

阅读申明

- 1.本站收集的数据手册和产品资料都来自互联网，版权归原作者所有。如读者和版权方有任何异议请及时告之，我们将妥善解决。
- 2.本站提供的中文数据手册是英文数据手册的中文翻译，其目的是协助用户阅读，该译文无法自动跟随原稿更新，同时也可能存在翻译上的不当。建议读者以英文原稿为参考以便获得更精准的信息。
- 3.本站提供的产品资料，来自厂商的技术支持或者使用者的心得体会等，其内容可能存在描述上的差异，建议读者做出适当判断。
- 4.如需与我们联系，请发邮件到marketing@iczoom.com，主题请标有“数据手册”字样。

Read Statement

1. The datasheets and other product information on the site are all from network reference or other public materials, and the copyright belongs to the original author and original published source. If readers and copyright owners have any objections, please contact us and we will deal with it in a timely manner.
2. The Chinese datasheets provided on the website is a Chinese translation of the English datasheets. Its purpose is for reader's learning exchange only and do not involve commercial purposes. The translation cannot be automatically updated with the original manuscript, and there may also be improper translations. Readers are advised to use the English manuscript as a reference for more accurate information.
3. All product information provided on the website refer to solutions from manufacturers' technical support or users the contents may have differences in description, and readers are advised to take the original article as the standard.
4. If you have any questions, please contact us at marketing@iczoom.com and mark the subject with "Datasheets" .

ANY2001B

Single-Chip, One-Output Clock Generator

AnyCLK

Service depends on time

Features

- Any frequency between 1 MHz and 110 MHz accurate to 6 decimal places
- Operating temperature from -40°C to 85°C. Refer to [ANY2018](#) for -40°C to 85°C option and [ANY2020](#) for -55°C to 125°C option
- Excellent total frequency stability as low as ±20 ppm
- Low power consumption of 3.5 mA typical
- Fast startup time of 5 ms
- LVC MOS/HCMOS compatible output
- 5-pin SOT23-5: 2.9mm x 2.8mm
- Pb-free, RoHS and REACH compliant
- For **AEC-Q100 one-output clock generators**, refer to [ANY2024](#) and [ANY2025](#)

Applications

- Industrial, medical, automotive, avionics and other high temperature applications
- Industrial sensors, PLC, motor servo, outdoor networking equipment, medical video cam, asset tracking systems, etc.



Electrical Specifications

Table 1. Electrical Characteristics

All Min and Max limits are specified over temperature and rated operating voltage with 15 pF output load unless otherwise stated. Typical values are at 25°C and nominal supply voltage.

Parameters	Symbol	Min.	Typ.	Max.	Unit	Condition
Frequency Range						
Output Frequency Range	f	1	–	110	MHz	
Frequency Stability and Aging						
Frequency Stability	F_stab	-20	–	+20	ppm	Inclusive of Initial tolerance at 25°C, 1st year aging at 25°C, and variations over operating temperature, rated power supply voltage and load (15 pF ± 10%).
		-25	–	+25	ppm	
		-50	–	+50	ppm	
Operating Temperature Range						
Operating Temperature Range (ambient)	T_use	-20	–	+70	°C	Extended Commercial
		-40	–	+85	°C	Industrial
Supply Voltage and Current Consumption						
Supply Voltage	Vdd	1.62	1.8	1.98	V	
		2.25	2.5	2.75	V	
		2.52	2.8	3.08	V	
		2.7	3.0	3.3	V	
		2.97	3.3	3.63	V	
		2.25	–	3.63	V	
Current Consumption	Idd	–	3.8	4.5	mA	No load condition, f = 20 MHz, Vdd = 2.8V, 3.0V or 3.3V
		–	3.7	4.2	mA	No load condition, f = 20 MHz, Vdd = 2.5V
		–	3.5	4.1	mA	No load condition, f = 20 MHz, Vdd = 1.8V
OE Disable Current	I_od	–	–	4.3	mA	Vdd = 2.5V to 3.3V, OE = Low, Output in high Z state.
		–	–	4.1	mA	Vdd = 1.8V, OE = Low, Output in high Z state.
Standby Current	I_std	–	2.6	4.3	µA	Vdd = 2.8V to 3.3V, \overline{ST} = Low, Output is weakly pulled down
		–	1.4	2.5	µA	Vdd = 2.5V, \overline{ST} = Low, Output is weakly pulled down
		–	0.6	1.3	µA	Vdd = 1.8V, \overline{ST} = Low, Output is weakly pulled down
LVC MOS Output Characteristics						
Duty Cycle	DC	45	–	55	%	All Vdds
Rise/Fall Time	Tr, Tf	–	1.0	2.0	ns	Vdd = 2.5V, 2.8V, 3.0V or 3.3V, 20% - 80%
		–	1.3	2.5	ns	Vdd = 1.8V, 20% - 80%
		–	–	2.0	ns	Vdd = 2.25V - 3.63V, 20% - 80%
Output High Voltage	VOH	90%	–	–	Vdd	IOH = -4 mA (Vdd = 3.0V or 3.3V) IOH = -3 mA (Vdd = 2.8V or 2.5V) IOH = -2 mA (Vdd = 1.8V)
Output Low Voltage	VOL	–	–	10%	Vdd	IOL = 4 mA (Vdd = 3.0V or 3.3V) IOL = 3 mA (Vdd = 2.8V or 2.5V) IOL = 2 mA (Vdd = 1.8V)

