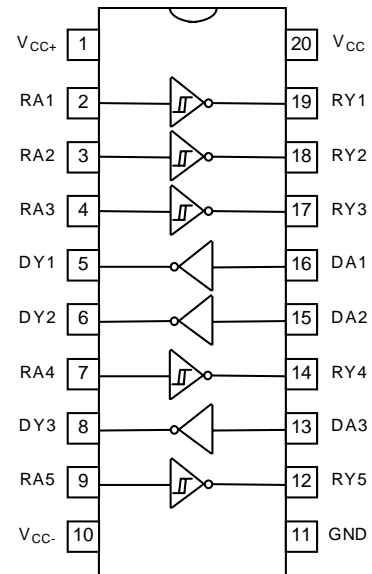IN75232

EIA-232-D INTERFACE 1 CHIP IC

Description

The IN75232N, IN75232D, IN75232TDS 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)
- Designed to Support Data Rate up to 120kbps
- 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)
- The transmitter outputs and receiver inputs are protected to ±15kV Air ESD.

Block Diagram

V_{CC+}	1	20	V_{CC}
RA1	2	19	RY1
RA2	3	18	RY2
RA3	4	17	RY3
DY1	5	16	DA1
DY2	6	15	DA2
RA4	7	14	RY4
DY3	8	13	DA3
RA5	9	12	RY5
V_{CC-}	10	11	GND

IN75232N, IN75232D, IN75232TDS

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	

IK Semicon

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 ~7	V
VI (Reciver)	Input Voltage	± 30	V
VO (Driver)	Output Voltage	-15 ~15	V
PT	Continuous Power Dissipation (Below 25 ^{o}C)	1.0	W
T_{STG}	Storage Temperature	-65 ~150	^{o}C
Top	Operating Temperature	0 ~75	^{o}C

