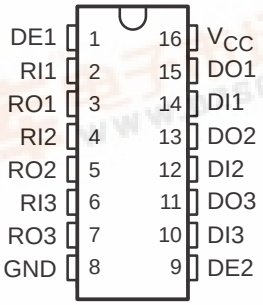
SN751730
TRIPLE LINE DRIVER/RECEIVER

SLLS062C – MAY 1990 – REVISED MAY 1995

- **Meets or Exceeds the Requirements of IBM™ 360/370 Input/Output Interface Specification for 4.5 Mb/s Operation**
- **Single 5-V Supply**
- **Uncommited Emmitter-Follower Output Structure for Party-Line Operation**
- **Driver Output Short-Circuit Protection**
- **Driver Input/Receiver Output Compatible With TTL**
- **Receiver Input Resistance . . . 7.4 kΩ to 20 kΩ**
- **Ratio Specification for Propagation Delay Time, Low-to-High/High-to-Low**

D OR N PACKAGE
(TOP VIEW)



description

The SN751730 triple line driver/receiver is specifically designed to meet the input/output interface specifications for IBM System 360/370. It is also compatible with standard TTL logic and supply voltage levels.

The low-impedance emitter-follower driver outputs of the SN751730 drive terminated lines such as coaxial cable or twisted pair. Having the outputs uncommitted allows wired-OR logic to be performed in party-line applications. Output short-circuit protection is provided by an internal clamping network that turns on when the output voltage drops below approximately 2.5 V.

An open line affects the receiver input as does a low-level input voltage.

All the driver inputs and receiver outputs are in conventional TTL configuration and the gating can be used during power-up and power-down sequences to ensure that no noise is introduced to the line by pulling either DE1 or DE2 to a low level.

Function Tables

EACH DRIVER

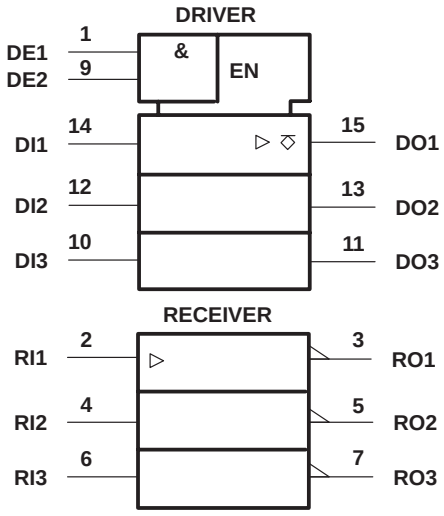
INPUTS			OUTPUT
DI	DE1	DE2	DO
L	X	X	L
X	L	X	L
X	X	L	L
H	H	H	H

EACH DRIVER

INPUT	OUTPUT
RI	RO
L	H
H	L
Open	H

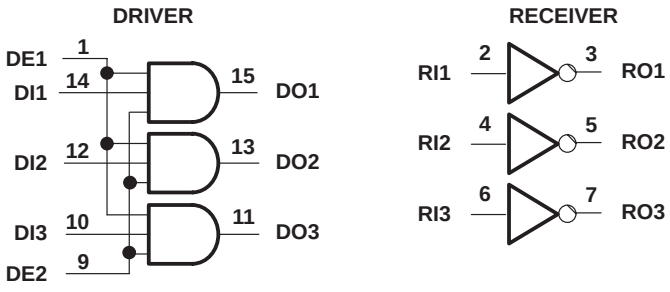
H = high level, L = low level,
X = irrelevant

