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承 認 書

SAMPLE SPECIFICATION REPORT

送樣廠商 / VENDER : 全科科技股份有限公司
品名 / PART NAME : TG-5006CJ-47L 32.000000 MHz_X1G0041310042
SEIKO EPSON
型號 / TYPE : X1G004131004216
適用模型 / MODEL NO. : 11300001217D

申請單編號:

備註: 游雅涵 Holly Yu 2019/09/03

承認客戶: 光寶網路通訊(東莞)有限公司

承認單位:



研究開發部 R & D	品保工程師 QA

承認書規格說明

此承認書的 SPECIFICATIONS 內文料號標註為 EPSON Product No.: X1G004131004200,但與全科實際下單料號: X1G004131004216 為相同料件，兩者僅有包裝數量的差異。

*(X1G004131004216 為 3000 pcs/reel 的 Quantity.)

詳細內容請見規格書 **PACKING SPECIFICATION [5] Quantity** 之說明。

[5] Quantity 收納數量

- 12 000 pcs./reel (Standard)

However it is not the limit, in case that the order quantity does not fill with 12000 pieces.

Packing quantity is defined by 14th and 15th digit of product number.

但し、注文数量が 12 000 pcs に満たない場合は、その限りではない。

收納數量は、製品型番の 14 桁、15 桁による。

14th and 15th digit of product number. 製品型番の 14 桁、15 桁	Quantity
00	12 000 pcs
01	Vinyl Bag(Bulk)
11	Any Quantity
12	250 pcs
14	1 000 pcs
15	2 000 pcs
16	3 000 pcs
17	4 000 pcs



RECIPIENT

SPECIFICATIONS

Product No. : X1G004131004200

MODEL : TG-5006CJ-47L

SPEC. No. : GVV19-2429

DATE : Feb. 7. 2017

SEIKO EPSON CORPORATION

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SPECIFICATIONS

1. Application

This document is applicable to the temperature compensated crystal oscillator (TCXO) that is delivered to **Customer** from SEIKO EPSON Corp.

This product is compliant with RoHS Directive.

This Product supplied (and any technical information furnished, if any) by SEIKO EPSON Corporation shall not be used for the development and manufacture of weapon of mass destruction or for other military purposes.

Making available such products and technology to any third party who may use such products or technologies for the said purposes are also prohibited.

This product listed here is designed as components or parts for electronics equipment in general consumer use.

We do not expect that any of these products would be incorporated or otherwise used as a component or part for the equipment, which requires an extra high reliability, such as satellite, rocket and other space systems, and medical equipment, the functional purpose of which is to keep life.

2. Product No. / Model

The product No. of this crystal oscillator unit is **X1G004131004200**.

The model is **TG-5006CJ-47L**.

3. Packing

It is subject to the packing standard of SEIKO EPSON Corp.

4. Amendment and abolishment

Amendment and/or abolishment of this specification are subject to the agreement of both parties.

5. Contents

Item No.	Item	Page
[1]	Characteristics	2
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[5]	Electrical characteristics	3
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[1] Characteristics

- Lead Free Reflowable and ultra small SMD(2.0 × 1.6 × 0.73 mm Typ.).
- Using the heat-resisting type AT cut quartz crystal allows almost the same temperature soldering as universal SMD IC.
- Output waveform : Clipped sine wave.

[2] Absolute maximum ratings

Parameter	Symbol	Value	Unit	Note
Supply voltage	V _{CC} -GND	-0.3 to 4.0	V	
Storage temperature range	T _{stg}	-40 to +90	°C	

[3] Operating range

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Supply voltage	V _{CC}	1.7	1.8	3.3	V	
	GND	0.0	-	0.0	V	
Operating temperature range	T _{use}	-30	+25	+85	°C	
Output load	Load _R	9	10	11	kΩ	
	Load _C	9	10	11	pF	
DC-cut capacitor	C _C	0.01	-	-	μF	

DC-cut capacitor is not included in this TCXO. Please insert DC-cut capacitor in output line.

[4] Frequency characteristics

1) Output frequency 32.000000 MHz

2) Frequency characteristics

(Condition : $V_{CC} = 1.8V, 2.8V, \text{ or } 3.0V, GND = 0.0V, \text{ Load } 10k\Omega//10pF(\text{DC cut}), T_{use} = +25^\circ C$)

Parameter	Symbol	Value			Unit	Note
		Min.		Max.		
Frequency tolerance	f_tol(osc)	-0.5	-	+0.5	$\times 10^{-6}$	$T_{use} = +25^\circ C \pm 2^\circ C$ Before reflow soldering
	f_tol *1	-2.0	-	+2.0	$\times 10^{-6}$	$T_{use} = +25^\circ C \pm 2^\circ C$ Reflow cycle : 2 times *2
Frequency / Temperature characteristics	fo-Tc	-2.0	-	+2.0	$\times 10^{-6}$	$T_{use} = -30^\circ C \text{ to } +85^\circ C$ Based on frequency at $+25^\circ C$
Frequency / Load coefficient	fo-Load	-0.2	-	+0.2	$\times 10^{-6}$	Load : $10 k\Omega // 10 pF \pm 10 \%$ each
Frequency / Voltage coefficient	fo- V_{CC}	-0.2	-	+0.2	$\times 10^{-6}$	$V_{CC1} = 1.8 V \pm 0.1 V$ $V_{CC2} = 2.5 V \pm 10 \%$ $V_{CC3} = 3.0 V \pm 10 \%$
Frequency aging	f_age	-1.0	-	+1.0	$\times 10^{-6}$	First year $T_{use} = +25^\circ C$
		-3.0	-	+3.0		5 years $T_{use} = +25^\circ C$
		-5.0	-	+5.0		10 years $T_{use} = +25^\circ C$

*1 Include initial frequency tolerance and frequency deviation after reflow cycles.

