

**IL75232N, IL75232D**  
EIA-232-D INTERFACE 1 CHIP IC

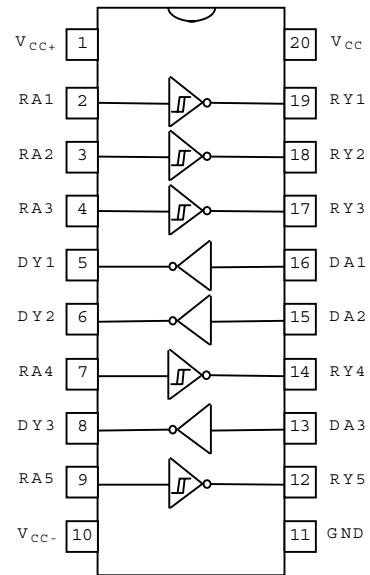
**Description**

The IL75232N, IL75232ND are monolithic device containing 3 independent drives and 5 receivers. These are designed to interface between data terminal equipment and data 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: MS-001AD (IL75232N) / MS-013AC (IL75232D)

**Block Diagram**



**IL75232N , IL75232D**

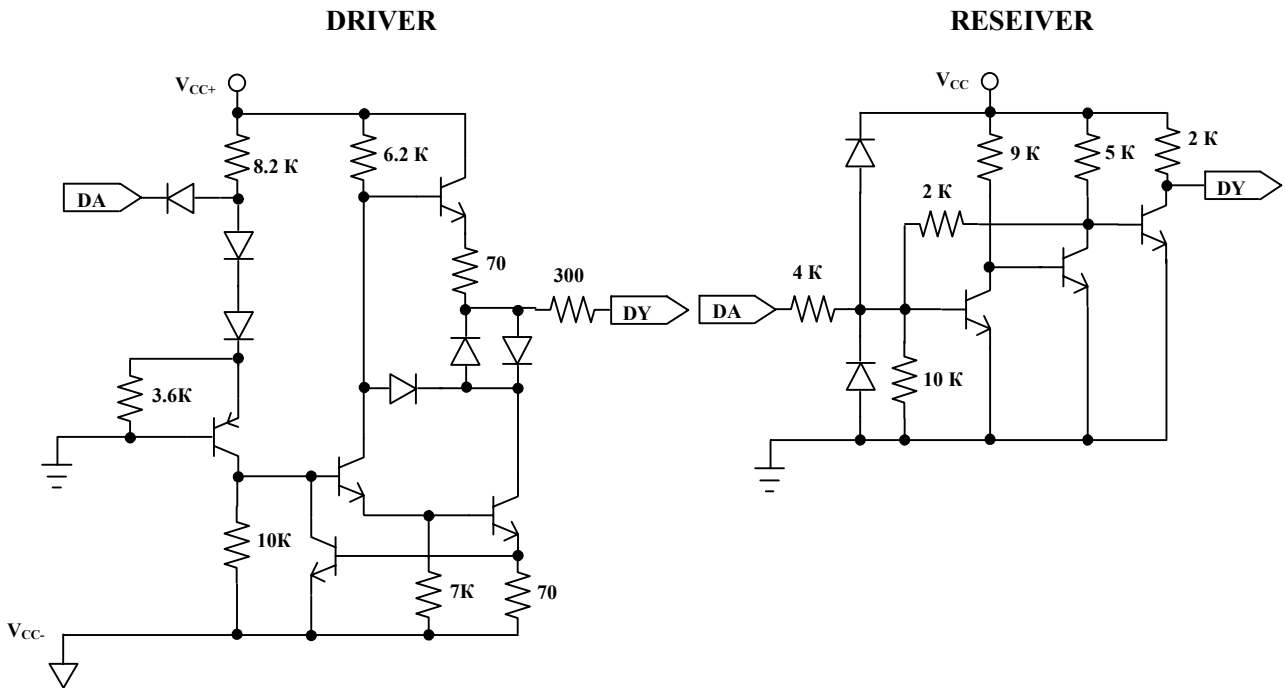
**Pin Description**

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

**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Unit
V <sub>CC+</sub>	Supply Voltage	15	V
V <sub>CC-</sub>	Supply Voltage	-15	V
V <sub>CC</sub>	Supply Voltage	10	V
VI (Driver)	Input Voltage	-15 ÷ +7	V
VI (Reciver)	Input Voltage	± 30	V
VO (Driver)	Output Voltage	-15 ÷ +15	V
PT	Continuous Power Dissipation (Below 25 °C)	1.0	W
T <sub>STG</sub>	Storage Temperature	-65 ÷ +175	°C
Top	Operating Temperature	0 ÷ +75	°C

