

XC2300

Series

Tri-State Buffer ICs



- ◆CMOS Low Power Consumption
- ◆Maximum Operating Frequency : 70MHz
- ◆Built-In Input Amplifier
- ◆3-State Output
- ◆Divider Circuit
- ◆Mini Mold SOT-26 Package

APPLICATIONS

- VCXO modules
- Crystal oscillator modules

GENERAL DESCRIPTION

The 2300 Series are a group of high frequency, CMOS low power tri-state buffer ICs with input amplifier, divider and output tri-state buffer circuits built-in.

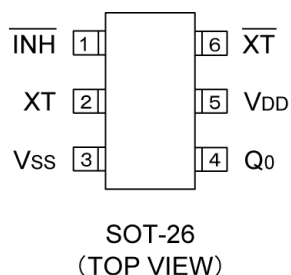
The series is available in an ultra small SOT-26 package.

FEATURES

Max. Operating Frequency	: 70MHz
Operating Voltage Range	: 3.3V±10%, 5.0V±20%
Divider Ratio	: fin/1
Output	: 3-State
Ultra Small Package	: SOT-26

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PIN CONFIGURATION



PIN ASSIGNMENT

PIN NUMBER	PIN NAME	FUNCTION
1	/INH	Stand-by Control (*)
2	XT	Clock Input
3	Vss	Ground
4	Q0	Clock Output
5	VDD	Power Supply
6	/XT	Feedback Resistor Connection (Output)

*Stand-by control pin has a pull-up resistor built-in.

/INH, Q0 PIN FUNCTION

/INH	Q0
"H" or OPEN	Clock Output
"L"	High Impedance

PRODUCT CLASSIFICATION

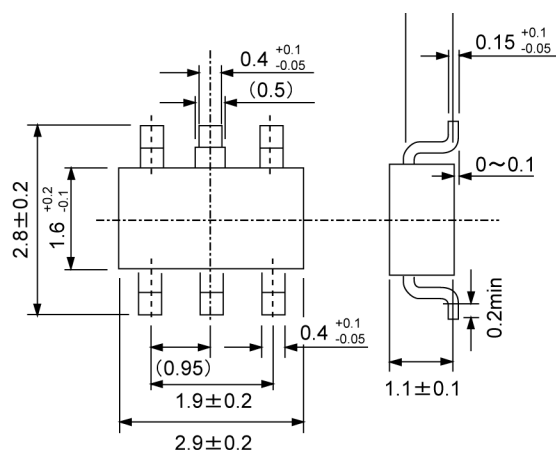
● Ordering Information

XC2300 ①②③④⑤⑥

DESTINATOR	DESCRIPTION	SIMBOL	DESCRIPTION
①	Duty Level	C	: CMOS ($V_{DD}/2$)
②	Fixed Number	2	: -
③	Divider Ratio	1	: $Q0=fin/1$
④	Output	V	: Tri-state buffer
⑤	Package	M	: SOT-26
⑥	Device Orientation	R	: Embossed tape, standard feed
		L	: Embossed tape, reverse feed

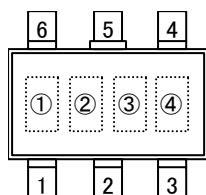
PACKAGING INFORMATION

● SOT-26



MARKING RULE

● SOT-26



SOT-26
(TOP VIEW)

① Represents product series

MARK	PRODUCT SERIES
0	XC2300xxxxxx

② Represents divider ratio

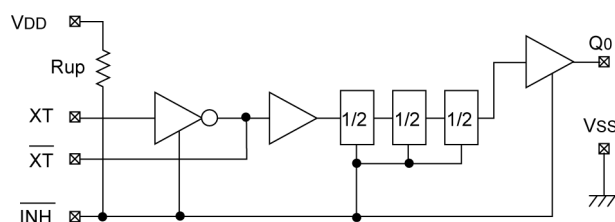
MARK	RATIO	MARK	RATIO
C	$fin/1$	E	$fin/4$
D	$fin/2$	F	$fin/8$

③ Represents tri-state buffer ICs

MARK
V

④ Represents assembly lot number (Based on internal standards)

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS

Ta=25°C

PARAMETER	SYMBOL	CONDITIONS	UNITS
Supply Voltage	V _{DD}	V _{SS} - 0.3 ~ V _{SS} + 7.0	V
Input Voltage	V _{IN}	V _{SS} - 0.3 ~ V _{DD} + 0.3	V
Power Dissipation	P _d	250(**)	mW
Operating Temperature Range	T _{opr}	- 40 ~ + 85	°C
Storage Temperature Range	T _{stg}	- 55 ~ + 125	°C

