To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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HD75161A

Octal General Purpose Interface Bus Transceivers

REJ03D0309–0200Z
(Previous ADE-205-591 (Z))
Rev.2.00
Jul.16.2004

Description

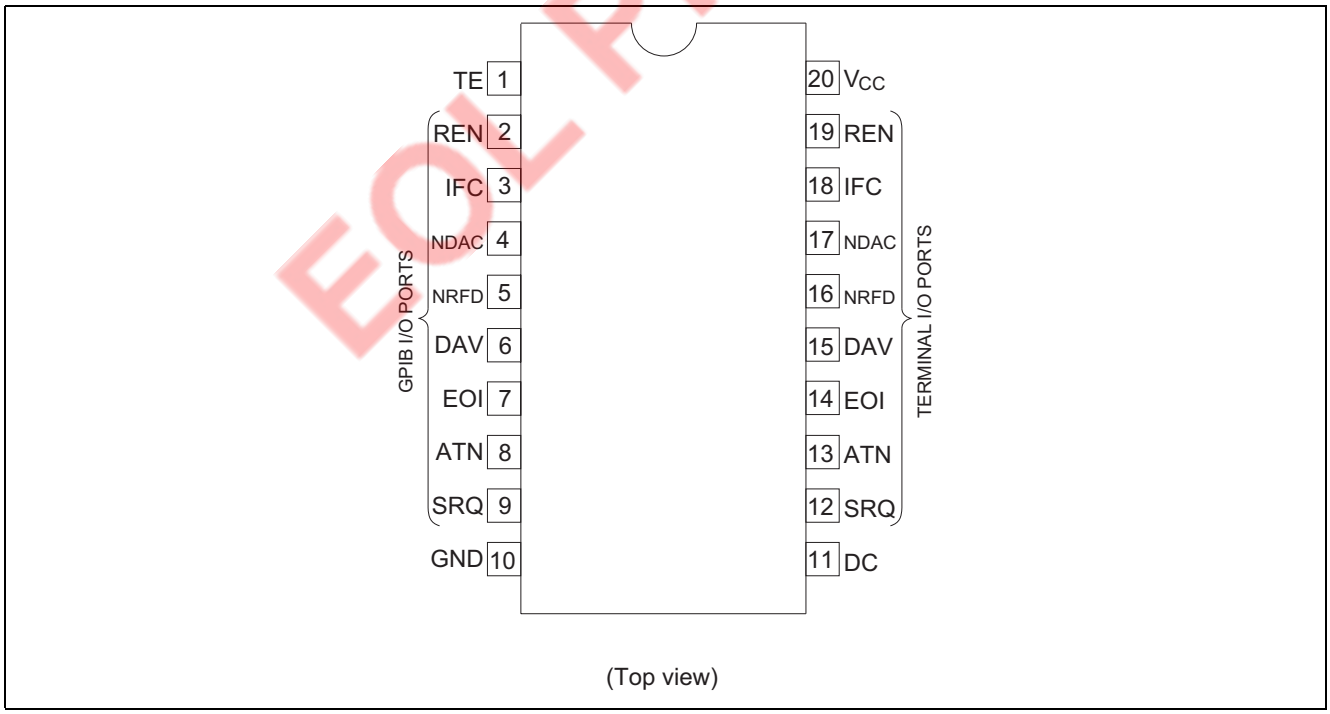
The HD75161A is an 8 channel general purpose interface bus transceiver designed to meet the requirements of IEEE standard 488-1978. The transceiver is to provide the bus management and data transfer signals during operating in a controller instrumentation system. When combined with the HD75160A octal bus transceiver, the HD75161A provides the complete 16 wire interface for the IEEE 488 bus. The HD75161A features eight driver receiver pairs connected in a front to back configureation to form input/output ports at both the bus and terminal sides. The direction of data through these driver receiver pairs is determined by the DC and TE enable signals. The device exhibits a high impedance to the bus when V_{CC} = 0 V since the bus terminating resistors are built in. If featurs driver outputs which can handle loads up to 48 mA of sink current. Each receiver features p n p transistor inputs for high input impedance and guaranteed hysteresis of 400 mV for increased noise immunity.

