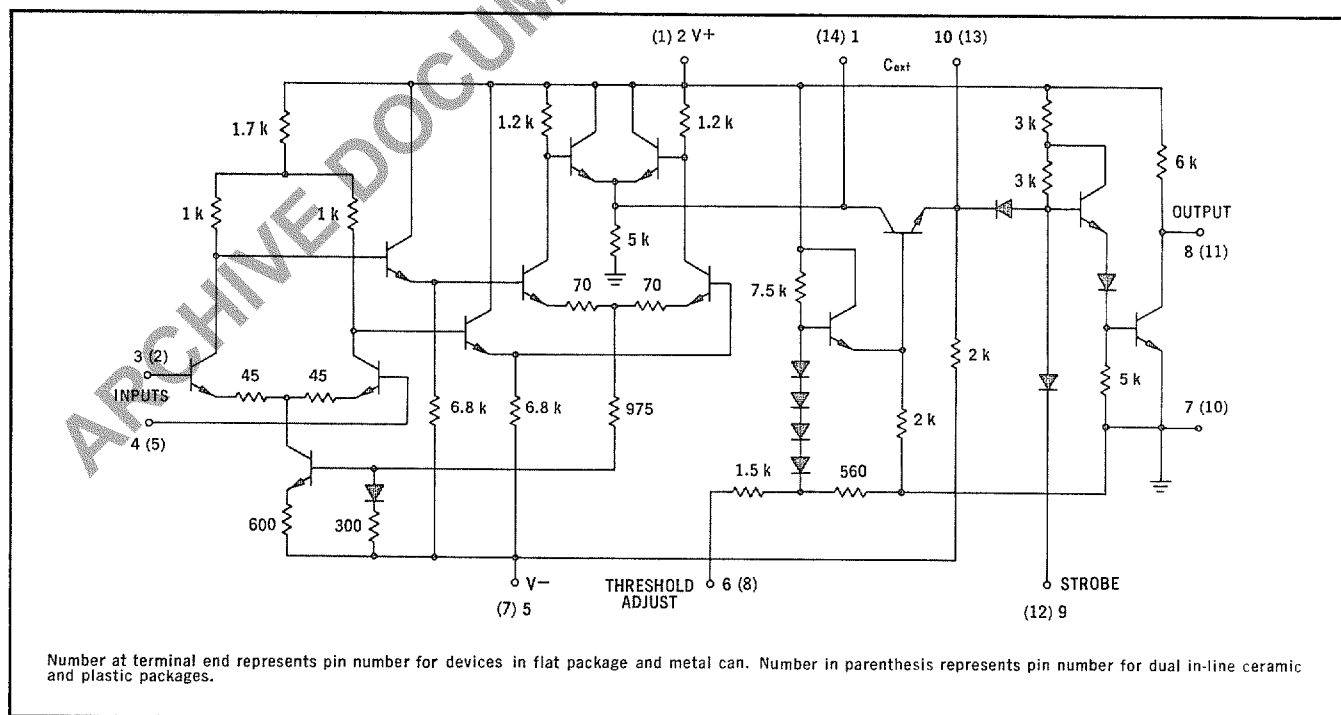
\*Input Offset Voltage = 1.0 mV;  $V_{th}$  is adjustable.

**F SUFFIX**  
CASE 606  
(Formerly Case 72)  
TO-91

**G SUFFIX**  
CASE 602B  
(Formerly Case 71)

**L SUFFIX**  
CERAMIC PACKAGE  
CASE 605C  
TO-116

**P SUFFIX**  
PLASTIC PACKAGE  
CASE 605  
(Formerly Case 93)  
TO-116



## DUAL SENSE AMPLIFIERS

**MC1711CF,G,L,P (0 to +75°C)**

**MC1711F,G,L (-55 to +125°C)**

... the MC1711 and MC1711C monolithic dual differential comparators are similar circuits specified over different temperature ranges. They are designed for use in level detection, low-level sensing, and memory applications.