** When implemented on a glass epoxy PCB.

■ ELECTRICAL CHARACTERISTICS

● DC Electrical Characteristics

5.0V operation

(Unless otherwise stated, V_{DD}=5.0V, No Load, Ta=25°C)

PARAMETER	SYMBOL	CONDITIONS		MIN.	TYP.	MAX.	UNITS
Operating Supply Voltage	V _{DD}			4.0	5.0	6.0	V
Input Voltage "High"	V _{IH}	/INH pin		2.4	-	-	V
Input Voltage "Low"	V _{IL}	/INH pin		-	-	0.4	V
Output Voltage "High"	V _{OH}	Q ₀ pin, V _{DD} =4.5V, I _{OH} = -8mA		3.9	4.2	-	V
Output Voltage "Low"	V _{OL}	Q ₀ pin, V _{DD} =4.5V, I _{OL} =8mA		-	0.3	0.4	V
Supply Current 1	I _{DD1}	/INH=OPEN, Q ₀ =OPEN Fin=70MHz	XC2300C21V (fin/1)	-	21.0	-	mA
Supply Current 2	I _{DD2}	/INH="L", fin=70MHz		-	0.05	-	mA
Input Pull-Up Resistance 1	R _{up1}	/INH="L"		2.0	4.0	8.0	MΩ
Input Pull-Up Resistance 2	R _{up2}	/INH=0.7V _{DD}		50	100	200	kΩ
Output Off Leak Current	I _{oz}	Q ₀ pin, /INH="L"		-	-	10	μA

3.3V operation

(Unless otherwise stated, V_{DD}=3.3V, No Load, Ta=25°C)

PARAMETER	SYMBOL	CONDITIONS		MIN.	TYP.	MAX.	UNITS
Operating Supply Voltage	V _{DD}			2.97	3.30	3.63	V
Input Voltage "High"	V _{IH}	/INH pin		2.4	-	-	V
Input Voltage "Low"	V _{IL}	/INH pin		-	-	0.4	V
Output Voltage "High"	V _{OH}	Q ₀ pin, V _{DD} =4.5V, I _{OH} = -4mA		2.2	2.4	-	V
Output Voltage "Low"	V _{OL}	Q ₀ pin, V _{DD} =4.5V, I _{OL} =4mA		-	0.3	0.4	V
Supply Current 1	I _{DD1}	/INH =OPEN, Q ₀ =OPEN Fin=50MHz	XC2300C21V (fin/1)	-	8.0	-	mA
Supply Current 2	I _{DD2}	/INH ="L", fin=50MHz		-	0.05	-	mA
Input Pull-Up Resistance 1	R _{up1}	/INH ="L"		4.0	7.0	14.0	MΩ
Input Pull-Up Resistance 2	R _{up2}	/INH =0.7V _{DD}		70	130	250	kΩ
Output Off Leak Current	I _{oz}	Q ₀ pin, /INH ="L"		-	-	10	μA

■ ELECTRICAL CHARACTERISTIC (Continued)

● AC Electrical Characteristics

5.0V operation

 (Unless otherwise stated, $V_{DD}=5.0V$, No Load, $T_a=25^{\circ}C$)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum Operating Frequency	fmax		70	-	-	MHz

5.0V operation (Reference value)

 (Unless otherwise stated, $V_{DD}=5.0V$, No Load, $T_a=25^{\circ}C$)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Amplitude (SIN wave)	V _{ipp}		0.5	-	-	V _{pp}
Output Duty Cycle (*1)	DUTY	f _{in} =70MHz, C _L =15pF, V _{ipp} =0.5V _{pp}	45	-	55	%
Output Rise Time (*2)	t _r	f _{in} =70MHz, C _L =15pF, V _{ipp} =0.5V _{pp}	-	(3.0)	5.0	ns
Output Fall Time (*3)	t _f	f _{in} =70MHz, C _L =15pF, V _{ipp} =0.5V _{pp}	-	(1.5)	5.0	ns

 *1) 0.5V_{DD}

 *2) 0.1V_{DD}→0.9V_{DD}

 *3) 0.9V_{DD}→0.1V_{DD}

3.3V operation

 (Unless otherwise stated, $V_{DD}=3.3V$, No Load, $T_a=25^{\circ}C$)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum Operating Frequency	fmax		50	-	-	MHz

3.3V operation (Reference value)

