

## 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.

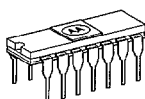
- Two Separate Outputs
- Strobe Capability
- High Output Sink Current — 2.8 mA min Each Comparator
- Differential Input Characteristics:  
Input Offset Voltage = 1.0 mV  
Offset Voltage Drift = 3.0  $\mu\text{V}/^\circ\text{C}$
- Short Propagation Delay Time — 40 ns
- Output Compatible with All Saturating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

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

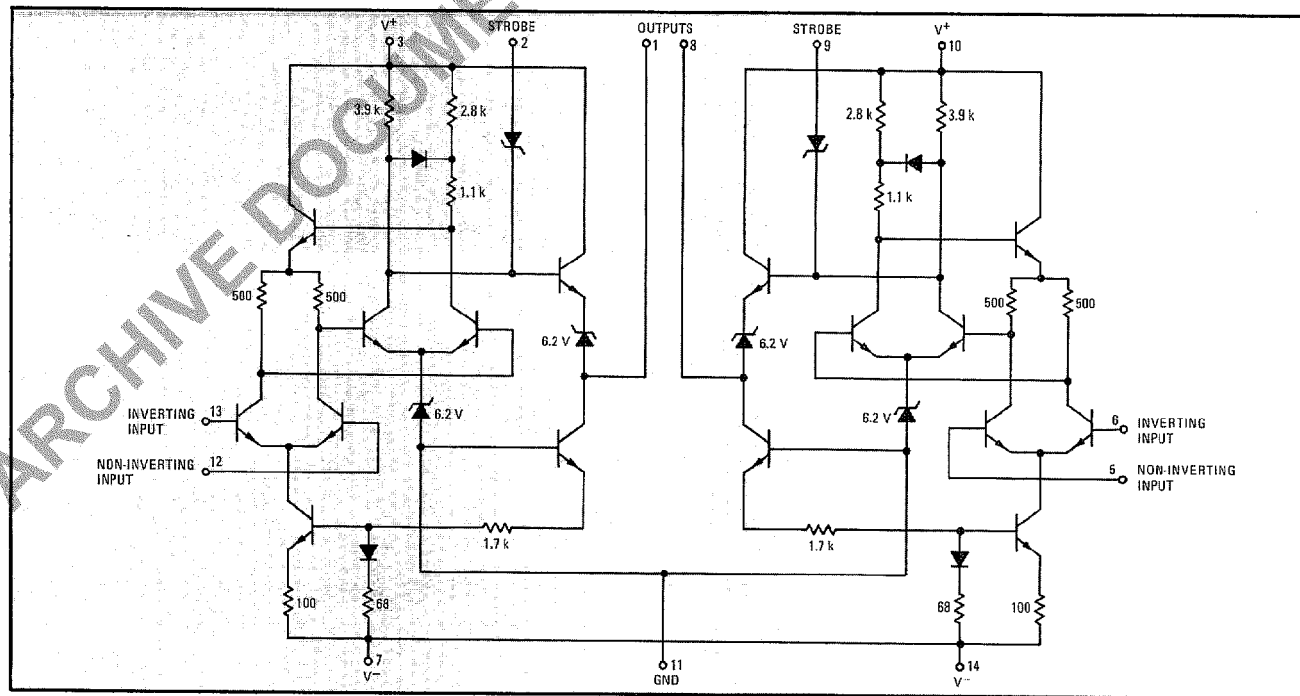
RATING	SYMBOL	VALUE	UNIT
Power Supply Voltage	$V^+$ $V^-$	+14 -7.0	Vdc
Differential Input Signal	$V_{\text{in}}$	$\pm 5.0$	Volts
Common Mode Input Swing	$\text{CMV}_{\text{in}}$	$\pm 7.0$	Volts
Peak Load Current	$I_L$	10	mA
Power Dissipation (package limitation) Ceramic Dual In-Line Package Derate above $T_A = 50^\circ\text{C}$	$P_D$	750 6.0	mW mW/ $^\circ\text{C}$
Operating Temperature Range	MC1414 MC1514 $T_A$	0 to +75 -55 to +125	$^\circ\text{C}$
Shortage Temperature Range	$T_{\text{stg}}$	-65 to +150	$^\circ\text{C}$