Typical Characteristics:

- Differential Input  
Input Offset Voltage = 1.0 mV  
Offset Voltage Drift = 5.0  $\mu\text{V}/^\circ\text{C}$
- Fast Response Time — 40 ns
- Output Compatible with All Saturating Logic  
Forms  $-V_{\text{out}} = +4.5\text{ V}$  to  $-0.5\text{ V}$  typical
- Low Output Impedance — 200 ohms



**F SUFFIX**  
CASE 606  
(Formerly Case 72)  
TO-91



**G SUFFIX**  
CASE 602A  
(Formerly Case 71A)



**P SUFFIX**  
PLASTIC PACKAGE  
CASE 605  
(Formerly Case 93)  
TO-116



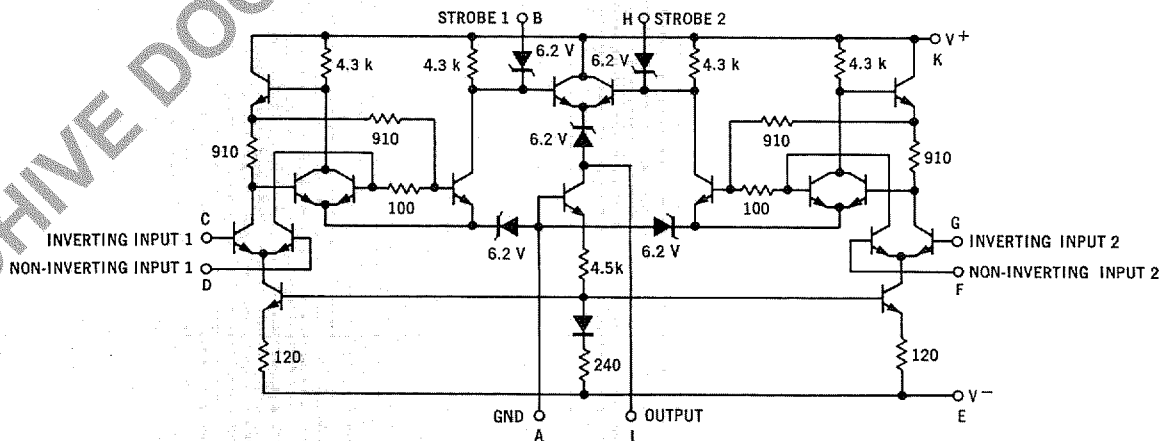
**L SUFFIX**  
CERAMIC PACKAGE  
CASE 605C  
TO-116

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

| RATING                                                          | SYMBOL                   | VALUE                      | UNIT                             |
|-----------------------------------------------------------------|--------------------------|----------------------------|----------------------------------|
| Power Supply Voltage                                            | $V^+$<br>$V^-$           | +14<br>-7.0                | Vdc<br>Vdc                       |
| Differential Input Signal                                       | $V_{\text{in}}$          | $\pm 5.0$                  | Volts                            |
| Common Mode Input Swing                                         | $\text{CMV}_{\text{in}}$ | $\pm 7.0$                  | Volts                            |
| Peak Load Current                                               | $I_L$                    | 50                         | mA                               |
| Power Dissipation (Package Limitation)                          | $P_D$                    |                            |                                  |
| Metal Can<br>Derate above $25^\circ\text{C}$                    |                          | 680<br>4.6                 | mW<br>$\text{mW}/^\circ\text{C}$ |
| Flat Package<br>Derate above $25^\circ\text{C}$                 |                          | 500<br>3.3                 | mW<br>$\text{mW}/^\circ\text{C}$ |
| Ceramic Dual In-Line Package<br>Derate above $25^\circ\text{C}$ |                          | 650<br>5.0                 | mW<br>$\text{mW}/^\circ\text{C}$ |
| Plastic Package<br>Derate above $25^\circ\text{C}$              |                          | 400<br>3.3                 | mW<br>$\text{mW}/^\circ\text{C}$ |
| Operating Temperature Range MC1711C<br>MC1711                   | $T_A$                    | 0 to +75<br>-55 to +125    | $^\circ\text{C}$                 |
| Storage Temperature Range G, F, & L Pkgs.<br>P Pkg.             | $T_{\text{stg}}$         | -65 to +150<br>-65 to +125 | $^\circ\text{C}$                 |