Table 1. Electrical Characteristics

Parameters	Symbol	Min.	Typ.	Max.	Unit	Condition
Input Characteristics						
Input High Voltage	V _{IH}	70%	–	–	V _{dd}	Pin 3, OE or \overline{ST}
Input Low Voltage	V _{IL}	–	–	30%	V _{dd}	Pin 3, OE or \overline{ST}
Input Pull-up Impedance	Z _{in}	50	87	150	k Ω	Pin 3, OE logic high or logic low, or \overline{ST} logic high
		2	–	–	M Ω	Pin 3, \overline{ST} logic low
Startup and Resume Timing						
Startup Time	T _{start}	–	–	5	ms	Measured from the time V _{dd} reaches its rated minimum value
Enable/Disable Time	T _{oe}	–	–	130	ns	f = 110 MHz. For other frequencies, T _{oe} = 100 ns + 3 ' clock periods
Resume Time	T _{resume}	–	–	5	ms	Measured from the time ST pin crosses 50% threshold
Jitter						
RMS Period Jitter	T _{jitt}	–	1.8	3	ps	f = 75 MHz, V _{dd} = 2.5V, 2.8V, 3.0V or 3.3V
		–	1.8	3	ps	f = 75 MHz, V _{dd} = 1.8V
Peak-to-peak Period Jitter	T _{pk}	–	12	20	ps	f = 75 MHz, V _{dd} = 2.5V, 2.8V, 3.0V or 3.3V
		–	14	25	ps	f = 75 MHz, V _{dd} = 1.8V
RMS Phase Jitter (random)	T _{phj}	–	0.5	0.9	ps	f = 75 MHz, Integration bandwidth = 900 kHz to 7.5 MHz
		–	1.3	2	ps	f = 75 MHz, Integration bandwidth = 12 kHz to 20 MHz

Table 2. Pin Description

Pin	Symbol	Functionality
1	GND	Power Electrical ground
2	NC	No Connect No connect
3	OE/ \overline{ST} /NC	Output Enable H ^[1] : specified frequency output L: output is high impedance. Only output driver is disabled.
		Standby H or Open ^[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 V _{dd} or Open ^[1] : Specified frequency output. Pin 3 has no function.
4	VDD	Power Power supply voltage ^[2]
5	OUT	Output Oscillator output

Notes:

1. In OE or \overline{ST} mode, a pull-up resistor of 10 k Ω or less is recommended if pin 3 is not externally driven. If pin 3 needs to be left floating, use the NC option.
2. A capacitor of value 0.1 μ F or higher between V_{dd} and GND is required.

Top View

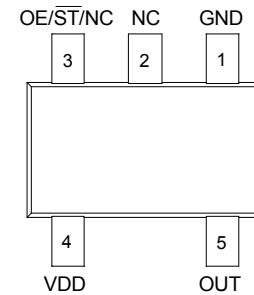


Figure 1. Pin Assignments

Table 3. Absolute Maximum Limits

Attempted operation outside the absolute maximum ratings 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	°C
Vdd	-0.5	4	V
Electrostatic Discharge	–	2000	V
Soldering Temperature (follow standard Pb free soldering guidelines)	–	260	°C
Junction Temperature ^[3]	–	150	°C

Note:

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

Table 4. Thermal Consideration^[4]

Package	θ_{JA} , 4 Layer Board (°C/W)	θ_{JC} , Bottom (°C/W)
SOT23-5	421	175

Note:

- Refer to JESD51 for θ_{JA} and θ_{JC} definitions, and reference layout used to determine the θ_{JA} and θ_{JC} values in the above table.

Table 5. Maximum Operating Junction Temperature^[5]

Max Operating Temperature (ambient)	Maximum Operating Junction Temperature
70°C	80°C
85°C	95°C

Note:

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

Table 6. 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°C

Test Circuit and Waveform^[6]

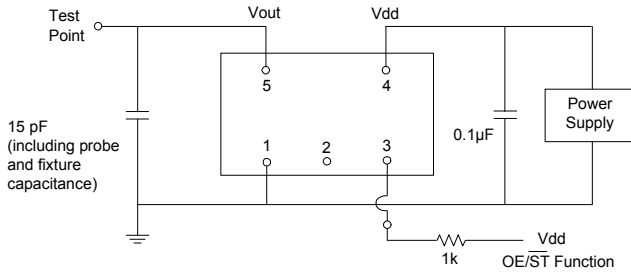


Figure 2. Test Circuit

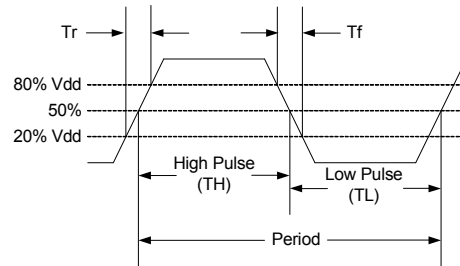
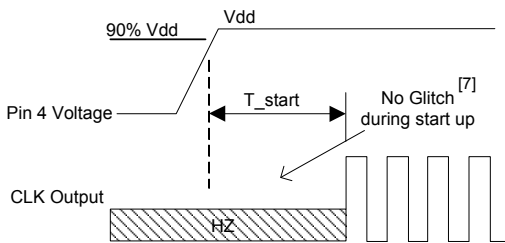


Figure 3. Output Waveform

Note:

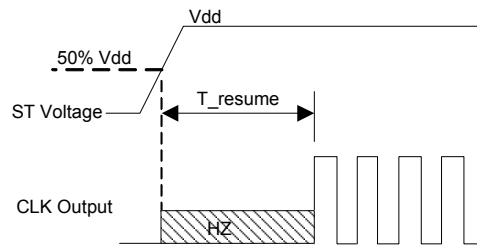
6. Duty Cycle is computed as $Duty\ Cycle = TH/Period$.

