2.5V CLOCK BUFFER

IDT2305NZT

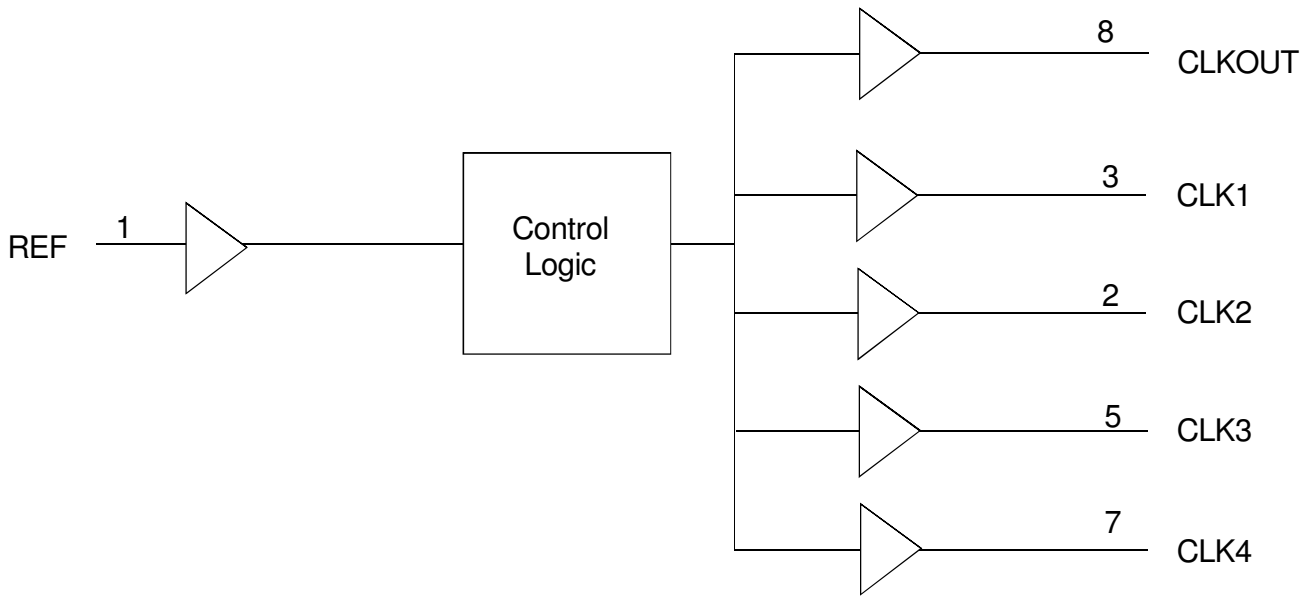
FEATURES:

- Clock Distribution
- 10MHz to 133MHz operating frequency
- Distributes one clock input to one bank of five outputs
- Output Skew < 250ps
- No external RC network required
- Operates at 2.5V V_{DD}
- Available in SOIC package
- Available in commercial and industrial temperature range

DESCRIPTION:

The IDT2305NZT is a high-speed clock buffer, designed to address high-speed clock distribution applications. IDT2305NZT accepts one reference input, and drives out five low skew clocks.

FUNCTIONAL BLOCK DIAGRAM



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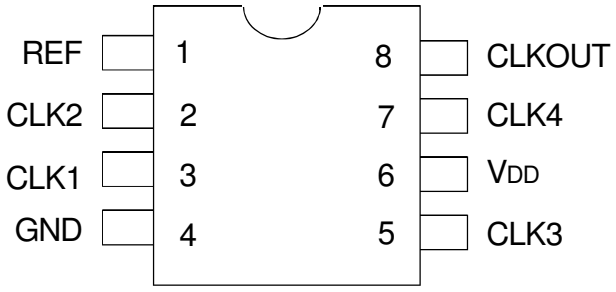
PIN CONFIGURATION



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	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.

