KoT cut OPAW Crystal Oscillator

Low Phase Noise / Low Phase Jitter / High Precision / 625 MHz / Low g-Sensitivity / LVDS, LVPECL

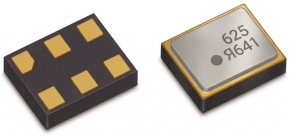
KCRO-05
Preliminary

FEATURES

- **Patented KoT cut® & OPAW® Technology:** Our proprietary crystal oscillator, featuring the innovative KoT cut® angle and distinctive OPAW® vibration mode, sets a new standard for performance, standing unmatched in the market.
- **Exceptional Frequency-Temperature Stability:** Surpassing conventional AT-cut oscillators, this unique technology delivers superior stability across extreme temperature variations, ensuring reliable operation in any environment.
- **Outstanding Low g-Sensitivity:** Engineered for resilience through advanced packaging, it maintains precise frequency output even under significant vibration and shock, ideal for demanding applications.
- **Unprecedented Low Jitter Performance:** Achieves industry-leading low jitter, crucial for maintaining signal integrity and reducing BER in high-speed data transmission systems.
- **Versatile Differential Output (LVDS/LVPECL):** Supports both LVDS and LVPECL outputs, providing design flexibility and robust signal transmission for diverse high-speed digital interfaces.

RoHS 2.0 Compliant 10 substances

Pb Free



Note: 'KoT': Kerfed orthogonal plate waves for zero Temperature coefficient, 'OPAW': Orthogonal Plate Acoustic Waves

APPLICATIONS

- **AI & High-Speed Data Center:** Scale-out AI Clusters, GPU/ASIC Reference Clocks (PCIe Gen6/7, CXL 3.0/4.0), and Next-gen AI Accelerators.
- **Next-Generation Networking:** 800G / 1.6T / 3.2T Ethernet Switches and Routers, 112G/224G SerDes Reference Clocks.
- **High-Speed Connectivity:** AEC (Active Electrical Cables), Retimers, Gearboxes, and OSFP800/1600 Optical Modules.
- **Advanced Infrastructure:** Multi-terabit OTN (Optical Transport Network), Coherent Optical Communications, and 6G Wireless Prototyping.
- **Precision Instruments:** High-performance Test & Measurement, Real-time High-speed DSP.

STANDARD SPECIFICATIONS

Item		Symbol	Specifications			Remarks
			MIN.	TYP.	MAX.	
Nominal frequency		fo	-	625 MHz	-	
Storage temperature		T_stg	-40 ℃	-	+125 ℃	
Operating temperature		T_use	-40 ℃	-	+105 ℃	
Frequency tolerance (includes initial accuracy, temperature characteristics, supply voltage change, and first year aging)		f_tol	±50 ppm	-	+50 ppm	Frequency tolerance options customized upon request.
LVDS	Supply voltage	V_{CC}	1.8 V ± 0.09 V,	2.5 V ± 0.125 V,	3.3 V ± 0.165 V	
	Current consumption	I_{CC}	-	-	40 mA	
	Output voltage	V_{OD}	400 mV	-	700 mV	
	Offset voltage	V_{OS}	1.15 V	1.25 V	1.35 V	For V_{CC} of 2.5 V or 3.3 V
			0.7 V	0.9 V	1.1 V	For V_{CC} of 1.8 V
	Differential swing	V_{SWG}	800 mV	-	1400 mV	
	LVDS load conditions	L_LVDS	-	100 Ω	-	Between output terminals
	Rise time	tr	-	-	350 ps	20 % to 80 %
	Fall time	tf	-	-	350 ps	80 % to 20 %
	Symmetry	SYM	45 %	50 %	55 %	
LVPECL	Supply voltage	V_{CC}	2.5 V ± 0.125 V, 3.3 V ± 0.165 V			
	Current consumption	I_{CC}	-	-	80 mA	
	Output voltage	V_{OH}	V_{CC} - 1.1 V	-	-	
		V_{OL}	-	-	V_{CC} - 1.5 V	
	Differential swing	V_{SWG}	800 mV	-	2000 mV	
	ECL load conditions	L_ECL	-	50 Ω	-	Terminated to V_{CC} - 2.0 V
	Rise time	tr	-	-	400 ps	20 % to 80 %
	Fall time	tf	-	-	400 ps	80 % to 20 %
	Symmetry	SYM	45 %	50 %	55 %	
Input voltage		V_{IH}	85 % V_{CC}	-	-	OE terminal
		V_{IL}	-	-	15 % V_{CC}	OE terminal
Start-up time		t_str	-	-	10 ms	
Phase jitter		t_pj	-	12 fs	20 fs	Offset frequency 12 kHz to 20 MHz
g-Sensitivity		-	-	-	2 ppb/g	

