SLLS012B – FEBRUARY 1986 – REVISED FEBRUARY 1993

- **Four Independent Receivers With Common Enable Input**
- **High Input Sensitivity . . . 25 mV Max**
- **High Input Impedance**
- **MC3450 and MC3550 Have 3-State Outputs**
- **MC3452 Has Open-Collector Outputs**
- **Glitch-Free Power-Up/Power-Down Operation**

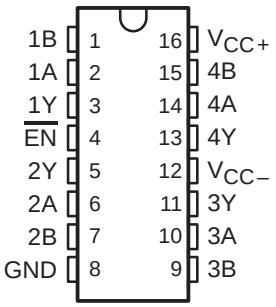
description

The MC3450, MC3550, MC3452, and MC3552 are quad differential line receivers designed for use in balanced and unbalanced digital data transmission. The MC34/3550 and MC34/3552 are the same except that the MC3450 and MC3550 have 3-state outputs whereas the MC3452 and MC3552 have open-collector outputs, which permit the wire-AND function with similar output devices. The 3-state and open-collector outputs permit connection directly to a bus-organized system.

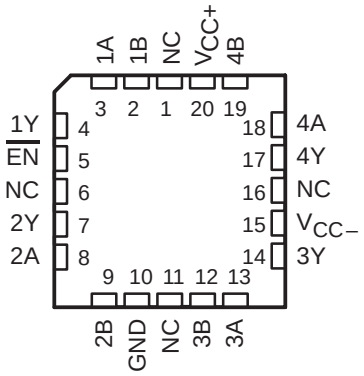
The MC3450, MC3550, MC3452, and MC3550 are designed for optimum performance when used with either the MC3453 or MC3553 quad differential line driver or SN75109A, SN75110A, and SN75112 dual differential drivers.

The MC3450 and MC3452 are characterized for operation from 0°C to 70°C. The MC3550 and MC3552 are characterized for operation over the full military temperature range of −55°C to 125°C.

MC3450, MC3452 . . . D OR N PACKAGE
MC3550, MC3552 . . . J PACKAGE
(TOP VIEW)



MC3550, MC3552 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

THE MC3452 IS NOT RECOMMENDED FOR NEW DESIGN

FUNCTION TABLE

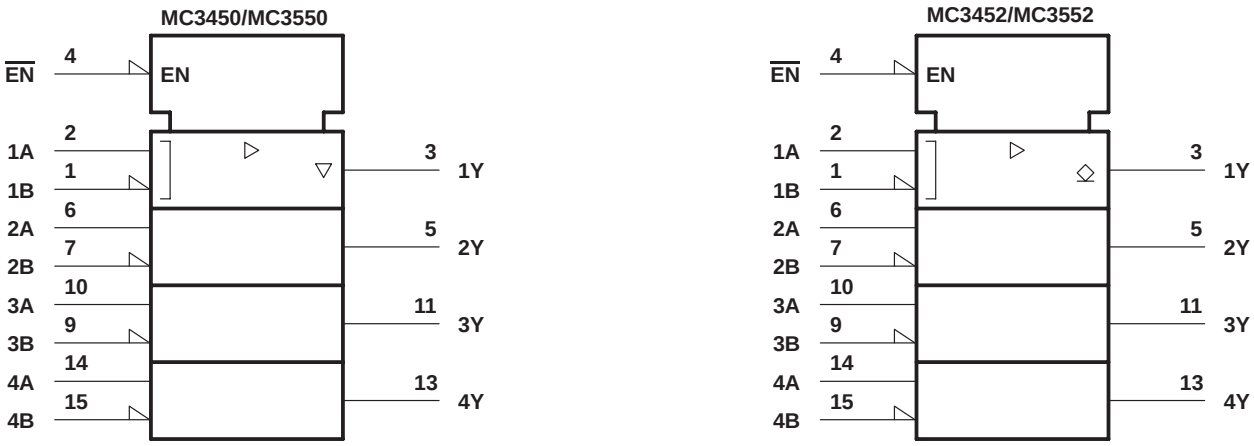
DIFFERENTIAL INPUTS A – B	ENABLE $\overline{EN}$	OUTPUT Y
$V_{ID} \geq 25$ mV	L	H
-25 mV $< V_{ID} < 25$ mV	L	?
$V_{ID} \leq 25$ mV	L	L
X	H	Z

