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FIVE OUTPUT 3.3V CLOCK BUFFER

IDT2305NZ

FEATURES:

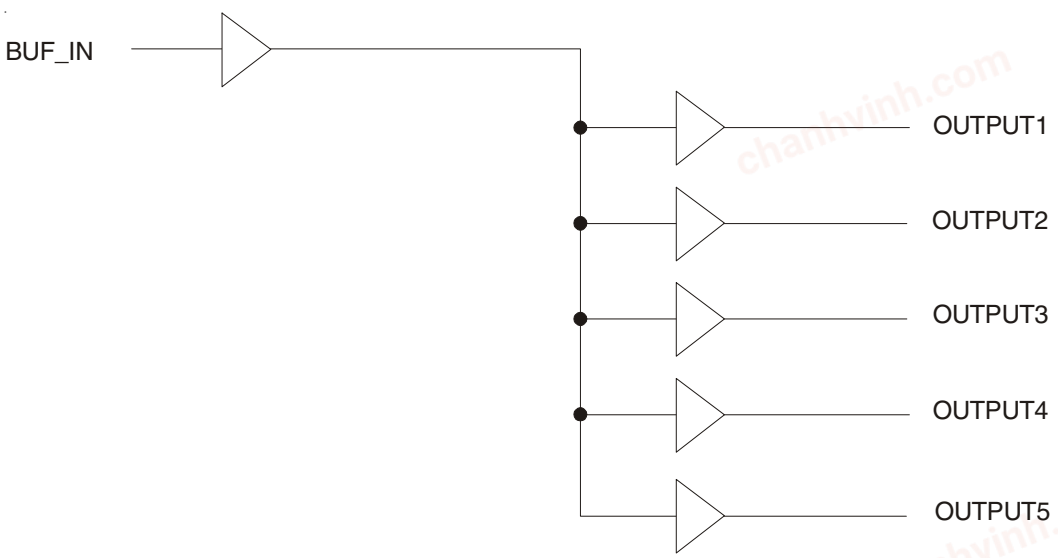
- One input to five output buffer/driver
- Low power consumption for mobile applications: less than 32mA at 66.6MHz with unloaded outputs
- 8.7ns max input-output delay
- Buffers all frequencies from DC to 133.33MHz
- Output-output skew < 250ps
- 3.3V operation
- High drive capability
- Available in SOIC package

DESCRIPTION:

The IDT2305NZ is a low-cost buffer designed to distribute high-speed clocks in mobile PC systems and desktop PC systems. The IDT2305NZ operates at 3.3V with five outputs that can run up to 133.33MHz

The IDT2305NZ is an 8-pin version of the IDT2309NZ. It is designed for low EMI and power optimization and consumes less than 32mA at 66.6MHz, making it ideal for the low power requirements of mobile systems.

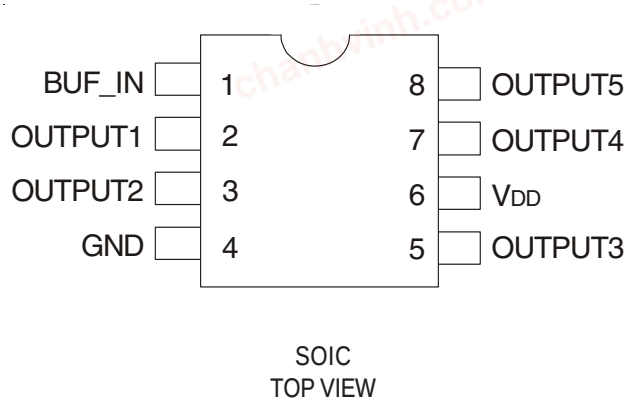
FUNCTIONAL BLOCK DIAGRAM



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PIN CONFIGURATION



SOIC
TOP VIEW

ABSOLUTE MAXIMUM RATINGS(1)

Symbol	Rating	Max.	Unit
V_{DD}	Supply Voltage Range	–0.5 to +4.6	V
V_I(2)	Input Voltage Range (REF)	–0.5 to +5.5	V
V_I	Input Voltage Range (except REF)	–0.5 to V_{DD}+0.5	V
I_{IK} (V_I < 0)	Input Clamp Current	–50	mA
I_O (V_O = 0 to V_{DD})	Continuous Output Current	±50	mA
V_{DD} or GND	Continuous Current	±100	mA
T_A = 55°C (in still air)(3)	Maximum Power Dissipation	0.7	W
T_{STG}	Storage Temperature Range	–65 to +150	°C
Operating Temperature	Commercial Temperature Range	0 to +70	°C
Operating Temperature	Industrial Temperature Range	-40 to +85	°C

NOTES:
1. Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.
2. The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
3. The maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils.

