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CITIZEN FINDEVICE CRYSTAL PRODUCTS

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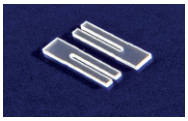
CITIZEN FINDEVICE – CRYSTAL PRODUCTS

CRYSTAL BLANKS

Nominal Frequency	±3.2 [MHz] ~ 155 [MHz] 83rd Overtone)
Cutting angle accuracy	±30 [secounds] ~ ±2 [minutes]
Blanke Size	0.8 x 0.4 ~ 8.0 x 2.5 [mm]
Shape	Convex, Bevel, Mesa and Flat plate type
Finishing of surface	#3000-Etching, #4000-Etching, Polish

MODEL | SIZE [MAX. mm] | FREQ. RANGE [KHZ] | TYPE



CRYSTAL DEVICES – TUNING FORK CRYSTAL UNITS

CFS-145	Ø: 1,5 x H: 5.1	32.768	Cylinder / Through hole
CFS-206	Ø: 2.1 x H: 6.2	32.768	Cylinder / Through hole
CFV-206	Ø: 2.1 x H: 6.2	30 ~ 100	Cylinder / Through hole
CMR200T	Ø: 2.1 x H: 6.2	32.768	Cylinder / Lead formed SMD
CMJ206T	L: 8.6 x W: 2.7 x H: 2.4	32.768	Cylinder / With jacket SMD
CM250C	L: 8.0 x W: 3.8 x H: 2.55	30 ~ 100	Plastic mold / SMD
CM200C	L: 8.0 x W: 3.8 x H: 2.55	32.768	Plastic mold / SMD
CM130	L: 7.0 x W: 1.5 x H: 1.4	32.768	Plastic mold / SMD
CM519	L: 5.05 x W: 1.95 x H: 1.0	32.768	Ceramic package / SMD
CM415	L: 4.2 x W: 1.6 x H: 0.9	32.768	Ceramic package / SMD
CM315D	L: 3.3 x W: 1.6 x H: 0.9	32.768	Ceramic package / SMD
CM315DL	L:3.3 x W: 1.6 x H: 0.9	32.768	Low ESR Ver. of CM315D (50 kΩ Max.)
CM315E	L: 3.3 x W: 1.6 x H: 0.9	32.768	3 pads / Li cover connected to GND
CM2012H	L: 2.15 x W: 1.3 x H: 0.6	32.768	Ceramic package / SMD
CM1610H	L: 1.7 x W: 1.1 x H: 0.5	32.768	Ceramic package / SMD

PART NUMBER SYSTEM EXAMPLE

Model	Frequency in Hz							
CM315D	32768	D	Z	F	T	-	□	□	□

Freq. Tolerance

A	± 30 ppm
D	± 20 ppm
E	± 10 ppm
H	± 5 ppm

Freq. Tolerance over Temp (Range)

Z	Only Standard Spec.

Load Capacitance

B	6.0 pF
C	9.0 pF
F	12.5 pF

T & R or BULK

T	Taped & Reel
B	BULK

Ref. code for internal use

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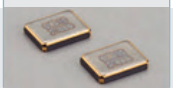
CITIZEN FINDEVICE – CRYSTAL PRODUCTS

MODEL | SIZE [MAX. mm] | FREQ. RANGE [MHz] | TYPE

AT-CUT CRYSTAL UNITS

HC-49/U-S		L: 11.5 x W: 4.66 x H: 3.5	3.5 ~ 50.0	Metal can / Through hole
HCM49		L: 12.8 x W: 4.9 x H: 4.3	3.5 ~ 50.0	Metal can / SMD
CM309E	**End of Life**	L: 11.7 x W: 4.8 x H: 3.7	4.0 ~ 60.0	Plastic mold / SMD
CS325S		L: 3.3 x W: 2.6 x H: 0.7	12.0 ~ 54.0	Ceramic package / SMD

PART NUMBER SYSTEM EXAMPLE

Model	Frequency in Hz							Freq. Tolerance
HCM49	20000000	A	B	J	T	-	□□□	A: ± 30 ppm D: ± 50 ppm

Freq. Tolerance over Temp (Range)

A	± 30 ppm (-10 to 60°C)
B	± 30 ppm (-10 to 60°C)

Load Capacitance

A	Series
I	16.0 pF
J	18.0 pF
K	20.0 pF

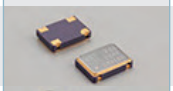
T & R or BULK

T	Taped & Reel
B	BULK

Ref. code for internal use

MODEL | SIZE [MAX. mm] | FREQ. RANGE [MHz] | TYPE

CRYSTAL OSCILLATOR UNITS

SSX-750P	**End of Life**	L: 7.2 x W: 5.2 x H: 1.6	1.0 ~ 125.0	Ceramic package / SMD
CSX-750F		L: 7.2 x W: 5.2 x H: 1.6	1.0 ~ 125.0	Ceramic package / SMD Low voltage Version
CSX-252F		L: 2.6 x W: 2.1 x H: 0.9	0.032768 ~ 60.0	Ceramic package / SMD Programmable

PART NUMBER SYSTEM EXAMPLE

Model	Refer to the individual data sheet						
CSX-750F	C	C	20000000	T	-	□□□	

Frequency Stability (Range)

B	±50ppm (-20 ~ + 70°C)
C	±50ppm (-20 ~ + 70°C)
E	±50ppm (-40 ~ + 85°C)
*P	±50ppm (-40 ~ + 85°C)

*Only CSX-252F

Frequency in Hz

T & R or BULK

T	Taped & Reel Only Tape & Reel

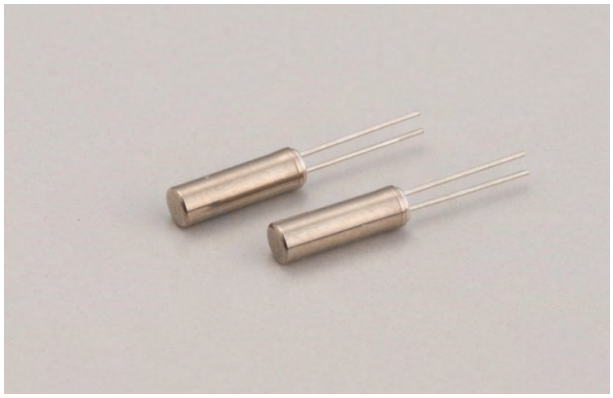
Ref. code for internal use

CITIZEN

TUNING FORK CRYSTAL UNIT (Cylinder Type)

RoHS compliant / Pb free

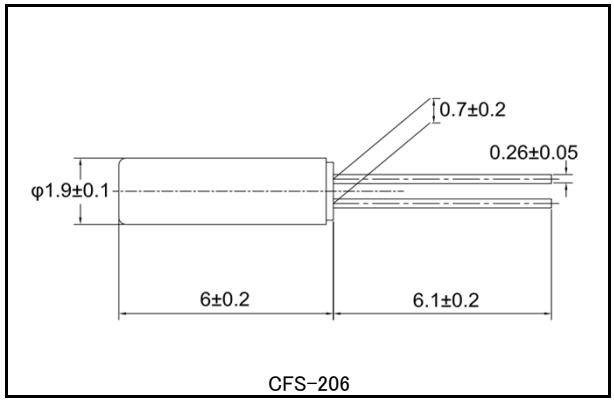
CFS-206・CFS-145



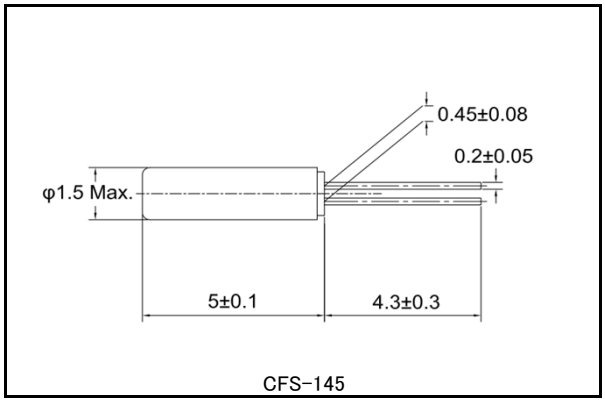
■ FEATURES

- Frequency range : 32.768kHz
- External dimensions (mm)
  CFS-206 Φ : 2.0 x L : 6.2
  CFS-145 Φ : 1.5 x L : 5.1
- Applications
  Watch / Clock / Security devices / Consumer products

■ DIMENSION [mm]



CFS-206



CFS-145

■ STANDARD SPECIFICATIONS

Item / Model		CFS-206	CFS-145	Conditions
Nominal Frequency	f_0	32.768kHz		
Frequency Tolerance	$\Delta f/f_0$	±5ppm / ±10ppm / ±20ppm		at 25℃
Load capacitance	C_L	6.0pF / 7.0pF / 8.0pF / 12.5pF		Please specify your requirement
Operating Temperature Range	T_{OPR}	-20℃ ～ +70℃		
Storage Temperature Range	T_{STR}	-40℃ ～ +85℃		
Turnover Temperature	T_M	25℃±5℃		
Temperature Coefficient	β	-0.034±0.006ppm/℃^{2}		
Motional (series) resistance	R_1	35KΩ Max.	40KΩ Max.	at 25℃
Level of drive	D_L	1μW Max.		
Aging (first year)	$\Delta f/f_0$	±3ppm Max.		25℃±3℃
Shunt capacitance	C_0	1.2pF Typ.	1.0pF Typ.	

■ PART NUMBERING SYSTEM

CFS-206 / CFS-145 32768 D Z F B - □□□

Frequency
Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)	
D	±20ppm (STD)
E	±10ppm
H	±5ppm

Frequency Tolerance over Operating Temp. Range	
Z	Standard Spec.

Load capacitance (CL)	
B	6.0pF
F	12.5pF (STD)
V	8.0pF
Y	7.0pF

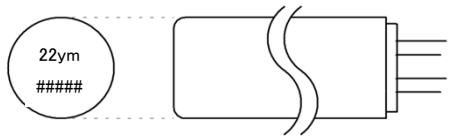
Package specification	
B	Only Bulk

CITIZEN management code
Ref. Code for internal use.

*Please contact us for specifications available.

■ Part Marking [standard]

CFS-206



22 : Manufacture's ID Code

y : The last digit of production year

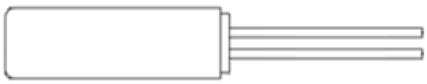
m : Production month (See Table.1)

: Production Lot No.

Table.1

Month	Jan	Feb	···	Sep	Oct	Nov	Dec
Code	1	2	···	9	X	Y	Z

CFS-145



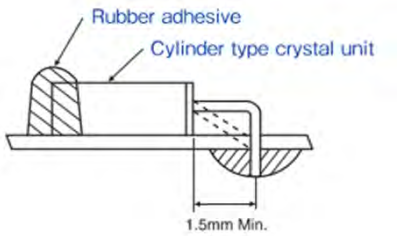
No marking

■ Handling Notes

Mounting

Soldering the body of cylinder type crystal unit must be strictly avoided as it may cause significant deterioration in characteristics of the product.

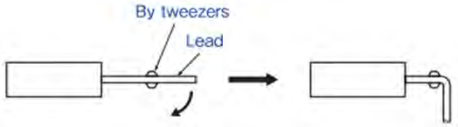
Rubber adhesive is recommended for mounting.



Bending Lead

Hold the body of crystal unit by hand, and the part to be bent with tweezers leaving more than 1.5mm of lead from the body case. (3.0mm is recommended)

Bend the lead 90° holding with the tweezers. Pulling the lead strongly may crack the hermetic seal glass at the root of the lead and may cause the airtightness and the characteristics to deteriorate.



CITIZEN

TUNING FORK CRYSTAL UNIT (Cylinder Type)

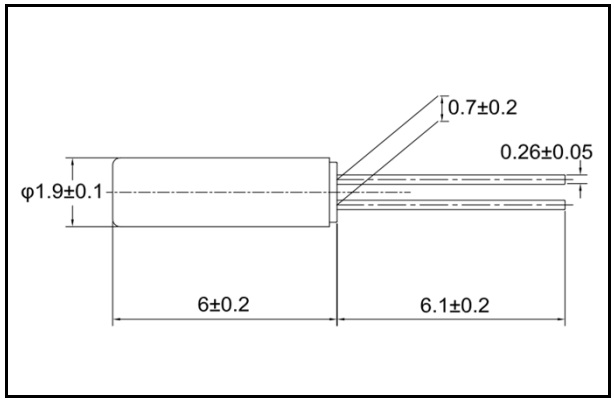
RoHS compliant / Pb free

CFV-206

■ FEATURES

- Frequency range : 30 ～ 100kHz
- External dimensions (mm)
  Φ : 2.0 x L : 6.2
- Applications
  Radio-controlled clock /
  Communication devices

■ DIMENSION [mm]



■ STANDARD SPECIFICATIONS

Item / Model		CFV-206	Conditions
Nominal Frequency	f_0	30kHz ～ 100kHz	Please contact us for frequencies available
Frequency Tolerance	$\Delta f/f_0$	±20ppm / ±30ppm	at 25℃
Load capacitance	C_L	12.5pF	
Operating Temperature Range	T_{OPR}	-20℃ ～ +70℃	
Storage Temperature Range	T_{STR}	-40℃ ～ +85℃	
Turnover Temperature	T_M	25℃±5℃	
Temperature Coefficient	β	-0.034±0.006ppm/℃^{2}	
Motional (series) resistance	R_1	50KΩ Max.	at 25℃
Level of drive	D_L	1μW Max.	
Aging (first year)	$\Delta f/f_0$	±5ppm Max.	25℃±3℃
Shunt capacitance	C_0	0.8pF ～ 1.7pF Typ.	Depend on frequency

■ PART NUMBERING SYSTEM

CFV-206 60000 A Z F B - □□□

Frequency
Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)	
A	±30ppm (STD)
D	±20ppm

Frequency Tolerance over Operating Temp. Range	
Z	Standard Spec.

Load capacitance (CL)	
F	12.5pF (STD)

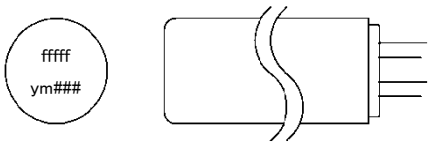
Package specification	
B	Only Bulk

CITIZEN management code
Ref. Code for internal use.

*Please contact us for specifications available.

■ Part Marking [standard]

CFV-206



f : Frequency in Hz unit

y : The last digit of production year

m : Production month (See Table.1)

: Production Lot No.

Table.1

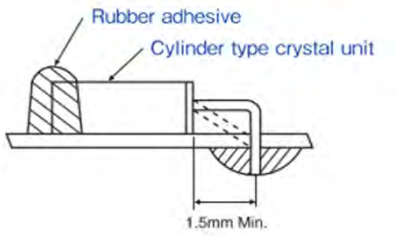
Month	Jan	Feb	⋯	Sep	Oct	Nov	Dec
Code	1	2	⋯	9	X	Y	Z

■ Handling Notes

Mounting

Soldering the body of cylinder type crystal unit must be strictly avoided as it may cause significant deterioration in characteristics of the product.

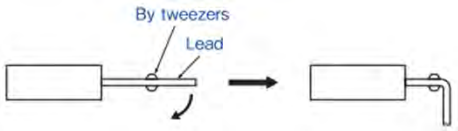
Rubber adhesive is recommended for mounting.



Bending Lead

Hold the body of crystal unit by hand, and the part to be bent with tweezers leaving more than 1.5mm of lead from the body case. (3.0mm is recommended)

Bend the lead 90° holding with the tweezers. Pulling the lead strongly may crack the hermetic seal glass at the root of the lead and may cause the airtightness and the characteristics to deteriorate.



CITIZEN

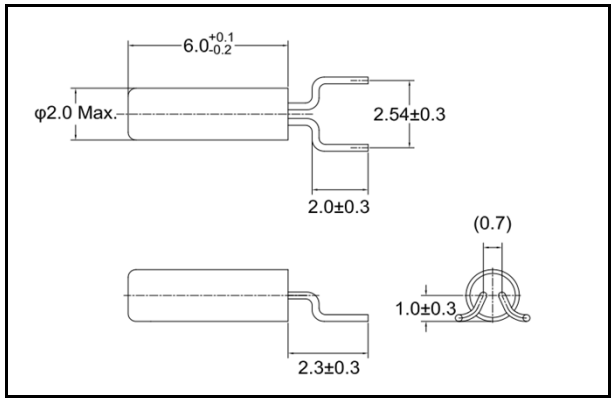
TUNING FORK CRYSTAL UNIT (SMD · Cylinder Type)

RoHS compliant / Pb free | **CMR200T** | **2,000pcs/reel**

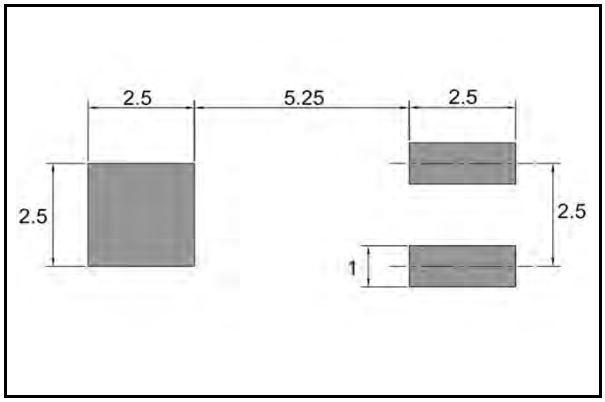
■ FEATURES

- Reflowable cylinder type
- Frequency range : 32.768kHz
- External dimensions (mm)
  Φ : 2.0 x L : 6.1
- Applications
  Smart Meters / Consumer products

■ DIMENSION [mm]



■ SOLDER PAD LAYOUT [mm]



■ STANDARD SPECIFICATIONS

Item / Model		CMR200T	Conditions
Nominal Frequency	f_0	32.768kHz	
Frequency Tolerance	$\Delta f/f_0$	±10ppm / ±20ppm	at 25℃
Load capacitance	C_L	6.0pF / 7.0pF / 12.5pF	Please specify your requirement
Operating Temperature Range	T_{OPR}	−40℃ ～ +85℃	
Storage Temperature Range	T_{STR}	−55℃ ～ +125℃	
Turnover Temperature	T_M	25℃±5℃	
Temperature Coefficient	β	−0.034±0.006ppm/℃^{2}	
Motional (series) resistance	R_1	50KΩ Max.	at 25℃
Level of drive	D_L	1μW Max.	
Aging (first year)	$\Delta f/f_0$	±3ppm Max.	25℃±3℃
Shunt capacitance	C_0	1.35pF Typ.	

