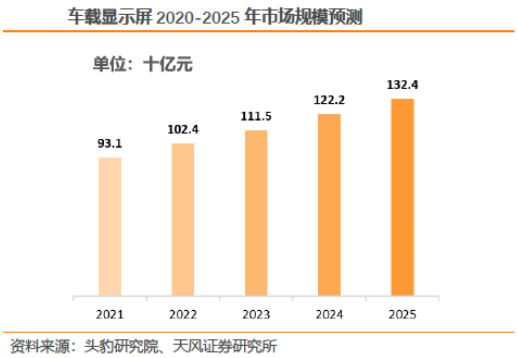
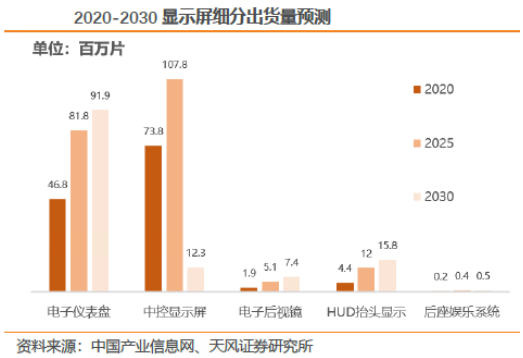
A variety of YXC vehicle display crystal oscillator solutions

With the continuous evolution and development of vehicle electrification and intelligence, and the growing demand of consumers for automobile comfort and safety, the design concept of automobile cockpit has undergone fundamental changes, and intelligent cockpit solutions are becoming an increasingly important part of the intelligent vehicle industry chain, dual-screen interaction, intelligent voice, Internet of Vehicles, and OTA have become the basic configuration of mainstream intelligent cockpits in the current market.

Intelligent cockpit drives the market demand for automotive displays

According to IHS data, the average number of screens installed in a single car in 2019 was 1.75, and it is expected that the number of cars equipped with 3 screens or more will reach by 2030 About 20%. New technology features continue to emerge in automotive displays, which also put forward higher requirements for crystal oscillators for their applications.





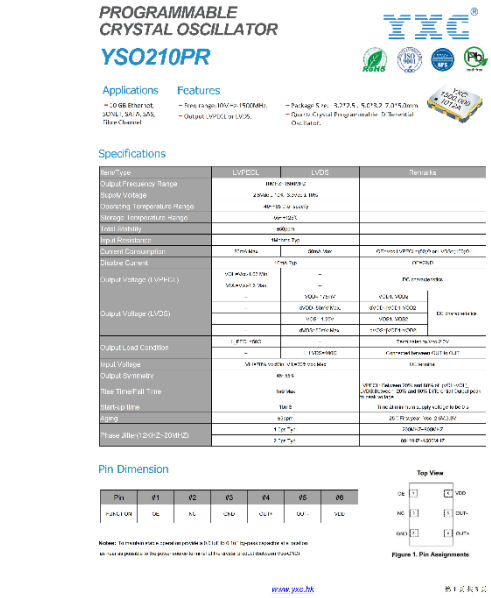
Common frequency points of vehicle screens: 8MHZ, 12MHZ, 16MHZ, 24MHZ, 25MHZ, 26MHZ, 27MH Z, 33.3MHZ, 32.768KHZ, the **following by the domestic original YXC** crystal oscillator **to introduce the characteristics and selection recommendation of**

crystal oscillator in vehicle display applications.

Since the on-board display can feedback road surface information in multiple dimensions and timely remind the driver of dangerous road conditions, the number of on-board display equipment continues to increase. **However, as screens continue to get larger, they also bring new challenges of signal attenuation and noise increase, and it is recommended to use differential crystals to output differential signals using two signals that are completely opposite to each other, thereby eliminating common-mode noise and producing a higher performance system.**

Recommended series of differential crystal oscillators:

YSO230LR, YSO210PR differential crystal oscillator, compatible with multiple voltages 2.5-3.3V, temperature up to -40~+85°, output mode LVDS/LVPECL.



PROGRAMMABLE
CRYSTAL OSCILLATOR

YSO210PR

Applications

Features

Specifications

Item/Type	LVPECL	LVDS	Remarks
Output Frequency Range			
Supply Voltage			
Operating Temperature Range			
Storage Temperature Range			
Total Stability			
Input Resistance			
Current Consumption			
Disable Current			
Output Voltage (LVPECL)			
Output Voltage (LVDS)			
Output Load Condition			
Input Voltage			
Output Symmetry			
Rise Time/Fall Time			
Start-up time			
Aging			
Phase Jitter(12KHZ~20MHZ)			

