XC2151 Series

ICs for use with Crystal Oscillators

◆CMOS :Low Power Consumption
◆Oscillation Frequency : 4MHz ~ 70MHz
◆Built-In Oscillator Capacitors
◆Divider Ratio : fo/1, fo/2, fo/4, fo/8
◆3-State Output
◆Supply Voltage : 5.0V
◆Mini Mold SOT-26 Package

■APPLICATIONS

●Crystal oscillator modules
●Communication equipment
●Microcomputers
●Clock units in motor control
●System clocks on boards
●Timers
●Palmtops

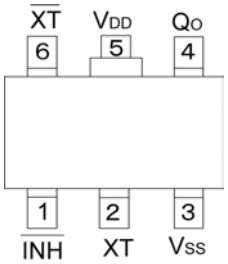
■GENERAL DESCRIPTION

The XC2151 series are a group of high frequency, CMOS low power crystal oscillators with oscillator & divider circuitry, oscillator capacitors and amplifier feedback resistors built-in. An oscillator circuit can be created from just an external crystal.
Output frequency can be selected from four frequencies : Fundamental f0/1, Divided f0/2, f0/4, f0/8.
The output buffer is 3-State and has a fanout of 10 - TTL.

■FEATURES

High Precision : Built-in oscillator capacitors 16pF (TYP.) (or selectable from 10 ~ 20pF)
: On-chip amplifier feedback resistor 5MΩ (TYP.) (or selectable from 1.6kΩ ~ 8.4kΩ)
Oscillation Frequency: 4MHz ~ 70MHz
Divider Ratio : Selectable from f0/1, f0/2, f0/4, f0/8
Output : 3-State, 10 - TTL fanout
Operating Voltage Range : 4.0V ~ 6.0V
Small Supply Current
Stand-By Function
Low Cost : Oscillator circuit can be created from just an external crystal
Ultra Small Package : SOT-26 (150mW) mini mold

■PIN CONFIGURATION



SOT-26
(TOP VIEW)

■PIN ASSIGNMENT

PIN NUMBER	PIN NAME	FUNCTION
1	/INH	Control *
2	XT	Oscillator Connection (Input)
3	VSS	GND
4	Q0	Output
5	VDD	Power Supply
6	/XT	Oscillator Connection (Output)

* Control pin has pull-up resistor built-in.

■INH, Q0 PIN FUNCTION

XC2151x51

/INH	Q0
"H"	Output
"L"	High Impedance (oscillation stopped)
open	Output

XC2151x55

/INH	Q0
"H"	Output
"L"	High Impedance (oscillation stopped)
open	Output

"H" = High level
"L" = Low level

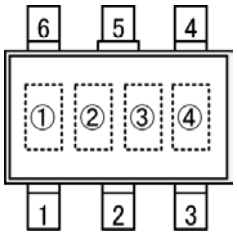
■PRODUCT CLASSIFICATION

●Ordering Information

XC21①②③④⑤⑥⑦⑧

DESIGNATOR	DESCRIPTION	SYMBOL	DESCRIPTION
①	Supply Voltage	5	: 5.0V
②	Product Series	1	: Large output capability
③	Duty Level	A	: CMOS (VDD/2) &TTL
		C	: CMOS (VDD/2)
		T	: TTL
④	Output Capacity	5	: 10TTL
⑤	Stand-By Mode & Divider Ratio	1	: f0/1 (CE)
		2	: f0/2 (CE)
		4	: f0/4 (CE)
		8	: f0/8 (CE)
		5	: f0/1 (OE)
⑥	Fundamental Rf, Cg, Dc	-	: (Please refer to electrical characteristics tables)
⑦	Package	M	: SOT-26
⑧	Device Orientation	R	: Embossed tape, Standard feed
		L	: Embossed tape, Reverse feed

■MARKING RULE



SOT-26
(TOP VIEW)

