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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HD75160A

Octal General Purpose Interface Bus Transceivers

REJ03D0308–0200Z
(Previous ADE-205-590 (Z))
Rev.2.00
Jul.16.2004

Description

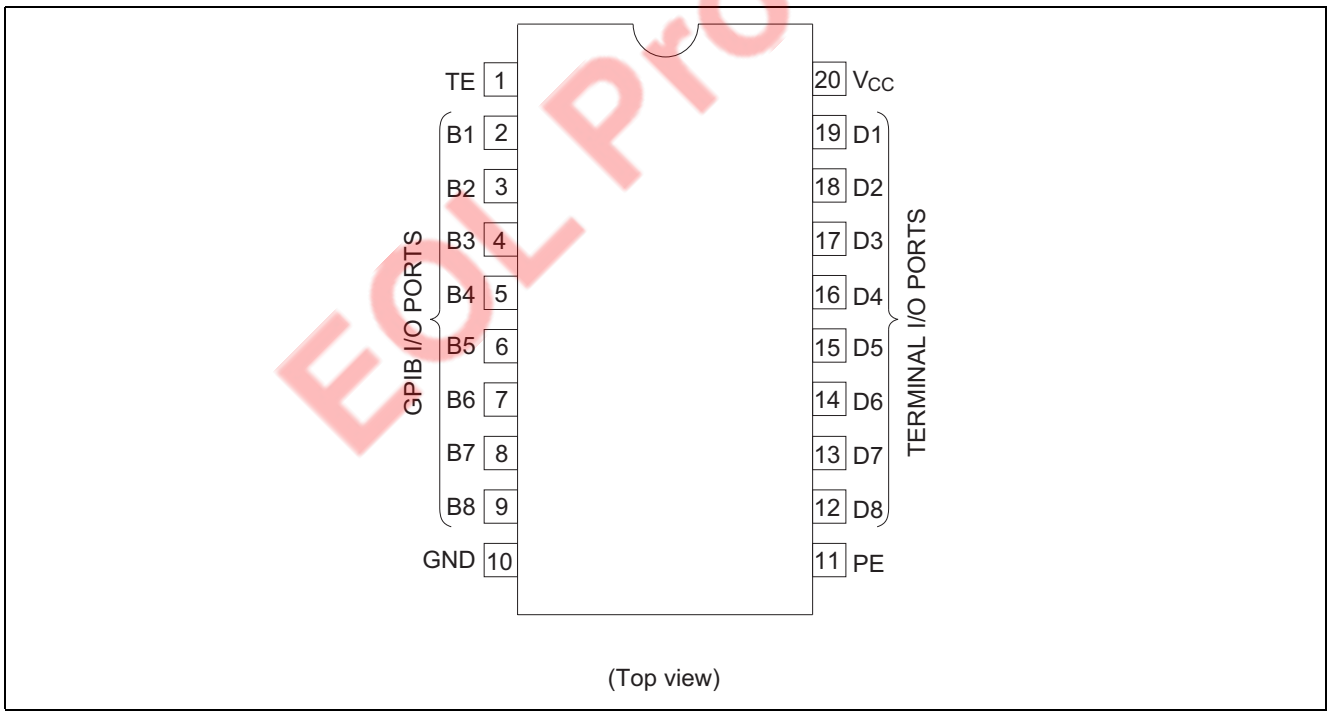
The HD75160A is an 8 channel general purpose interface bus transceiver designed to meet the requirements of IEEE standard 488-1978. The transceiver features driver outputs which can handle loads up to 48 mA of sink current if talk Enable(TE) is high, the ports have the characteristics of open collector outputs when pull up enable(PE) is low, and of three state outputs when PE is high. Taking TE low places the ports in the high impedance state. The device exhibits a high impedance to the bus when V_{CC} = 0 V since the bus terminating resistors are built in when combined with the HD75161A mangement bus transceivers, the pair provides the complete 16 wire interface for the IEEE-488 bus.

Features

- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD75160AP	DILP-20 pin	DP-20N, -20NEV	P	—

Pin Arrangement



(Top view)

Function Table

Drivers				Receivers			
Input			Output B	Input			Output D
D	TE	PE		B	TE	PE	
H	H	H	H	L	L	X	L
L	H	X	L	H	L	X	H
H	X	L	Z*[1]	X	H	X	Z
X	L	X	Z*[1]				

H : High level

L : Low level

X : Irrelevant

Z : High impedance

Note: 1. This is the high impedance state of a normal three state output modified by the internal resistors to V_{CC} and ground.

