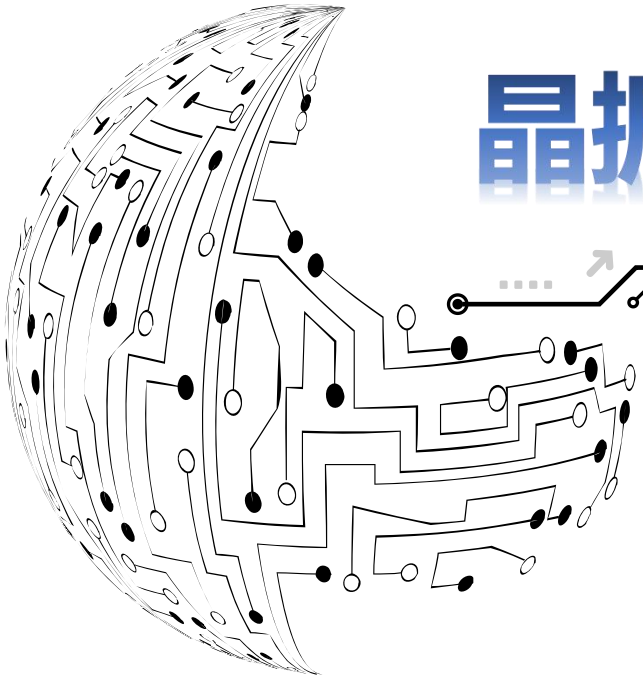
专/注/晶/振/30/余/年



晶振产品技术交流会

深 圳 扬 兴 科 技 有 限 公 司

Shenzhen Yangxing Technology Co., Ltd

公司概况

10



years

深耕行业30载，10年磨一剑

扬兴**创立于1986年**，于**2010年注册**成立，2018年通过国家高新技术企业认定，公司拥有知名的YXC晶振品牌及产品设计研发能力，并于2017年被评为“电子元器件十大品牌”，产品通过Rohs、环保等认证。2016年，扬兴成为**国内首家可编程晶振厂商**，拥有核心的编程设计技术能力。2019年扬兴成功研发了国内首台可编程晶振编程器。

YXC服务于**华为海思、大华、长城开发**等大型终端厂商及方案商，现在全球有超过12家代理商，服务范围触及四大洲。

现扬兴产品广泛应用于智能穿戴、工业控制、IOT物联网、AI、摄像头、基站等领域,与员工客户共享成长，立志共圆中华电子梦。

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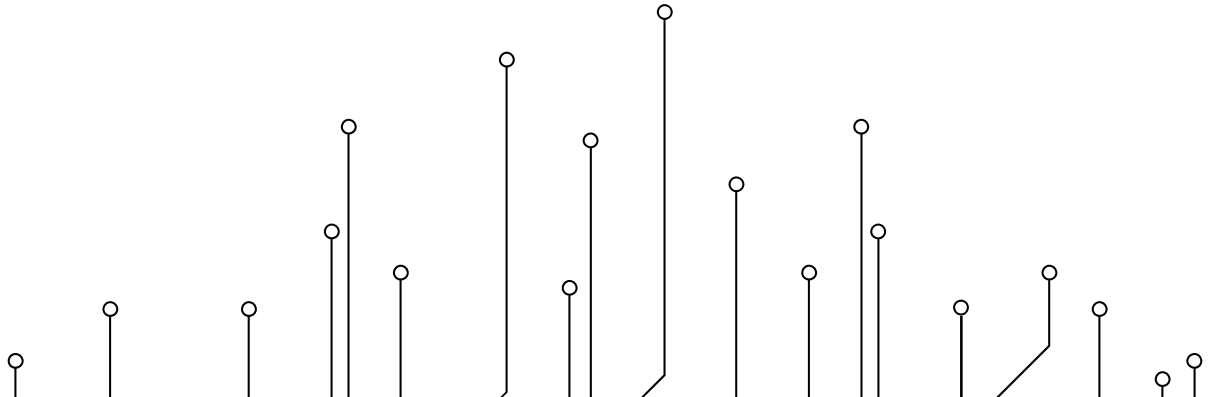
P ART TWO 编程核心技术