Timing Diagrams



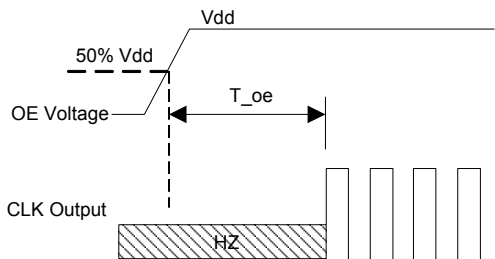
T_{start} : Time to start from power-off

Figure 4. Startup Timing (OE/ST Mode)



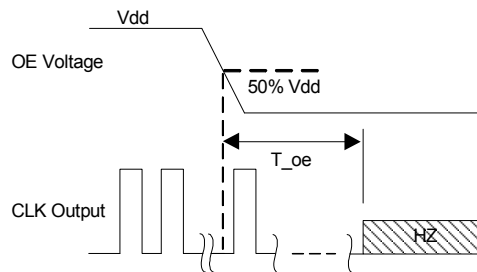
T_{resume} : Time to resume from ST

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)

Note:

7. ANY2001 has "no runt" pulses and "no glitch" output during startup or resume.

Performance Plots^[8]

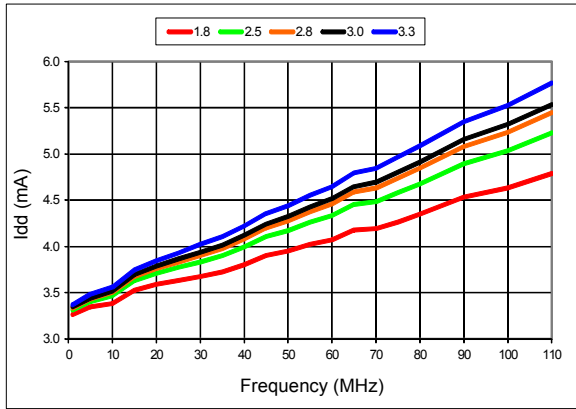


Figure 8. Idd vs Frequency

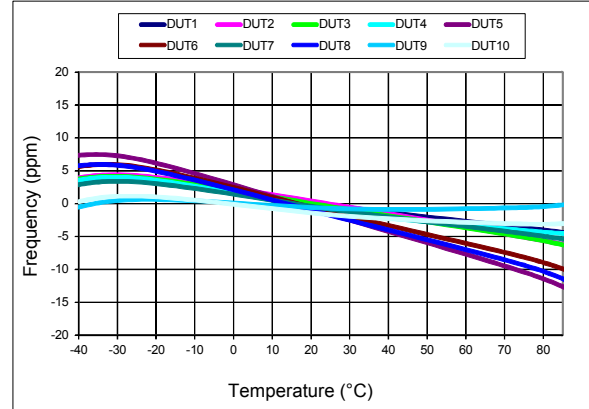


Figure 9. Frequency vs Temperature

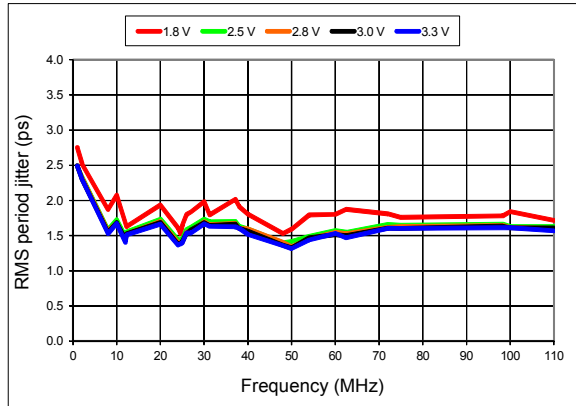


Figure 10. RMS Period Jitter vs Frequency

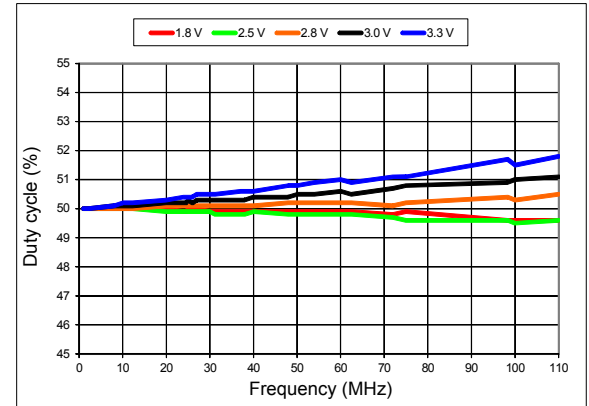


Figure 11. Duty Cycle vs Frequency

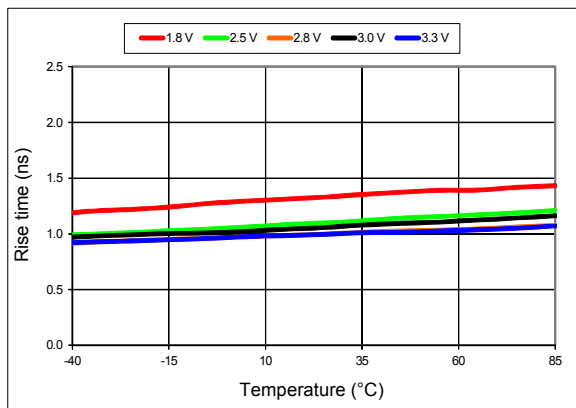


Figure 12. 20%-80% Rise Time vs Temperature

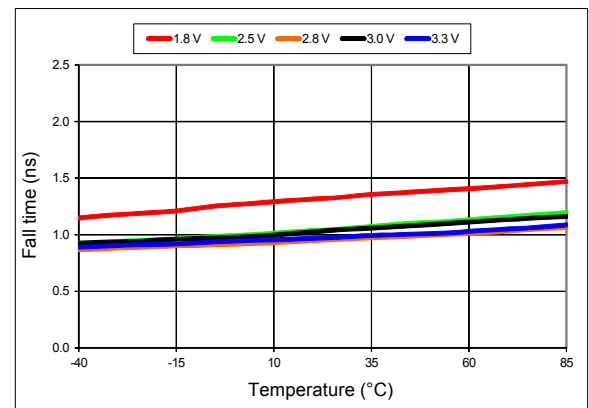


Figure 13. 20%-80% Fall Time vs Temperature

Performance Plots^[8]

