XO SPECIFICATION

Customer：

Customer P/N：

TKD P/N： XO32F156250HAPE001

Part Name： SMD XO 3225

Product Description： 156.250000MHz

Issue Date： 2025/2/26

Product Standard： ☑Pb free ☑RoHS 2.0 ☑REACH ☑HF

CUSTOMER'S APPROVAL

(PLEASE RETURN A COPY WITH APPOVAL)

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Approved	Checked	Designer
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Rev.	Description of Revision History	Date	Designer	Checked By
A	New Revision	2025/2/26	Zhang JingYuan	Wang Peng

XO SPECIFICATION

1.Description : SMD Simple Packaged Xtal Difference Oscillator 3225

2.Nominal Frequency : 156.250000MHz

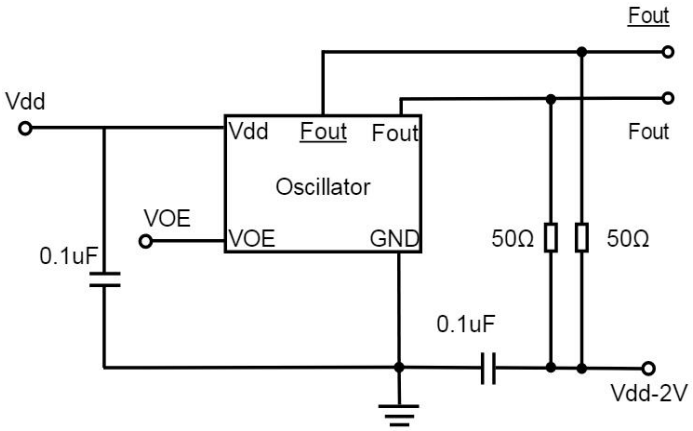
3.Electrical Specifications :

Item	Parameters	Condition	Electrical Specifications			
			Min	Typ	Max	Units
1	Nominal Frequency		156.250000			MHz
2	Oscillation Mode		Fundamental			
3	Frequency Stability Overall	-40~85℃ （Note1）	-50		50	ppm
		-40~105℃ （Note1）	-70		70	ppm
	Frequency Stability	-40~85℃ （Note2）	-35		35	ppm
		-40~105℃ （Note2）	-35		55	ppm
	vs. Load	±10%	-2		2	ppm
	vs. Supply voltage	±10%	-2		2	ppm
	Frequency Slope	2℃/min；1℃/step	-3		3	ppm/℃
	Dip	2℃/min；1℃/step	-3		3	ppm
4	Aging	1st year	-3		3	ppm
		10th year	-10		10	ppm
5	Operating Temperature Range		-40		105	℃
6	Supply Voltage		2.97	3.3	3.63	V
7	Supply Current	Output Enabled(Idd/OE)			60	mA
8	Output Waveform		LVPECL			
9	Output Voltage High Level	V_{OH}	Vdd-1.0		Vdd-0.8	V
10	Output Voltage Low Level	V_{OL}	Vdd-1.8		Vdd-1.6	V
11	Output Rise/Fall Time	20%~80% of Waveform			0.4	ns
12	Enable		0.7Vdd			V
13	Disable				0.3Vdd	V
14	Duty Cycle		45	50	55	%
15	Output Load			50		Ω
16	Start-up Time	90%Vdd to correct frequency			10	ms
17	Phase Noise	@10 Hz offset			-50	dBc/Hz
		@100 Hz offset			-85	dBc/Hz
		@1 kHz offset			-110	dBc/Hz
		@10 kHz offset			-123	dBc/Hz
		@100 kHz offset			-135	dBc/Hz
		@1 MHz offset			-148	dBc/Hz
		@10 MHz offset			-150	dBc/Hz
18	Jitter	12kHz - 20MHz			0.25	ps-rms
		12kHz - 1MHz			0.2	ps-rms
19	Spurious Suppression				5	dbc
20	Storage Temperature		-55		125	℃

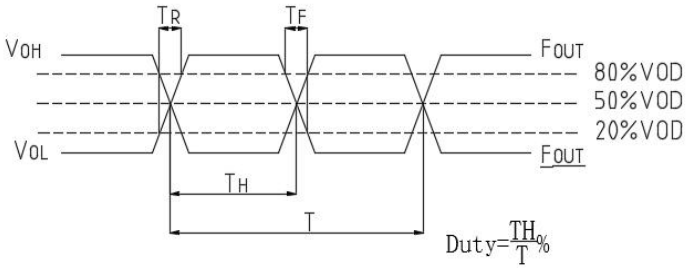
Note1 Frequency stability overall includes frequency tolerance@25±3℃ and frequency stability vs. operating temperature range and voltage variance and load variance and 10th year aging

