XC2301 Series

ETR1409_001a

Tri-State Buffer ICs

■GENERAL DESCRIPTION

The 2301 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.

Output can be selected from any one of the following values for fin (input frequency) : fin/1, fin/2, fin/4, fin/8.

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

■APPLICATIONS

●VCXO Modules

●Crystal Oscillator Modules

■FEATURES

Maximum Operating Frequency : 160MHz

Operating Voltage Range : 3.3V±10%

Divider Ratio : Selectable from fin/1, fin/2, fin/4, fin/8

Output : 3-State

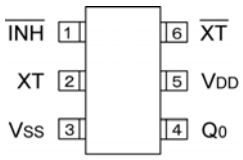
CMOS Low Power Consumption

Built-In Input Amplifier

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	GND
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

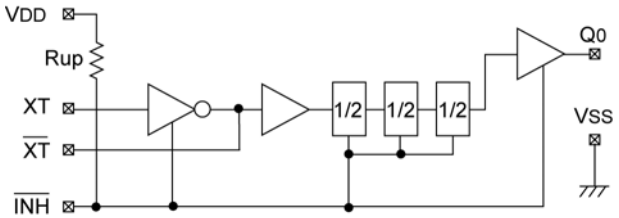
XC2301①②③④⑤⑥-⑦(*1)

DESIGNATOR	DESCRIPTION	SYMBOL	DESCRIPTION
①	Duty Level	C	: CMOS (VDD/2)
②	Fixed Number	5	: -
③	Divider Ratio	1	: Q0=fin/1
		2	: Q0=fin/2
		4	: Q0=fin/4
		8	: Q0=fin/8
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	VDD	VSS - 0.3 ~ VSS + 7.0	V
Input Voltage	VIN	VSS - 0.3 ~ VDD + 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

(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}	Q0 pin, V_{DD}=2.97V, I_{OH}= -8mA		2.2	2.4	-	V
Output Voltage "Low"	V_{OL}	Q0 pin, V_{DD}=2.97V, I_{OL}=8mA		-	0.3	0.4	V
Supply Current 1	I_{DD1}	/I_{NH} =OPEN, Q_0=OPEN Fin=160MHz	XC2301C51V (fin/1)	-	13.0	-	mA
			XC2301C52V (fin/2)	-	9.0	-	
			XC2301C54V (fin/4)	-	7.0	-	
			XC2301C58V (fin/8)	-	6.0	-	
Supply Current 2	I_{DD2}	/I_{NH} ="L", fin=160MHz		-	4.5	-	mA
Input Pull-Up Resistance 1	Rup1	/I_{NH} ="L"		1.0	2.0	4.0	MΩ
Input Pull-Up Resistance 2	Rup2	/I_{NH} =0.7V_{DD}		35	70	140	kΩ
Output Off Leak Current	IOZ	Q_0 pin, /I_{NH} ="L"		-	-	10	μA

●AC Electrical Characteristics

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

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Maximum Operating Frequency	fmax		160	-	-	MHz

●Reference Value : XC2301C51V (fQ0 = fin/1), XC2301C52V (fQ0 = fin/2)

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

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Amplitude	Vipp		0.5	-	-	Vpp
Output Duty Cycle (*1)	DUTY	fin=160MHz, C_L=15pF, Vipp=1.0Vpp	40	-	60	%
		fin=125MHz, C_L=15pF, Vipp=0.5Vpp				
		fin=70MHz, C_L=30pF, Vipp=0.5Vpp				
Output Rise Time (*2)	tr	fin=160MHz, C_L=15pF, Vipp=1.0Vpp	-	(1.7)	3.0	ns
		fin=70MHz, C_L=30pF, Vipp=0.5Vpp	-	(2.7)	4.5	ns
Output Fall Time (*3)	tf	fin=160MHz, C_L=15pF, Vipp=1.0Vpp	-	(1.7)	3.0	ns
		fin=70MHz, C_L=30pF, Vipp=0.5Vpp	-	(2.7)	4.5	ns

*1) 0.5V_{DD}
*2) 0.1V_{DD}→0.9V_{DD}
*3) 0.9V_{DD}→0.1V_{DD}

●Reference Value : XC2301C54V (fQ0=fin/4), XC2301C58V (fQ0=fin/8)

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

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input Amplitude	Vipp		0.5	-	-	Vpp
Output Duty Cycle (*1)	DUTY	fin=160MHz, C_L=15pF, Vipp=1.0Vpp	45	-	55	%
		fin=125MHz, C_L=15pF, Vipp=0.5Vpp				
		fin=70MHz, C_L=30pF, Vipp=0.5Vpp				
Output Rise Time (*2)	tr	fin=160MHz, C_L=15pF, Vipp=1.0Vpp	-	(1.7)	3.0	ns
		fin=70MHz, C_L=30pF, Vipp=0.5Vpp	-	(2.7)	4.5	ns
Output Fall Time (*3)	tf	fin=160MHz, C_L=15pF, Vipp=1.0Vpp	-	(1.7)	3.0	ns
		fin=70MHz, C_L=30pF, Vipp=0.5Vpp	-	(2.7)	4.5	ns