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■ PART NUMBERING SYSTEM

CMR200T 32768 D Z F T - □□□

Frequency
Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)

D	±20ppm (STD)
E	±10ppm

Frequency Tolerance over Operating Temp. Range

Z	Standard Spec.

Load capacitance (CL)

B	6.0pF
F	12.5pF (STD)
Y	7.0pF

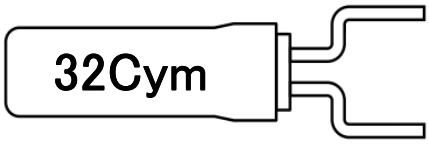
Package specification

T	Only Tape & Reel

CITIZEN management code
Ref. Code for internal use.

*Please contact us for specifications available.

■ Part Marking [standard]



32C : Manufacture's ID Code

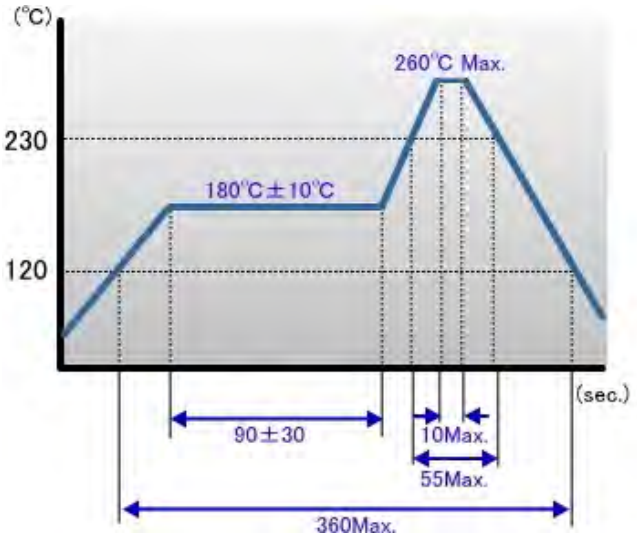
y : The last digit of production year

m : Production month (See Table.1)

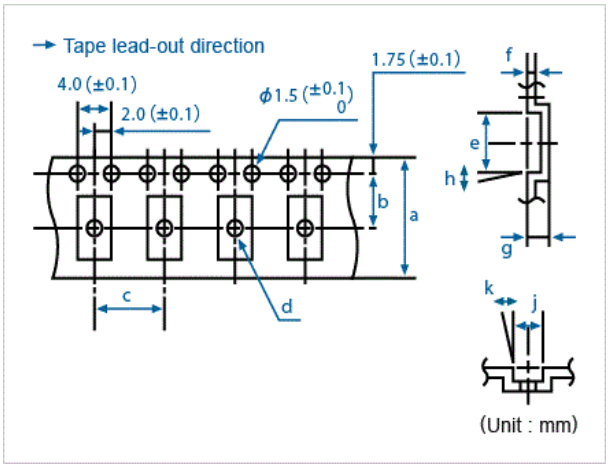
Table.1

Month	Jan	Feb	···	Sep	Oct	Nov	Dec
Code	1	2	···	9	X	Y	Z

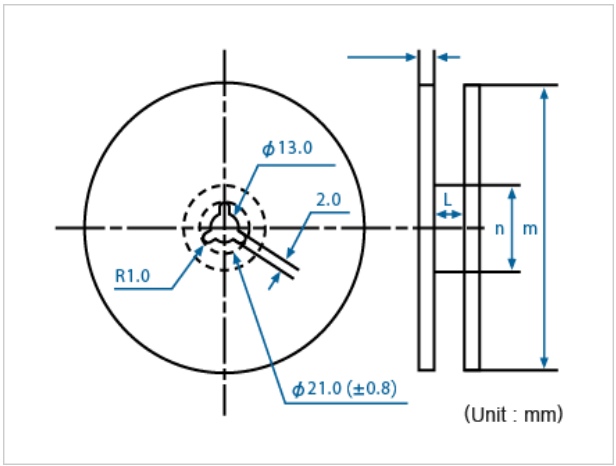
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

Q'ty/reel	a	b	c	d (ϕ)	e	f	g	h	j	k	l	m (ϕ)	n (ϕ)
2,000	16.0	7.5	8.0	–	9.4	0.3	2.15	–	5.0	–	17.5	330	100

Rev.1

CITIZEN

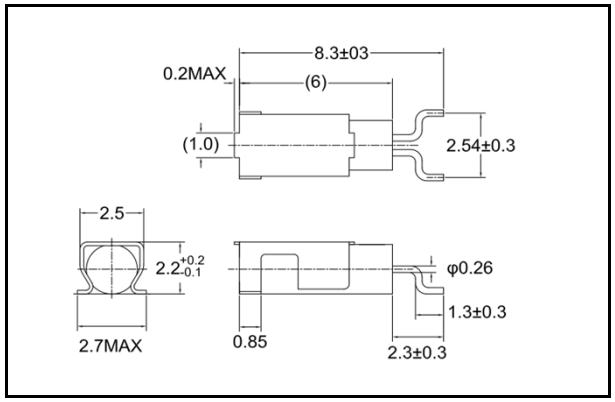
TUNING FORK CRYSTAL UNIT (SMD · Jacket Type)

RoHS compliant / Pb free | **CMJ206T** | **3,000pcs/reel**

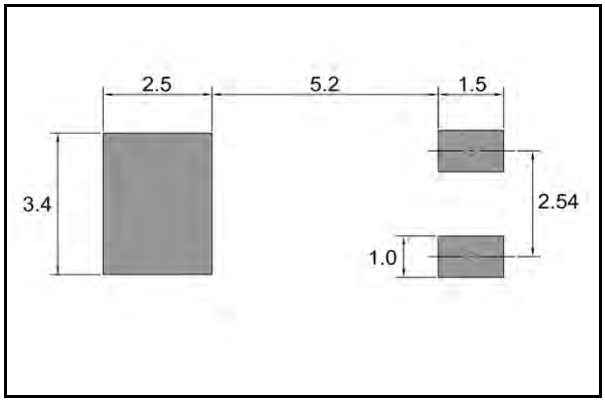
■ FEATURES

- Reflowable cylinder type
- Frequency range : 32.768kHz
- External dimensions (mm)
  L : 8.6 x W : 2.7 x H : 2.4
- Applications
  Smart Meters / Consumer products

■ DIMENSION [mm]



■ SOLDER PAD LAYOUT [mm]



■ STANDARD SPECIFICATIONS

Item / Model		CMJ206T	Conditions
Nominal Frequency	f_0	32.768kHz	
Frequency Tolerance	$\Delta f/f_0$	±10ppm / ±20ppm	at 25℃
Load capacitance	C_L	6.0pF / 12.5pF	Please specify your requirement
Operating Temperature Range	T_{OPR}	−40℃ ～ +85℃	
Storage Temperature Range	T_{STR}	−55℃ ～ +125℃	
Turnover Temperature	T_M	25℃±5℃	
Temperature Coefficient	β	−0.034±0.006ppm/℃^{2}	
Motional (series) resistance	R_1	50KΩ Max.	at 25℃
Level of drive	D_L	1μW Max.	
Aging (first year)	$\Delta f/f_0$	±3ppm Max.	25℃±3℃
Shunt capacitance	C_0	1.35pF Typ.	

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■ PART NUMBERING SYSTEM

CMJ206T 32768 D Z F T - □□□

Frequency
Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)

D	±20ppm (STD)
E	±10ppm

Frequency Tolerance over Operating Temp. Range

Z	Standard Spec.

Load capacitance (CL)

B	6.0pF
F	12.5pF (STD)

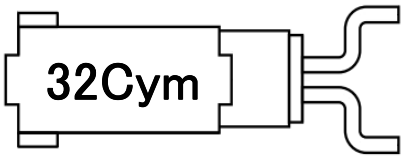
Package specification

T	Only Tape & Reel

CITIZEN management code
Ref. Code for internal use.

*Please contact us for specifications available.

■ Part Marking [standard]



32C : Manufacture's ID Code

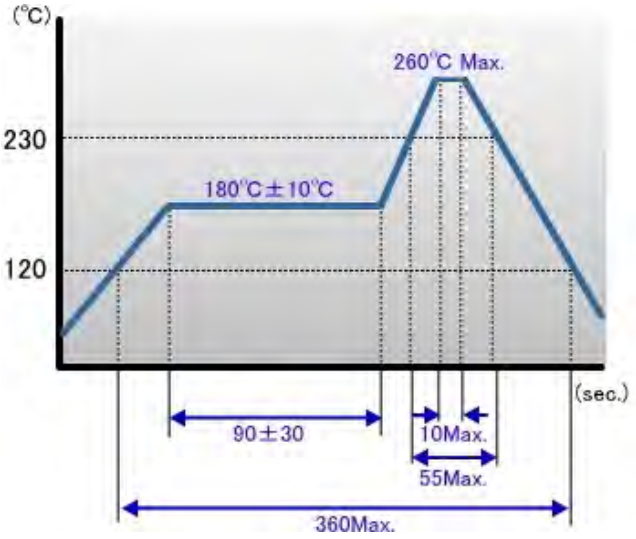
y : The last digit of production year

m : Production month (See Table.1)

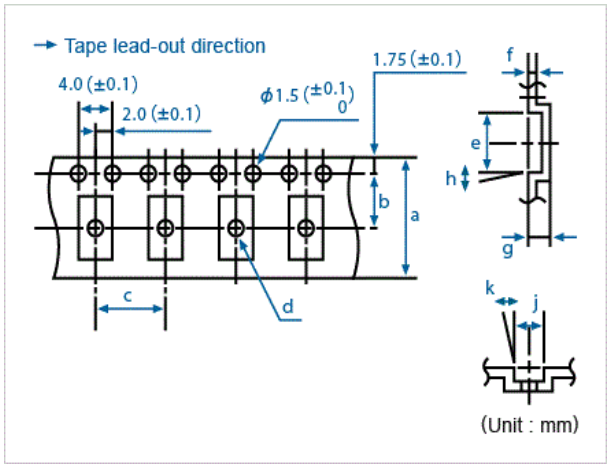
Table.1

Month	Jan	Feb	···	Sep	Oct	Nov	Dec
Code	1	2	···	9	X	Y	Z

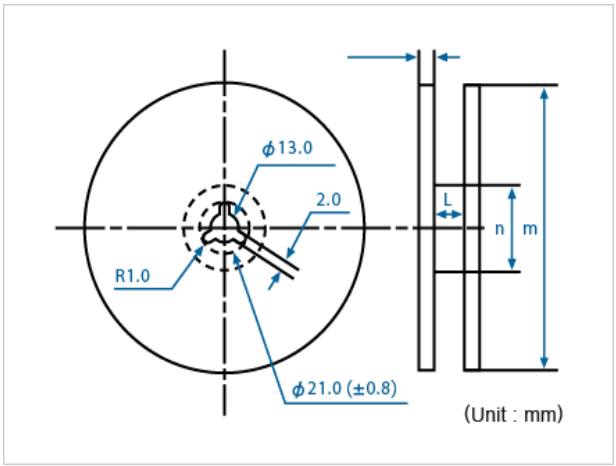
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

Q'ty/reel	a	b	c	d (ϕ)	e	f	g	h	j	k	l	m (ϕ)	n (ϕ)
3,000	16.0	9.2	8.0	–	9.5	0.3	2.1	–	3.0	5°	17.5	330	100

Rev.1

CITIZEN

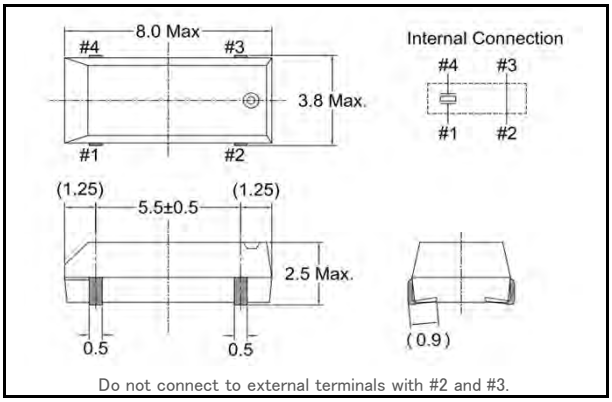
TUNING FORK CRYSTAL UNIT (SMD · Plastic Package)

RoHS compliant | **CM200C** | **3,000pcs/reel**

■ FEATURES

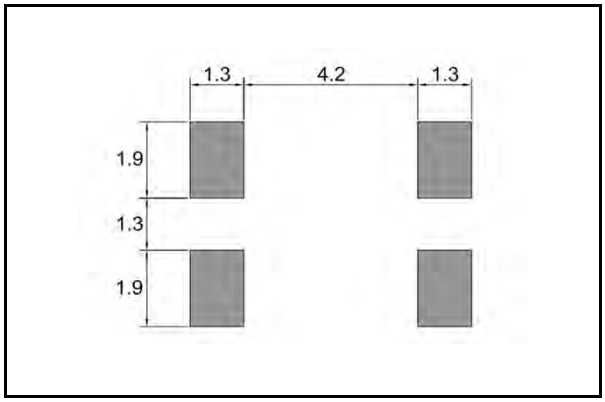
- Frequency range : 32.768kHz
- External dimensions (mm)
  L : 8.0 x W : 3.8 x H : 2.55
- Applications
  Smart Meters / Consumer products

■ DIMENSION [mm]



Do not connect to external terminals with #2 and #3.

■ SOLDER PAD LAYOUT [mm]



■ STANDARD SPECIFICATIONS

Item \ Model		CM200C	Conditions
Nominal Frequency	f_0	32.768kHz	
Frequency Tolerance	$\Delta f/f_0$	±5ppm / ±10ppm / ±20ppm	at 25℃
Load capacitance	C_L	6.0pF / 7.0pF / 9.0pF / 12.5pF	Please specify your requirement
Operating Temperature Range	T_{OPR}	−40℃ ～ +85℃	
Storage Temperature Range	T_{STR}	−55℃ ～ +125℃	
Turnover Temperature	T_M	25℃±5℃	
Temperature Coefficient	β	−0.034±0.006ppm/℃^{2}	
Motional (series) resistance	R_1	50KΩ Max.	at 25℃
Level of drive	D_L	1μW Max.	
Aging (first year)	$\Delta f/f_0$	±3ppm Max.	25℃±3℃
Shunt capacitance	C_0	1.35pF Typ.	

CITIZEN

■ PART NUMBERING SYSTEM

CM200C 32768 D Z F T - □□□

Frequency

Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)

D	±20ppm (STD)
E	±10ppm
H	±5ppm

Frequency Tolerance over Operating Temp. Range

Z	Standard Spec.

Load capacitance (CL)

B	6.0pF
C	9.0pF (STD)
F	12.5pF (STD)
Y	7.0pF

Package specification

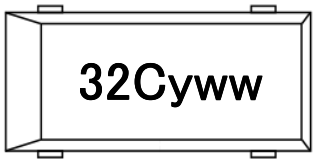
T	Only Tape & Reel

CITIZEN management code

Ref. Code for internal use.

*Please contact us for specifications available.