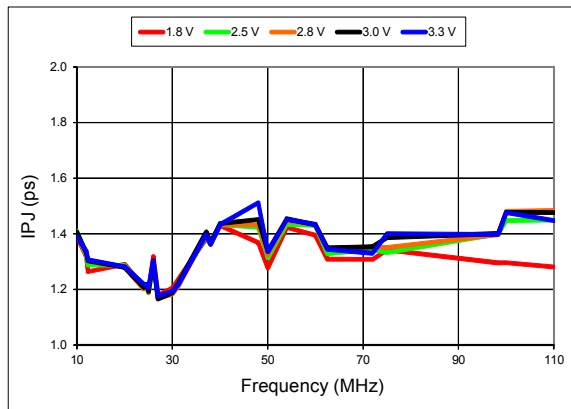


Figure 14. RMS Integrated Phase Jitter Random (12 kHz to 20 MHz) vs Frequency^[9]

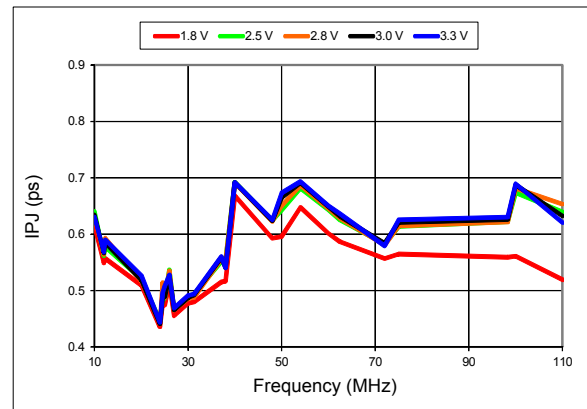


Figure 15. RMS Integrated Phase Jitter Random (900 kHz to 20 MHz) vs Frequency^[9]

Notes:

- 8. All plots are measured with 15 pF load at room temperature, unless otherwise stated.
- 9. Phase noise plots are measured with Agilent E5052B signal source analyzer. Integration range is up to 5 MHz for carrier frequencies up to 40 MHz.

Programmable Drive Strength

The ANY2001 includes a programmable drive strength feature to provide a simple, flexible tool to optimize the clock rise/fall time for specific applications. Benefits from the programmable drive strength feature are:

- Improves system radiated electromagnetic interference (EMI) by slowing down the clock rise/fall time.
- Improves the downstream clock receiver's (RX) jitter by decreasing (speeding up) the clock rise/fall time.
- Ability to drive large capacitive loads while maintaining full swing with sharp edge rates.

For more detailed information about rise/fall time control and drive strength selection, see the Anyclk Application Notes.

EMI Reduction by Slowing Rise/Fall Time

Figure 16 shows the harmonic power reduction as the rise/fall times are increased (slowed down). The rise/fall times are expressed as a ratio of the clock period. For the ratio of 0.05, the signal is very close to a square wave. For the ratio of 0.45, the rise/fall times are very close to near-triangular waveform. These results, for example, show that the 11th clock harmonic can be reduced by 35 dB if the rise/fall edge is increased from 5% of the period to 45% of the period.

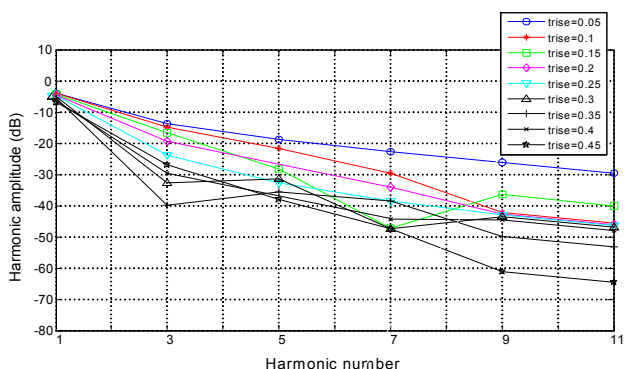


Figure 16. Harmonic EMI reduction as a Function of Slower Rise/Fall Time

Jitter Reduction with Faster Rise/Fall Time

Power supply noise can be a source of jitter for the downstream chipset. One way to reduce this jitter is to speed up the rise/fall time of the input clock. Some chipsets may also require faster rise/fall time in order to reduce their sensitivity to this type of jitter. Refer to the Rise/Fall Time Tables (Table 7 to Table 11) to determine the proper drive strength.

High Output Load Capability

The rise/fall time of the input clock varies as a function of the actual capacitive load the clock drives. At any given drive strength, the rise/fall time becomes slower as the output load increases. As an example, for a 3.3V ANY2001 device with default drive strength setting, the typical rise/fall time is 1 ns for 15 pF output load. The typical rise/fall time slows down to 2.6 ns when the output load increases to 45 pF. One can choose to speed up the rise/fall time to 1.83 ns by then increasing the drive strength setting on the ANY2001.

The ANY2001 can support up to 60 pF in maximum capacitive loads with drive strength settings. Refer to the Rise/Fall Time Tables (Table 7 to 11) to determine the proper drive strength for the desired combination of output load vs. rise/fall time.

ANY2001 Drive Strength Selection

Tables 7 through 11 define the rise/fall time for a given capacitive load and supply voltage.

1. Select the table that matches the ANY2001 nominal supply voltage (1.8V, 2.5V, 2.8V, 3.0V, 3.3V).
2. Select the capacitive load column that matches the application requirement (5 pF to 60 pF)
3. Under the capacitive load column, select the desired rise/fall times.
4. The left-most column represents the part number code for the corresponding drive strength.
5. Add the drive strength code to the part number for ordering purposes.

Calculating Maximum Frequency

Based on the rise and fall time data given in Tables 7 through 11, the maximum frequency the oscillator can operate with guaranteed full swing of the output voltage over temperature can be calculated as the following:

$$\text{Max Frequency} = \frac{1}{5 \times \text{Trf}_{20/80}}$$

where $\text{Trf}_{20/80}$ is the typical value for 20%-80% rise/fall time.

