TinyLogic UHS Dual Buffer (Open-Drain Outputs)

NC7WZ07

Description

The NC7WZ07 is a dual buffer with open-drain outputs from ON Semiconductor's Ultra-High Speed (UHS) series of TinyLogic. The device is fabricated with advanced CMOS technology to achieve ultra-high speed with high output drive, while maintaining low static power dissipation over a broad V_{CC} operating range. The device is specified to operate over a very broad V_{CC} operating range. The device is specified to operate over the 1.65 V to 5.5 V V_{CC} range. The inputs and outputs are high impedance when V_{CC} is 0 V. Inputs tolerate voltages up to 5.5 V independent of V_{CC} operating voltage.

Features

- Ultra–High Speed: t_{PZL} = 2.3 ns (Typical)
- High I_{OL} Output Drive: ±24 mA at 3 V V_{CC}
- Broad V_{CC} Operating Range: 1.65 V to 5.50 V
- Power Down High-Impedance Inputs / Outputs
- Over-Voltage Tolerance Inputs Facilitate 5 V to 3 V Translation
- Proprietary Noise / EMI Reduction Circuitry
- Ultra-Small MicroPakTM Packages
- These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant

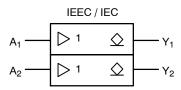
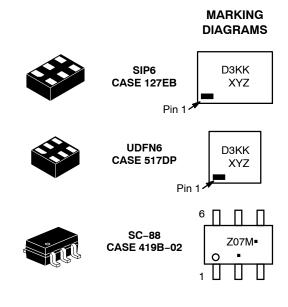


Figure 1. Logic Symbol



ON Semiconductor®

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D3, Z07	= Specific Device Code
KK	= 2-Digit Lot Run Traceability Code
XY	= 2-Digit Date Code Format
Z	= Assembly Plant Code
М	= Date Code*
•	= Pb-Free Package
() [-] -	

(Note: Microdot may be in either location)

*Date Code orientation and/or position may vary depending upon manufacturing location.

ORDERING INFORMATION

See detailed ordering, marking and shipping information in the package dimensions section on page 5 of this data sheet.

NC7WZ07

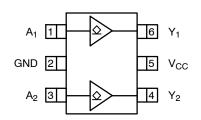
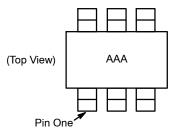


Figure 2. SC-88 (Top View)



NOTES:

- AAA represents product code top mark *(see Ordering Information)*.
 Orientation of top mark determines pin one location.
 Read the top mark left to right, pin one is the lower left pin.

Figure 4. Pin 1 Orientation

PIN DEFINITIONS

Pin # SC-88	Pin # MicroPak	Name	Description
1	1	A ₁	Input
2	2	GND	Ground
3	3	A ₂	Input
4	4	Y ₂	Output
5	5	V _{CC}	Supply Voltage
6	6	Y ₁	Output

FUNCTION TABLE (Y = A)

Inputs	Output
А	Y
LOW Logic Level	LOW Logic Level
HIGH Logic Level	HIGH Impedance Output State, Open Drain

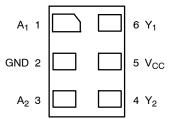


Figure 3. MicroPak (Top Through View)

ABSOLUTE MAXIMUM RATINGS

Symbol	Param	Min	Max	Unit	
V _{CC}	Supply Voltage	-0.5	6.5	V	
V _{IN}	DC Input Voltage		-0.5	6.5	V
V _{OUT}	DC Output Voltage		-0.5	6.5	V
I _{IK}	DC Input Diode Current	V _{IN} < 0 V	-	-50	mA
I _{OK}	DC Output Diode Current	V _{OUT} < 0 V	-	-50	mA
I _{OUT}	DC Output Current	-	±50	mA	
$I_{CC} \text{ or } I_{GND}$	DC V _{CC} or Ground Current	-	±50	mA	
T _{STG}	Storage Temperature Range	-65	+150	°C	
TJ	Junction Temperature Under Bias		-	+150	°C
ΤL	Junction Lead Temperature (Sold	ering, 10 Seconds)	-	+260	°C
PD	Power Dissipation in Still Air	SC-88	-	332	mW
		MicroPak-6	-	812	
		MicroPak2™–6	-	812	
ESD	Human Body Model, JEDEC: JESD22-A114		-	4000	V
	Charge Device Model, JEDEC: J	ESD22-C101	-	2000	