*2 Measurement of frequency deviation is made 24 h after reflow soldering.

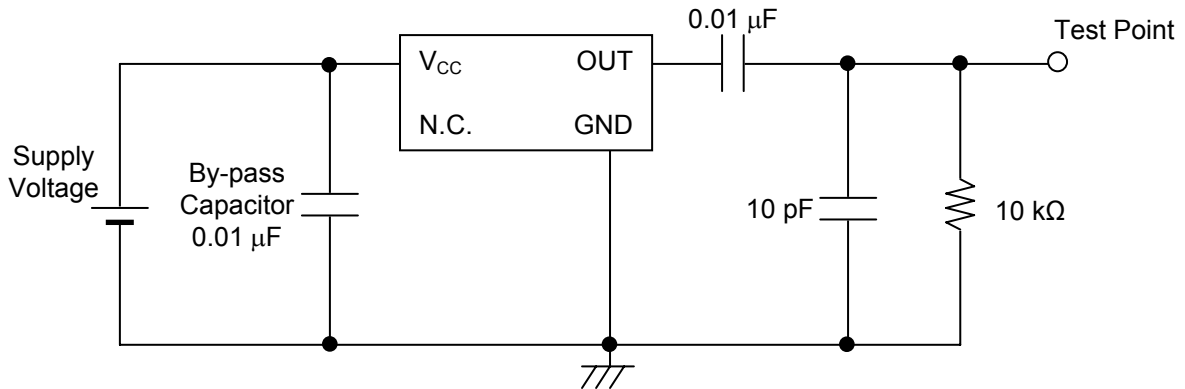
[5] Electrical characteristics

(Condition : $V_{CC} = 1.8V, 2.8V, \text{ or } 3.0V, GND = 0.0V, \text{ Load } 10k\Omega//10pF(\text{DC cut}), T_{use} = +25^\circ C$)

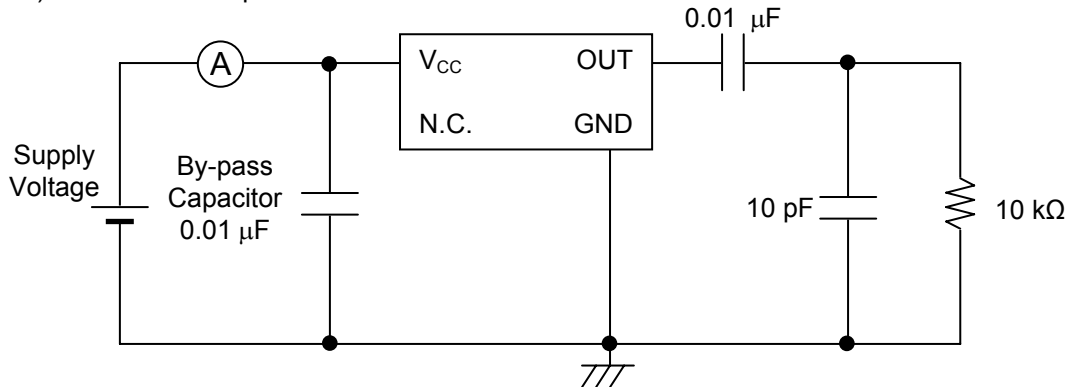
Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Current consumption	I_{CC}	-	-	2.0	mA	
Output level	V_{PP}	0.8	-	1.5	V	Peak to peak voltage Clipped sine wavw
Symmetry	SYM	40	-	60	%	GND Level
Harmonics	-	-	-	-10	dBc	3 rd
		-	-	-15		Other
Start up time	t_str	-	-	2.0	msec	Until output signal has been reached min 90 % of final amp.
		-	-	2.0		Until frequency has been reached within $\pm 1 \times 10^{-6}$ of final frequency.
SSB Phase noise	L(f)	-	-88	-83	dBc /Hz	Offset : 10 Hz
		-	-114	-110		Offset : 100 Hz
		-	-136	-134		Offset : 1 kHz
		-	-149	-146		Offset : 10 kHz
		-	-150	-148		Offset : 100 kHz
		-	-151	-148		Offset : 1 MHz

[6] Test circuit

1) Output Load : 10 k Ω //10 pF



2) Current consumption



3) Conditions

- | | |
|----------------------------|-------------------|
| 1. Oscilloscope: Impedance | Min. 1 M Ω |
| Input capacitance | Max. 10 pF |
| Band width | Min. 300 MHz |

Impossible to measure both frequency and wave form at the same time. (In case of using oscilloscope's amplifier output, possible to measure both at the same time.)

