Approval Specification

for _____

Commodity: Crystal Unit

Model: TSX-3225

Frequency: 26.000 MHz

No.	T N 4 － 2 6 2 4 5 (Rev. 1)

Customer's Received Certificate

Please return this copy as a certification of your approval.

Checked &
Approved by: _____

Date. _____

TOYO COMMUNICATION EQUIPMENT CO., LTD.

DATE: February. 28, 2005

DRAW: T.Inose

APP.: H.Konno

登録 REGIST.		Approval spec.		名称 TITLE	仕番 SPEC. NO.
版	年月日 DATE			CRYSTAL UNIT TSX-3225	TN4-26245
1	2005.2.21	作成部門 SECTION 35410	作成年月日 DATE 2004.2.21		頁 P. 1 / 11

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This document contains specifications which apply to TSX-3225 26.000MHz Crystal Unit.

1. General Specification

No.	Item	Description
1.1	TOYOCOM parts number	TN4-26245
1.2	User's name	Silicon Laboratories.
1.3	User's parts number	
1.4	Operating temperature range	-20°C to +85°C

2. Mechanical Characteristics

No.	Item	Description
2.1	Package	TSX-3225
2.2	Dimensions	3.2±0.15 x 2.5±0.15 x 0.6 max. [mm]
2.3	Marking	Laser marking (1)TOYOCOM's ID / 4 digits (2)TOYOCOM Mark (3)Lot No./ 4 digits
2.4	Leak rate	1 x 10^{-9} Pa·m^3/sec.max.

承認 APP.	照査 CHK'D	照査 CHK'D	作成 DRAW
H.Konno	A.Inoshita	Y.Kawaguchi	T.Inose

改版記事 DESCRIPTION

tNo.04 A4 02.06. 2,000 B

3. Electrical Characteristics

No.	Item	Specifications
3.1	Nominal frequency	26.000000 MHz
3.2	Resonance mode	Fundamental
3.3	Operating temperature range	-20°C to +85°C
3.4	Storage temperature range	-45°C to +90°C
3.5	Frequency tolerance	±10ppm (at +25±2°C)
3.6	Frequency stability	±10 ppm (-20°C to +85°C,Ref. at +25±2°C)
3.7	Equivalent series resistance(R1)	40 ohms max.
3.8	Operating drive level	0.1 mW max.
3.9	Load capacitance	8 pF ※(Toyocom test jig no. S8-11-5)
3.10	Pulling sensitivity	28 ppm/pF typ.(at CL=8pF)
3.11	Aging	±1ppm/year(at +25±2°C)

※Toyocom jig(S8-11-5) was made and adjusted to the chipset,"Aero2+" of Silicon Laboratories.

