

Approved by: 黄灏东
Checked by: 杨霞
Issued by: 玉静霞

SPECIFICATION

SJK P/N: S20400000133J

深圳市晶科鑫实业有限公司
SHENZHEN CRYSTAL TECHNOLOGY INDUSTRIAL CO., LTD.

Add: 12F, Bldg. 3C, TianAn Cloud Park Phase 1, Bantian, Longgang, Shenzhen 518129, China
Tel: (86) 755 88352809 88352810 Fax: (86) 755 88353718 88352499
E-mail: jolly@g-crystal.com HTTP://www.g-crystal.com

Low Power Programmable Oscillator

2.5*2.0 mm



Applications

- n Ideal for GPON/GPON, network switches, routers, servers, embedded systems
- n Ideal for high-speed serial protocols such as: USB, SATA, SAS, Firewire, 100M / 1G / 10G Ethernet, etc.

ELECTRICAL SPECIFICATIONS

No	Parameters	Symbol	Condition	Electrical Specifications			
				MIN	TYP	MAX	UNITS
1	Nominal Frequency	-		40.000			MHz
2	Output		CMOS				
3	Operating Temperature	Topr		-40	~	85	°C
4	Storage Temperature	Tstg		-55	~	125	°C
5	Frequency Stability	-		±30			ppm
6	Supply Voltage	VDD		2.97	3.3	3.63	V
7	Current Consumption	Idd	No load condition, f = 20 MHz, Vdd = 2.8V to 3.3V		3.8	4.5	mA
8	OE Disable Supply Current	I_OE	Vdd = 2.5V to 3.3V, OE = GND, Output in high-Z state			4.2	mA
9	Standby Current	I_std	ST = GND, Vdd = 2.8V to 3.3V, Output is weakly pulled down		2.1	4.3	μA
10	Duty Cycle	DC	All Vdds	45		55	%
11	Rise/Fall Time	Tr, Tf	Vdd = 2.5V, 2.8V, 3.0V or 3.3V, 20% - 80%		1	2	ns
12	Input Voltage High	VIH	Pin 1, OE or ST	70%			VDD
13	Input Voltage Low	VIL	Pin 1, OE or ST	-	-	30%	VDD
14	Output Voltage High	VoH	IOH = -4 mA (Vdd = 3.0V or 3.3V)	90%VDD	-	-	V
15	Output Voltage Low	VoL	IOL = 4 mA (Vdd = 3.0V or 3.3V)	-	-	10%VDD	V
16	Input Pull-up Impedence	Z_in	Pin 1, OE logic high or logic low, or ST logic high		87	150	KΩ
			Pin 1, ST logic low	2			MΩ
17	Startup Time	T_start	Measured from the time Vdd reaches its rated minimum value			5	mS
18	RMS Period Jitter	T_jitt	f = 75 MHz, Integration bandwidth = 12 kHz to 20 MHz		1.3	2	ps

Note:

1. All electrical specifications in the above table are specified with 15 pF output load and for all Vdd(s) unless otherwise stated.

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Table 1. Pin Description

Pin	Symbol		Functionality
1	OE/ $\overline{\text{ST}}/\text{NC}$	Output Enable	H ^[1] : specified frequency output L: output is high impedance. Only output driver is disabled.
		Standby	H ^[1] : specified frequency output L: output is low (weak pull down). Device goes to sleep mode. Supply current reduces to I _{std} .
		No Connect	Any voltage between 0 and Vdd or Open ^[1] : Specified frequency output. Pin 1 has no function.
2	GND	Power	Electrical ground
3	OUT	Output	Oscillator output
4	VDD	Power	Power supply voltage ^[2]

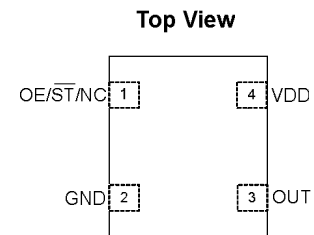


Figure 1. Pin Assignments

Notes:

1. In OE or $\overline{\text{ST}}$ mode, a pull-up resistor of 10 k Ω or less is recommended if pin 1 is not externally driven. If pin 1 needs to be left floating, use the NC option.
2. A capacitor of value 0.1 μF or higher between Vdd and GND is required.

Table 2. Absolute Maximum Limits

Attempted operation outside the absolute maximum ratings of the part may cause permanent damage to the part. Actual performance of the IC is only guaranteed within the operational specifications, not at absolute maximum ratings.

Parameter	Min.	Max.	Unit
Storage Temperature	-65	150	$^{\circ}\text{C}$
Vdd	-0.5	4	V
Electrostatic Discharge	–	2000	V
Soldering Temperature (follow standard Pb free soldering guidelines)	–	260	$^{\circ}\text{C}$
Junction Temperature	–	150	$^{\circ}\text{C}$

Note:

2. Exceeding this temperature for extended period of time may damage the device.

Table 3. Thermal Consideration

Package	θ_{JA} , 4 Layer Board ($^{\circ}\text{C}/\text{W}$)	θ_{JA} , 2 Layer Board ($^{\circ}\text{C}/\text{W}$)	θ_{JC} , Bottom ($^{\circ}\text{C}/\text{W}$)
2520	117	222	26

Table 4. Maximum Operating Junction Temperature

Max Operating Temperature (ambient)	Maximum Operating Junction Temperature
70 $^{\circ}\text{C}$	80 $^{\circ}\text{C}$
85 $^{\circ}\text{C}$	95 $^{\circ}\text{C}$

Note:

4. Datasheet specifications are not guaranteed if junction temperature exceeds the maximum operating junction temperature.