RIVER
Sales Contacts:

RIVER ELETEC CORPORATION
E-mail: river_sales@river-ele.co.jp
River Electronics (Singapore) Pte.Ltd. TEL: +65-6258-7874
Taiwan River Co.,Ltd. TEL: +886-2-8988-2811 FAX: +886-2-2983-4785
Xi'an River Electronics Corporation (China) TEL: +86-755-86528590 FAX: +86-755-86528590

https://global.river-ele.co.jp/
2-1-11 Fujimigaoka, Nirasaki, Yamanashi, 407-8502, Japan

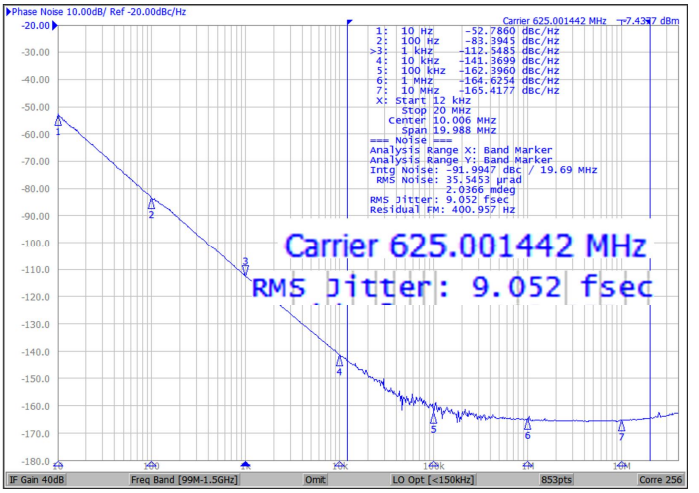
Apr. 16, 2026

KoT cut OPAW Crystal Oscillator

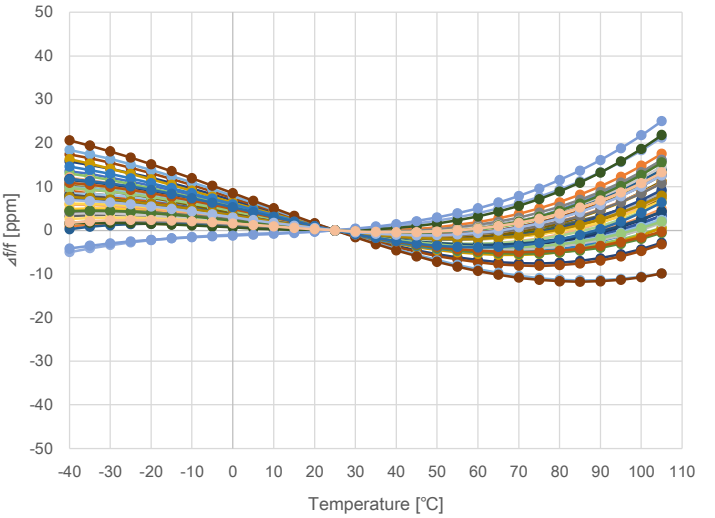
Low Phase Noise / Low Phase Jitter / High Precision / 625 MHz / Low g-Sensitivity / LVDS, LVPECL

