

ICs for use with low voltage Crystal Oscillators

■ GENERAL DESCRIPTION

The XC2165 series is a CMOS IC operates in 1.5V to 3.6V with the built-in circuits for crystal oscillator and divider.

Output is selectable from any one of f₀, f₀/1, f₀/2, f₀/4 and f₀/8.

With oscillation capacitors and a feedback resistor built-in, it is possible to configure a stable fundamental oscillator using only an external crystal.

In stand-by mode, oscillation stops completely and output pin Q0 becomes high impedance.

The XC2165 series is available in SOT-26 package.

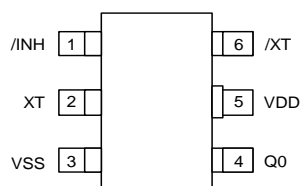
■ APPLICATIONS

- Crystal oscillation modules
- Micro computers, DSP clocks
- Communication equipment
- Various system clocks
- Cellular and portable phones

■ FEATURES

Oscillation Frequency	:	8MHz~120MHz (Fundamental)
Divider Ratio	:	f ₀ /1, f ₀ /2, f ₀ /4, f ₀ /8
Output	:	3-State
Operating Voltage Range	:	1.5V ~ 3.6V
Low Current Consumption	:	Stand-by function included : 30 μA (MAX.) when stand-by
Built-in Capacitors C_g, C_d		
Built-in Feedback Resistor		
Operating Ambient Temperature	:	- 40°C~ + 85°C
Package	:	SOT-26
Environmentally Friendly	:	EU RoHS Compliant, Pb Free

■ PIN CONFIGURATION



SOT-26 (TOP VIEW)

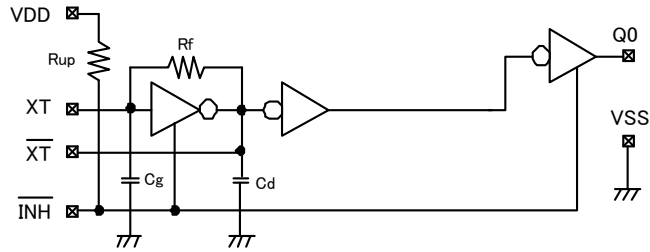
■ PIN ASSIGNMENT

PIN NUMBER	PIN NAME	FUNCTIONS
1	/INH	Stand-by Control *
2	XT	Crystal Oscillator Connection (Input)
3	VSS	Ground
4	Q0	Clock Output
5	VDD	Power Supply
6	/XT	Crystal Oscillator Connection (Output)

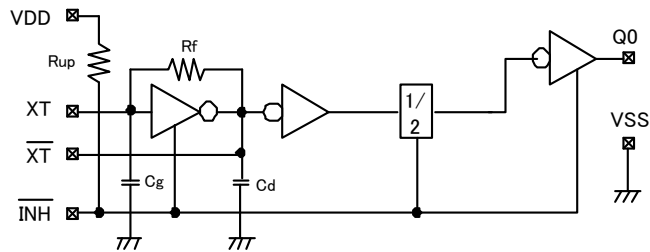
* Pull-up resistor is built-in to the stand-by control pin.

■ BLOCK DIAGRAM

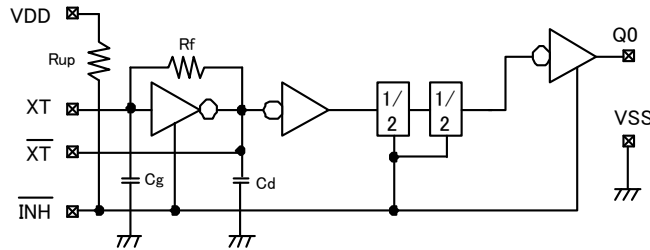
1). XC2165C21Axx/XC2165C21Bxx ($f_{OSC} = f_0/1$)



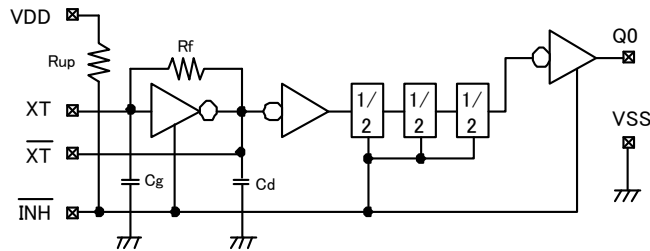
2). XC2165C22Axx/XC2165C22Bxx ($f_{OSC} = f_0/2$)