2. CL includes probe capacitance.
3. A capacitor (By-pass: 0.01 μ F) is placed between V_{CC} and GND, and closely to TCXO.
4. Use the current meter whose internal impedance value is small.
5. Power Supply
Impedance of power supply should be as low as possible.
6. GND pin should be connected to low impedance GND.

[7] Environmental and mechanical characteristics

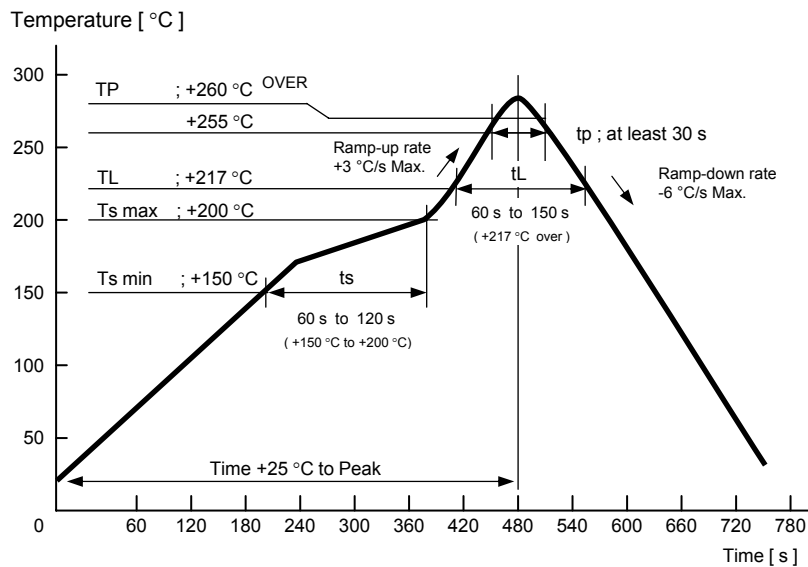
(The company evaluation condition. we evaluate it by the following examination item and examination condition.)

No.	Item	Value *1	Test method
		Freq. Tolerance [1×10^{-6}] *2 Electrical characteristics	
1	High temp. storage *3	± 2.0	+85 °C × 1000 h
2	Low temp. storage *3	± 2.0	-40 °C × 1000 h
3	High temp. with humidity	± 2.0	+85 °C × 85%RH × 1000 h
4	Temp. cycle *3	± 2.0	-40 °C to +85 °C (30 min × 100 cycle/each)
5	Resistance to Soldering heat (Reflow characteristics)	± 1.0	Reflow furnace with the condition 3 times
6	Drop	± 2.0	150g dummy jig (SEIKO EPSON Standard) drop from 1500 mm height on the concrete 6 directions 3 times.
7	Vibration	± 2.0	10 Hz to 55 Hz amplitude 0.75 mm 55 Hz to 500 Hz acceleration 98 m/s^2 10 Hz → 500 Hz → 10 Hz 15 min / cycle 6 h (2 h × 3 directions)
8	Solderability	Terminals must be 95 % covered with fresh solder	Dip termination into solder bath at +235 °C for 5 s (Using Rosin Flux)

