

納入仕様書

ENGINEERING SPECIFICATIONS

提出先
Ordered by

品名 表面実装型水晶振動子
Product Surface mount type crystal unit

貴社部品番号 TFX-02S-32.768KJ71356
Part No.

製品番号 TFX-02S-32.7678KJ71356
RIVER Code

型名 TFX-02S
Type

公称周波数 32.768kHz
Nominal frequency

- ① 新規納入仕様書を提出します。
We submit a new engineering specification.
- 2 当方の製造工程の都合により別紙の如く仕様変更を許可されたくお願い致します。
尚、他の仕様に関しては変わりございません。
We would like to apply specification change by the reason of our manufacturing process, as following sheets. And, there follows no other change(s).
- 3 貴社の要望により変更致します。
It is changed by your request.

受領印欄
Approval signature

受領印を押印の上1部御返却下さい。
Please return one copy with your signature.

※ 本仕様書に関するお問い合わせ先は、営業所までお願い致します。
Inquiry regarding this specification, please contact office.

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■前回提出納入仕様書との差異要旨 The difference compared with previous engineering specification.

No.	提出日 Date	Page	項目 Items	変更内容 Contents	変更理由 Reason
1	Mar 21, 2017			新規 New appliance	

■標準状態 Standard conditions

特に指定がない限り、測定は温度15～35℃、湿度45～75%、気圧86～106kPaにて行う。但し、判定に疑義を生じた場合は温度25±1℃、湿度48～52%、気圧86～106kPaにて行う。

動作温度範囲:-40～+125℃

保存温度範囲:-40～+125℃

Unless otherwise specified, the standard range of atmospheric conditions for measurements and tests are as follows.

Ambient temperature: 15 to 35℃, Relative humidity: 45 to 75%, Air pressure: 86 to 106kPa

If there is any doubt about the results, measurement shall be made within the following limits.

Ambient temperature: 25±1℃, Relative humidity: 48 to 52%, Air pressure: 86 to 106kPa

Operating temperature range: -40 to +125℃

Storage temperature range: -40 to +125℃

■定格および電氣的性能 Ratings and electrical characteristics

	項目 Items	規格 Specifications
1	公称周波数 Nominal frequency	32.768000kHz
2	型名 Type	TFX-02S
3	振動次数 Overtone order	1次 Fundamental
4	負荷容量 Load capacitance	12.5pF
5	励振レベル Drive level	0.1±0.01 μW
6	限界励振レベル Maximum drive level	1.0 μW max.
7	周波数偏差 Frequency tolerance	Within ±20ppm(at 25±5℃)
8	周波数温度特性 Temperature characteristics	(-0.03±0.01) × 10 ⁻⁶ /°C ² Turnover temperature 25℃±5℃
9	等価直列抵抗 Equivalent series resistance	70kΩ or less
10	並列容量 Shunt capacitance	7.0pF or less(at 1MHz)
11	絶縁抵抗 Insulation resistance	DC100±15Vにて500MΩ以上 500MΩ min. at DC100±15V

■測定条件 Measurement condition

ネットワークアナライザ250C又は同等品、励振レベル0.1 μWの条件で測定する。

Measurements are carried out with Network analyzer 250C on 0.1 μW drive level or it's compatible.

