XC25BS3 Series

TOREX

PLL Clock Generator ICs with Built-In Divider/Multiplier Circuits

◆CMOS : Low Power Consumption
◆Input Frequency : 14KHz ~ 35MHz
◆Divider Ratio : 1 ~ 2047 divisions (laser trimming)
◆Multiplier Ratio : 20 ~ 2047 multiplications (laser trimming)
◆Comparative Frequency : 14KHz ~ 500KHz
◆Output Frequency : 9MHz ~ 80MHz
◆Mini Mold SOT-26 Package

■Applications

- ●Crystal Oscillation Modules
- ●Personal Computers
- ●PDAs
- ●Portable Audio Systems
- ●Various System Clocks

■General Description

The XC25BS3 series are high frequency, low power consumption PLL clock generator ICs with built-in crystal oscillator circuit, divider circuit & multiplier PLL circuit.

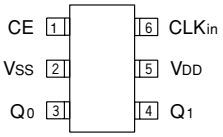
Laser trimming gives the option of being able to select from divider ratios (M) of 1 to 2047 and multiplier rations (N) of 20 to 2047.

Output frequency (Q0) is equal to reference oscillation (fCLKin) multiplied by N/M, within a range of 9MHz to 80MHz. Q1 output is selectable from input reference frequency (f0), Ground (GND), PLL output frequency/2 (Q0/2), and comparative frequency/2 (f0/M/2). Further, comparative frequency, within a range of 14KHz to 500KHz, can be obtained by dividing the reference oscillation. By halting oscillation via the CE pin, consumption current can be controlled. Output will be one of high impedance.

■Features

Output Frequency : 9MHz ~ 80MHz (Q0=fCLKin × N/M)
Input Frequency (f0) : 14KHz ~ 35MHz
Divider Ratio (M) : Selectable from divisions of 1 ~ 2047
Multiplier Ratio (N) : Selectable from multiplications of 20 ~ 2047
Output : 3-State
Q1 output selectable from reference oscillation, GND, PLL output frequency/2, comparative frequency/2.
Operating Voltage Range : 2.97V ~ 5.5V
Low Power Consumption : CMOS (stand-by function included)*1
Ultra Small Package : SOT-26 mini mold
*1 High output impedance during standby

■Pin Configuration



SOT-26
(Top View)

■Pin Assignment

PIN NUMBER	PIN NAME	FUNCTION
1	CE	Chip Enable
2	VSS	GND
3	Q0	PLL Output
4	Q1	Reference Oscilation, GND, Comparative Frequency/2, or PLL Output/2 Output
5	VDD	Power Supply
6	CLKin	Reference Clock Input

■Function List

●CE, Q0/Q1 Pin Function

CE	FUNCTION
"H"	Q0/Q1 clock output
"L"	Standby. Ouput pin = high impedance
Open	Standby. Ouput pin = high impedance
	(VSS pin pull down due to IC's internal resistance)

"H" = High Level
"L" = Low Level

■Product Classification

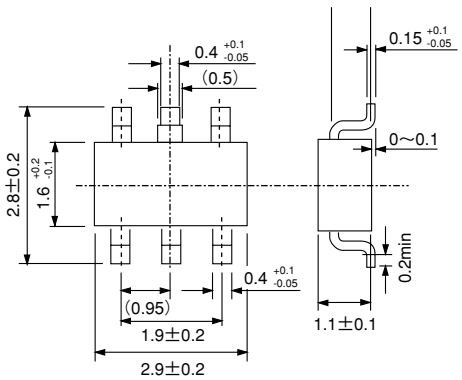
●Ordering Information

X C 2 5 B S 3 ①②③④⑤

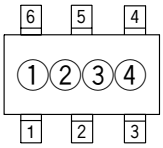
DESIGNATOR	DESCRIPTION
①②③	Denotes Product Number (Based on internal standards) e.g. Product Number 001 ---→ ①②③ = 001
④	Package: M：SOT-26
⑤	Device Orientation: R ：Embossed Tape : Standard Feed L ：Embossed Tape : Reverse Feed

■Packaging Information

●SOT-26



■Marking



SOT-26
(TOP VIEW)

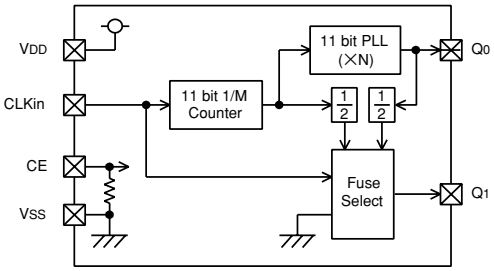
① Represents the Series name

MARK
3

②③Represents the second and third figure of the Product Number
(Based on internal standards)