Features

- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD75161AP	DILP-20 pin	DP-20N, -20NEV	P	—

Pin Arrangement



(Top view)

Table Of Abbreviation

DRIVERS		
Name	**Identity**	**Class**
DC	Direction Control	Control
TE	Talk Enable	
ATN	Attention	Bus Management
SRQ	Service Request	
REN	Remote Enable	
IFC	Interface Clear	
EOI	End Or Identify	
DAV	Data Valid	
NDAC	Not Data Accepted	Data Transfer
NRFD	Not Ready For Data	

Function Table

Controls			Bus management Channels					Data transfer Channels		
			ATN*[1]	SRQ	REN	IFC		DAV	NDAC	NRFD
DC	**TE**	**ATN**	**Controlled By DC**				**EOI**	**Controlled by TE**		
H	H	H	R	T	R	R	T	T	R	R
H	H	L					R			
L	L	H	T	R	T	T	R	R	T	T
L	L	L					T			
H	L	X	R	T	R	R	R	R	T	T
L	H	X	T	R	T	T	T	T	R	R

H : High level
L : Low level
X : Irrelevant
R : Receiver
T : Transmit

Notes: 1. ATN is a normal transceiver channel that functions additionally as an internal direction control or talk enable for EOI whenever the DC and TE inputs are in the same state.
2. Direction of data transmittion is from the terminal side to the bus side and the direction of data receiving is from the bus side to the terminal side. Data transfer is noninverting in both directions.

Absolute Maximum Ratings

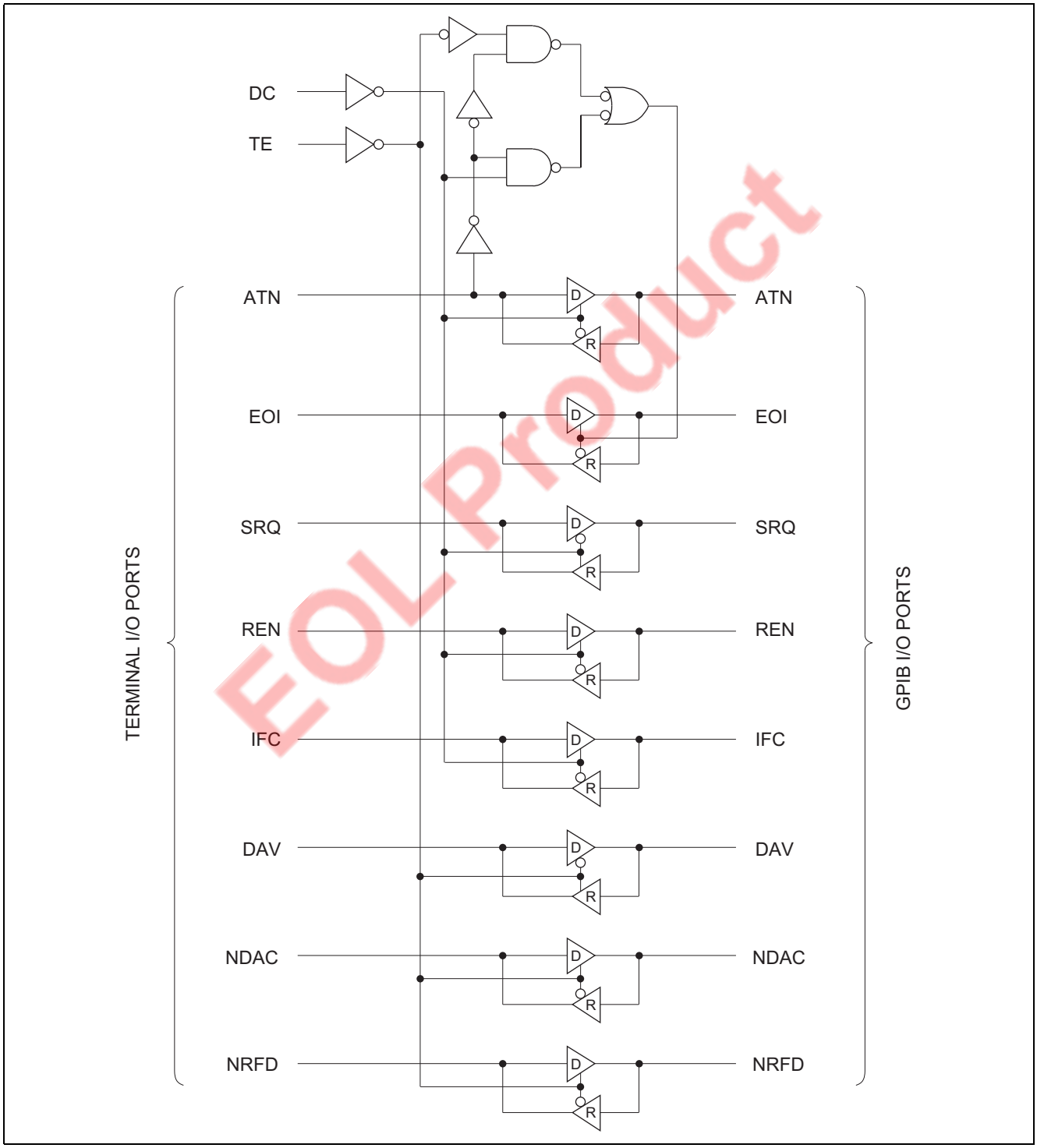
Item	Symbol	Rating	Unit
Supply Voltage	V_{CC}	7	V
Input Voltage	V_{IC}	5.5	V
Output Current	I_{OL}	100	mA
Power Dissipation (Ta = 25°C)	P_T	1150	mW
Operating Temperature Range	Topr	0 to 70	°C
Storage Temperature Range	Tstg	–65 to +150	°C