■指定回路 Specified circuit

下記条件を満足する回路にて使用のこと

(1)負性抵抗:210kΩ以上

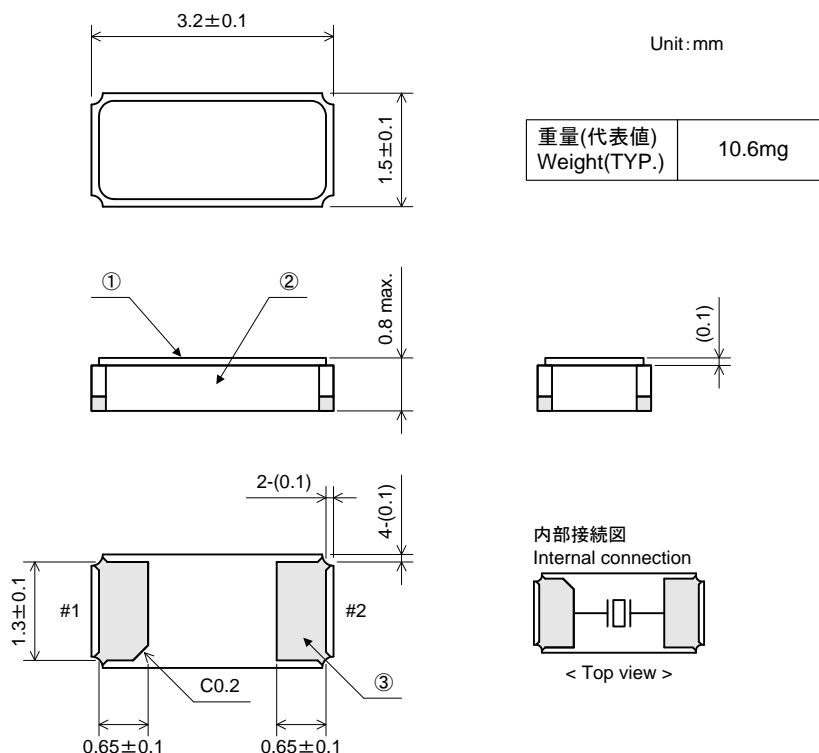
(2)励振レベル:1.0 μW以下

Oscillation circuit is required following conditions.

(1)Negative resistance:210kΩ min.

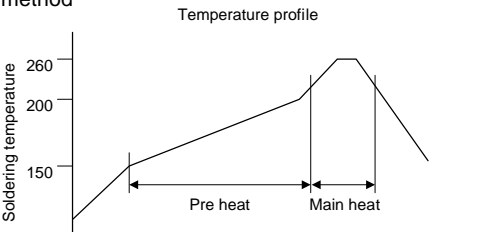
(2)Drive level:1.0 μW max.

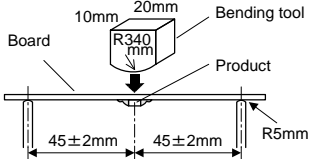
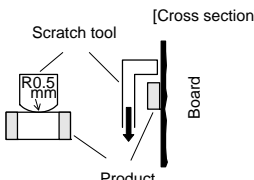
■寸法図 Dimensions



■構成部品 Components

	構成部品 Components	材質及び処理 Materials and Finish
①	リッド Lid	クラッド材[ニッケル(Ni)+コパール+銅(Cu)+銀ろう(Ag-Cu)] Clad Metals[Nichel(Ni)+Kovar+Copper(Cu)+Silver solder(Ag-Cu)]
②	ケース Case	セラミック(Al_2O_3 90%以上) 灰色 Ceramic(Al_2O_3 90% and over) Gray
③	端子 Terminals	モリブデン(Mo)メタライズ+ニッケル(Ni)メッキ+金(Au)メッキ Molybdenum(Mo) metallize +Nickel(Ni) plating +Gold(Au) plating