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

TYPE	$V^+$ (Vdc)	$V^-$ (Vdc)	$V_{\text{io}}$ (mV)	$A_{\text{VOL}}$ (V/V)	$V_{\text{OH}}$ (Vdc)	$V_{\text{OL}}$ (Vdc)	$t_{\text{pd}}$ (ns)	$\text{CMV}_{\text{in}}$ (Vdc)	$\text{TCV}_{\text{io}}$ ( $\mu\text{V}/^\circ\text{C}$ )
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



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



MOTOROLA Semiconductor Products Inc.

# 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

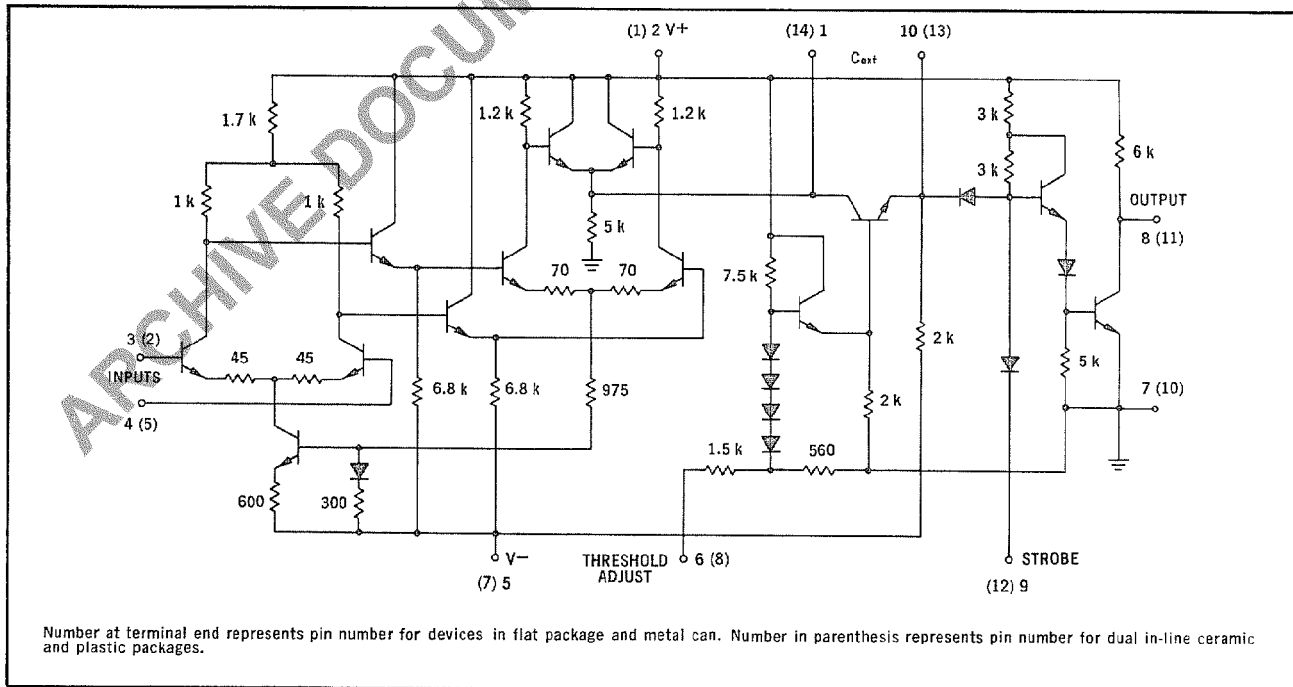
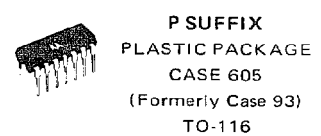
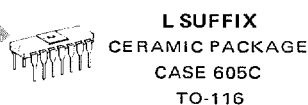
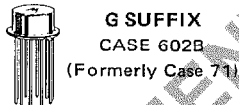
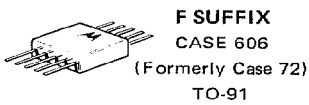
### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ UNLESS OTHERWISE NOTED)