Absolute Maximum Ratings

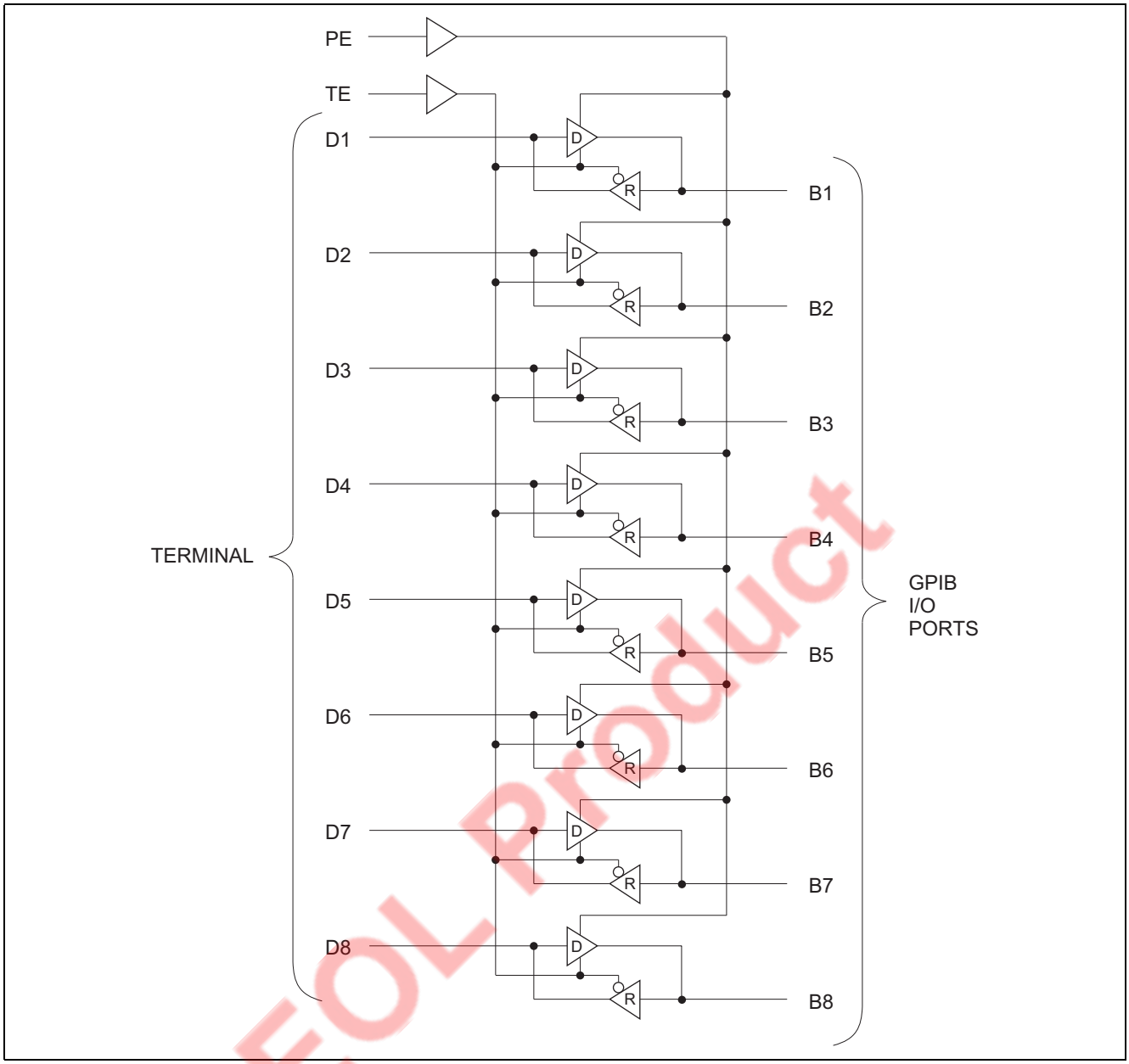
Item	Symbol	Rating	Unit
Supply Voltage	V_{CC}	7	V
Input Voltage	V_{IN}	5.5	V
Output Current	I_{OL}	100	mA
Power Dissipation (Ta = 25°C)	P_T	1150	mW
Operating temperature range	Topr	0 to 70	°C
Storage Temperature Range	Tstg	–65 to +150	°C

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 Pull Ups Active	I_{OH}	—	—	–5.2	mA
	Terminal Ports		—	—	–800	µA
Output Current	Bus Ports	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	II = –18 mA	
Hysteresis	Bus	$V_T^+ - V_T^-$	0.4	—	—	V		
IOutput Voltage	Terminal	V_{OH}	2.7	—	—	V	I_{OH} = –800 µA, TE at 0.8 V	
	Bus		2.5	—	—		I_{OH} = –5.2 mA, PE and TE at 2 V	
	Terminal	V_{OL}	—	—	0.5	V	I_{OL} = 16 mA, TE at 0.8 V	
	Bus		—	—	0.5		I_{OL} = 48 mA, TE at 2 V	
Input Current	Terminal	I_I	—	—	100	µA	V_I = 5.5 V	
		I_{IH}	—	—	20		V_I = 2.7 V	
		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
			—	—	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}	—	60	80	mA	No Load, Receivers Low and Enabled	
			—	75	100		No Load, Drivers Low and Enabled	
Busport Capacitance		$C_{I/O\ (bus)}$	—	30	—	pF	V_{CC} = 5 V or 0 V, $V_{I/O}$ = 0 to 2 V, f = 1 MHz	