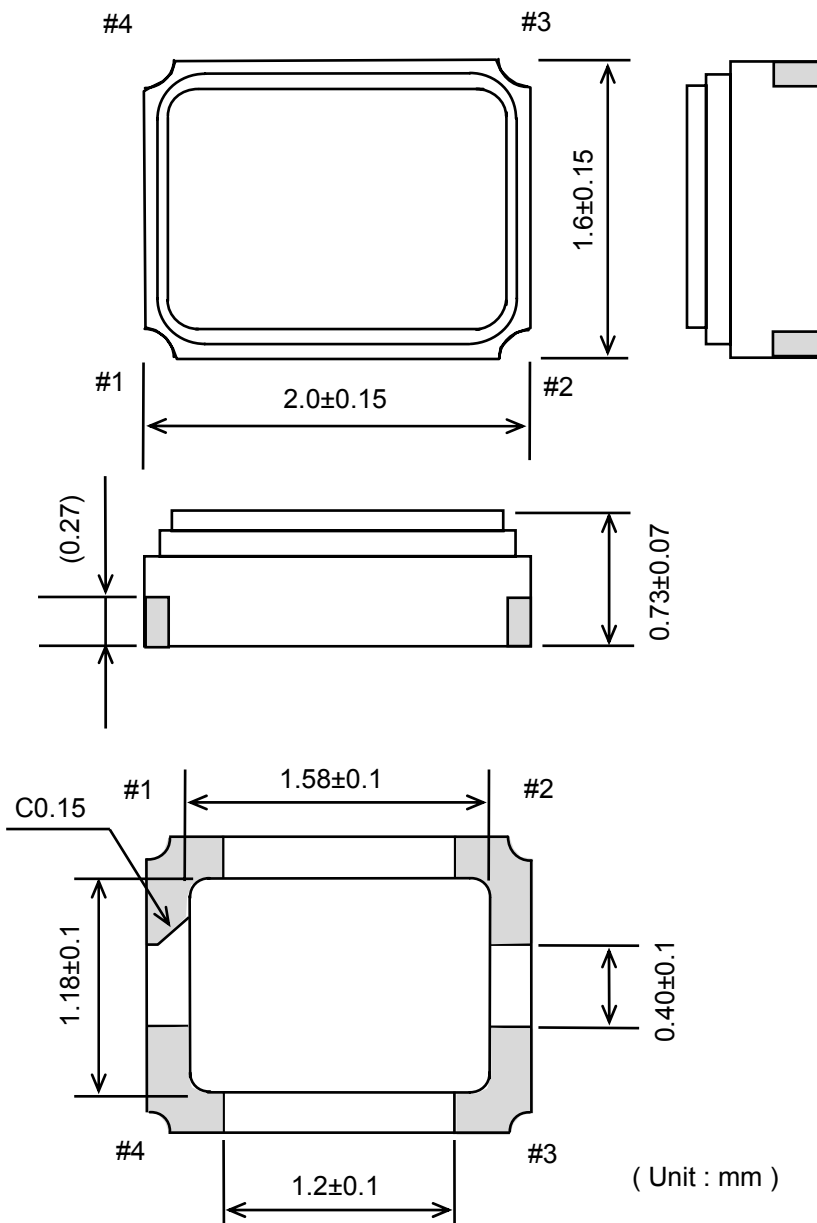
Notes

- 1.*1 each test is independent.
- 2.*2 measuring 2 h to 24 h later leaving in room temperature after each test.
- 3.*3 Initial value shall be measured after 24 h storage at room temperature Pre-treatment
Pre-treatment : Bake (+125°C x 24 h) → Moisture soak (+85°C x 85 % x 168 h) → reflow (3 times)

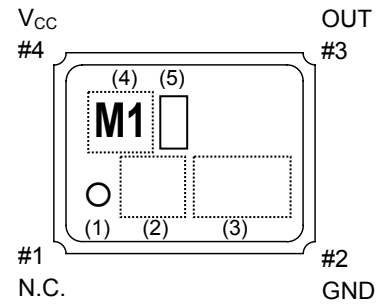
Reflow condition (follow to IPC / JEDEC J-STD-020D.1)



[8] Dimensions and marking layout



Marking



- (1) 1Pin Mark
- (2) Arbitrary marking area (2digits)
- (3) TCXO LOT NO. (3digits)
- (4) TCXO Model ID (M1)
- (5) Image recognition mark

Connection

Pin No.	Terminal
# 1	N.C.
# 2	GND
# 3	OUT
# 4	V _{CC}

Material

Base : Ceramics
Terminal : Au plated nickel

「Do not connect "N.C." leads with any other leads (also mutually)」

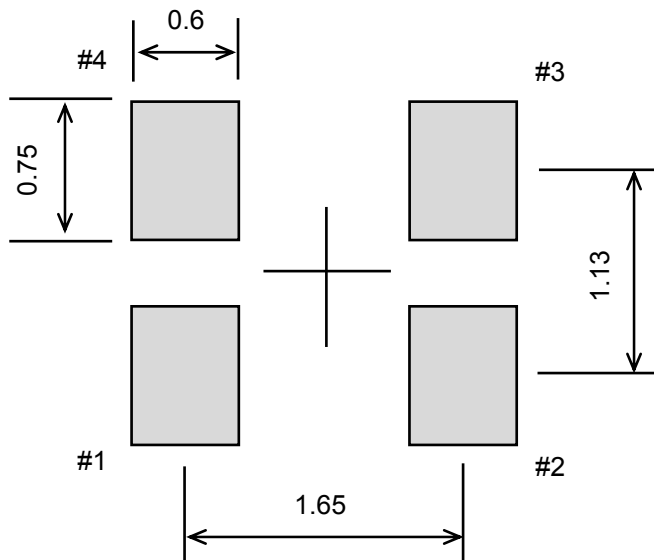
[9] Recommendable patterning

For actual design work, please consider optimum condition together with mounting density, reliability of soldering and mount ability etc.

To maintain stable operation, provide a 0.01uF to 0.1uF by-pass capacitor at a location as near as possible to the power source terminal of the crystal product (between Vcc - GND).

Soldering position

(Unit: mm)



[10] Handling precautions

Prior to using this product, please carefully read the section entitled “Precautions” on our Web site (<http://www5.epsondevice.com/en/quartz/tech/precaution/>) for instructions on how to handle and use the product properly to ensure optimal performance of the product in your equipment. Before using the product under any conditions other than those specified therein, please consult with us to verify and confirm that the performance of the product will not be negatively affected by use under such conditions.

In addition to the foregoing precautions, in order to avoid the deteriorating performance of the product, we strongly recommend that you DO NOT use the product under ANY of the following conditions:

- (1) Mounting the product on a board using water-soluble solder flux and using the product without removing the residue of the flux completely from the board. The residue of such flux that is soluble in water or water-soluble cleaning agent, especially the residues which contains active halogens, will negatively affect the performance and reliability of the product.
- (2) Using the product in any manner that will result in any shock or impact to the product.
- (3) Using the product in places where the product is exposed to water, chemicals, organic solvent, sunlight, dust, corrosive gasses, or other materials.
- (4) Using the product in places where the product is exposed to static electricity or electromagnetic waves.
- (5) Applying ultrasonic cleaning without advance verification and confirmation that the product will not be affected by such a cleaning process, because it may damage the crystal, IC and/or metal line of the product.
- (6) Touching the IC surface with tweezers or other hard materials directly.
- (7) Using the product under any other conditions that may negatively affect the performance and/or reliability of the product.
- (8) Using the product with power line ripple exceeding 50 mV(p-p) level.