P ART THREE 产品介绍

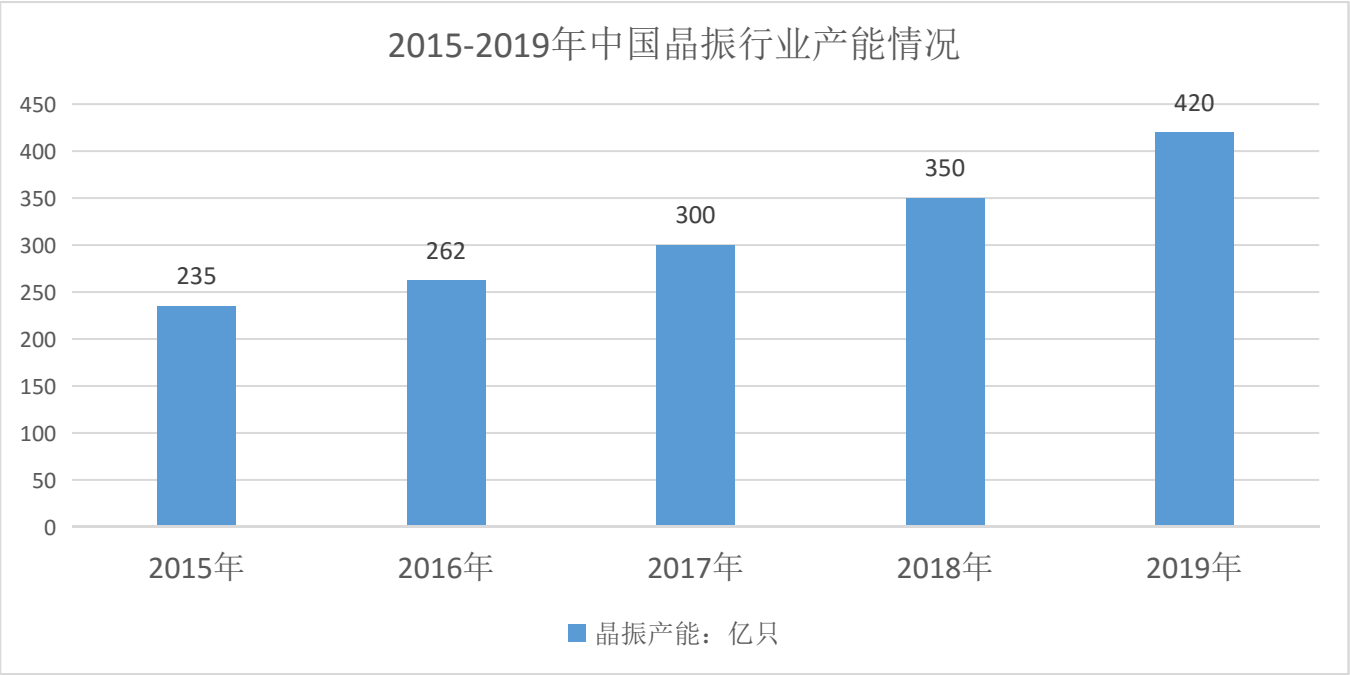
P ART FOUR 行业趋势分析

PART ONE

国内晶振行业概况

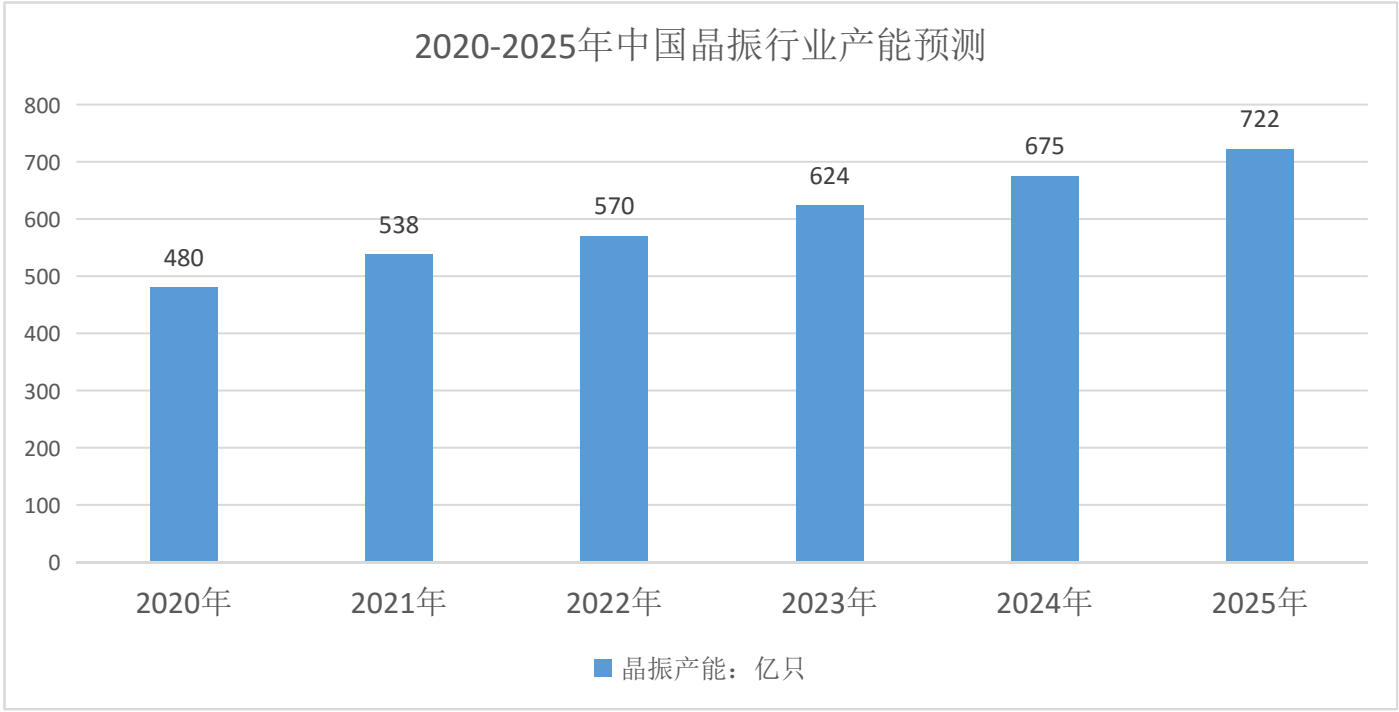


近5年国内晶振行业产能情况



近几年，我国晶振行业产能从2015年的235亿只增长到了2019年的420亿只，复合增长率为15.62%。(资料来源：智研咨询整理)