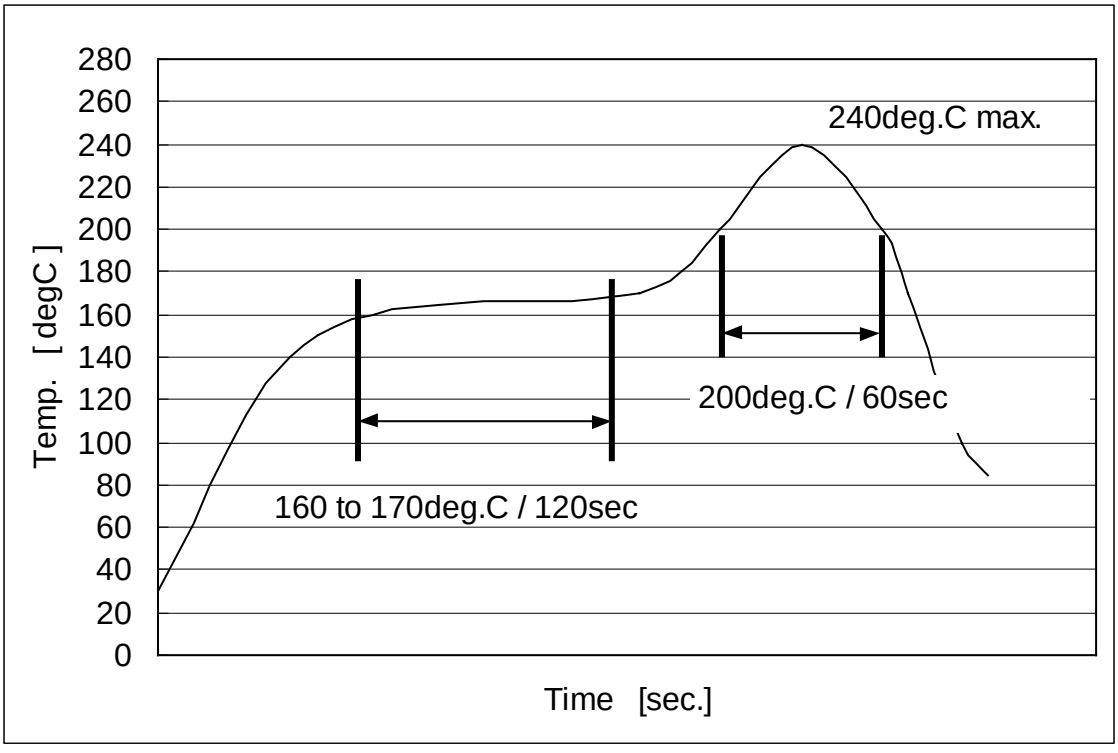
4.Reliability

No.	Item	Conditions	Contents
4.1	Drop test		The components shall remain within the table 1 and mechanical specifications after test.
	method	fallen on the concrete with 100g dummy. (thickness is 3cm or more)	
	height	80 cm	
	direction	each direction of 6 mutually perpendicular (x,y,z) axis.	
	number of shocks	1shocks in each directions	
4.2	Shock	Half-sine waveform Maximum acceleration=1000g Duration=0.6ms 3 shocks / direction=18 shocks 3 direction / module	
4.3	Sinusoidal vibrations	From 5Hz to 9Hz : 3mm peak From 9Hz to 200Hz : 1g 1 Octave/min – 2 per direction	
4.4	Random vibrations	30mn per axis From 5Hz to 200Hz , 0.01g²/Hz From 200Hz to 500Hz , 0.003g²/Hz	
4.5	Thermal shock	low temperature: -40°C for 0.5 h high temperature: +85°C for 0.5 h duration: 1000 cycles	
4.6	Cold-operating conditions	temperature: -20°C±3°C duration: 96 hours	
4.7	Heat-operating conditions	temperature: +70±3°C duration: 96 hours	
4.8	Static humidity	temperature: +60°C±3°C humidity: 90 to 95% duration: 504 hours	

No.	Item	Conditions	Contents
4.9	Resistance to solder heat (Reflow)	pre-heat: 150°C to 180°C, 120 sec. max. top-heat: 220°C, 60 sec. max. peak: 260°C max. time: 2 times *See fig.1	The components shall remain within No. 3.5 and mechanical specifications after test.
4.10	Solderbility	Immerse in soldering bath. temperature: 230°C±5°C time: 5±0.5 sec.	More than 3/4 area of the soldering pad must be covered with new solder.

	Frequency	Equivalent series resistance
Table 1	±2 ppm max.	±15% max.

Fig.1 Temperature profile of reflow soldering



5. Shipment

Crystal units will be shipped in tape and reel.