Should any customer use the product in any manner contrary to the precautions and/or advice herein, such use shall be done at the customer’s own risk.

TAPING SPECIFICATION

テープ梱包基準書

1. APPLICATION 適用範囲

This document is applicable to 2.0 x 1.6 SMD package.

本基準書は、2.0 x 1.6 セラミックパッケージのテーピング梱包について規定する。

2. CONTENTS 目次

Item No.	Item	Page
[1]	Taping specification テーピング仕様	2 to 3
[2]	Shipping carton 外装箱への収納	4
[3]	Marking 表示	
[4]	Quantity 収納数量	
[5]	Storage environment 保管環境	5
[6]	Handling リール取扱い	

[1] Taping specification テーピング仕様

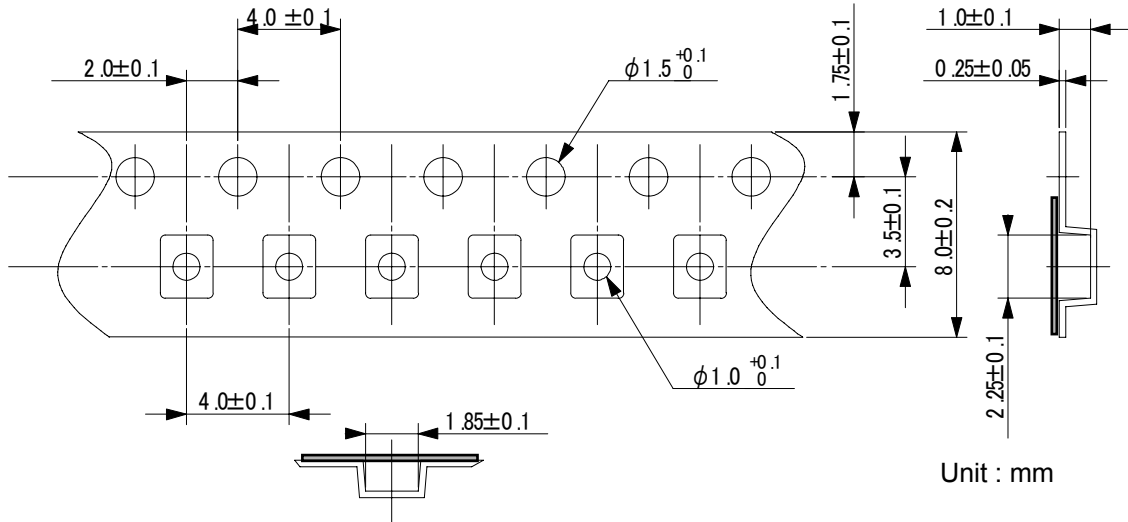
Subject to EIA-481 , IEC 60286 , JIC C0806.

「EIA-481」「IEC 60286」「JIC C0806」に準拠する。

(1) Tape dimensions TE0804L

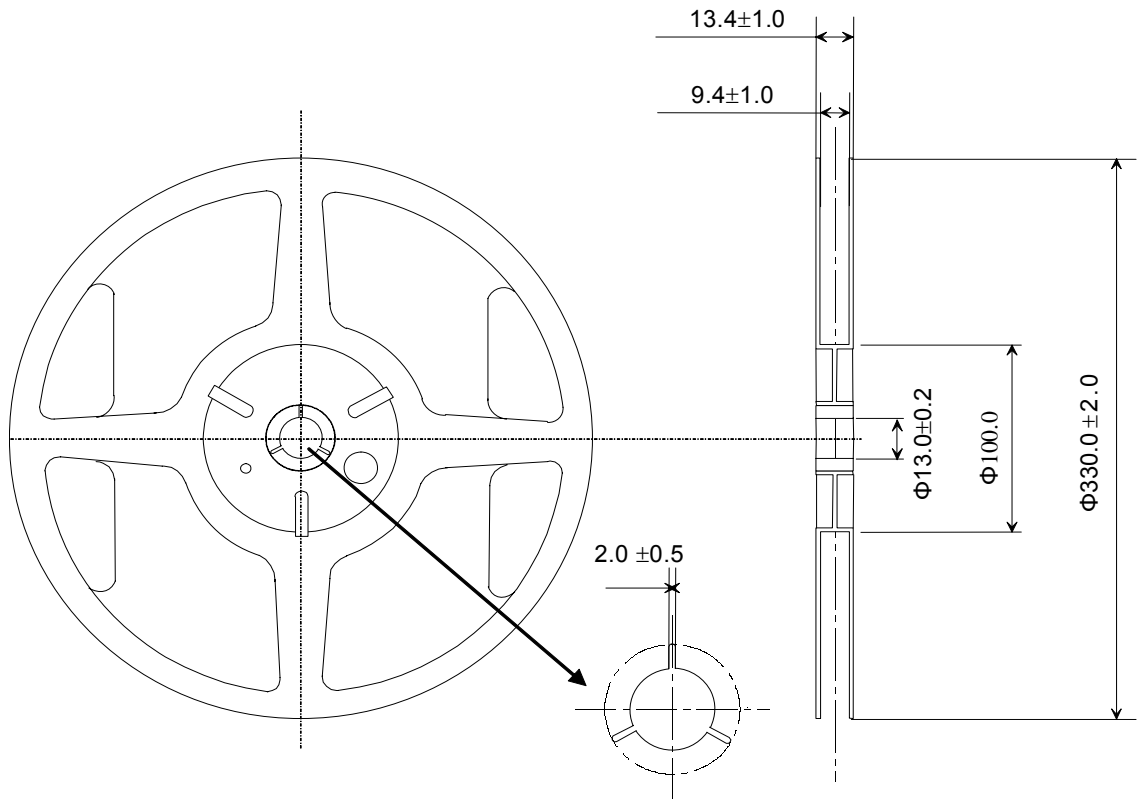
Material of the Carrier Tape キャリアテープ材質: PS (Black / Conductive 黒/導電性)