Schematic
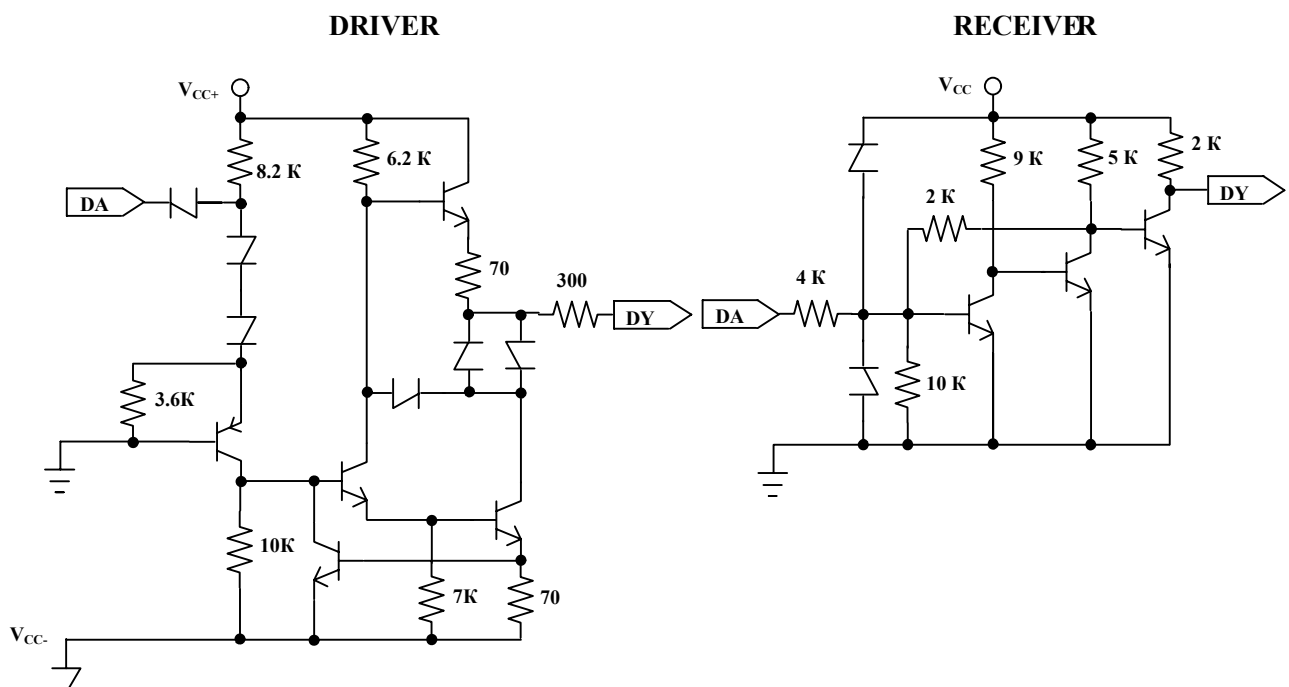
Electrical Characteristics

Supply Current

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

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

Driver Section

Symbol	Parameter	Test Conditions		Min	Max	Unit
V_{IH}	High Level	$V_{CC+} = 9$ V		1.9		V
	Input Voltage	$V_{CC-} = -9$ V				
V_{IL}	Low Level				0.8	V
	Input Voltage					
V_{OH}	High Level	$V_{IL} = 0.8V$	$V_{CC+} = 9$ V	6		V
	Output Voltage	$RL = 3$ kΩ	$V_{CC-} = -9$ V			
			$V_{CC+} = 13.2$ V	9		
			$V_{CC-} = -13.2$ V			
V_{OL}	Low Level	$V_{IH} = 1.9V$	$V_{CC+} = 9$ V		-6	V
	Output Voltage	$RL = 3$ kΩ	$V_{CC-} = -9$ V			
			$V_{CC+} = 13.2$ V		-9	
			$V_{CC-} = -13.2$ V			
I_{IH}	High Level	$V_I = 5V$			10	μA
	Input Current					
I_{IL}	Low Level	$V_I = 0$			-1.6	mA
	Input Current					
$I_{OS(H)}$	Short Circuit	$V_I = 0.8V$		-6	-12	mA
	Output Current	$V_O = 0$				
	at High Level					
$I_{OS(L)}$	Short Circuit	$V_I = 1.9V$		6	12	mA
	Output Current	$V_O = 0$				
	at Low Level					
R_O	Output Resistance,	$V_{CC+} = 0$, $V_{CC-} = 0$		300		Ω
	Power Off	$V_O = -2V$ to $2V$				

Driver Switching Characteristic

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

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

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

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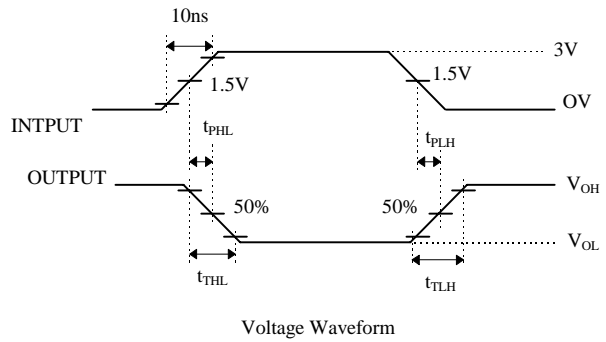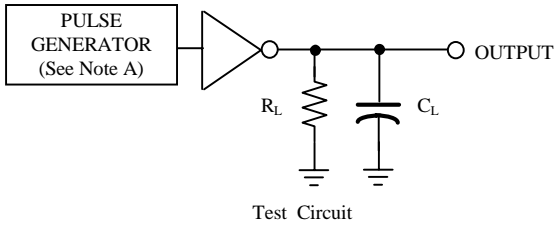
Receiver Section

Symbol	Parameter	Test Conditions	Min	Max	Unit
VT+	Positive-Going		1.75	2.25	V
	Threshold Voltage				
VT-	Negative-Going		0.75	1.25	V
	Threshold Voltage				
V_{OH}	High Level Output	V_I= 0.75V, I_{OL}=-0.5mA	2.6	5	V
	Voltage	Input Open,	2.6	5	
		I_{OL} = -0.5 mA			
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		-3		mA
	Output Current		(tip)		

