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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HD74LS640

Octal Bus Transceivers (inverted 3-state outputs)

REJ03D0487–0200
Rev.2.00
Feb.18.2005

This octal bus transceivers is designed for asynchronous two-way communication between data buses. The device transmit data from the A bus to the B bus or from the B bus to the A bus depending upon the level at the direction control (DIR) input. The enable input ($\overline{G}$) can be used to disable the device so that the buses are effectively isolated.

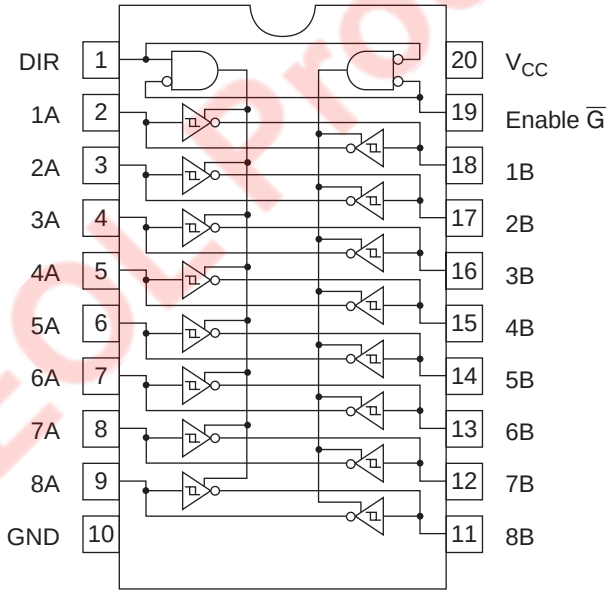
Features

- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LS640P	DILP-20 pin	PRDP0020AC-B (DP-20NEV)	P	—
HD74LS640FPEL	SOP-20 pin (JEITA)	PRSP0020DD-B (FP-20DAV)	FP	EL (2,000 pcs/reel)

Note: Please consult the sales office for the above package availability.

Pin Arrangement



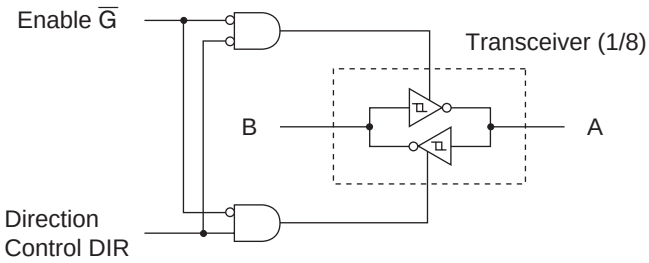
(Top view)

Function Table

Enable $\overline{G}$	Direction Control DIR	Operation
L	L	$\overline{B}$ data to A bus
L	H	$\overline{A}$ data to B bus
H	X	Isolation

Note: H; high level, L; low level, X; irrelevant

Block Diagram



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage	V_{CC}	7	V
Input voltage	V_{IN}	7	V
Power dissipation	P_T	400	mW
Storage temperature	Tstg	–65 to +150	°C

Note: Voltage value, unless otherwise noted, are with respect to network ground terminal.

Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit
Supply voltage	V_{CC}	4.75	5.00	5.25	V
Output current	I_{OH}	—	—	–15	mA
	I_{OL}	—	—	24	mA
Operating temperature	Topr	–20	25	75	°C

Electrical Characteristics

(Ta = –20 to +75 °C)

