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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HD29468

Triple Line Drivers/Receivers

REJ03D0307–0200Z
(Previous ADE-205-583 (Z))
Rev.2.00
Jul.16.2004

Description

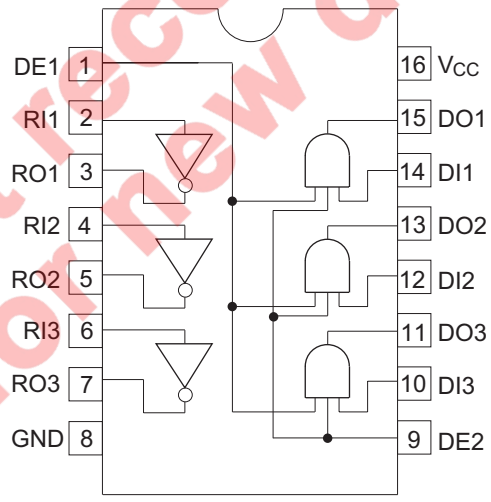
The HD29468 features line drivers and receivers for unbalanced transmissions, which meet the specs of IBM 360 and 370. This device has three drivers and receivers in one package. Input of driver and output of receiver are compatible with low power schottky TTL circuit and operates from a single 5 V power supply. The driver has two types of enable inputs. Sprius noise can be prevented by grounding either input when power supply is throw or cut off. The outputs are protected from short circuit and the wired logic is available due to emitter follower from for party line data bus applications. The device operates at high speed. Low to high level and high to low level propagation delay times defference are 10 ns max.

Features

- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD29468P	DILP-16 pin	DP-16E, -16FV	P	—

Pin Arrangement



(Top view)

Function Table

Driver				Receiver	
IInput			Output	Input	Output
DI	DE1	DE2	DO	RI	RO
L	X	X	L	L	H
X	L	X	L	H	L
X	X	L	L		
H	H	H	H		

H : High level
L : Low level
X : Immaterial

Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply Voltage	V_{CC}	+7	V
Driver Input Voltage	V_{ID}	–0.5 to +7	V
Driver Output Voltage	V_{OD}	–0.5 to +7	V
Receiver Input Voltage	V_{IR}	–0.5 to +7	V
Power Dissipation (Ta = 25°C)*1	DP	1000	mW
	FP	785	
Operating Temperature	Ta	0 to +75	°C
Storage Temperature	Tstg	–65 to +150	°C

Notes: 1. The above data were taken by the ΔV_{BE} method,mounting on a glass epoxy board (40 × 40 × 1.6 mm) of 10% wiring density.
2. 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
Operating Temperature	Ta	0	—	75	°C

Electrical Characteristics

Driver (V_{CC} = 5.0 V ± 5 %, Ta = 0 to +75°C)

Item		Symbol	Min	Max	Unit	Conditions
High Level Input Voltage		V_{IH}	2.0	—	V	
Low Level Input Voltage		V_{IL}	—	0.8	V	
Input Clamp Voltage		V_{IK}	—	–1.5	V	V_{CC} = 4.75 V, I_{IN} = –18 mA
High Level Output Voltage		V_{OH}	3.11	—	V	V_{CC} = 4.75 V, V_{IH} = 2.0 V I_{OH} = –59.3 mA (Ta = 25°C)
			—	4.1		V_{CC} = 5.25 V, V_{IH} = 2.0 V I_{OH} = –78.1 mA
Low Level Output Voltage		V_{OL}	—	0.15	V	V_{CC} = 5.25 V, V_{IL} = 0.8 V I_{OL} = –0.24 mA, V_{IH} = 4.5 V
High Level Input Current	DI	I_{IH}	—	20	µA	V_{CC} = 5.25 V, V_{IH} = 2.7 V
	DE		—	60		V_{CC} = 5.25 V, V_{IH} = 2.7 V
Low Level Input Current	DI	I_{IL}	—	–400	µA	V_{CC} = 5.25 V, V_{IL} = 0.4 V
	DE		—	–1200		V_{CC} = 5.25 V, V_{IL} = 0.4 V
High Level Output Current		I_{OH}	—	100	µA	V_{CC} = 4.75 V, V_{IL} = 0 V, V_{OH} = 5.0 V
			—	100		V_{CC} = 4.75 V, V_{IH} = 4.5 V, V_{OH} = 5.0 V
Short Circuit Output Current		I_{OS}	—	–30	mA	V_{CC} = 5.25 V, V_{IH} = 4.5 V

Receiver (Ta = 0 to +75°C)