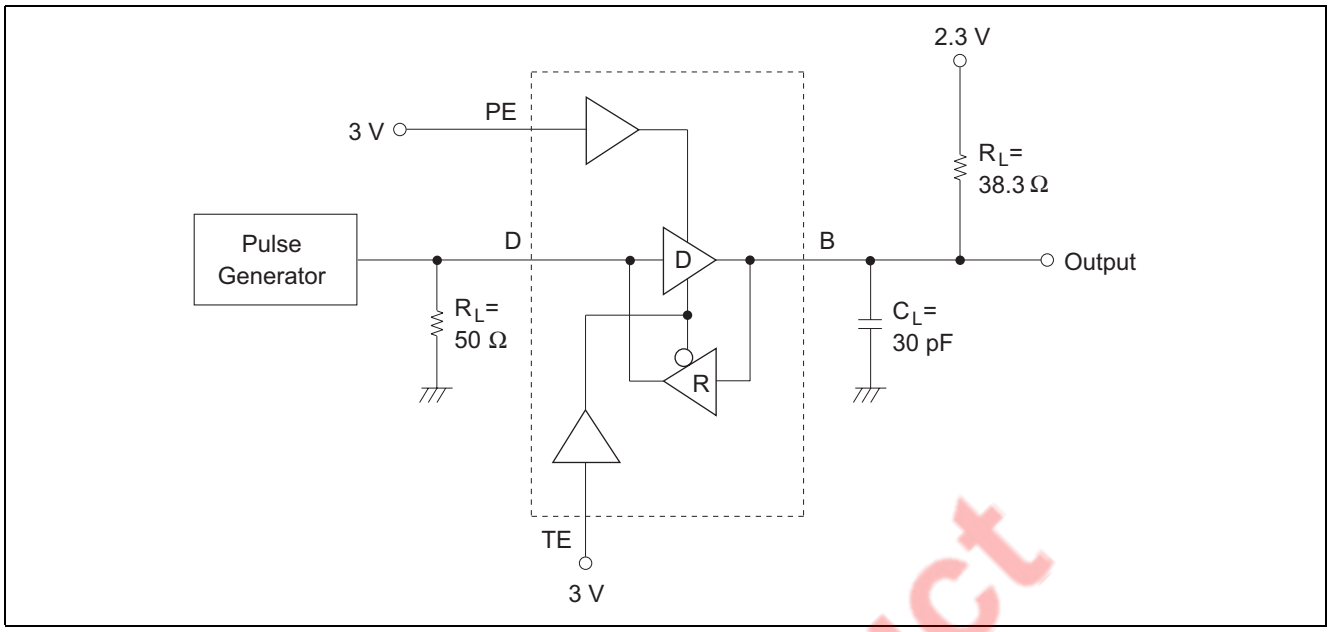
Note: 1. V_{CC} = 5 V, Ta = 25°C

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

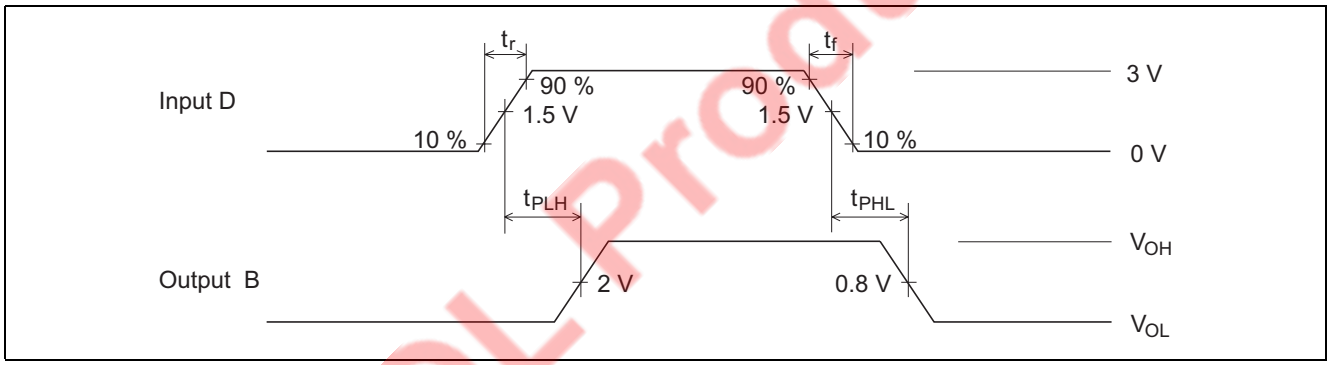
Item	Symbol	Input	Output	Min	Typ	Max	Unit	Test Circuit	Conditions
Propagation Delay Time	t_{PLH}	Terminal	BUS	—	14	20	ns	1	C_L = 30 pF
	t_{PHL}			—	14	20			R_L = 38.3 Ω to 2.3 V
	t_{PLH}	BUS	Terminal	—	12	20		2	C_L = 30 pF
	t_{PHL}			—	16	22			R_L = 240 Ω to 5 V
Output Enable Time	t_{ZH}	TE	BUS	—	25	35		3	C_L = 15 pF
Output Disable Time	t_{HZ}			—	13	22			R_L = 480 Ω to 0 V
Output Enable Time	t_{ZL}			—	22	35			C_L = 15 pF
Output Disable Time	t_{LZ}			—	22	32			R_L = 38.3 Ω to 2.3 V
Output Enable Time	t_{ZH}	TE	Terminal	—	20	30		4	C_L = 15 pF
Output Disable Time	t_{HZ}			—	12	20			R_L = 3 kΩ to 0 V
Output Enable Time	t_{ZL}			—	23	32			C_L = 15 pF
Output Disable Time	t_{LZ}			—	19	30			R_L = 280 Ω to 5 V
Output Pull up Enable Time	ten	PE	BUS	—	15	22		5	C_L = 15pF R_L = 480 Ω to 0 V
Output Pull up Disable Time	tdis			—	13	20			