Note2 Frequency stability includes frequency tolerance@25±3℃ and frequency stability vs. operating temperature range

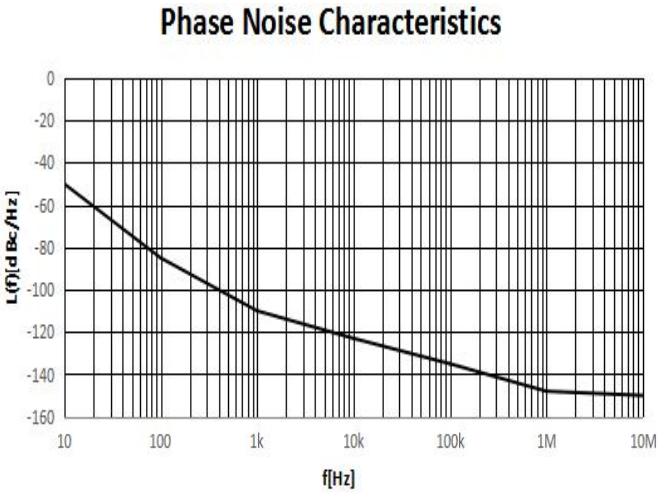
4.Test Circuit (LVPECL Load)



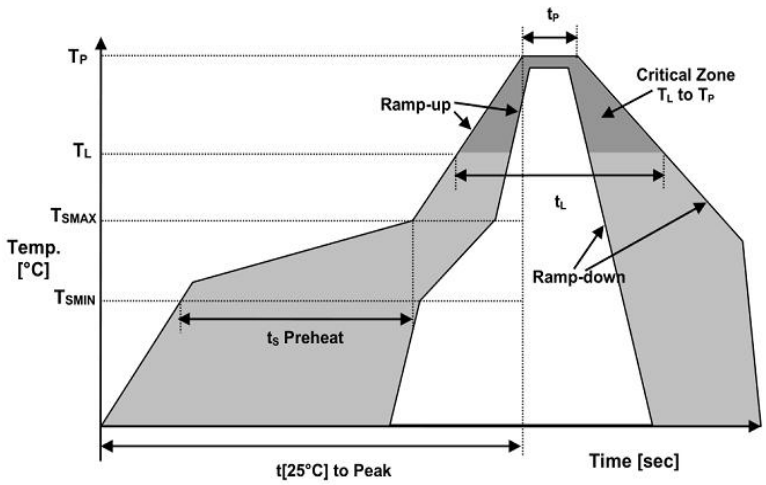
5.Output Waveform (LVPECL Load)