Example 1

Calculate f_{MAX} for the following condition:

- Vdd = 1.8V (Table 7)
- Capacitive Load: 30 pF
- Desired Tr/f time = 3 ns (rise/fall time part number code = E)

Part number for the above example:

ANY2001BIES2-18E-66.666660



Drive strength code is inserted here. Default setting is “-”

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

Table 7. V_{dd} = 1.8V Rise/Fall Times for Specific C_{LOAD}

Rise/Fall Time Typ (ns)					
Drive Strength \ C _{LOAD}	5 pF	15 pF	30 pF	45 pF	60 pF
L	6.16	11.61	22.00	31.27	39.91
A	3.19	6.35	11.00	16.01	21.52
R	2.11	4.31	7.65	10.77	14.47
B	1.65	3.23	5.79	8.18	11.08
T	0.93	1.91	3.32	4.66	6.48
E	0.78	1.66	2.94	4.09	5.74
U	0.70	1.48	2.64	3.68	5.09
F or "-": default	0.65	1.30	2.40	3.35	4.56

Table 8. V_{dd} = 2.5V Rise/Fall Times for Specific C_{LOAD}

Rise/Fall Time Typ (ns)					
Drive Strength \ C _{LOAD}	5 pF	15 pF	30 pF	45 pF	60 pF
L	4.13	8.25	12.82	21.45	27.79
A	2.11	4.27	7.64	11.20	14.49
R	1.45	2.81	5.16	7.65	9.88
B	1.09	2.20	3.88	5.86	7.57
T	0.62	1.28	2.27	3.51	4.45
E or "-": default	0.54	1.00	2.01	3.10	4.01
U	0.43	0.96	1.81	2.79	3.65
F	0.34	0.88	1.64	2.54	3.32

Table 9. V_{dd} = 2.8V Rise/Fall Times for Specific C_{LOAD}

Rise/Fall Time Typ (ns)					
Drive Strength \ C _{LOAD}	5 pF	15 pF	30 pF	45 pF	60 pF
L	3.77	7.54	12.28	19.57	25.27
A	1.94	3.90	7.03	10.24	13.34
R	1.29	2.57	4.72	7.01	9.06
B	0.97	2.00	3.54	5.43	6.93
T	0.55	1.12	2.08	3.22	4.08
E or "-": default	0.44	1.00	1.83	2.82	3.67
U	0.34	0.88	1.64	2.52	3.30
F	0.29	0.81	1.48	2.29	2.99

Table 10. V_{dd} = 3.0V Rise/Fall Times for Specific C_{LOAD}

Rise/Fall Time Typ (ns)					
Drive Strength \ C _{LOAD}	5 pF	15 pF	30 pF	45 pF	60 pF
L	3.60	7.21	11.97	18.74	24.30
A	1.84	3.71	6.72	9.86	12.68
R	1.22	2.46	4.54	6.76	8.62
B	0.89	1.92	3.39	5.20	6.64
T or "-": default	0.51	1.00	1.97	3.07	3.90
E	0.38	0.92	1.72	2.71	3.51
U	0.30	0.83	1.55	2.40	3.13
F	0.27	0.76	1.39	2.16	2.85

Table 11. V_{dd} = 3.3V Rise/Fall Times for Specific C_{LOAD}

Rise/Fall Time Typ (ns)					
Drive Strength \ C _{LOAD}	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

Pin 3 Configuration Options (OE, \overline{ST} , or NC)

Pin 3 of the ANY2001 can be factory-programmed to support three modes: Output Enable (OE), standby (\overline{ST}) or No Connect (NC).

Output Enable (OE) Mode

In the OE mode, applying logic Low to the OE pin only disables the output driver and puts it in Hi-Z mode. The core of the device continues to operate normally. Power consumption is reduced due to the inactivity of the output. When the OE pin is pulled High, the output is typically enabled in $<1\mu\text{s}$.

Standby (\overline{ST}) Mode

In the \overline{ST} mode, a device enters into the standby mode when Pin 3 pulled Low. All internal circuits of the device are turned off. The current is reduced to a standby current, typically in the range of a few μA . When \overline{ST} is pulled High, the device goes through the “resume” process, which can take up to 5 ms.

No Connect (NC) Mode

In the NC mode, the device always operates in its normal mode and outputs the specified frequency regardless of the logic level on pin 3.

Table 12 below summarizes the key relevant parameters in the operation of the device in OE, \overline{ST} , or NC mode.

Table 12. OE vs. \overline{ST} vs. NC

	OE	\overline{ST}	NC
Active current 20 MHz (max, 1.8V)	4.1 mA	4.1 mA	4.1 mA
OE disable current (max, 1.8V)	4.1 mA	N/A	N/A
Standby current (typical 1.8V)	N/A	0.6 μA	N/A
OE enable time at 110 MHz (max)	130 ns	N/A	N/A
Resume time from standby (max, all frequency)	N/A	5 ms	N/A
Output driver in OE disable/standby mode	High Z	weak pull-down	N/A

Output on Startup and Resume

The ANY2001 comes with gated output. Its clock output is accurate to the rated frequency stability within the first pulse from initial device startup or resume from the standby mode.

In addition, the ANY2001 supports “no runt” pulses, and “no glitch” output during startup or resume as shown in the waveform captures in Figure 17 and Figure 18.