■ Part Marking [standard]

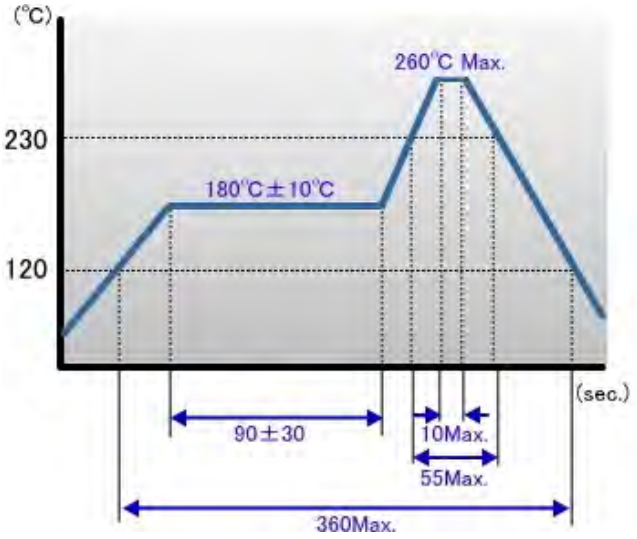


32C : Manufacture's ID Code

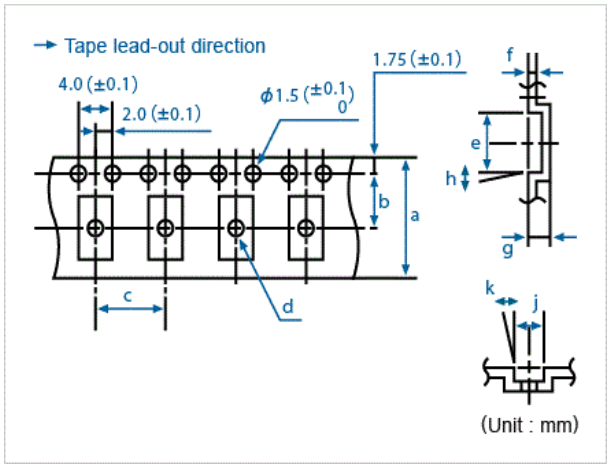
y : The last digit of production year

w : Production week code

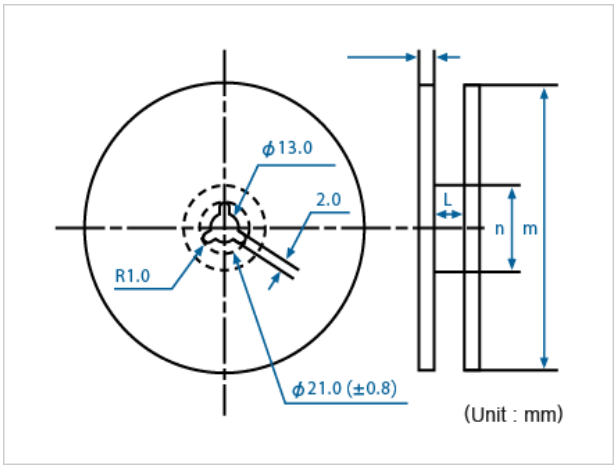
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

Q'ty/reel	a	b	c	d (ϕ)	e	f	g	h	j	k	l	m (ϕ)	n (ϕ)
3,000	16.0	7.5	8.0	1.6	8.3	0.3	2.70	5°	4.05	5°	17.5	330	100

Rev.1

CITIZEN

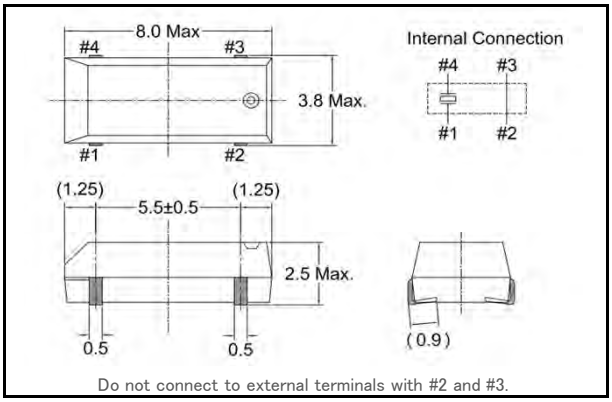
TUNING FORK CRYSTAL UNIT (SMD · Plastic Package)

RoHS compliant | **CM250C** | **3,000pcs/reel**

■ FEATURES

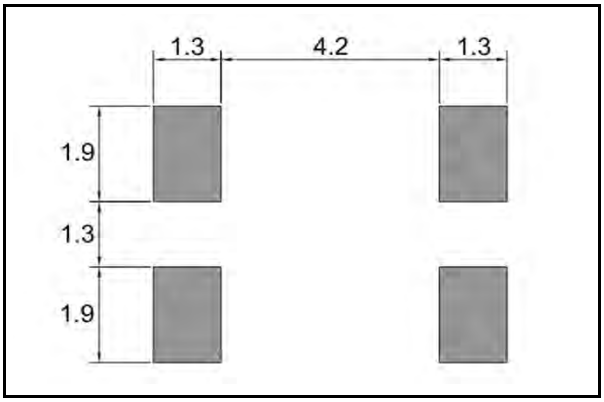
- Frequency range : 30 ～ 100kHz
- External dimensions (mm)
  L : 8.0 x W : 3.8 x H : 2.55
- Applications
  Communication devices

■ DIMENSION [mm]



Do not connect to external terminals with #2 and #3.

■ SOLDER PAD LAYOUT [mm]



■ STANDARD SPECIFICATIONS

Item	Model	CM250C	Conditions
Nominal Frequency	f_0	30kHz ～ 100kHz	Please contact us for frequencies available
Frequency Tolerance	$\Delta f/f_0$	±20ppm / ±30ppm	at 25℃
Load capacitance	C_L	12.5pF	Please specify your requirement
Operating Temperature Range	T_{OPR}	−40℃ ～ +85℃	
Storage Temperature Range	T_{STR}	−55℃ ～ +125℃	
Turnover Temperature	T_M	25℃±5℃	
Temperature Coefficient	β	−0.034±0.006ppm/℃^{2}	
Motional (series) resistance	R_1	50KΩ Max.	at 25℃
Level of drive	D_L	1μW Max.	
Aging (first year)	$\Delta f/f_0$	±5ppm Max.	25℃±3℃
Shunt capacitance	C_0	0.8pF ～ 1.7pF Typ.	

CITIZEN

■ PART NUMBERING SYSTEM

CM250C 60000 D Z F T - □□□

Frequency
Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)	
A	±30ppm (STD)
D	±20ppm

Frequency Tolerance over Operating Temp. Range	
Z	Standard Spec.

Load capacitance (CL)	
F	12.5pF (STD)

Package specification	
T	Only Tape & Reel

CITIZEN management code
Ref. Code for internal use.

*Please contact us for specifications available.

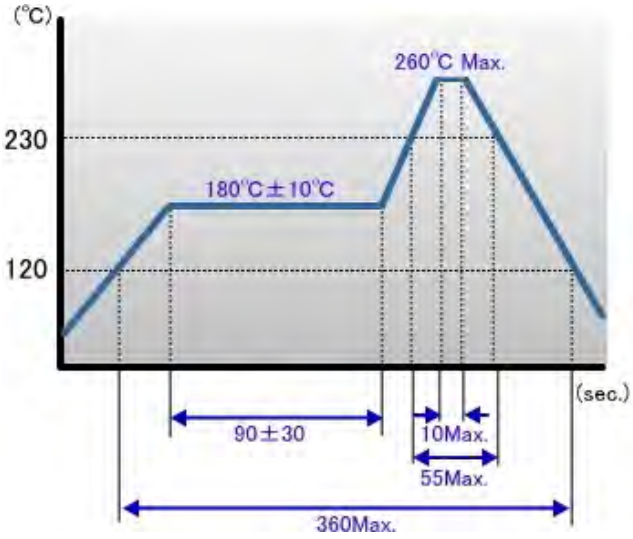
■ Part Marking [standard]

* : Manufacture's ID Code

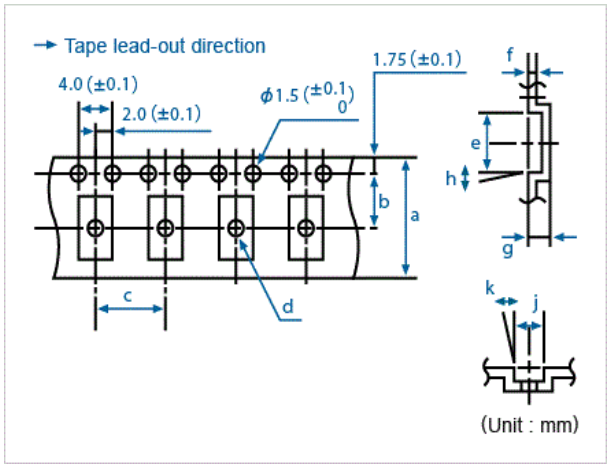
y : The last digit of production year

w : Production week code

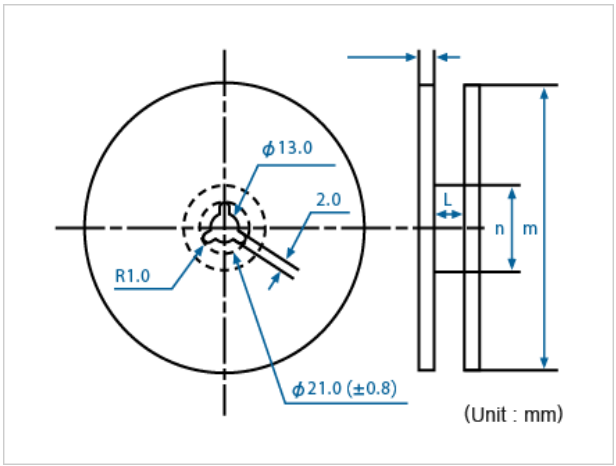
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

Q'ty/reel	a	b	c	d (ϕ)	e	f	g	h	j	k	l	m (ϕ)	n (ϕ)
3,000	16.0	7.5	8.0	1.6	8.3	0.3	2.70	5°	4.05	5°	17.5	330	100

Rev.1

CITIZEN

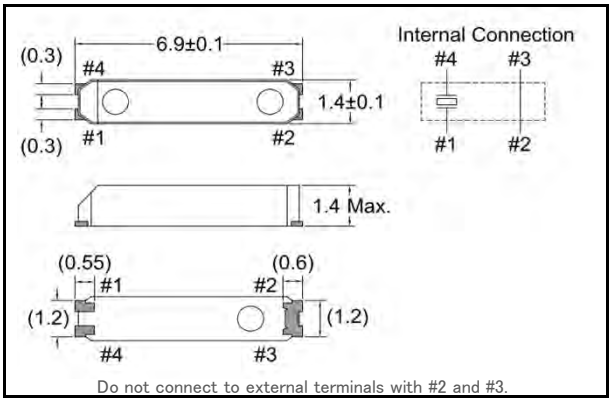
TUNING FORK CRYSTAL UNIT (SMD · Plastic Package)

RoHS compliant | **CM130** | **3,000pcs/reel**

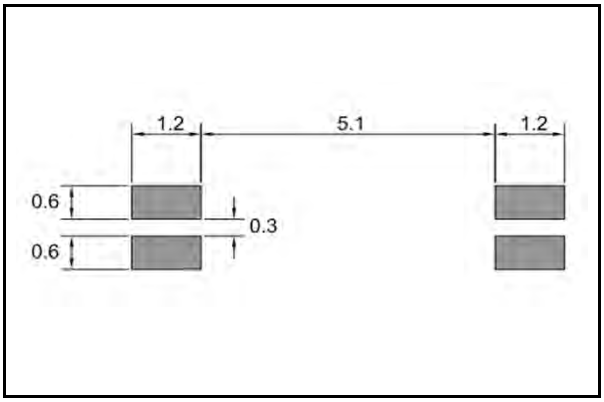
■ FEATURES

- Frequency range : 32.768kHz
- External dimensions (mm)
  L : 7.0 x W : 1.5 x H : 1.4
- Applications
  Small mobile devices / Consumer products

■ DIMENSION [mm]



■ SOLDER PAD LAYOUT [mm]



■ STANDARD SPECIFICATIONS

Item / Model		CM130	Conditions
Nominal Frequency	f_0	32.768kHz	
Frequency Tolerance	$\Delta f/f_0$	±10ppm / ±20ppm	at 25℃
Load capacitance	C_L	6.0pF / 7.0pF / 9.0pF / 12.5pF	Please specify your requirement
Operating Temperature Range	T_{OPR}	−40℃ ～ +85℃	
Storage Temperature Range	T_{STR}	−55℃ ～ +125℃	
Turnover Temperature	T_M	25℃±5℃	
Temperature Coefficient	β	−0.04ppm/℃^{2} Max.	
Motional (series) resistance	R_1	65KΩ Max.	at 25℃
Level of drive	D_L	1.0μW Max.	
Aging (first year)	$\Delta f/f_0$	±3ppm Max.	25℃±3℃
Shunt capacitance	C_0	0.8pF Typ.	

CITIZEN

■ PART NUMBERING SYSTEM

CM130 32768 D Z F T - □□□

Frequency
Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)

D	±20ppm (STD)
E	±10ppm

Frequency Tolerance over Operating Temp. Range

Z	Standard Spec.

Load capacitance (CL)

B	6.0pF
C	9.0pF (STD)
F	12.5pF (STD)
Y	7.0pF

Package specification

T	Only Tape & Reel

CITIZEN management code
Ref. Code for internal use.

*Please contact us for specifications available.

■ Part Marking [standard]

32C : Manufacture's ID Code

y : The last digit of production year

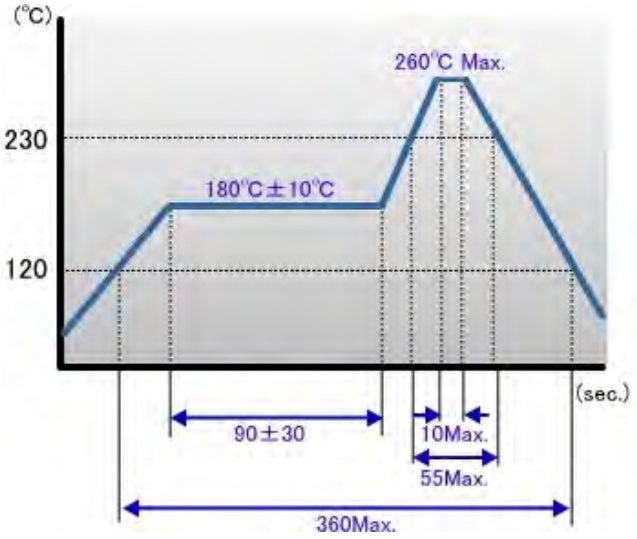
m : Production month (See Table.1)

* : CL Code B : 6.0pF
C : 9.0pF
Y : 7.0pF
Φ : 12.5pF

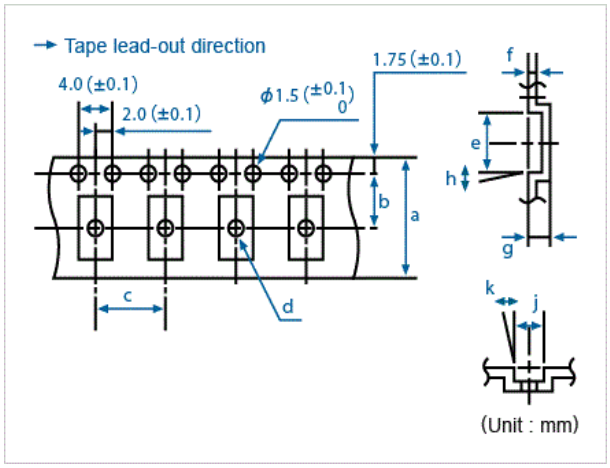
Table.1

Month	Jan	Feb	···	Sep	Oct	Nov	Dec
Code	1	2	···	9	X	Y	Z

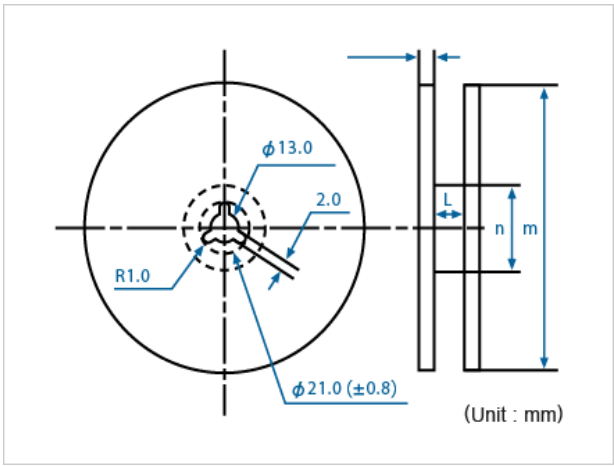
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

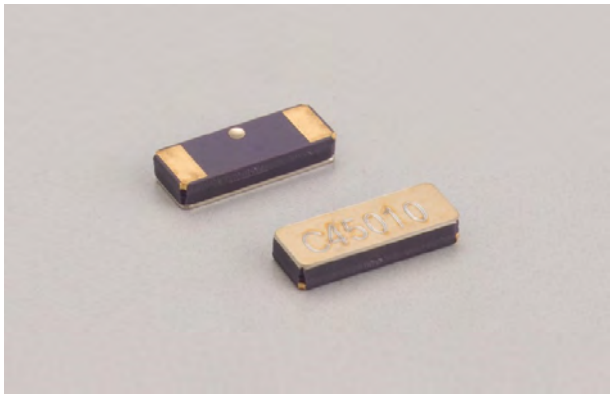
Q'ty/reel	a	b	c	d (φ)	e	f	g	h	j	k	l	m (φ)	n (φ)
3,000	16.0	7.5	4.0	1.0	7.2	0.3	1.4	5°	1.55	5°	17.0	180	50

Rev.1

CITIZEN

TUNING FORK CRYSTAL UNIT (SMD · Ceramic Package)

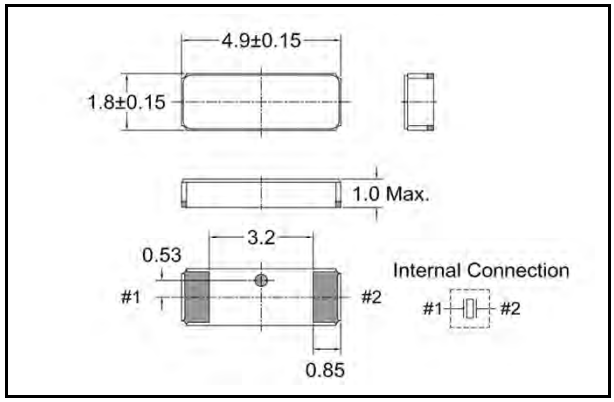
RoHS compliant / Pb free | **CM519** | **3,000pcs/reel**



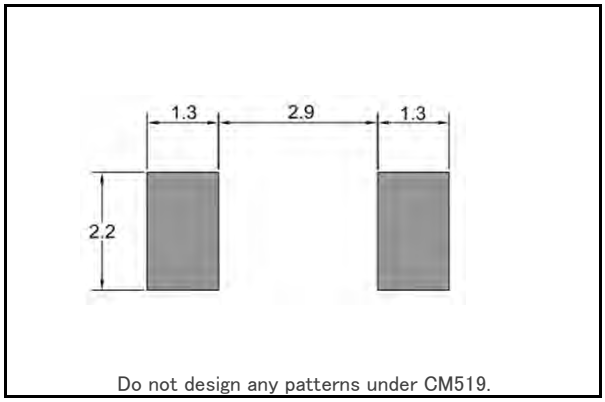
■ FEATURES

- Frequency range : 32.768kHz
- External dimensions (mm)
  L : 5.05 x W : 1.95 x H : 1.0
- Applications
  Consumer products

■ DIMENSION [mm]



■ SOLDER PAD LAYOUT [mm]



Do not design any patterns under CM519.