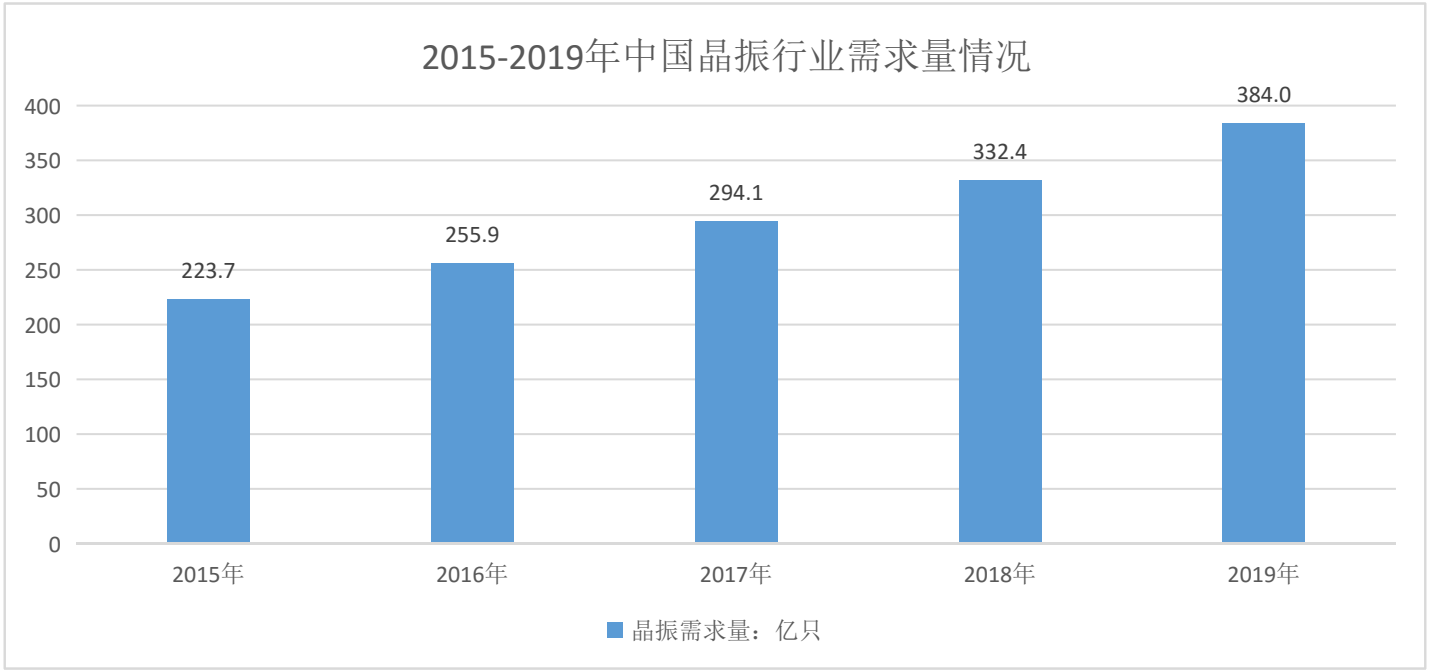
国内晶振行业产能预测



未来几年，我国晶振行业产能继续呈爆发式增长，预计在2023年突破600亿只。

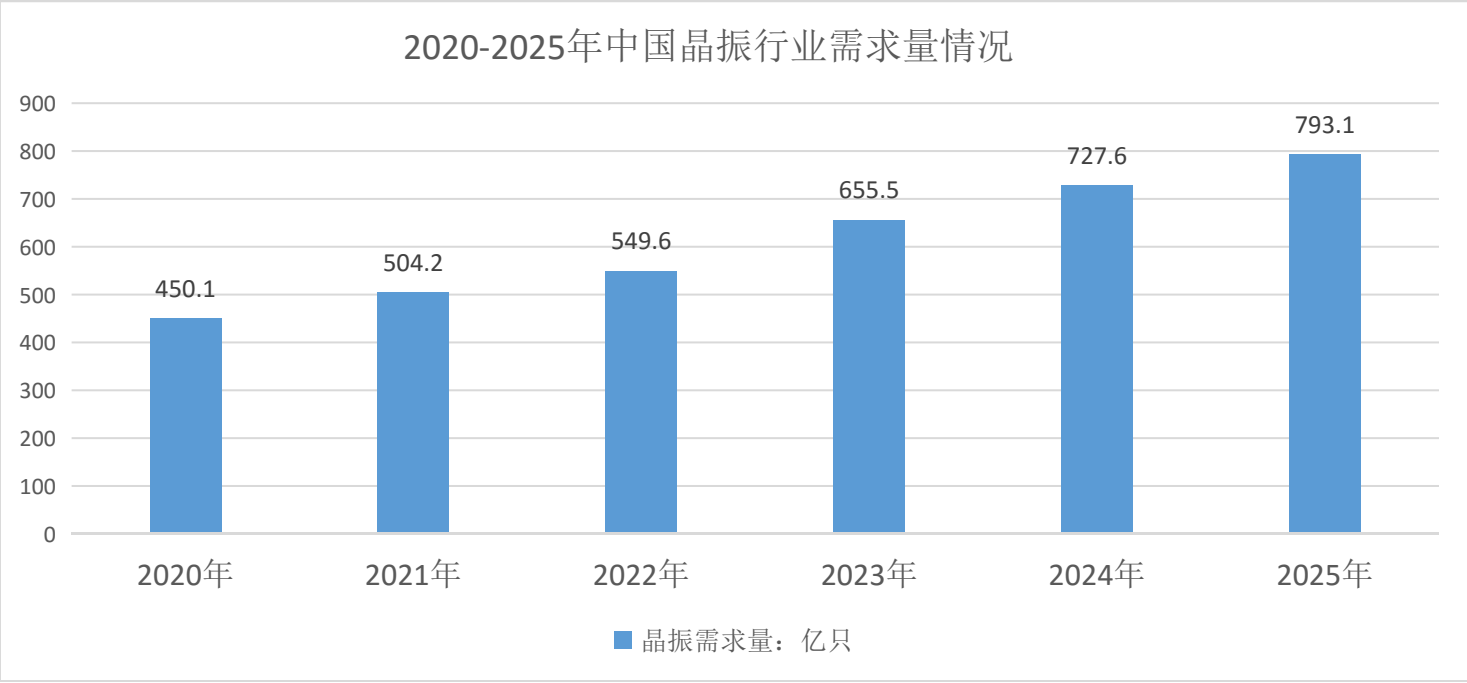
(资料来源：公开整理)

近5年国内晶振行业需求量情况



数据显示，2015年我国晶振行业需求量223.7亿只，到2019年增长到了384.0亿只。(资料来源：智研咨询整理)

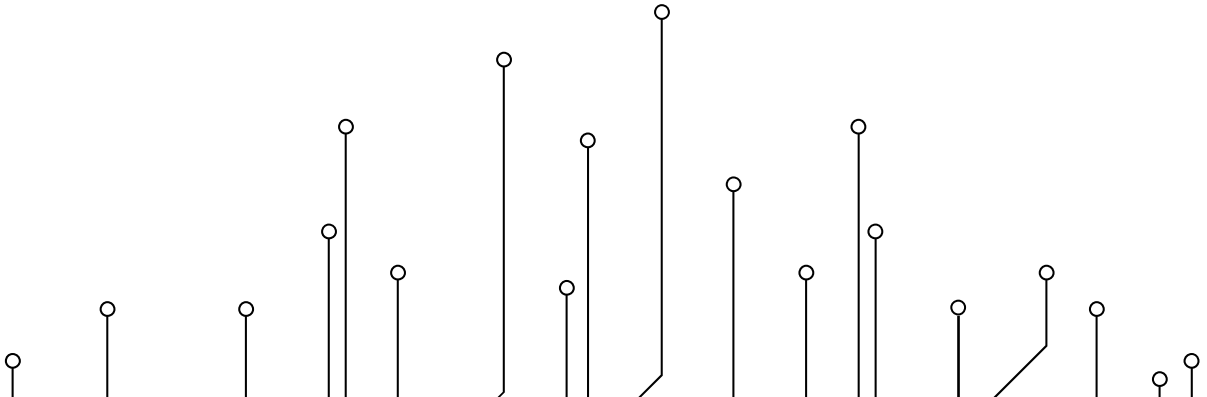
国内晶振行业需求量预测



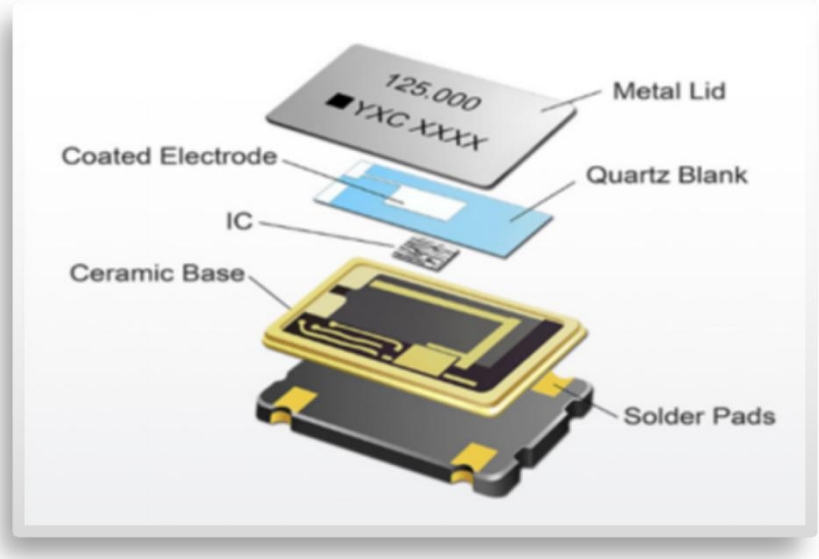
中国是全球电子产品的主要生产产地，预测未来几年内，中国晶振行业需求量整体将保持10%左右的增速。(资料来源：公开资料整理)