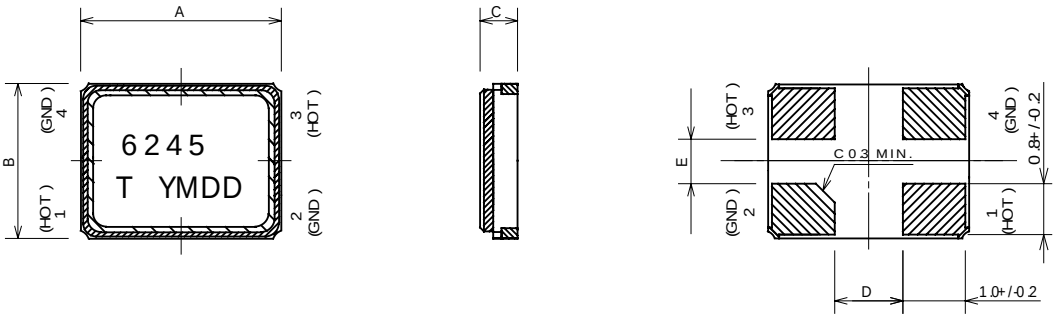
6. Remarks

6.1 Ultrasonic cleaning

Ultrasonic vibration may cause deterioration and destruction of the components.

Please avoid ultrasonic cleaning.

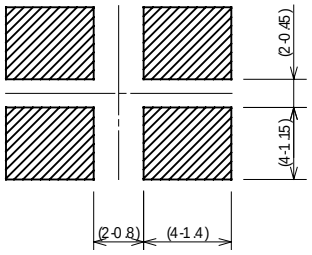
7.Package outlines and Marking(Example)



Size in mm

A	B	C	D	E
3.20	2.50	0.60	1.00	0.70
±0.15	±0.15	max.	±0.20	±0.20

[LAND PATTERN]



Marking

Laser marking

Description

TOYOCOM's ID(4 digits)

TOYOCOM Mark(T)

Lot No.(4 digits)

Y: the last 1 digit of year

M: 1 digit of month(Jan to Sept; 1 to 9, Oct;X, Nov;Y, Dec;Z)