■ STANDARD SPECIFICATIONS

Item / Model		CM519	Conditions
Nominal Frequency	f_0	32.768kHz	
Frequency Tolerance	$\Delta f/f_0$	±10ppm / ±20ppm	at 25℃
Load capacitance	C_L	6.0pF / 7.0pF / 9.0pF / 12.5pF	Please specify your requirement
Operating Temperature Range	T_{OPR}	−40℃ ～ +85℃	
Storage Temperature Range	T_{STR}	−55℃ ～ +125℃	
Turnover Temperature	T_M	25℃±5℃	
Temperature Coefficient	β	−0.034±0.006ppm/℃^{2}	
Motional (series) resistance	R_1	70KΩ Max.	at 25℃
Level of drive	D_L	1μW Max.	
Aging (first year)	$\Delta f/f_0$	±3ppm Max.	25℃±3℃
Shunt capacitance	C_0	1.35pF Typ.	

■ PART NUMBERING SYSTEM

CM519 32768 D Z F T - □□□

Frequency
Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)

D	±20ppm (STD)
E	±10ppm

Frequency Tolerance over Operating Temp. Range

Z	Standard Spec.

Load capacitance (CL)

B	6.0pF
C	9.0pF (STD)
F	12.5pF (STD)
Y	7.0pF

Package specification

T	Only Tape & Reel

CITIZEN management code
Ref. Code for internal use.

*Please contact us for specifications available.

■ Part Marking [standard]

C : Manufacture's ID Code

y : The last digit of production year

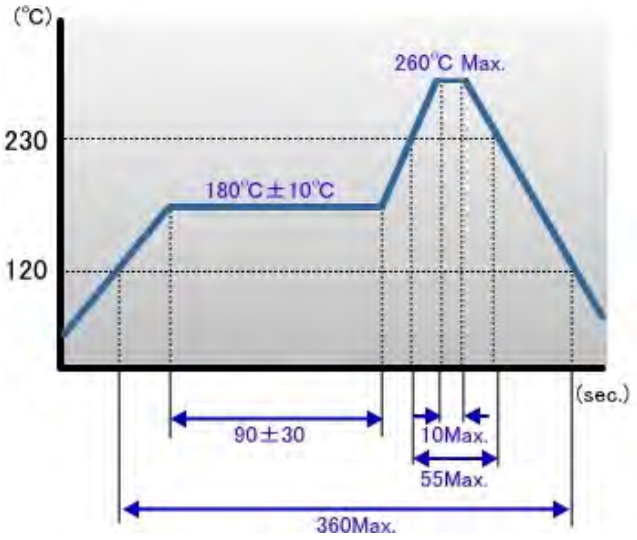
m : Production month (See Table.1)

: Production Lot No.

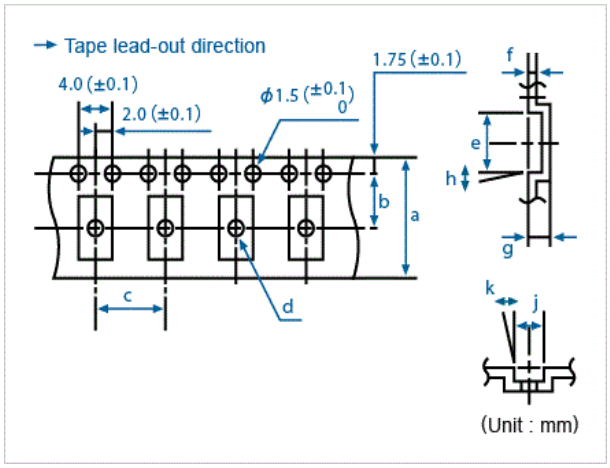
Table.1

Month	Jan	Feb	⋯	Sep	Oct	Nov	Dec
Code	1	2	⋯	9	X	Y	Z

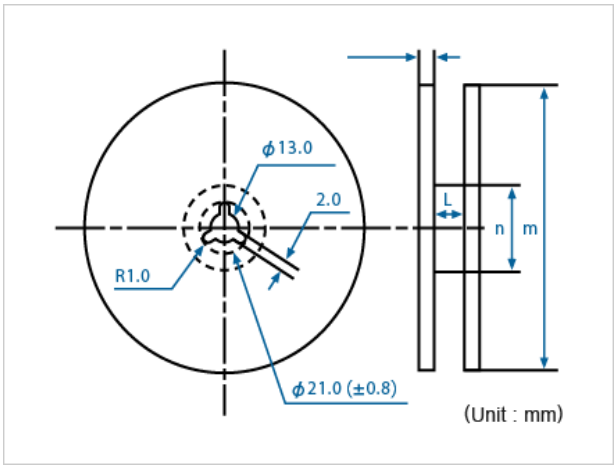
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

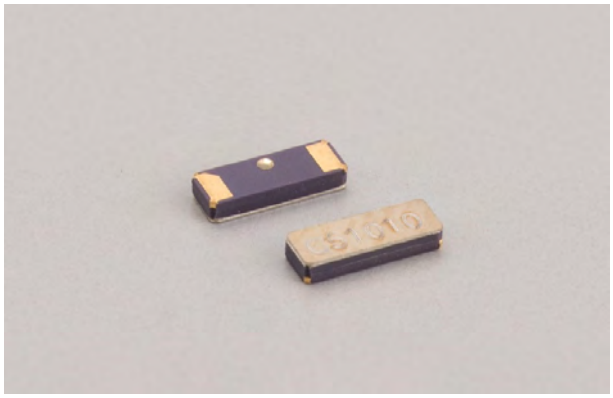
Q'ty/reel	a	b	c	d (ϕ)	e	f	g	h	j	k	l	m (ϕ)	n (ϕ)
3,000	12.0	5.5	4.0	1.0	5.3	0.3	1.1	5°	2.1	5°	13.0	180	60

Rev.1

CITIZEN

TUNING FORK CRYSTAL UNIT (SMD · Ceramic Package)

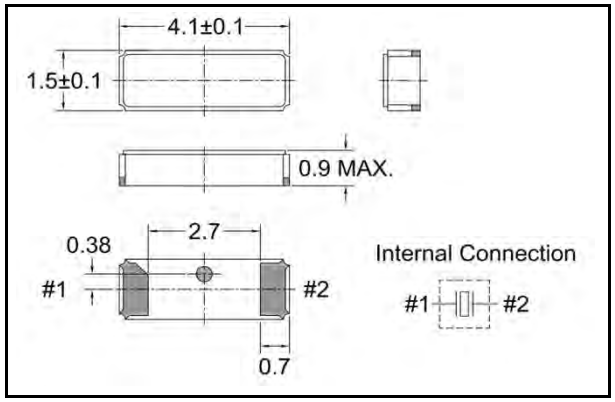
RoHS compliant / Pb free | **CM415** | **3,000pcs/reel**



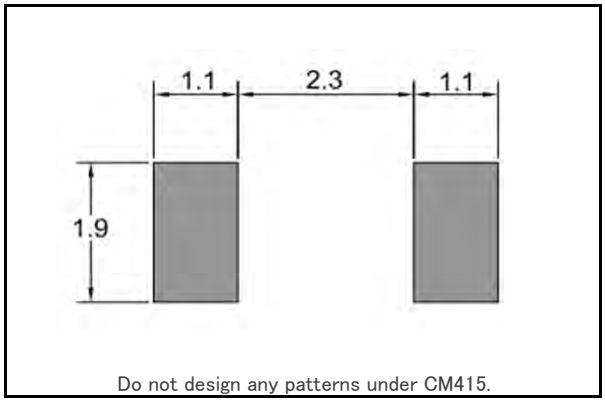
■ FEATURES

- Frequency range : 32.768kHz
- External dimensions (mm)
  L : 4.2 x W : 1.6 x H : 0.9
- Applications
  Consumer products

■ DIMENSION [mm]



■ SOLDER PAD LAYOUT [mm]



Do not design any patterns under CM415.

■ STANDARD SPECIFICATIONS

Item / Model		CM415	Conditions
Nominal Frequency	f_0	32.768kHz	
Frequency Tolerance	$\Delta f/f_0$	±10ppm / ±20ppm	at 25℃
Load capacitance	C_L	6.0pF / 7.0pF / 9.0pF / 12.5pF	Please specify your requirement
Operating Temperature Range	T_{OPR}	−40℃ ～ +85℃	
Storage Temperature Range	T_{STR}	−55℃ ～ +125℃	
Turnover Temperature	T_M	25℃±5℃	
Temperature Coefficient	β	−0.034±0.006ppm/℃^{2}	
Motional (series) resistance	R_1	70KΩ Max.	at 25℃
Level of drive	D_L	1μW Max.	
Aging (first year)	$\Delta f/f_0$	±3ppm Max.	25℃±3℃
Shunt capacitance	C_0	1.10pF Typ.	

■ PART NUMBERING SYSTEM

CM415 32768 D Z F T - □□□

Frequency
Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)

D	±20ppm (STD)
E	±10ppm

Frequency Tolerance over Operating Temp. Range

Z	Standard Spec.

Load capacitance (CL)

B	6.0pF
C	9.0pF (STD)
F	12.5pF (STD)
Y	7.0pF

Package specification

T	Only Tape & Reel

CITIZEN management code
Ref. Code for internal use.

*Please contact us for specifications available.

■ Part Marking [standard]

C : Manufacture's ID Code

y : The last digit of production year

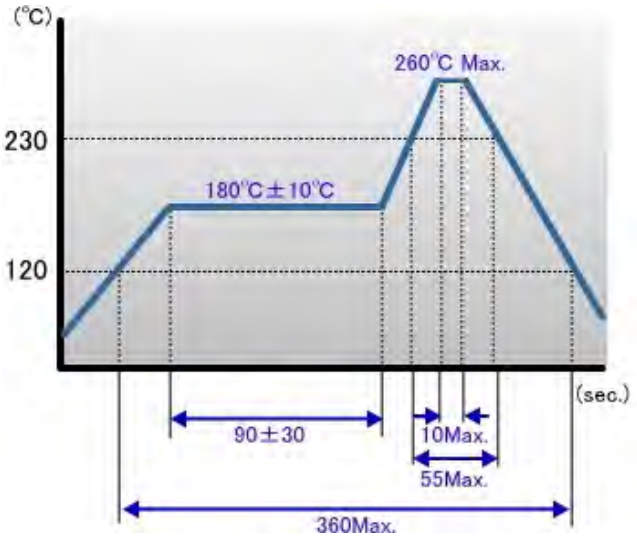
m : Production month (See Table.1)

: Production Lot No.

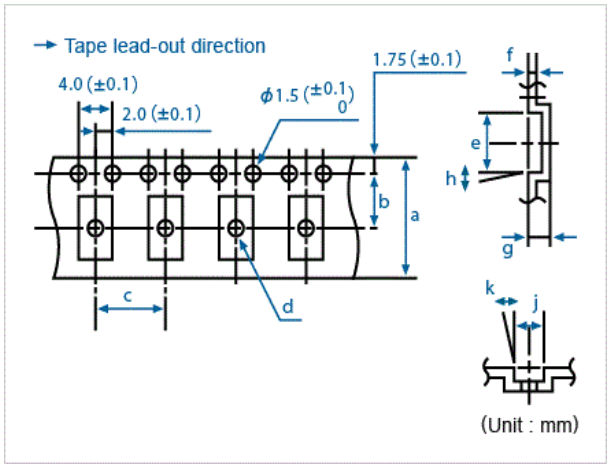
Table.1

Month	Jan	Feb	···	Sep	Oct	Nov	Dec
Code	1	2	···	9	X	Y	Z

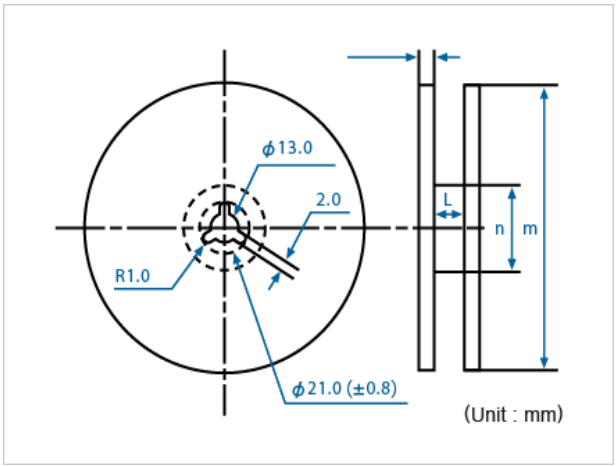
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

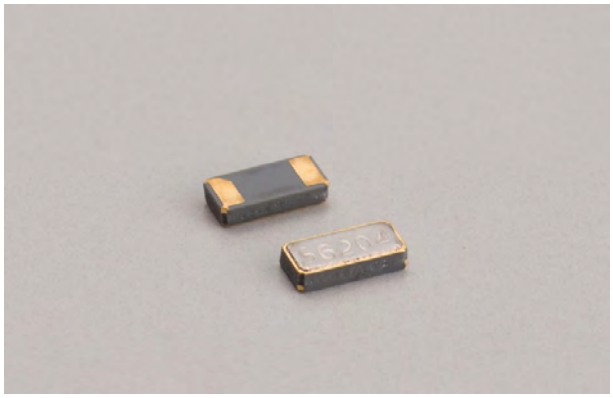
Q'ty/reel	a	b	c	d (ϕ)	e	f	g	h	j	k	l	m (ϕ)	n (ϕ)
3,000	12.0	5.5	4.0	1.0	4.5	0.3	1.0	5°	1.9	5°	13.0	180	60

Rev.1

CITIZEN

TUNING FORK CRYSTAL UNIT (SMD · Ceramic Package)

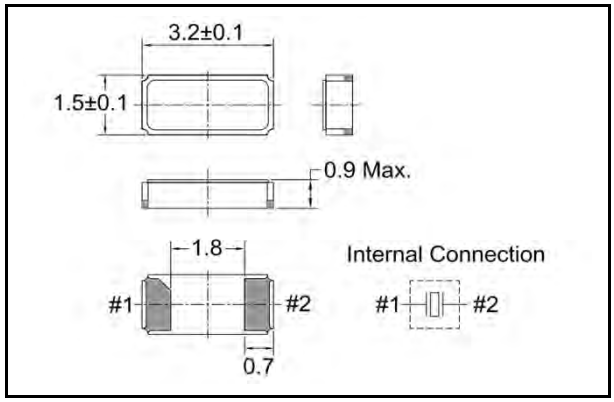
RoHS compliant / Pb free | **CM315D** | **3,000pcs/reel**



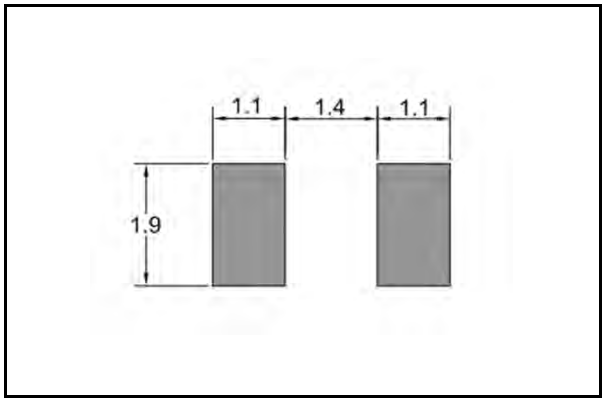
■ FEATURES

- Frequency range : 32.768kHz
- External dimensions (mm)
  L : 3.3 x W : 1.6 x H : 0.9
- Applications
  Smart Meters / Small mobile devices /
  Consumer products

■ DIMENSION [mm]



■ SOLDER PAD LAYOUT [mm]



■ STANDARD SPECIFICATIONS

Item / Model		CM315D	Conditions
Nominal Frequency	f_0	32.768kHz	
Frequency Tolerance	$\Delta f/f_0$	±5ppm / ±10ppm / ±20ppm	at 25℃
Load capacitance	C_L	6.0pF / 7.0pF / 9.0pF / 12.5pF	Please specify your requirement
Operating Temperature Range	T_{OPR}	−40℃ ～ +85℃	
Storage Temperature Range	T_{STR}	−55℃ ～ +125℃	
Turnover Temperature	T_M	25℃±5℃	
Temperature Coefficient	β	−0.034±0.006ppm/℃^{2}	
Motional (series) resistance	R_1	70KΩ Max.	at 25℃
Level of drive	D_L	1μW Max.	
Aging (first year)	$\Delta f/f_0$	±3ppm Max.	25℃±3℃
Shunt capacitance	C_0	0.95pF Typ.	