Note: 1. The absolute maximum ratings are values which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

Recommended Operating Conditions

Item		Symbol	Min	Typ	Max	Unit
Supply Voltage		V_{CC}	4.75	5.00	5.25	V
Output Current	Bus Ports With 3 State Outputs	I_{OH}	—	—	–5.2	mA
	Terminal Ports		—	—	–800	µA
Output Current	Bus Ports With 3 State Outputs	I_{OL}	—	—	48	mA
	Terminal Ports		—	—	16	
Operating Temperature		Topr	0	—	70	°C

Logic Diagram



DC Electrical Characteristics (Ta = 0 to 70°C)

Item		Symbol	V_{CC}	Min	Max	Unit	Conditions	
Input Voltage		V_{IH}	2	—	—	V		
		V_{IL}	—	—	0.8			
Input Clamp Voltage		V_{IK}	—	—	–1.5	V	I_I = –18 mA	
Hysteresis	Bus	$V_T^+ - V_T^-$	0.4	—	—	V		
Output Voltage	Terminal	V_{OH}	2.7	—	—	V	I_{OH} = –800 µA	
	Bus		2.5	—	—		I_{OH} = –5.2 mA	
	Terminal	V_{OL}	—	—	0.5	V	I_{OL} = 16 mA	
	Bus		—	—	0.5		I_{OL} = 48 mA	
Input Current	Terminal	I_I	—	—	100	µA	V_I = 5.5 V	
	Terminal And	I_{IH}	—	—	20		V_I = 2.7 V	
	Control Inputs	I_{IL}	—	—	–100		V_I = 0.5 V	
Voltage at Bus Port		$V_{I/O\ (bus)}$	2.5	—	3.7	V	Driver	$I_{I(bus)}$ = 0
			—	—	–1.5		Disabled	$I_{I(bus)}$ = –12 mA
Current Into Bus Port	V_{CC} ON	$I_{I/O\ (bus)}$	–1.3	—	—	mA	Driver	$V_{I(bus)}$ = –1.5 V to 0.4 V
			0	—	–3.2		Disabled	$V_{I(bus)}$ = 0.4 V to 2.5 V
			—	—	+2.5 –3.2			$V_{I(bus)}$ = 2.5 V to 3.7 V
			0	—	2.5			$V_{I(bus)}$ = 3.7 V to 5 V
			0.7	—	2.5			$V_{I(bus)}$ = 5 V to 5.5 V
	V_{CC} OFF		—	—	40	µA	V_{CC} = 0,	$V_{I(bus)}$ = 0 V to 2.5 V
Short Circuit Output Current	Terminal	I_{OS}	–15	—	–75	mA		
	Bus		–25	—	–125			
Supply Voltage		I_{CC}	—	—	100	mA	No Load TE, DC, low	
Bus port Capacitance		$C_{I/O\ (bus)}$	—	30	—	pF	V_{CC} = 5 V or 0 V, $V_{I/O}$ = 0 to 2 V, f = 1 MHz	