PIN DESCRIPTION

Pin Name	Pin Number	Functional Description
V_{DD}	6	3.3V Digital Voltage Supply
GND	4	Ground
BUF_IN	1	Input clock
OUTPUT[1:5]	2, 3, 6, 7, 10	Outputs

OPERATING CONDITIONS - COMMERCIAL

Symbol	Parameter	Min.	Max.	Unit
V_{DD}	Supply Voltage	3	3.6	V
T_A	Operating Temperature (Ambient Temperature)	0	70	°C
C_L	Load Capacitance, F_{OUT} < 100MHz	—	30	pF
	Load Capacitance 100MHz < F_{OUT} < 133.33MHz	—	15	
C_{IN}	Input Capacitance	—	7	pF
BUF_IN, OUTPUT[1:5]	Operating Frequency	DC	133.33	MHz

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OPERATING CONDITIONS - INDUSTRIAL

Symbol	Parameter	Min.	Max.	Unit
V_{DD}	Supply Voltage	3	3.6	V
T_A	Operating Temperature (Ambient Temperature)	-40	+85	°C
C_L	Load Capacitance, F_{OUT} < 100MHz	—	30	pF
	Load Capacitance 100MHz < F_{OUT} < 133.33MHz	—	15	
C_{IN}	Input Capacitance	—	7	pF
BUF_IN, OUTPUT[1:5]	Operating Frequency	DC	133.33	MHz

DC ELECTRICAL CHARACTERISTICS - COMMERCIAL

Symbol	Parameter	Conditions	Min.	Max.	Unit
V_{IL}	Input LOW Voltage(1)		—	0.8	V
V_{IH}	Input HIGH Voltage(1)		2	—	V
I_{IL}	Input LOW Current	V_{IN} = 0V	—	50	µA
I_{IH}	Input HIGH Current	V_{IN} = V_{DD}	—	100	µA
V_{OL}	Output LOW Voltage(2)	I_{OL} = 12mA	—	0.4	V
V_{OH}	Output HIGH Voltage(2)	I_{OH} = -12mA	2.4	—	V
I_{DD}	Supply Current	Unloaded Outputs at 66.66MHz	—	32	mA

NOTES:
1. BUF_IN input has a threshold voltage of V_{DD}/2.
2. Parameter is guaranteed by design but not production tested.

DC ELECTRICAL CHARACTERISTICS - INDUSTRIAL

Symbol	Parameter	Conditions	Min.	Max.	Unit
V_{IL}	Input LOW Voltage(1)		—	0.8	V
V_{IH}	Input HIGH Voltage(1)		2	—	V
I_{IL}	Input LOW Current	V_{IN} = 0V	—	50	µA
I_{IH}	Input HIGH Current	V_{IN} = V_{DD}	—	100	µA
V_{OL}	Output LOW Voltage(2)	I_{OL} = 12mA	—	0.4	V
V_{OH}	Output HIGH Voltage(2)	I_{OH} = -12mA	2.4	—	V
I_{DD}	Supply Current	Unloaded Outputs at 66.66MHz	—	35	mA

NOTES:
1. BUF_IN input has a threshold voltage of V_{DD}/2.
2. Parameter is guaranteed by design but not production tested.

SWITCHING CHARACTERISTICS - COMMERCIAL (1)

Symbol	Parameter(2)	Conditions	Min.	Typ.	Max.	Unit
t_3	Rise Time	Measured between 0.8V and 2V	—	—	1.5	ns
t_4	Fall Time	Measured between 0.8V and 2V	—	—	1.5	ns
t_5	Output to Output Skew	All outputs equally loaded	—	—	250	ps
t_6	Propagation Delay, BUF_IN Rising Edge to OUTPUT Rising Edge	Measured at V_{DD}/2	1	5	8.7	ns
DC	Duty Cycle	Measured at V_{DD}/2	45	—	55	%

NOTES:
1. All parameters specified with loaded outputs.
2. Parameter is guaranteed by design but not production tested.