DD: 2 digits of day

Package

Lid; KOVAR, Electrolytic Ni plating

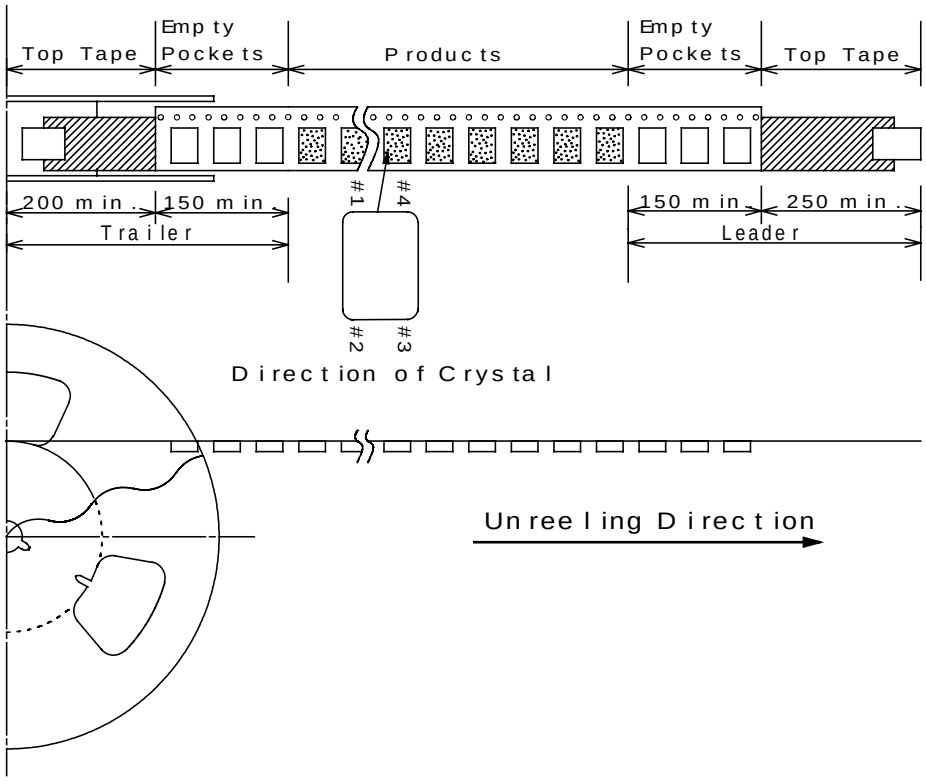
Base; Ceramic, W+Ni+Au plated

Seal; Seam weld, N_2 gas

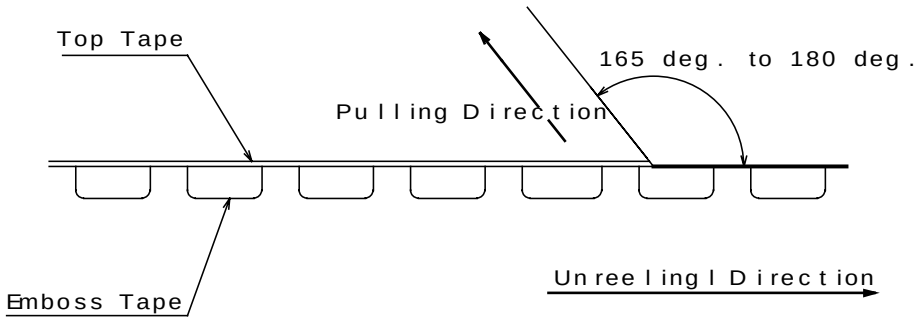
8.Tape and Reel

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Taping

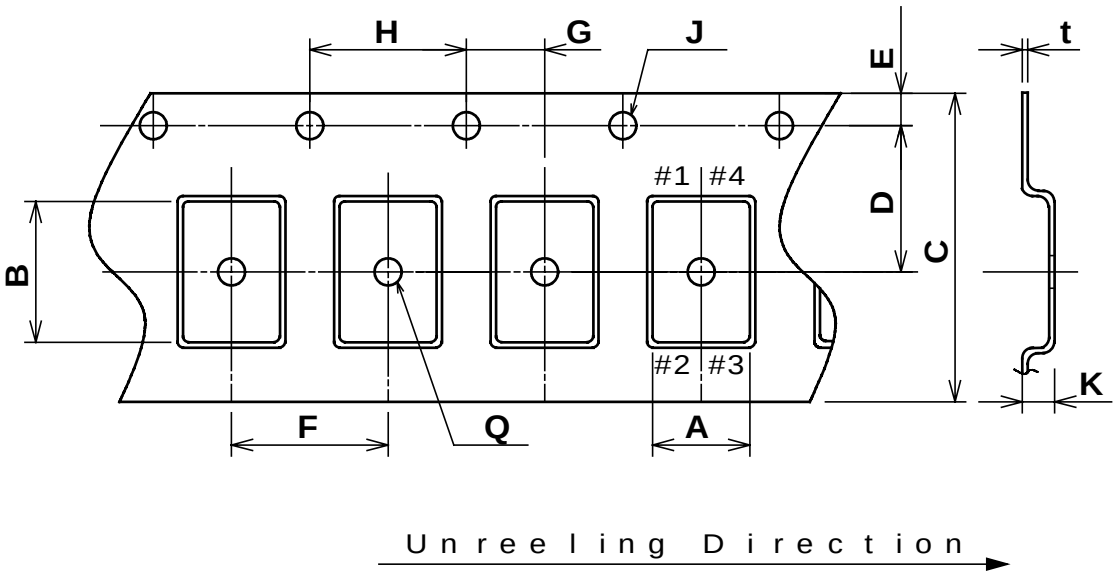


Top Tape Pulling-off Strength



(1)Angle:165 deg. to 185 deg. from unreeling direction
(2)Speed:300 mm/min.
(3)Power:20g to 70g
(4)Others:The top tape shall not be torn while pulled off.