3). XC2165C24Axx/XC2165C24Bxx ($f_{OSC} = f_0/4$)



4). XC2165C28Axx/XC2165C28Bxx ($f_{OSC} = f_0/8$)



■ PRODUCT CLASSIFICATION

● Ordering Information

XC2165 ①②③④⑤⑥-⑦

DESIGNATOR	ITEM	SYMBOL	DESCRIPTION
①	Duty Level	C	CMOS
②	Fixed Number	2	-
③	Divider Ratio	1	f0/1
		2	f0/2
		4	f0/4
		8	f0/8
④	Oscillation Frequency	A	8MHz ~ 70MHz
		B	16MHz ~ 120MHz
⑤⑥-⑦ ^(*)	Package(Order Unit)	MR	SOT-26(3,000/Reel)
		MR-G	SOT-26(3,000/Reel)

(*) The "-G" suffix denotes Halogen and Antimony free as well as being fully RoHS compliant.

■ PIN FUNCTION

/ INH	Q0
'H' or Open	Clock Output
'L'	High Impedance

■ ABSOLUTE MAXIMUM RATINGS

Ta=25°C

PARAMETER	SYMBOL	RATINGS	UNITS
Supply Voltage	V _{DD}	V _{SS} – 0.3 to V _{SS} + 7.0	V
/ INH Pin Voltage	V _{INH}	V _{SS} – 0.3 to V _{DD} + 0.3	V
Q0 Pin Voltage	V _{Q0}	V _{SS} – 0.3 to V _{DD} + 0.3	V
Q0 Output Current	I _{Q0}	± 50	mA
Power Dissipation	P _d	250	mW
Operating Ambient Temperature	T _{opr}	- 40 to + 85	°C
Storage Temperature	T _{stg}	- 55 to + 125	°C

DC ELECTRICAL CHARACTERISTICS

XC2165C2xAxx

1.8V Operation (Unless otherwise stated, $V_{DD} = 1.8V$, $f_0=70MHz$, No Load, $T_a = -40^{\circ}C \sim +85^{\circ}C$)

PARAMETER	SYMBOL	FUNCTION	MIN.	TYP.	MAX.	UNIT	CIRCUIT	
Operating Voltage	V_{DD}		1.5	1.8	3.6	V	-	
Crystal Oscillation Frequency	f_0		8	-	70	MHz	-	
Output Frequency	f_{OSC}	MIN : $f_0=8MHz$, MAX : $f_0=70MHz$, $C_L=15pF$	XC2165C21Axx	8	-	70	MHz	-
			XC2165C22Axx	4	-	35		
			XC2165C24Axx	2	-	17.5		
			XC2165C28Axx	1	-	8.75		
'H' Level Input Voltage	V_{IH}	/INH pin	$0.7V_{DD}$	-	-	V	1	
'L' Level Input Voltage	V_{IL}	/INH pin	-	-	$0.3V_{DD}$	V	1	
'H' Level Output Voltage	V_{OH}	Q0 pin, $V_{DD}=1.5V$, $I_{OH} = -2.0mA$	1.0	1.1	-	V	2	
'L' Level Output Voltage	V_{OL}	Q0 pin, $V_{DD}=1.5V$, $I_{OL} = 2.0mA$	-	0.3	0.4	V	2	
Supply Current 1	I_{DD1}	/INH =Open, $C_L=15pF$	XC2165C21Axx	-	5.0	10.0	mA	3
			XC2165C22Axx	-	3.5	7.0		
			XC2165C24Axx	-	3.0	6.0		
			XC2165C28Axx	-	2.5	6.0		
Supply Current 2	I_{DD2}	/INH = 'L', $f_0 = 70MHz$, $C_L=15pF$	-	15	30	μA	3	
Input Pull-Up Resistance 1	Rup1	/INH = 'L'	0.8	2.0	6.0	$M\Omega$	4	
Input Pull-Up Resistance 2	Rup2	/INH = $0.7V_{DD}$	20.0	50.0	150.0	$k\Omega$	4	
Internal Oscillation Capacity	C_g		-	$10^{(*)}$	-	pF	-	
	C_d		-	$10^{(*)}$	-	pF	-	
Internal Oscillation Feedback Resistance	Rf		1.2	3.0	5.5	$M\Omega$	5	
Output Off Leak Current	I_{oz}	$V_{DD}=3.6V$, /INH = 'L'	-	-	1.0	μA	6	