項目 Items	条件 Conditions	規格 Spec.															
1	High Temperature Exposure(Storage)-1 Quartz crystal units shall be stored in the $125\pm 2^{\circ}\text{C}$ atmosphere for 1000 hours. Other procedures conform to MIL-STD-202 Method 108.	C·D·F															
2	Temperature Cycling Quartz crystal units shall be subjected successively 1000 cycles of temperature change shown below. Other procedures conform to JESD22 Method JA-104. <table border="1" data-bbox="587 443 1233 712"> <thead> <tr> <th></th> <th>温度 Temperature</th> <th>放置時間 Duration</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>$-40\pm 3^{\circ}\text{C}$</td> <td>30分 30 minutes</td> </tr> <tr> <td>2</td> <td>常温 Normal temperature</td> <td>30秒以内 Within 30 seconds</td> </tr> <tr> <td>3</td> <td>$125\pm 2^{\circ}\text{C}$</td> <td>30分 30 minutes</td> </tr> <tr> <td>4</td> <td>常温 Normal temperature</td> <td>30秒以内 Within 30 seconds</td> </tr> </tbody> </table>		温度 Temperature	放置時間 Duration	1	$-40\pm 3^{\circ}\text{C}$	30分 30 minutes	2	常温 Normal temperature	30秒以内 Within 30 seconds	3	$125\pm 2^{\circ}\text{C}$	30分 30 minutes	4	常温 Normal temperature	30秒以内 Within 30 seconds	C·D·F
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4	常温 Normal temperature	30秒以内 Within 30 seconds															
3	Biased Humidity Quartz crystal units shall be stored in the $85\pm 2^{\circ}\text{C}$ atmosphere with 85% relative humidity for 1000 hours at operating condition(DL= $10\mu\text{W}$). Other procedures conform to MIL-STD-202 Method 103.	B·D·F															
4	Operational Life Quartz crystal units shall be stored in the $125\pm 2^{\circ}\text{C}$ atmosphere for 1000 hours at operating condition(DL= $10\mu\text{W}$). Other procedures conform to MIL-STD-202 Method 108.	C·D·F															
5	Resistance to Solvents Note: Also aqueous wash chemical - OKEM clean or equivalent. Do not use banned solvents. Other procedures conform to MIL-STD-202 Method 215.	A·B·D J·K															
6	Mechanical Shock Quartz crystal units shall be accelerated at 981m/s^2 by 6ms pulse duration. This shock shall be applied in each 3 perpendicular axes. Other procedures conform to MIL-STD-202 Method 213 Condition C.	A·B·D															
7	Vibration Quartz crystal units shall be vibrated with the sweeping frequency from 10Hz to 2000Hz and return to 10Hz in 20 minutes, with 1.5mm amplitude or accelerated at $49\text{m/s}^2(5\text{G})$ is smaller value. This vibration shall be applied for 2 hours in each 3 perpendicular axes. Other procedures conform to MIL-STD-202 Method 204.	A·B·D															
8	Resistance to Soldering heat Reflow soldering method  <p>Peak temperature: 260°C for within 20 seconds. Main heat temperature: 217°C or higher for within 60 to 150 seconds. Pre-heating temperature: 150 to 200°C for within 60 to 120 seconds. Quartz crystal units which is put on PCB shall be through reflow soldering furnace twice with the condition shown above. Other procedures conform to J-STD-020D.</p>	B·E F·J															
9	Solderability Terminals coated with flux shall be immersed in the solder bath for 3.5 ± 0.5 seconds. Other procedures conform to J-STD-002. Solder : Sn-3.0Ag-0.5Cu Temperature : $245\pm 5^{\circ}\text{C}$. Flux: Approximately 25wt% methanol(JIS K 8891) solution of rosin(JIS K 5902).	L															

項目 Items	条件 Conditions	規格 Spec.	
10 Board Flex	Apply pressure in the direction of the arrow at the rate of (about) 0.5mm/s until the deformation reaches 2mm, then hold for 60 seconds. Other procedures conform to AEC-Q200-005.	 A diagram showing a board with a central product. A bending tool with a 20mm width and R340mm radius is applied to the board. The board is supported by two points, each 45±2mm from the center. The board thickness is R5mm.	A・B・D
11 Terminal strength	Apply 17.7N(1.8kgf) static load to the core of quartz crystal units in the direction of the arrow using a R0.5 scratch tool, then hold for 60 seconds. Other procedures conform to AEC-Q200-006.	 A diagram showing a cross-section of a board and product. A scratch tool with a R0.5mm radius is applied to the product. The board is labeled 'Board' and the product is labeled 'Product'.	A・B・D