RATING	SYMBOL	VALUE	UNIT
Power Supply Voltage	$V^+$ $V^-$	+10 -10	Vdc 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	MC1440G, F, P, L MC1540F MC1540G, L	$T_A$	
		0 to +75 -55 to +100 -55 to +125	°C
Storage Temperature Range		$T_{stg}$	-65 to +150
			°C

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

TYPE	$V^+$ (Vdc)	$V^-$ (Vdc)	$V_{in}^*$ (mV)	$A_V$ (V/V)	$V_{OH}$ (Vdc)	$V_{OL}$ (Vdc)	$t_{pd}$ (ns)	$t_r$ (ns)	$CMV_{in}$ (Vpk)	$TCV_{th}$ ( $\mu$ 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.



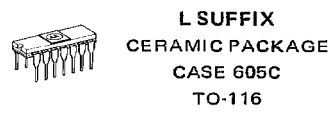
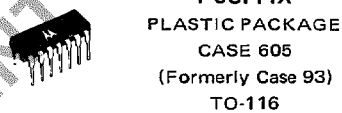
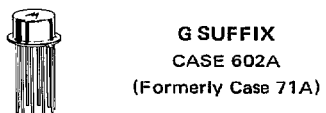
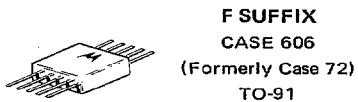
# DUAL SENSE AMPLIFIERS

