

Tri-State Buffer ICs

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.

APPLICATIONS

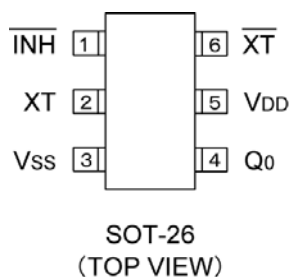
VCXO modules

Crystal oscillator modules

FEATURES

- Max. Operating Frequency** : 70MHz
- Operating Voltage Range** : 3.3V ± 10%, 5.0V ± 20%
- Divider Ratio** : $f_{in}/1$
- Output** : 3-State
- CMOS Low Power Consumption**
- Built-In Input Amplifier**
- Ultra Small Package** : SOT-26
- Environmentally Friendly** : EU RoHS Compliant, Pb Free

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

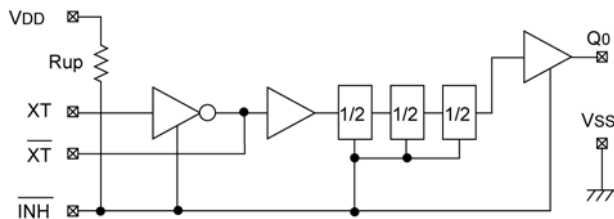
XC2300 - (*)

DESTINATOR	DESCRIPTION	SIMBOL	DESCRIPTION
	Duty Level	C	: CMOS ($V_{DD}/2$)
	Fixed Number	2	: -
	Divider Ratio	1	: $Q0=fin/1$
	Output	V	: Tri-state buffer
-	Packages Taping Type (*)	MR-G	: SOT-26

(*) The "-G" suffix indicates that the products are Halogen and Antimony free as well as being fully RoHS compliant.

(**) The device orientation is fixed in its embossed tape pocket. For reverse orientation, please contact your local Torex sales office or representative. (Standard orientation: R- , Reverse orientation: L-)

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

$T_a=25$

PARAMETER	SYMBOL	CONDITIONS	UNITS
Supply Voltage	V_{DD}	$V_{SS} - 0.3 \sim V_{SS} + 7.0$	V
Input Voltage	V_{IN}	$V_{SS} - 0.3 \sim V_{DD} + 0.3$	V
Power Dissipation	P_d	250(**)	mW
Operating Temperature Range	T_{opr}	- 40 ~ + 85	
Storage Temperature Range	T_{stg}	- 55 ~ + 125	

** When implemented on a glass epoxy PCB.

ELECTRICAL CHARACTERISTICS

DC Electrical Characteristics

5.0V operation

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

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	M
Input Pull-Up Resistance 2	R _{up2}	/INH=0.7V _{DD}		50	100	200	k
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, T_a=25)

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	M
Input Pull-Up Resistance 2	R _{up2}	/INH =0.7V _{DD}		70	130	250	k
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, $T_a=25$)

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, $T_a=25$)

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, $T_a=25$)

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, $T_a=25$)

