



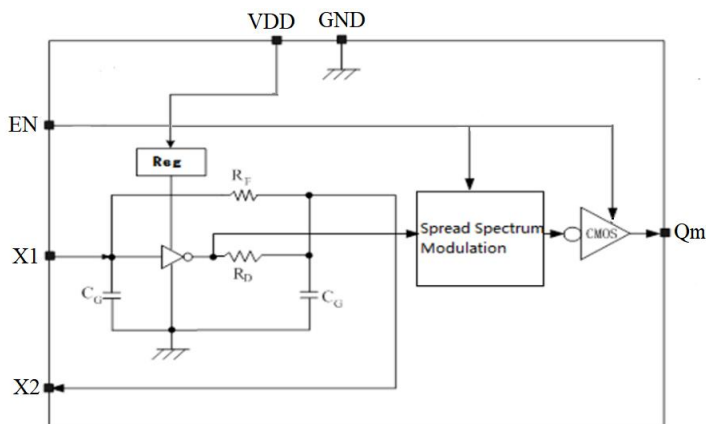
Features

- 10 to 50MHz input frequency ranges
- Operating voltages of 1.62 V to 3.63V
- Spreading Ratio:
- **AC: -2.0%**
- **AE: -1.5%**
- **AF: -1.0%**
- **BF: -0.8%**
- Modulation Rate: $F_{in} / 764$
- Low power consumption and dissipation
- AEC-Q 100 qualified. PPAP capable, and manufactured in IATF 16949 certified facilities.

Applications

- IP Camera
- Printers/MFPs
- Media players
- DTV/Set-top Box
- Embedded digital video devices
- LCD Panel Modules
- Automotive components
- Networking devices
- Surveillance

Block Diagram



Description

The XO6201-xx-Q is one Low Power Spread Spectrum Frequency Multiplier part of RSM SSC family. The output frequency is same as crystal, and is designed to reduce electromagnetic interference (EMI) by spreading the clock.

The Spreading Mode/Ratio is programmed in fab by ROM codes. The XO6201-xx-Q provides spread, refer to different option.

Benefits

- Reduction in EMI
- System cost saving
- Reduced system complexity
- Faster time to market

Applications

- Fundamental Crystal Oscillator
- 7050, 5032, 3225, 2520, 2016

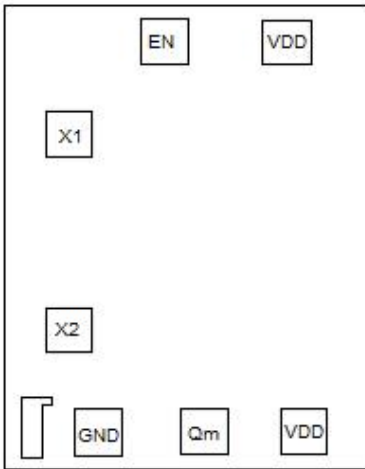
Order Information

Part no.	Package type
XO6201-xx-3DE-Q	Die form
XO6201-xx-3WF-Q	Wafer form
XO6201-xx-4DE-Q	Die form
XO6201-xx-4WF-Q	Wafer form

- Note: -xx: -AC: -2.0%
-AE: -1.5%
-AF: -1.0%
-BF: -0.8%



Pad Configuration



Pad Coordinate File

Pad Name	X Coordinate	Y Coordinate	Pad Name	X Coordinate	Y Coordinate
X1	-179.47	-203.87	Qm	337.015	28.24
EN	-337.00	-40.37	GND	337.015	-152.925
VDD	-337.00	169.575	X2	160.53	-203.87
VDD	337.015	198.86			

Note: Substrate is connected to GND or floating.

Die Size: 800 μ m*630 μ m (Not including scribe line, Scribe Line Width 60 μ m)

Die Thickness: 130 μ m \pm 15 μ m (-3) ,100 μ m \pm 15 μ m (-4)

Pad Size: 80 μ m*80 μ m

Substrate Level: GND or Floating

Pad Description

Pin Name	I/O Type	Description
OE	I	Output Enable/Disable or Spreading Enable/Disable control by 3 states; Low: Qm output Hiz; High: Qm output with spreading >VDD + 1V: Qm output without spreading.
X1	I	Crystal input pad.
X2	O	Crystal output pad.
GND	GND	Ground.
Qm	O	Spread spectrum clock output (OE=VDD).
V _{DD}	Power	Power supply.



Maximum Rating

Supply Voltage to Ground Potential.....	4V
OE pin	V _{DD} +2V
Other Inputs and Output.....	V _{DD} +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 sections 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.)