H = high level, L = low level, ? = indeterminate,
X = impedance (off)

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

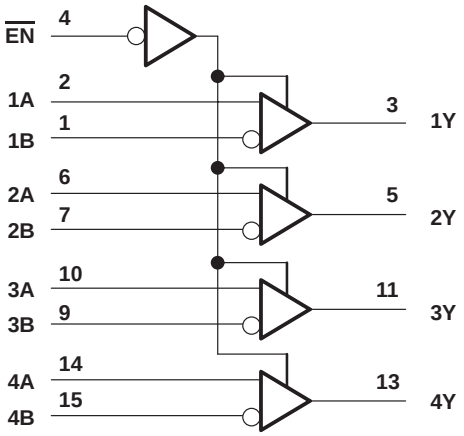
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logic symbols†

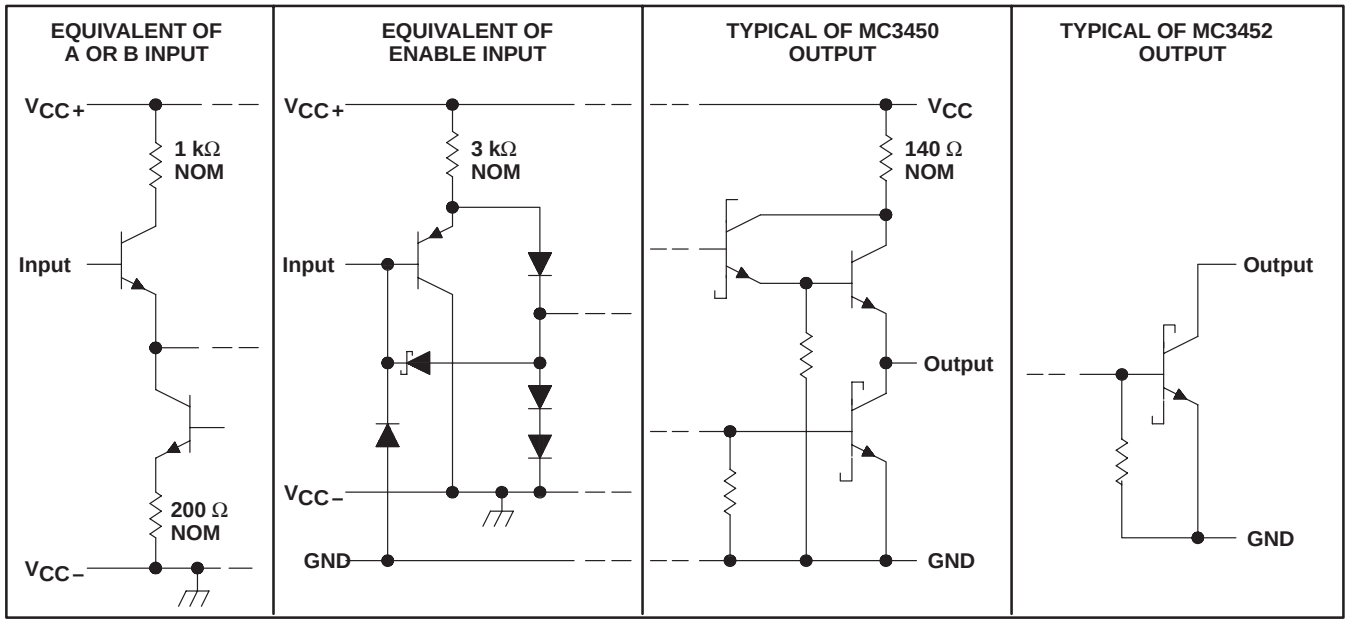


† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



schematics of inputs and outputs



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC+} (see Note 1) . . . . . 7 V
Supply voltage, V_{CC-} . . . . . –7 V
Differential input voltage (see Note 2) . . . . . ±6 V
Common-mode input voltage (see Note 3) . . . . . ±5 V
Enable input voltage . . . . . 5.5 V
Continuous total dissipation . . . . . See Dissipation Rating Table
Operating free-air temperature range . . . . . 0°C to 70°C
Storage temperature range . . . . . –65°C to 150°C
Case temperature for 60 seconds: FK package . . . . . 260°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: D or N package . . . . . 260°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: J package . . . . . 300°C

NOTES: 1. All voltage values, except differential input voltage, are with respect to network ground terminal.
2. Differential input voltage is measured at the noninverting input with respect to the corresponding inverting input.
3. Common-mode input voltage is the average of the voltages at the A and B inputs.