①Represents divider ratio

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

②Represents stand-by mode, duty level & output capability

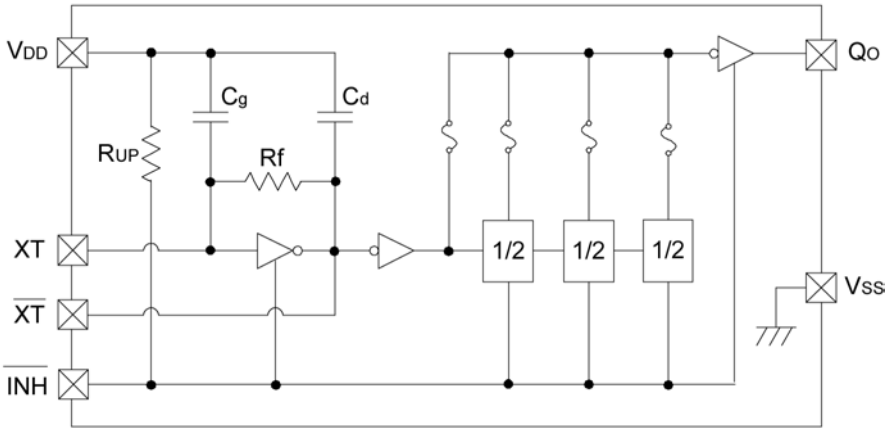
MARK	STAND-BY MODE	DUTY LEVEL	OUTPUT CAPABILITY
5	CE	CMOS (VDD/2), TTL	10TTL
6	CE	CMOS (VDD/2)	10TTL
7	CE	TTL	10TTL
8	OE	XC2151T=TTL , XC2151C=CMOS	10TTL

③Represents fundamental and Rf, Cg, Cd

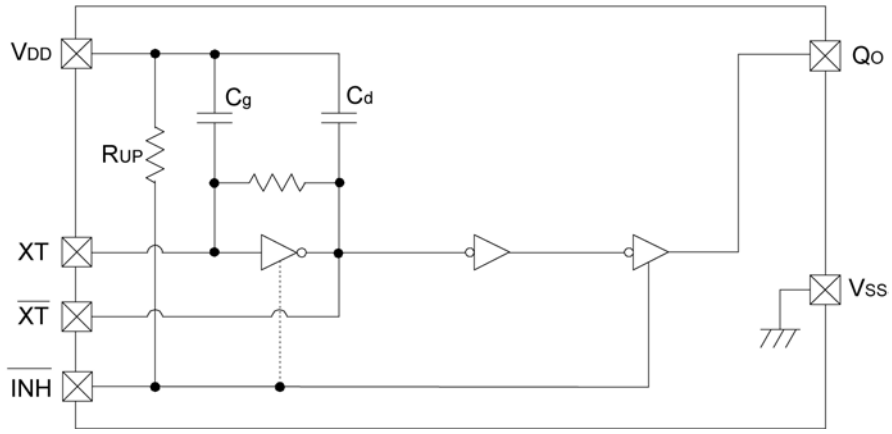
④Represents assembly lot number
(based on internal standards)

■BLOCK DIAGRAM

1) XC2151A Series



2) XC2151T/C Series



■ABSOLUTE MAXIMUM RATINGS

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	150	mW
Operating Temparature Range	Topr	-30 ~ +75	℃
Storage Temparature Range	Tstg	-55 ~ +125	℃

■ELECTRICAL CHARACTERISTICS

XC2151A510 / 519 (Fundamental)