Item	Symbol	Min	Max	Unit	Conditions	
High Level Output Threshold Voltage	V_{OTH}	2.7	—	V	V_{CC} = 4.75 V, V_{IL} = 1.15 V I_{OH} = –400 µA	
Low Level Output Threshold Voltage	V_{OTL}	—	0.5	V	V_{CC} = 5.25 V, V_{IH} = 1.55 V I_{OL} = 8 mA	
High Level Output Voltage	V_{OH}	2.7	—	V	V_{CC} = 4.75 V, V_{IN}: Open I_{OH} = –400 µA	
Low Level Output Voltage	V_{OL}	—	0.5	V	V_{CC} = 4.75 V	I_{OL} = 8 mA
		—	0.4		V_{IH} = 1.55 V	I_{OL} = 4 mA
Input Resistance	R_{IN}	7.4	20	KΩ	V_{CC} = 0 V	
High Level Input Current	I_{IH}	—	0.42	mA	V_{CC} = 4.75 V, V_{IH} = 3.11 V	
Low Level Input Current	I_{IL}	0.04	-0.24	mA	V_{CC} = 5.25 V, V_{IL} = 0.15 V	
Short Circuit Output Current	I_{OS}	–20	–100	mA	V_{CC} = 5.25 V, V_{IL} = 0 V	

Driver/Receiver (Ta = 0 to +75°C)

Item	Symbol	Min	Max	Unit	Conditions
Supply Voltage	I_{CCH}	—	37	mA	V_{CC} = 5.25 V, V_{IH} = 4.5 V
	I_{CCL}	—	55		V_{CC} = 5.25 V, V_{IL} = 0 V

Switching Characteristics

Driver (V_{CC} = 5.0 V, Ta = 25°C)

Item	Symbol	Min	Max	Unit	Conditions
Rise Propagation Delay Time	t_{PLH}	6.5	18.5	ns	R_L = 47.5 Ω
Fall Propagation Delay Time	t_{PHL}	6.5	18.5	ns	
Propagation Delay Time Difference*[1]	Δt_{PD}	—	10	ns	

Note: 1. $\Delta t_{PD} = |t_{PLH} - t_{PHL}|$

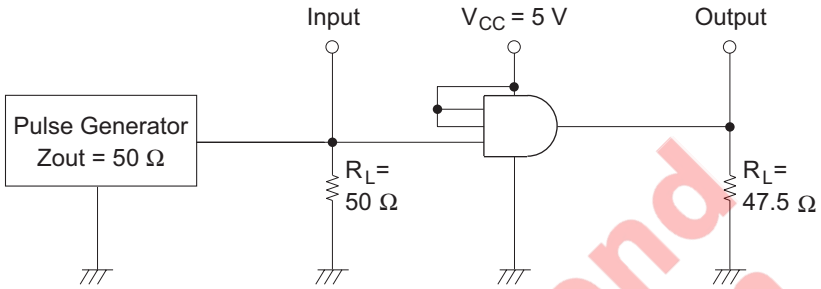
Receiver (V_{CC} = 5.0 V, Ta = 25°C)

Item	Symbol	Min	Max	Unit	Conditions
Rise Propagation Delay Time	t_{PLH}	7.5	19.5	ns	R_L = 2 KΩ, C_L = 15pF
Fall Propagation Delay Time	t_{PHL}	7.5	19.5	ns	R_L = 2 KΩ, C_L = 15pF
Propagation Delay Time Difference*1	Δt_{PD}	—	10	ns	R_L = 2 KΩ, C_L = 15pF

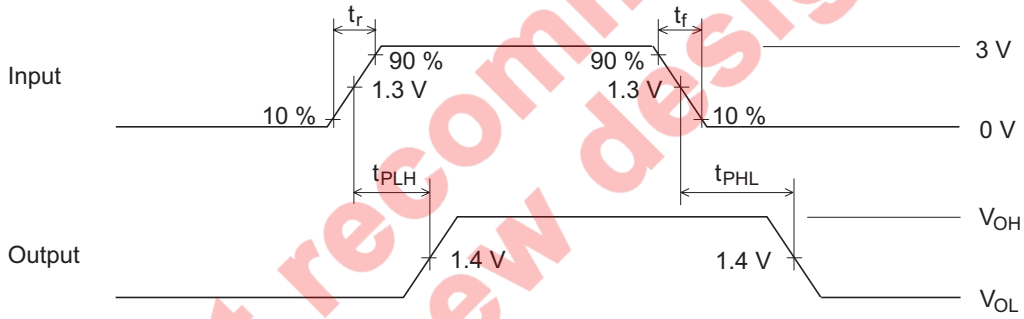
Note: 1. $\Delta t_{PD} = |t_{PLH} - t_{PHL}|$