KCRO-05
Preliminary

PHASE NOISE, PHASE JITTER

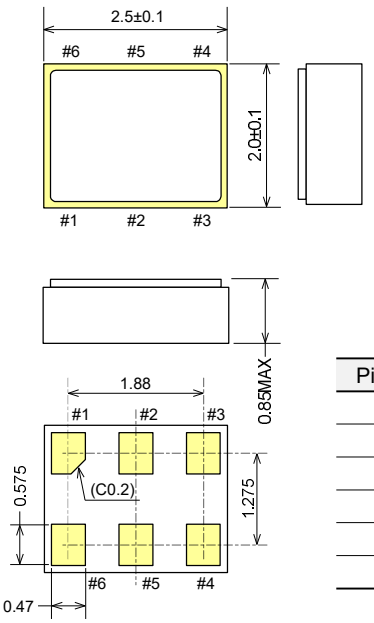


FREQUENCY vs. TEMPERATURE CHARACTERISTICS



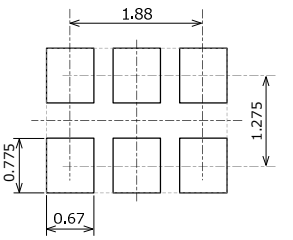
OUTLINE DIMENSIONS

(Unit: mm)



RECOMMENDED LAND PATTERN

(Unit: mm)



Pin#	Function	Description
1	OE	“H” or Open: Enable, “L”: Disable
2	NC	Connect to V_{CC} (Recommended) or leave Open
3	GND	GND
4	OUT	OUTPUT
5	$\overline{OUT}$	Complementary OUTPUT
6	V_{CC}	Supply Voltage

ORDERING NUMBER GUIDE

K5X — **62500** — **33** — **G** — **S6** — **X** — **##**

Type

K5A	KCRO-05 (LVDS)
K5B	KCRO-05 (LVPECL)

Nominal Frequency

“62500” = 625.00 MHz

Supply Voltage

33	3.3 V ± 5 %
25	2.5 V ± 5 %
18	1.8 V ± 5 % (K5A only)

Frequency Tolerance

G	Overall

Frequency / Temperature Characteristics & Operating Temperature

Operating temperature	Frequency / temperature characteristics
	±50 ppm
-40 ～ +105 °C	**S6**
Other *1	**NN**

RIVER use only (as needed)

Tape and Reel

X	3000 pcs/reel
N	Other *1

*1. Please consult us for your requirements.

RIVER Sales Contacts:

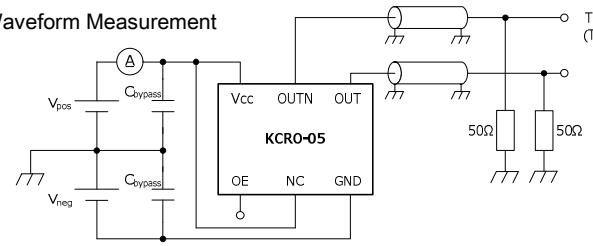
RIVER ELETEC CORPORATION
E-mail: river_sales@river-ele.co.jp
https://global.river-ele.co.jp/
2-1-11 Fujimigaoka, Nirasaki, Yamanashi, 407-8502, Japan

River Electronics (Singapore) Pte.Ltd. TEL: +65-6258-7874
Taiwan River Co.,Ltd. TEL: +886-2-8988-2811 FAX: +886-2-2983-4785
Xi'an River Electronics Corporation (China) TEL: +86-755-86528590 FAX: +86-755-86528590

Apr. 16, 2026

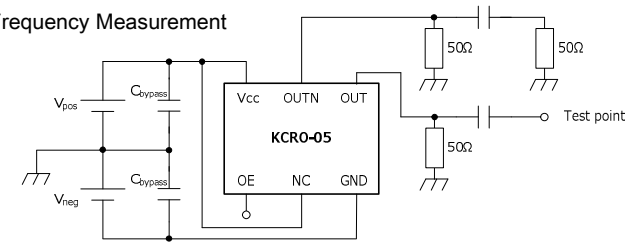
MEASUREMENT CIRCUITS (LVDS)