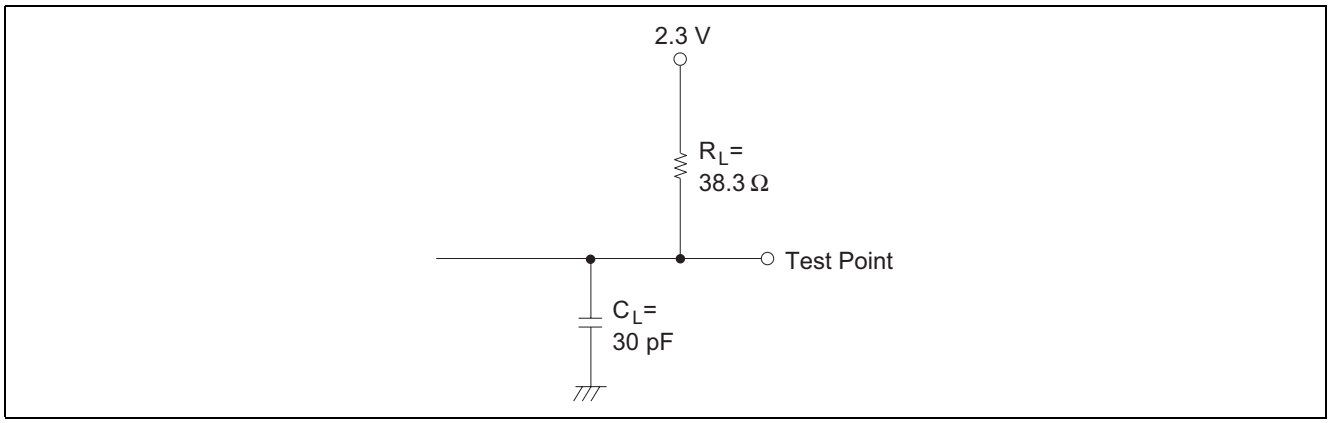
Note: 1. V_{CC} = 5 V, Ta = 25°C

Switching Characteristics (V_{CC} = 5 V, Ta = 25°C)

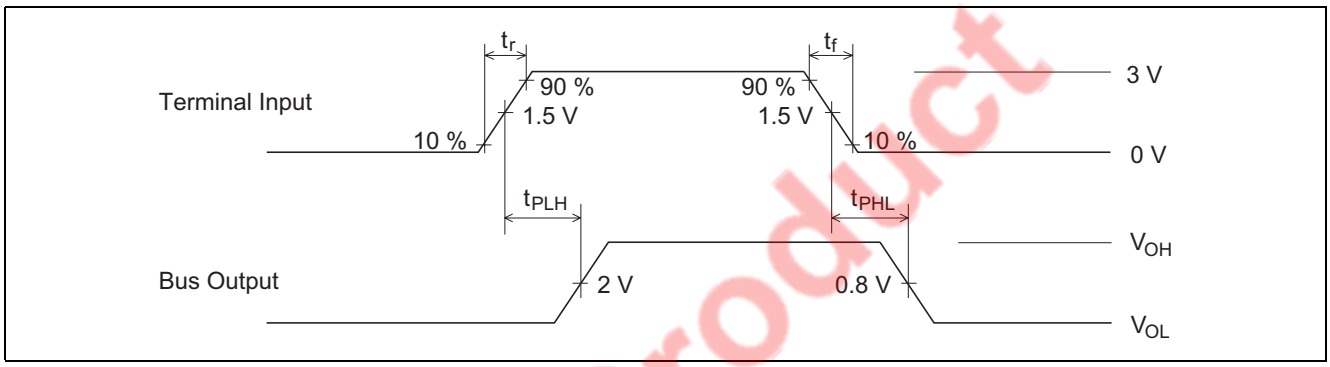
Item	Symbol	Input	Output	Min	Typ	Max	Unit	Test Circuit	Test Conditions
Propagation Delay Time	t_{PLH}	Terminal	BUS	—	14	20	ns	1	C_L = 30 pF
	t_{PHL}			—	14	20			R_L = 38.3 Ω to 2.3 V
	t_{PLH}	BUS	Terminal	—	12	20		2	C_L = 30 pF
	t_{PHL}			—	16	22			R_L = 240 Ω to 5 V
Output Enable Time	t_{ZH}	TE DC	BUS	—	—	60		3	C_L = 15 pF
Output Disable Time	t_{HZ}		ATTN, EO1	—	—	45			R_L = 480 Ω to 0 V
Output Enable Time	t_{ZL}		REN, IFC	—	—	60			C_L = 15 pF
Output Disable Time	t_{LZ}		and DAY	—	—	55			R_L = 38.3 Ω to 2.3 V
Output Enable Time	t_{ZH}	TE DC	Terminal	—	—	55		4	C_L = 15 pF
Output Disable Time	t_{HZ}			—	—	50			R_L = 3 kΩ to 0 V
Output Enable Time	t_{ZL}			—	—	45			C_L = 15 pF
Output Disable Time	t_{LZ}			—	—	55			R_L = 280 Ω to 5 V