Material of the Top Tape トップテープ材質 : PET+PE



(2) Reel dimensions

Material of the Reel リール材質: PS (Black / Conductive 黒/導電性)

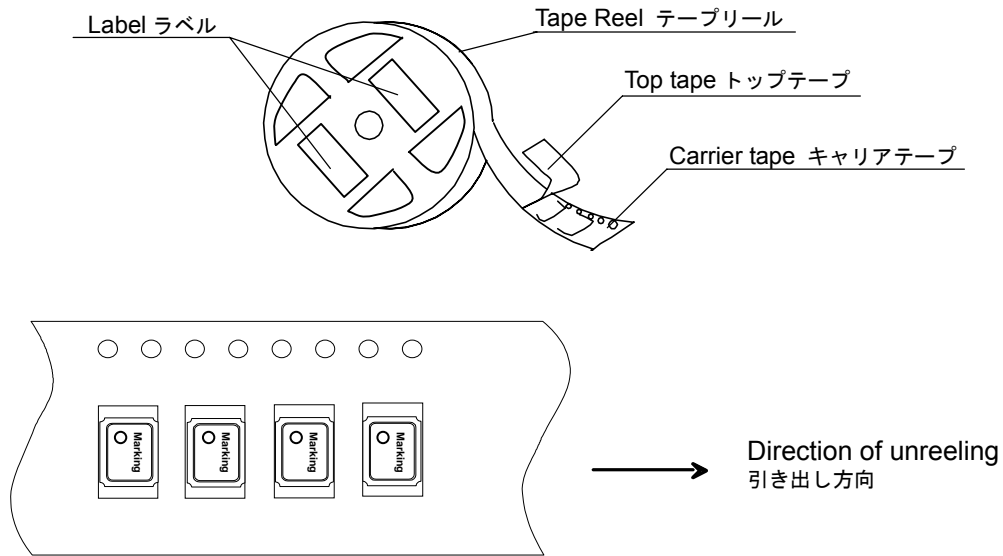


Form and Size of reel window shows are one of the example

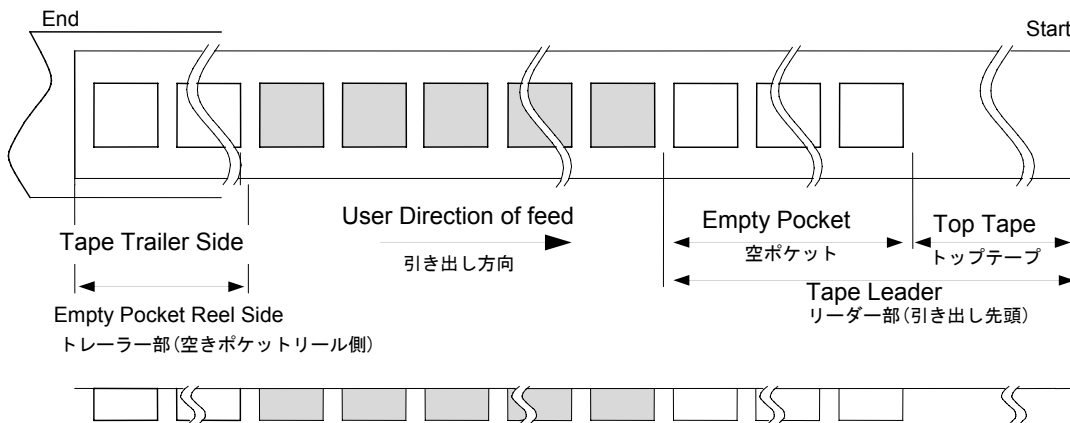
リールの窓の形状は代表例を掲載。

Unit : mm

(3) Packing 収納形態
 (a) Tape & Reel デバイス収納方法



(b) Start & End Point 引き出し先頭側及びリール側の処理



Item 項目		Empty Space 空きスペース	Note 備考
Tape Leader (引き出し先頭側)	Top Tape	Min. 200 mm	Feeding in the Top tape, the tip is fixed with tape. トップテープ単独で繰り出し、先端はテープにより固定。
	Carrier Tape	Min. 150 mm	Winding method is a diagram of the above リールへの巻き取り方法は、上図の通り。
Tape Trailer (リール側)	Top Tape	Min. 0 mm	Tip is fixed to the reel. 先端はリールに固定。
	Carrier Tape	Min. 150 mm	