規格 Specifications

A	破損等機械的損傷及び気密性の異常が無いこと Without mechanical damage such as breaks and satisfy sealing specification.
B	周波数変化量: ±5ppm以内 Frequency change: Within ±5ppm
C	周波数変化量: ±15ppm以内 Frequency change: Within ±15ppm
D	等価直列抵抗変化量: ±5kΩ以内 Equivalent series resistance(E.S.R.) change: Within ±5kΩ
E	等価直列抵抗変化量: ±10kΩ以内 Equivalent series resistance(E.S.R.) change: Within ±10kΩ
F	試験後、常温常湿中に1時間放置し測定する After conditioning, quartz crystal units shall be subjected to standard atmospheric conditions for 1 hour, and measured.
G	内部から連続した気泡が無いこと Without repetitive leaking bubbles from quartz crystal units.
H	$1 \times 10^{-9} \text{Pa} \cdot \text{m}^3/\text{s}$ or less
J	外観に著しい異常が無いこと Without distinct deformation in appearance.
K	表示が読み取れること Marking shall be legible.
L	浸漬部分の95%以上新しいはんだで覆われていること Minimum 95% of immersed terminal shall be covered with new uniform solder.

■試験回路 Test circuit

ネットワークアナライザ250C又は同等品、励振レベル0.1μWの条件で測定する。

Measurements are carried out with Network analyzer 250C on 0.1 μW drive level or it's compatible.

■試験基板 Test board

材質: ガラス布基材エポキシ樹脂(FR-4または相当品)

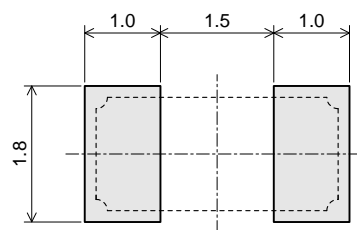
板厚: 0.8mm

銅箔厚さ: 18 μm

Material: Glass fabric base epoxy resin.(FR-4 or equivalent)

Thickness of board: 0.8mm

Copper foil thickness: 18 μm



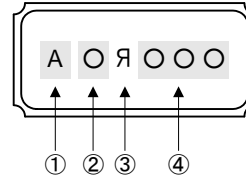
ランド寸法図(Unit:mm)
Land dimensions

■製品 Product

製品の表面には次の項目を表示する。
Marking on the product.

- ① 公称周波数(A:32.768kHz)
Nominal frequency(A:32.768kHz)
- ② 負荷容量略号(下記参照)
Abbreviated load capacitance(Refer to following)

負荷容量 Load capacitance	12.5pF	9.0pF	7.0pF	その他 Others
略号 Abbreviated	A	B	C	Z



- ③ 製造者略号: Я
Abbreviated manufacture's name: Я
- ④ ロット番号: 年月日(下記参照)
Lot No.: Year Month Day(Refer to following)
年: 西暦末尾1桁
Year: Last digit of year

月 Month	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
	1	2	3	4	5	6	7	8	9	X	Y	Z

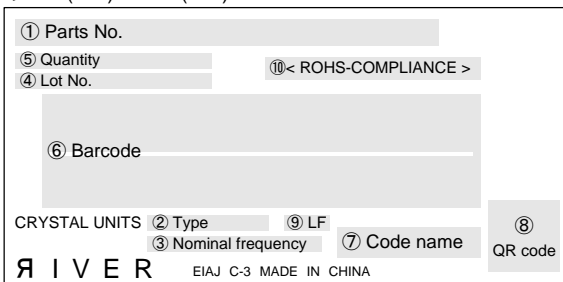
日 Day	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	17th	18th
	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H	J
	19th	20th	21st	22nd	23rd	24th	25th	26th	27th	28th	29th	30th	31st	※ IとOは除く Except "I", "O"				
	K	L	M	N	P	Q	R	S	T	U	V	W	X					

■リール, 包装箱 Reel, Packing box

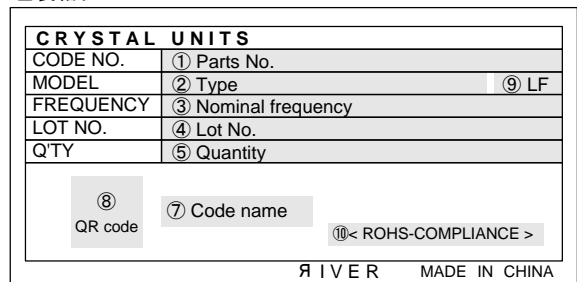
ラベルには次の項目を表示する。
Marking on the label.