Driver

Test Circuit



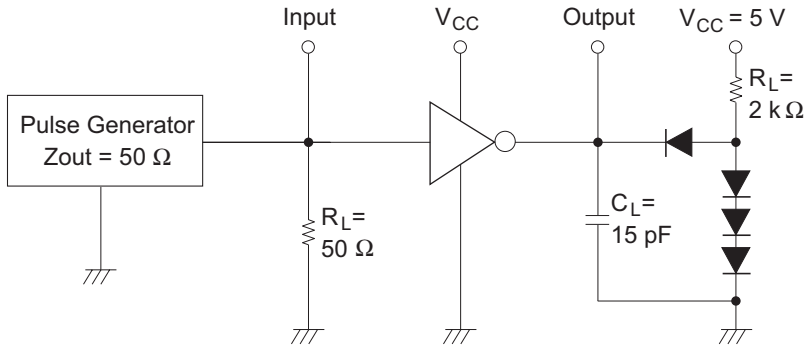
Waveforms



Notes: 1. t_r = 15 ns, t_f = 6 ns
2. Input waveforms: PRR = 1 MHz, duty cycle 50%

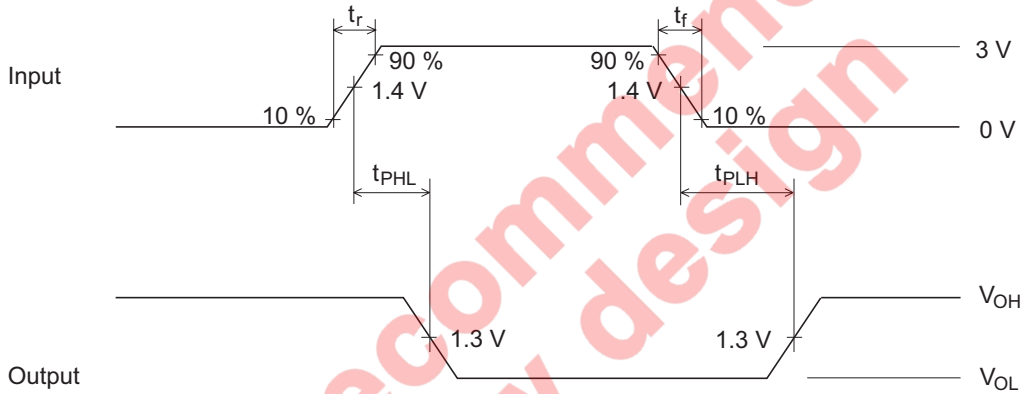
Receiver

Test Circuit



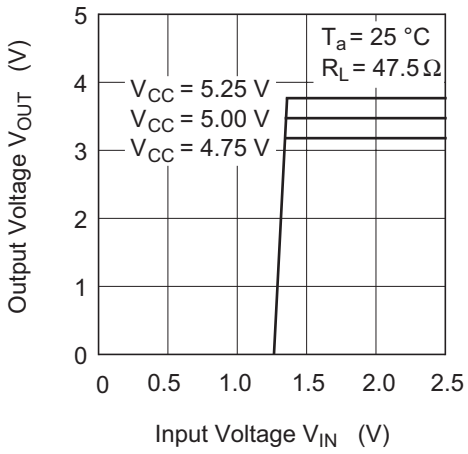
Note: 1. C_L includes probe and jig capacitance.