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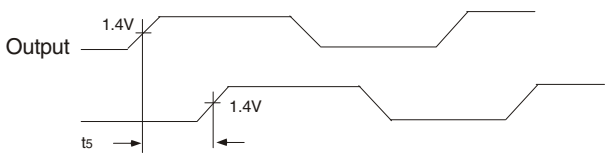
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SWITCHING CHARACTERISTICS - INDUSTRIAL (1)

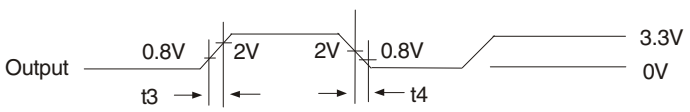
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t_4	Fall Time	Measured between 0.8V and 2V	—	—	1.5	ns
t_5	Output to Output Skew	All outputs equally loaded	—	—	250	ps
t_6	Propagation Delay, BUF_IN Rising Edge to OUTPUT Rising Edge	Measured at $V_{DD}/2$	1	5	8.7	ns
DC	Duty Cycle	Measured at $V_{DD}/2$	45	—	55	%

NOTES:
1. All parameters specified with loaded outputs.
2. Parameter is guaranteed by design but not production tested.

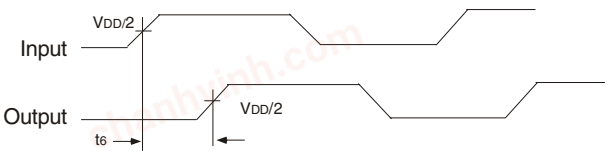
SWITCHING WAVEFORMS



Output to Output Skew

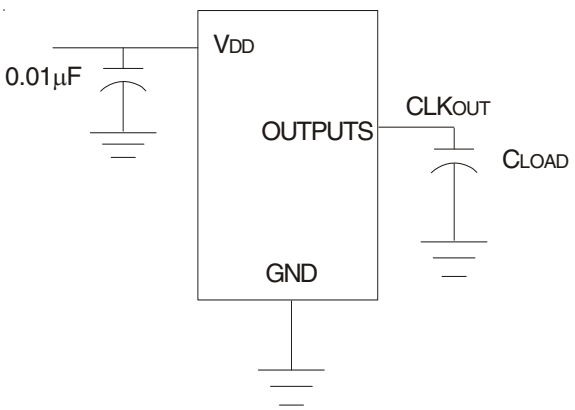


All Outputs Rise/Fall Time



Input to Output Propagation Delay

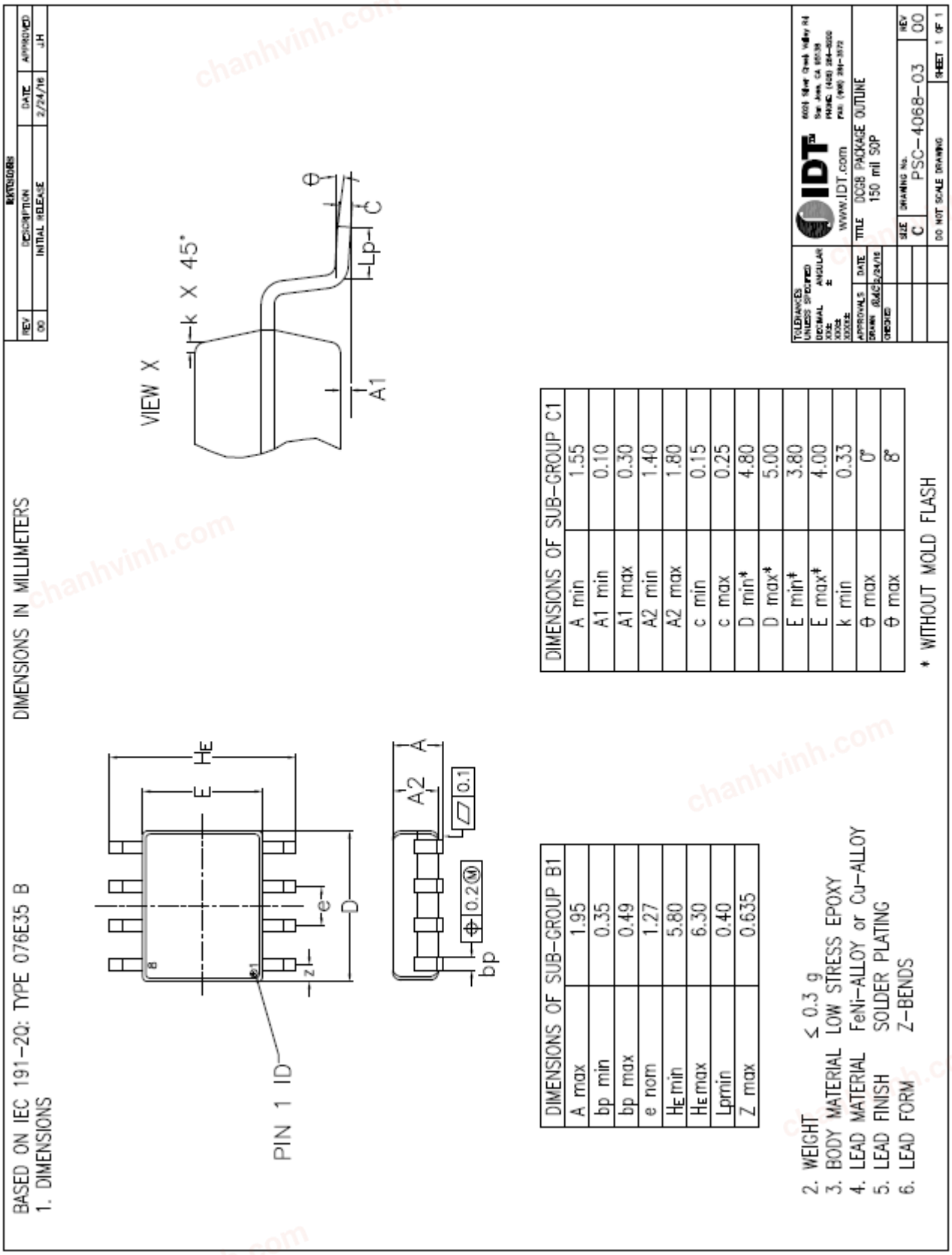
TEST CIRCUIT



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PACKAGE OUTLINE AND DIMENSIONS