Switching Time Test Method

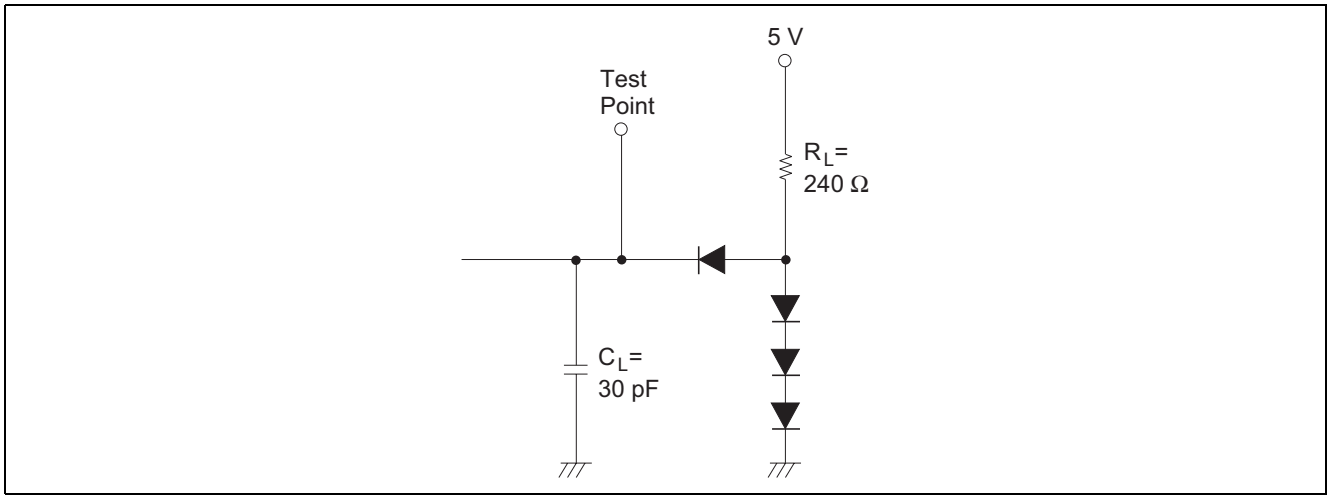
1. t_{PLH}, t_{PHL}



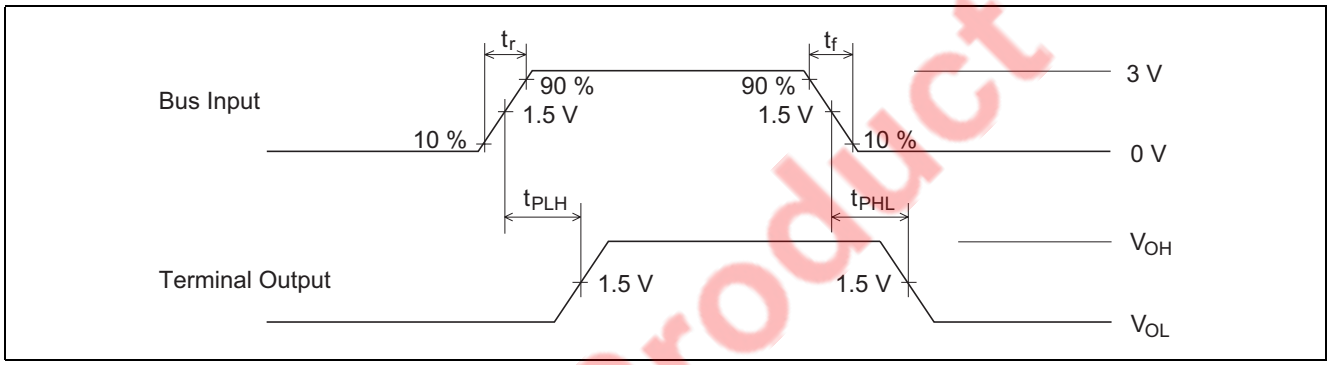
Waveforms-1



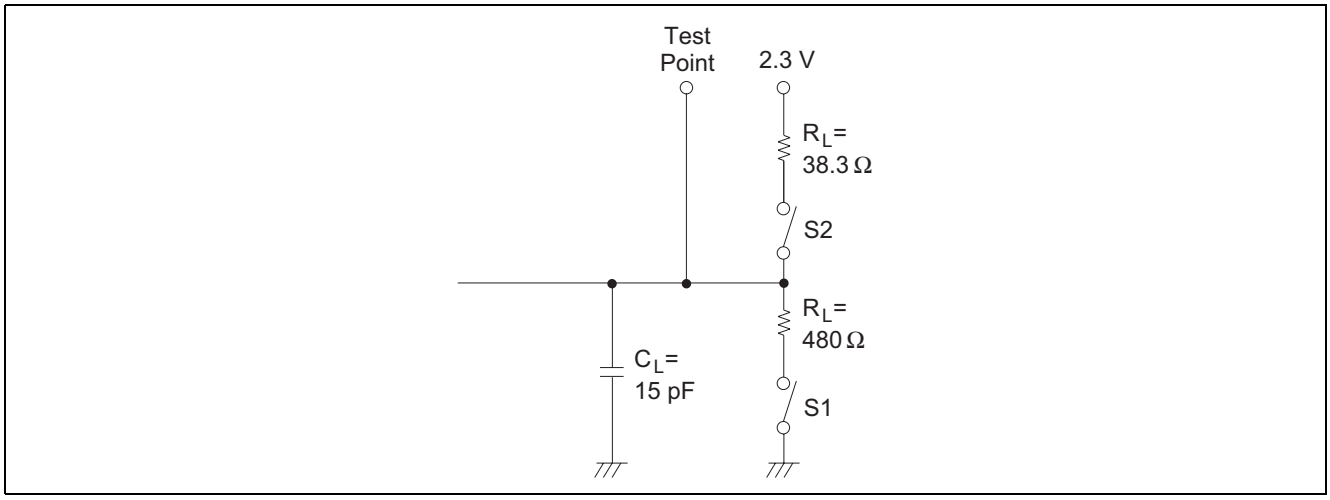
2. t_{PLH}, t_{PHL}



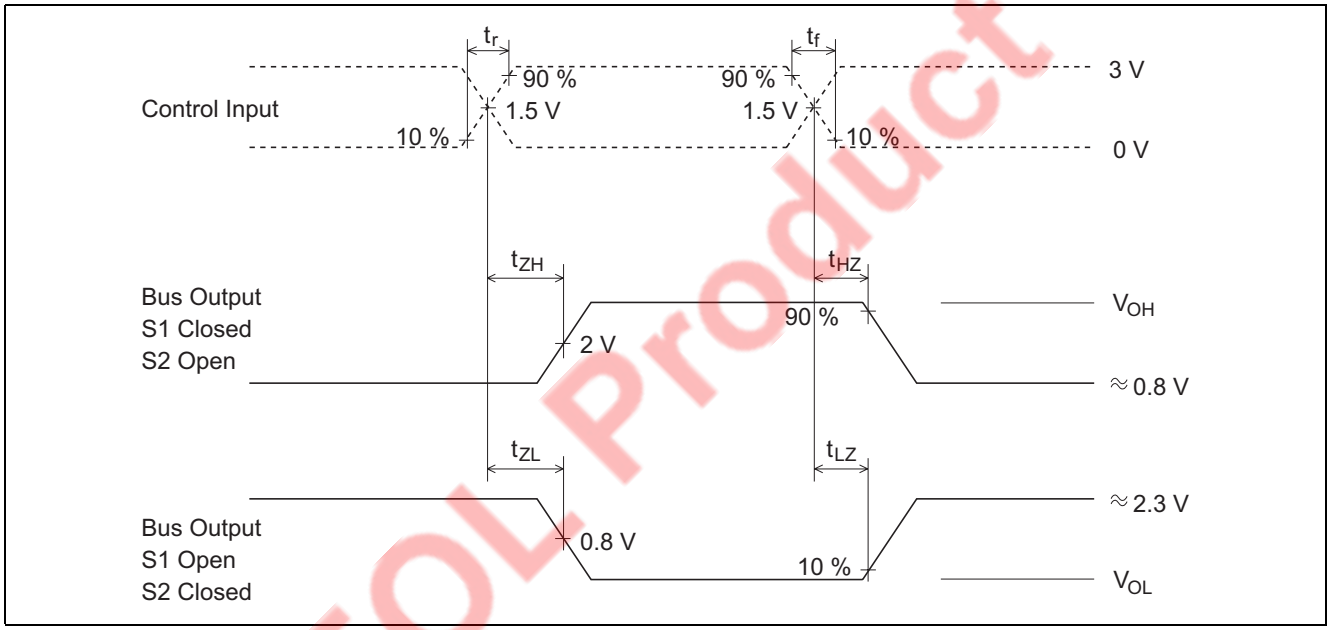