Waveform Measurement

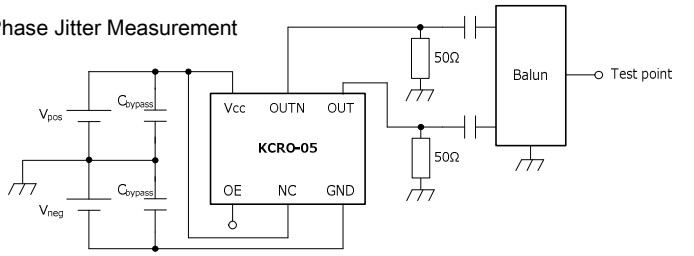


Vcc	Vpos	Vneg
3.3V	+2.1V	-1.2V
2.5V	+1.3V	-1.2V
1.8V	+0.9V	-0.9V

Frequency Measurement

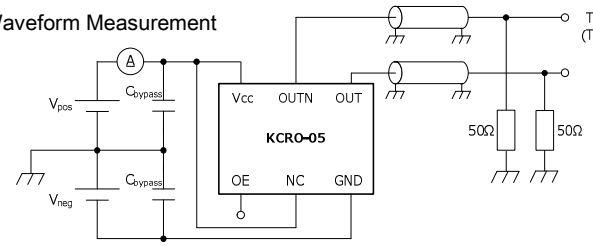


Phase Jitter Measurement



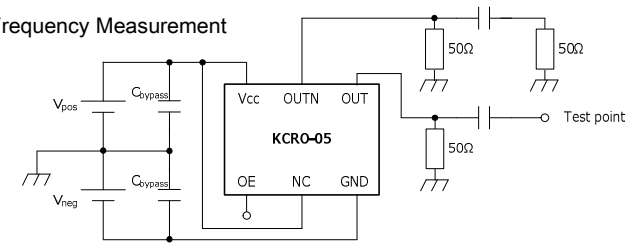
MEASUREMENT CIRCUITS (LVPECL)

Waveform Measurement

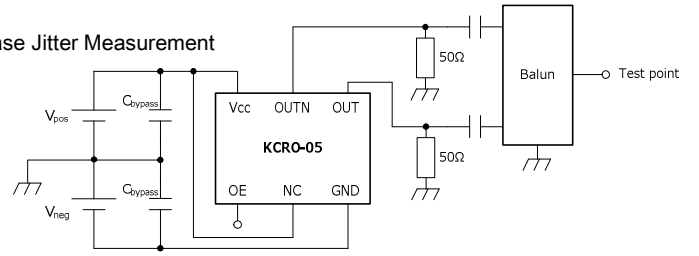


Vcc	Vpos	Vneg
3.3V	+2.0V	-1.3V
2.5V	+2.0V	-0.5V

Frequency Measurement



Phase Jitter Measurement



NOTES

- To ensure stable operation of the crystal oscillator, please implement a bypass capacitor of 0.01 µF to 0.1 µF between the V_{CC} and GND near the product.
- The OE pin (Pin#1) is high-impedance and is sensitive to noise, which can cause malfunctions. To prevent malfunction from external noise, it is recommended to connect the OE pin to V_{CC} when OE function is not in use.
- The NC pin (Pin#2) acts as a programming pin and is internally connected to the semiconductor. Due to its high impedance, it is also is sensitive to noise, which can cause malfunctions. To prevent malfunction, we recommend connecting the NC pin to V_{CC} whenever possible.
- Avoid applying power with an excessively fast rise time.
- Do not install or remove this device while voltage is applied to the circuit. (No hot socketing allowed)
- The contents of this catalog are subject to change without notice.
- For specifications other than the standard ones, please contact our sales department.

RIVER ELETEC CORPORATION
E-mail: river_sales@river-ele.co.jp
https://global.river-ele.co.jp/
2-1-11 Fujimigaoka, Nirasaki, Yamanashi, 407-8502, Japan

Sales Contacts:
River Electronics (Singapore) Pte.Ltd. TEL: +65-6258-7874
Taiwan River Co.,Ltd. TEL: +886-2-8988-2811 FAX: +886-2-2983-4785
Xi'an River Electronics Corporation (China) TEL: +86-755-86528590 FAX: +86-755-86528590