CITIZEN

■ PART NUMBERING SYSTEM

CM315D 32768 D Z F T - □□□

Frequency
Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)

D	±20ppm (STD)
E	±10ppm
H	±5ppm

Frequency Tolerance over Operating Temp. Range

Z	Standard Spec.

Load capacitance (CL)

B	6.0pF
C	9.0pF (STD)
F	12.5pF (STD)
Y	7.0pF

Package specification

T	Only Tape & Reel

CITIZEN management code
Ref. Code for internal use.

*Please contact us for specifications available.

■ Part Marking [standard]

y : The last digit of production year

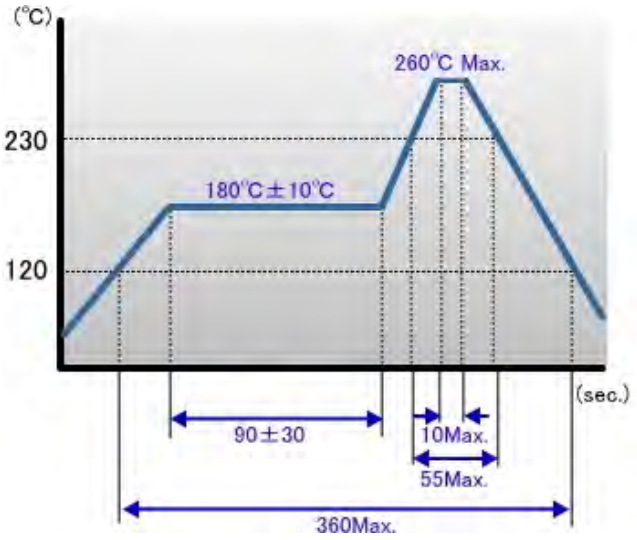
m : Production month (See Table.1)

: Production Lot No.

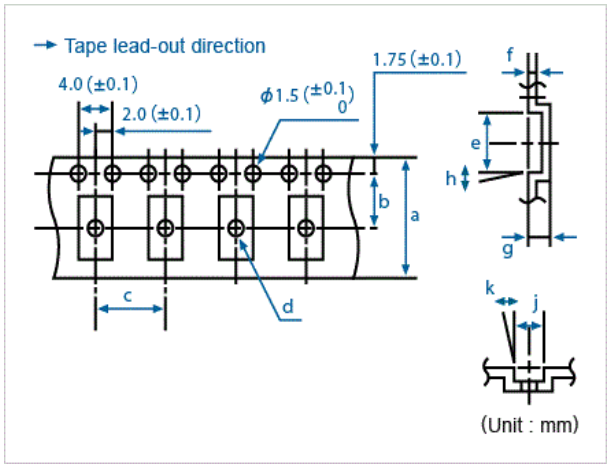
Table.1

Month	Jan	Feb	···	Sep	Oct	Nov	Dec
Code	1	2	···	9	X	Y	Z

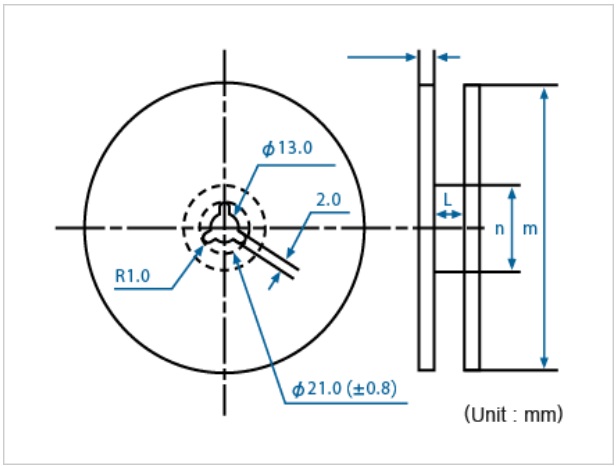
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

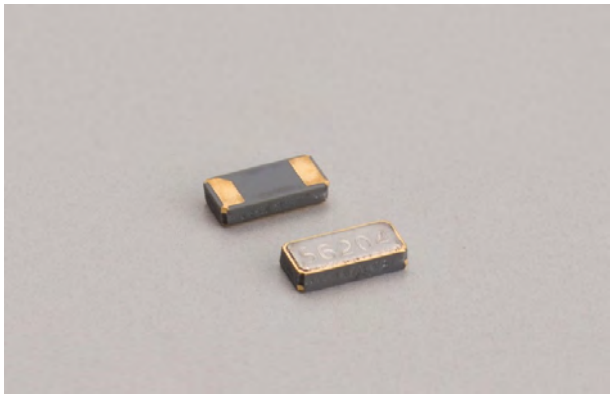
Q'ty/reel	a	b	c	d (ϕ)	e	f	g	h	j	k	l	m (ϕ)	n (ϕ)
3,000	12.0	5.5	4.0	1.0	3.6	0.3	1.0	5°	1.9	5°	13.0	180	60

Rev.1

CITIZEN

TUNING FORK CRYSTAL UNIT (SMD · Ceramic Package)

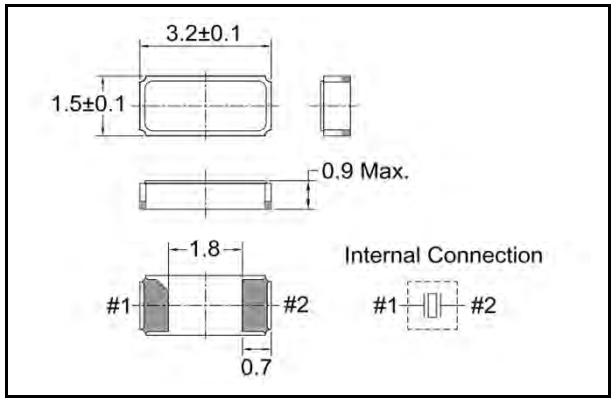
RoHS compliant / Pb free | **CM315DL** | **3,000pcs/reel**



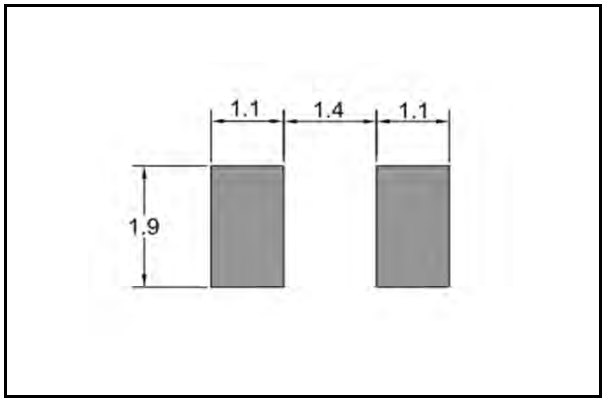
■ FEATURES

- Low ESR type
- Frequency range : 32.768kHz
- External dimensions (mm)
  L : 3.3 x W : 1.6 x H : 0.9
- Applications
  Smart Meters / Small mobile devices /
  Consumer products

■ DIMENSION [mm]



■ SOLDER PAD LAYOUT [mm]



■ STANDARD SPECIFICATIONS

Item / Model		CM315DL	Conditions
Nominal Frequency	f_0	32.768kHz	
Frequency Tolerance	$\Delta f/f_0$	±10ppm / ±20ppm	at 25℃
Load capacitance	C_L	6.0pF / 7.0pF / 9.0pF / 12.5pF	Please specify your requirement
Operating Temperature Range	T_{OPR}	−40℃ ～ +85℃	
Storage Temperature Range	T_{STR}	−55℃ ～ +125℃	
Turnover Temperature	T_M	25℃±5℃	
Temperature Coefficient	β	−0.034±0.006ppm/℃^{2}	
Motional (series) resistance	R_1	50KΩ Max.	at 25℃
Level of drive	D_L	0.5μW Max.	
Aging (first year)	$\Delta f/f_0$	±3ppm Max.	25℃±3℃
Shunt capacitance	C_0	1.30pF Typ.	

CITIZEN

■ PART NUMBERING SYSTEM

CM315DL 32768 D Z F T - □□□

Frequency
Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)

D	±20ppm (STD)
E	±10ppm

Frequency Tolerance over Operating Temp. Range

Z	Standard Spec.

Load capacitance (CL)

B	6.0pF
C	9.0pF (STD)
F	12.5pF (STD)
Y	7.0pF

Package specification

T	Only Tape & Reel

CITIZEN management code
Ref. Code for internal use.

*Please contact us for specifications available.

■ Part Marking [standard]

ymL##

y : The last digit of production year

m : Production month (See Table.1)

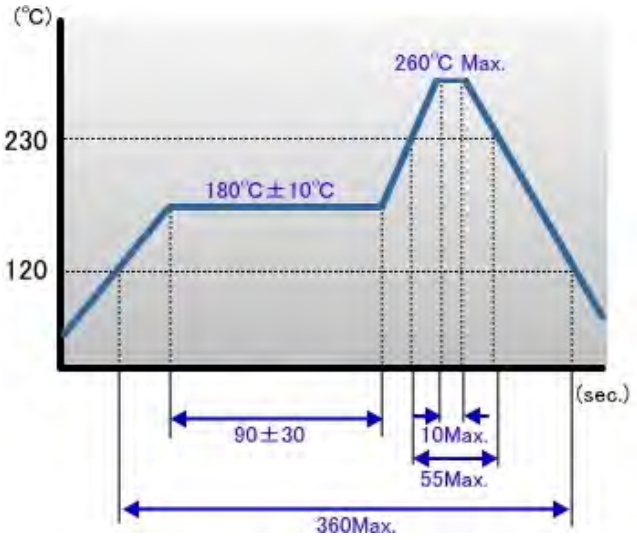
L : Manufacture's ID Code

: Production Lot No.

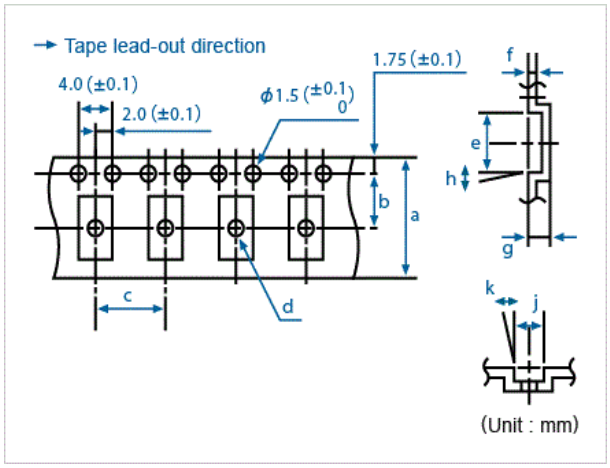
Table.1

Month	Jan	Feb	···	Sep	Oct	Nov	Dec
Code	1	2	···	9	X	Y	Z

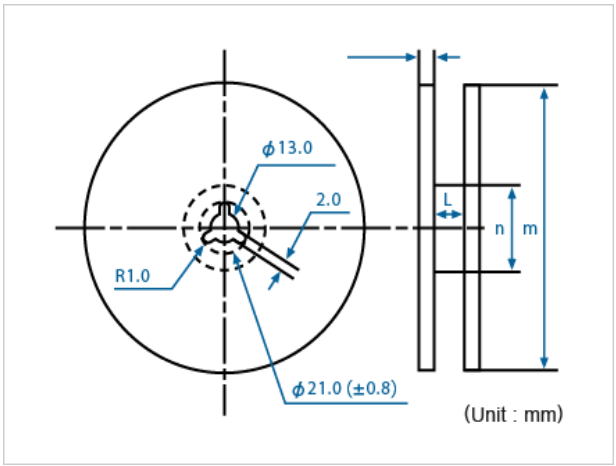
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

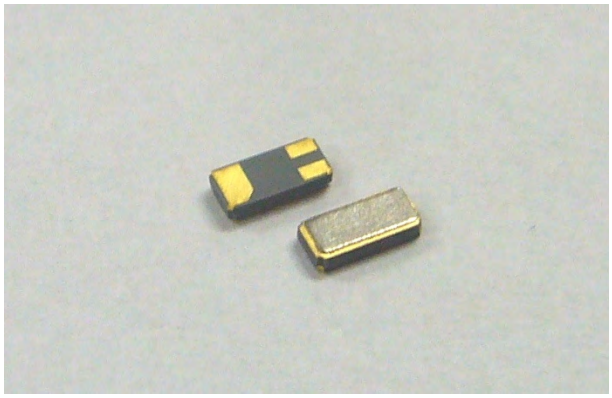
Q'ty/reel	a	b	c	d (φ)	e	f	g	h	j	k	l	m (φ)	n (φ)
3,000	12.0	5.5	4.0	1.0	3.6	0.3	1.0	5°	1.9	5°	13.0	180	60

Rev.1

CITIZEN

TUNING FORK CRYSTAL UNIT (SMD · Ceramic Package)

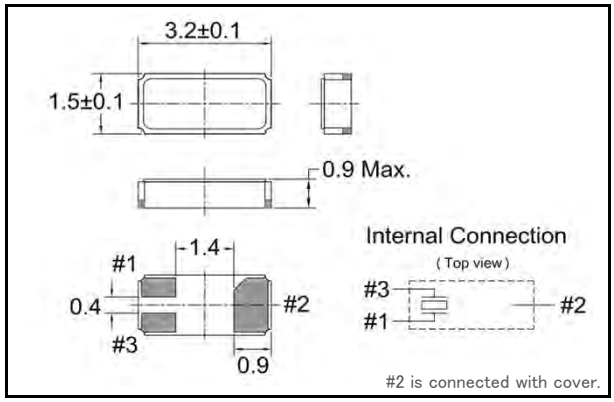
RoHS compliant / Pb free | **CM315E** | **3,000pcs/reel**



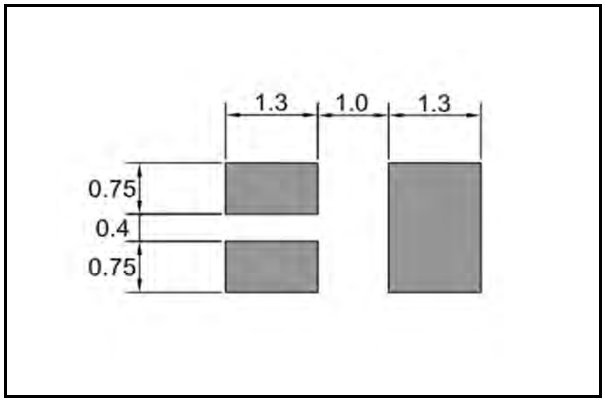
■ FEATURES

- Metal Lid GND connected
  EMI reduced type
- Frequency range : 32.768kHz
- External dimensions (mm)
  L : 3.3 x W : 1.6 x H : 0.9
- Applications
  Smart Meters / Small communication devices / Consumer products

■ DIMENSION [mm]



■ SOLDER PAD LAYOUT [mm]



■ STANDARD SPECIFICATIONS

Item / Model		CM315E	Conditions
Nominal Frequency	f_0	32.768kHz	
Frequency Tolerance	$\Delta f/f_0$	±20ppm	at 25℃
Load capacitance	C_L	4.0pF / 6.0pF / 8.0pF / 9.0pF / 12.5pF	Please specify your requirement
Operating Temperature Range	T_{OPR}	−40℃ ～ +85℃	
Storage Temperature Range	T_{STR}	−55℃ ～ +125℃	
Turnover Temperature	T_M	25℃±5℃	
Temperature Coefficient	β	−0.034±0.006ppm/℃^{2}	
Motional (series) resistance	R_1	70KΩ Max.	at 25℃
Level of drive	D_L	1μW Max.	
Aging (first year)	$\Delta f/f_0$	±3ppm Max.	25℃±3℃
Shunt capacitance	C_0	0.75pF Typ.	

CITIZEN

■ PART NUMBERING SYSTEM

CM315E 32768 D Z F T - □□□

Frequency
Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)

D	±20ppm (STD)

Frequency Tolerance over Operating Temp. Range

Z	Standard Spec.

Package specification

T	Only Tape & Reel

CITIZEN management code
Ref. Code for internal use.

Load capacitance (CL)

B	6.0pF
C	9.0pF (STD)
F	12.5pF (STD)
V	8.0pF
Z	4.0pF or Other

*Please contact us for specifications available.

■ Part Marking [standard]

y : The last digit of production year

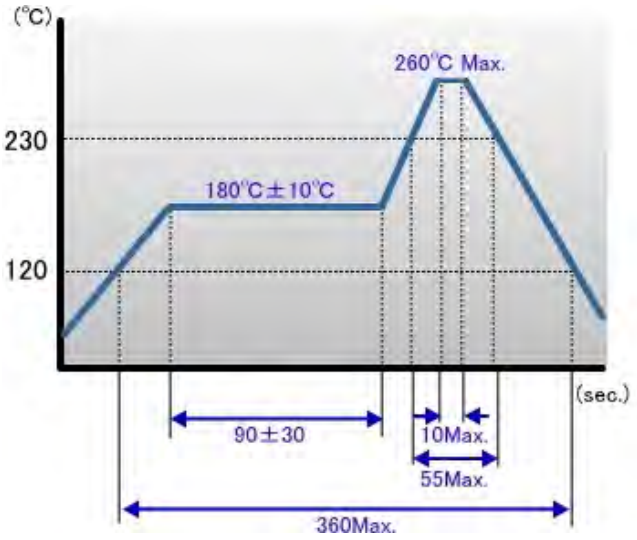
m : Production month (See Table.1)

: Production Lot No.