④ Represents the Assembly Lot No.
(Based on internal standards)

■Block Diagram



■Absolute Maximum Ratings

Ta=25℃

PARAMETER	SYMBOL	CONDITIONS	UNITS
Supply Voltage	VDD	VSS−0.3～VSS+7.0	V
CLKin Pin Voltage	VCK	VSS−0.3～VDD+0.3	V
CE Pin Voltage	VCE	VSS−0.3～VDD+0.3	V
Q0 Pin Voltage	VQ0	VSS−0.3～VDD+0.3	V
Q1 Pin Voltage	VQ1	VSS−0.3～VDD+0.3	V
Q0 Output Current	IQ0	±50	mA
Q1 Output Current	IQ1	±50	mA
Power Dissipation	Pd	150	mW
Ambient Temp.	Topr	−30～+80	℃
Storage Temp.	Tstg	−40～+125	℃

■Electrical Characteristics

●Set Value (example1)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Input Frequencies	f CLKin	13.000	—	20.000	MHz
Q0 Pin Output Multiplier Ratios	N/M	—	4.000	—	Multiplier
Output Frequencies 1	fQ0	52.000	—	80.000	MHz
Output Frequencies 2	Q1	f CLKin			—

●Electrical Characteristics (DC)

fCLKin=20MHz, Q0 pin Output Multiplier Ratios=4, Ta=25℃, No Load

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Supply Voltage	VDD		2.97	3.3	3.63	V
Input Voltage "High"	VIH		2.7	—	—	V
Input Voltage "Low"	VIL		—	—	0.6	V
Input Current "High"	IIH	VCK=3.3V	—	—	3.0	μA
Input Current "Low"	IIL	VCK=0V	−3.0	—	—	μA
Output Voltage "High"	VOH	VDD=2.97V、IOH=−8mA	2.5	—	—	V
Output Voltage "Low"	VOL	VDD=2.97V、IOL=8mA	—	—	0.4	V
Supply Current 1	IDD1	CE=3.3V	—	5.5	11.0	mA
Supply Current 2	IDD2	CE=0V	—	—	5.0	μA
CE "High" Voltage	VCEH		2.70	—	—	V
CE "Low" Voltage	VCEL		—	—	0.45	V
CE Pull down Resistance 1	Rp1	CE=3.3V	0.5	1.5	2.5	MΩ
CE Pull down Resistance 2	Rp2	CE=0.3V	20.0	50.0	80.0	KΩ

●Electrical Characteristics (AC)

fCLKin=20MHz, Q0 pin Output Multiplier Ratios=4, Ta=25℃, CL=15pF

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Rise Time	TTLH	VDD=3.3V (20% to 80%) *2	—	5.0	—	ns
Output Fall Time	TTHL	VDD=3.3V (20% to 80%) *2	—	5.0	—	ns
Duty Ratio	DUTY		40	50	60	%
Output Start Time	Ton	*2	—	—	20	ms
Jitter	Tj	1σ *2	—	60	—	ps

*2 R&D guarantee

●Set Value (example2)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Input Frequencies	f CLKin	10.000	—	16.000	MHz
Q0 Pin Output Multiplier Ratios	N/M	—	3.000	—	Multiplier
Output Frequencies 1	fQ0	30.000	—	48.000	MHz
Output Frequencies 2	Q1	GND			—

●Electrical Characteristics (DC)

fCLKin=16kHz, Q0 pin Output Multiplier Ratios=1250, Ta=25℃, No Load

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Supply Voltage	V_{DD}		2.97	3.3	3.63	V
Input Voltage "High"	V_{IH}		2.7	—	—	V
Input Voltage "Low"	V_{IL}		—	—	0.6	V
Input Current "High"	I_{IH}	V_{CK}=3.3V	—	—	3.0	μA
Input Current "Low"	I_{IL}	V_{CK}=0V	−3.0	—	—	μA
Output Voltage "High"	V_{OH}	V_{DD}=2.97V、I_{OH}=−8mA	2.5	—	—	V
Output Voltage "Low"	V_{OL}	V_{DD}=2.97V、I_{OL}=8mA	—	—	0.4	V
Supply Current 1	I_{DD1}	CE=3.3V	—	4.0	8.0	mA
Supply Current 2	I_{DD2}	CE=0V	—	—	5.0	μA
CE "High" Voltage	V_{CEH}		2.70	—	—	V
CE "Low" Voltage	V_{CEL}		—	—	0.45	V
CE Pull down Resistance 1	Rp1	CE=3.3V	0.5	1.5	2.5	MΩ
CE Pull down Resistance 2	Rp2	CE=0.3V	20.0	50.0	80.0	KΩ