Waveforms-2



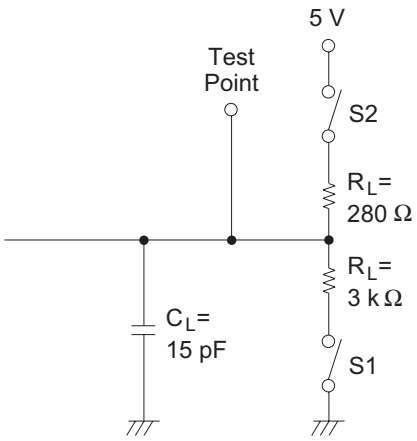
3. t_{ZH}, t_{HZ}, t_{ZL}, t_{LZ}



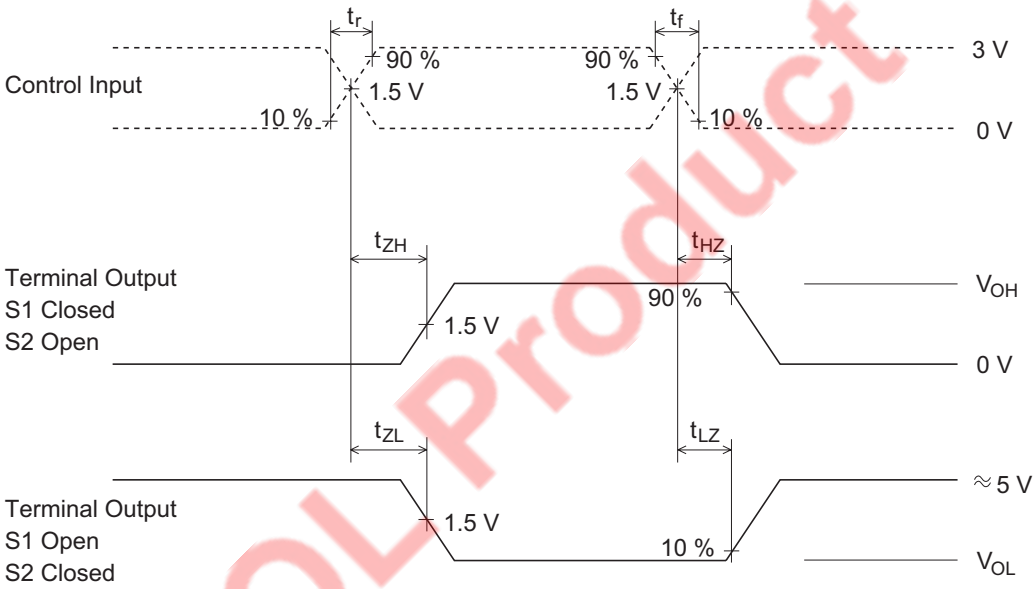
Waveforms-3



4. t_{ZH}, t_{HZ}, t_{ZL}, t_{LZ}



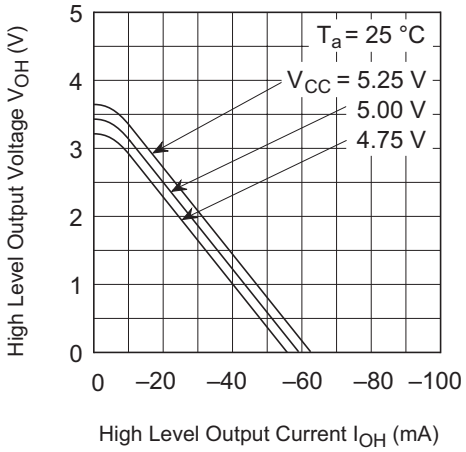
Waveforms-4



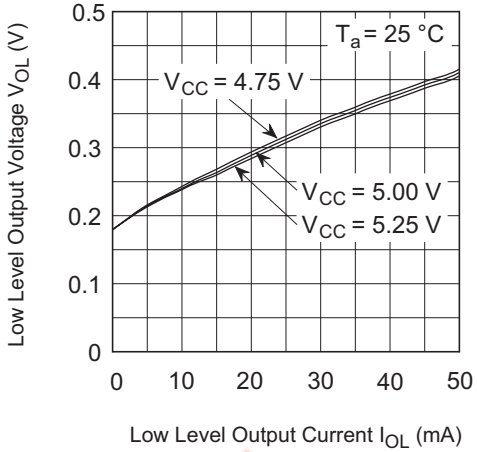
Notes:
1. The pulse generator has the following characteristics: PRR = 1 MHz, 50% duty cycle, t_r≤ 6 ns, t_f≤ 6 ns, Zout = 50 Ω
2. C_L includes probe and jig capacitance.
3. All diodes are 1S2074(H).