DISSIPATION RATING TABLE

PACKAGE	$T_A \le 25°C$ POWER RATING	OPERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING	$T_A = 125°C$ POWER RATING
D	950 mW	7.6 mW/°C	608 mW	—
FK	1375 mW	11.0 mW/°C	880 mW	275 mW
J	1375 mW	11.0 mW/°C	880 mW	275 mW
N	1150 mW	9.2 mW/°C	736 mW	—

recommended operating conditions

		MIN	NOM	MAX	UNIT
Supply voltage, V_{CC+}	$T_A \geq 25°C$	4.5	5	5.5	V
	$T_A < 25°C$	4.75	5	5.5	
Supply voltage, V_{CC-}	$T_A \geq 25°C$	−4.5	−5	−5.5	V
	$T_A < 25°C$	−4.75	−5	−5.5	
High-level enable input voltage, V_{IH}		2			V
Low-level enable input voltage, V_{IL}				0.8	V
Low-level output current, I_{OL}				−16	mA
Differential input voltage, V_{ID} (see Note 4)		−5†		5	V
Common-mode input voltage, V_{IC} (see Note 4)		−3†		3	V
Input voltage range, any different input to GND		−5†		3	V
Operating free-air temperature, T_A	MC3450, MC3452	0		70	°C
	MC3550, MC3552	−55		125	

† The algebraic convention, in which the less positive (more negative) limit is designated minimum, is used in this data sheet for common-mode input voltage.

NOTE 4: The recommended combinations of input voltages fall within the shaded area of Figure 1.

RECOMMENDED COMBINATIONS OF INPUT VOLTAGES

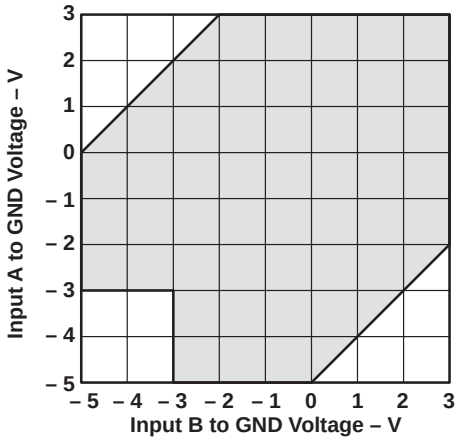


Figure 1

electrical characteristics over recommended operating free-air temperature range, $V_{CC\pm}$ = MAX (unless otherwise noted)

PARAMETER			TEST CONDITIONS	MC3450, MC3550			MC3452, MC3552			UNIT
				MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{OH}	High-level output voltage		$V_{CC\pm}$ = ±4.75 V, V_{ID} = 25 mV, $\overline{EN}$ at 0.8 V, I_{OH} = –400 µA, V_{IC} = –3 V to 3 V	2.4						V
V_{OL}	Low-level output voltage		$V_{CC\pm}$ = ±4.75 V, V_{ID} = –25 mV, $\overline{EN}$ at 2 V, I_{OL} = 16 mA, V_{IC} = –3 V to 3 V			0.5			0.5	V
I_{OH}	High-level output current		$V_{CC\pm}$ = ±4.75 V, V_{OH} = 5.25 V						250	µA
I_{IH}	High-level input current	A inputs	V_{ID} = –2 V		30	75		30	75	µA
		B inputs	V_{ID} = –2 V		30	75		30	75	
		$\overline{EN}$	V_{IH} = 2.4 V			40			40	µA
			V_{IH} = 5.25 V			1			1	mA
I_{IL}	Low-level input current	A inputs	V_{ID} = 2 V			–10			–10	µA
		B inputs	V_{ID} = 2 V			–10			–10	
		$\overline{EN}$	V_{IL} = 0.4 V			–1.6			–1.6	mA
I_{OZ}	High-impedance state output current		V_O = 2.4 V			40				µA
			V_O = 0.4 V			–40				
I_{OS}	Short-circuit output current‡		V_{ID} = 25 mV, V_O = 0, $\overline{EN}$ at 0.8 V	–18		–70				mA
I_{CCH+}	Supply current from V_{CC+}, outputs high		A inputs at GND, B inputs at 3 V, $\overline{EN}$ at 3 V			60			60	mA
I_{CCH-}	Supply current from V_{CC-}, outputs high					–30			–30	mA