Switching Time Test Method

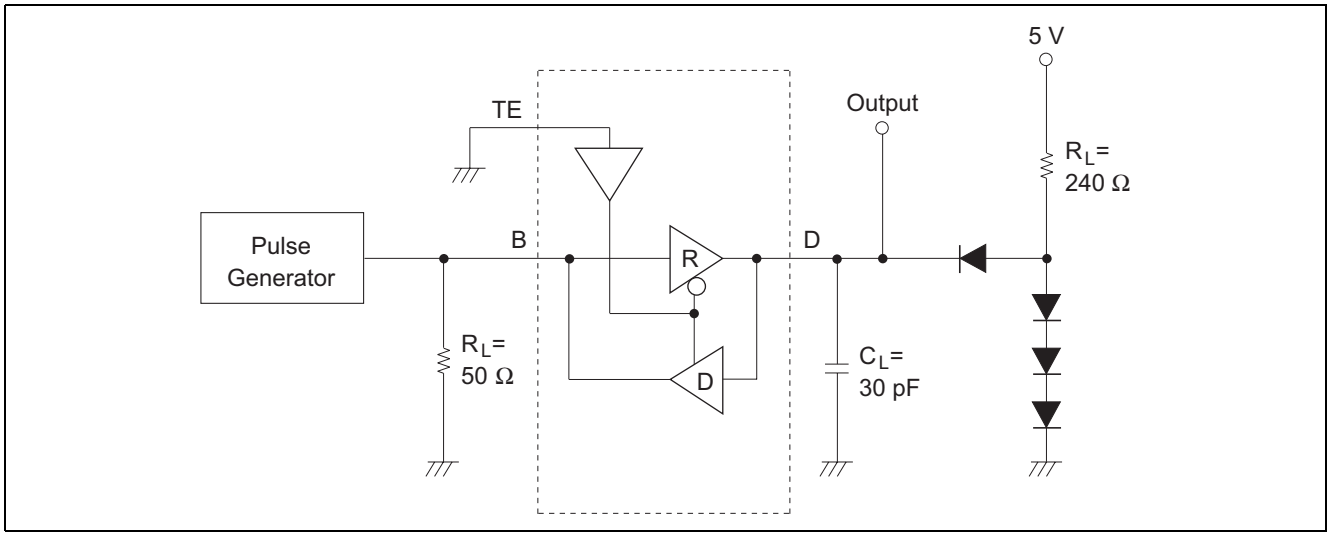
1. t_{PLH}, t_{PHL}



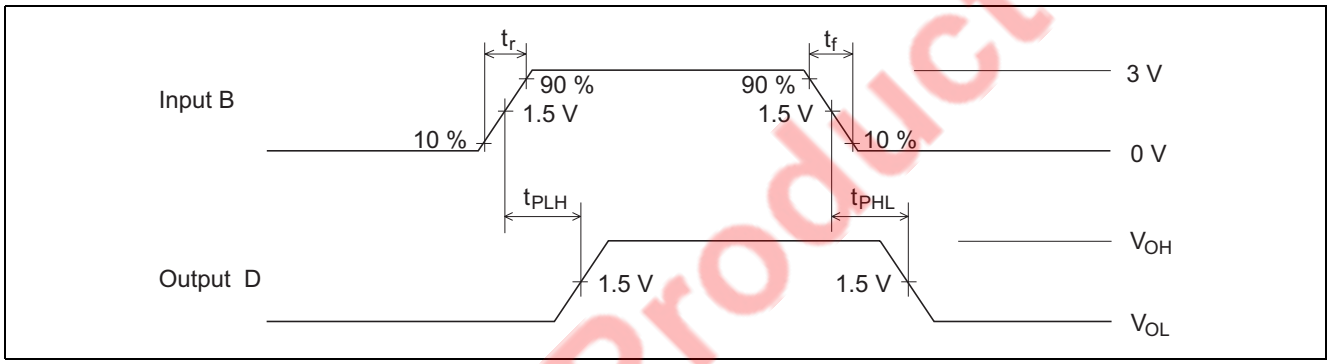
Waveforms-1



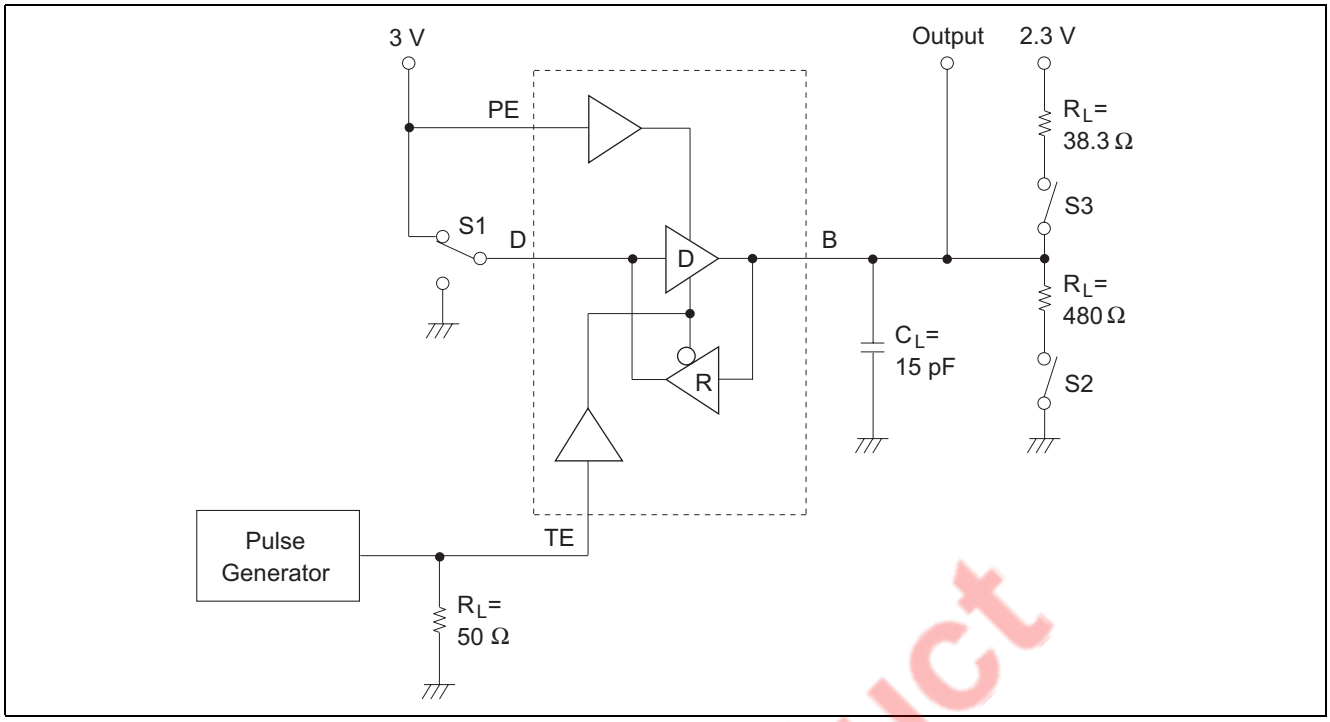
2. t_{PLH}, t_{PHL}