APPLICATIONS:

- **SDRAM**
- **Telecom**
- **Datacom**
- **PC Motherboards/Workstations**
- **Critical Path Delay Designs**

PIN DESCRIPTION

Pin Name	Pin Number	Type	Functional Description
REF(1)	1	IN	Input reference clock, 3.3V tolerant input
CLK2(2)	2	OUT	Output clock
CLK1(2)	3	OUT	Output clock
GND	4	GND	Ground
CLK3(2)	5	OUT	Output clock
V_{DD}	6	PWR	2.5V Supply
CLK4(2)	7	OUT	Output clock
CLKOUT(2)	8	OUT	Output clock

NOTES:
1. Weak pull down.
2. Weak pull down on all outputs.

OPERATING CONDITIONS

Symbol	Parameter	Min.	Max.	Unit
V_{DD}	Supply Voltage	2.3	2.7	V
T_A	Operating Temperature (Ambient Temperature)	-40	+85	°C
C_L	Load Capacitance 10MHz - 133MHz	—	15	pF
C_{IN}	Input Capacitance	—	7	pF

DC ELECTRICAL CHARACTERISTICS

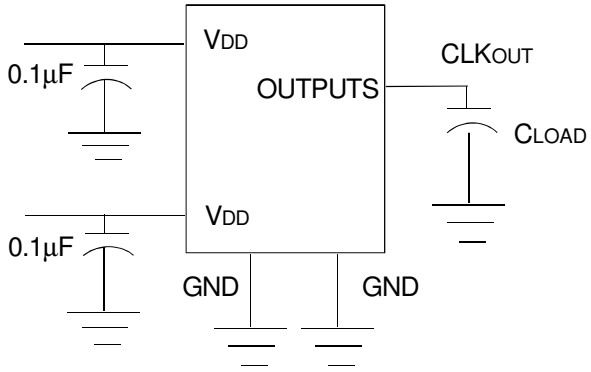
Symbol	Parameter	Conditions	Min.	Max.	Unit
V_{IL}	Input LOW Voltage Level		—	0.7	V
V_{IH}	Input HIGH Voltage Level		1.7	—	V
I_{IL}	Input LOW Current	V_{IN} = 0V	—	50	µA
I_{IH}	Input HIGH Current	V_{IN} = V_{DD}	—	100	µA
V_{OL}	Output LOW Voltage	Standard Drive, I_{OL} = 8mA	—	0.3	V
V_{OH}	Output HIGH Voltage	Standard Drive, I_{OH} = -8mA	2	—	V
I_{DD_PD}	Power Down Current	REF = 0MHz	—	12	µA
I_{DD}	Supply Current	Unloaded Outputs at 66.66MHz	—	32	mA

SWITCHING CHARACTERISTICS[1,2]

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
t_1	Output Frequency	15pF Load	10	—	133	MHz
	Duty Cycle = $t_2 \div t_1$	Measured at $V_{DD}/2$, F_{OUT} = 66.66MHz	40	50	60	%
t_3	Rise Time	Measured between 0.7V and 1.7V	—	—	2.5	ns
t_4	Fall Time	Measured between 0.7V and 1.7V	—	—	2.5	ns
t_5	Output to Output Skew	All outputs equally loaded	—	—	250	ps
t_6	Delay, REF Rising Edge to CLKOUT Rising Edge	Measured at $V_{DD}/2$	—	0	8.7	ns
t_7	Device-to-Device Skew	Measured at $V_{DD}/2$ on the CLKOUT pins of devices	—	0	700	ps

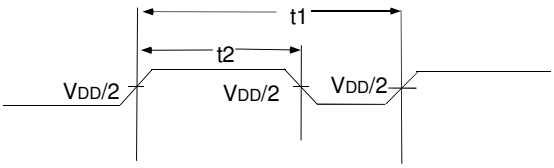
NOTES:
1. REF Input has a threshold voltage of $V_{DD}/2$.
2. All parameters specified with loaded outputs.