**Schematic**



**Electrical Characteristics**
**Supply Current**
 $V_{CC} = 5V, T_A = 25\text{ }^{\circ}C$ 

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

**Driver Section**

Symbol	Parameter	Test Conditions		Min	Max	Unit
$V_{IH}$	High Level Input Voltage	$V_{CC+} = 9\text{ V}$		1.9		V
$V_{IL}$	Low Level Input Voltage	$V_{CC-} = -9\text{ V}$			0.8	V
$V_{OH}$	High Level Output Voltage	$V_{IL} = 0.8V$ $RL = 3\text{ k}\Omega$	$V_{CC+} = 9\text{ V}$ $V_{CC-} = -9\text{ V}$	6		V
			$V_{CC+} = 13.2\text{ V}$ $V_{CC-} = -13.2\text{ V}$	9		
$V_{OL}$	Low Level Output Voltage	$V_{IH} = 1.9V$ $RL = 3\text{ k}\Omega$	$V_{CC+} = 9\text{ V}$ $V_{CC-} = -9\text{ V}$		-6	V
			$V_{CC+} = 13.2\text{ V}$ $V_{CC-} = -13.2\text{ V}$		-9	
$I_{IH}$	High Level Input Current	$V_I = 5V$			10	$\mu A$
$I_{IL}$	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, Power Off	$V_{CC+} = 0, V_{CC-} = 0$ $V_O = -2V\text{ to }2V$		300		$\Omega$

**Driver Switching Characteristic**

$V_{CC+} = 9V, V_{CC-} = -9V T_A = 25\text{ }^{\circ}C$

Symbol	Parameter	Test Conditions	Min	Max	Unit
$t_{PLH}$	Propagation Delay Time, Low-To-High-Level Output	$R_L = 3\text{ k}\Omega$ $C_L = 15\text{ }\mu\text{F}$		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**		$R_L = 3\text{ k}\Omega$ to $7\text{ k}\Omega$ $C_L = 2500\text{ }\mu\text{F}$	2.5 (tip)	$\mu\text{s}$
$t_{THL}$	Transition Time, High-To-Low -Level Output**	See Figure 1	3.0 (tip)	$\mu\text{s}$	

\*- 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 <sub>OH</sub>	High Level Output Voltage	$V_I = 0.75V, I_{OL} = -0.5mA$	2.6	5	V
		Input Open, $I_{OL} = -0.5\text{ mA}$	2.6	5	
V <sub>OL</sub>	Low Level Output Voltage	$V_I = 3V, I_{OL} = 10\text{ mA}$		0.45	V
I <sub>IH</sub>	High-Level Input Current	$V_I = 25V$	3.6	8.3	mA
		$V_I = 3V$	0.43		
I <sub>IL</sub>	Low-Level Input Current	$V_I = -25V$	-3.6	-8.3	mA
		$V_I = -3V$	-0.43		
I <sub>OS</sub>	Short-Circuit Output Current			-3 (tip)	mA