logic symbols†

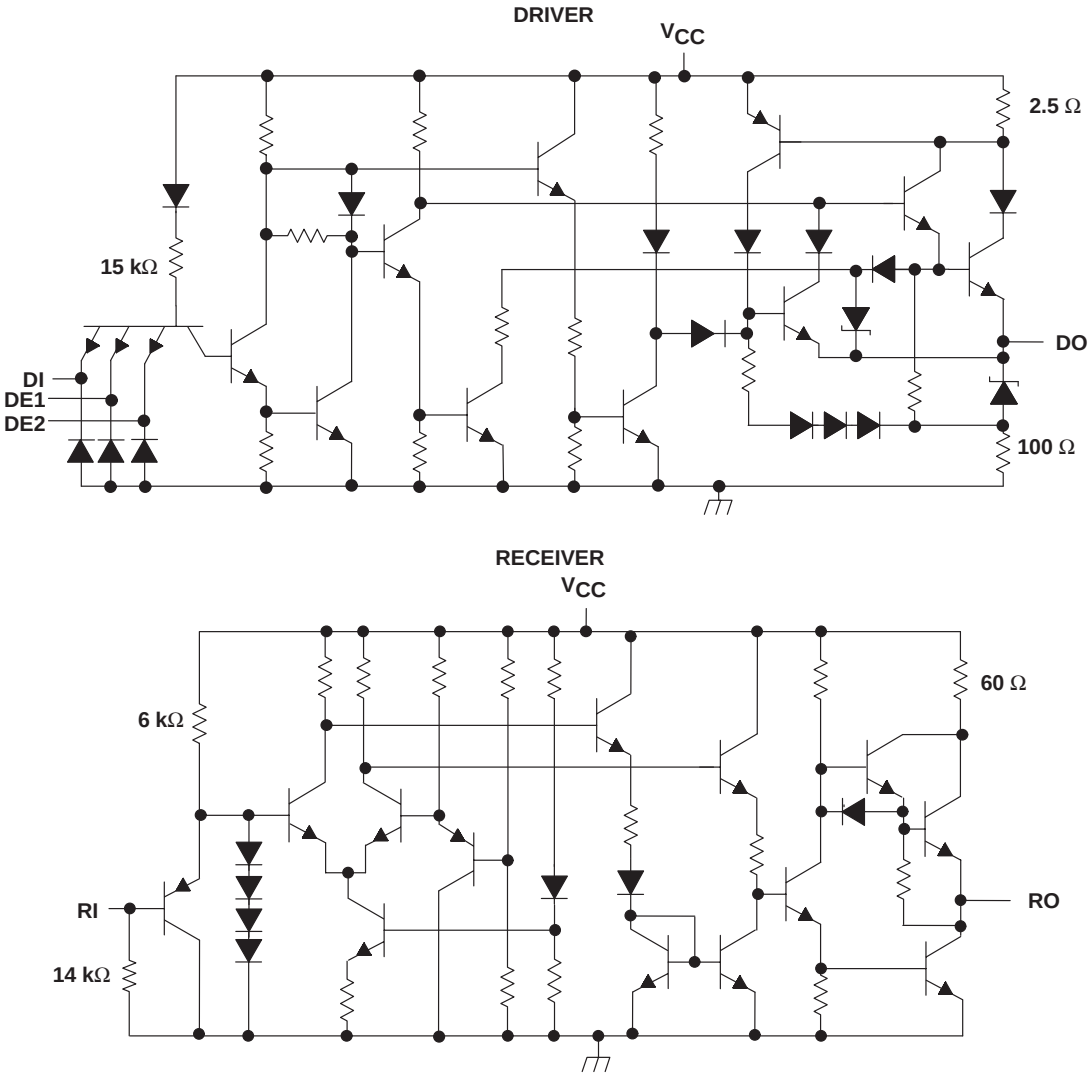


† These symbols are in accordance with ANSI/IEE Std 91-1984 and IEC Publication 617-12.

logic diagrams (positive logic)



equivalent schematics of driver and receiver†



† All resistor values are nominal.

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

Supply voltage, V_{CC} (see Note 1) . . . . . 7 V
Input voltage range, V_I: Driver . . . . . –0.5 V to 7 V
Receiver . . . . . –0.5 V to 7 V
Output voltage range, V_O: Driver . . . . . –0.5 V to 7 V
Enable input voltage range . . . . . –0.5 V to 7 V
Continuous total power dissipation . . . . . See Dissipation Rating Table
Operating free-air temperature range, T_A . . . . . 0°C to 70°C
Storage temperature range, T_{stg} . . . . . –65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds . . . . . 260°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: All voltage values are with respect to network ground terminal.

