ORDERING INFORMATION

Device	Temperature Range	Package
MC1440G	0°C to +75°C	Metal Can
MC1440L	0°C to +75°C	Ceramic DIP
MC1540G	−55°C to +125°C	Metal Can
MC1540L	−55°C to +125°C	Ceramic DIP

MC1440
MC1540

CORE MEMORY SENSE AMPLIFIER

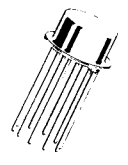
SILICON MONOLITHIC INTEGRATED CIRCUIT

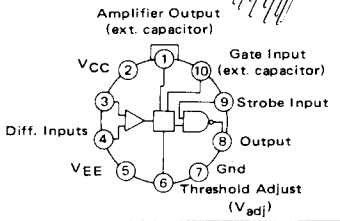
SENSE AMPLIFIER

. . . consisting of a wideband differential amplifier, a dc restoration circuit which also incorporates facilities to externally adjust the threshold, and an MDTL 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 μs.

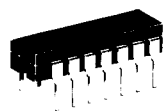
- Differential Threshold Characteristics:
  - Adjustable Threshold — 10-25 mV
  - Nominal Threshold — 17 mV @ V_{adj} = 6.0 V
  - Input Offset Voltage — 1.0 mV typical
  - Threshold Drift — -10 μV/°C typical
- Fast Response Time — 20 ns typical
- Short Recovery Time :
  - 50 ns max @ V_i = 1.8 V Common Mode
  - 50 ns max @ V_o = 400 mV Differential Mode

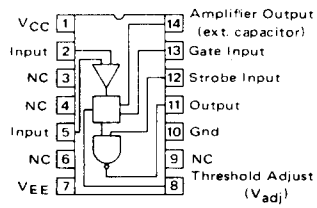
G SUFFIX
CASE 603B



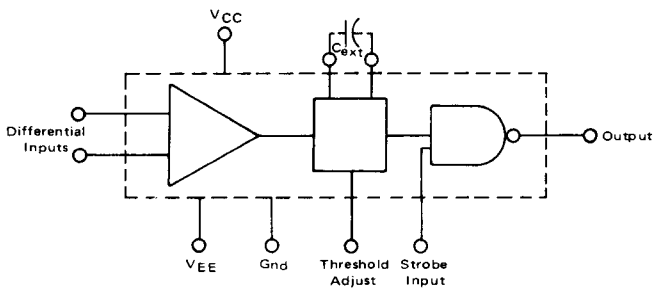


L SUFFIX
CERAMIC PACKAGE
CASE 632
TO-116

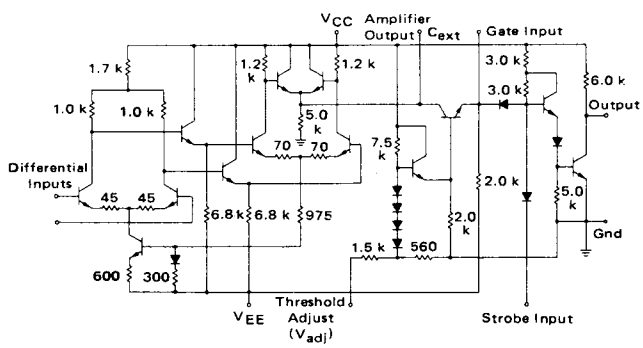




MC1540/MC1440 BLOCK DIAGRAM



REPRESENTATIVE CIRCUIT SCHEMATIC



MAXIMUM RATINGS (T_A = 25°C unless otherwise noted.)

Rating	Symbol	Value	Unit
Power Supply Voltages	V_{CC} V_{EE}	+10 -10	Vdc
Differential Input Voltage Range	V_{IDR}	±5.0	Vdc
Common-Mode Input Voltage Range	V_{ICR}	±5.0	Vdc
Output Load Current	I_L	25	mA
Power Dissipation (Package Limitation) Metal Can Derate above 25°C Flat Package Derate above 25°C Plastic and Ceramic DIP Derate above 25°C	P_D	 680 4.6 500 3.3 625 5.0	 mW mW/°C mW mW/°C mW mW/°C
Operating Ambient Temperature Range MC1540 MC1440	T_A	 0 to 75 -55 to 125	 °C °C
Storage Temperature Range	T_{stg}	-65 to 150	°C