V_{DD}=5.0V, Fosc=20MHz, No Load, Ta = 25℃

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Operating Supply Voltage	V_{DD}		4.0	–	6.0	V
Input Voltage 'High'	V_{IH}		2.4	–	–	V
Input Voltage 'Low'	V_{IL}		–	–	0.4	V
Output Current 'High'	I_{OH}	V_{OH} = 4.6V	–	- 10	–	mA
Output Current 'Low'	I_{OL}	V_{OL} = 0.4V	16	–	–	mA
Supply Current 1	I_{DD1}	/ INH = OPEN, Q_0 = OPEN	–	–	12	mA
Supply Current 2	I_{DD2}	/ INH = "L"	–	2	5	μA
Input Pull-Up Resistance	R_{UP}	/ INH = 4.5V	50	–	200	kΩ
Internal Oscillator Capacitance	Cg,Cd	see note below	–	16	–	pF
Internal Oscillator Feedback Resistance	Rf		–	5	–	MΩ
Output Disable Leak Current	I_{OZ}		–	–	10	μA

Note : The values for Cg,Cd are the designed values with XC2151A510. The XC2151A519 is an external type.

XC2151A580 / 589 (Fundamental, f0 / 8)

V_{DD}=5.0V, Fosc=20MHz, No Load, Ta = 25℃

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Operating Supply Voltage	V_{DD}		4.0	–	6.0	V
Input Voltage 'High'	V_{IH}		2.4	–	–	V
Input Voltage 'Low'	V_{IL}		–	–	0.4	V
Output Current 'High'	I_{OH}	V_{OH} = 4.6V	–	- 10	–	mA
Output Current 'Low'	I_{OL}	V_{OL} = 0.4V	16	–	–	mA
Supply Current 1	I_{DD1}	/ INH = OPEN, Q_0 = OPEN	–	–	12	mA
Supply Current 2	I_{DD2}	/ INH = "L"	–	2	5	μA
Input Pull-Up Resistance	R_{UP}	/ INH = 4.5V	50	–	200	kΩ
Internal Oscillator Capacitance	Cg,Cd	see note below	–	16	–	pF
Internal Oscillator Feedback Resistance	Rf		–	5	–	MΩ
Output Disable Leak Current	I_{OZ}		–	–	10	μA

Note : The values for Cg,Cd are the designed values with XC2151A580. The XC2151A589 is an external type.

XC2151A (Fundamental)

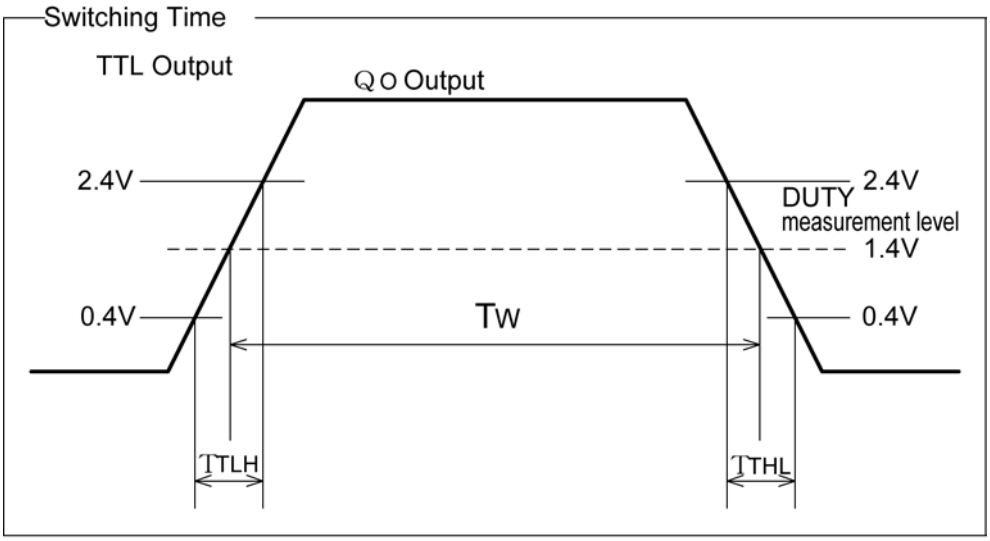
PART No.	DUTY LEVEL	OUTPUT	DIVIDER RATIO	Rf (MΩ)	Cg/Cd (pF)	RECOMMENDED FREQUENCY RANGE
XC2151A510	CMOS (V_{DD}/2), TTL	10TTL	f0 / 1	5.0	16	4MHz to 30MHz
XC2151A520	CMOS (V_{DD}/2), TTL	10TTL	f0 / 2	5.0	16	4MHz to 30MHz
XC2151A540	CMOS (V_{DD}/2), TTL	10TTL	f0 / 4	5.0	16	4MHz to 30MHz
XC2151A580	CMOS (V_{DD}/2), TTL	10TTL	f0 / 8	5.0	16	4MHz to 30MHz
XC2151A519	CMOS (V_{DD}/2), TTL	10TTL	f0 / 1	5.0	16 (ext.)	4MHz to 30MHz
XC2151A529	CMOS (V_{DD}/2), TTL	10TTL	f0 / 2	5.0	16 (ext.)	4MHz to 30MHz
XC2151A549	CMOS (V_{DD}/2), TTL	10TTL	f0 / 4	5.0	16 (ext.)	4MHz to 30MHz
XC2151A589	CMOS (V_{DD}/2), TTL	10TTL	f0 / 8	5.0	16 (ext.)	4MHz to 30MHz