BASED ON IEC 191-2Q: TYPE 076E35 B
1. DIMENSIONS IN MILLIMETERS

DIMENSIONS OF SUB-GROUP B1	
A max	1.95
bp min	0.35
bp max	0.49
e nom	1.27
HE min	5.80
HE max	6.30
Lp min	0.40
Z max	0.635

DIMENSIONS OF SUB-GROUP C1	
A min	1.55
A1 min	0.10
A1 max	0.30
A2 min	1.40
A2 max	1.80
c min	0.15
c max	0.25
D min*	4.80
D max*	5.00
E min*	3.80
E max*	4.00
k min	0.33
Θ max	0°
Θ max	8°

* WITHOUT MOLD FLASH

2. WEIGHT ≤ 0.3 g
3. BODY MATERIAL LOW STRESS EPOXY
4. LEAD MATERIAL FeNi-ALLOY or Cu-ALLOY
5. LEAD FINISH SOLDER PLATING
6. LEAD FORM Z-BENDS

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ORDERING INFORMATION

Part / Order Number	Shipping Packaging	Package	Temperature
2305NZ-1HDCG	Tubes	8-pin SOIC	0 to +70°
2305NZ-1HDCG8	Tape and Reel	8-pin SOIC	0 to +70°
2305NZ-1HDCGI	Tubes	8-pin SOIC	-40 to +85°
2305NZ-1HDCGI8	Tape and Reel	8-pin SOIC	-40 to +85°

"G" after the two-letter package code denotes Pb-free configuration, RoHS compliant

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