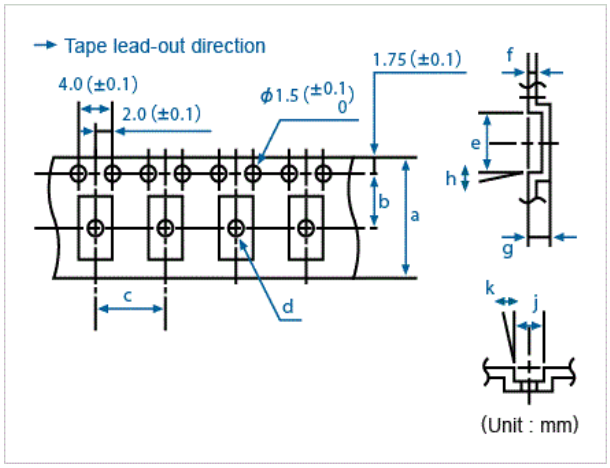
Table.1

Month	Jan	Feb	···	Sep	Oct	Nov	Dec
Code	1	2	···	9	X	Y	Z

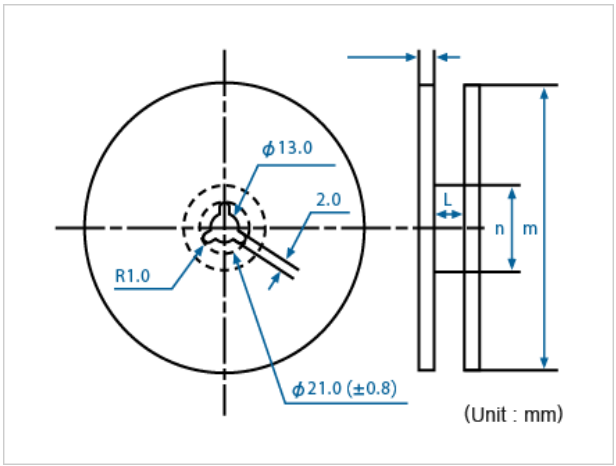
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

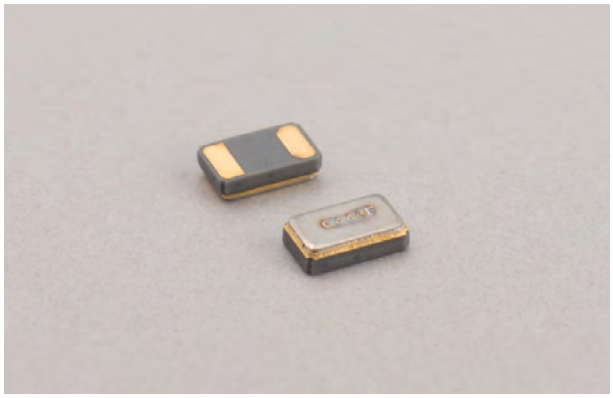
Q'ty/reel	a	b	c	d (ϕ)	e	f	g	h	j	k	l	m (ϕ)	n (ϕ)
3,000	12.0	5.5	4.0	1.0	3.6	0.3	1.0	5°	1.9	5°	13.0	180	60

Rev.1

CITIZEN

TUNING FORK CRYSTAL UNIT (SMD · Ceramic Package)

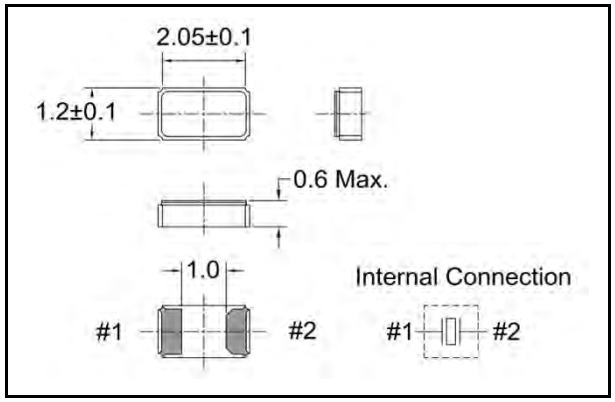
RoHS compliant / Pb free | **CM2012H** | **3,000pcs/reel**



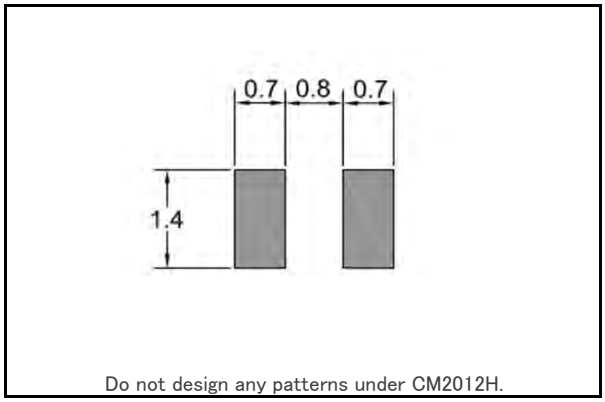
■ FEATURES

- Frequency range : 32.768kHz
- External dimensions (mm)
  L : 2.15 x W : 1.3 x H : 0.6
- Applications
  Small communication devices

■ DIMENSION [mm]



■ SOLDER PAD LAYOUT [mm]



Do not design any patterns under CM2012H.

■ STANDARD SPECIFICATIONS

Item / Model		CM2012H	Conditions
Nominal Frequency	f_0	32.768kHz	
Frequency Tolerance	$\Delta f/f_0$	±10ppm / ±20ppm	at 25℃
Load capacitance	C_L	6.0pF / 7.0pF / 9.0pF / 12.5pF	Please specify your requirement
Operating Temperature Range	T_{OPR}	−40℃ ～ +85℃	
Storage Temperature Range	T_{STR}	−55℃ ～ +125℃	
Turnover Temperature	T_M	25℃±5℃	
Temperature Coefficient	β	−0.033±0.003ppm/℃^{2}	
Motional (series) resistance	R_1	70KΩ Max.	at 25℃
Level of drive	D_L	1.0μW Max.	
Aging (first year)	$\Delta f/f_0$	±3ppm Max.	25℃±3℃
Shunt capacitance	C_0	1.3pF Typ.	

■ PART NUMBERING SYSTEM

CM2012H 32768 D Z F T - □□□

Frequency
Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)

D	±20ppm (STD)
E	±10ppm

Frequency Tolerance over Operating Temp. Range

Z	Standard Spec.

Load capacitance (CL)

B	6.0pF
C	9.0pF (STD)
F	12.5pF (STD)
Y	7.0pF

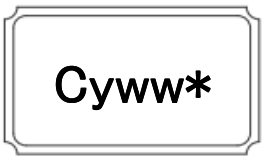
Package specification

T	Only Tape & Reel

CITIZEN management code
Ref. Code for internal use.

*Please contact us for specifications available.

■ Part Marking [standard]



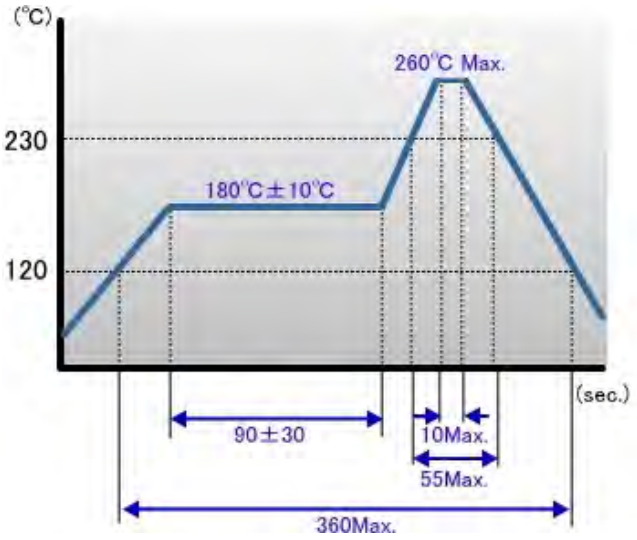
C : Manufacture's ID Code

y : The last digit of production year

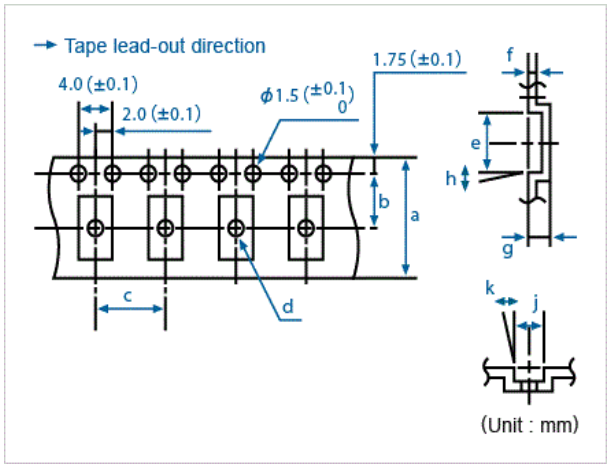
w : Production week code

* : CL Code
B : 6.0pF
C : 9.0pF
F : 12.5pF
Y : 7.0pF

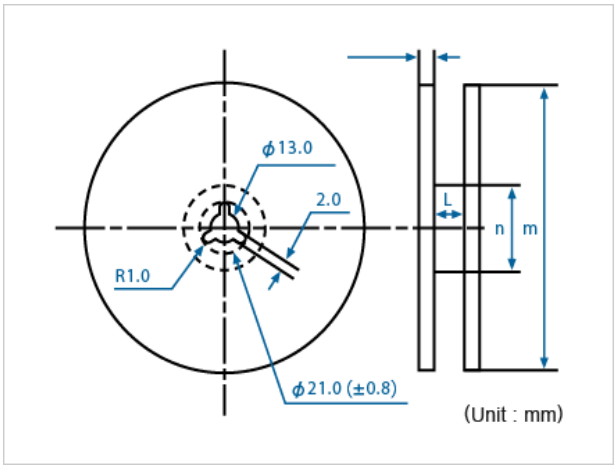
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

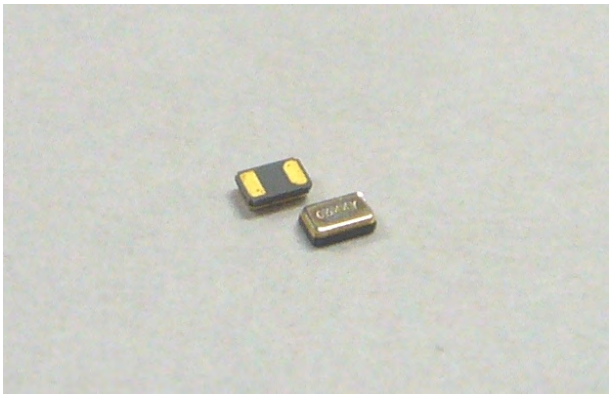
Q'ty/reel	a	b	c	d (φ)	e	f	g	h	j	k	l	m (φ)	n (φ)
3,000	8.0	3.5	4.0	1.0	2.25	0.23	0.8	5°	1.4	5°	9.0	180	60

Rev.1

CITIZEN

TUNING FORK CRYSTAL UNIT (SMD · Ceramic Package)

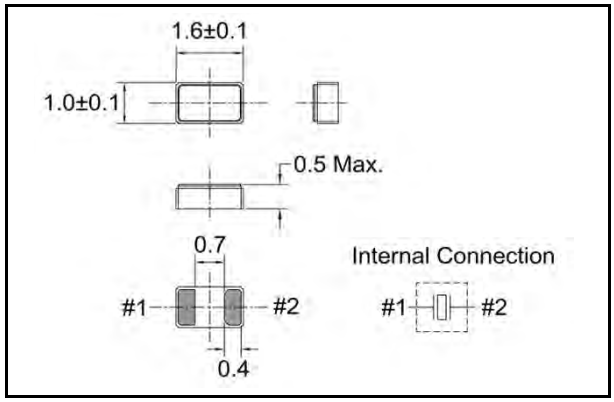
RoHS compliant / Pb free | **CM1610H** | **5,000pcs/reel**



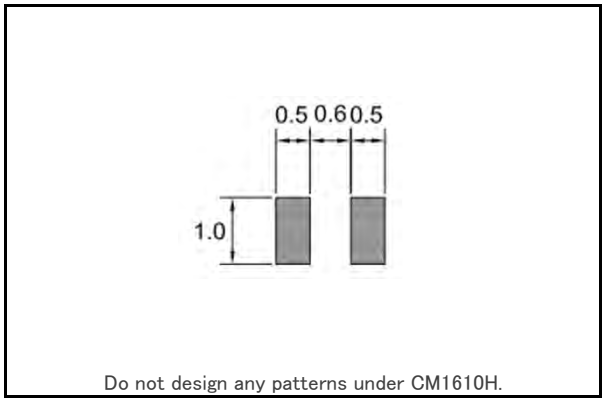
■ FEATURES

- Ultra-lightweight microminiature TF Crystal units
  SMD type
- Frequency range : 32.768kHz
- External dimensions (mm)
  L : 1.6 x W : 1.0 x H : 0.5
- Applications
  Small communication devices

■ DIMENSION [mm]



■ SOLDER PAD LAYOUT [mm]



Do not design any patterns under CM1610H.

■ STANDARD SPECIFICATIONS

Item / Model		CM1610H	Conditions
Nominal Frequency	f_0	32.768kHz	
Frequency Tolerance	$\Delta f/f_0$	±20ppm	at 25℃
Load capacitance	C_L	6.0pF / 7.0pF / 9.0pF / 12.5pF	Please specify your requirement
Operating Temperature Range	T_{OPR}	−40℃ ～ +85℃	
Storage Temperature Range	T_{STR}	−55℃ ～ +125℃	
Turnover Temperature	T_M	25℃±5℃	
Temperature Coefficient	β	(−0.036±10%) ppm/℃^{2}	
Motional (series) resistance	R_1	90KΩ Max.	at 25℃
Level of drive	D_L	0.5μW Max.	
Aging (first year)	$\Delta f/f_0$	±3ppm Max.	25℃±3℃
Shunt capacitance	C_0	1.2pF Typ.	

CITIZEN

■ PART NUMBERING SYSTEM

CM1610H 32768 D Z F T - □□□

Frequency
Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)	
D	±20ppm (STD)

Frequency Tolerance over Operating Temp. Range	
Z	Standard Spec.

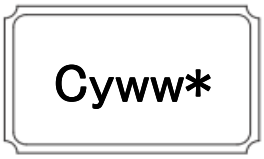
Load capacitance (CL)	
B	6.0pF
C	9.0pF (STD)
F	12.5pF (STD)
Y	7.0pF

Package specification	
T	Only Tape & Reel

CITIZEN management code
Ref. Code for internal use.

*Please contact us for specifications available.

■ Part Marking [standard]



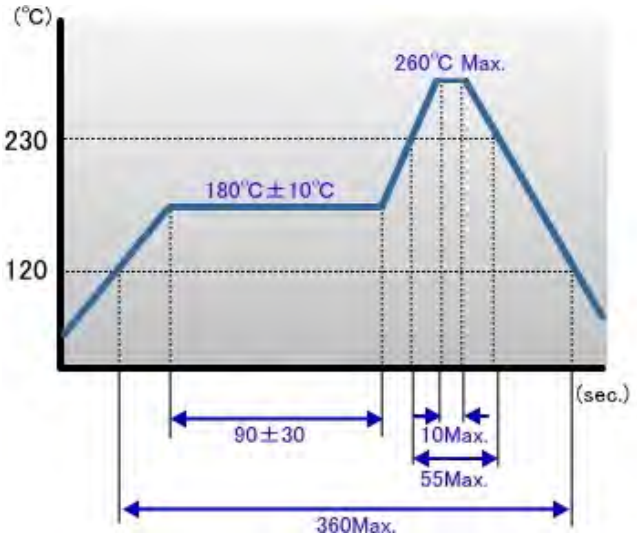
C : Manufacture's ID Code

y : The last digit of production year

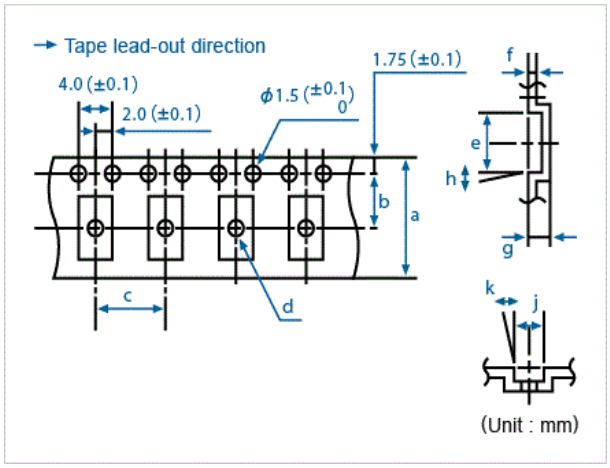
w : Production week code

* : CL Code B:6.0pF
C:9.0pF
F:12.5pF
Y:7.0pF

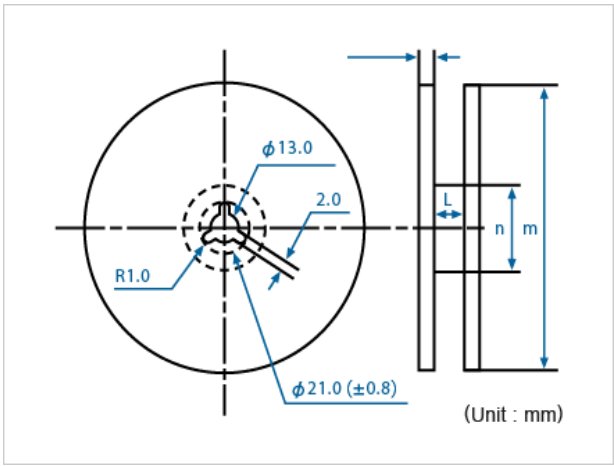
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

