XC2300 series is Discontinued.

XC2300 Series

TOREX

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	: fin/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
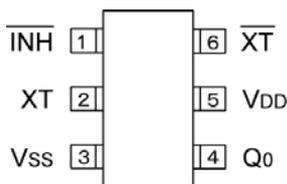
SOT-26
(TOP VIEW)

■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

XC2300①②③④⑤⑥-⑦ [*1]

DESTINATOR	DESCRIPTION	SIMBOL	DESCRIPTION
①	Duty Level	C	: CMOS (VDD/2)
②	Fixed Number	2	: -
③	Divider Ratio	1	: Q0=fin/1
④	Output	V	: Tri-state buffer
⑤⑥-⑦	Packages Taping Type [*2]	MR-G	: SOT-26

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

[*2] The device orientation is fixed in its embossed tape pocket.   For reverse orientation, please contact your local Torex sales office or representative. (Standard orientation: ⑤R-⑦, Reverse orientation: ⑤L-⑦)

■ BLOCK DIAGRAM
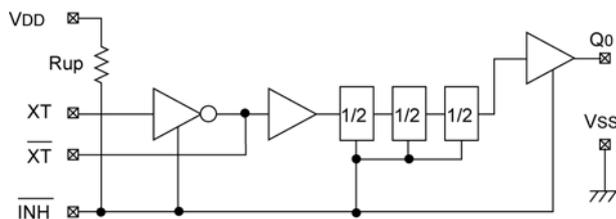
■ ABSOLUTE MAXIMUM RATINGS

Ta=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	Pd	250(**)	mW
Operating Temperature Range	Topr	- 40 ~ + 85	℃
Storage Temperature Range	Tstg	- 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, Ta=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}	/I_{NH} pin		2.4	-	-	V
Input Voltage "Low"	V_{IL}	/I_{NH} 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}	/I_{NH}=OPEN, Q_0=OPEN Fin=70MHz	XC2300C21V (fin/1)	-	21.0	-	mA
Supply Current 2	I_{DD2}	/I_{NH}="L", fin=70MHz		-	0.05	-	mA
Input Pull-Up Resistance 1	Rup1	/I_{NH}="L"		2.0	4.0	8.0	MΩ
Input Pull-Up Resistance 2	Rup2	/I_{NH}=0.7V_{DD}		50	100	200	kΩ
Output Off Leak Current	I_{OZ}	Q_0 pin, /I_{NH}="L"		-	-	10	μA

3.3V operation   (Unless otherwise stated, V_{DD}=3.3V, No Load, Ta=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}	/I_{NH} pin		2.4	-	-	V
Input Voltage "Low"	V_{IL}	/I_{NH} 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}	/I_{NH} =OPEN, Q_0=OPEN Fin=50MHz	XC2300C21V (fin/1)	-	8.0	-	mA
Supply Current 2	I_{DD2}	/I_{NH} ="L", fin=50MHz		-	0.05	-	mA
Input Pull-Up Resistance 1	Rup1	/I_{NH} ="L"		4.0	7.0	14.0	MΩ
Input Pull-Up Resistance 2	Rup2	/I_{NH} =0.7V_{DD}		70	130	250	kΩ
Output Off Leak Current	I_{OZ}	Q_0 pin, /I_{NH} ="L"		-	-	10	μA

■ELECTRICAL CHARACTERISTIC (Continued)

● AC Electrical Characteristics

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

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Amplitude (S_{IN} wave)	Vipp		0.5	-	-	Vpp
Output Duty Cycle (*1)	DUTY	fin=70MHz, C_L=15pF, Vipp=0.5Vpp	45	-	55	%
Output Rise Time (*2)	tr	fin=70MHz, C_L=15pF, Vipp=0.5Vpp	-	(3.0)	5.0	ns
Output Fall Time (*3)	tf	fin=70MHz, C_L=15pF, Vipp=0.5Vpp	-	(1.5)	5.0	ns

*1) $0.5V_{DD}$
*2) $0.1V_{DD} \rightarrow 0.9V_{DD}$
*3) $0.9V_{DD} \rightarrow 0.1V_{DD}$

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

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Amplitude (S_{IN} wave)	Vipp		0.5	-	-	Vpp
Output Duty Cycle (*1)	DUTY	fin=50MHz, C_L=15pF, Vipp=0.5Vpp	45	-	55	%
Output Rise Time (*2)	tr	fin=50MHz, C_L=15pF, Vipp=0.5Vpp	-	(4.0)	8.0	ns
Output Fall Time (*3)	tf	fin=50MHz, C_L=15pF, Vipp=0.5Vpp	-	(2.0)	8.0	ns

*1) $0.5V_{DD}$
*2) $0.1V_{DD} \rightarrow 0.9V_{DD}$
*3) $0.9V_{DD} \rightarrow 0.1V_{DD}$

