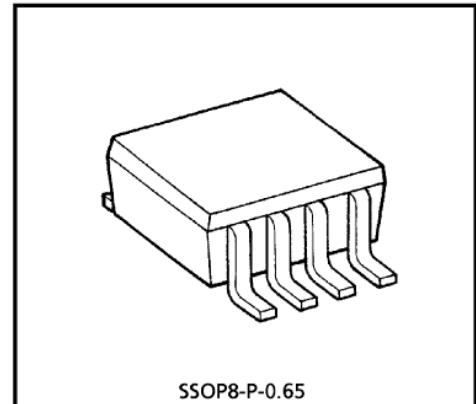


TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

## TC3W03FU

## CRYSTAL OSCILLATOR

The TC3W03FU is a IC for high speed CMOS crystal oscillator fabricated with silicon gate C<sup>2</sup>MOS technology. It can be used to make high efficient crystal oscillator with certain output signal by added external crystal oscillation unit, some capacitor and resistor. It has selective 4-step ( $f_0$ ,  $1/2f_0$ ,  $1/4f_0$ ,  $1/8f_0$ ) frequency devide down function. And by setting the disable oscillate input (CE) to low level, the output (Q) becomes high impedance. All inputs are equipped with protection circuits against static discharge or transient excess voltage.



Weight : 0.02g (Typ.)

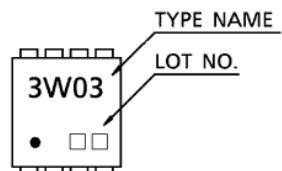
## FEATURES

- Wide oscillation frequency range  $\cdots f_{osc} = 1MHz \sim 40MHz$
- Incorporated frequency devide down step
  - $\cdots$  selective  $f_0$ ,  $1/2f_0$ ,  $1/4f_0$  or  $1/8f_0$
- 3-state output
- Output drive capability  $\cdots$  10 LSTTL loads
- Very small package

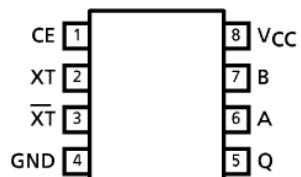
## MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	V <sub>CC</sub>	-0.5~7.0	V
DC Input Voltage	V <sub>IN</sub>	-0.5~V <sub>CC</sub> + 0.5	V
DC Output Voltage	V <sub>OUT</sub>	-0.5~V <sub>CC</sub> + 0.5	V
Input Diode Current	I <sub>IN</sub>	$\pm 20$	mA
Output Diode Current	I <sub>OUT</sub>	$\pm 25$	mA
Power Dissipation	P <sub>C</sub>	300	mW
Storage Temperature	T <sub>stg</sub>	-65~150	°C
Lead Temperature (10s)	T <sub>L</sub>	260	°C

## MARKING



## PIN ASSIGNMENT (TOP VIEW)



## (Note)

This IC is used only for crystal oscillation. So, this is unfit for DC~low frequency range operation and frequency devide down.

## TRUTH TABLE

INPUTS			OUTPUTS
CE	A	B	Q
H	L	L	$f_0$
	L	H	$1/2f_0$
	H	L	$1/4f_0$
	H	H	$1/8f_0$
	L	Don't care	Z

Z : High impedance

## PIN DESIGNATIONS

PIN NO.	SYMBOL	FUNCTION
1	CE	Disable oscillate and Reset
2	XT	Connect to crystal unit divide down step.
3	$\bar{XT}$	Connect to crystal unit divide down step.
4	GND	Ground
5	Q	Output
6	A	Select for divide down ratio
7	B	Select for divide down ratio
8	$V_{CC}$	Supply voltage

## RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	$V_{CC}$	$5 \pm 0.5$	V
Input Voltage	$V_{IN}$	$0 \sim V_{CC}$	V
Operating Temperature	$T_{opr}$	$-45 \sim 85$	°C