6.Phase Noise



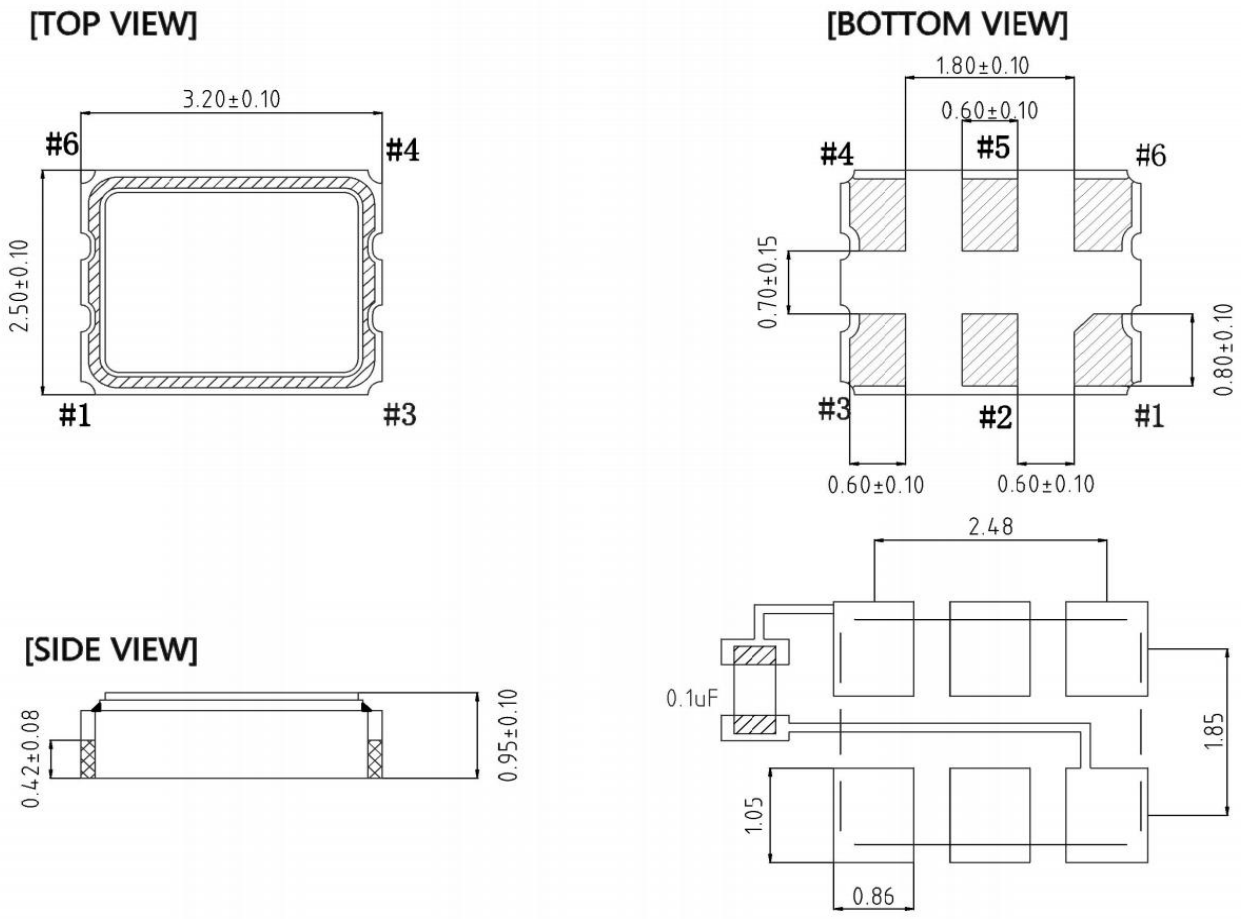
7.Recommended Reflow Profile



Reflow Profile		
Temperature MIN Preheat	T_{SMIN}	150℃
Temperature MAX Preheat	T_{SMAX}	200℃
Time（T_{SMIN} -T_{SMAX}）	t_S	60-180sec
Temperature	T_L	217℃
Peak Temperature	T_P	260℃
Ramp-up Rate	R_{UP}	3℃/sec max
Ramp-Down Rate	R_{DOWN}	6℃/sec max
Time within 5℃ of Peak Temperature	t_P	30sec
Time t(25℃) to Peak Temperature	t(25℃)to Peak	480sec
Time	t_L	60-150sec