Waveforms

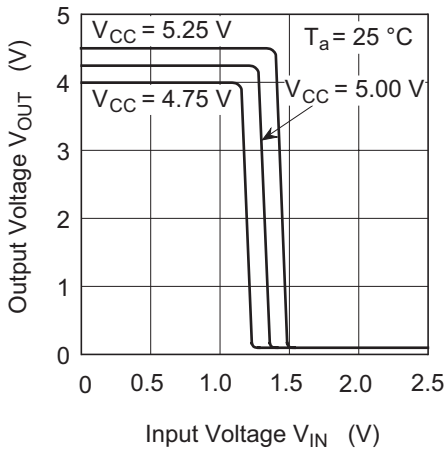


Notes: 1. $t_r = t_f$ = 10 ns
2. Input waveforms: PRR = 1 MHz, duty cycle 50%

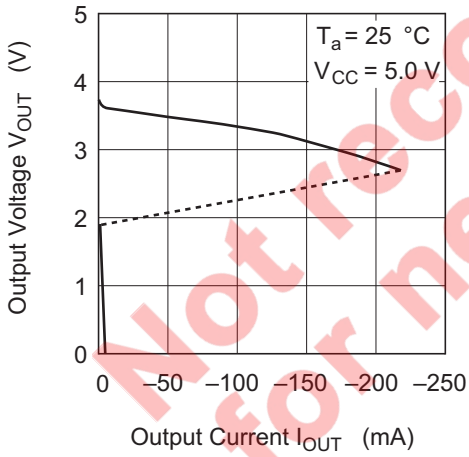
Driver $V_{IN} - V_{OUT}$



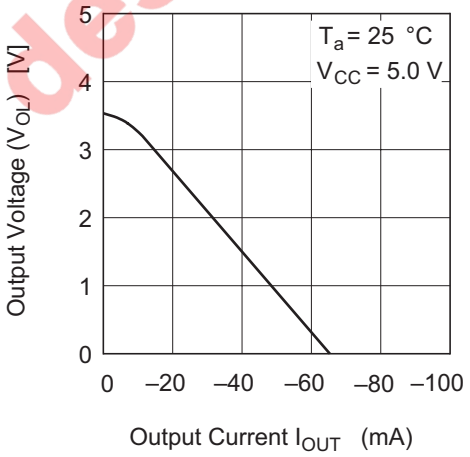
Receiver $V_{IN} - V_{OUT}$



Driver $I_{OUT} - V_{OUT}$



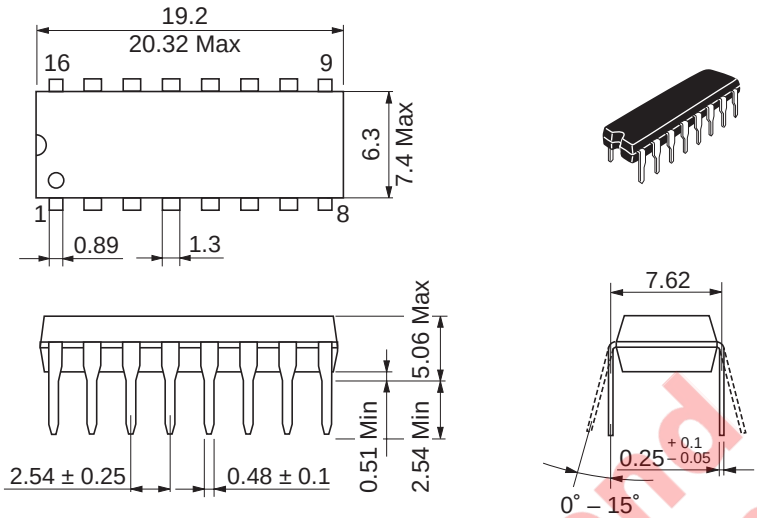
Receiver $I_{OUT} - V_{OUT}$



Package Dimensions

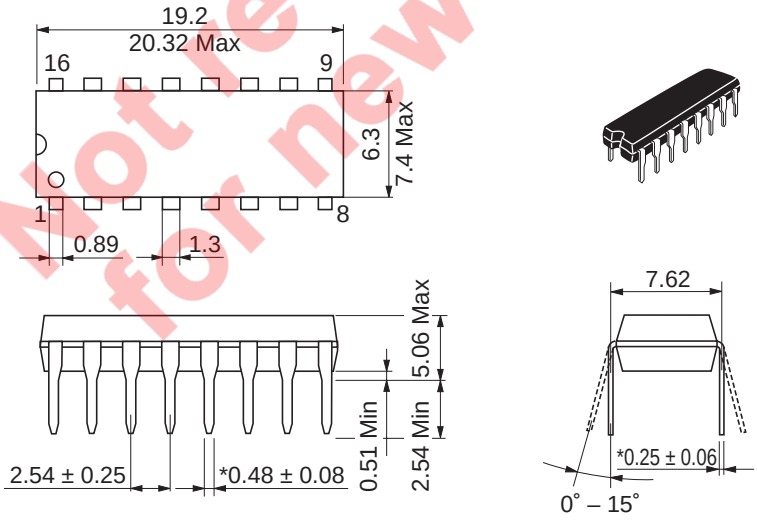
As of January, 2003

Unit: mm



Package Code	DP-16E
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	1.05 g

Unit: mm



*NI/Pd/AU Plating

Package Code	DP-16FV
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	1.05 g

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