PART TWO

编程核心技术



石英可编程晶振定义



满足

任意频点

可编程

石英可编程（Q MEMS）具有高稳定、高精度等优越性能的石英材料[QUARTZ]和[MEMS]组合而成，以石英为原料进行精微加工(光刻)并可以提供的小型化、高性能的晶体元器件被称为[Q MEMS]。

石英可编程晶振生产工艺

IC固定 → 胶液固化 → IC绑定 ↓

晶片清洗 → 晶片披银 → 点胶固定 → 胶点固化 → 频率微调 ↓

激光印字 → 产品检测 → 高温老化 → 模拟回流焊 → 产品封焊

↓

空白片库存 → 

测试编程 → 卷带封装

石英可编程晶振生产速度



批量自动化设备：人工效率提升20倍（自动化：2000只/时>人工：100只/时），人工出错率随之降低。

便携式可编程烧录器

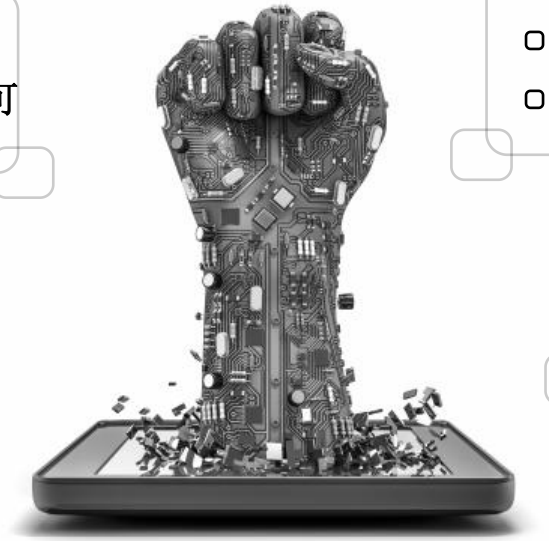




便携式烧录器，随时随地可出样，大大缩减开发周期，从72H出样到2’S出样！

石英可编程晶振优势

- 批量交期短（1-2天）
- 频点丰富（1-1500mhz可定制）

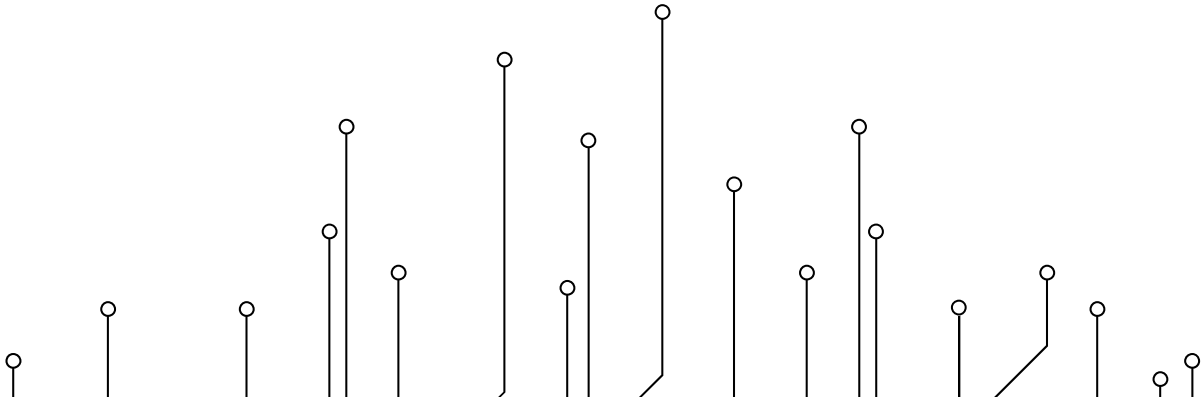


- 质量保证（20年质保）
- 体积小（2016、1612）

- 零库存压力
- 样品零交期

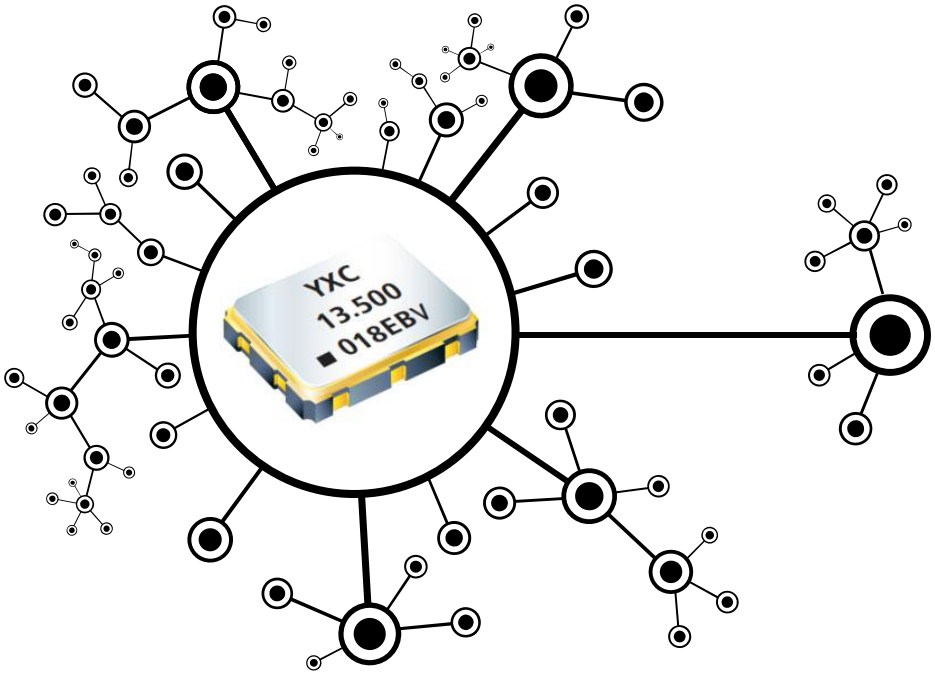
- 兼容性高
- 快速起振

PART 产品介绍



石英差分晶振

NEW



- YSO210PR
- YSV220PR
- YSV310PR
- YSO230LR

YSO210PR&产品指标

Electrical Specifications

Item / Type	LVPECL	LVDS	Remarks
Output Frequency Range	10MHZ ~ 1500MHZ		
Supply Voltage	2.5Vdc ± 10%	3.3Vdc ± 10%	
Operating Temperature Range	-40 ~ +85℃		
Storage Temperature Range	-55 ~ +125℃		
Total Stability	±50ppm		
Input Resistance	1Mohms Typ		
Current consumption	80mA Max	50mA Max	OE=Vcc, LVPECL=(50) Ω or LVDS=(100) Ω
Disable Current	16mA Typ		OE=GND
Output Voltage (LVPECL)	VOH=Vcc-1.03 Min	--	DC characteristics
	VOL=Vcc-1.6 Max	--	
Output Voltage (LVDS)	--	VOD=175mV Min.	VOD1, VOD2 / DC characteristics
	--	dVOD=50mV Max.	dVOD= | VOD1-VOD2 | / DC characteristics
	--	VOS=1.25V Typ.	VOS1, VOS2 / DC characteristics
	--	dVOS=50mV Max.	dVOS= | VOS1-VOS2 | / DC characteristics
Output Load Condition	L_PECL=50Ω	--	Terminated to Vcc-2.0V
	--	L_LVDS=100Ω	Connected between OUT to $\overline{OUT}$
Iutput Voltage	VIH=70% VccMin,	VIL=30%Vcc Max	OE terminal
Output Symmetry	45~55%		
Rise Time/Fall Time	1nS Max		LVPECL: Between 20% and 80% of (VOH-VOL), LVDS:Between 20% and 80% Differential Outputpeak to peak voltage
Start-up time	10mS		Time at minimum supply voltage to be 0 s
Phase Jitter (12KHZ~20MHZ)	1.0pS Typ.		200MHZ~800MHZ
	2.0pS Typ.		801MHZ~1500MHZ
Aging	± 3ppm		25℃,First year, Vcc=2.5V,3.3V

YSV220PR&产品指标

Electrical Specifications

Item / Type SMD VCXO	LVPECL	LVDS	Remarks
Output Frequency Range	10MHZ ~ 1500MHZ		
Supply Voltage	2.5Vdc ± 10%	3.3Vdc ± 10%	
Operating Temperature Range	-40~ +85℃		
Storage Temperature Range	-55~ +125℃		
Total Stability	± 50ppm		
Absolute Pull Range	±50ppmMin,		
Input Resistance	1Mohms Typ		
Current	80mA Max	50mA Max	OE=Vcc, LVPECL=(50) Ω or LVDS=(100) Ω
Disable Current	16mA Typ		OE=GND
Output Voltage (LVPECL)	VOH=Vcc-1.03 Min	--	DC characteristics
	VOL=Vcc-1.6 Max	--	
Output Voltage (LVDS)	--	VOD=175mV Min.	VOD1, VOD2 / DC characteristics
	--	dVOD=50mV Max.	dVOD=| VOD1-VOD2 | / DC characteristics