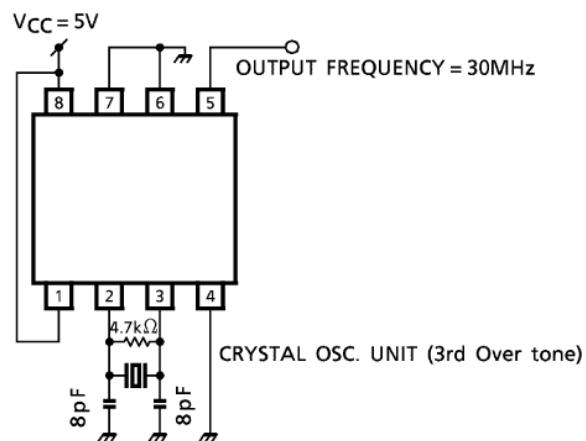
## DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CIR-CUIT	TEST CONDITION	Ta = 25°C			Ta = - 40~85°C		UNIT
				MIN.	TYP.	MAX.	MIN.	MAX.	
High-Level Input Voltage	$V_{IH}$	—	$V_{CC} = 5V$	3.5	—	—	3.5	—	V
Low-Level Input Voltage	$V_{IL}$	—	$V_{CC} = 5V$	—	—	1.5	—	1.5	V
High-Level Output Current	$I_{OH}$	—	$V_{CC} = 5V$	-4.0	—	—	-3.8	—	mA
Low-Level Output Current	$I_{OL}$	—	$V_{CC} = 5V$	4.0	—	—	3.8	—	mA
High-Level Input Current	$I_{IH}$	—	$CE = A = B = V_{CC}$	—	—	0.1	—	1.0	$\mu A$
Low-Level Input Current	$I_{IL}$	—	$A = B = GND$	—	—	-0.1	—	-1.0	$\mu A$
Quiescent Supply Current	$I_{CC}$	—	$CE = V_{CC}, A = B = GND$	—	—	1.0	—	10	$\mu A$
Stand by Current	$I_{STN}$	—	$CE = GND$	—	—	500	—	700	$\mu A$
3-State Output Off-State Current	$I_{OZ}$	—	$A = B = V_{IH} \text{ or } V_{IL}$ $V_{OUT} = V_{CC} \text{ or } GND$	—	—	$\pm 0.5$	—	$\pm 5.0$	$\mu A$
Builtin Pull-up Resistor	$R_{CE}$	—	—	154	220	286	154	286	k $\Omega$

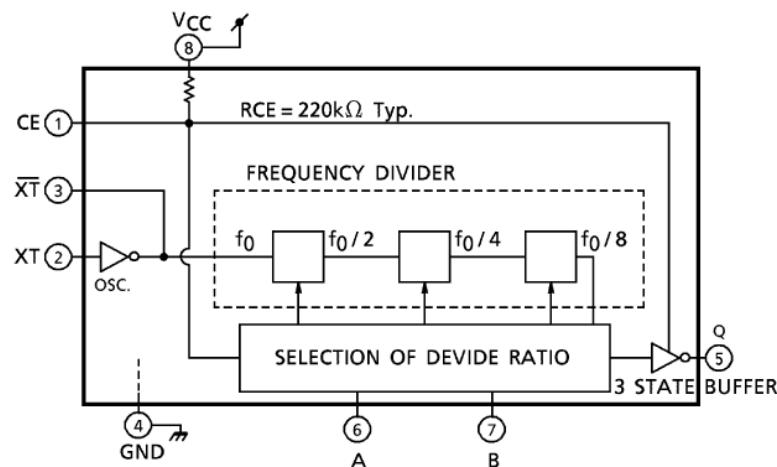
AC ELECTRICAL CHARACTERISTICS ( $V_{CC} = 5V$ ,  $Ta = 25°C$ )

PARAMETER	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	$I_{CC(opr)}$	—	See application circuit	—	—	22	mA
Operating Frequency Range	$f_{opr}$	—	See application circuit	1.0	—	40	MHz
Output Wave form Duty	Duty	—	See application circuit	45	50	55	%

## APPLICATION CIRCUIT (Example)



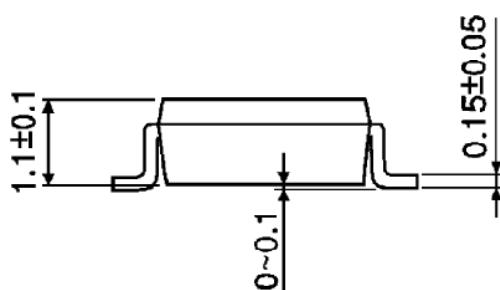
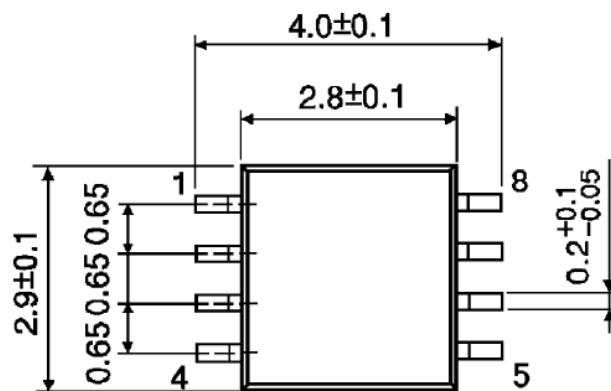
## SYSTEM DIAGRAM



**PACKAGE DIMENSIONS**

SSOP8-P-0.65

Unit : mm



Weight : 0.02g (Typ.)

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20070701-EN GENERAL

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