Line Driver / Receiver

## Description

The SL75232N, SL75232D are monolithic device containing 3 independent drives and 5 receivers. These are designed to interface between date terminal equipment and date communication equipment as designed by EIA-232-D.

Features

- Meets standard EIA-232-D (Revision of RS-232-C)
- Drivers
- Current Limited Output   10 mA Typical
- Power-off Output Impedance   300 Ω Min
- Slew Rate Control by Load Capacitor
- Flexible Supply Voltage Range
- Input Compatible with Most TTL and DTL Circuits
- Receivers
- Input Resistance   3 kΩ to 7 kΩ
- Input Signal Range   ± 30 V
- Built-in Input Hysteresis (Double Threshold)
- 20 DIP/SO20: Ì S-001AD (SL75232N) / Ì S-013AÑ (SL75232D)

Block Diagram
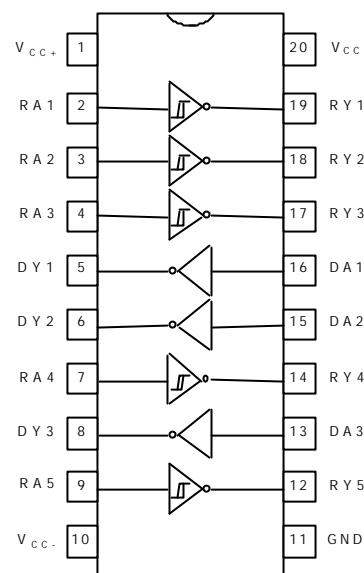
IL75232N, IL75232D

Pin Description

Name	Pin No	Function	Name	Pin No	Function
V_{CC+}	1	Driver Section Supply +	V_{CC-}	10	Driver Section Supply -
DA1	16		DY1	5	
DA2	15		DY2	6	Driver Output
DA3	13	Driver Input	DY3	8	
V_{CC}	20	Receiver Section Supply	GND	11	Ground
RA1	2		RY1	19	
RA2	3		RY2	18	
RA3	4	Receiver Input	RY3	17	Receiver Output
RA4	7		RY4	14	
RA5	9		RY5	12	

SL75232

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
V_{CC+}	Supply Voltage	15	V
V_{CC-}	Supply Voltage	-15	V
V_{CC}	Supply Voltage	10	V
VI (Driver)	Input Voltage	$-15 \div +7$	V
VI (Reciver)	Input Voltage	± 30	V
VO (Driver)	Output Voltage	$-15 \div +15$	V
PT	Continuous Power Dissipation (Below 25 ^{o}C)	1.0	W
T_{STG}	Storage Temperature	$-65 \div +175$	^{o}C
Top	Operating Temperature	$0 \div +75$	^{o}C

Schematic

DRIVER   RESEIVER
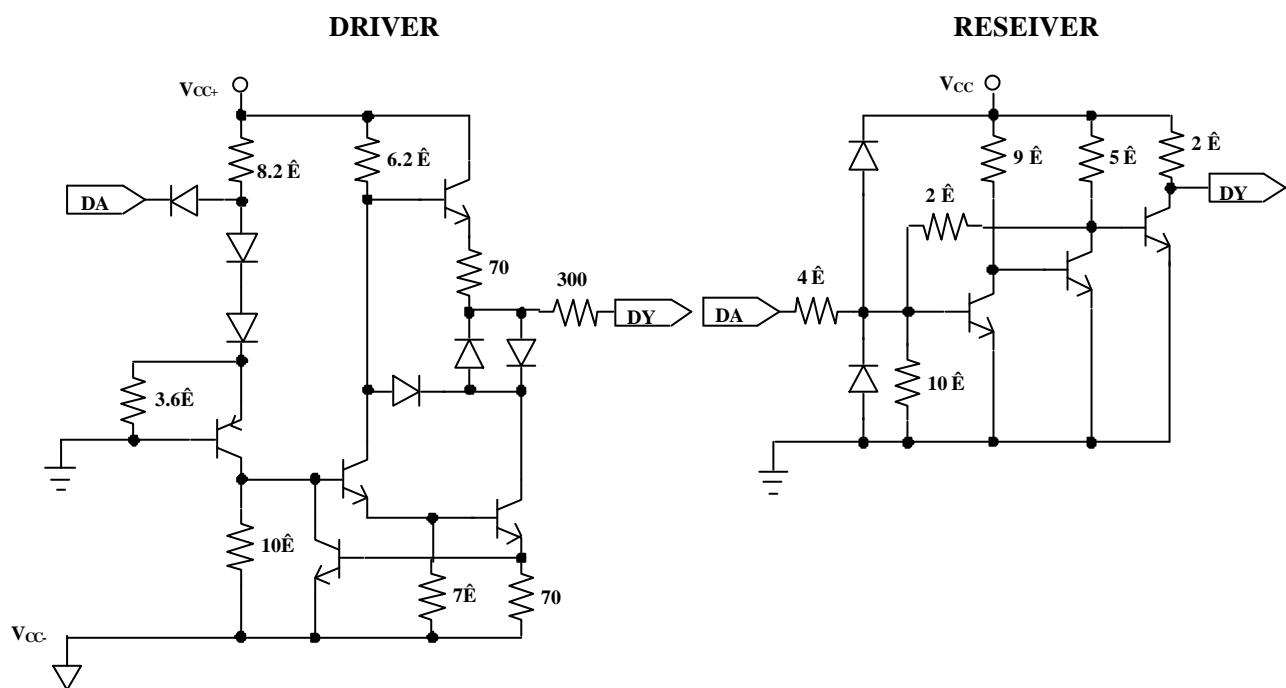
Electrical Characteristics

