XO630x

Crystal Oscillator Dual output (32.768 kHz + MHz) Module IC Family

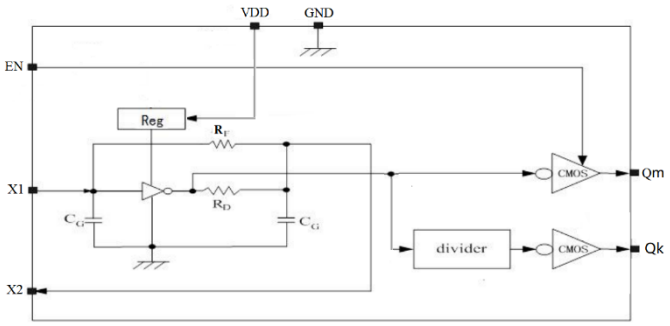
Features

- 24/25/26 MHz input frequency
  XO6301: 24MHz fundamental crystal
  XO6302: 25MHz fundamental crystal
  XO6303: 26MHz fundamental crystal
- Operating voltages of 1.62 V to 3.63V
- Dual output (32.768kHz+MHz output)
- Mode function available (Single output (32.768kHz) or Dual output (32.768kHz+MHz) is selectable.)
- Output Specification : CMOS
- 50±5% output duty cycle
- 15pF output drive: -40~85℃
- Die form or Wafer form

Applications

- Bluetooth Low Energy (BLE) communication function
- Wearable devices, and compact and thin devices such as smartphone and tablet
- Devices both with clock signal source for microcomputer and clock function other than above.
- Fundamental Crystal Oscillator
- 7050, 5032, 3225, 2520,2016

Block Diagram



Description

The XO630x is a Low Power double output production. The part generates MHz output and 32.768KHz output from a crystal.

Mode function available：Single output (32.768kHz) or Dual output (32.768kHz+MHz) is selectable.

Function table:

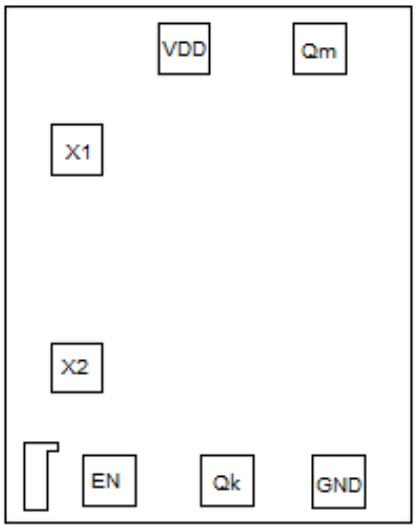
EN pin	32.768KHz	MHz
Level H	Output On	Output On
Level L	Output On	Output Hiz

Order Information

Part no.	Package type
XO630x-3WF	Wafer form
XO630x-3DE	Die form
XO630x-4WF	Wafer form
XO630x-4DE	Die form

Note: X: 1-24MHz input;2-25MHz input; 3-26MHz

Pad Configuration



Pad Coordinate File					
Pad Name	X Coordinate	Y Coordinate	Pad Name	X Coordinate	Y Coordinate
X1	-179.47	-203.87	Qk	337.015	28.24
VDD	-337.00	-40.37	EN	337.015	-152.925
Qm	-337.00	169.575	X2	160.53	-203.87
GND	337.015	198.86			
Note: Substrate is connected to GND or floating.					
Die Size: 800μm*630μm (Not including scribe line , Scribe Line Width 60um) **Die Thickness:** 130μm±15μm(-3) or 180um±20um(-8), 100um±15um(-4) **Pad Size:** 80μm*80μm **Substrate Level:** GND or Floating					

Pad Description

Pad Name	I/O Type	Description
OE	I	Output Mode Select. EN=H: Qm ON, Qk ON; EN=L: Qm Hiz, Qk ON.
X_1	I	Crystal input pad.
X_2	O	Crystal output pad.
GND	GND	Ground.
Qm	O	Mhz Clock output
Qk	O	32.768k Clock output.
V_{DD}	Power	Power supply.

Maximum Rating

Supply Voltage to Ground Potential……..……4V
All Inputs and Output……..….VDD+0.5V
Storage Temperature…….……-65°C to +150°C

Note:
Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sec-tions of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Recommended Operating Conditions

(GND=0V, unless otherwise noted.)