Receiver Switching Characteristic

V_{CC}= 5V

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

Parameter Measurement Information

DRIVER

Test Circuit

Voltage Waveform

RESEIVER

Test Circuit

$T_W=25 \mu s$, Voltage Waveform
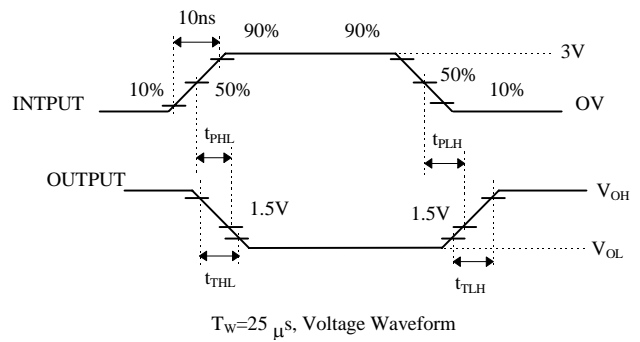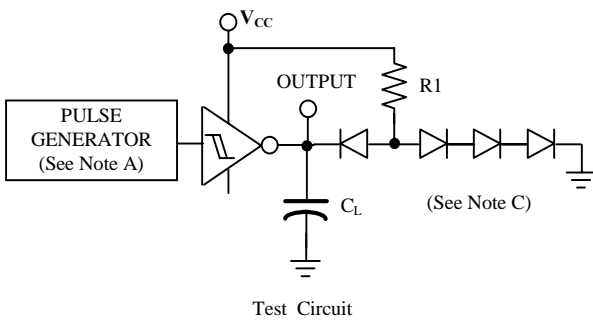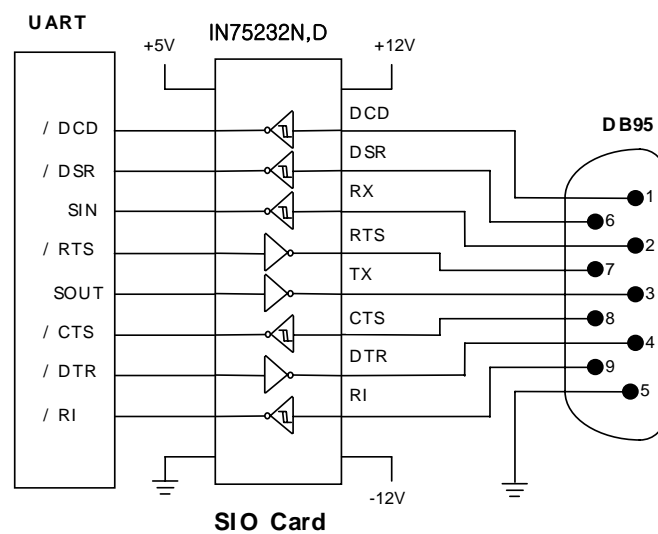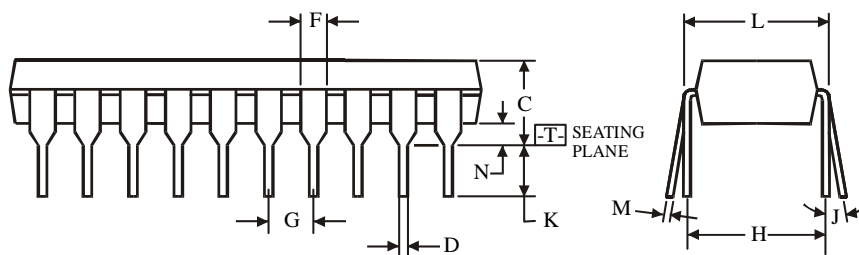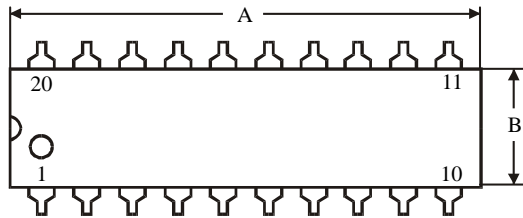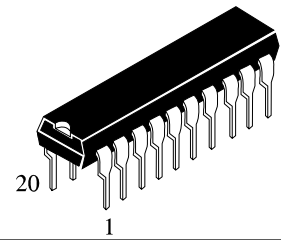
Note   A.   The pulse generator has the following characteristics. f = 200 KHz, $Z_O = 50 \Omega$
        B.   C included probe and jig capacitance.
        C.   All diodes are 1N3064 or equivalent.