Supply Current

$V_{CC} = 5V$, $T_A = 25\,^{\circ}C$

Symbol	Parameter	Test Conditions		Min	Max	Unit
I_{CC+}	Supply Current from V_{CC+}	$V_{CC+} = 9$ V No Load	$V_{IN} = 1.9V$		15	mA
			$V_{IN} = 0.8V$		4.5	
		$V_{CC+} = 12$ V No Load	$V_{IN} = 1.9V$		19	
			$V_{IN} = 0.8V$		5.5	
		$V_{CC+} = 15$ V No Load	$V_{IN} = 1.9V$		25	
			$V_{IN} = 0.8V$		9	
I_{CC-}	Supply Current from V_{CC-}	$V_{CC-} = -9$ V No Load	$V_{IN} = 1.9V$		-15	mA
			$V_{IN} = 0.8V$		-3.2	
		$V_{CC-} = -12$ V No Load	$V_{IN} = 1.9V$		-19	
			$V_{IN} = 0.8V$		-3.2	
		$V_{CC-} = -15$ V No Load	$V_{IN} = 1.9V$		-25	
			$V_{IN} = 0.8V$		-3.2	
I_{CC}	Supply Current from V_{CC}	$V_{CC} = 5$ V	$V_{IN} = 5.0V$		30	mA

Driver Section

Symbol	Parameter	Test Conditions		Min	Max	Unit
V_{IH}	High Level Input Voltage	$V_{CC+} = 9$ V $V_{CC-} = -9$ V		1.9		V
V_{IL}	Low Level Input Voltage				0.8	V
V_{OH}	High Level Output Voltage	$V_{IL} = 0.8V$ RL = 3 kΩ	$V_{CC+} = 9$ V $V_{CC-} = -9$ V	6		V
			$V_{CC+} = 13.2$ V $V_{CC-} = -13.2$ V	9		
V_{OL}	Low Level Output Voltage	$V_{IH} = 1.9V$ RL = 3 kΩ	$V_{CC+} = 9$ V $V_{CC-} = -9$ V		-6	V
			$V_{CC+} = 13.2$ V $V_{CC-} = -13.2$ V		-9	
I_{IH}	High Level Input Current	$V_I = 5V$			10	μA
I_{IL}	Low Level Input Current	$V_I = 0$			-1.6	mA
$I_{OS(H)}$	Short Circuit Output Current at High Level	$V_I = 0.8V$ $V_O = 0$		-6	-12	mA
$I_{OS(L)}$	Short Circuit Output Current at Low Level	$V_I = 1.9V$ $V_O = 0$		6	12	mA
R_O	Output Resistance,	$V_{CC+} = 0$, $V_{CC-} = 0$		300		Ω

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	Power Off	V_O = -2V to 2V				

Driver Switching Characteristic

Symbol	Parameter	Test Conditions	Min	Max	Unit
t_{PLH}	Propagation Delay Time, Low-To-High-Level Output	RL = 3 kΩ CL = 15 µF		500	ns
t_{PHL}	Propagation Delay Time, High -To- Low -Level Output	See Figure 1		175	ns
t_{TLH}	Transition Time, Low-To-High-Level Output *			100	ns
t_{THL}	Transition Time, High -To- Low -Level Output*			75	ns
t_{TLH}	Transition Time, Low-To-High-Level Output**	RL = 3 kΩ to 7 kΩ CL = 2500 ρF	2.5 (tip)		µs
t_{THL}	Transition Time, High-To-Low -Level Output**	See Figure 1	3.0 (tip)		µs