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Conditions	Min	Мах	Unit
V _{CC}	Supply Voltage Operating		1.65	5.5	V
	Supply Voltage Data Retention		1.5	5.5	
V _{IN}	Input Voltage		0	5.5	V
V _{OUT}	Output Voltage		0	5.5	V
t _r , t _f	Input Rise and Fall Times	V_{CC} at 1.8 V ±0.15 V, 2.5 V ±0.2 V	0	20	ns/V
		V _{CC} at 3.3 V ±0.3 V	0	10	
		V_{CC} at 5.0 V ± 0.5 V	0	5	
T _A	Operating Temperature		-40	+85	°C
θ_{JA}	Thermal Resistance	SC-88-6	-	377	°C/W
		MicroPak-6	-	154	
		MicroPak2-6	-	154	

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability. 4. Unused inputs must be held HIGH or LOW. They may not float.

NC7WZ07

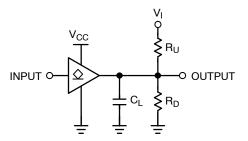
DC ELECTICAL CHARACTERISTICS

						T,	₄ = +25°	С	T _A = −40 to +85°C		
Symbol	Parameter	V _{CC} (V)	Conditions	Min	Тур	Max	Min	Max	Unit		
VIH	HIGH Level Input Voltage	1.65 to 1.95		$0.65 V_{CC}$	-	-	$0.65 V_{CC}$	-	V		
		2.30 to 5.50		$0.70 V_{CC}$	-	-	0.70 V _{CC}	-			
V _{IL}	LOW Level Input Voltage	1.65 to 1.95		-	-	0.35 V _{CC}	-	$0.35 V_{CC}$	V		
		2.30 to 5.50		-	-	0.30 V _{CC}	-	$0.30 \ V_{CC}$			
I _{LKG}	HIGH Level Output Leakage Current	1.65 to 1.95		-	-	±5	-	±10	μA		
V _{OL}	LOW Level Output Voltage	1.65	$V_{IN} = V_{IH} \text{ or } V_{IL},$	-	0.00	0.10	-	0.00	V		
		1.80	l _{OL} = 100 μA -	-	0.00	0.10	-	0.10			
		2.30		-	0.00	0.10	-	0.10			
		3.00		-	0.00	0.10	-	0.10			
		4.50		-	0.00	0.10	-	0.10			
		1.65	I _{OL} = 4 mA	-	0.80	0.24	-	0.24			
		2.30	I _{OL} = 8 mA	-	0.10	0.30	-	0.30			
		3.00	l _{OL} = 16 mA	-	0.16	0.40	-	0.40			
		3.00	I _{OL} = 24 mA	-	0.24	0.55	-	0.55			
		4.50	I _{OL} = 32 mA	-	0.25	0.55	-	0.55			
I _{IN}	Input Leakage Current	1.65 to 5.5	$0 \leq V_{IN} \leq 5.5 \ V$	-	-	±0.1	-	±10	μA		
I _{OFF}	Power Off Leakage Current	0	V_{IN} or V_{OUT} = 5.5 V	-	-	1	-	10	μA		
I _{CC}	Quiescent Supply Current	1.65 to 5.50	V _{IN} = 5.5 V, GND	-	-	1	-	10	μA		