(*) Designed value

AC ELECTRICAL CHARACTERISTICS

XC2165C2xAxx

1.8V Operation (Unless otherwise stated, $V_{DD} = 1.8V$, $f_0=70MHz$, $C_L=15pF$, $T_a = -40^{\circ}C \sim +85^{\circ}C$)

PARAMETER	SYMBOL	FUNCTION	MIN.	TYP.	MAX.	UNIT	CIRCUIT
Output Rise Time	t_r	$V_{DD}=1.8V$, $C_L=15pF$ (10% to 90%)	-	-	$6.5^{(*)}$	ns	-
Output Fall Time	t_f	$V_{DD}=1.8V$, $C_L=15pF$ (10% to 90%)	-	-	$6.5^{(*)}$	ns	-
Duty Cycle	DUTY	$C_L=15pF$ @ $0.5V_{DD}$	40	-	60	%	7
Output Start Time	t_{on}	$f_0=8MHz$	-	-	$4.0^{(*)}$	ms	-

(*) Designed value

■ DC ELECTRICAL CHARACTERISTICS (Continued)

XC2165C2xBxx

2.5V Operation (Unless otherwise stated, V_{DD} = 2.5V, f₀=120MHz, No Load, Ta = - 40°C ~ + 85°C)

PARAMETER	SYMBOL	FUNCTION	MIN.	TYP.	MAX.	UNIT	CIRCUIT	
Operating Voltage	V _{DD}		1.8	2.5	3.6	V	-	
Crystal Oscillation Frequency	f ₀		16	-	120	MHz	-	
Output Frequency	f _{OSC}	MIN : f ₀ =16MHz, MAX : f ₀ =120MHz, C _L =5pF	XC2165C21Bxx	16	-	120	MHz	-
			XC2165C22Bxx	8	-	60		
			XC2165C24Bxx	4	-	30		
			XC2165C28Bxx	2	-	15		
'H' Level Input Voltage	V _{IH}	/INH pin	0.7V _{DD}	-	-	V	1	
'L' Level Input Voltage	V _{IL}	/INH pin	-	-	0.3V _{DD}	V	1	
'H' Level Output Voltage	V _{OH}	Q0 pin, V _{DD} =1.8V, I _{OH} = - 2.0mA	1.3	1.4	-	V	2	
'L' Level Output Voltage	V _{OL}	Q0 pin, V _{DD} =1.8V, I _{OL} = 2.0mA	-	0.3	0.4	V	2	
Supply Current 1	I _{DD1}	/INH =Open, f ₀ =120MHz, C _L =5pF	XC2165C21Bxx	-	10.0	20.0	mA	3
			XC2165C22Bxx	-	T.B.D.	T.B.D.		
			XC2165C24Bxx	-	T.B.D.	T.B.D.		
			XC2165C28Bxx	-	T.B.D.	T.B.D.		
Supply Current 2	I _{DD2}	/INH = 'L', f ₀ = 120MHz, C _L =5pF	-	15.0	30.0	μA	3	
Input Pull-Up Resistance 1	R _{up1}	/INH = 'L'	0.8	2.0	6.0	MΩ	4	
Input Pull-Up Resistance 2	R _{up2}	/INH = 0.7V _{DD}	20.0	50.0	150.0	kΩ	4	
Internal Oscillation Capacity	C _g		-	10 ^(*)	-	pF	-	
	C _d		-	10 ^(*)	-	pF	-	
Internal Oscillation Feedback Resistance	R _f		1.2	3.0	5.5	MΩ	5	
Output Off Leak Current	I _{oz}	V _{DD} =3.6V, /INH = 'L'	-	-	1.0	μA	6	

(*) Designed value

■ AC ELECTRICAL CHARACTERISTICS (Continued)

XC2165C2xBxx

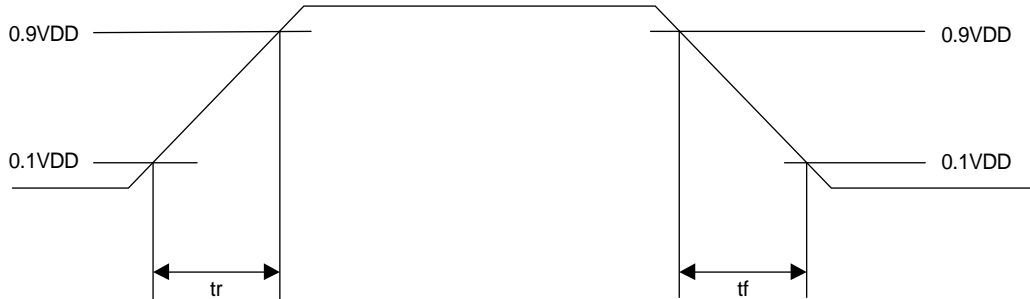
2.7V Operation (Unless otherwise stated, V_{DD} = 2.7V, f₀=120MHz, C_L=5pF, Ta = - 40°C ~ + 85°C)