Sym.	Parameter	Conditions	Min	Typ	Max	Unit
V _{DD}	Supply voltage	-	1.62	-	3.63	V
T _A	Operating temperature	-	-40		+125	°C
f ₀	Oscillation frequency*1	-	10	25	50	MHz

DC Characteristics

V_{DD}= 1.62V to 3.63V, Ambient Temperature -40 to +125°C

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{DD}	Operating voltage	-	1.62	-	3.63	V
V _{OH}	Output high voltage	V _{DD} =1.8V, I _{OH} = -1mA	V _{DD} -0.4			V
		V _{DD} =2.5V, I _{OH} = -1mA	V _{DD} -0.4	-	-	V
		V _{DD} =3.3V, I _{OH} = -1mA	V _{DD} -0.4	-	-	V
V _{OL}	Output low voltage	V _{DD} =1.8V, I _{OL} = 1mA			0.4	V
		V _{DD} =2.5V, I _{OL} = 1mA	-	-	0.4	V
		V _{DD} =3.3V, I _{OL} = 1mA	-	-	0.4	V
V _{IH}	HIGH-level input voltage	OE Measurement	0.7V _{DD}			V
V _{IL}	LOW-level input voltage	OE Measurement			0.3V _{DD}	V
I _{DD1}	Supply current1	V _{DD} =1.8V, OE=V _{DD} , 25MHz/15pf		2	4	mA
		V _{DD} =2.5V, OE=V _{DD} , 25MHz/15pf		2.5	5	mA
		V _{DD} =3.3V, OE=V _{DD} , 25MHz/15pf		3.0	6	mA
I _{DD2}	Supply current2	V _{DD} =1.8V, OE>V _{DD} +1V,25MHz/15pf		1.3	3	mA
		V _{DD} =2.5V, OE>V _{DD} +1V,25MHz/15pf		1.7	3.5	mA
		V _{DD} =3.3V, OE>V _{DD} +1V,25MHz/15pf		2.1	4	mA



AC Characteristics

V_{DD}= 1.62V to 3.63V, Ambient Temperature -40 to +125°C

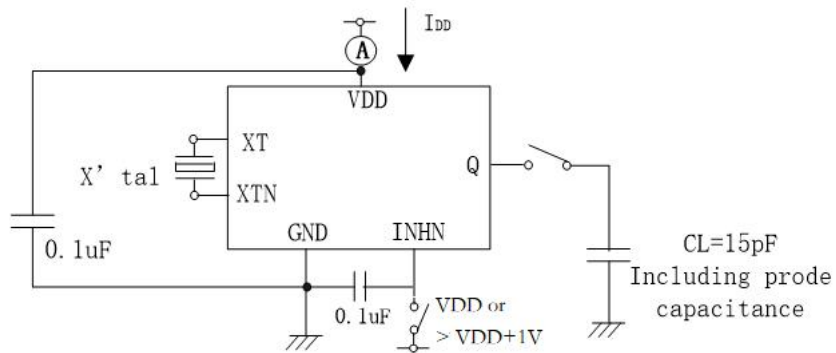
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
X1, X2	Crystal input frequency range		10	–	50	MHz
t _{Rise}	Output rise time (25MHz)	Measured from 20% to 80% V _{DD} =1.8V, Load=15pf		2.4	5	ns
		Measured from 10% to 90% V _{DD} =2.5V, Load=15pf		2.4	5	ns
		Measured from 10% to 90% V _{DD} =3.3V, Load=15pf	–	2	5	ns
t _{Fall}	Output fall time (25MHz)	Measured from 80% to 20% V _{DD} =1.8V, Load=15pf		2.6	5	ns
		Measured from 90% to 10% V _{DD} =2.5V, Load=15pf		2.4	5	ns
		Measured from 90% to 10% V _{DD} =3.3V, Load=15pf	–	2	5	ns
Duty cycle	Output duty cycle	Load=15pf, 50%V _{DD}	45	50	55	%

Note: Typical condition is on room temperature at 25°



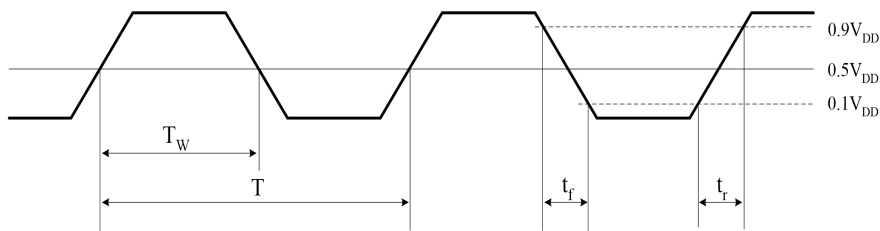
Measurement Circuit

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



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

Output switching waveform



$$\text{DUTY} = T_w / T \times 100 (\%)$$



Revision History

Revision	Description	Date
0	Initiated	2023/4/28
1.0	Official released	2024/6/24