Item		Symbol	min.	typ.*	max.	Unit	Condition	
Input voltage		V_{IH}	2.0	—	—	V		
		V_{IL}	—	—	0.8	V		
Hysteresis		$V_T^+ - V_T^-$	0.2	—	—	V	V_{CC} = 4.75 V	
Output voltage		V_{OH}	2.4	—	—	V	I_{OH} = –3 mA	V_{CC} = 4.75 V, V_{IH} = 2 V, V_{IL} = 0.8 V
			2	—	—	V	I_{OH} = –15 mA	
		V_{OL}	—	—	0.4	V	I_{OL} = 12 mA	V_{CC} = 4.75 V, V_{IH} = 2 V, V_{IL} = 0.8 V
			—	—	0.5	V	I_{OL} = 24 mA	
Output current		I_{OZH}	—	—	20	µA	V_O = 2.7 V	V_{CC} = 5.25 V, $\overline{G}$ input = 2 V
		I_{OZL}	—	—	–400	µA	V_O = 0.4 V	
Input current		I_{IH}	—	—	20	µA	V_{CC} = 5.25 V, V_I = 2.7 V	
		I_{IL}	—	—	–400	µA	V_{CC} = 5.25 V, V_I = 0.4 V	
	A or B	I_I	—	—	0.1	mA	V_I = 5.5 V	V_{CC} = 5.25 V
	DIR or $\overline{G}$		—	—	0.1	mA	V_I = 7 V	
Short-circuit output current		I_{OS}**	–40	—	–225	mA	V_{CC} = 5.25 V	
Supply current		I_{CCH}	—	48	70	mA	V_{CC} = 5.25 V, Output open	
		I_{CCL}	—	62	90	mA		
		I_{CCZ}	—	64	95	mA		
Input clamp voltage		V_{IK}	—	—	–1.5	V	V_{CC} = 4.75 V, I_{IN} = –18 mA	

Notes: * V_{CC} = 5 V, Ta = 25°C

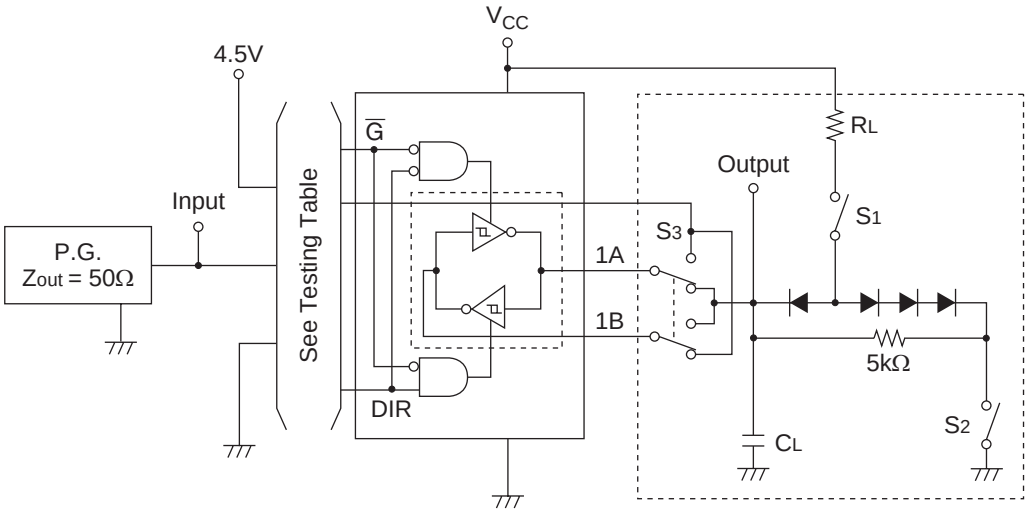
** Not more than one output shall be shorted at a time. the duration of the short circuit shall not exceed one second.

Switching Characteristics

(V_{CC} = 5 V, Ta = 25°C)

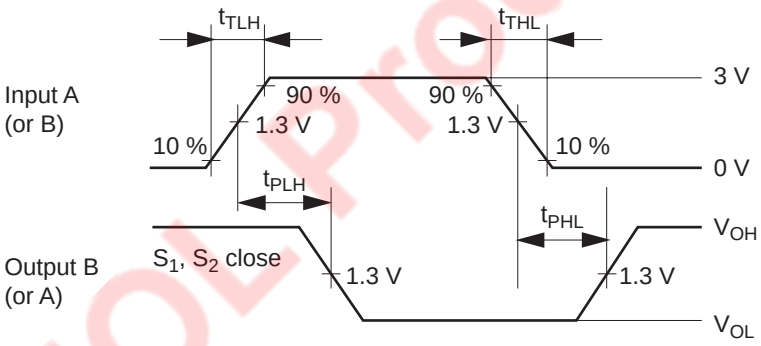
Item	Symbol	Inputs	Outputs	min.	typ.	max.	Unit	Condition
Propagation delay time	t_{PLH}	A	B	—	6	10	ns	C_L = 45 pF, R_L = 667 Ω
		B	A	—	6	10	ns	
	t_{PHL}	A	B	—	8	15	ns	
		B	A	—	8	15	ns	
Output enable time	t_{ZL}	$\overline{G}$	A	—	31	40	ns	
		$\overline{G}$	B	—	31	40	ns	
	t_{ZH}	$\overline{G}$	A	—	23	40	ns	
		$\overline{G}$	B	—	23	40	ns	
Output disable time	t_{LZ}	$\overline{G}$	A	—	15	25	ns	C_L = 5 pF, R_L = 667 Ω
		$\overline{G}$	B	—	15	25	ns	
	t_{HZ}	$\overline{G}$	A	—	15	25	ns	
		$\overline{G}$	B	—	15	25	ns	