Figure 17. Startup Waveform vs. Vdd

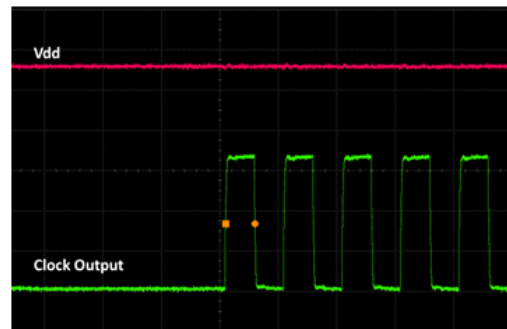
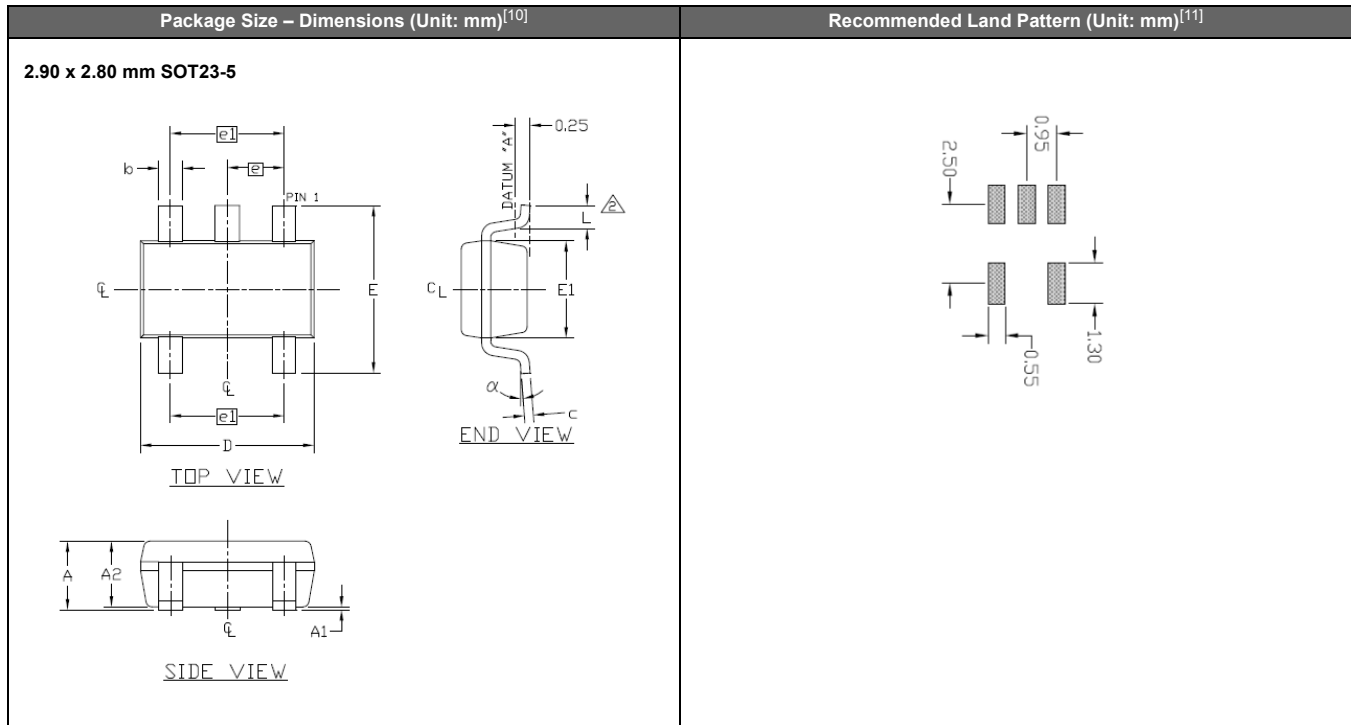


Figure 18. Startup Waveform vs. Vdd (Zoomed-in View of Figure 17)

Dimensions and Patterns



Notes:

- 10. Top marking: Y denotes manufacturing origin and XXXX denotes manufacturing lot number. The value of “Y” will depend on the assembly location of the device.
- 11. A capacitor value of 0.1 μ F between Vdd and GND is required

Table 13. Dimension Table

Symbol	Min.	Nom.	Max.
A	0.90	1.25	1.45
A1	0.00	0.05	0.15
A2	0.90	1.10	1.30
b	0.35	0.40	0.50
c	0.08	0.15	0.20
D	2.80	2.90	3.00
E	2.60	2.80	3.00
E1	1.50	1.625	1.75
L	0.35	0.45	0.60
L1	0.60 REF		
e	0.95 BSC.		
e1	1.90 BSC.		
α	0°	2.5°	8°

ANY2001B

Single-Chip, One-Output Clock Generator

AnyCLK

Service depends on time

Ordering Information

The Part No. Guide is for reference only. To customize and build an exact part number, use the Anyclk [Part Number Generator](#).

ANY2001BI-S2-18E - 25.000025D

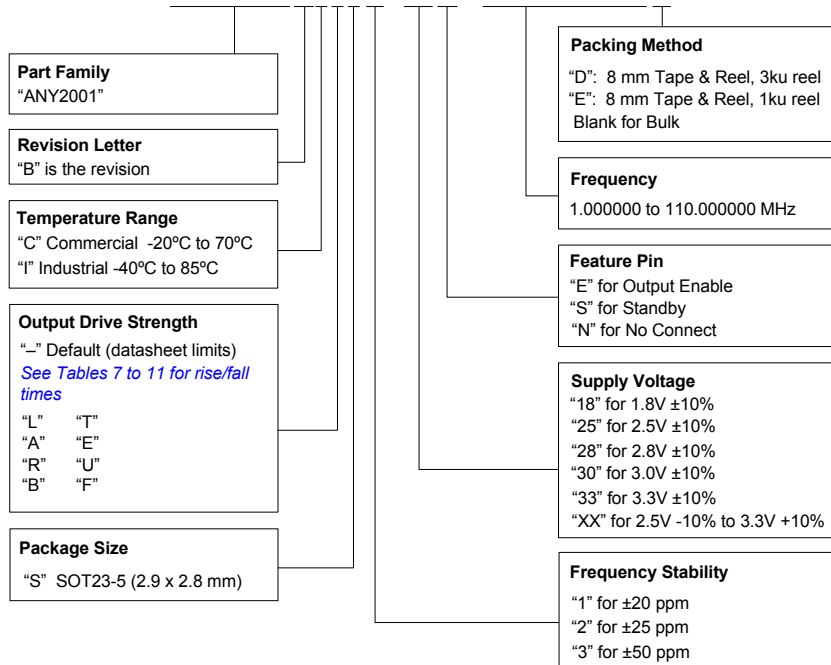


Table 14. Additional Information

Document	Description	Download Link
Time Machine II	MEMS oscillator programmer	Mail to info@anyclk.com
Field Programmable Oscillators	Devices that can be programmable in the field by Time Machine II	Mail to info@anyclk.com
Manufacturing Notes	Tape & Reel dimension, reflow profile and other manufacturing related info	Mail to info@anyclk.com
Qualification Reports	RoHS report, reliability reports, composition reports	Mail to info@anyclk.com
Performance Reports	Additional performance data such as phase noise, current consumption and jitter for selected frequencies	Mail to info@anyclk.com
Termination Techniques	Termination design recommendations	Mail to info@anyclk.com
Layout Techniques	Layout recommendations	Mail to info@anyclk.com