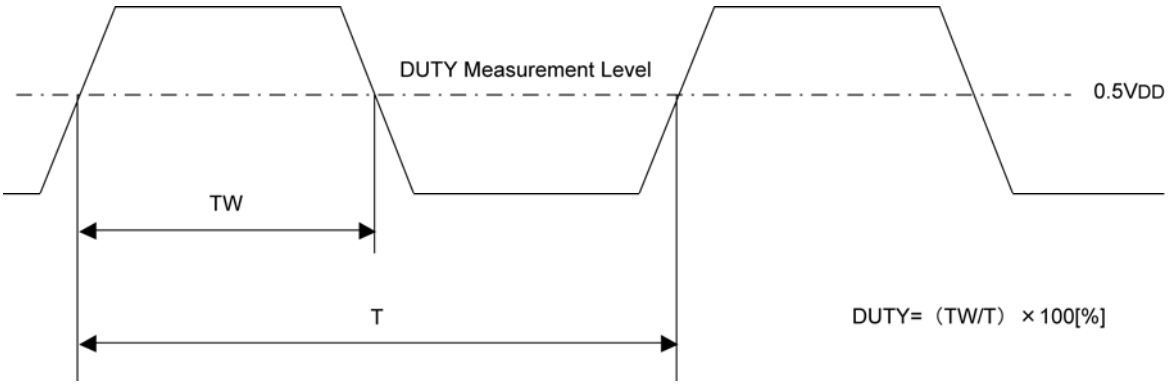
*1) 0.5V_{DD}
*2) 0.1V_{DD}→0.9V_{DD}
*3) 0.9V_{DD}→0.1V_{DD}

■SWITCHING WAVEFORMS

(1) Switching Time

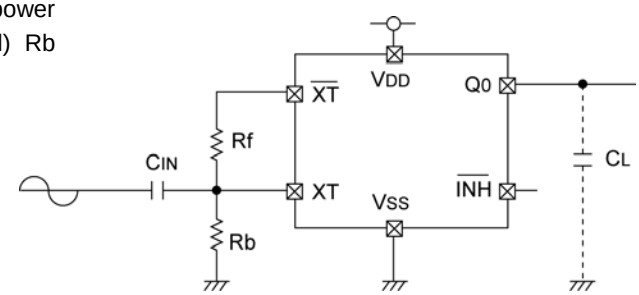


(2) Duty Cycle



■SUPPLY CURRENT, DUTY MEASUREMENT CIRCUIT

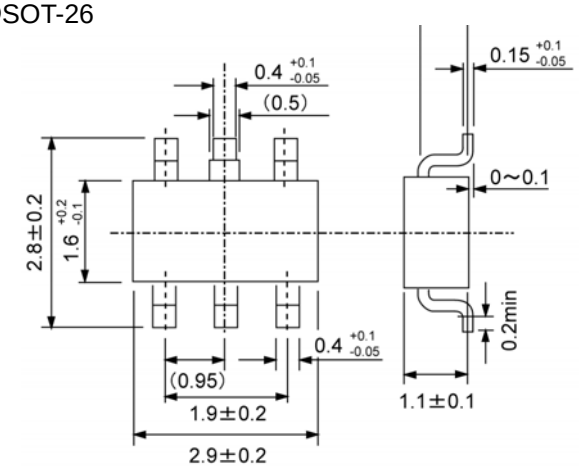
*) The feedback resistor (fixed) Rf must be connected.
*) When the duty needs to be adjusted because of power supply and/or input amplitude, duty resistor (fixed) Rb should be connected.



<Reference Peripheral Values: Rf, Rb, CIN >
VDD=3.3V, fin=160MHz, Vipp=0.5Vpp
CIN = 10000 [pF]
Rf = 51 [kΩ]
Rb = 360 [kΩ]

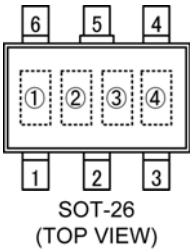
■ PACKAGING INFORMATION

●SOT-26



■ MARKING RULE

●SOT-26



SOT-26
(TOP VIEW)

①Represents product series

MARK	PRODUCT SERIES
1	XC2301xxxxxx

②Represents divider ratio

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

③Represents tri-state buffer ICs

MARK
V

④Represents assembly lot number
(Based on internal standards)

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