PARAMETER	SYMBOL	FUNCTION	MIN.	TYP.	MAX.	UNIT	CIRCUIT
Output Rise Time	t _r	V _{DD} =2.5V, C _L =5pF (10% to 90%)	-	-	4.0 ^(*)	ns	-
Output Fall Time	t _f	V _{DD} =2.5V, C _L =5pF (10% to 90%)	-	-	4.0 ^(*)	ns	-
Duty Cycle	DUTY	C _L =5pF @ 0.5V _{DD}	40	-	60	%	7
Oscillation Start Time	t _{osc_on}	f ₀ =16MHz	-	-	3.0 ^(*)	ms	-

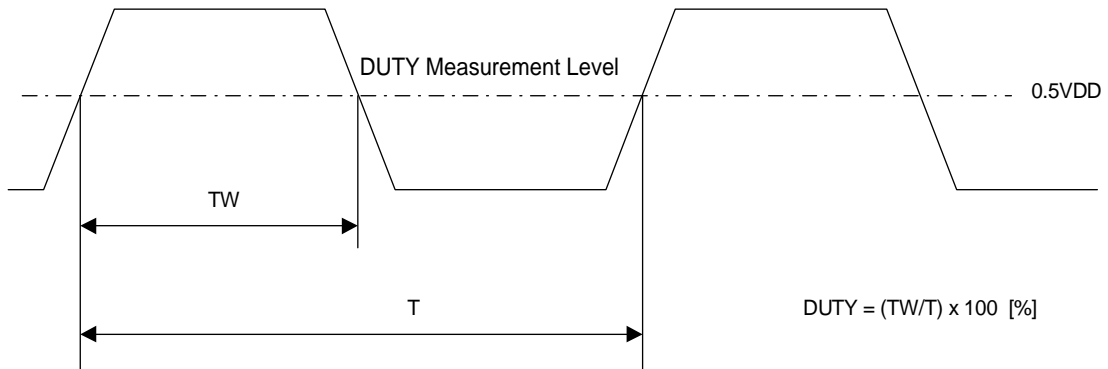
(*) Designed value

SWITCHING CHARACTERISTICS MEASUREMENT WAVEFORMS

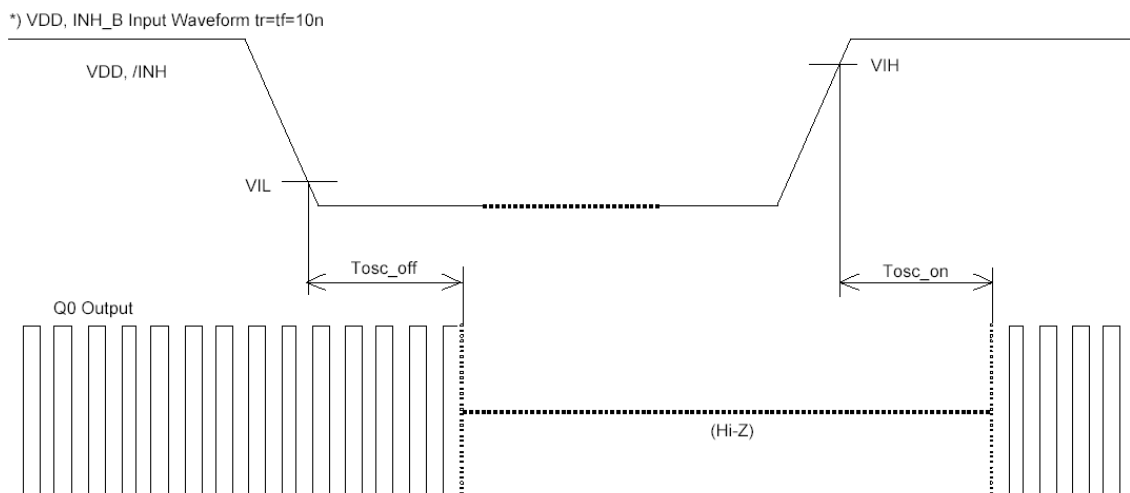
(1) Output Rise Time: t_r / Output Fall Time: t_f