- ① 貴社部品番号 Parts No. ② 型名 Type ③ 公称周波数 Nominal frequency ④ ロット番号 Lot No.
- ⑤ 数量 Quantity ⑥ バーコード Barcode ⑦ 弊社管理コード Code name ⑧ QRコード QR code
- ⑨ LF:Lead free ⑩ ROHS対応 ROHS-COMPLIANCE

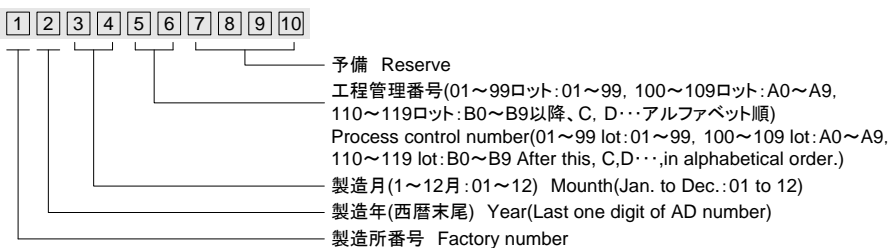
ラベル(C-3) Label(C-3)



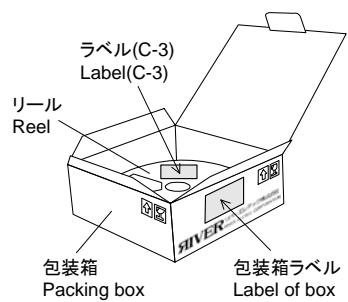
包装箱ラベル Label of box



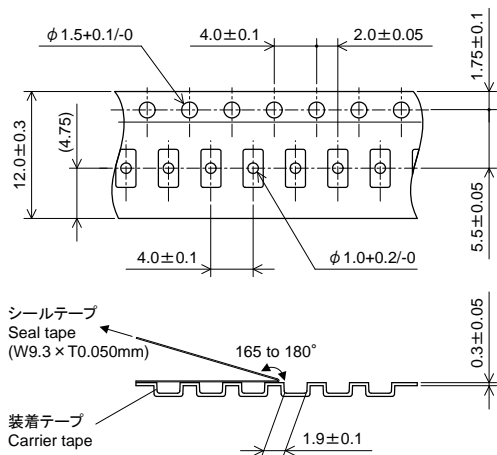
④ ロット番号の構成 Lot No. Explanation



■張り付け位置 Position

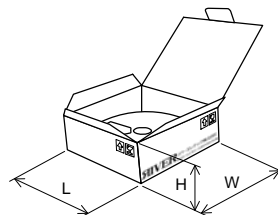
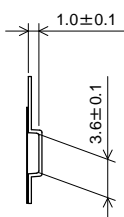


■テーピング Taping



■包装箱 Packing box

Unit: mm



材質: 紙
数量: 3リール以下
Material: Cardboard
Quantity: 3 reels max.

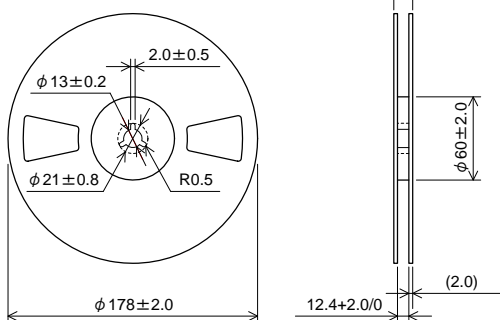
Unit: mm

	L	W	H
外寸 Outer dimensions	188 (185)	185 (190)	70 (23)
内寸 Inner dimensions	185 (180)	183 (180)	63 (20)

()内の数値が1リール用包装箱寸法です。
Parenthesised numbers indicate the dimensions of one reel packing box.