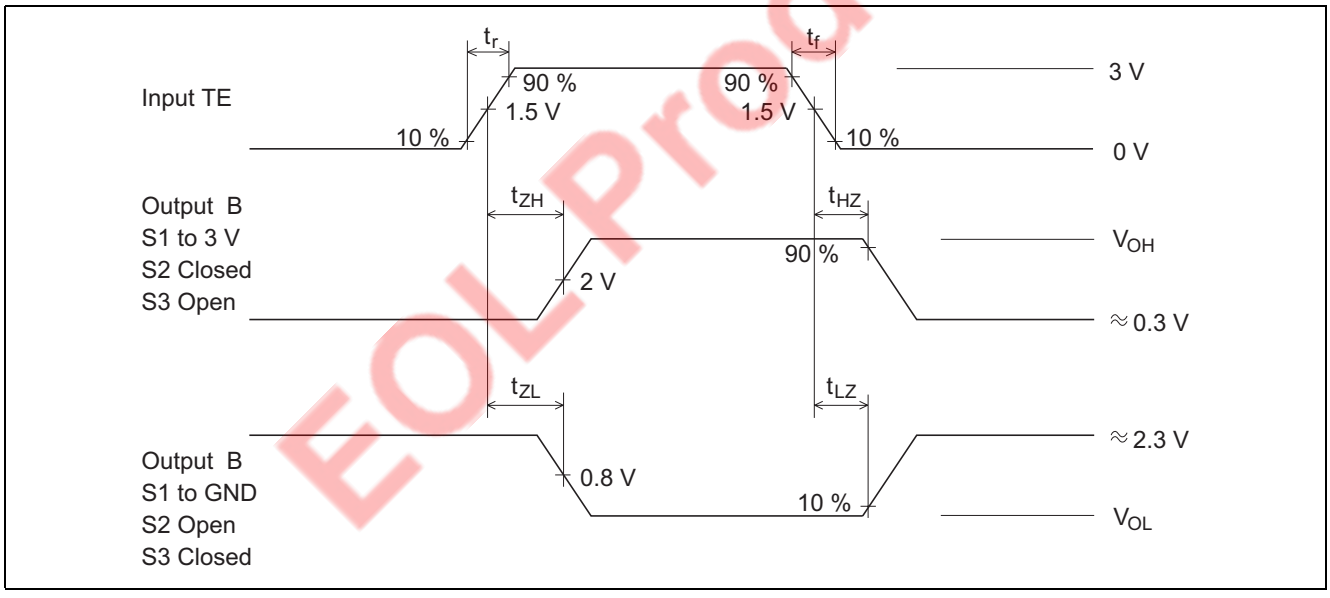
Waveforms-2



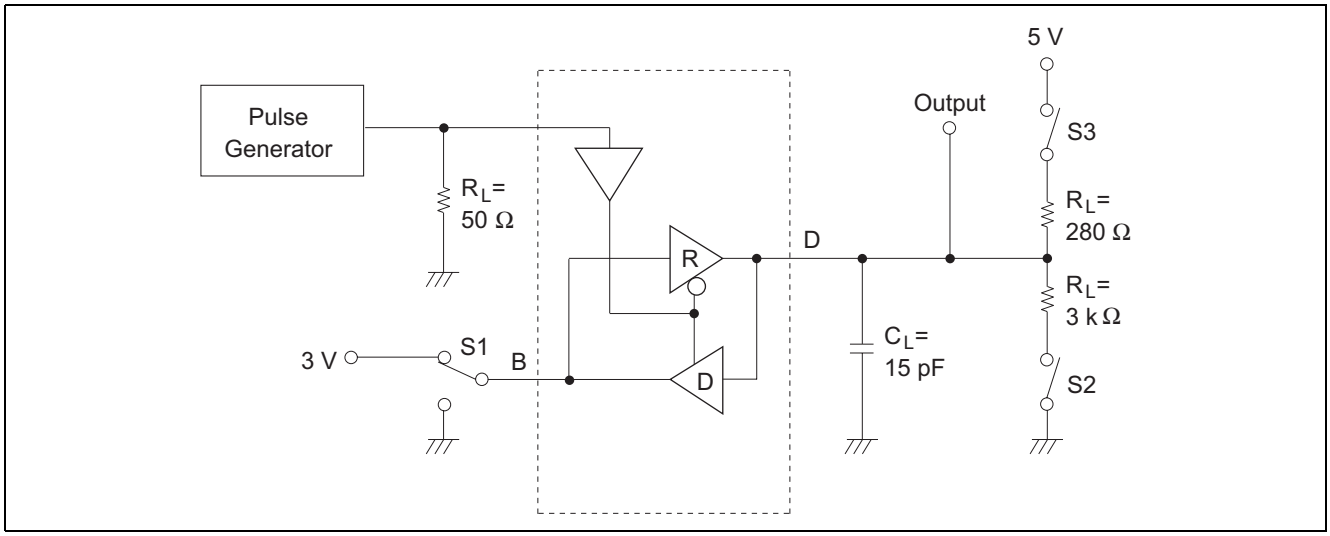
3. t_{ZH}, t_{HZ}, t_{ZL}, t_{LZ}



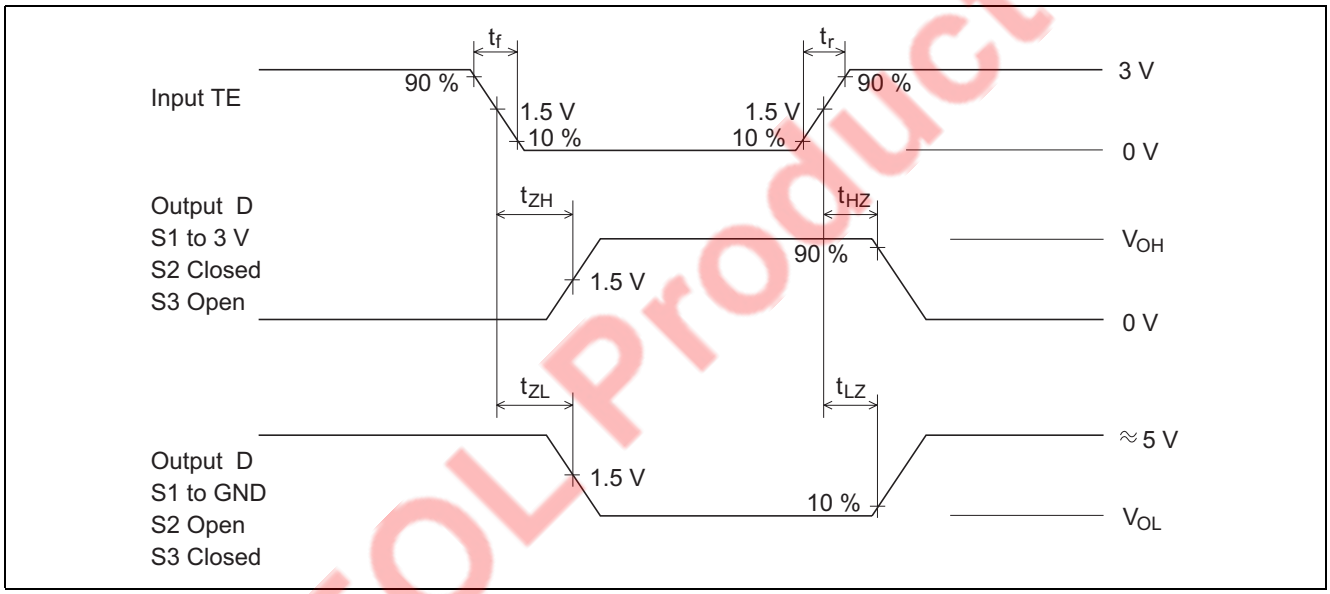
Waveforms-3



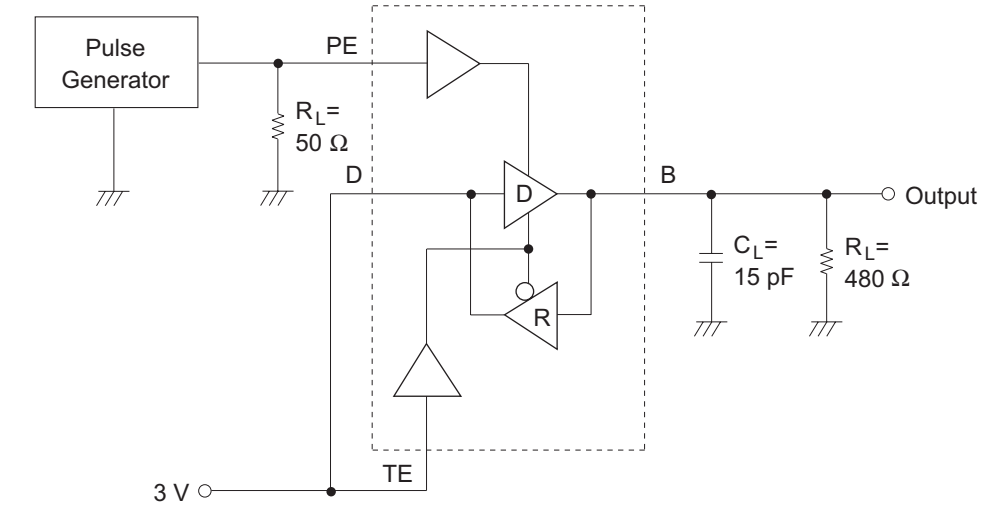