## 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

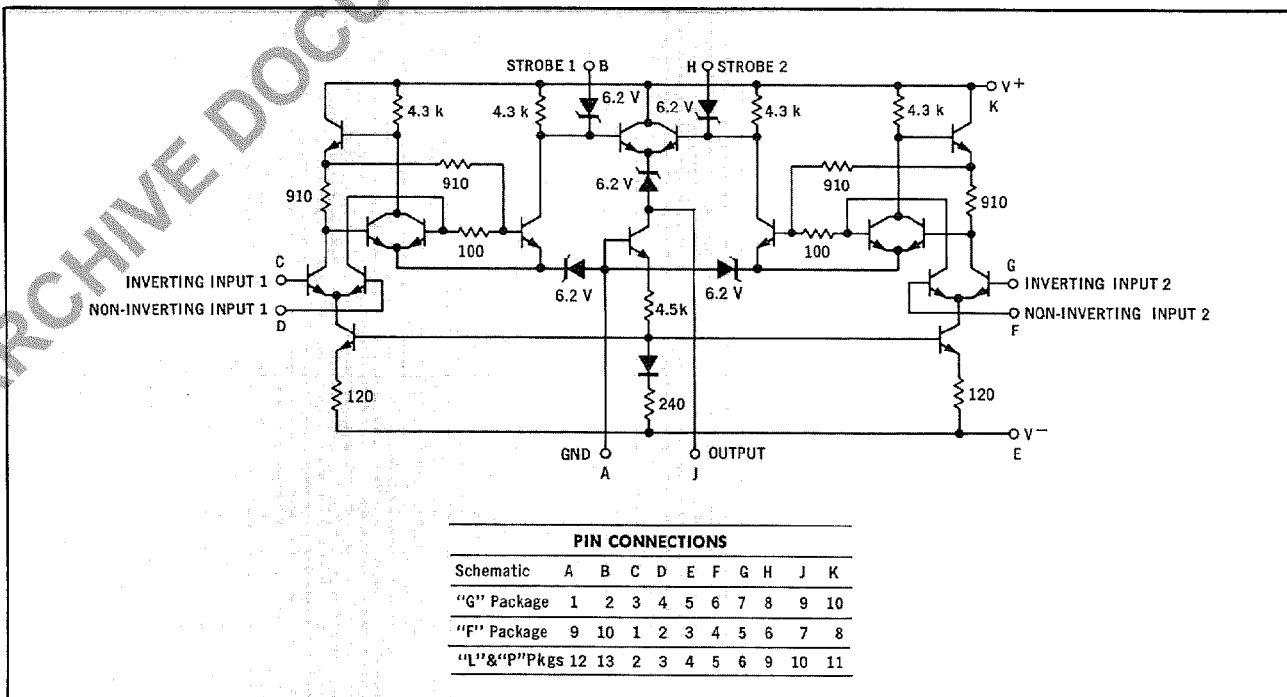


### MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

RATING	SYMBOL	VALUE	UNIT
Power Supply Voltage	V+ V-	+14 -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>	50	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		650	mW
Derate above 25°C		5.0	mW/°C
Plastic Package		400	mW
Derate above 25°C		3.3	mW/°C
Operating Temperature Range MC1711C MC1711	T <sub>A</sub>	0 to +75 -55 to +125	°C
Storage Temperature Range G,F,&L Pkgs. P Pkg.	T <sub>stg</sub>	-65 to +150 -65 to +125	°C

### 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> (V <sub>pi</sub> )	TCV <sub>io</sub> ( $\mu\text{V}/^\circ\text{C}$ )
MC1711	+12	-6.0	1.0	1500	3.2	-0.5	40	±5.0	5.0
MC1711C	+12	-6.0	1.0	1500	3.2	-0.5	40	±5.0	5.0



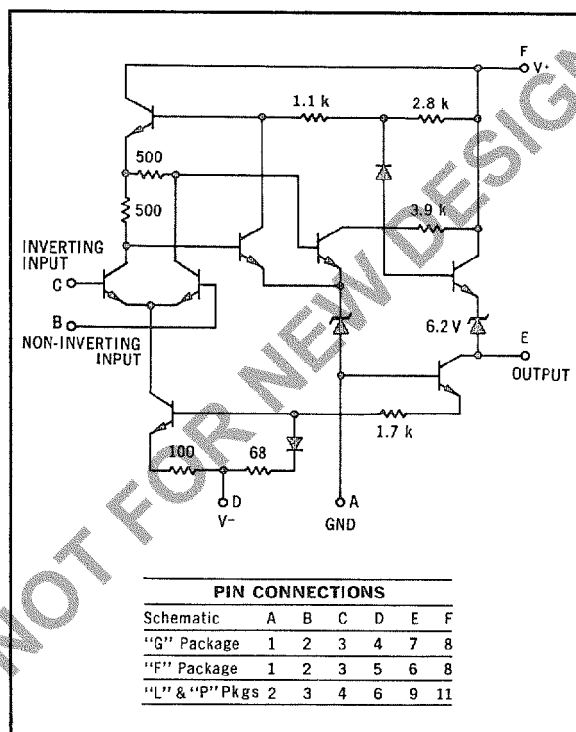
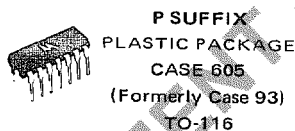
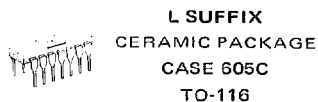
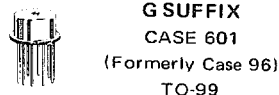
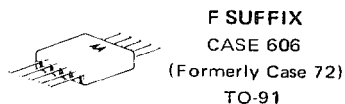
## SENSE AMPLIFIERS

**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



### 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 <sup>+</sup> V <sup>-</sup>	+10 -10	Vdc Vdc
Differential Input Signal	V <sub>in</sub>	±5	Vdc
Common Mode Input Voltage	CMV <sub>in</sub>	±5	Vdc
Load Current	I <sub>L</sub>	25	mA
Power Dissipation (Package Limitation)	P <sub>o</sub>		mW
Flat Package		500	mW/°C
Derate above 25°C		3.3	mW/°C
Ceramic Dual In-Line Package		600	mW/°C
Derate above 25°C		4.8	mW/°C
Plastic Package		415	mW/°C
Derate above 25°C		3.3	mW/°C
Operating Temperature Range	T <sub>A</sub>		°C
MC1541F, MC1541L		-55 to +125	
MC1441F, MC1441L, MC1441P		0 to +75	
Storage Temperature Range	T <sub>stg</sub>		°C
Ceramic Packages		-65 to +150	
Plastic Package		-55 to +125	