	--	VOS=1.25V Typ.	VOS1, VOS2 / DC characteristics
	--	dVOS=50mV Max.	dVOS=| VOS1-VOS2 | / DC characteristics
Output Load Condition	L_PECL=50Ω	--	Terminated to Vcc-2.0V
	--	L_LVDS=100Ω	Connected between OUT to $\overline{OUT}$
Iutput Voltage	VIH=70% VccMin, VIL=30%Vcc Max		OE terminal
Output Symmetry	45~55%		
Rise Time/Fall Time	1nS Max		LVPECL: Between 20% and 80% of (VOH-VOL), LVDS:Between 20% and 80% Differential Output peak to peak voltage
Start-up time	10mS		Time at minimum supply voltage to be 0 s
Phase Jitter (12KHZ~20MHZ)	1.0pS Typ.		200MHZ~800MHZ
	2.0pS Typ.		801MHZ~1500MHZ
Aging	± 3ppm		25℃,First year, Vcc=2.5V,3.3V

YSV310PR&产品指标

Electrical Specifications

Item / Type SMD VCXO	CMOS
Output Frequency Range	10MHZ ~ 250MHZ
Supply Voltage	2.5Vdc ± 10% 3.3Vdc ± 10%
Operating Temperature Range	-40~ +85℃
Storage Temperature Range	-55 ~ +125℃
Total Stability	± 50ppm
Absolute Pull Range	±50ppm Min
Input Resistance	1Mohms Typ
Current	40mA Max
Output Load condition CMOS	15PF
Output Voltage	VOH=90%Vcc Min
	VOL=10%Vcc Max
Input Voltage	VIH=70% Vcc Min, VIL=30%Vcc Max
Symmetry	45~55%
Rise Time/Fall Time	4nS Max
Start-up time	10mS Max
Phase Jitter (12KHZ~20MHZ)	1.0pS Typ.
Aging (25℃,First year, Vcc=2.5V,3.3V)	± 3ppm

YSO230LR&产品指标

Electrical Specifcations

Item / Type	LVPECL 7050/5032	LVPECL 3225/2520	LVDS 7050/5032	LVDS 3225/2520	Remarks
Output Frequency Range	13.5~200MHZ	13.5~156.25MHZ	13.5~200MHZ	13.5~156.25MHZ	
Supply Voltage	2.5V~3.3V		1.8V, 2.5V~3.3V		
Operating Temperature Range	-40 ~ + 85℃				
Storage Temperature Range	-55 ~ +125℃				
Total Stability	± 50ppm				
Current consumption	80mA Max	50mA Max	60mA Max	40mA Max	OE=Vcc, LVPECL=(50) Ω or LVDS=(100) Ω
Disable Current	10 μA Max				OE=GND
Output Voltage (LVPECL)	VOH=Vcc-1.03 Min		--		DC characteristics
	VOL=Vcc-1.6 Max		--		
Output Voltage (LVDS)	--		VOD= 247~454mV		VOD1, VOD2 / DC characteristics
	--		dVOD=50mV Max.		dVOD= | VOD1-VOD2 |
	--		VOS= 1.125~1.375V		VOS1, VOS2
	--		dVOS=50mV Max.		dVOS= | VOS1-VOS2 |
Output Load Condition	L_PECL=50Ω		--		Terminated to Vcc-2.0V
	--		L_LVDS=100Ω		Connected between OUT to $\overline{OUT}$
Iutput Voltage	VIH=70% VccMin, VIL=30%Vcc Max				OE terminal
Output Symmetry	45~55%				
Rise Time/Fall Time	0.8nS Max				LVPECL: Between 20% and 80% of (VOH-VOL), LVDS:Between 20% and 80% Differential Output peak to peak voltage
Start-up time	10mS				Time at minimum supply voltage to be 0 s
Aging	± 3ppm				25℃,First year, Vcc=2.5V,3.3V

Phase Jitter (12KHZ~20MHZ)	100MHZ	125MHZ	148.5MHZ	156.25MHZ	180MHZ	200MHZ
	0.3ps Typ.	0.1ps Typ.				