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

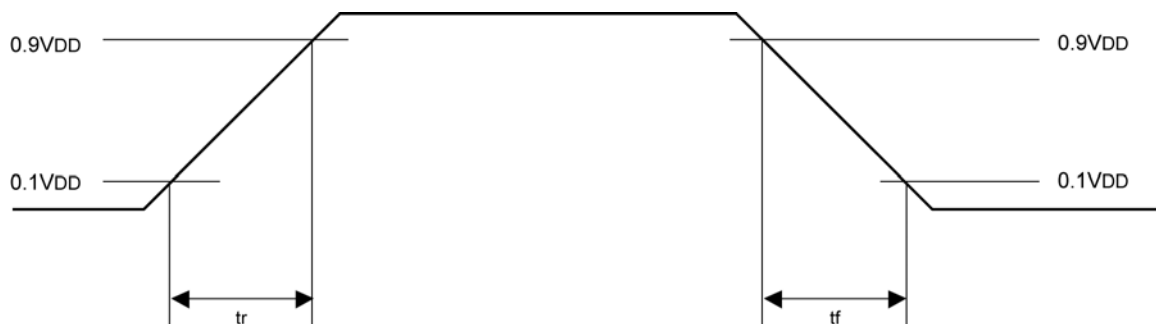
*1) 0.5V_{DD}

*2) 0.1V_{DD} 0.9V_{DD}

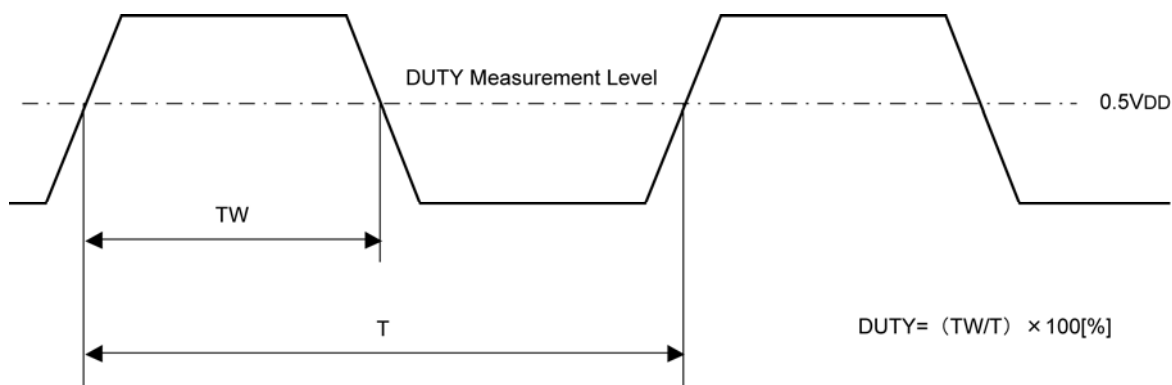
*3) 0.9V_{DD} 0.1V_{DD}

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]

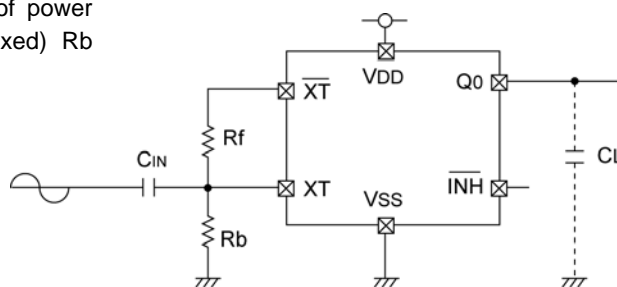
$R_b = 720$ [k]

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

$C_{IN} = 10000$ [pF]

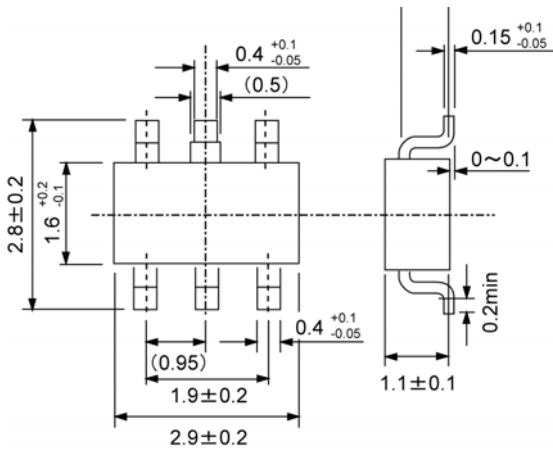
$R_f = 100$ [k]

$R_b = 820$ [k]



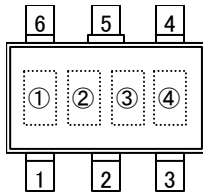
PACKAGING INFORMATION

SOT-26



MARKING RULE

SOT-26



SOT-26
(TOP VIEW)

Represents product series

MARK	PRODUCT SERIES
0	XC2300xxxxxx

Represents divider ratio

MARK	RATIO
C	fin/1

Represents tri-state buffer ICs

MARK
V

Represents assembly lot number
(Based on internal standards)

1. The products and product specifications contained herein are subject to change without notice to improve performance characteristics. Consult us, or our representatives before use, to confirm that the information in this datasheet is up to date.
2. We assume no responsibility for any infringement of patents, patent rights, or other rights arising from the use of any information and circuitry in this datasheet.
3. Please ensure suitable shipping controls (including fail-safe designs and aging protection) are in force for equipment employing products listed in this datasheet.
4. The products in this datasheet are not developed, designed, or approved for use with such equipment whose failure or malfunction can be reasonably expected to directly endanger the life of, or cause significant injury to, the user.
(e.g. Atomic energy; aerospace; transport; combustion and associated safety equipment thereof.)
5. Please use the products listed in this datasheet within the specified ranges.
Should you wish to use the products under conditions exceeding the specifications, please consult us or our representatives.
6. We assume no responsibility for damage or loss due to abnormal use.
7. All rights reserved. No part of this datasheet may be copied or reproduced without the prior permission of TOREX SEMICONDUCTOR LTD.

TOREX SEMICONDUCTOR LTD.