●Electrical Characteristics (AC)

fCLKin=16kHz, Q0 pin Output Multiplier Ratios=1250, Ta=25℃, C_L=15pF

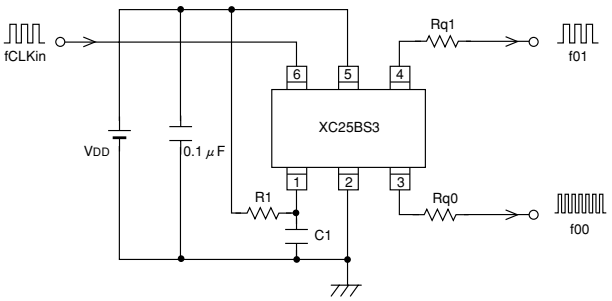
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Output Rise Time	T_{TLH}	V_{DD}=3.3V (20% to 80%) *2	—	5.0	—	ns
Output Fall Time	T_{THL}	V_{DD}=3.3V (20% to 80%) *2	—	5.0	—	ns
Duty Ratio	DUTY		40	50	60	%
Output Start Time	Ton	*2	—	—	20	ms
Jitter	Tj	1σ *2	—	60	—	ps

*2 R&D guarantee

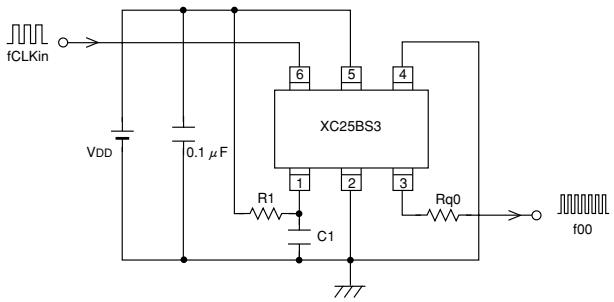
■Typical Application Circuits

●Circuit Example

① Q1 Pin - reference oscillation, PLL output frequency/2, comparative frequency/2



② Q1 Pin - GND



■Directions for use

●Note:

(1) Please insert a by-pass capacitor of 0.1μF.

(2) Rq0 and Rq1 are matching resistors. Their use is recommended in order to counter unwanted radiations.

(3) Please place a by-pass capacitor and matching resistors as close to the IC as possible. It may be that the output cannot be locked if the by-pass capacitor is not close enough to the IC. Further, there is a possibility of unwanted radiation occurance between the resistor and the IC pin if the matching resistor is not close enough to the IC.

(4) When selecting GND for the Q1 pin, although the IC will be connected to GND internally, it is also recommended that the PCB be connected to GND.

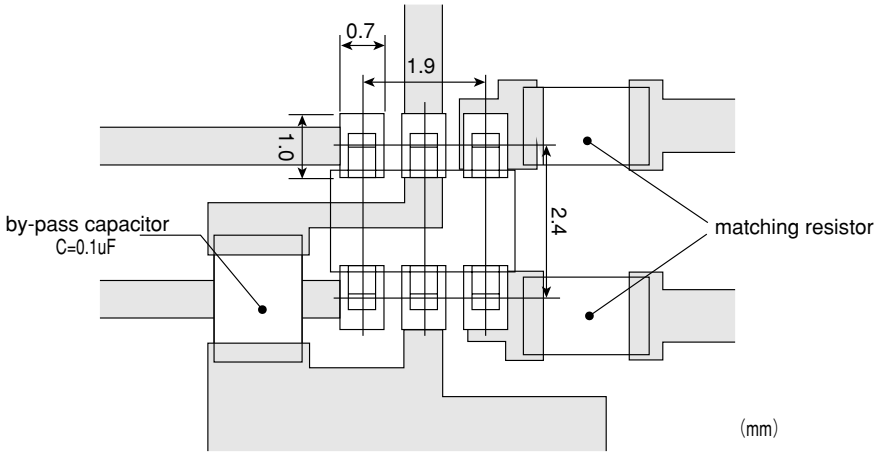
(5) When the CE pin is not controlled by external signals, it is recommended that a time constant circuit of R1=1kΩ × C1μF be added for stability.