DISSIPATION RATING TABLE

PACKAGE	$T_A \le 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING
D	950 mV	7.6 mW/°C	608 mW
N	1150 mV	9.2 mW/°C	736 mW

recommended operating conditions

		MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}		4.75	5	5.25	V
High-level input voltage, V_{IH}	Driver, Enable	2			V
	Receiver	1.55			
Low-level input voltage, V_{IL}	Driver, Enable			0.8	V
	Receiver			1.15	
Operating free-air temperature, T_A		0		70	°C

DRIVER SECTION

electrical characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted)

PARAMETER			TEST CONDITIONS		MIN	MAX	UNIT
V_{IK}	Input clamp voltage		V_{CC} = 4.75 V,	I_{IL} = –18 mA		–1.5	V
V_{OH}	High-level output voltage		V_{CC} = 4.75 V, I_{OH} = –59.3 mA	V_{IH} = 2 V, T_A = 25°C	3.11		V
			V_{CC} = 5.25 V, I_{OH} = –78.1 mA	V_{IH} = 2 V,		4.10	
			V_{CC} = 4.75 V, R_L = 51.4 Ω	V_{IH} = 2 V,	3.05		
			V_{CC} = 5.25 V, R_L = 56.9 Ω	V_{IH} = 2 V,		4.20	
V_{ODH}	Differential high-level output voltage		R_L = 46.3 Ω or 56.9 Ω			0.50	V
V_{OL}	Low-level output voltage		V_{CC} = 5.25 V, V_{IL} = 0.8 V, V_{IH} = 4.5 V	I_{OL} = –0.24 mA		0.15	V
				R_L = 56.9 Ω		0.15	
I_{IH}	High-level input current	DI	V_{CC} = 5.25 V,	V_{IH} = 2.7 V		20	µA
		DE				60	
I_{IL}	Low-level input current	DI	V_{CC} = 5.25 V,	V_{IH} = 0.4 V		–400	µA
		DE				–1200	
I_{OH}	High-level output current		V_{CC} = 4.75 V, V_{OH} = 5 V	V_{IL} = 0		100	µA
				V_{IH} = 4.5 V		100	
I_{OS}	Short-circuit output current†		V_{CC} = 5.25 V	V_{IH} = 4.5 V		–30	mA
I_{CCH}	Supply current (total package)		V_{CC} = 5.25 V, No load	$V_{I(D)}$ = 4.5 V, $V_{I(R)}$ = 0		47	mA
I_{CCL}				$V_{I(D)}$ = 0, $V_{I(R)}$ = 4.5 V		80	

† No more than one output should be shorted at a time, and duration of the short circuit should not exceed one second.

switching characteristics, V_{CC} = 5 V ±5%, T_A = 25°C

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low- to high-level output	R_L = 47.5 Ω,	See Figure 1	6.5	12	18.5	ns
t_{PHL}	Propagation delay time, high- to low-level output			6.5	12	18.5	ns
Δt_{pd}	Differential propagation delay time‡					10	ns
t_r	Output rise time	V_{CC} = 5 V, R_L = 47.5 Ω, See Figure 1	V_O = 0.15 V to 3.05 V, C_L = 10.2 pF,	5	10		ns
t_f	Output fall time			5	13		ns
SR	Slew rate	V_O = 1 V to 3 V average, R_L = 47.5 Ω, See Figure 1	C_L = 10.2 pF,			0.65	V/ns

‡ $\Delta t_{pd} = |t_{PLH} - t_{PHL}|$

RECEIVER SECTION

electrical characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted)

PARAMETER		TEST CONDITIONS		MIN	MAX	UNIT
V_{OH}	High-level output voltage	V_{CC} = 4.75 V, I_{OH} = –400 μA	V_I = 1.15 V,	2.7		V
V_{OL}	Low-level output voltage	V_{CC} = 4.75 V, V_{IH} = 1.55 V	I_{OL} = 8 mA		0.5	V
			I_{OL} = 4 mA		0.4	
r_I	Input resistance	V_{CC} = 0,	V_I = 0.15 V to 3.9 V	7.4	20	kΩ
I_{IH}	High-level input current	V_{CC} = 4.75 V,	V_{IH} = 3.11 V		0.42	mA
I_{IL}	Low-level input current	V_{CC} = 5.25 V,	V_{IL} = 0.15 V	–0.24	0.04	mA
I_{OS}†	Short-circuit output current	V_{CC} = 5.25 V,	V_{IL} = 0	–20	–100	mA
I_{CCH}	Supply current (total package)	V_{CC} = 5.25 V, No load	$V_{I(D)}$ = 4.5 V, $V_{I(R)}$ = 0		47	mA
I_{CCL}			$V_{I(D)}$ = 0, $V_{I(R)}$ = 4.5 V		80	