ELECTRICAL CHARACTERISTICS (Unless otherwise noted, T_A = 25°C, V_{CC} = +6.0 Vdc ±1.0%, V_{EE} = -6.0 Vdc ±1% and C_{ext} = 0.01 μF)

Characteristic	Symbol	MC1540 Min	MC1540 Typ	MC1540 Max	MC1440 Min	MC1440 Typ	MC1440 Max	Unit
Input Threshold Voltage (V_{adj} = -6.0 V, T_A = 25°C) (V_{adj} = -6.0 V, T_A = T_{low}*) (V_{adj} = -6.0 V, T_A = T_{high}*)	V_{th}	 14 12 12	 17 17 17	 20 24 22	 12 10 10	 17 17 17	 24 30 30	mV
Input Offset Voltage	V_{IO}	–	1.0	5.0	–	1.0	6.0	mV
Input Bias Current (T_A = 25°C) (T_A = T_{high} to T_{low})	I_{IB}	 – –	 7.5 –	 50 100	 – –	 7.5 –	 75 100	μA
Input Offset Current	I_{IO}	–	2.0	10	–	2.0	15	μA
Output Voltage– High Logic State	V_{OH}	5.9	–	–	5.8	–	–	Vdc
Output Voltage – Low Logic State (I_{OL} = 6.0 mA, $V_{IH(G)}$ = 6.0 V) (T_A = T_{high})	V_{OL}	 – –	 – –	 350 400	 – –	 – –	 400 450	mV
Amplifier Voltage Gain (V_i = 15 mV peak)	A_v	–	85	–	–	85	–	V/V
Strobe Input Current – Low Logic State ($V_{IL(S)}$ = 0 V)	$I_{IL(S)}$	–	–	1.2	–	–	1.5	mA
Strobe Input Current – High Logic State ($V_{IH(S)}$ = 5.0 V) ($V_{IH(S)}$ = 6.0 V, T_A = T_{high})	$I_{IH(S)}$	 – –	 – –	 2.0 25	 – –	 – –	 5.0 30	μA
Power Consumption	P_C	–	120	180	–	120	250	mW

*T_{low} = -55°C for MC1540, 0°C for MC1440
T_{high} = 125°C for MC1540, 75°C for MC1440

SWITCHING CHARACTERISTICS (Unless otherwise noted, V_{CC} = 6.0 V, V_{EE} = -6.0 V, T_A = 25°C, C_{ext} = 0.01 μF.)

Characteristic	Symbol	MC1540 Min	MC1540 Typ	MC1540 Max	MC1440 Min	MC1440 Typ	MC1440 Max	Unit
Propagation Delay Time from Differential Input to Amplifier Output	$t_{PLH(A)}$	–	10	15	–	10	20	ns
Propagation Delay Time from Differential Input to Low Logic State Output	$t_{PHL(A)}$	–	20	30	–	20	50	ns
Propagation Delay Time from Strobe Input to Low Logic State Output	$t_{PHL(S)}$	–	10	15	–	10	30	ns
Differential Mode Recovery Time	$t_{R(DM)}$	–	20	50	–	20	90	ns
Common-Mode Recovery Time	$t_{R(CM)}$	–	20	50	–	20	60	ns