Fig1. Propagation and Transition Times

Typical Application

SIO Card

N SUFFIX PLASTIC DIP
(MS - 001AD)

	Dimension, mm	
Symbol	**MIN**	**MAX**
A	24.89	26.92
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	

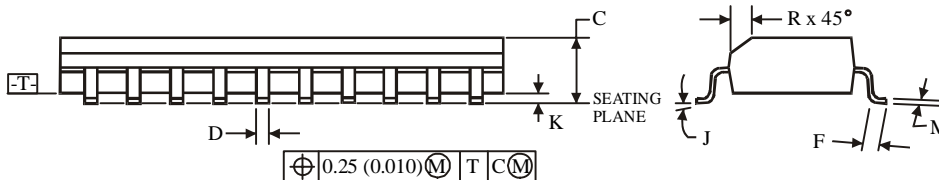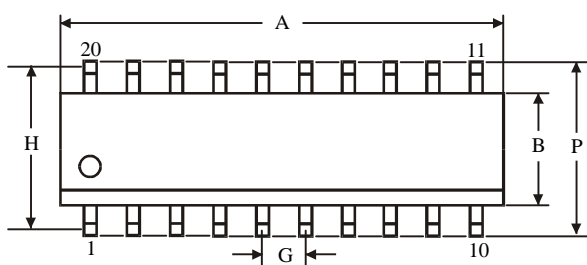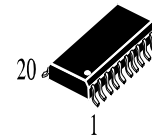$\oplus$ 0.25 (0.010) Ⓜ T

NOTES:

1. Dimensions "A", "B" do not include mold flash or protrusions.

   Maximum mold flash or protrusions 0.25 mm (0.010) per side.

D SUFFIX SOIC
(MS - 013AC)

	Dimension, mm	
Symbol	**MIN**	**MAX**
A	12.6	13
B	7.4	7.6
C	2.35	2.65
D	0.33	0.51
F	0.4	1.27
G	1.27	
H	9.53	
J	0°	8°
K	0.1	0.3
M	0.23	0.32
P	10	10.65
R	0.25	0.75

$\oplus$ 0.25 (0.010) Ⓜ T C Ⓜ

NOTES:

1. Dimensions A and B do not include mold flash or protrusion.

2. Maximum mold flash or protrusion 0.15 mm (0.006) per side
   for A; for B – 0.25 mm (0.010) per side.

TSSOP-20

6.60(.260)
6.40(.252)

[0.33(.013)] B

-A-

20

4.50(.177)
4.30(1.69)

6.55(.258)
6.25(.246)

PIN #1 INDEX

-B-

1

0.65(.026)BSC

DETAIL "K"

1.20(.047)MAX

0.10(.004) C

-C-

SEATING PLANE

0.30(.012)
0.19(.007)

⊕ 0.10(.004) Ⓜ C B A

14° TYP

MIN. 0.09(.004) R

MIN. 0.09(.004) R

0.25(.010)

1.05(.041)
0.80(.032)

GAGE PLANE

BASE PLANE

0°-8°

0.20(.008)
0.09(.004)

0.75(.030)
0.45(.018) A

0.15(.006)
0.05(.002)

[1.00(.039)] A

IKSemicon