8.Product Dimensions

Unit：mm



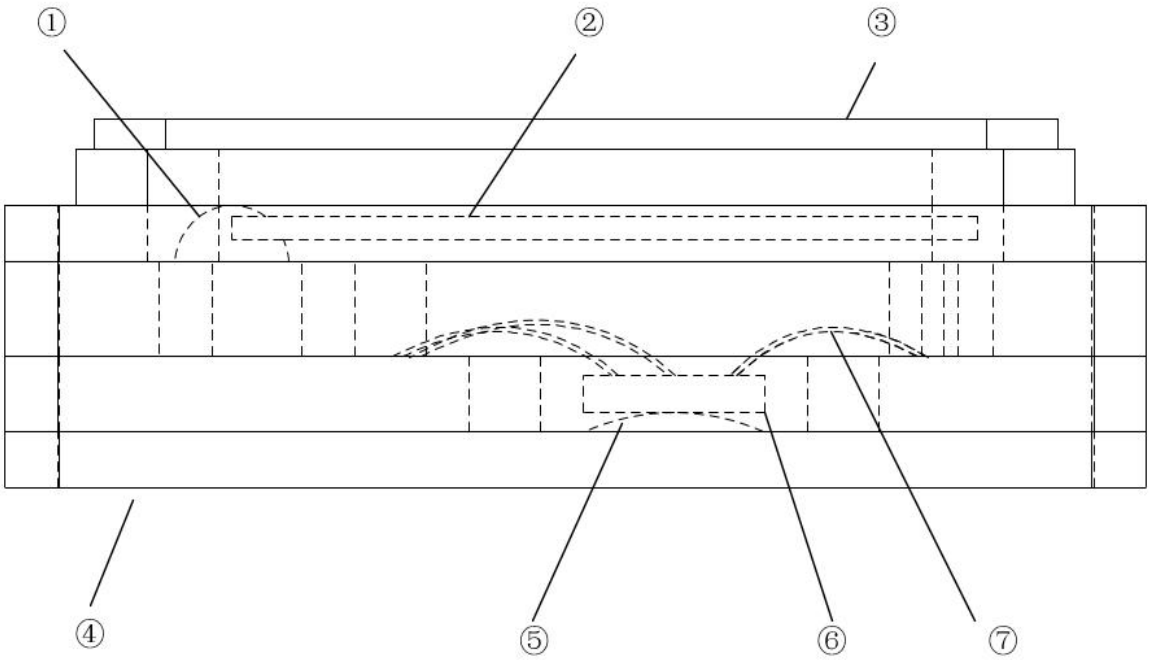
Pin Connection

Name	Connection
pin 1	Tri-State
pin 2	NC
pin 3	Vss
pin 4	Fout
pin 5	Fout
pin 6	Vdd

Function

Pin1 Input	Pin4&5 output
High level	Oscillation Out
Low level	High Z

9.Structure illustration



No.	Components	Materials
①	Conductive Adhesive	Ag+Silicone resin
②	Crystal Blank	SiO_2
③	Lid	Fe-Ni-Co Alloy
④	Base	Ceramic+Noble Metal
⑤	Conductive Adhesive of Solid IC	Ag+Epoxy resin
⑥	IC	Si
⑦	Gold wire	Au

10.Product Identification (Marking)

T： TKD Logo

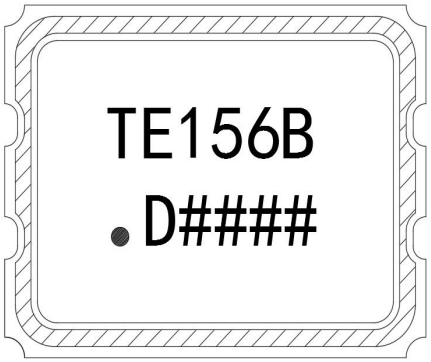
E： Oscillator Code

156B： Frequency Code

●： Pin1 Index

D： Date Code

####： XO Lot Code

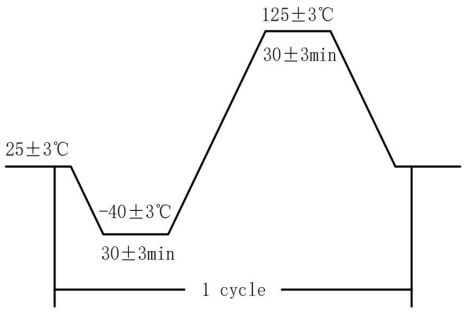
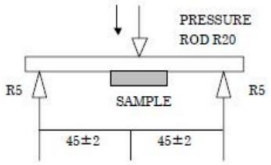


Date Code

Year		2019	2020	2021	2022
		2023	2024	2025	2026
		2027	2028	2029	2030
		2031	2032	2033	2034
Month	JAN	a	n	A	N
	FEB	b	p	B	P
	MAR	c	q	C	Q
	APR	d	r	D	R
	MAY	e	s	E	S
	JUN	f	t	F	T
	JUL	g	u	G	U
	AUG	h	v	H	V
	SEP	j	w	J	W
	OCT	k	x	K	X
	NOV	l	y	L	Y
	DEC	m	z	M	Z