石英差分晶振 NEW

型号	类型	频率	工作温度	电压	总温偏	封装尺寸
YSO210PR	石英可编程DXO	10MHz~1500MHz	-40℃~+85℃	2.5V~3.3V	±50ppm	3225 5032 7050
YSV220PR	石英可编程压控差分晶振	10MHz~1500MHz	-40℃~+85℃	2.5V~3.3V	±50ppm	3225 5032 7050
YSV310PR	石英可编程VCXO	10MHz~250MHz	-40℃~+85℃	2.5V~3.3V	±50ppm	3225 5032 7050
YSO230LR	定频DXO	13.5MHz~200MHz	-40℃~+85℃	1.8v~3.3v	±50ppm	2520 3225 5032 7050

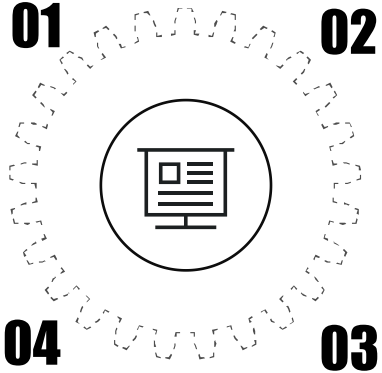
石英差分晶振产品优势

高频率范围
可达1500MHZ

01

02

小体积
最小封装尺寸为2520



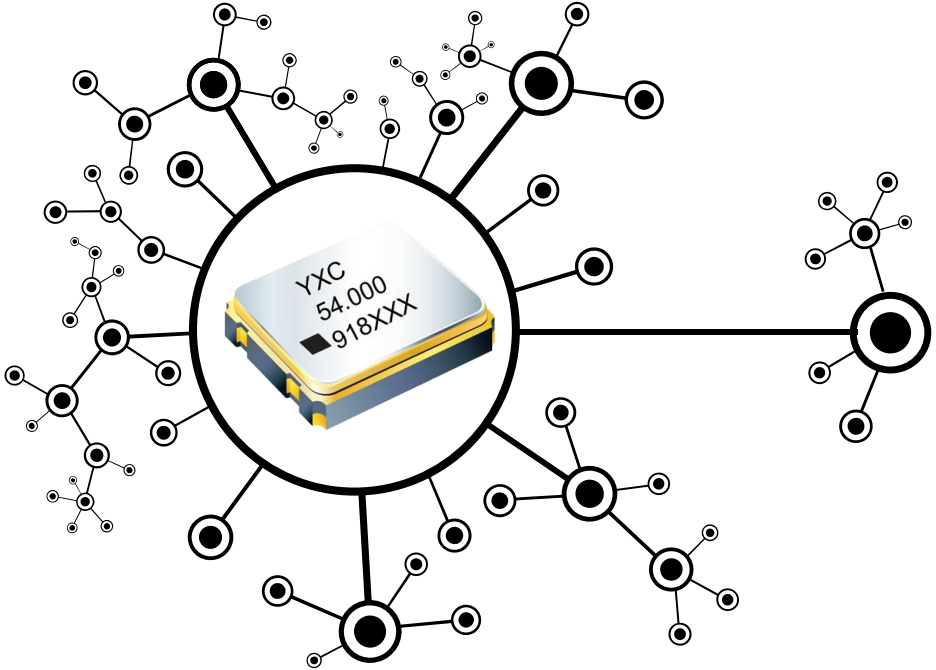
低抖动
0.3PS以内

04

03

快速出样
2s出样

石英有源晶振 NEW



- YSO110TR
- YSO120TK
- YSO130HR

YSO110TR&产品指标

Electrical Specifications

Item / Type	YSO110TR
Output Frequency Range	1~54MHz or specify
Output Type	CMOS
Supply Voltage	1.8V ~ 3.3V
Oscillation Mode	Fundamental
Frequency Tolerance (at 25℃)	±10ppm, ±20ppm, or specify
Output Load	15 pF, or specify
Operating Temperature Range	-40~+85℃,-40~+125℃,or specify
Frequency Versus Temperature Characteristics	± 20ppm, ± 30ppm, ± 50ppm, or specify
Storage Temperature Range	- 55 ~ + 125 ℃
Voltage Vol (Max.) / Vol (Min.)	90%Vdd min./10%Vdd max
Symmetry	45~55%
Rise (Tr) / Fall (Tf) Time	4ns Max.
Start-up Time	3 ms Max.
Supply Current	See Below
Frequency Aging (at 25℃)	± 3 ppm / year Max.

YSO110TR&功耗性能

Vdc=1.8~3.3V 15pF only				
Frequency / Voltage / Size	1~40MHZ		41~54MHZ	
	7050/5032/3225	2520/2016/1612	7050/5032/3225/2520	2016/1612
1.8V	4mA max	4mA max	9mA max	10mA max
2.5V	4.5mA max		10mA max	
3.3V	5mA max		12mA max	

YSO120TK&产品指标

Electrical Specifications

Item / Type	YSO120TK
Output Frequency Range	32.768KHz
Output Type	CMOS
Supply Voltage	1.8V ~ 3.3V
Oscillation Mode	Fundamental
Frequency Tolerance (at 25℃)	±10ppm, ±20ppm, or specify
Output Load	15 pF, or specify
Operating Temperature Range	-40~+85 ℃, -40~+ 125℃, or specify
Frequency Versus Temperature Characteristics	± 20ppm, ± 30ppm, ± 50ppm, or specify
Storage Temperature Range	- 55 ~ + 125 ℃
Voltage Vol (Max.) / Vol (Min.)	90%Vdd min./10%Vdd max
Symmetry	45~55%
Rise (Tr) / Fall (Tf) Time	30ns Max.
Start-up Time	3 ms Max.
Supply Current	See Below
Frequency Aging (at 25℃)	± 3 ppm / year Max.