*- Measured between 10 % and 90 % Points of Output Waveform

** - Measured between +3V and -3V Points on the Output Waveform (EIA-232-D Condition)

Receiver Section

Symbol	Parameter	Test Conditions	Min	Max	Unit
VT+	Positive-Going Threshold Voltage		1.75	2.25	V
VT-	Negative-Going Threshold Voltage		0.75	1.25	V
V_{OH}	High Level Output Voltage	V_I= 0.75V, I_{OL}=-0.5mA	2.6	5	V
		Input Open, I_{OL} = -0.5 mA	2.6	5	
V_{OL}	Low Level Output Voltage	V_I= 3V, I_{OL} = 10 mA		0.45	V
I_{IH}	High-Level Input Current	V_I= 25V	3.6	8.3	mA
		V_I= 3V	0.43		
I_{IL}	Low-Level Input Current	V_I= -25V	-3.6	-8.3	mA
		V_I= -3V	-0.43		
I_{OS}	Short-Circuit Output Current		-3 (tip)		mA

Receiver Switching Characteristic

Symbol	Parameter	Test Conditions	Min	Max	Unit
t_{PLH}	Propagation Delay Time, Low-To-High-Level Output	C_L = 15 ρF R_L = 3.9 kΩ		190	ns
t_{PHL}	Propagation Delay Time, High -To- Low -Level Output	C_L = 15 ρF R_L = 390 kΩ		60	ns
t_{TLH}	Transition Time, Low-To-High-Level Output	C_L = 15 ρF R_L = 3.9 kΩ		175	ns

t_{THL}	Transition Time, High -To- Low -Level Output	$C_L = 15 \ \rho F$ $R_L = 390 \ k\Omega$		20	ns

Parameter Measurement Information

DRIVER

Test Circuit

Voltage Waveform

RESEIVER

Test Circuit

$T_W = 25 \ \mu s$, Voltage Waveform
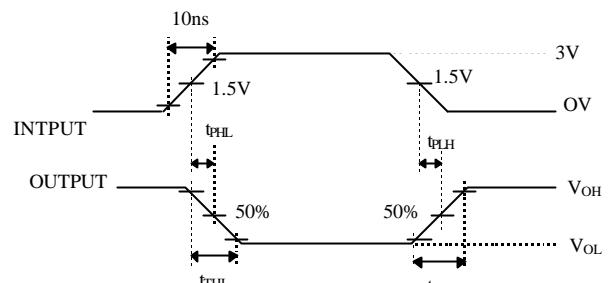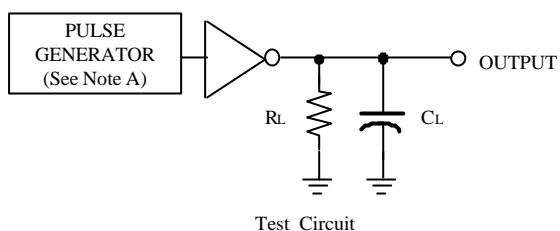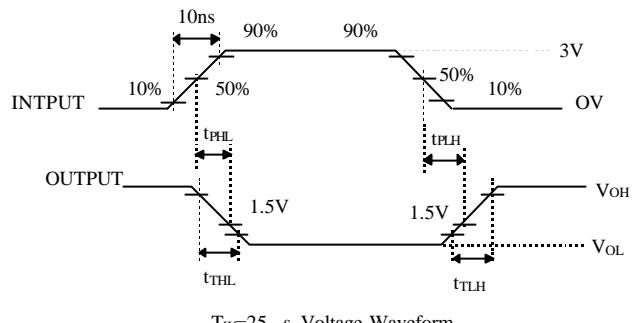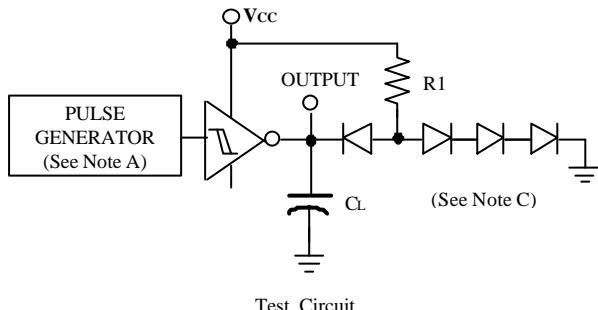
Note   A.   The pulse generator has the following characteristics. $f = 200$ KHz, $Z_O = 50 \ \Omega$

         B.   C included probe and jig capacitance.

         C.   All diodes are 1N3064 or equivalent.

Fig1. Propagation and Transition Times

Typical Application

SIO Card