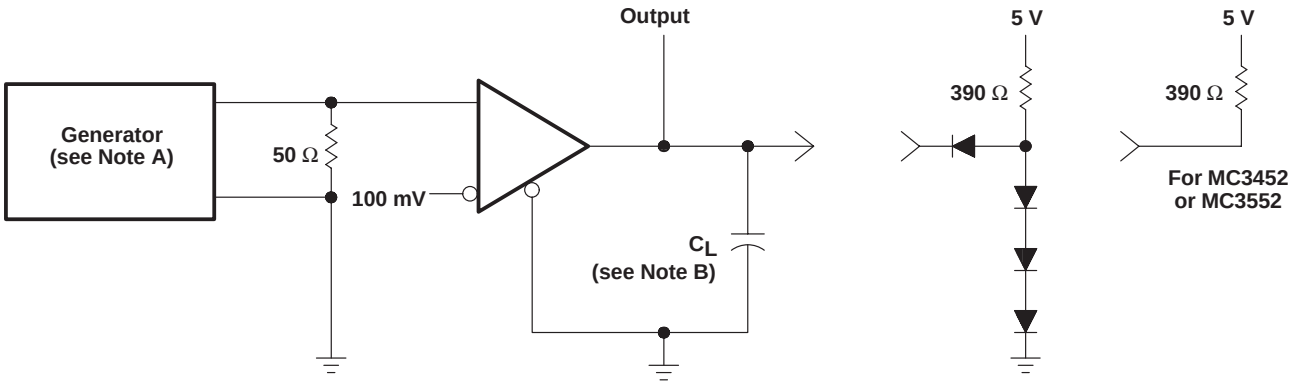
† All typical values are at V_{CC+} = 5 V, V_{CC-} = –5 V, T_A = 25°C.
‡ Not more than one output should be shorted at a time.

switching characteristics, $V_{CC\pm}$ = ±5 V, T_A = 25°C

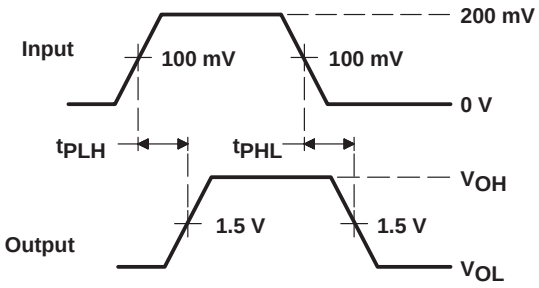
PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MC3450, MC3550			MC3452, MC3552			UNIT
				MIN	TYP†	MAX	MIN	TYP†	MAX	
t_{PLH}	A and B	Y	C_L = 50 pF, See Figure 2		17	25				ns
			C_L = 15 pF, See Figure 2					19	25	
t_{PHL}	A and B	Y	C_L = 50 pF, See Figure 2		17	25				ns
			C_L = 15 pF, See Figure 2					19	25	
t_{PZH}	$\overline{EN}$	Y	C_L = 50 pF, See Figure 2			21				ns
t_{PZL}	$\overline{EN}$	Y				27				
t_{PHZ}	$\overline{EN}$	Y	C_L = 15 pF, See Figure 3			18				ns
t_{PLZ}	$\overline{EN}$	Y				29				
t_{PLH}	$\overline{EN}$	Y	C_L = 15 pF, See Figure 4						25	ns
t_{PHL}	$\overline{EN}$	Y	C_L = 15 pF, See Figure 4						25	ns

† All typical values are at V_{CC+} = 5 V, V_{CC-} = –5 V, T_A = 25°C.

PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT



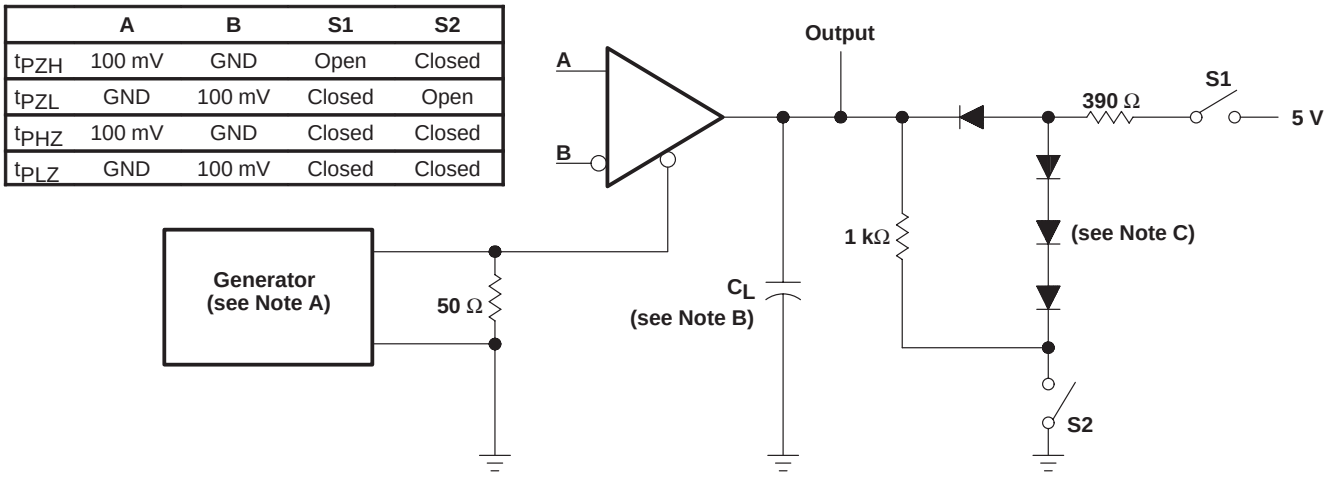
VOLTAGE WAVEFORMS

NOTES: A. The input pulse is supplied by a generator having the following characteristics: PRR ≤ 1 MHz, duty cycle = 50%, t_r ≤ 6 ns, t_f ≤ 6 ns.
B. C_L includes probe and jig capacitance.
C. All diodes are 1N916 or equivalent.

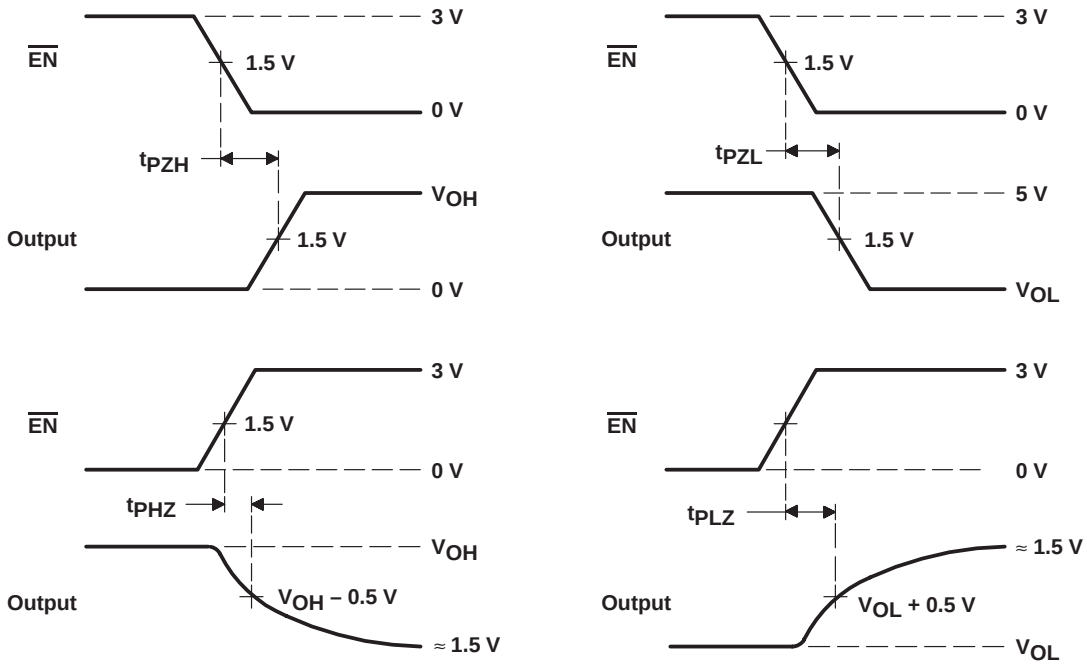
Figure 2. Test Circuit and Voltage Waveforms