YSO120TK&功耗性能

Vdc=1.8~3.3V 15pF only		
Frequency / Voltage / Size	32.768KHZ	
	7050/5032/3225	2520/2016/1612
1.8V	0.2mA max	0.2mA max
2.5V	0.3mA max	0.3mA max
3.3V	0.5mA max	0.4mA max

YSO130HR&产品指标

Electrical Specifications

Item / Type	YSO130HR
Output Frequency Range	1MHz~100MHz
Output Type	CMOS
Supply Voltage	5V, or specify
Oscillation Mode	Fundamental
Frequency Tolerance (at 25℃)	±10ppm, ±20ppm, or specify
Output Load	15 pF, or specify
Operating Temperature Range	-40~ +85 ℃, or specify
Frequency Versus Temperature Characteristics	± 20ppm, ± 30ppm, ± 50ppm, or specify
Storage Temperature Range	- 55 ~ + 125 ℃
Voltage Vol (Max.) / Vol (Min.)	90%Vdd min./10%Vdd max
Symmetry	45~55%
Rise (Tr) / Fall (Tf) Time	4ns Max.
Start-up Time	3 ms Max.
Supply Current	See Below
Frequency Aging (at 25 ℃)	± 3 ppm / year Max.

YSO130HR&功耗性能

Vdc=5V 15pF only		
Voltage / Frequency / Size	5V	
	7050/5032	3225
1~36MHZ	8mA max	8mA max
36~70MHZ	20mA max	20mA max
70~100MHZ	55mA max	25mA max

石英有源晶振

NEW

型号	类型	频率	工作温度	电压	频差	封装尺寸
YSO110TR	SPXO	1MHz~54MHz	-40℃~+85℃ -40℃~+125℃	1.8V~3.3V	±10ppm ±20ppm	1612 2016 2520 3225 5032 7050
YSO120TK	SPXO	32.768KHz	-40℃~+85℃ -40℃~+125℃	1.8V~3.3V	±10ppm ±20ppm	1612 2016 2520 3225 5032 7050
YSO130HR	SPXO	1MHz~100MHz	-40℃~+85℃	5V	±10ppm ±20ppm	3225 5032 7050

石英有源晶振产品优势

低功耗

最低功耗可达
0.2Ma

高精度

±10PPM(25°C)
±20PPM（-40~+85°C）

快速起振

起振时间3ms



工温

-40~+85°C
-40~+125°C

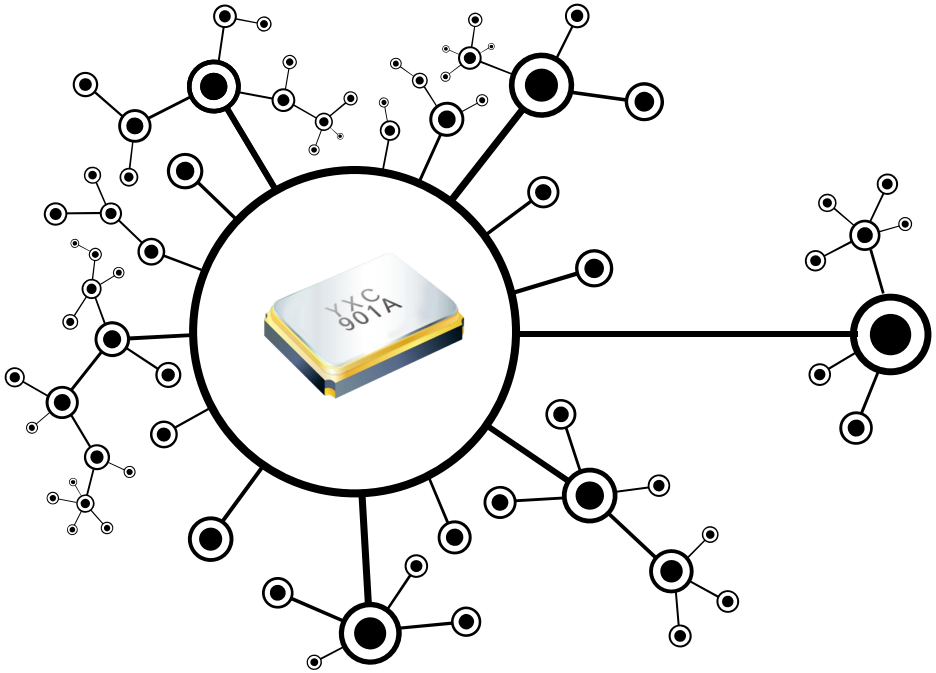
宽电压

1.8V-3.3V(通用)
5V

性价比高

价格优于同行

小体积无源晶体



- YSX211SL
- YSX1612SL
- YSX1210SL

YSX211SL&产品指标

Electrical Specifications

Item / Type	YSX211SL
Standard Frequency	16~54 MHz
Vibration Mode	AT Fundamental
Load Capacitance	8pF, 9pF, 12pF, or specify
Frequency Tolerance (at 25 ℃)	± 10 ppm, ± 15 ppm, ± 20 ppm, or specify
Frequency Versus Temperature Characteristics	±20 ppm, or specify
Operating Temperature	- 20 ~ + 70 ℃ , - 40 ~ + 85 ℃ , or specify
Storage Temperature	- 40 ~ + 85 ℃ , or specify
Shunt Capacitance	3 pF Max.
Level of Drive	10 ~200 μ W Max.(10uW typical)
Frequency Aging (at 25 ℃)	± 3 ppm / year Max.

YSX1612SL&产品指标

Electrical Specifications

Item / Type	YSX1612SL
Standard Frequency	24~60 MHz
Vibration Mode	AT Fundamental
Load Capacitance	8pF, 10pF, or specify
Frequency Tolerance (at 25 ℃)	± 10 ppm, ± 30 ppm, or specify
Frequency Versus Temperature Characteristics	±20 ppm, or specify
Operating Temperature	- 20 ~ + 70 ℃ , - 40 ~ + 85 ℃ , or specify
Storage Temperature	- 40 ~ + 85 ℃ , or specify
Shunt Capacitance	3 pF Max.
Level Of Drive	50 μW Max
Frequency Aging (at 25 ℃)	± 2 ppm / year Max.