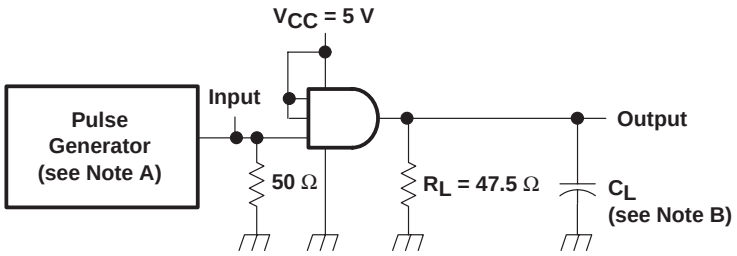
† Only one output should be shorted at a time, and duration of the short circuit should not exceed one second.

switching characteristics, V_{CC} = 5 V ±5%, T_A = 25°C

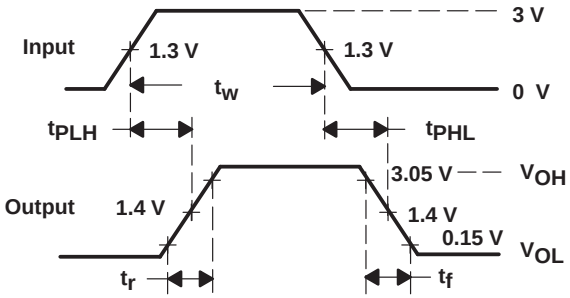
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low- to high-level output	R_L = 2 kΩ, C_L = 15 pF, See Figure 2	7.5	12	19.5	ns
t_{PHL}	Propagation delay time, high- to low-level output		7.5	12	19.5	ns
Δt_{pd}‡	Differential propagation delay time				10	ns

‡ $\Delta t_{pd} = |t_{PLH} - t_{PHL}|$

PARAMETER MEASUREMENT INFORMATION



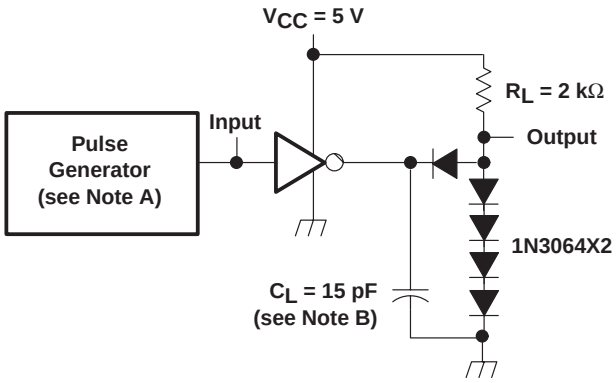
TEST CIRCUIT



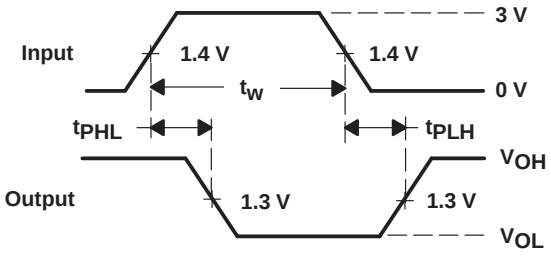
VOLTAGE WAVEFORMS

NOTES: A. The pulse generator has the following characteristics: $Z_O \approx 50\ \Omega$, $t_W \le 500$ ns, PRR ≤ 1 MHz, $t_f \le 6$ ns, $t_r \le 15$ ns.
B. C_L includes probe and jig capacitance.

Figure 1. Driver Test Circuit and Voltage Waveforms



TEST CIRCUIT



VOLTAGE WAVEFORMS

NOTES: A. The pulse generator has the following characteristics: $Z_O \approx 50\ \Omega$, $t_W \le 500$ ns, PRR ≤ 1 MHz, $t_f \le 10$ ns, $t_r \le 10$ ns.
B. C_L includes probe and jig capacitance.

Figure 2. Receiver Test Circuit and Voltge Waveforms

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