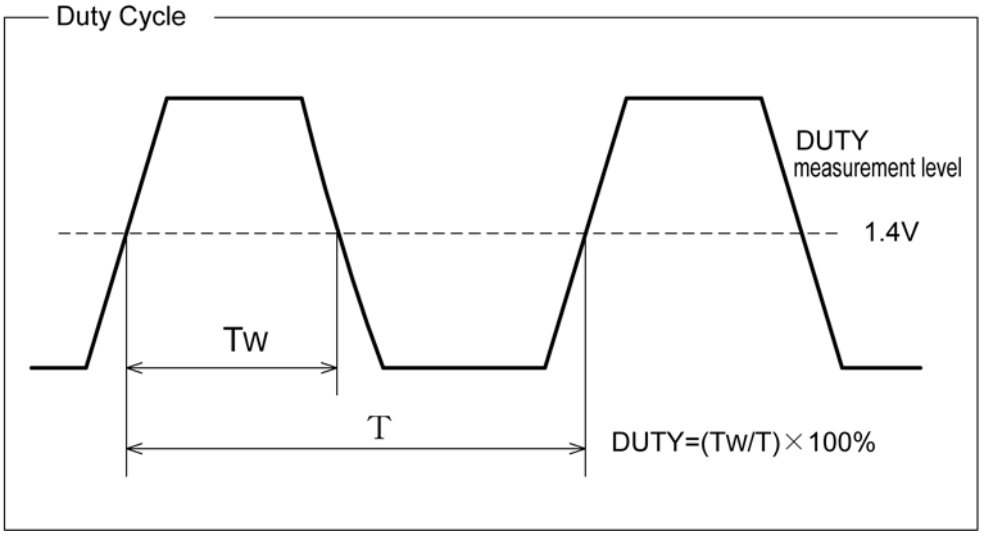
■SWITCHING CHARACTERISTICS

XC2151T

TTL Duty, V_{DD}=5.0V, Ta = 25℃

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output Rise Time	T_{TLH}	Load=10TTL, 0.4V → 2.4V	–	–	5	nsec
Output Fall Time	T_{THL}	Load=10TTL, 2.4V → 0.4V	–	–	5	nsec
Duty Cycle	DUTY	Load=10TTL @ 1.4V	45	–	55	%





■SWITCHING CHARACTERISTICS (Continued)

XC2151C

TTL Duty, V_{DD}=5.0V, Ta = 25℃

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output Rise Time	T_{TLH}	C_L=15pF, 0.1V_{DD} ⟶ 0.9V_{DD}	–	–	5	nsec
Output Fall Time	T_{THL}	C_L=15pF, 0.9V_{DD} ⟶ 0.1V_{DD}	–	–	5	nsec
Duty Cycle	DUTY	C_L=15pF @ V_{DD} / 2	45	–	55	%