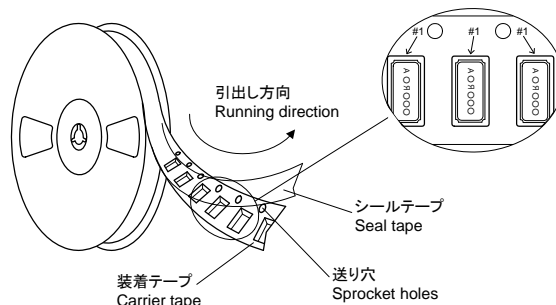
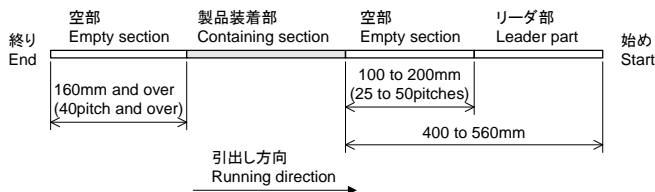
■リール Reel

Unit: mm



材質: 導電性ポリスチレン
数量: 3000個以下/リール
Material: Conductive Polystyrene
Quantity: 3000 pieces max./Reel

■テーピング方法 Taping



シールテープ材質(帯電防止処理): ポリエチレンテレフタレート(PET)+ポリエチレン系樹脂(PE)

装着テープ材質: 導電性ポリスチレン

シールテープは送り穴をふさいだり、装着テープからはみ出したりしていないこと

欠品個所数: 0個所/リール

シールテープ引張り強度: 10N以上

送り穴の累積ピッチの許容誤差は10ピッチで±0.1mm以内

シールテープ剥離強度: 0.2~0.7N以内(速度: 300mm/分 角度: 165~180°)

Material of the seal tape(Anti-static): Polyethylene terephthalate(PET)+Polyethylene resin(PE)

Material of the carrier tape: Conductive Polystyrene

The seal tape shall not cover the sprocket holes, and not protrude from the carrier tape.

Empty component pockets: 0/reel

Tensile strength of the seal tape: 10N and over.

Tolerance of the cumulative pitch of sprocket hole: within ±0.1mm(10 pitches)

Peeling force of the seal tape: 0.2 to 0.7N(velocity: 300mm/min, angle: 165 to 180°)

■注意事項 Remarks

リフローはんだ付け回数2回以内で御使用下さい。(フローはんだ未対応)
温度差150°Cを越える瞬間的な熱衝撃は避けて下さい。本製品は防湿梱包を使用しておりません。ベーキングの必要はありません。
Please use reflow soldering method within twice(Do not perform flow soldering).
Please avoid sudden exposure to temperature over 150°C. This product doesn't use the moisture-proof package.
There is no necessity of the baking.

■保管期限 Storage period

温度5~35°C, 湿度45~85%, 気圧86~106kPaで直射日光を避け保管した場合1年間。
When being kept within temperature 5 to 35°C, 45 to 85% of the humidity, atmospheric pressure
86 to 106kPa without direct sunlight: 1 year.

■優先言語 Priority language

日本語を優先言語と致します。
Priority language is Japanese.

■重要注意事項 Important Notice

当水晶部品は、生命に関わる用途向けではありません。生命に関わる用途には使わないで下さい。例としては、車載や医療の基幹部分、全ての軍事用途など。

This crystal component is not designed for any life-threatening usage or applications. Do not use this product for any life-threatening applications. Examples of life-threatening applications include main functions of automotive or medical devices and all kinds of military applications.

■RoHS対応 RoHS-compliant

欧州連合発行の「有害物質使用制限(RoHS:Restriction on Hazardous Substances)指令」に対応しています。
This products is in compliance with the RoHS(Restriction of the use of certain Hazardous Substances in electrical and electronic equipment) directive.

■AEC-Q200適合性 Conformity to AEC-Q200

本製品は、AEC-Q200に準拠しています。
This product is designed and manufactured with reference to AEC-Q200.