4. t_{ZH}, t_{HZ}, t_{ZL}, t_{LZ}



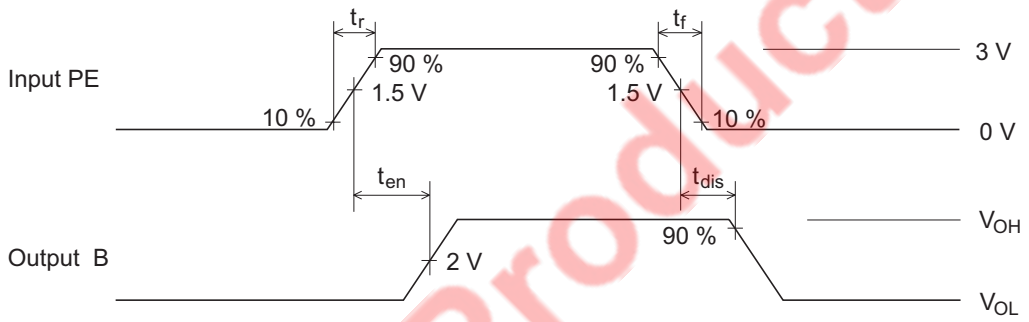
Waveforms-4



5. t_{en}, t_{dis}



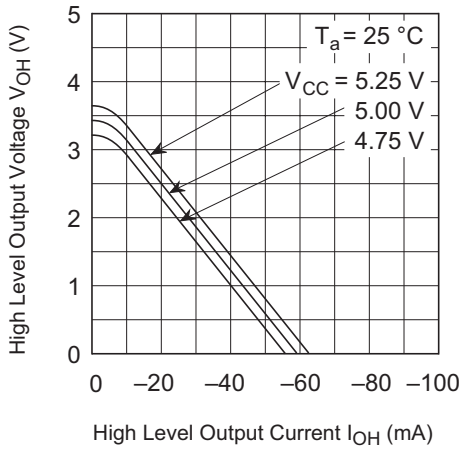
Waveforms-5



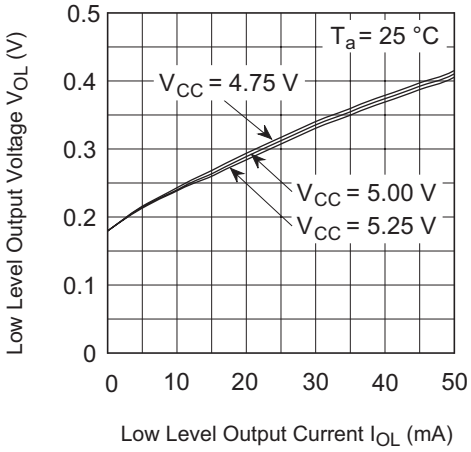
Notes:
1. The pulse generator has the following characteristics:
   PRR = 1 MHz, 50% duty cycle, $t_r \leq 6$ ns, $t_f \leq 6$ ns, Zout = 50 Ω
2. CL includes probe and jig capacitance.
3. All diodes are 1S2074(H).