Emboss Tape



A	B	C	D	E	F
2.9±0.1	3.6±0.1	8.0±0.2	3.5±0.1	1.75±0.1	4.0±0.1
G	H	J	K	Q	t
2.0±0.1	4.0±0.1	dia.1.5+0.1/0	1.0±0.1	dia.1.0±0.1	0.25±0.05

Size in mm

Note

1)Cumulative pitch tolerance: ±0.15mm at 10 pitches

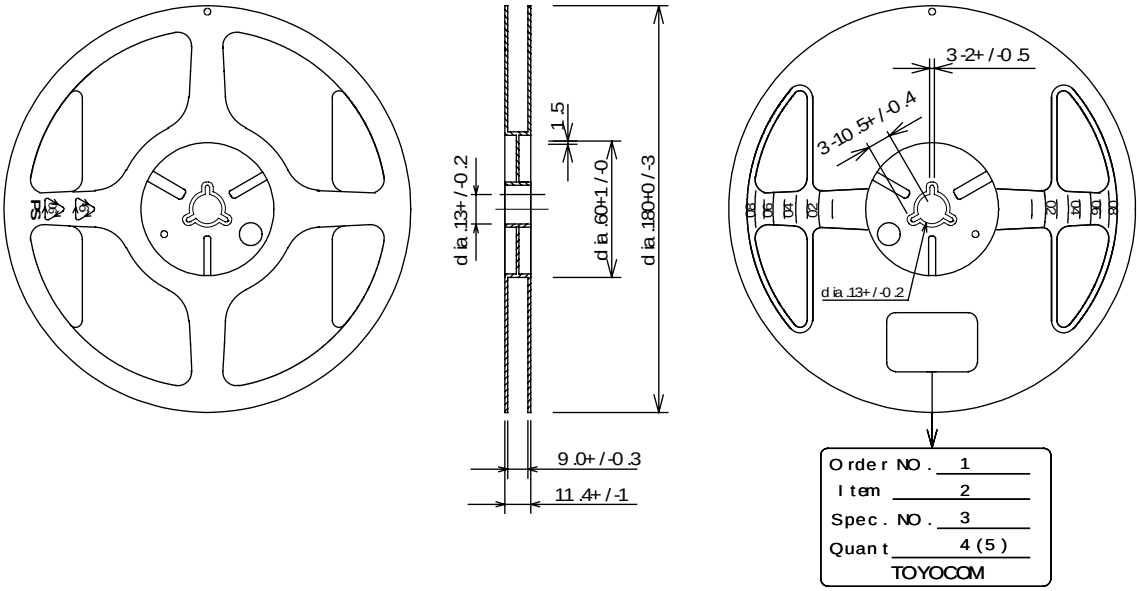
2)Material: PS(Antistatic material)

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Reel



Note

1) Reel is recyclable
2) Material: PS(Antistatic material)
3) Label:1.Order number
:2.Package & Nominal frequency
:3.Specification number
:4.Quantity
:5.Lot number(YMDD)

*The label should be stuck on the reel.

承認 APP.
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作成 DRAW

改版記事 DESCRIPTION

9. Packing

Put one reel(2000pcs max.) into an anti-static bag separately, and in the case of some reels, put them into a poly bag together.

Put the following label(A) on the both bag.

(A)

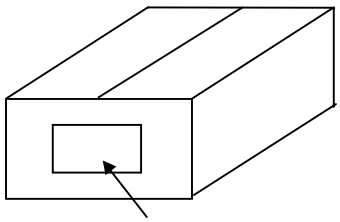
TOYOCOM CRYSTAL	
TYPE	
FREQ	MHZ
QUANTITY	PCS
Product Lot. NO	

MADE IN JAPAN

Put the wrapped reels with cushion into outer cardboard box and seal by gum tape. Carton size varies according to the order quantity and the following are main carton styles. And Crystal Unit quantity is 80000pcs max./Carton.

Carton Style	Size (mm)	Quantity
T-2	L:294 x W:194 x H:171	3 reels max.
KB	L:400 x W:300 x H:170	10 reels max.
T-4W	L:400 x W:300 x H:316	22 reels max.
KD	L:441 x W:339 x H:333	40 reels max.

Put the following label(B) on the face of the cardboard.



(B)

(B)

TOYOCOM	
PURCHASE ORDER. NO	
PART. NO	
FREQUENCY	MHZ
QUANTITY	PCS
O/C. NO	
CARTON. NO	