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

| TYPE    | $V^+$<br>(Vdc) | $V^-$<br>(Vdc) | $V_{\text{io}}$<br>(mV) | $A_{\text{VOL}}$<br>(V/V) | $V_{\text{OH}}$<br>(Vdc) | $V_{\text{OL}}$<br>(Vdc) | $t_r$<br>(ns) | $\text{CMV}_{\text{in}}$<br>(V <sub>pt</sub> ) | $\text{TCV}_{\text{io}}$<br>( $\mu\text{V}/^\circ\text{C}$ ) |
|---------|----------------|----------------|-------------------------|---------------------------|--------------------------|--------------------------|---------------|------------------------------------------------|--------------------------------------------------------------|
| MC1711  | +12            | -6.0           | 1.0                     | 1500                      | 3.2                      | -0.5                     | 40            | $\pm 5.0$                                      | 5.0                                                          |
| MC1711C | +12            | -6.0           | 1.0                     | 1500                      | 3.2                      | -0.5                     | 40            | $\pm 5.0$                                      | 5.0                                                          |



#### PIN CONNECTIONS

| Schematic      | A  | B  | C | D | E | F | G | H | J  | K  |
|----------------|----|----|---|---|---|---|---|---|----|----|
| "G" Package    | 1  | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9  | 10 |
| "F" Package    | 9  | 10 | 1 | 2 | 3 | 4 | 5 | 6 | 7  | 8  |
| "L" & "P" Pkgs | 12 | 13 | 2 | 3 | 4 | 5 | 6 | 9 | 10 | 11 |

## SENSE AMPLIFIERS

**MC1710CF, G, L, P** (0 to +75°C)

**MC1710F, G, L** (-55 to +125°C)

... the MC1710 and MC1710C are identical circuits specified over different temperature ranges. These devices are differential voltage comparators for use in level detection, low-level sensing, and memory applications. Features:

- Differential Input Characteristics:  
Input Offset Voltage = 1 mV  
Offset Voltage Drift = 3  $\mu$ V/°C
- Fast Response Time — 40 ns
- Low Output Impedance — 200 ohms
- Output Compatible with All Saturating Logic Forms —  
+3.2 V to -0.5 V typical