PARAMETER MEASUREMENT INFORMATION

	A	B	S1	S2
t_{PZH}	100 mV	GND	Open	Closed
t_{PZL}	GND	100 mV	Closed	Open
t_{PHZ}	100 mV	GND	Closed	Closed
t_{PLZ}	GND	100 mV	Closed	Closed



TEST CIRCUIT

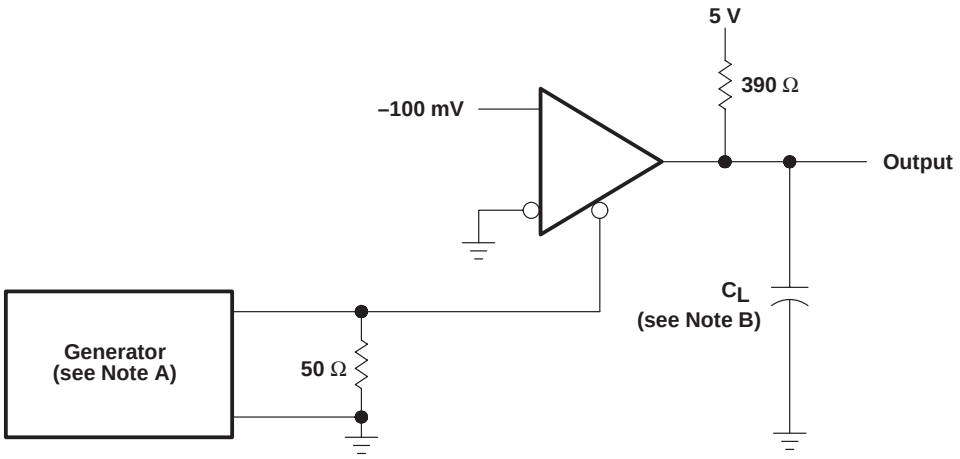


VOLTAGE WAVEFORMS

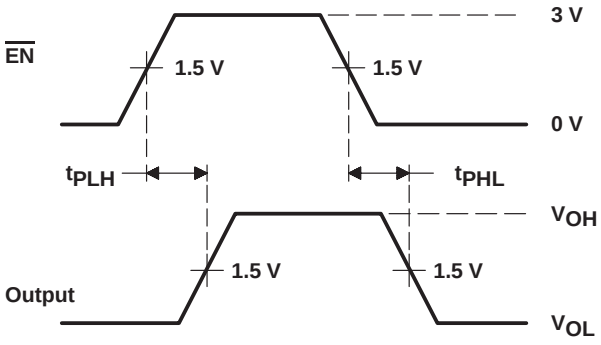
NOTES: A. The input pulse is supplied by a generator having the following characteristics: PRR ≤ 1 MHz, duty cycle = 50%, t_r ≤ 6 ns, t_f ≤ 6 ns.
B. C_L includes probe and jig capacitance.
C. All diodes are 1N916 or equivalent.

Figure 3. MC3450 and MC3550 Test Circuit and Voltage Waveforms

PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT



VOLTAGE WAVEFORMS

NOTES: A. The input pulse is supplied by a generator having the following characteristics: PRR ≤1 MHz, duty cycle = 50%, t_r ≤ 6 ns, t_f ≤ 6 ns.
B. C_L includes probe and jig capacitance.

Figure 4. MC3452 and MC3552 Test Circuit and Voltage Waveforms

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