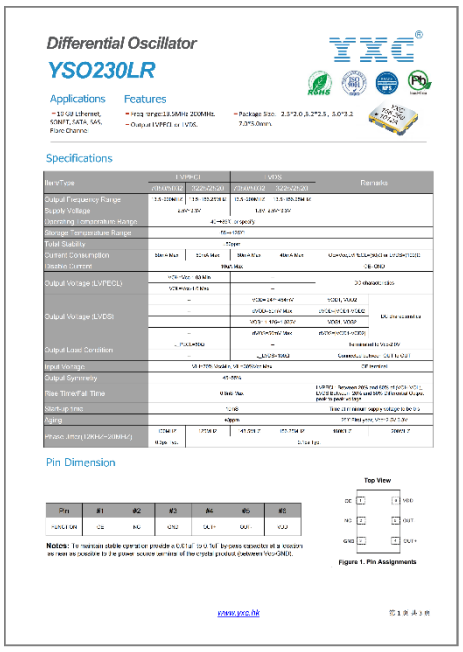
Pin Dimension

Pin	#1	#2	#3	#4	#5	#6
FUNCTION	OE	NC	GND	OUT+	OUT-	VDD

Top View

Figure 1. Pin Assignments

www.yxc.hk



Differential Oscillator

YSO230LR

Applications

Features

Specifications

Item/Type	LVPECL		LVDS		Remarks
	Symmetry	Typ.	Symmetry	Typ.	
Output Frequency Range					
Supply Voltage					
Operating Temperature Range					
Storage Temperature Range					
Total Stability					
Current Consumption					
Disable Current					
Output Voltage (LVPECL)					
Output Voltage (LVDS)					
Output Load Condition					
Input Voltage					
Output Symmetry					
Rise Time/Fall Time					
Start-up time					
Aging					
Phase Jitter(12KHZ~20MHZ)					

Pin Dimension

Pin	#1	#2	#3	#4	#5	#6
FUNCTION	OE	NC	GND	OUT+	OUT-	VDD

Top View

Figure 1. Pin Assignments

www.yxc.hk

Trend 2:

High definition, high refresh rate, high stability

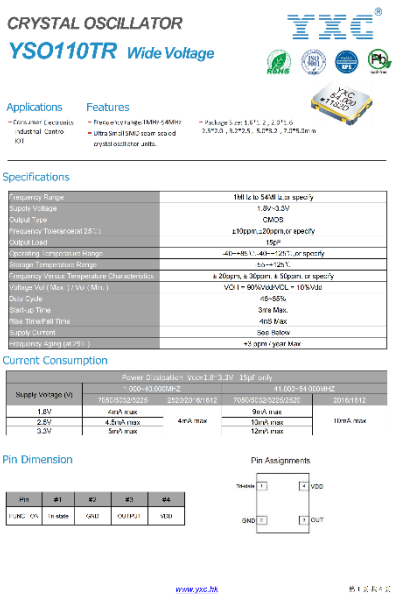
At present, the vehicle display screen is upgraded and integrated with functions such as film and television, games, entertainment, interpersonal interaction, etc., which puts forward higher requirements for the service life, working stability and resolution, contrast, field of view, optical indicators and response speed of the central control screen, so the **crystal oscillator selection needs to**

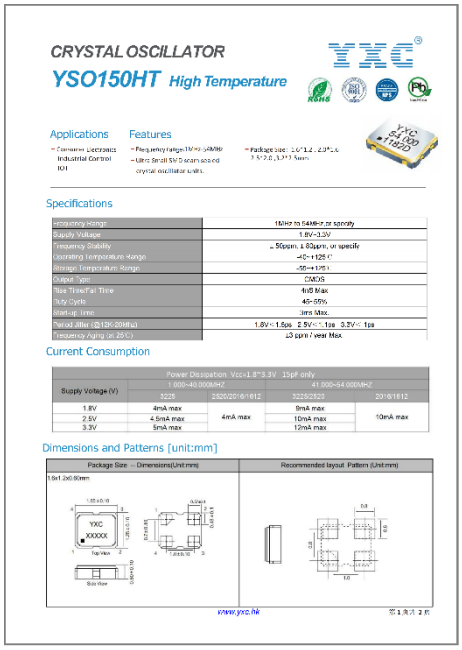
have the characteristics of high precision, high stability, and earthquake resistance.