 (Unless otherwise stated, $V_{DD}=3.3V$, No Load, $T_a=25^{\circ}C$)

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Amplitude (SIN wave)	V _{ipp}		0.5	-	-	V _{pp}
Output Duty Cycle (*1)	DUTY	f _{in} =50MHz, C _L =15pF, V _{ipp} =0.5V _{pp}	45	-	55	%
Output Rise Time (*2)	t _r	f _{in} =50MHz, C _L =15pF, V _{ipp} =0.5V _{pp}	-	(4.0)	8.0	ns
Output Fall Time (*3)	t _f	f _{in} =50MHz, C _L =15pF, V _{ipp} =0.5V _{pp}	-	(2.0)	8.0	ns

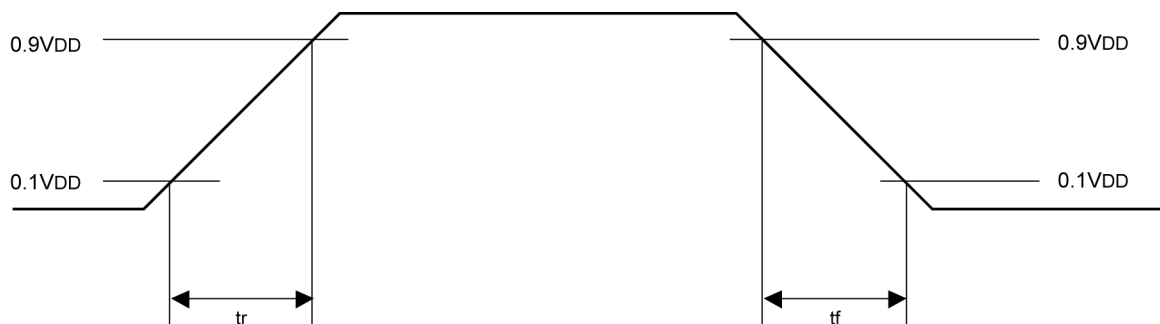
 *1) 0.5V_{DD}

 *2) 0.1V_{DD}→0.9V_{DD}

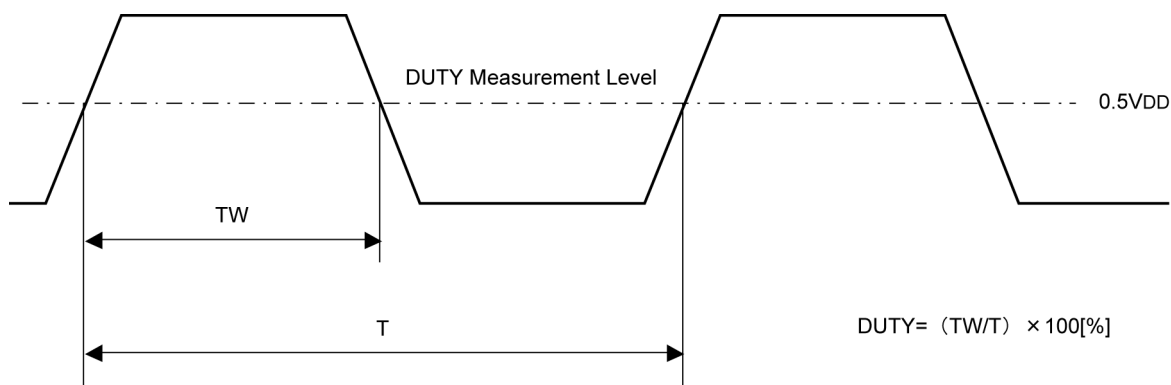
 *3) 0.9V_{DD}→0.1V_{DD}

SWITCHING WAVEFORMS

(1) Switching Time



(2) Duty Cycle



SUPPLY CURRENT, DUTY TEST CIRCUIT

- *) The feedback resistor (fixed) R_f must be connected.
- *) When the duty needs to be adjusted because of power supply and/or input amplitude, duty resistor (fixed) R_b should be connected.

<Reference Peripheral Values: R_f , R_b , C_{IN} >

$V_{DD}=5.0V$, $f_{in}=70MHz$, $V_{ipp}=0.5V_{pp}$

$C_{IN} = 10000 [pF]$

$R_f = 100 [k\Omega]$

$R_b = 720 [k\Omega]$

$V_{DD}=3.3V$, $f_{in}=50MHz$, $V_{ipp}=0.5V_{pp}$

$C_{IN} = 10000 [pF]$

$R_f = 100 [k\Omega]$

$R_b = 820 [k\Omega]$