V	Parameter	Conditions	Min	Typ	Max	Unit
V_{DD}	Supply voltage	-	1.62	-	3.63	V
T_A	Operating temperature	-	-40		+85	°C
f_0	Oscillation frequency*1	-		24/25/26		MHz

DC Characteristics

V_{DD}= 1.62V to 3.63V, Ambient Temperature -40 to +85°C

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
VDD	Operating voltage	–	1.62	–	3.63	V
V_{OH}	Output high voltage	VDD=1.8V, IOH = -1mA	VDD-0.4	–	–	V
		VDD=2.5V, IOH = -1mA	VDD-0.4	–	–	V
		VDD=3.3V, IOH = -1mA	VDD-0.4	–	–	V
V_{OL}	Output low voltage	VDD=1.8V, IOL = 1mA	–	–	0.4	V
		VDD=2.5V, IOL = 1mA	–	–	0.4	V
		VDD=3.3V, IOL = 1mA	–	–	0.4	V
V_{IH}	HIGH-level input voltage	OE Measurement	0.7VDD			
V_{IL}	LOW-level input voltage	OE Measurement			0.3VDD	
IDD1	Supply current1	VDD=1.8V, OE=VDD, Load=15pf		2	4	mA
		VDD=2.5V, OE=VDD, Load=15pf		2.5	5	mA
		VDD=3.3V, OE=VDD; Load=15pf		3.0	6	mA
IDD2	Supply current2	VDD=1.8V, OE=GND, Load=15pf		63	120	uA
		VDD=2.5V, OE=GND, Load=15pf		63	120	uA
		VDD=3.3V, OE=GND, Load=15pf		66	130	uA

AC Characteristics

V_{DD}= 1.62V to 3.63V, Ambient Temperature -40 to +85°C

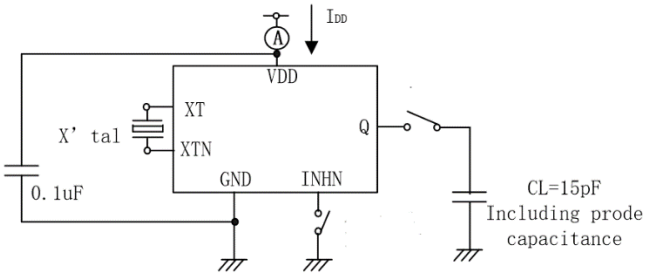
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
X_{IN}, X_{OUT}	Crystal input frequency range			24/25/26		MHz
T_{Rise1_MHz}	Output rise time	Measured from 20% to 80% VDD=1.8V, Load=15pf		1.6	2.5	ns
		Measured from 10% to 90% VDD=2.5V, Load=15pf		1.6	2.5	ns
		Measured from 10% to 90% VDD=3.3V, Load=15pf		1.2	2	ns
T_{Fall1_MHz}	Output fall time	Measured from 80% to 20% VDD=1.8V, Load=15pf		1.9	3	ns
		Measured from 90% to 10% VDD=2.5V, Load=15pf		1.7	3	ns
		Measured from 90% to 10% VDD=3.3V, Load=15pf		1.3	2	ns
$T_{Rise2\_32.768KHz}$	Output rise time	Measured from 20% to 80% VDD=1.8V, Load=15pf		5.0	8	ns
		Measured from 10% to 90% VDD=2.5V, Load=15pf		7.0	10	ns
		Measured from 10% to 90% VDD=3.3V, Load=15pf	–	7.0	10	ns
$T_{Fall2\_32.768KHz}$	Output fall time	Measured from 80% to 20% VDD=1.8V, Load=15pf		7.0	10	ns
		Measured from 90% to 10% VDD=2.5V, Load=15pf		8.5	12	ns
		Measured from 90% to 10% VDD=3.3V, Load=15pf	–	7.5	10	ns
Duty cycle	Output duty cycle	Load=15pf, 50%VDD	45	50	55	%

Note: Typical condition is on room temperature at 25°

Measurement Circuit

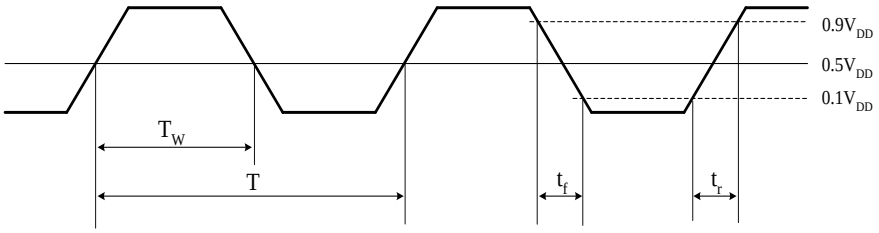
Measurement cct1

Measurement parameter: I_{DD}, Duty, t_r, t_f



Note:The AC characteristics are observed using an oscilloscope on pin Q

Output switching waveform



DUTY=TW/T×100(%)

History Log:

Rev #	DCN NO.	REVISION HISTORY	DATE
0	230117	Initiated	2023/5/30