**F SUFFIX**  
CASE 606  
(Formerly Case 72)  
TO-91

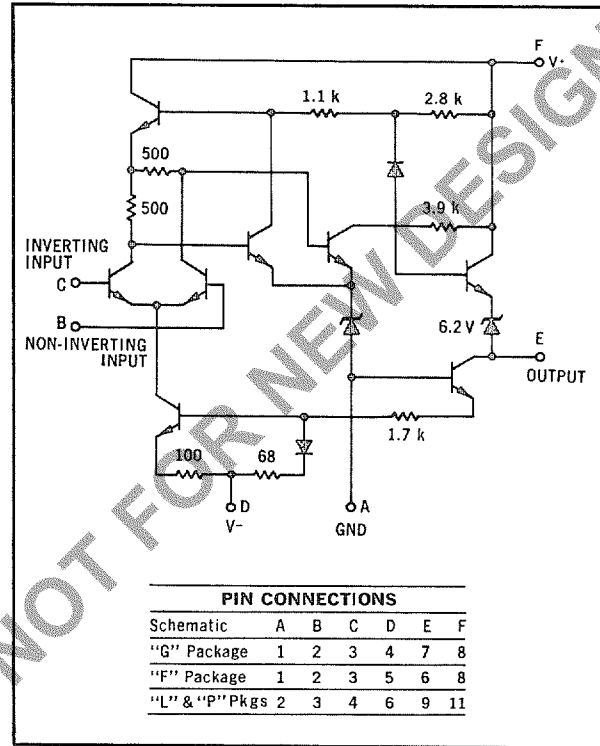


**G SUFFIX**  
CASE 601  
(Formerly Case 96)  
TO-99

**L SUFFIX**  
CERAMIC PACKAGE  
CASE 605C  
TO-116



**P SUFFIX**  
PLASTIC PACKAGE  
CASE 605  
(Formerly Case 93)  
TO-116



### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

| RATING                                    | SYMBOL            | VALUE       | UNIT  |
|-------------------------------------------|-------------------|-------------|-------|
| Power Supply Voltage                      | V+                | +14         | Vdc   |
|                                           | V-                | -7.0        | Vdc   |
| Differential Input Signal                 | V <sub>in</sub>   | ±5.0        | Volts |
| Common Mode Input Swing                   | CMV <sub>in</sub> | ±7.0        | Volts |
| Peak Load Current                         | I <sub>L</sub>    | 10          | mA    |
| Power Dissipation (Package Limitation)    | P <sub>D</sub>    |             |       |
| Metal Can                                 |                   | 680         | mW    |
| Derate above 25°C                         |                   | 4.6         | mW/°C |
| Flat Package                              |                   | 500         | mW    |
| Derate above 25°C                         |                   | 3.3         | mW/°C |
| Ceramic Dual In-Line Package              |                   | 600         | mW    |
| Derate above 25°C                         |                   | 4.8         | mW/°C |
| Plastic Package                           |                   | 400         | mW    |
| Derate above 25°C                         |                   | 3.3         | mW/°C |
| Operating Temperature Range MC1710C       | T <sub>A</sub>    | 0 to +75    | °C    |
| MC1710                                    |                   | -55 to +125 |       |
| Storage Temperature Range G, F, & L Pkgs. | T <sub>stg</sub>  | -65 to +150 | °C    |
| P Pkg.                                    |                   | -65 to +125 |       |

### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

| TYPE    | V+ (Vdc) | V- (Vdc) | V <sub>io</sub> (mV) | A <sub>VOL</sub> (V/V) | V <sub>OH</sub> (Vdc) | V <sub>OL</sub> (Vdc) | t <sub>r</sub> (ns) | CMV <sub>in</sub> (Vdc) | TCV <sub>io</sub> ( $\mu$ V/°C) |
|---------|----------|----------|----------------------|------------------------|-----------------------|-----------------------|---------------------|-------------------------|---------------------------------|
| MC1710  | +12      | -6.0     | 1.0                  | 1700                   | 3.2                   | -0.5                  | 40                  | ±5.0                    | 3.0                             |
| MC1710C | +12      | -6.0     | 1.5                  | 1500                   | 3.2                   | -0.5                  | 40                  | ±5.0                    | 5.0                             |

## SENSE AMPLIFIERS

### MC1441F,L,P (0 to +75°C) MC1541F,L (-55 to +125°C)

... consisting of a dual-channel gated sense amplifier with separate wideband differential input amplifiers. Either can be gated on from saturated logic levels. The sense amplifier features adjustable threshold, saturated logic output levels, and a strobe input that accommodates saturated logic levels. Designed to detect bipolar signals from either of two sense lines. Operates with core memory cycle times less than 0.5  $\mu$ s.

- Nominal Threshold — 17 mV
- Input Offset Voltage — 1.0 mV typical
- Propagation Delay
  - Input to Gate-Output — 20 ns
  - Input to Amplifier-Output — 10 ns
  - Gate Response Time — 15 ns
  - Strobe Response Time — 15 ns
- Common Mode Input Range — 1.5 Volts
- Differential Mode Input Range
  - With Gate On — 600 mV
  - With Gate Off — 1.5 Volts
- Power Dissipation — 140 mW typical

#### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

| RATING                                 | SYMBOL         | VALUE                      | UNIT       |
|----------------------------------------|----------------|----------------------------|------------|
| Power Supply Voltage                   | $V^+$<br>$V^-$ | +10<br>-10                 | Vdc<br>Vdc |
| Differential Input Signal              | $V_{in}$       | $\pm 5$                    | Vdc        |
| Common Mode Input Voltage              | $CMV_{in}$     | $\pm 5$                    | Vdc        |
| Load Current                           | $I_L$          | 25                         | mA         |
| Power Dissipation (Package Limitation) | $P_D$          |                            |            |
| Flat Package                           |                | 500                        | mW         |
| Derate above 25°C                      |                | 3.3                        | mW/°C      |
| Ceramic Dual In-Line Package           |                | 600                        | mW         |
| Derate above 25°C                      |                | 4.8                        | mW/°C      |
| Plastic Package                        |                | 415                        | mW         |
| Derate above 25°C                      |                | 3.3                        | mW/°C      |
| Operating Temperature Range            | $T_A$          | -55 to +125<br>0 to +75    | °C         |
| Storage Temperature Range              | $T_{stg}$      | -65 to +150<br>-55 to +125 | °C         |

#### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

| TYPE   | $V^+$<br>(Vdc) | $V^-$<br>(Vdc) | $V_{th}^*$<br>(mV) | $A_v$<br>(V/V) | $V_{OH}$<br>(Vdc) | $V_{OL}$<br>(mVdc) | $t_{pd}$<br>(ns) | $t_r$<br>(ns) | $CMV_{in}$<br>(Vpk) |
|--------|----------------|----------------|--------------------|----------------|-------------------|--------------------|------------------|---------------|---------------------|
| MC1541 | +5.0           | -5.0           | 17                 | 75             | 4.9               | 350                | 20               | 30            | $\pm 5.0$           |
| MC1441 | +5.0           | -5.0           | 17                 | 75             | 4.9               | 350                | 20               | 30            | $\pm 5.0$           |



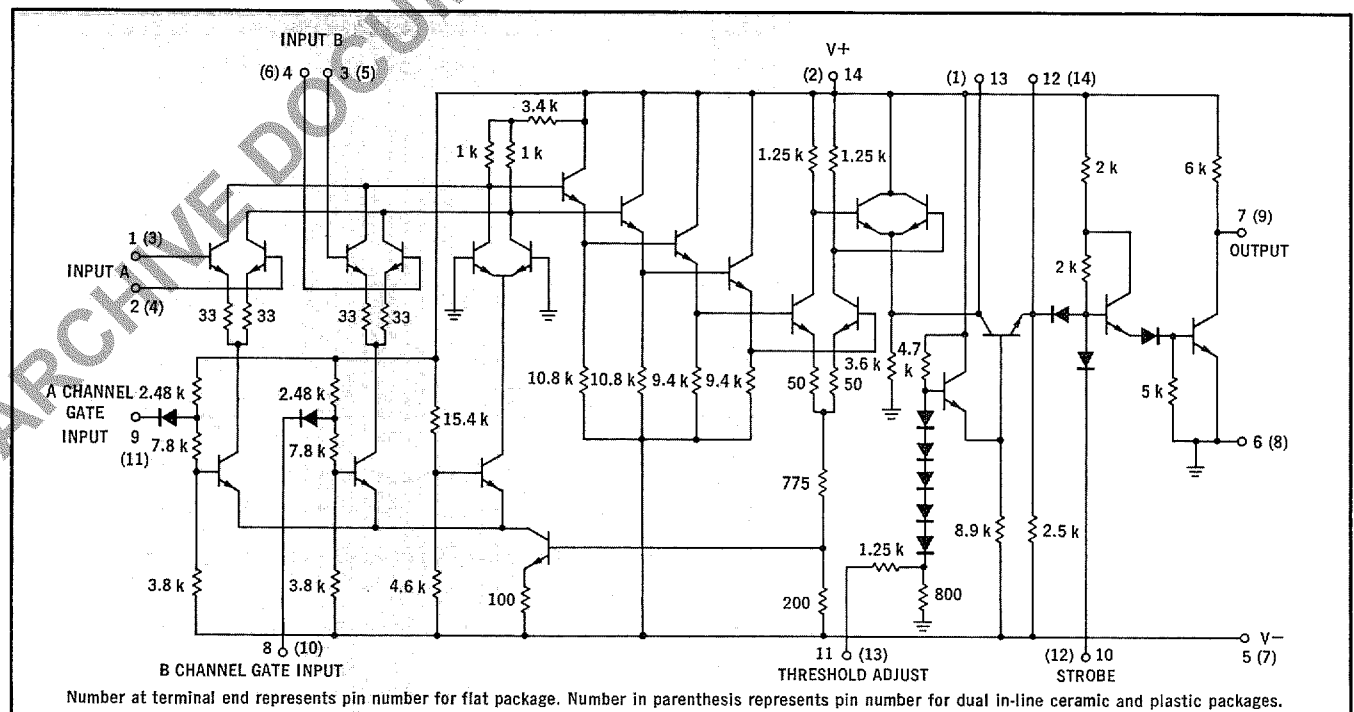
**F SUFFIX**  
CASE 607  
(Formerly Case 83)  
TO-86



**L SUFFIX**  
CERAMIC PACKAGE  
CASE 605C  
TO-116



**P SUFFIX**  
PLASTIC PACKAGE  
CASE 605  
(Formerly Case 93)  
TO-116



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