Revision History

Table 15. Datasheet Version and Change Log

Version	Release Date	Change Summary
0.95	3/13/15	Initial Release
1.0	5/13/15	<ul style="list-style-type: none"> Revised the Electrical Characteristics, Timing Diagrams and Performance Plots Revised SOT23 package diagram

Supplemental Information

The Supplemental Information section is not part of the datasheet and is for informational purposes only.

Silicon MEMS Outperforms Quartz

Best Reliability

Silicon is inherently more reliable than quartz. Unlike quartz suppliers, Anyclk has in-house MEMS and analog CMOS expertise, which allows Anyclk to develop the most reliable products. Figure 1 shows a comparison with quartz technology.

Why is Anyclk Best in Class:

- Anyclk's MEMS resonators are vacuum sealed using an advanced EpiSeal™ process, which eliminates foreign particles and improves long term aging and reliability
- World-class MEMS and CMOS design expertise

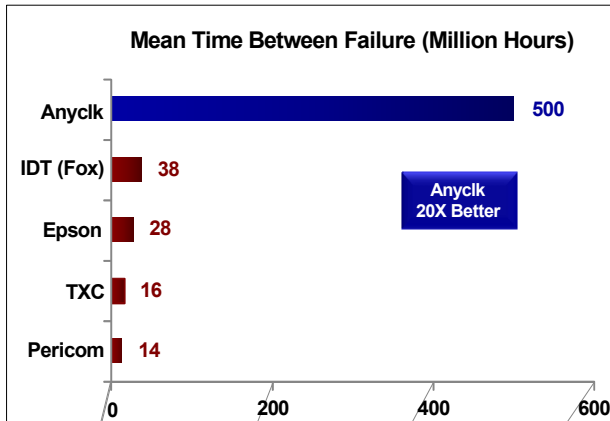


Figure 1. Reliability Comparison^[1]

Best Aging

Unlike quartz, MEMS oscillators have excellent long term aging performance which is why every new Anyclk product specifies 10-year aging. A comparison is shown in Figure 2.

Why is Anyclk Best in Class:

- Anyclk's MEMS resonators are vacuum sealed using an advanced EpiSeal process, which eliminates foreign particles and improves long term aging and reliability
- Inherently better immunity of electrostatically driven MEMS resonator

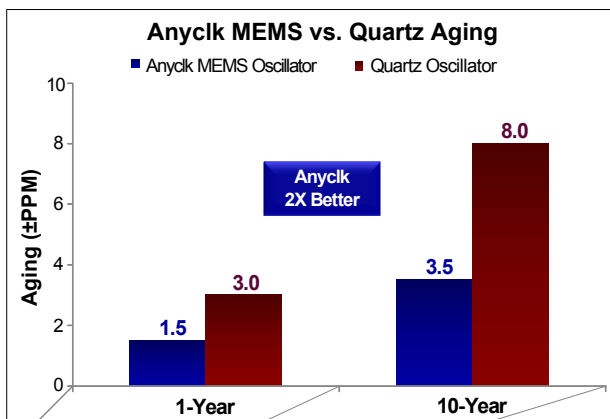


Figure 2. Aging Comparison^[2]

Best Electro Magnetic Susceptibility (EMS)

Anyclk's oscillators in plastic packages are up to 54 times more immune to external electromagnetic fields than quartz oscillators as shown in Figure 3.

Why is Anyclk Best in Class:

- Internal differential architecture for best common mode noise rejection
- Electrostatically driven MEMS resonator is more immune to EMS

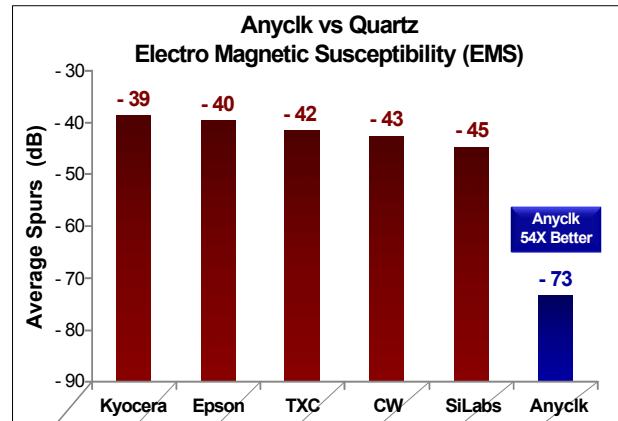


Figure 3. Electro Magnetic Susceptibility (EMS)^[3]

Best Power Supply Noise Rejection

Anyclk's MEMS oscillators are more resilient against noise on the power supply. A comparison is shown in Figure 4.