(6) With this IC, output is achieved by dividing and multiplying the reference oscillation by means of the PLL circuit. In cases where this output is further used as a reference oscillation of another PLL circuit, it may be that the final output signal's jitter increases, so all necessary precautions should be taken to avoid this.

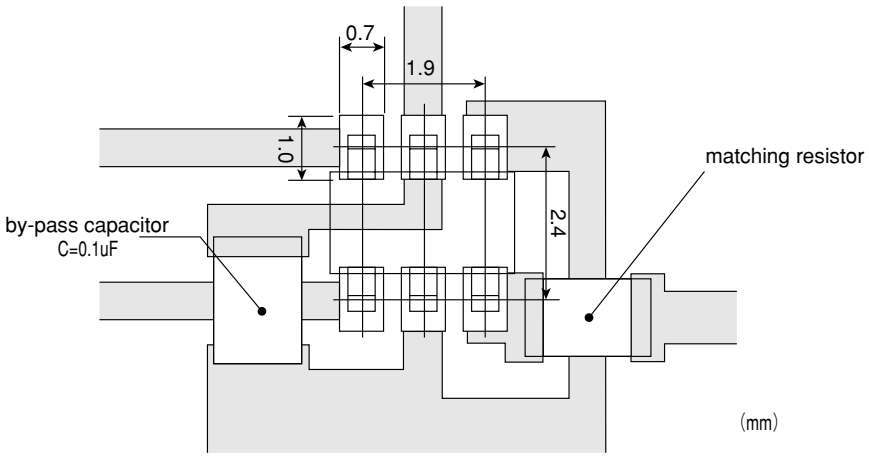
(7) It is recommended that a low noise power supply, such as a series regulator, be used for the supply voltage. Using a power supply such as a switching regulator might lead to a larger jitter which in turn may lead to an inability to lock due to the ripple of the switching regulator.

■Reference Land Pattern

① Q1 Pin - reference oscillation, PLL output frequency/2, comparative frequency/2

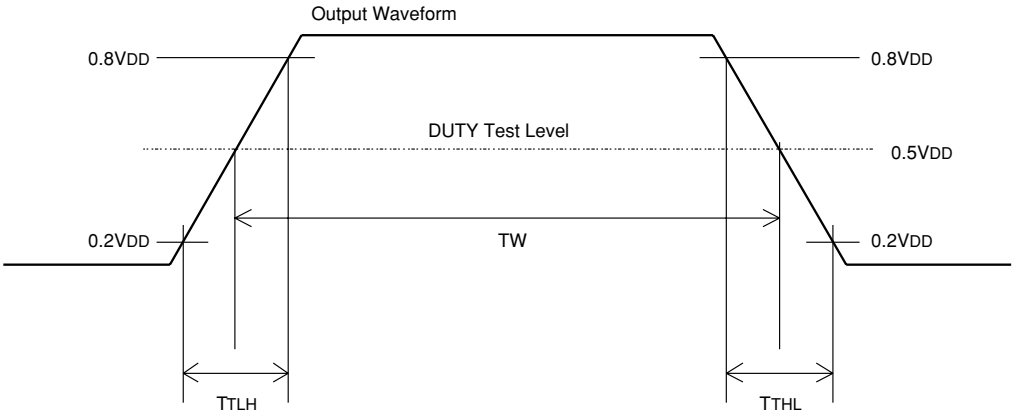


② Q1 Pin - GND

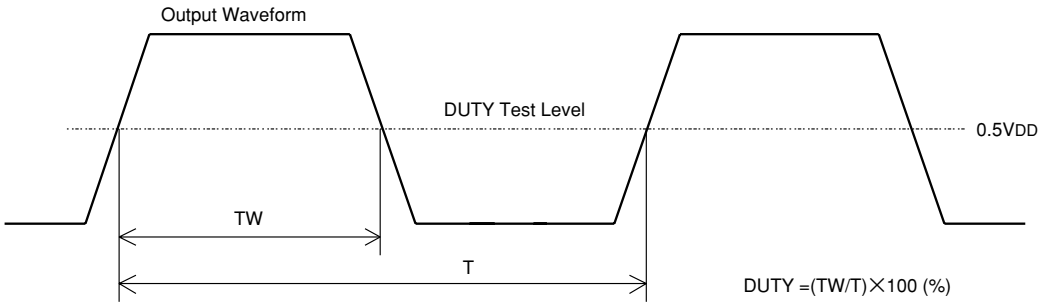


■AC Characteristics Waveforms

1) Output Rise Time / Output Fall Time



2) Duty Ratio



3) Output Start Time