YSX1210SL&产品指标

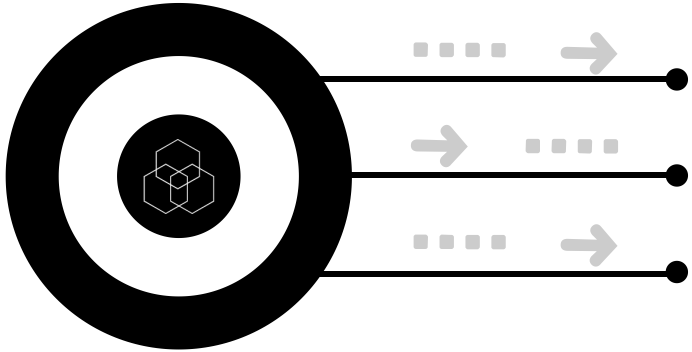
Electrical Specifications

Item / Type	YSX1210SL
Standard Frequency	32~60 MHz
Vibration Mode	AT Fundamental
Load Capacitance	8pF, 10pF, or specify
Frequency Tolerance (at 25 ℃)	± 10 ppm, ± 30 ppm, or specify
Frequency Versus Temperature Characteristics	±20 ppm, or specify
Operating Temperature	- 30 ~ + 85 ℃ , or specify
Storage Temperature	- 40 ~ + 85 ℃ , or specify
Shunt Capacitance	3 pF Max.
Level Of Drive	50 μW Max
Frequency Aging (at 25 ℃)	± 2 ppm / year Max.

小体积无源晶体

型号	类型	频率	工作温度	负载	频差	封装尺寸
YSX211SL	MHz Crystal	16MHz~54MHz 96MHz	-20℃~+70℃ -40℃~+85℃	8pF, 9pF,12pF	±10ppm ±20ppm	2.0x1.6mm (2016)
YSX1612SL	MHz Crystal	24MHZ-60MHZ	-20℃~+70℃ -40℃~+85℃	8pf	±10ppm ±30ppm	1.6x1.2mm (1612)
YSX1210SL	MHz Crystal	32MHz~60MHz	-30℃~+85℃	8pf,12pf	±10ppm ±30ppm	1.2*1.0mm (1210)

小体积无源晶体产品优势



高精度±10PPM

高频率60MHZ

超薄厚度0.35mm

售前技术服务

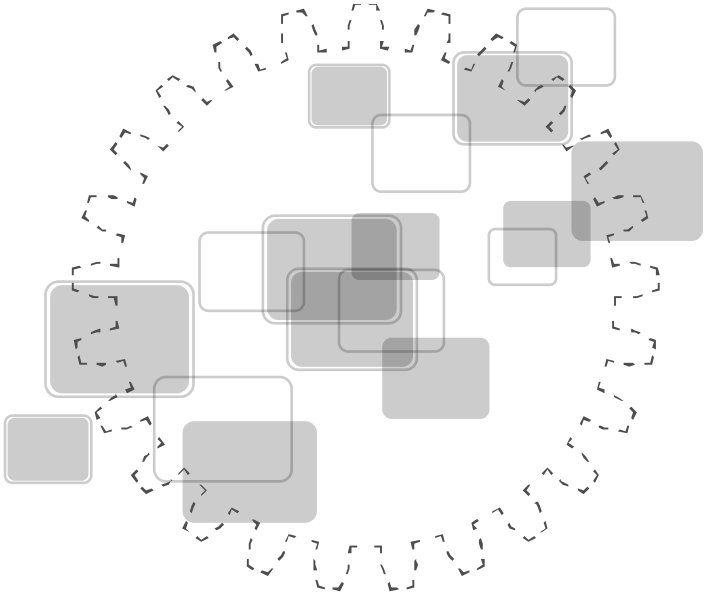






自主实验室：在产品前端开发验证期间可节省20%的开发成本，提升加快10%开发时间。

售前技术服务



01 电路匹配分析

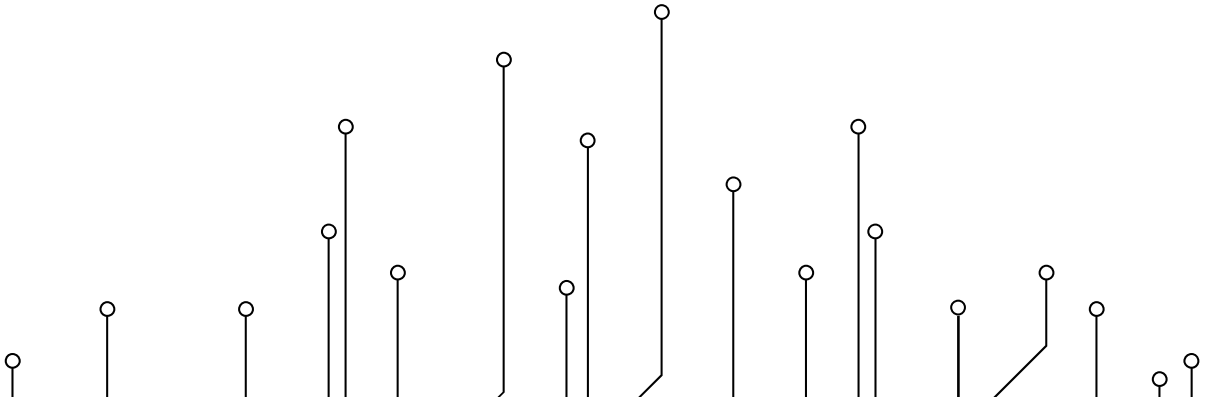
02 晶振单体数据分析

04 晶振单体高低温数据分析

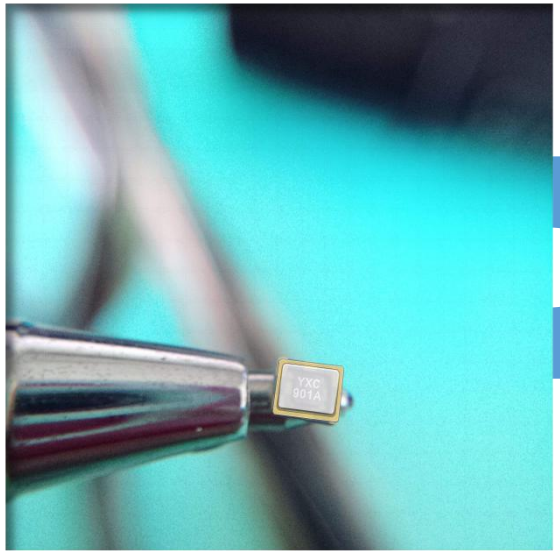
06 时钟延时数据采集分析

PART FOUR

行业趋势分析



行业趋势分析-性能指标



小型化

高精度

高频化

低功耗

行业趋势分析-应用领域



5G通讯

5G通讯（WIFI 6 / 光端机/交换机/基站/通讯模块）



智慧交通

RSU/车载终端/无人机/部标一体机



民用医疗设备

呼吸机/血糖仪/血压仪/胃镜胶囊。



商业类

IOT/摄像头/触摸屏/工业显示屏。

行业趋势分析-国产化替代需求

自中美贸易战以来，越来越多的国内厂商如**华为海思、大疆**等都采用国产的晶振。

打破国外长期以来的垄断局势，走出一条国产化之路，是现阶段唯一出路！



感谢聆听