(4) Peel force of the cover tape トップテープの剥離強度

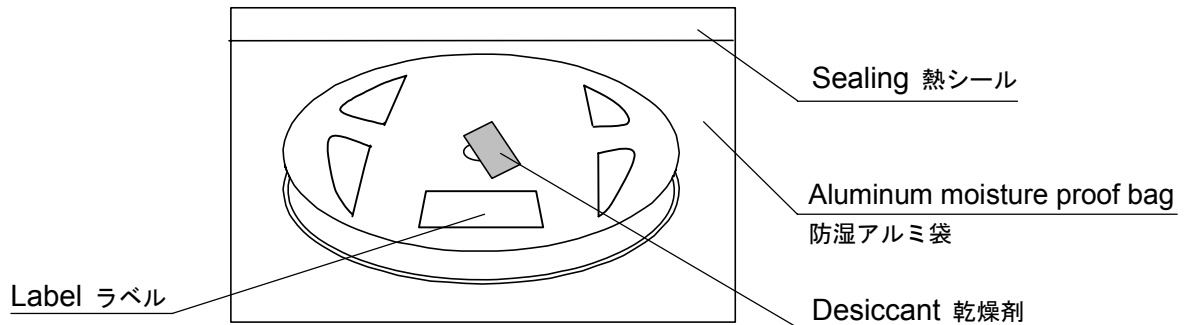
(a) Angle: cover tape during peel off and the direction of unreeling shall be 165° to 180°.
 剥離角度：テープの接着面に対し 165~180 度とする。

(b) Peel speed: 300 mm/min.
 剥離速度：300 mm/min とする。

(c) Peel strength: 0.1 ~ 1.0 N.
 剥離強度：0.1~1.0 N

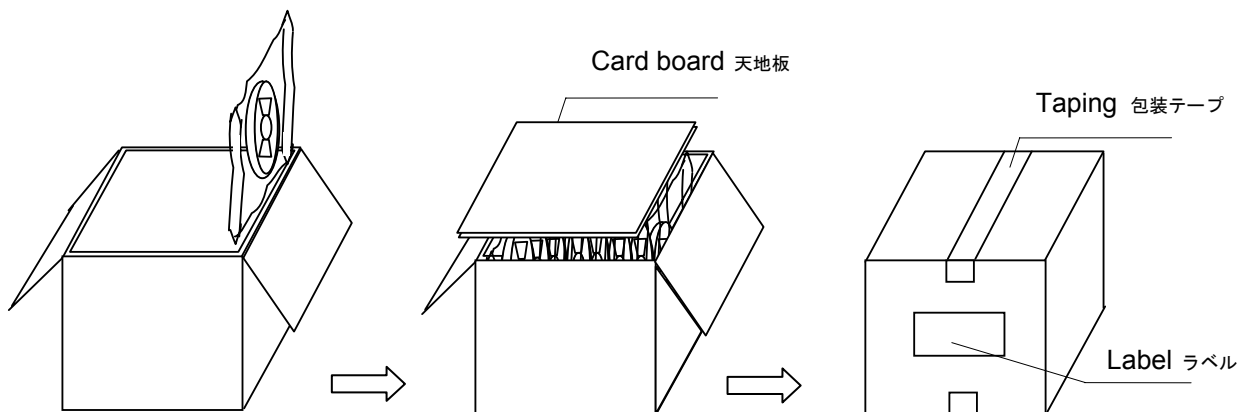
[2] Shipping carton 外装箱への収納

a) Packing to antistatic bag 袋への収納



b) Packing to shipping carton 外装箱への収納

If there is space in the outer box, material is put in a shock absorbing together.
空間ができた時は、クッション材を入れる。



[4] Marking 表示

(1) Reel marking リールへの表示

- Reel marking shall consist of

下記内容をリール表面に表示できるラベルを貼る。:

- 1) Parts name 製品名称
- 2) Quantity 製品数量
- 3) Manufacturing Date or symbol 製品の製造年月又はこれを示す記号
- 4) Manufacturer's Date or symbol 製品の製造業者又はその略号
- 5) Others (if necessary) その他必要事項

(2) Aluminum moisture proof bag marking アルミ防湿袋への表示

- Same as reel marking.

リールへの表示と同一内容

(3) Shipping carton marking 外装箱への表示

- Shipping carton marking shall consist of :

下記内容を外装箱表面に表示できるラベルを貼る。:

- 1) Parts name 製品名称
- 2) Quantity 製品数量

[5] Quantity 収納数量

- 12 000 pcs./reel (Standard)

However it is not the limit, in case that the order quantity does not fill with 12000 pieces.
Packing quantity is defined by 14th and 15th digit of product number.

但し、注文数量が 12 000 pcs に満たない場合は、その限りではない。

収納数量は、製品型番の 14 桁、15 桁による。

14th and 15th digit of product number. 製品型番の 14 桁、15 桁	Quantity
00	12 000 pcs
01	Vinyl Bag(Bulk)
11	Any Quantity
12	250 pcs
14	1 000 pcs
15	2 000 pcs
16	3 000 pcs
17	4 000 pcs

[6] Storage environment 保管環境

- (1) Before open the packing, we recommend to keep less than +30 °C and 60 %RH of Humidity, and to use it less than 6 months after delivery.