Q'ty/reel	a	b	c	d (φ)	e	f	g	h	j	k	l	m (φ)	n (φ)
5,000	8.0	3.5	4.0	0.5	1.8	0.23	0.6	5°	1.2	5°	9.0	180	60

Rev.1

CITIZEN

AT-CUT CRYSTAL UNIT (Metal-can Type)

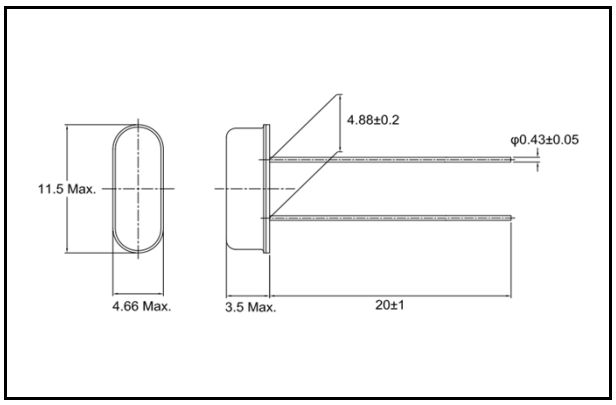
RoHS compliant

HC-49/U-S

■ FEATURES

- Frequency range : 3.5 ～ 50.0MHz
- External dimensions (mm)
  L : 11.5 x W : 4.66 x H : 3.5
- Applications
  Consumer products

■ DIMENSION [mm]



■ STANDARD SPECIFICATIONS

Item / Model		HC-49/U-S	Conditions
Nominal Frequency	f_0	3.5MHz ～ 30.0MHz (Fundamental) 30.0MHz ～ 50.0MHz (3rd Overtone)	Please contact us for frequencies available
Frequency Tolerance	$\Delta f/f_0$	±30ppm	at 25°C
Frequency Tolerance over Operating Temperature Range	$\Delta f/f_0$	below 6.0MHz:±50ppm above 6.0MHz:±30ppm	−10°C～+60°C
Operating Temperature Range	T_{OPR}	−20°C ～ +70°C	
Storage Temperature Range	T_{STR}	−40°C ～ +85°C	
Motional (series) resistance	R_1	Refer to the following table	at 25°C
Load capacitance	C_L	Fundamental:10.0pF ～ ∞ 3rd Overtone:5.0pF ～ ∞	Please specify your requirement
Shunt capacitance	C_0	7.0pF Max.	
Level of drive	D_L	100 μW	
Insulation Resistance	I_R	500MΩMin.	DC100V±15V
Aging (first year)	$\Delta f/f_0$	±5ppm Max.	25°C±3°C

■ MOTIONAL (SERIES) RESISTANCE (R_1)

Freq. Range (MHz)	3.5≦f0<4.0	4.0≦f0<6.0	6.0≦f0<10.0	10.0≦f0<14.0	14.0≦f0<30.0	30.0≦f0<36.0	36.0≦f0≦50.0
Mode	Fundamental	Fundamental	Fundamental	Fundamental	Fundamental	3rd Overtone	3rd Overtone
R_1	200Ω Max.	150Ω Max.	100Ω Max.	80Ω Max.	50Ω Max.	140Ω Max.	100Ω Max.

■ PART NUMBERING SYSTEM

HC-49/U-S 20000000 A B J B - □□□

Frequency
Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)	
A	±30ppm (STD)
B	±50ppm (STD)

Frequency Tolerance over Operating Temp. Range	
A	±30ppm Range −10℃ ～ +60℃
B	±50ppm Range −10℃ ～ +60℃
G	±50ppm Range −40℃ ～ +85℃
H	±100ppm Range −40℃ ～ +85℃

Load capacitance (CL)	
I	16.0pF
J	18.0pF
K	20.0pF

Package specification	
B	Bulk (STD)
T	Ammo pack

CITIZEN management code
Ref. Code for internal use.

*Please contact us for specifications available.

■ Part Marking [standard]

f : The first 4 digits of Frequency including the decimal point

C : Manufacture's ID Code

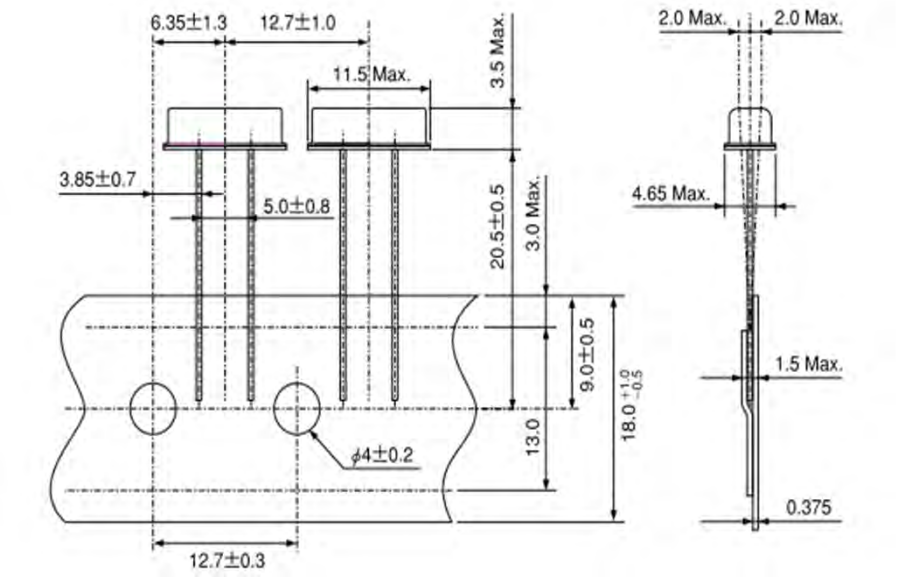
y : The last digit of production year

m : Production month (See Table.1)

Table.1

Month	Jan	Feb	⋯	Sep	Oct	Nov	Dec
Code	1	2	⋯	9	X	Y	Z

■ Taping dimension : 2,000pcs/Ammo pack [mm]



Rev.1

CITIZEN

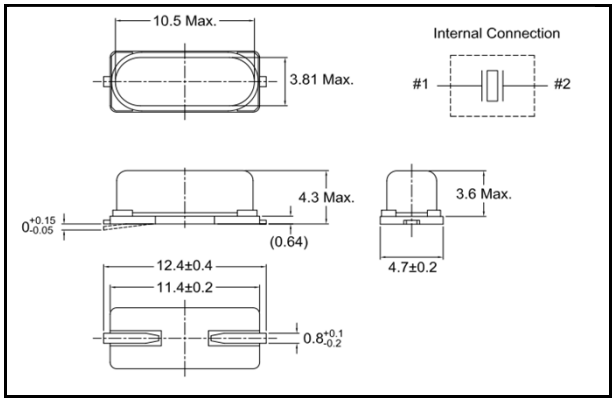
AT-CUT CRYSTAL UNIT (SMD · Metal-can Type)

RoHS compliant | **HCM49** | **1,000pcs/reel**

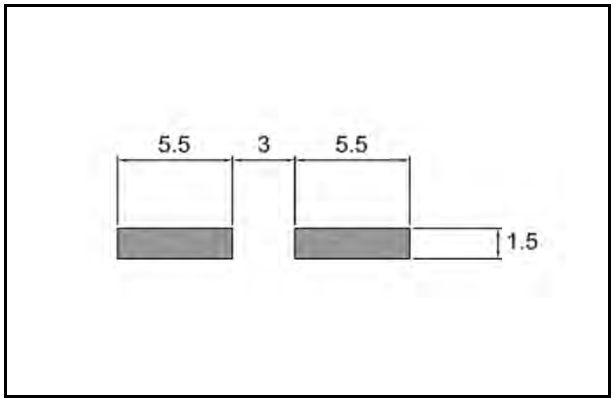
■ FEATURES

- Frequency range : 3.5 ～ 50.0MHz
- External dimensions (mm)
  L : 12.8 x W : 4.9 x H : 4.3
- Applications
  Consumer products

■ DIMENSION [mm]



■ SOLDER PAD LAYOUT [mm]



■ STANDARD SPECIFICATIONS

Item	Model	HCM49	Conditions
Nominal Frequency	f_0	3.5MHz ～ 30.0MHz (Fundamental) 30.0MHz ～ 50.0MHz (3rd Overtone)	Please contact us for frequencies available
Frequency Tolerance	$\Delta f/f_0$	±30ppm	at 25°C
Frequency Tolerance over Operating Temperature Range	$\Delta f/f_0$	below 6.0MHz:±50ppm above 6.0MHz:±30ppm	−10°C～+60°C
Operating Temperature Range	T_{OPR}	−40°C ～ +85°C	
Storage Temperature Range	T_{STR}	−55°C ～ +125°C	
Motional (series) resistance	R_1	Refer to the following table	at 25°C
Load capacitance	C_L	Fundamental:10.0pF ～ ∞ 3rd Overtone:5.0pF ～ ∞	Please specify your requirement
Shunt capacitance	C_0	7.0pF Max.	
Level of drive	D_L	100 μW	
Insulation Resistance	I_R	500MΩ Min.	DC100V±15V
Aging (first year)	$\Delta f/f_0$	±5ppm Max.	25°C±3°C

■ MOTIONAL (SERIES) RESISTANCE (R_1)

Freq. Range (MHz)	3.5≦f0<4.0	4.0≦f0<6.0	6.0≦f0<10.0	10.0≦f0<14.0	14.0≦f0<30.0	30.0≦f0<36.0	36.0≦f0≦50.0
Mode	Fundamental	Fundamental	Fundamental	Fundamental	Fundamental	3rd Overtone	3rd Overtone
R_1	200Ω Max.	150Ω Max.	100Ω Max.	80Ω Max.	50Ω Max.	140Ω Max.	100Ω Max.

■ PART NUMBERING SYSTEM

HCM49 20000000 A B J T - □□□

Frequency

Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)

A	±30ppm (STD)
B	±50ppm (STD)

Frequency Tolerance over Operating Temp. Range

A	±30ppm Range −10℃ ～ +60℃
B	±50ppm Range −10℃ ～ +60℃
G	±50ppm Range −40℃ ～ +85℃
H	±100ppm Range −40℃ ～ +85℃

Load capacitance (CL)

I	16.0pF
J	18.0pF
K	20.0pF

Package specification

T	Only Tape & Reel

CITIZEN management code

Ref. Code for internal use.

*Please contact us for specifications available.

■ Part Marking [standard]

f : The first 4 digits of Frequency including the decimal point

C : Manufacture's ID Code

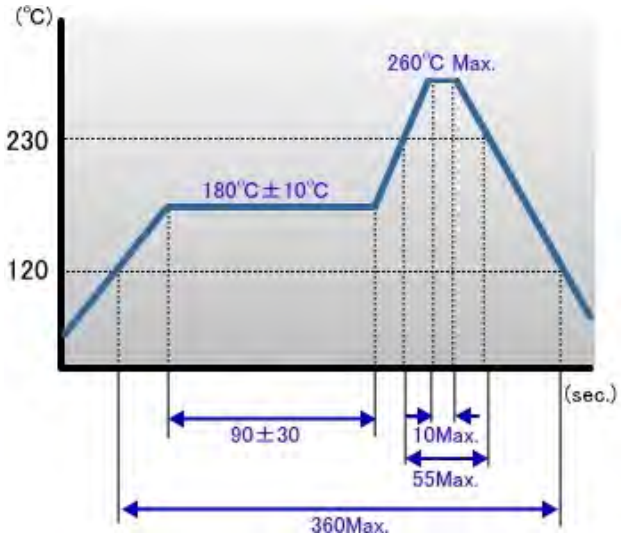
y : The last digit of production year

m : Production month (See Table.1)

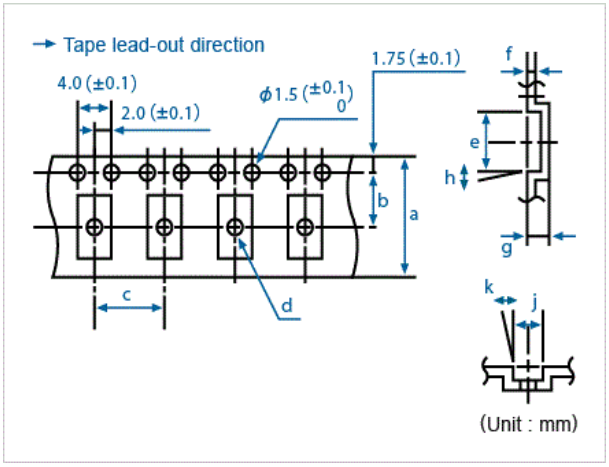
Table.1

Month	Jan	Feb	⋯	Sep	Oct	Nov	Dec
Code	1	2	⋯	9	X	Y	Z

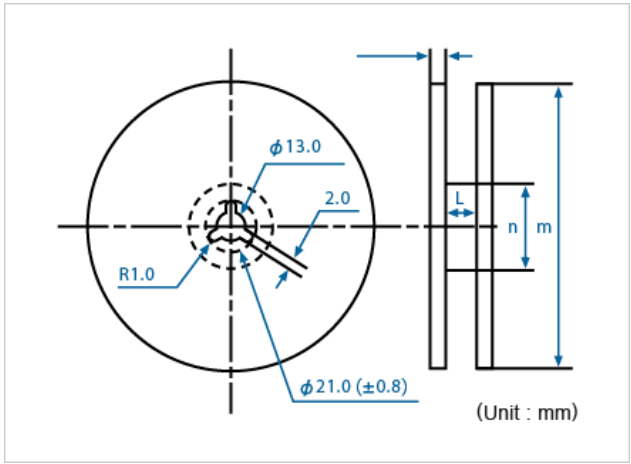
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

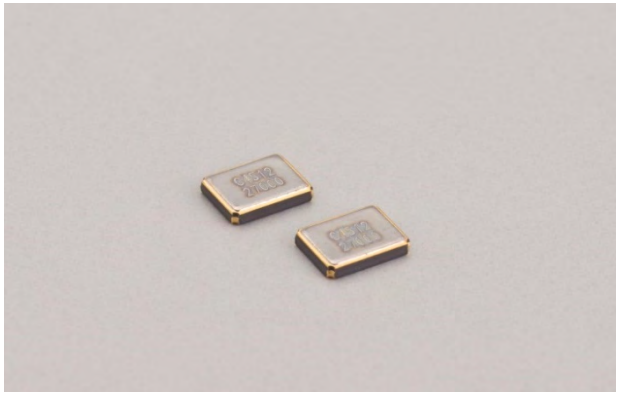
Q'ty/reel	a	b	c	d (φ)	e	f	g	h	j	k	l	m (φ)	n (φ)
1,000	24.0	11.5	12.0	2.0	14.1	0.4	4.2	5°	6.5	5°	25.5	330	80

Rev.1

CITIZEN

AT-CUT CRYSTAL UNIT (SMD · Ceramic Package)

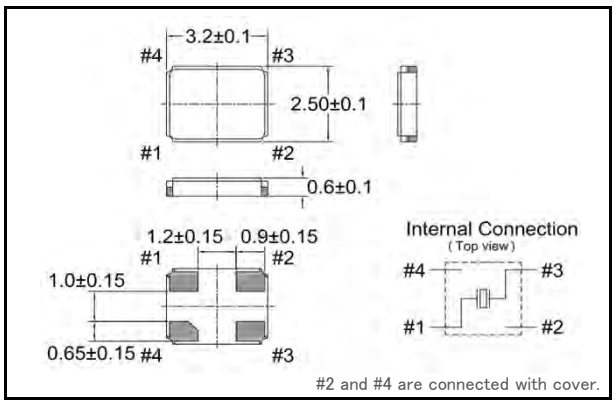
RoHS compliant / Pb free | **CS325S** | **3,000pcs/reel**



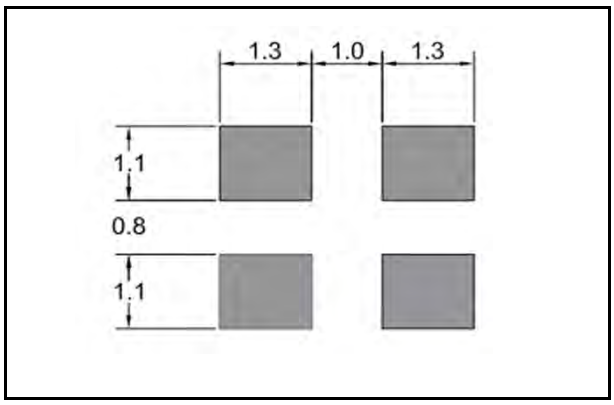
■ FEATURES

- Ultra-lightweight microminiature AT Crystal units SMD type
- Frequency range : 12.0 ～ 54.0MHz
- External dimensions (mm)
  L : 3.3 x W : 2.6 x H : 0.7
- Applications
  Small mobile devices / Consumer products

■ DIMENSION [mm]



■ SOLDER PAD LAYOUT [mm]



■ STANDARD SPECIFICATIONS

Item / Model		CS325S	Conditions
Nominal Frequency	f_0	12.0MHz ～ 54.0MHz (Fundamental)	Please contact us for frequencies available
Frequency Tolerance	$\Delta f/f_0$	±30ppm	at 25°C
Frequency Tolerance over Operating Temperature Range	$\Delta f/f_0$	±30ppm	−10°C～+60°C
Operating Temperature Range	T_{OPR}	−40°C ～ +85°C	
Storage Temperature Range	T_{STR}	−55°C ～ +125°C	
Motional (series) resistance	R_1	Refer to the following table	at 25°C
Load capacitance	C_L	10.0pF ～ ∞	Please specify your requirement
Shunt capacitance	C_0	5.0pF Max.	
Level of drive	D_L	100 μW Max.	
Insulation Resistance	I_R	500MΩ Min.	DC100V±15V
Aging (first year)	$\Delta f/f_0$	±5ppm Max.	25°C±3°C

■ MOTIONAL (SERIES) RESISTANCE (R_1)

Freq. Range (MHz)	12.0≦f0＜16.0	16.0≦f0＜20.0	20.0≦f0＜30.0	30.0≦f0＜54.0
R_1	150Ω Max.	120Ω Max.	80Ω Max.	50Ω Max.