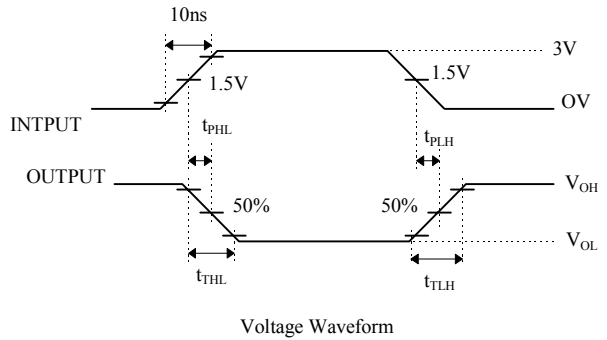
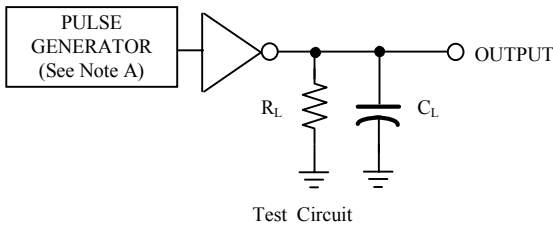
**Receiver Switching Characteristic**

$V_{CC} = 5V$

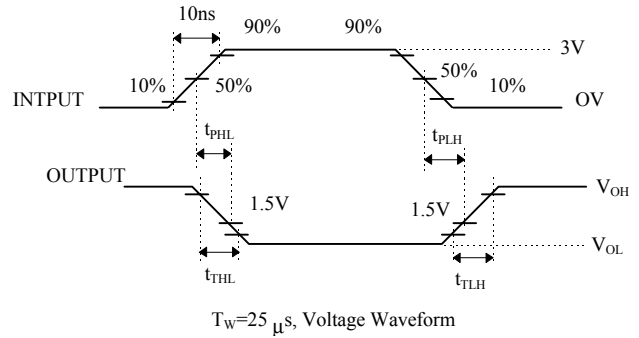
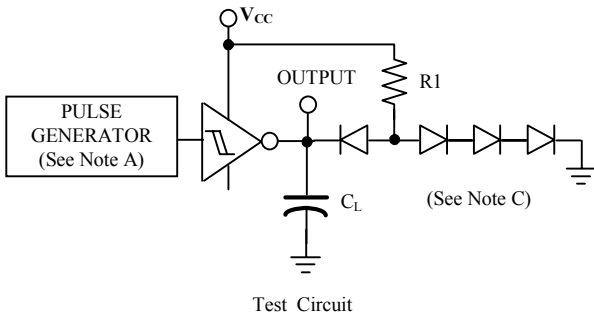
Symbol	Parameter	Test Conditions	Min	Max	Unit
$t_{PLH}$	Propagation Delay Time, Low-To-High-Level Output	$C_L = 15\text{ }\mu\text{F}$ $R_L = 3.9\text{ k}\Omega$		150	ns
$t_{PHL}$	Propagation Delay Time, High -To- Low -Level Output	$C_L = 15\text{ }\mu\text{F}$ $R_L = 390\text{ k}\Omega$		50	ns
$t_{TLH}$	Transition Time, Low-To-High-Level Output	$C_L = 15\text{ }\mu\text{F}$ $R_L = 3.9\text{ k}\Omega$		175	ns
$t_{THL}$	Transition Time, High -To- Low -Level Output	$C_L = 15\text{ }\mu\text{F}$ $R_L = 390\text{ k}\Omega$		20	ns