Characteristics Of Driver And Receiver

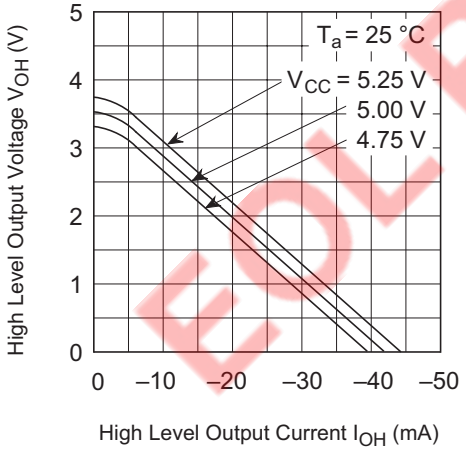
(a) Driver Output



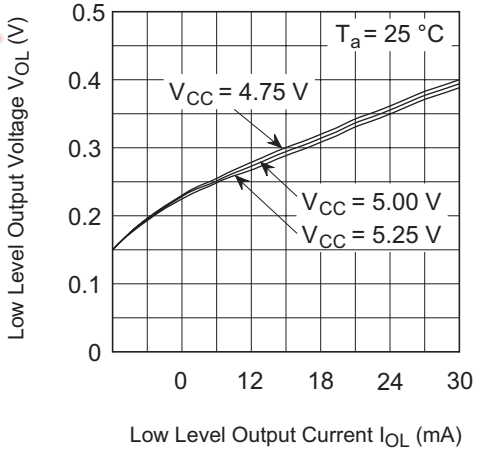
(b) Driver Output



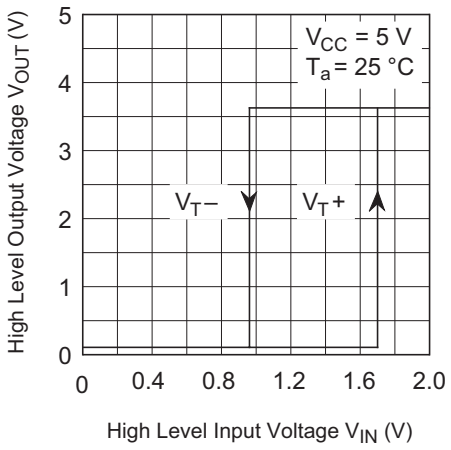
(c) Receiver Output



(d) Receiver Output



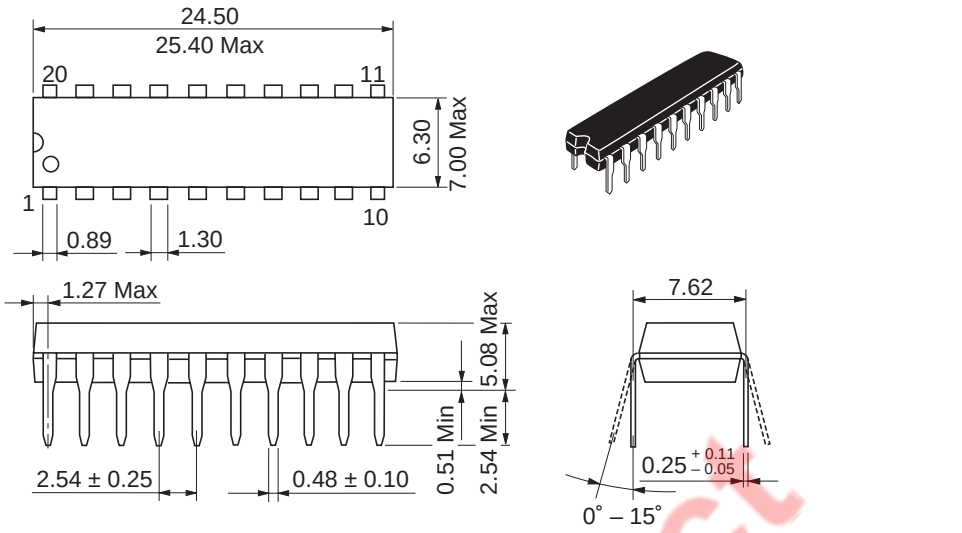
(e) Input / Output Characteristics at Receiver



Package Dimensions

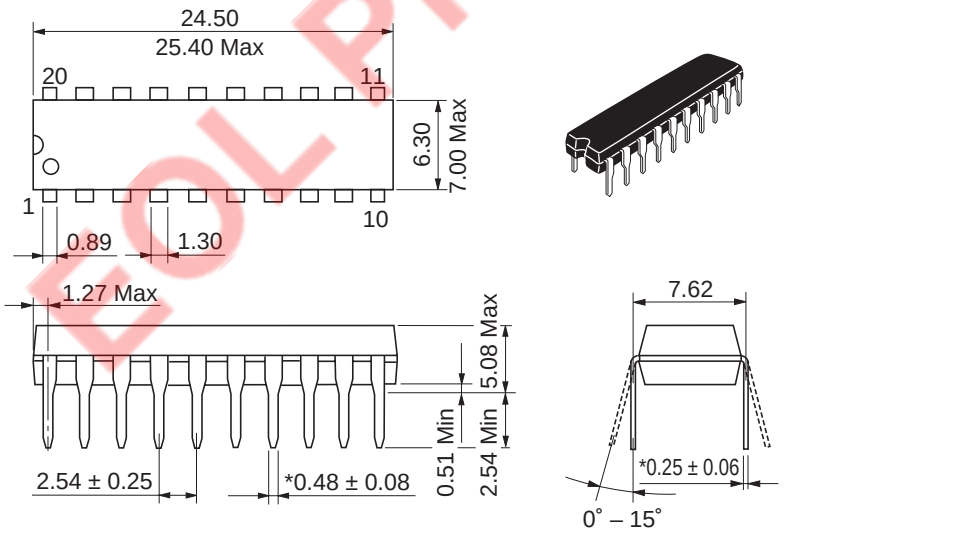
As of January, 2003

Unit: mm



Package Code	DP-20N
JEDEC	—
JEITA	Conforms
Mass (reference value)	1.26 g

Unit: mm



*NI/Pd/AU Plating

Package Code	DP-20NEV
JEDEC	—
JEITA	Conforms
Mass (reference value)	1.26 g

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