Table 5. Environmental Compliance

Parameter	Condition/Test Method
Mechanical Shock	MIL-STD-883F, Method 2002
Mechanical Vibration	MIL-STD-883F, Method 2007
Temperature Cycle	JESD22, Method A104
Solderability	MIL-STD-883F, Method 2003
Moisture Sensitivity Level	MSL1 @ 260 $^{\circ}\text{C}$

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Test Circuit and Waveform

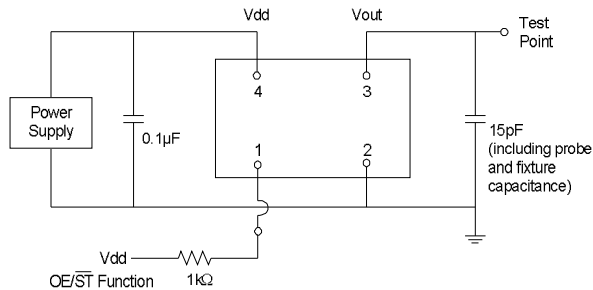


Figure 2. Test Circuit

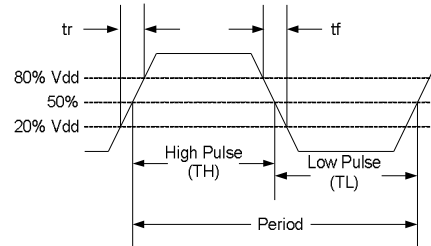
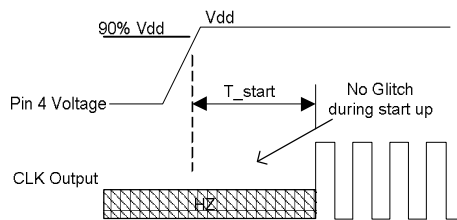


Figure 3. Waveform

Note:

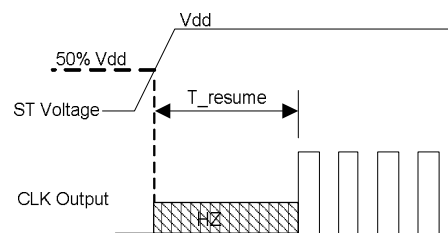
1. Duty Cycle is computed as $\text{Duty Cycle} = \text{TH} / \text{Period}$.

Timing Diagrams



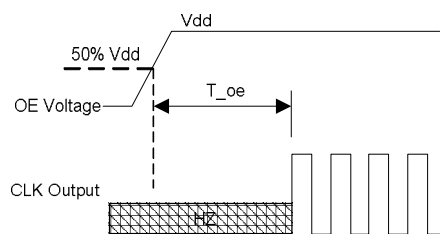
T_{start} : Time to start from power-off

Figure 4. Startup Timing (OE/ST Mode)



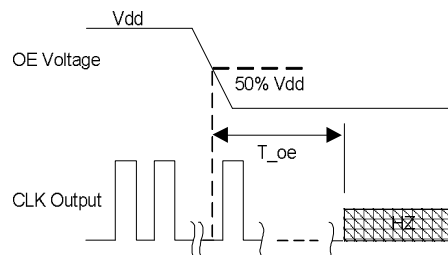
T_{resume} : Time to resume from ST

Figure 5. Standby Resume Timing (ST Mode Only)



T_{oe} : Time to re-enable the clock output

Figure 6. OE Enable Timing (OE Mode Only)



T_{oe} : Time to put the output in High Z mode

Figure 7. OE Disable Timing (OE Mode Only)

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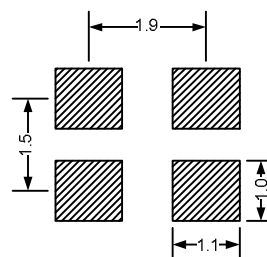
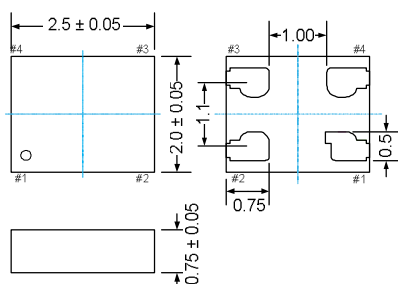
Rise/Fall Time (20% to 80%) vs C_{LOAD} Tables

Table 1. V_{dd} = 3.3V Rise/Fall Times for Specific C_{LOAD}

Drive Strength \ C _{LOAD}	Rise/Fall Time Typ (ns)				
	5 pF	15 pF	30 pF	45 pF	60 pF
L	3.39	6.88	11.63	17.56	23.59
A	1.74	3.50	6.38	8.98	12.19
R	1.16	2.33	4.29	6.04	8.34
B	0.81	1.82	3.22	4.52	6.33
T or "-": default	0.46	1.00	1.86	2.60	3.84
E	0.33	0.87	1.64	2.30	3.35
U	0.28	0.79	1.46	2.05	2.93
F	0.25	0.72	1.31	1.83	2.61

Dimensions and Patterns

2.5 x 2.0 x 0.75 mm



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