Testing Method



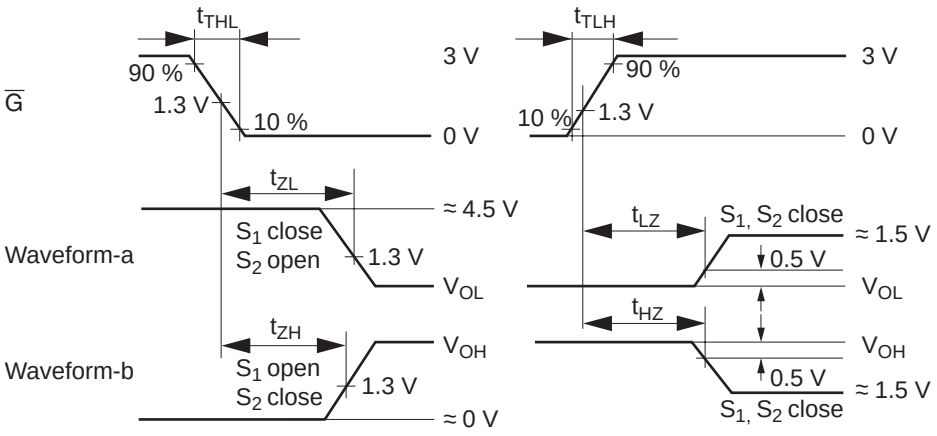
Notes:
1. C_L includes prove and jig capacitance.
2. 2A-2B, 3A-3B, 4A-4B, 5A-5B, 6A-6B, 7A-7B, 8A-8B, are identical to abobe load circuit.
3. S_3 is a input-output switch.
4. All diodes are 1S2074(H).

Waveforms 1



Note: Input pulse: $t_{TLH} \leq 15$ ns, $t_{THL} \leq 6$ ns, PRR = 1 MHz, duty cycle 50%