Parameter Measurement Information

DRIVER



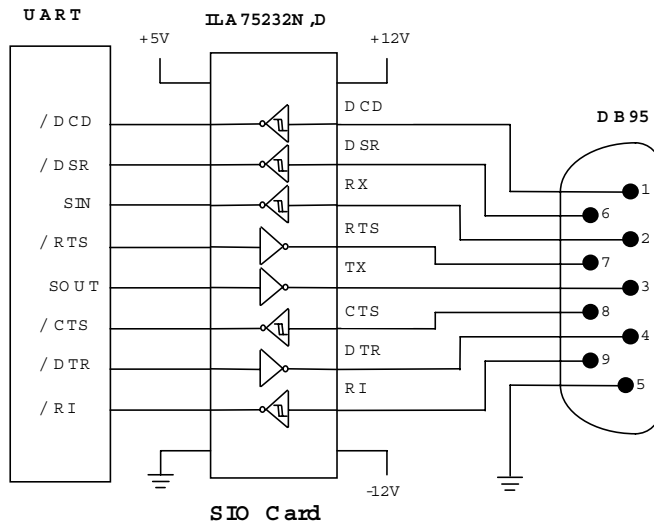
RESEIVER



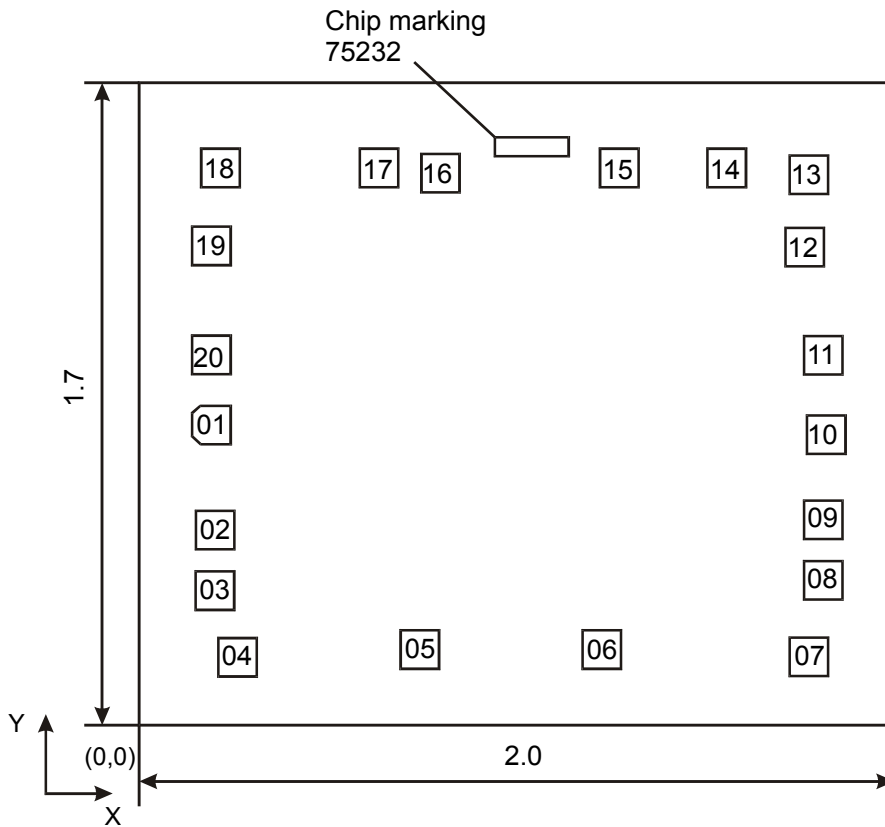
- Note
- A. The pulse generator has the following characteristics.  $f = 200 \text{ KHz}$ ,  $Z_0 = 50 \Omega$
  - B. C included probe and jig capacitance.
  - C. All diodes are 1N3064 or equivalent.

Fig1. Propagation and Transition Times

Typical Application



**CHIP PAD DIAGRAM**



**Location of marking (mm):** left lower corner  $x=0.942, y=1.506$ , right higher corner  $x=1.137, y=1.556$ .

**PAD LOCATION**

Pad No	Location (left lower corner), mm		Pad size, mm
	X	Y	
01	0.141	0.743	0.102 x 0.102
02	0.151	0.466	0.102 x 0.102
03	0.151	0.306	0.102 x 0.102
04	0.210	0.128	0.102 x 0.102
05	0.692	0.149	0.102 x 0.102
06	1.174	0.149	0.102 x 0.102
07	1.722	0.130	0.102 x 0.102
08	1.760	0.333	0.102 x 0.102
09	1.760	0.493	0.102 x 0.102
10	1.768	0.718	0.102 x 0.102
11	1.760	0.928	0.102 x 0.102
12	1.711	1.214	0.102 x 0.102
13	1.722	1.406	0.102 x 0.102
14	1.504	1.424	0.102 x 0.102
15	1.220	1.424	0.102 x 0.102
16	0.747	1.410	0.102 x 0.102
17	0.584	1.424	0.102 x 0.102
18	0.165	1.424	0.102 x 0.102
19	0.141	1.217	0.102 x 0.102
20	0.106	0.929	0.102 x 0.102

Note: Size is given as per passivation layer