開梱前の製品は、温度 +30 °C、湿度 60 %RH 以下での保管をして下さい。

貴社納入後、袋未開封で 6 ヶ月以内の実装を推奨します。

- (2) We recommend to open Package in immediately before use. After open Package, We recommend to keeps less than 6 month. No need dry air before soldering work if it is less than temperature +30 °C, 85 humidity %RH.

使用直前まで開梱せず、袋開封後は 6 ヶ月以内の実装を推奨します。

温度 +30 °C、湿度 85 %RH 以下では、はんだ付け作業前に乾燥不要です。

- (3) Not to storage with some erosive chemicals.

化学薬品類との同居を避ける。

- (4) Nothing is allowed to put on the reel or carton to prevent mechanical damage.

外装箱がゆがまないようまた、外圧がかからないように保管して下さい。

[7] Handling リール取扱い

To handle with care to prevent the damage of tape, reel and products.

リールの取扱いについては、中のテープ・製品を変形させないようにして下さい。

Structure Diagram 構造図

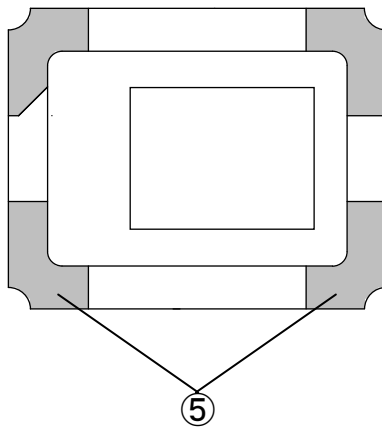
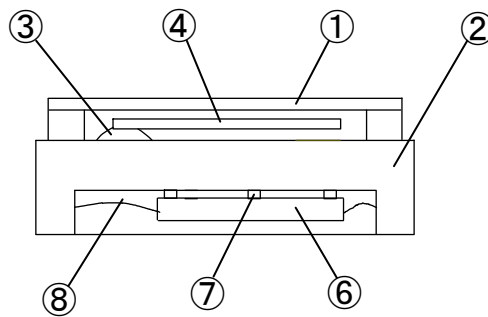
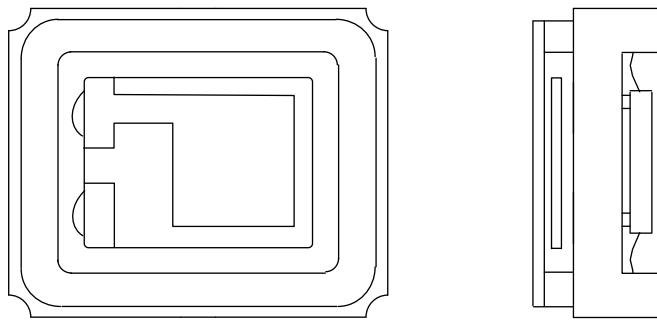
Rev.02

Model
型式

TG-50xxCE / TG-50xxCG / TG-50xxCJ

Document No.
管理No.

TG-50xxCx_D_0001



No.	Name of Part 部品名	No.	Name of Part 部品名
①	Lid リッド	⑤	Terminal 端子
②	Package パッケージ	⑥	IC IC
③	Crystal adhesive 接着材	⑦	FC bump FC バンプ
④	Crystal chip 水晶片	⑧	Underfill アンダーフィル

RELIABILITY TEST DATA

Product Name : TG-50xxCJ series

The Company evaluation condition

We evaluate environmental and mechanical characteristics by the following test condition .

DTA-1509_E

No.	ITEM	TEST CONDITIONS	VALUE *1		TEST	FAIL
			$\Delta f / f$ *2 [1×10^{-6}]	Electrical characteristics	Qty [n]	Qty [n]
1	High temperature storage	+85 °C × 1 000 h	*3 ± 2.0	Satisfy output level after test	22	0
2	Low temperature storage	-40 °C × 1 000 h	*3 ± 2.0		22	0
3	High Temperature with Humidity	+85°C × 85 %RH × 1 000 h	*3 ± 2.0		22	0
4	Temperature cycle	-40 °C ⇔ +85 °C 30 min at each temp. 1000 cycles	*3 ± 2.0		22	0
5	Resistance to soldering heat	Convection reflow soldering furnace (3 times)	± 1.0		22	0
6	Drop	150g dummy jig (SEIKO EPSON Standard) drop from 1500 mm height on the concrete 6 directions 3 times.	± 2.0		22	0
7	Vibration	10 Hz to 55 Hz amplitude 0.75 mm 55 Hz to 500 Hz acceleration 98 m/s ² 10 Hz → 500 Hz → 10 Hz 15 min / cycle 6 h (2 h × 3 directions)	± 2.0		22	0
8	Solderability	Dip termination into solder bath at +235 °C ± 5 °C for 5 s (Using Rosin Flux)	Termination must be covered with fresh solder more than 95 % of dip area.		11	0

Notes

1. *1 Each test done independently.
2. *2 Measuring 2 h to 24 h later leaving in room temperature after each test.
3. *3 Initial value shall be measured after 24 h storage at room temperature Pre-treatment
Pre-treatment : Bake (+125 °C × 24 h) →Moisture soak (+85 °C × 85 % × 168 h) →reflow (3 times)

Product Name : TG-50xxCJ series

df / f