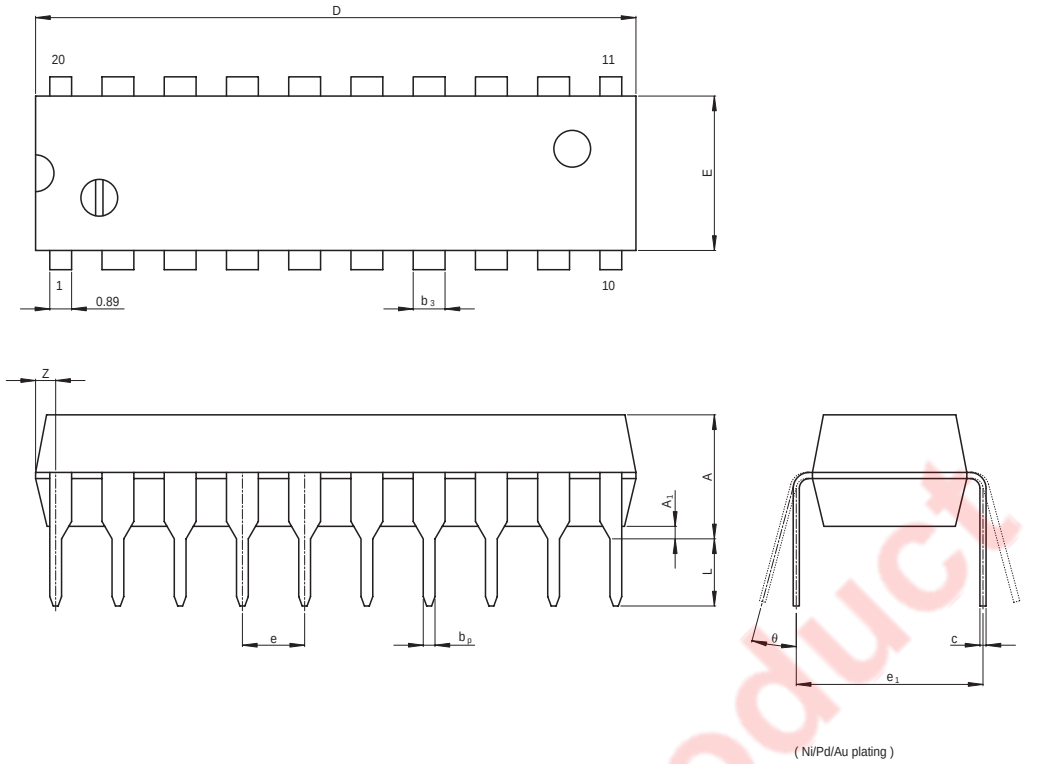
Waveforms 2



Notes:
1. Input pulse: $t_{TLH} \leq 15$ ns, $t_{THL} \leq 6$ ns, PRR = 1 MHz, duty cycle 50%
2. Waveform a is an output by internal conditions like "L" except for the case where an output is disabled by output control.
3. Waveform b is an output by internal conditions like "H" except for the case where an output is disabled by output control.

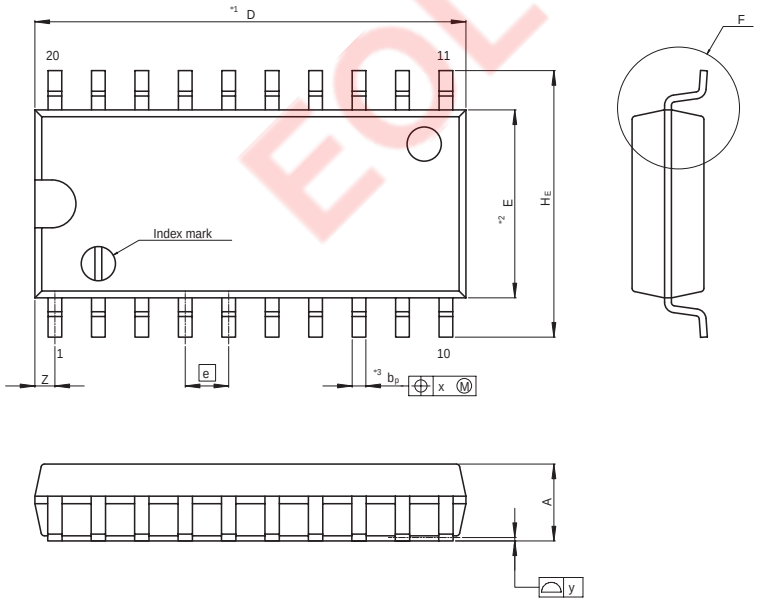
Package Dimensions

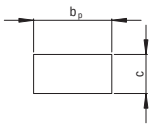
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-DIP20-6.3x24.5-2.54	PRDP0020AC-B	DP-20NEV	1.26g



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e 1	—	7.62	—
D	—	24.50	25.40
E	—	6.30	7.00
A	—	—	5.08
A 1	0.51	—	—
b p	0.40	0.48	0.56
b 3	—	1.30	—
c	0.19	0.25	0.31
θ	0°	—	15°
e	2.29	2.54	2.79
Z	—	—	1.27
L	2.54	—	—

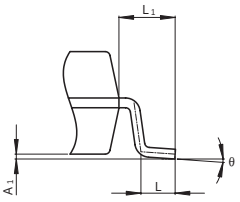
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP20-5.5x12.6-1.27	PRSP0020DD-B	FP-20DAV	0.31g





Terminal cross section
(Ni/Pd/Au plating)

NOTE)
1. DIMENSIONS"*1 (Nom)"AND"*2"
DO NOT INCLUDE MOLD FLASH.
2. DIMENSION"*3"DOES NOT
INCLUDE TRIM OFFSET.



Detail F

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	12.60	13.0
E	—	5.50	—
A 2	—	—	—
A 1	0.00	0.10	0.20
A	—	—	2.20
b p	0.34	0.40	0.46
b 1	—	—	—
c	0.15	0.20	0.25
c 1	—	—	—
θ	0°	—	8°
HE	7.50	7.80	8.00
e	—	1.27	—
x	—	—	0.12
y	—	—	0.15
Z	—	—	0.80
L	0.50	0.70	0.90
L 1	—	1.15	—

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