■SWITCHING WAVEFORMS

(1) Switching Time

(2) Duty Cycle

$$DUTY = (TW/T) \times 100[\%]$$
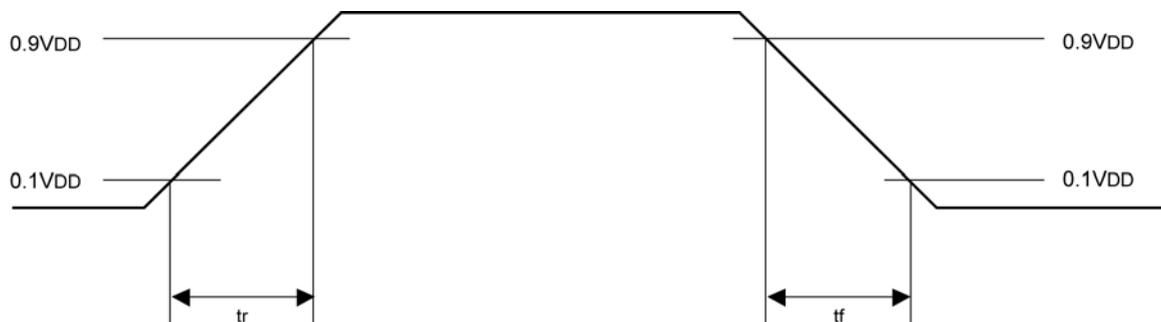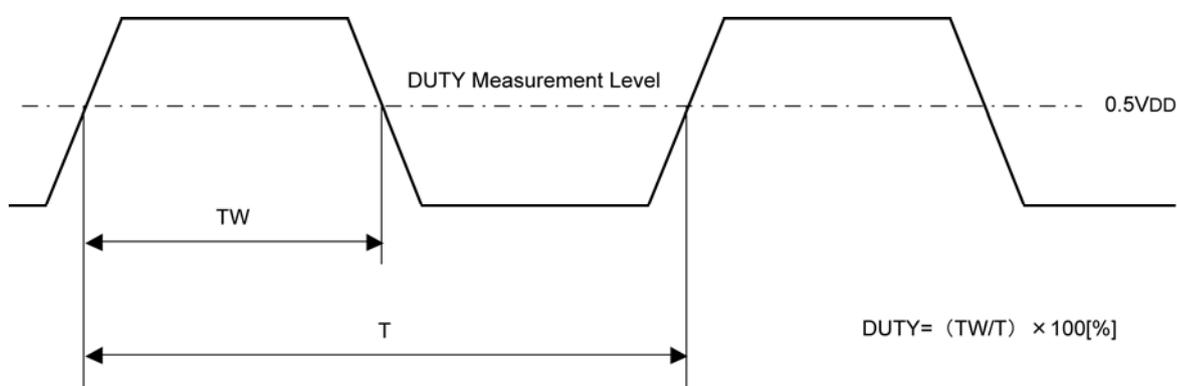
■SUPPLY CURRENT, DUTY TEST CIRCUIT

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

<Reference Peripheral Values: Rf, Rb, C_{IN}>
V_{DD}=5.0V, fin=70MHz, Vipp=0.5Vpp
C_{IN} =   10000 [pF]
Rf =   100 [kΩ]
Rb =   720 [kΩ]

V_{DD}=3.3V, fin=50MHz, Vipp=0.5Vpp
C_{IN} =   10000 [pF]
Rf =   100 [kΩ]
Rb =   820 [kΩ]
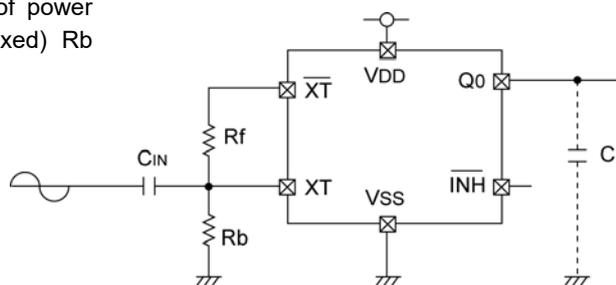
■ PACKAGING INFORMATION

● SOT-26
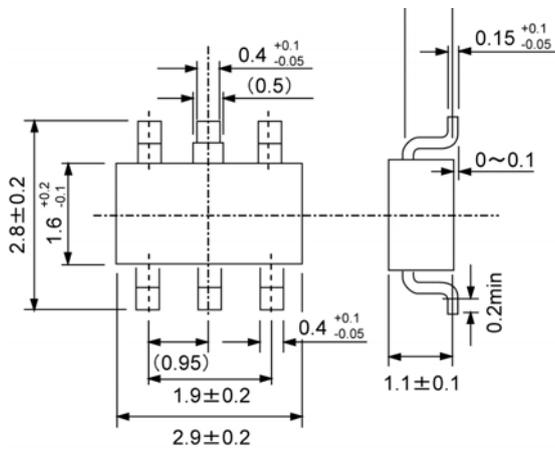
■ MARKING RULE

● SOT-26
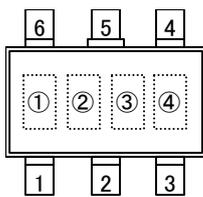
SOT-26
(TOP VIEW)

①Represents product series

MARK	PRODUCT SERIES
0	XC2300xxxxxx

②Represents divider ratio

MARK	RATIO
C	fin/1

③Represents tri-state buffer ICs

MARK
V

④Represents assembly lot number
   (Based on internal standards)

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