TEST CIRCUIT

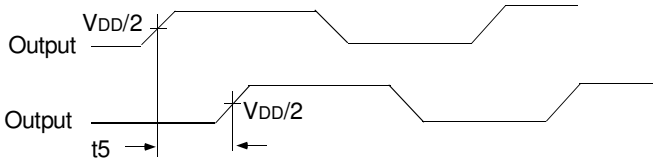


Test Circuit for All Parameters

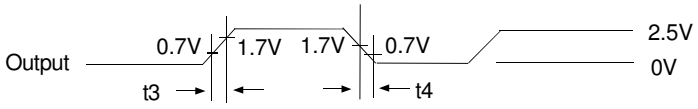
SWITCHING WAVEFORMS



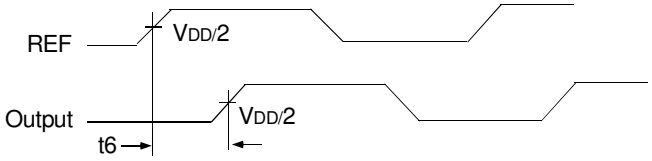
Duty Cycle Timing



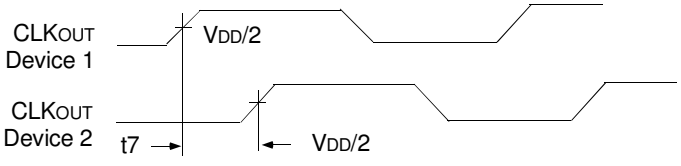
Output to Output Skew



All Outputs Rise/Fall Time

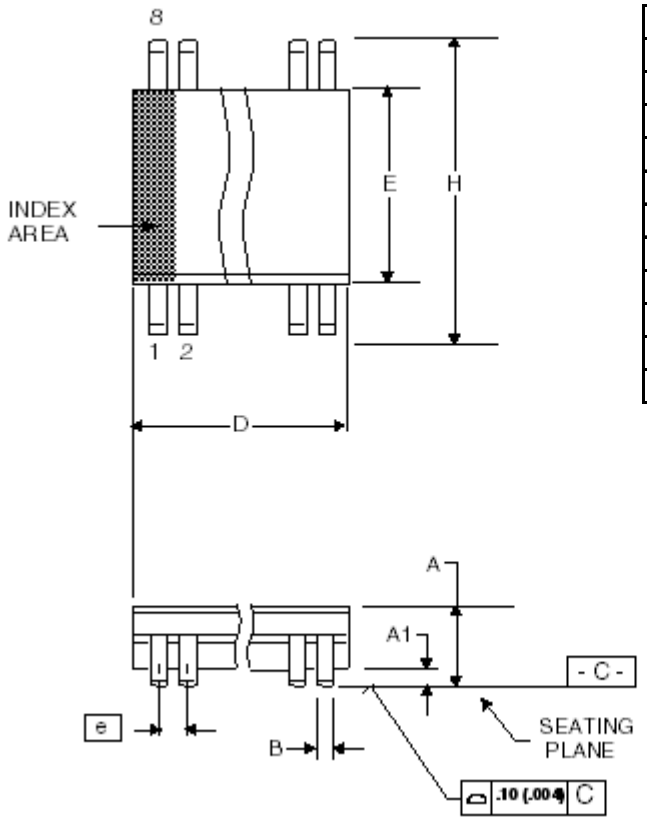


Input to Output Propagation Delay



Device to Device Skew

Package Outline and Package Dimensions (8-pin SOIC, 150 Mil. Body)



	Millimeters		Inches	
Symbol	**Min**	**Max**	**Min**	**Max**
A	1.35	1.75	0.0532	0.0688
A1	0.1	0.25	0.004	0.0098
B	0.33	0.51	0.013	0.02
C	0.19	0.25	0.0075	0.0098
D	4.8	5	0.189	0.1968
E	3.8	4	0.1497	0.1574
e	1.27 BASIC		0.050 BASIC	
H	5.8	6.2	0.2284	0.244
h	0.25	0.5	0.01	0.02
L	0.4	1.27	0.016	0.05
a	0°	8°	0°	8°

Ordering Information

Part / Order Number	Shipping Packaging	Package	Temperature
2305NZT-1DCG	Tubes	8-pin SOIC	0 to +70° C
2305NZT-1DCG8	Tape and Reel	8-pin SOIC	0 to +70° C
2305NZT-1DCGI	Tubes	8-pin SOIC	-40 to +85° C
2305NZT-1DCGI8	Tape and Reel	8-pin SOIC	-40 to +85° C

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

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