Characteristics Of Driver And Receiver

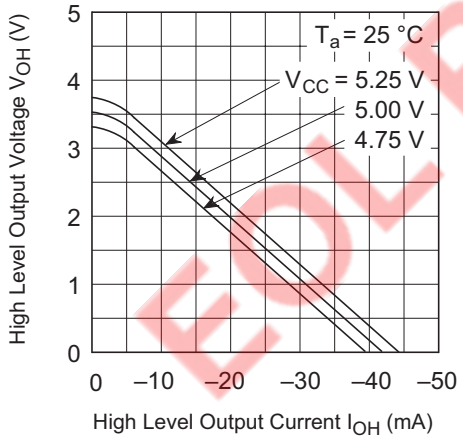
(a) Driver Output



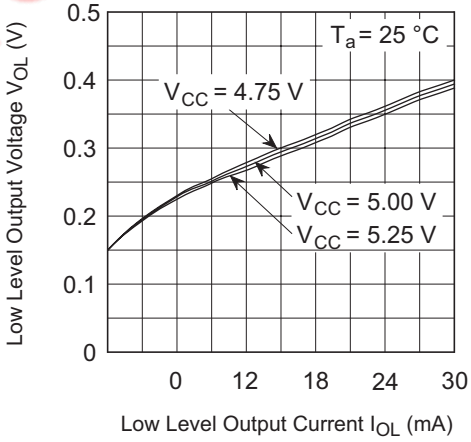
(b) Driver Output



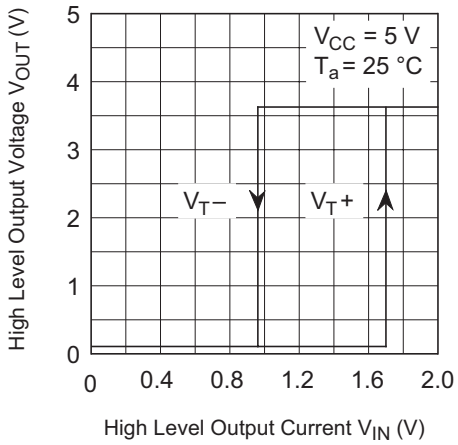
(c) Receiver Output



(d) Receiver Output



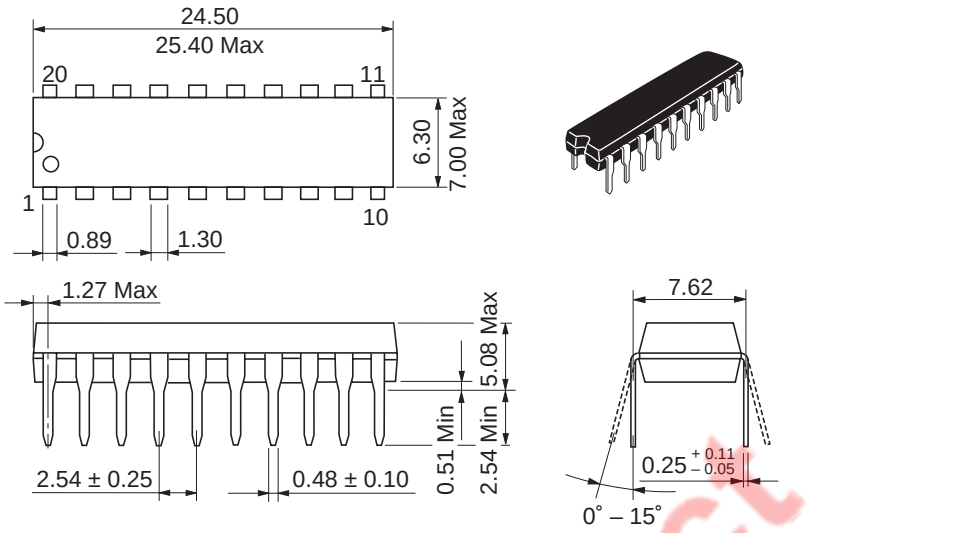
(e) Input / Output Characteristics at Receiver



Package Dimensions

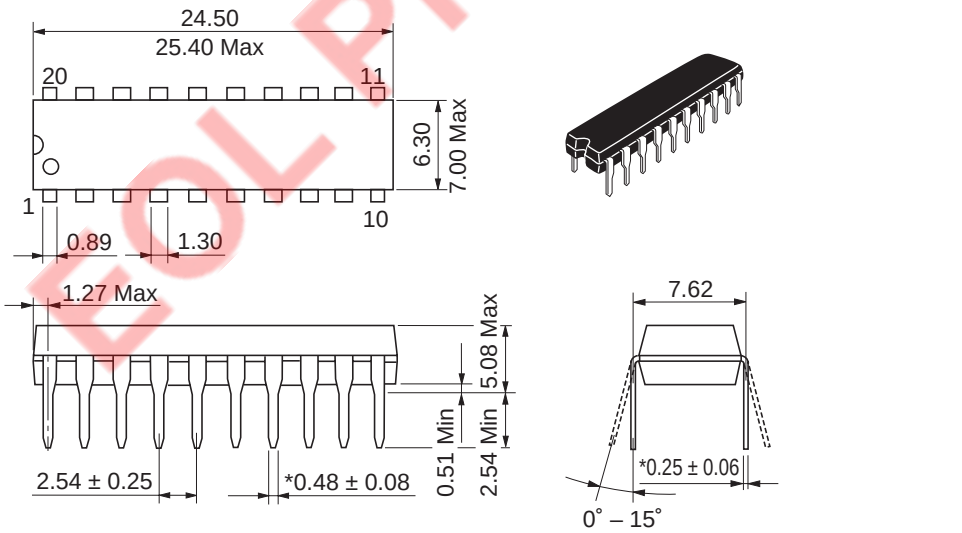
As of January, 2003

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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