Why is Anyclk Best in Class:

- On-chip regulators and internal differential architecture for common mode noise rejection
- Best analog CMOS design expertise

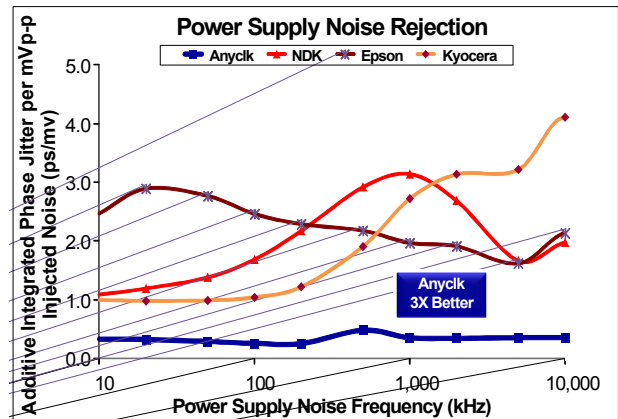


Figure 4. Power Supply Noise Rejection^[4]

Best Vibration Robustness

High-vibration environments are all around us. All electronics, from handheld devices to enterprise servers and storage systems are subject to vibration. Figure 5 shows a comparison of vibration robustness.

Why is Anyclk Best in Class:

- The moving mass of Anyclk's MEMS resonators is up to 3000 times smaller than quartz
- Center-anchored MEMS resonator is the most robust design

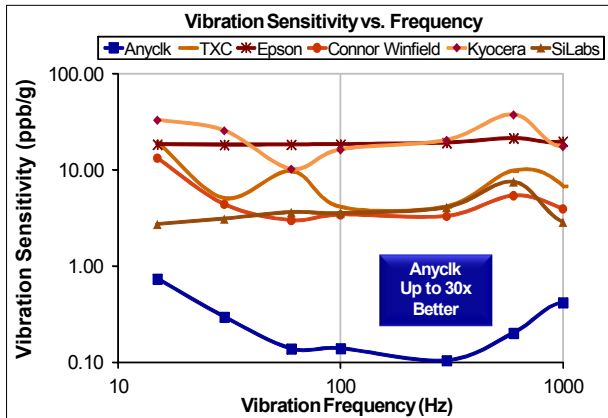


Figure 5. Vibration Robustness^[5]

Best Shock Robustness

Anyclk's oscillators can withstand at least 50,000 g shock. They all maintain their electrical performance in operation during shock events. A comparison with quartz devices is shown in Figure 6.

Why is Anyclk Best in Class:

- The moving mass of Anyclk's MEMS resonators is up to 3000 times smaller than quartz
- Center-anchored MEMS resonator is the most robust design

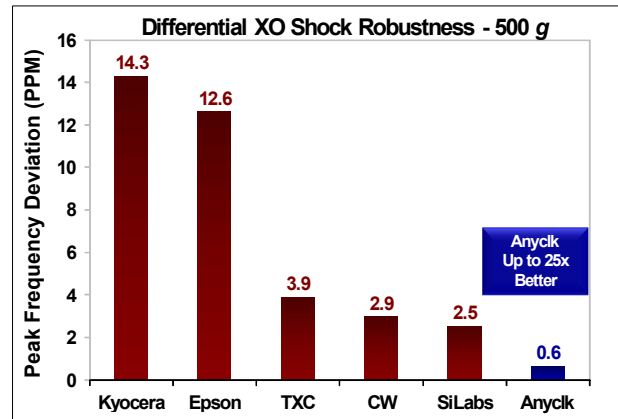


Figure 6. Shock Robustness^[6]

Notes:

1. Data Source: Reliability documents of named companies.
2. Data source: Anyclk and quartz oscillator devices datasheets.
3. Test conditions for Electro Magnetic Susceptibility (EMS):
 - According to IEC EN61000-4.3 (Electromagnetic compatibility standard)
 - Field strength: 3V/m
 - Radiated signal modulation: AM 1 kHz at 80% depth
 - Carrier frequency scan: 80 MHz – 1 GHz in 1% steps
 - Antenna polarization: Vertical
 - DUT position: Center aligned to antenna

Devices used in this test:
 Anyclk, ANY9120AC-1D2-33E156.250000 - MEMS based - 156.25 MHz
 Epson, EG-2102CA 156.2500M-PHPAL3 - SAW based - 156.25 MHz
 TXC, BB-156.250MBE-T - 3rd Overtone quartz based - 156.25 MHz
 Kyocera, KC7050T156.250P30E00 - SAW based - 156.25 MHz
 Connor Winfield (CW), P123-156.25M - 3rd overtone quartz based - 156.25 MHz
 SiLabs, Si590AB-BDG - 3rd overtone quartz based - 156.25 MHz
4. 50 mV pk-pk Sinusoidal voltage.

Devices used in this test:
 Anyclk, ANY8208AI-33-33E-25.000000, MEMS based - 25 MHz
 NDK, NZ2523SB-25.6M - quartz based - 25.6 MHz
 Kyocera, KC2016B25MOC1GE00 - quartz based - 25 MHz
 Epson, SG-310SCF-25M0-MB3 - quartz based - 25 MHz
5. **Devices used in this test:** same as EMS test stated in Note 3.
6. Test conditions for shock test:
 - MIL-STD-883F Method 2002
 - Condition A: half sine wave shock pulse, 500-g, 1ms
 - Continuous frequency measurement in 100 μs gate time for 10 seconds

Devices used in this test: same as EMS test stated in Note 3
7. Additional data, including setup and detailed results, is available upon request to qualified customers. Please contact info@anyclk.com

Document Feedback Form

Anyclk values your input in improving our documentation. Click [here](#) for our online feedback form or fill out and email the form below to info@anyclk.com

1. Does the Electrical Characteristics table provide complete information? Yes No

If No, what parameters are missing?

2. Is the organization of this document easy to follow? Yes No

If "No," please suggest improvements that we can make:

3. Is there any application specific information that you would like to see in this document? (Check all that apply)

EMI Termination recommendations Shock and vibration performance Other

If "Other," please specify:

4. Are there any errors in this document? Yes No

If "Yes", please specify (what and where):

5. Do you have additional recommendations for this document?

Name _____

Title _____

Company _____

Address _____

City / State or Province / Postal Code / Country _____

Telephone _____

Application _____

Would you like a reply? Yes No

Thank you for your feedback. Please click the email icon in your Adobe Reader tool bar and send to info@anyclk.com or you may use our [online feedback form](#).