AC ELECTRICAL CHARACTERISTICS

				T _A = +25°C		;	T _A = -40	to +85°C	
Symbol	Parameter	V _{CC} (V)	Conditions	Min	Тур	Max	Min	Max	Unit
t _{PZL} , t _{PLZ}	Propagation Delay	1.65	C _L = 50 pF,	-	6.6	11.5	-	12.6	ns
	(Figure 5, 6)	1.80	RU = 500 Ω, RD = 500 Ω,	_	5.5	9.5	-	10.5	
		2.50 ±0.20	$V_{I} = 2 \times V_{CC}$	_	3.7	5.8	-	6.4	
		3.30 ± 0.30		_	2.9	4.4	-	4.8	
		5.00 ±0.50		_	2.3	3.5	-	3.9	
		1.65	$C_{L} = 50 \text{ pF},$	-	5.5	11.5	-	12.6	
		1.80	RU = 500 Ω, RD = 500 Ω,	_	4.3	9.5	-	10.5	
		2.50 ±0.20	$V_{I} = 2 \times V_{CC}$	_	2.8	5.8	-	6.4	
		3.30 ± 0.30		_	2.1	4.4	-	4.8	
		5.00 ±0.50		_	1.4	3.5	-	3.9	
C _{IN}	Input Capacitance	0		-	2.5	-	-	-	pF
C _{OUT}	Output Capacitance	0		-	4.0	-	-	-	pF
C _{PD}	Power Dissipation Capacitance	3.30		-	3	-	-	-	pF
	(Note 5) (Figure 7)	5.00	1	_	4	-	-	-	

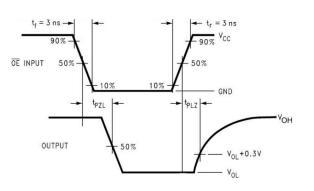
5. C_{PD} is defined as the value of the internal equivalent capacitance which is derived from dynamic operating current consumption (I_{CCD}) at no output loading and operating at 50% duty cycle. C_{PD} is related to I_{CCD} dynamic operating current by the expression:
 I_{CCD} = (C_{PD}) (V_{CC}) (f_{IN}) + (I_{CC}static).



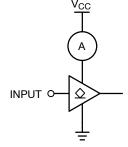
NOTE:

- 6. C_L includes load and stray capacitance. 7. Input PRR = 1.0 MHz, t_W = 500 ns.

Figure 5. AC Test Circuit

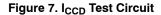






NOTE:

8. Input = AC Waveform; $t_r = t_f = 1.8$ ns; PRR = Variable; Duty Cycle = 50%.



ORDERING INFORMATION

Part Number	Top Mark	Package	Shipping [†]
NC7WZ07P6X	Z07	SC-88	3000 / Tape & Reel
NC7WZ07L6X	D3	MicroPak	5000 / Tape & Reel
NC7WZ07FHX	D3	MicroPak2	5000 / Tape & Reel

+For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

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SIP6 1.45X1.0 CASE 127EB ISSUE O

DATE 31 AUG 2016



0.043

0.004





- XXX = Specific Device Code

(Note: Microdot may be in either location)

*Date Code orientation and/or position may vary depending upon manufacturing location.

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.



DIMENSIONS: MILLIMETERS

*For additional information on our Pb-Free strategy and soldering

details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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DATE 11 DEC 2012