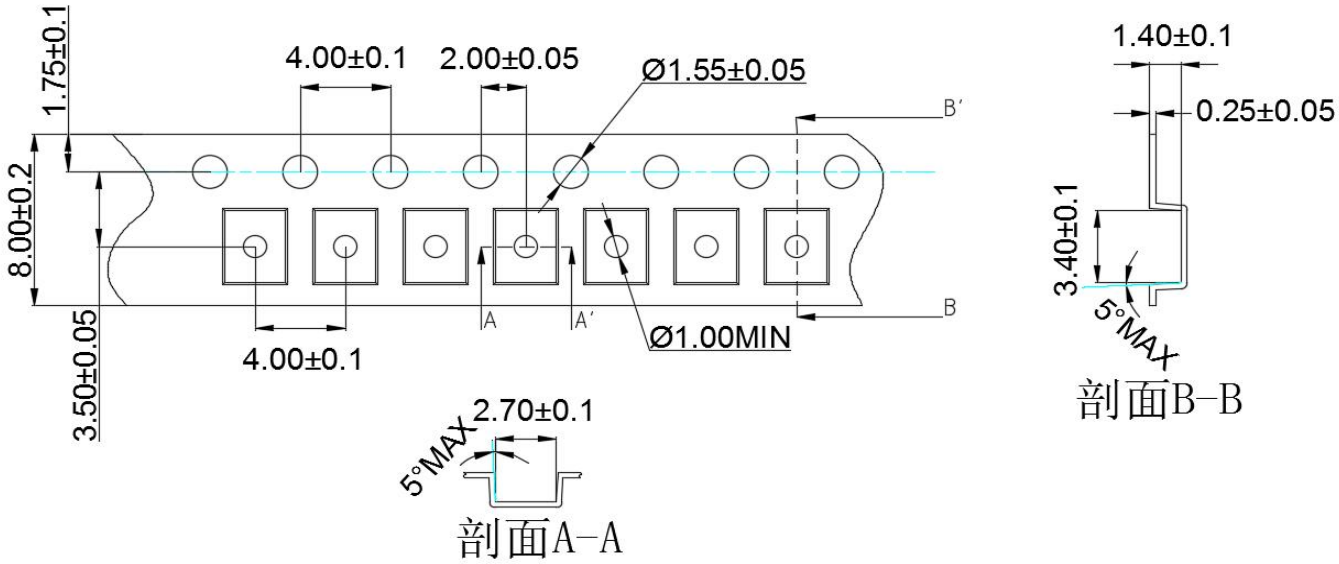
This date code will be cycled every four years.

11.Reliability

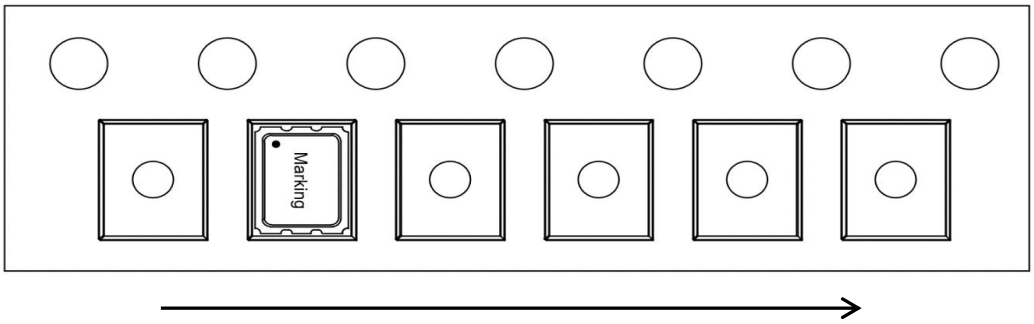
No.	Item	Test Methods	Criteria
1	Low Temperature Storage	Temperature：-40℃ ± 3℃（or the specification shall prevail） Duration：500 hours	±5.0 ppm
2	High temperature and humidity	Temperature：85ºC ± 2ºC Humidity：RH 85% Duration：500 hours	±5.0 ppm
3	Thermal Shock	 Temperature：-40℃~125℃（or the specification shall prevail） Duration：100 cycles	±5.0 ppm
4	High Temperature Operating Life	Temperature ：85℃ （or the specification shall prevail） Duration：1000 hours Vdd Applied	±10.0 ppm
5	Vibration	Duration ：2 hours/each direction Frequency range：10～55 Hz Direction：3 axis	±5.0 ppm
6	Mechanical Shock	Acceleration：100 g Duration：6.0 ms Test cycles：3 times for all 6 axis，half sina	±5.0 ppm
7	Drop Test	Height：100 cm Test cycles：3 times	±5.0 ppm
8	Solderability	Soldering bath temperature：245℃ ± 5℃ Duration：2±0.6 second	95% Coated
9	Resistance to Soldering Heat	Soldering temperature：260℃ ± 10℃ Duration：15±5 second	±5.0 ppm
10	Board Flex	Height：3.0 mm Duration：5 second Speed：0.5mm/sec 	±5.0 ppm