(2) Duty Cycle

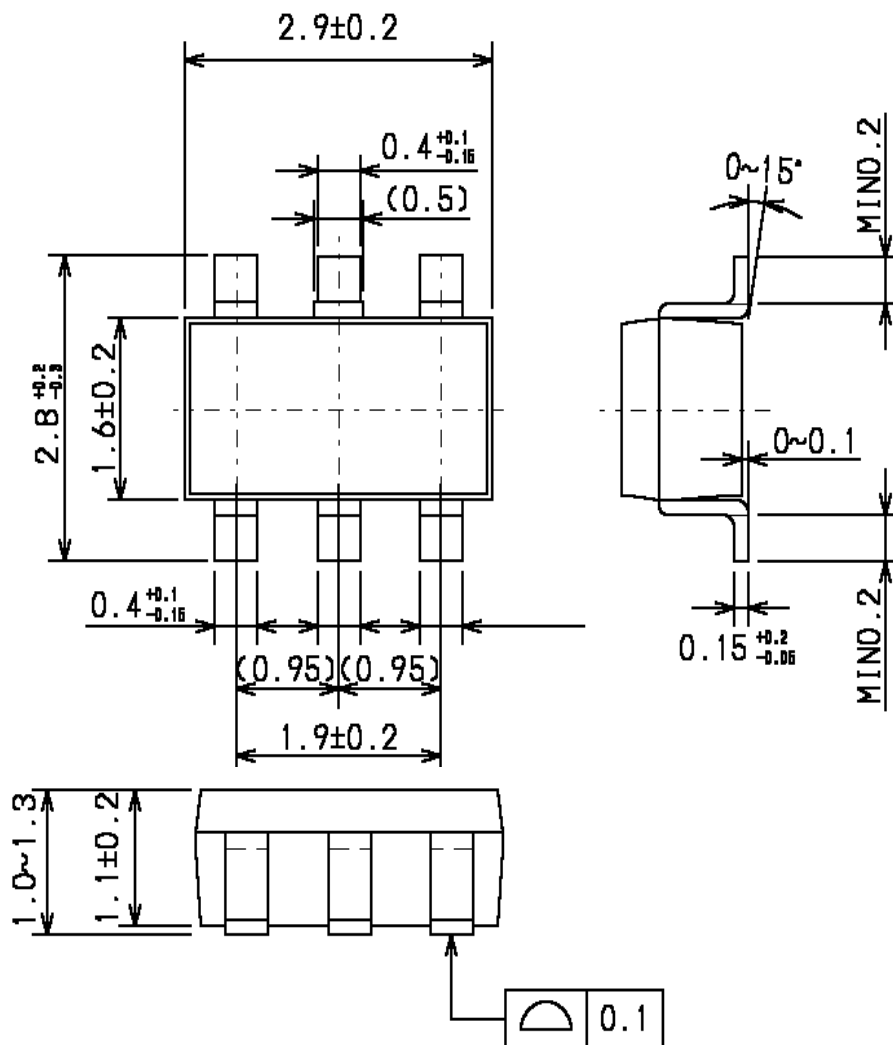


(3) Oscillation Start Time: t_{osc_on} / Oscillation Stop Time: t_{osc_off}

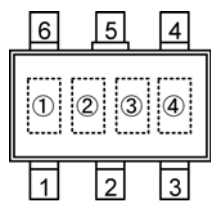


PACKAGING INFORMATION

●SOT-26



MARKING RULE



SOT-26 (TOP VIEW)

① represents product series (Fixed marking)

MARK	PRODUCT SERIES
5	XC2165 series

② represents oscillation frequency

MARK	OSCILLATION FREQUENCY
A	C2xA: 8MHz ~ 70MHz (Fundamental)
B	C2xB: 16MHz ~ 120MHz (Fundamental)

③ represents divider ratio

MARK	DEVIDER RATIO	MARK	DEVIDER RATIO
A	f0/1	B	f0/2
C	f0/4	D	f0/8

④ 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 catalog 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 catalog.
3. Please ensure suitable shipping controls (including fail-safe designs and aging protection) are in force for equipment employing products listed in this catalog.
4. The products in this catalog 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 catalog 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 catalog may be copied or reproduced without the prior permission of Torex Semiconductor Ltd.

TOREX SEMICONDUCTOR LTD.

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: org@lifeelectronics.ru