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

TYPE	V <sub>+</sub> (Vdc)	V <sub>-</sub> (Vdc)	V <sub>TH</sub> <sup>†</sup> (mV)	A <sub>V</sub> (V/V)	V <sub>OH</sub> (Vdc)	V <sub>OL</sub> (mVdc)	t <sub>pd</sub> (ns)	t <sub>r</sub> (ns)	CMV <sub>in</sub> (Vpk)
MC1541	+5.0	-5.0	17	75	4.9	350	20	30	±5.0
MC1441	+5.0	-5.0	17	75	4.9	350	20	30	±5.0



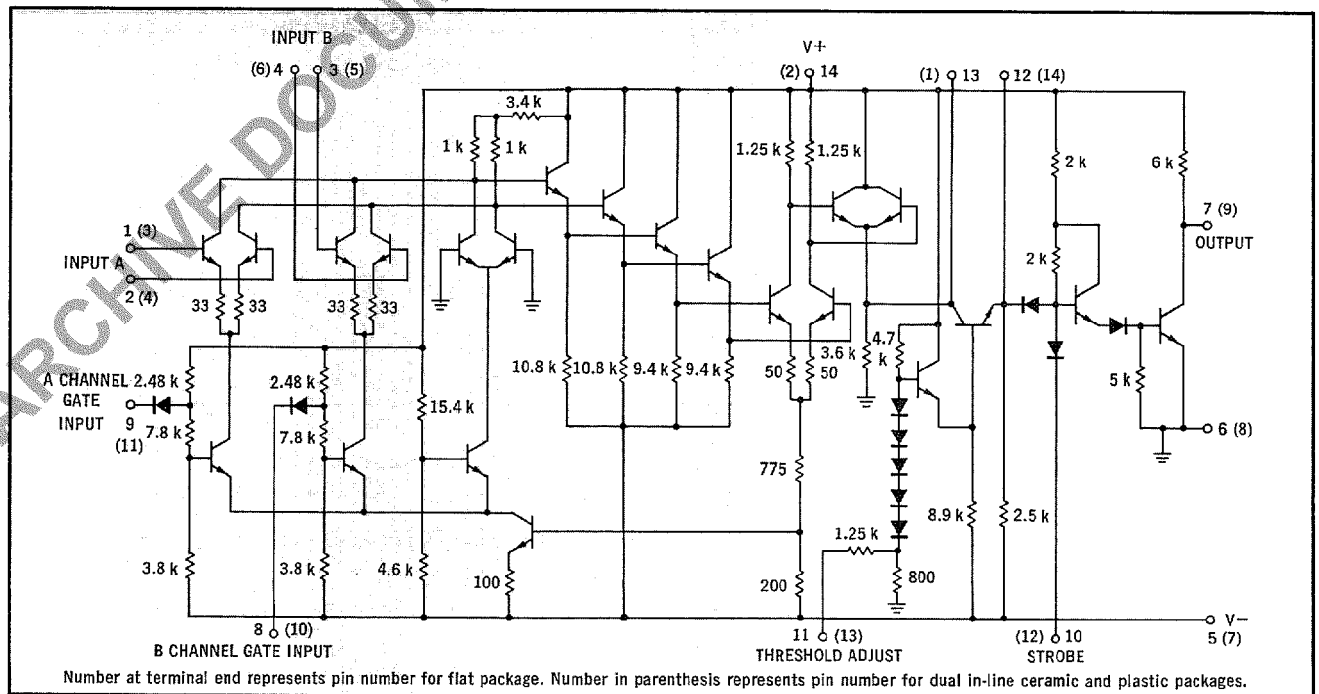
**F SUFFIX**  
CASE 607  
(Formerly Case 83)  
TO-86



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



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



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