FIGURE 1 – THRESHOLD VOLTAGE TEST CIRCUIT AND WAVEFORMS

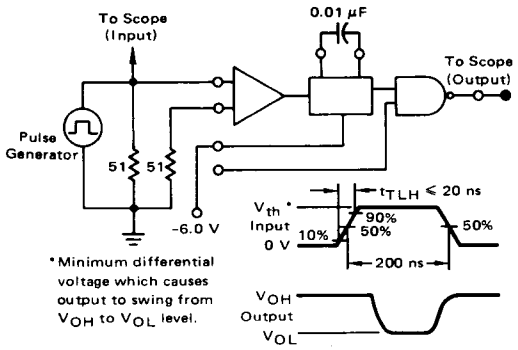


FIGURE 2 – AMPLIFIER VOLTAGE GAIN TEST CIRCUIT AND WAVEFORMS

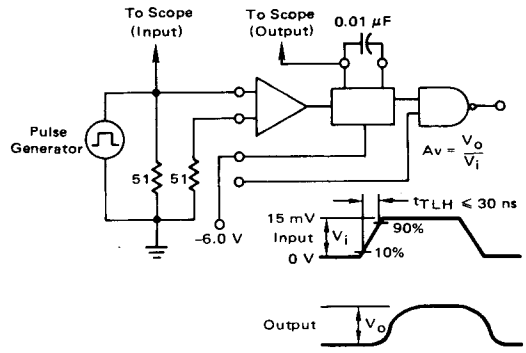


FIGURE 3 – TEST CIRCUIT AND WAVEFORMS FOR PROPAGATION DELAY TIMES FROM DIFFERENTIAL INPUTS TO AMPLIFIER AND GATE OUTPUTS

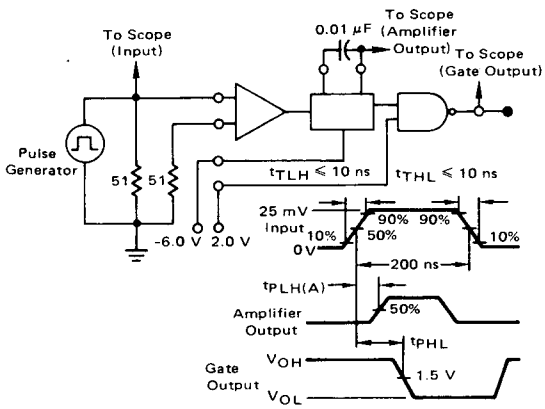


FIGURE 4 – TEST CIRCUIT AND WAVEFORMS FOR PROPAGATION DELAY TIME FROM STROBE INPUT TO OUTPUT

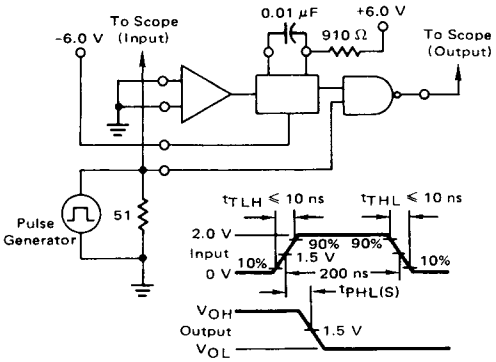


FIGURE 5 – TEST CIRCUIT AND WAVEFORMS FOR DIFFERENTIAL MODE RECOVERY TIME

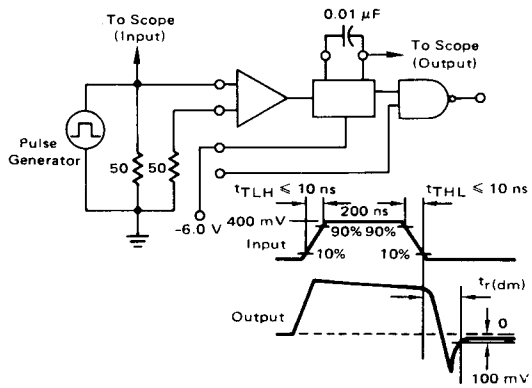
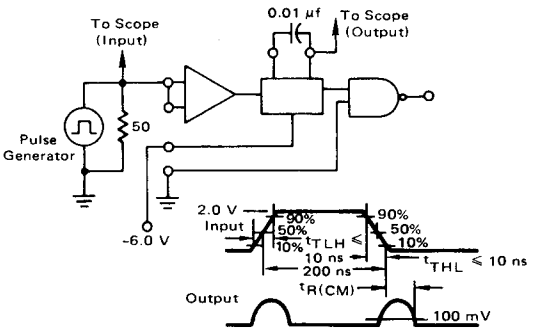


FIGURE 6 – TEST CIRCUIT AND WAVEFORMS FOR COMMON-MODE RECOVERY TIME



NOTE: The output shown is representative of that obtained, however, the two pulse amplitudes may not be equal or even present. Input Pulse width equals 200 ns, f = 1.0 MHz.

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