12.Package Information

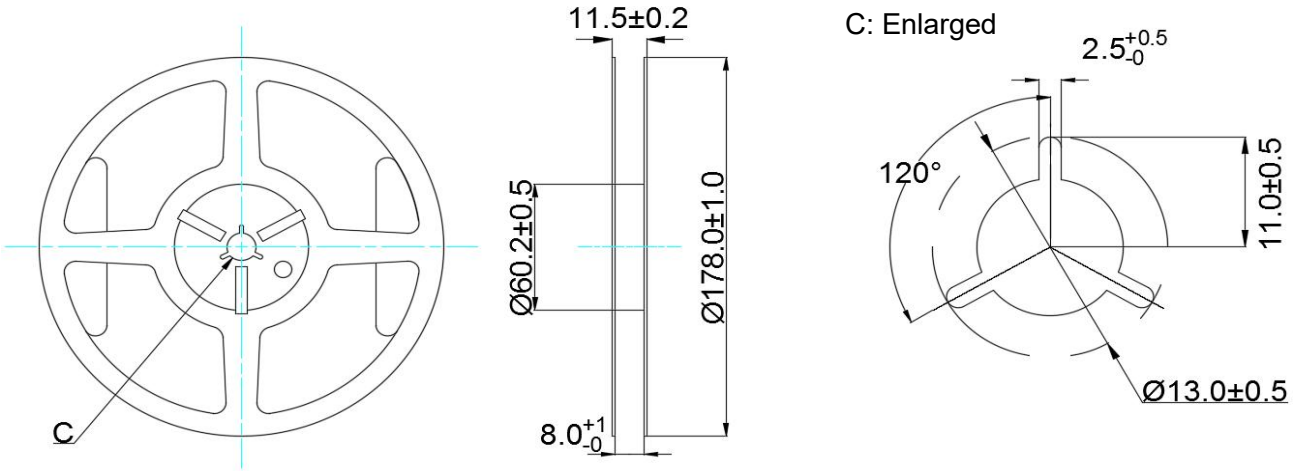
Tape (Carrier) Dimensions Unit：mm



The Direction of Packing



Reel Dimensions 3000 Pcs/Reel Unit：mm



Handling Instructions

1. Cautions for Handling

a) Prevention against electrostatic breakdown
Your full attention to static electricity is still requested.
b) Direction
Before mounting the crystal oscillator on board, Please confirm the direction to make sure the GND terminal and the terminal of power supply are not taken wrongly.

2. Prevention against Vibration and Shock

While the product is being transported or mounted onto board, if undue hock and vibration exceeding the specification is put on, there is risk hat the built-in crystal blank is broken.
When undue shock and vibration exceeding the specification is put on the product,please be sure to make confirmation of the product's characteristics.

3. Soldering

In order to assure the reliability of the crystal oscillator, please use the product under the recommended conditions.

4. Surface mounting

a)This product is surface-mounting device.
So, Please pay attention to the following things.
b)Extreme deformation of board may make pattern off, the electrode of terminals off and solder broken.Full attention is requested especially when splitting the board with the oscillator mounted where the camber of the board occurs.
c)In case that automatic mounter is used, please choose the type with small shock generation and make confirmation of the shock before use.

5. Cleaning

Because cleaning will cause change to all characteristics, cleaning is forbidden.

6. Store keeping (method and duration)

Long-time storage in the high/low temperature and high humidity leads to deterioration of solderability.
So, please keep the product in the temperature of +5~+35 and humidity of 45~70%.
Moreover, please keep the product in the circumstance with measures against static electricity.
(Please use it after confirming the product solderability.)

7. Caution

This product should not be used in toxic, harmful, or corrosive environments such as mercury, chlorine, sulfur, acid-base environments etc.

8. Application scenarios

TKD products are designed specifically for general and specific electronic applications. Without confirmation, they should not be used in critical areas beyond expectations, such as space technology, vehicle control, military weapon development, etc., to avoid significant risks to safety, health, property, or society. For intended use only, there is no additional guarantee for specific use products. If you need products for specific purposes, please consult TKD sales representatives in advance.