In addition, because the car is often placed in a high temperature environment or placed in an outdoor environment, the vehicle display screen needs to have sufficient heat resistance and cold resistance, and the **crystal oscillator selection needs to choose the working temperature of** -40~**+85°** or -**40~+125°** to ensure **long-term normal operation stability.**

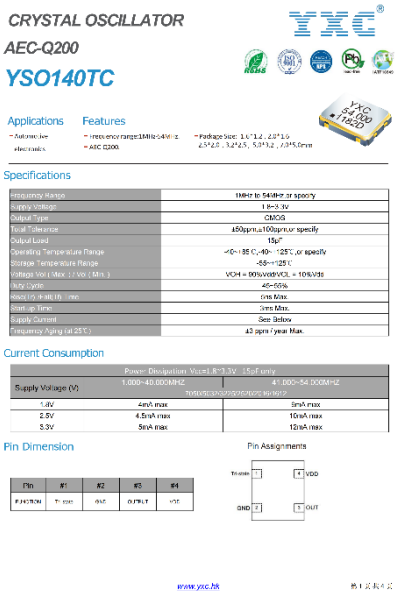
Recommended series of active crystal oscillators:

(1) YSO110TR/YSO150HT (high temperature), frequency stability ± 10ppm, frequency range 1-54MHZ, can accommodate multiple voltages 1.8-3.3V, working temperature -40~ +85° or -40~+125°;





(2) YSO140TC, automotive-grade oscillator, frequency range 1-54MHZ, a variety of package sizes 1612-7050, compatible with multiple voltages 1.8-3.3V, temperature up to -40~ +125°, AEC-Q200, IATF16494 certified.



CRYSTAL OSCILLATOR

AEC-Q200

YSO140TC

Applications

Features

Specifications

Frequency Range	1MHz to 54MHz or specify
Supply Voltage	1.8~3.3V
Output Type	CMOS
Total Tolerance	±50ppm,±100ppm,or specify
Output Load	15pF
Operating Temperature Range	-40~+85℃,-40~+125℃,or specify
Storage Temperature Range	-55~+125℃
Voltage Vol (Max.) / Voh (Min.)	VOH = 90%xVdd/VOL = 10%Vdd
Duty Cycle	45~55%
Rise Time / Fall Time	6ns Max.
Start-up Time	5ms Max.
Supply Current	See Below
Frequency Aging (at 25℃)	±3 ppm / year Max.

Current Consumption

Power Dissipation Vcc=1.8~3.3V, 15pF only		
Supply Voltage (V)	1.000~40.000MHZ	40.001~54.000MHZ
1.8V	4mA max	5mA max
2.5V	4.5mA max	10mA max
3.3V	5mA max	12mA max

Pin Dimension

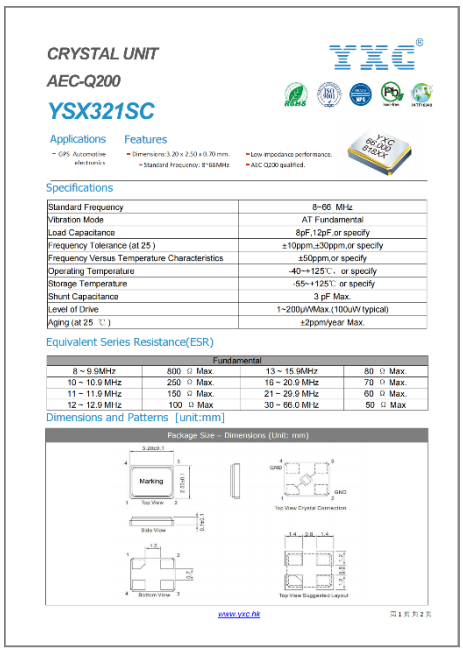
Pin	#1	#2	#3	#4
FUNCTION	Tri-state	GND	OUTPUT	VDD

Pin Assignments

www.yxc.hk

Recommended series of passive crystal oscillators:

YSX321SC, automotive grade resonator, frequency range 8-66MHZ, 3225 package, conventional complex load (PF) 12-20PF, temperature up to -40~ +125°, AEC-Q200, IATF16494 certified.



CRYSTAL UNIT

AEC-Q200

YSX321SC

Applications

Features

Specifications

Standard Frequency	8~66 MHz
Vibration Mode	AT Fundamental
Load Capacitance	8pF,12pF,or specify
Frequency Tolerance (at 25)	±10ppm,±30ppm,or specify
Frequency Versus Temperature Characteristics	±50ppm,or specify
Operating Temperature	-40~+125℃, or specify
Storage Temperature	-55~+125℃ or specify
Shunt Capacitance	3 pF Max.
Level of Drive	1~200μWMax.(100uW typical)
Aging (at 25 ℃)	±2ppm/year Max.

Equivalent Series Resistance(ESR)

Fundamental			
8 ~ 9.9MHz	800 Ω Max.	13 ~ 15.9MHz	80 Ω Max.
10 ~ 10.9 MHz	250 Ω Max.	16 ~ 20.9 MHz	70 Ω Max.
11 ~ 11.9 MHz	150 Ω Max.	21 ~ 29.9 MHz	60 Ω Max.
12 ~ 12.9 MHz	100 Ω Max	30 ~ 66.0 MHz	50 Ω Max

Dimensions and Patterns [unit:mm]

Package Size – Dimensions (Unit: mm)

www.yxc.hk