STYLE 1: PIN 1. EMITTER 2 2. BASE 2 3. COLLECTOR 1 4. EMITTER 1 5. BASE 1 6. COLLECTOR 2	STYLE 2: CANCELLED	STYLE 3: CANCELLED	STYLE 4: PIN 1. CATHODE 2. CATHODE 3. COLLECTOR 4. EMITTER 5. BASE 6. ANODE	STYLE 5: PIN 1. ANODE 2. ANODE 3. COLLECTOR 4. EMITTER 5. BASE 6. CATHODE	STYLE 6: PIN 1. ANODE 2 2. N/C 3. CATHODE 1 4. ANODE 1 5. N/C 6. CATHODE 2
STYLE 7: PIN 1. SOURCE 2 2. DRAIN 2 3. GATE 1 4. SOURCE 1 5. DRAIN 1 6. GATE 2	STYLE 8: CANCELLED	STYLE 9: PIN 1. EMITTER 2 2. EMITTER 1 3. COLLECTOR 1 4. BASE 1 5. BASE 2 6. COLLECTOR 2	STYLE 10: PIN 1. SOURCE 2 2. SOURCE 1 3. GATE 1 4. DRAIN 1 5. DRAIN 2 6. GATE 2	STYLE 11: PIN 1. CATHODE 2 2. CATHODE 2 3. ANODE 1 4. CATHODE 1 5. CATHODE 1 6. ANODE 2	STYLE 12: PIN 1. ANODE 2 2. ANODE 2 3. CATHODE 1 4. ANODE 1 5. ANODE 1 6. CATHODE 2
STYLE 13:	STYLE 14:	STYLE 15:	STYLE 16:	STYLE 17:	STYLE 18:
PIN 1. ANODE	PIN 1. VREF	PIN 1. ANODE 1	PIN 1. BASE 1	PIN 1. BASE 1	PIN 1. VIN1
2. N/C	2. GND	2. ANODE 2	2. EMITTER 2	2. EMITTER 1	2. VCC
3. COLLECTOR	3. GND	3. ANODE 3	3. COLLECTOR 2	3. COLLECTOR 2	3. VOUT2
4. EMITTER	4. IOUT	4. CATHODE 3	4. BASE 2	4. BASE 2	4. VIN2
5. BASE	5. VEN	5. CATHODE 2	5. EMITTER 1	5. EMITTER 2	5. GND
6. CATHODE	6. VCC	6. CATHODE 1	6. COLLECTOR 1	6. COLLECTOR 1	6. VOUT1
STYLE 19:	STYLE 20:	STYLE 21:	STYLE 22:	STYLE 23:	STYLE 24:
PIN 1. I OUT	PIN 1. COLLECTOR	PIN 1. ANODE 1	PIN 1. D1 (i)	PIN 1. Vn	PIN 1. CATHODE
2. GND	2. COLLECTOR	2. N/C	2. GND	2. CH1	2. ANODE
3. GND	3. BASE	3. ANODE 2	3. D2 (i)	3. Vp	3. CATHODE
4. V CC	4. EMITTER	4. CATHODE 2	4. D2 (c)	4. N/C	4. CATHODE
5. V EN	5. COLLECTOR	5. N/C	5. VBUS	5. CH2	5. CATHODE
6. V REF	6. COLLECTOR	6. CATHODE 1	6. D1 (c)	6. N/C	6. CATHODE
STYLE 25:	STYLE 26:	STYLE 27:	STYLE 28:	STYLE 29:	STYLE 30:
PIN 1. BASE 1	PIN 1. SOURCE 1	PIN 1. BASE 2	PIN 1. DRAIN	PIN 1. ANODE	PIN 1. SOURCE 1
2. CATHODE	2. GATE 1	2. BASE 1	2. DRAIN	2. ANODE	2. DRAIN 2
3. COLLECTOR 2	3. DRAIN 2	3. COLLECTOR 1	3. GATE	3. COLLECTOR	3. DRAIN 2
4. BASE 2	4. SOURCE 2	4. EMITTER 1	4. SOURCE	4. EMITTER	4. SOURCE 2
5. EMITTER	5. GATE 2	5. EMITTER 2	5. DRAIN	5. BASE/ANODE	5. GATE 1
6. COLLECTOR 1	6. DRAIN 1	6. COLLECTOR 2	6. DRAIN	6. CATHODE	6. DRAIN 1

Note: Please refer to datasheet for style callout. If style type is not called out in the datasheet refer to the device datasheet pinout or pin assignment.

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