CITIZEN

■ PART NUMBERING SYSTEM

CS325S 20000000 A B J T - □□□

Frequency
Please specify the frequency in Hz.

Frequency Tolerance (at 25℃)

A	±30ppm (STD)
E	±10ppm

Frequency Tolerance over Operating Temp. Range

A	±30ppm Range −10℃ ～ +60℃
B	±50ppm Range −10℃ ～ +60℃
E	±10ppm Range −10℃ ～ +60℃

Load capacitance (CL)

J	18.0pF
Q	10.0pF

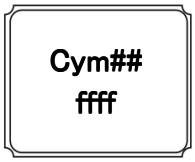
Package specification

T	Only Tape & Reel

CITIZEN management code
Ref. Code for internal use.

*Please contact us for specifications available.

■ Part Marking [standard]



C : Manufacture's ID Code

y : The last digit of production year

m : Production month (See Table.1)

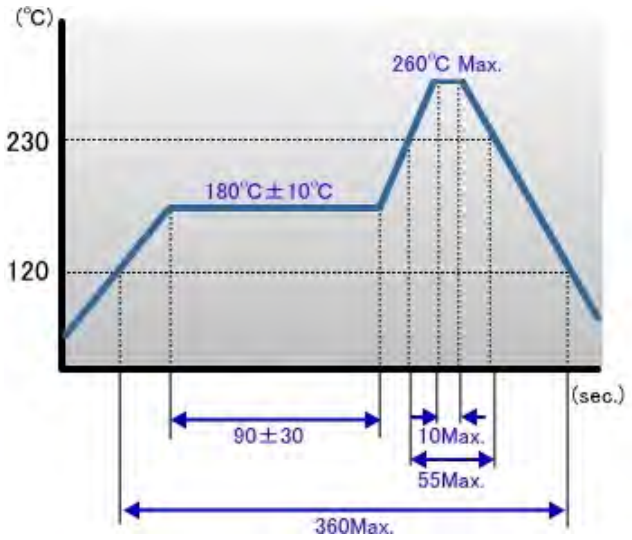
: Production Lot No.

f : The first 4 digits of Frequency including the decimal point

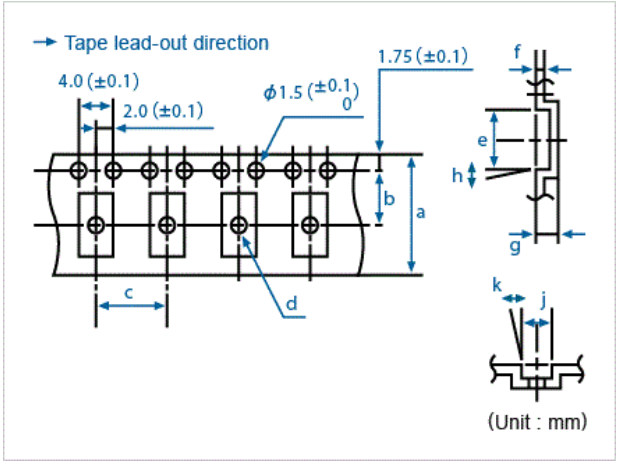
Table.1

Month	Jan	Feb	···	Sep	Oct	Nov	Dec
Code	1	2	···	9	X	Y	Z

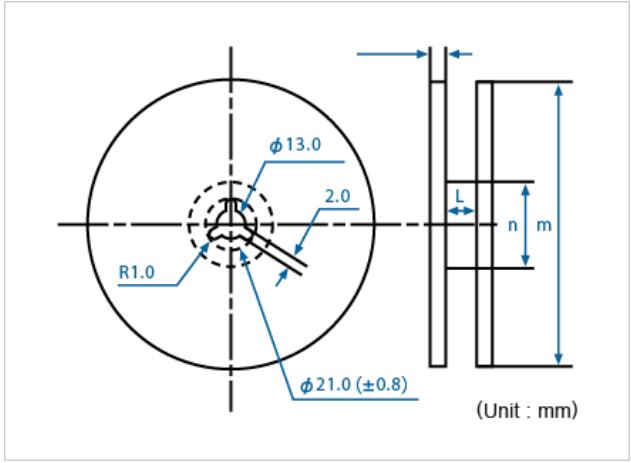
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC−1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC−1009B R15

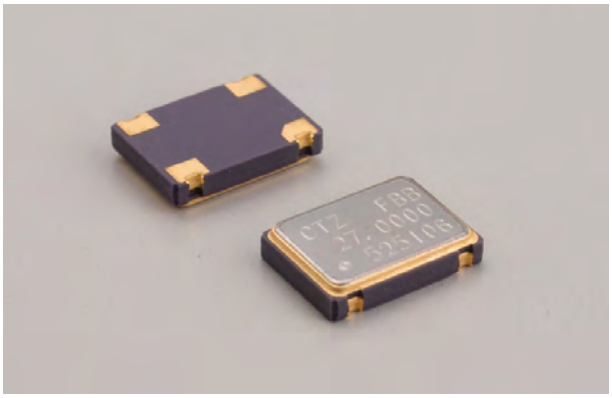
Q'ty/reel	a	b	c	d (φ)	e	f	g	h	j	k	l	m (φ)	n (φ)
3,000	8.0	3.5	4.0	1.1	3.5	0.25	0.75	5°	2.8	−	11.4	180	60

Rev.1

CITIZEN

CRYSTAL CLOCK OSCILLATORS (SMD · Ceramic Package)

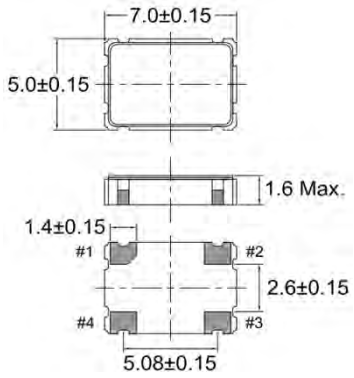
RoHS compliant | **CSX-750F** | **1,000pcs/reel**



■ FEATURES

- Frequency range : 1.0 ～ 80.0MHz
- External dimensions (mm)
  L : 7.2 x W : 5.2 x H : 1.6
- Applications
  Consumer products

■ DIMENSION [mm]



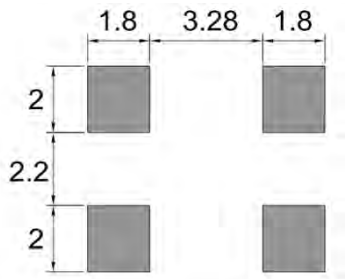
Pin Assignment

Terminal	Connection
#1	OE or Stand By
#2	GND
#3	OUTPUT
#4	Vdd

Function

#1 Input	#3 Output Condition
High	Oscillation out
Open	Oscillation out
Low	Oscillation stop

■ SOLDER PAD LAYOUT [mm]



■ STANDARD SPECIFICATIONS

*Model is determined by selection of OE/ST functions, frequency stability, and supply voltage.

Item \ Model	OE / STAND-BY	CSX-750FC (*)		CSX-750FB (*)	CSX-750FJ (*)
Frequency Range		1.8432～39.999MHz	40.000～75.000MHz	1.8432～39.999MHz	40.000～80.000MHz
Supply Voltage		Vdd:5.0V±0.5V		Vdd:3.3V±0.3V	
Frequency Stability	(*)	B:±50ppm(−20℃ ～ +70℃), C:±100ppm(−20℃ ～ +70℃) E:±50ppm(−40℃ ～ +85℃), F:±100ppm(−40℃ ～ +85℃)			
Operating Temperature Range		−20℃ ～ +70℃ / (−40℃ ～ +85℃)			
Storage Temperature Range		−55℃ ～ +125℃			
Current consumption		25mA Max.	45mA Max.	15mA Max.	25mA Max.
Duty	TTL level (1.4V)	40～60%		—	
	CMOS level (1/2 Vdd)	45～55%			
Output Voltage	V_{OH}	0.9Vdd Min.			
	V_{OL}	0.4V Max.		0.1Vdd Max.	
Output Load	TTL	10TTL Max.		—	
	CMOS	50pF Max.		30pF Max.	
Rise and Fall Time		8 nsec Max.	6 nsec Max.	8 nsec Max.	6 nsec Max.
Start-up time		4 msec Max.	10 msec Max.	4 msec Max.	10 msec Max.
Input Voltage	V_{IH}	2.0V Min.			0.7Vdd Min.
	V_{IL}	0.8V Max.		0.4V Max.	0.3Vdd Max.
Disable current		10mA Max.	20mA Max.	5mA Max.	—
Stand-by current		—			10μA Max.

CITIZEN

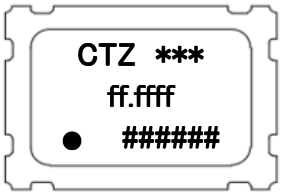
■ PART NUMBERING SYSTEM

CSX-750F C B 20000000 T - □□□

Model	Frequency Stability Operating Temp. Range		Frequency	Package specification		CITIZEN management code
Please specify the model by referring to STANDARD SPECIFICATIONS.	B	±50ppm (−20℃ ～ +70℃)	Please specify the frequency in Hz.	T	Only Tape & Reel	Ref. Code for internal use.
	C	±100ppm (−20℃ ～ +70℃)				
	E	±50ppm (−40℃ ～ +85℃)				
	F	±100ppm (−40℃ ～ +85℃)				

*Please contact us for specifications available.

■ Part Marking [standard]



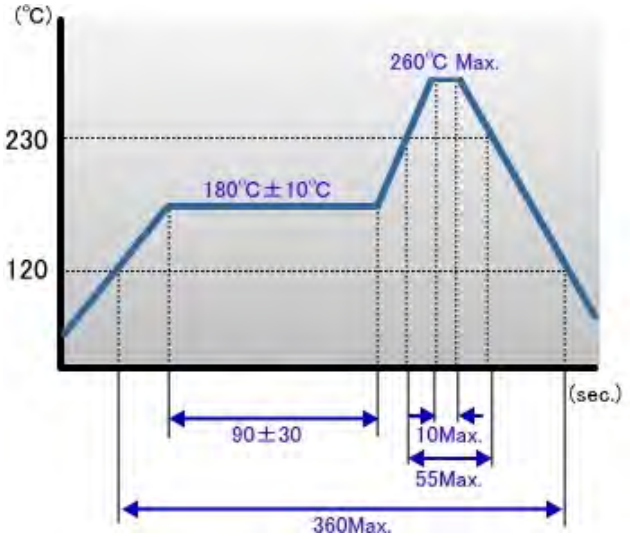
CTZ : Manufacture's ID Code

* : Model

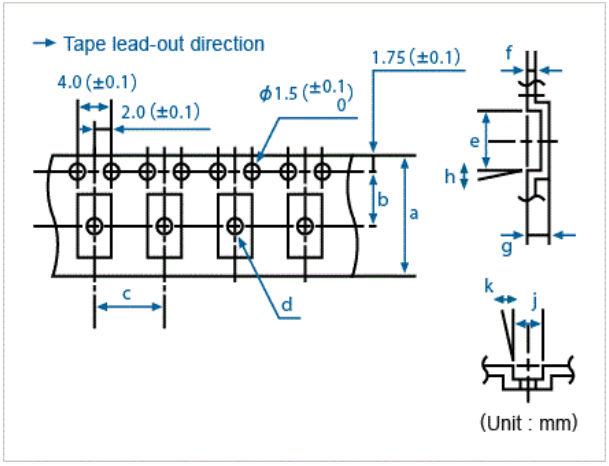
f : Frequency

: Production Lot No.

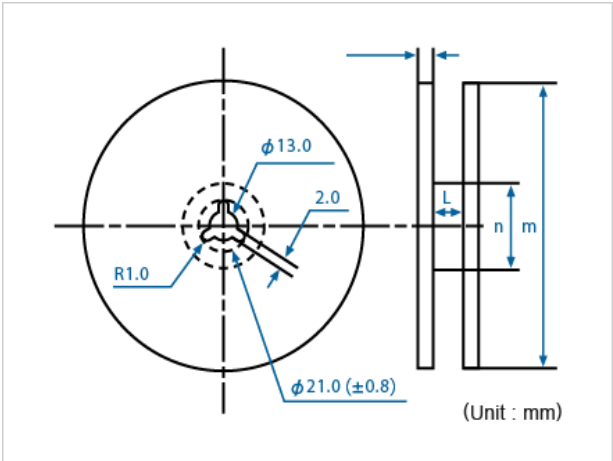
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

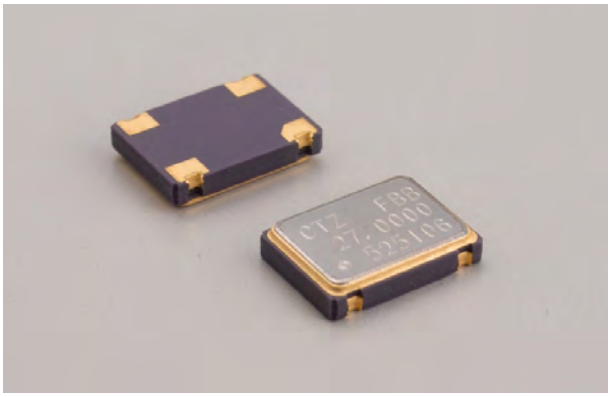
Q'ty/reel	a	b	c	d (φ)	e	f	g	h	j	k	l	m (φ)	n (φ)
1,000	16.0	7.5	8.0	1.5	7.4	0.3	1.9	5°	5.4	5°	16.0	180	62

Rev.1

CITIZEN

CRYSTAL CLOCK OSCILLATORS (SMD · Ceramic Package)

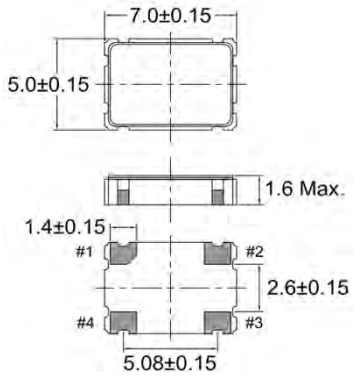
RoHS compliant | **CSX-750F (Low Voltage Ver.)** | 1,000pcs/reel



■ FEATURES

- Low current consumption type
- Frequency range : 1.0 ～ 39.9MHz
- External dimensions (mm)
  L : 7.2 x W : 5.2 x H : 1.6
- Applications
  Consumer products

■ DIMENSION [mm]



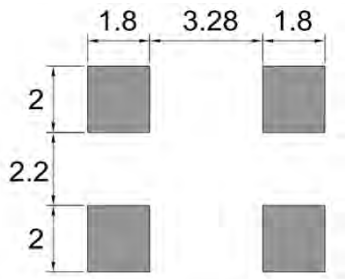
Pin Assignment

Terminal	Connection
#1	OE or Stand By
#2	GND
#3	OUTPUT
#4	Vdd

Function

#1 Input	#3 Output Condition
High	Oscillation out
Open	Oscillation out
Low	Oscillation stop

■ SOLDER PAD LAYOUT [mm]



■ STANDARD SPECIFICATIONS

Item \ Model	OE / STAND-BY	CSX-750FM (*)	CSX-750FH (*)	CSX-750FN (*)
Frequency Range		1.8432MHz～39.999MHz		
Supply Voltage		Vdd : 1.8V±0.2V	Vdd : 2.5V±0.2V	Vdd : 2.8V±0.2V
Frequency Stability	(*)	B : ±50ppm (−20℃ ～ +70℃), C : ±100ppm (−20℃ ～ +70℃) E : ±50ppm (−40℃ ～ +85℃), F : ±100ppm (−40℃ ～ +85℃)		
Operating Temperature Range		−20℃ ～ +70℃ / (−40℃ ～ +85℃)		
Storage Temperature Range		−55℃ ～ +125℃		
Current consumption		2.5mA Max.	3.0mA Max.	3.2mA Max.
Duty	TTL level (1.4V)	—		
	CMOS level (1/2 Vdd)	45～55%		
Output Voltage	V_{OH}	0.9Vdd Min.		
	V_{OL}	0.1Vdd Max.		
Output Load	TTL	—		
	CMOS	15pF Max.		
Rise and Fall Time		8 nsec Max.		
Start-up time		4 msec Max.		
Input Voltage	V_{IH}	0.8Vdd Min.		
	V_{IL}	0.2Vdd Max.		
Disable current		—		
Stand-by current		10 μA Max.		

CITIZEN

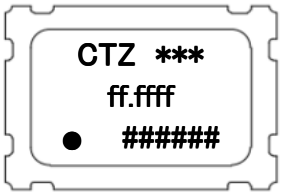
■ PART NUMBERING SYSTEM

CSX-750F M B 20000000 T - □□□

Model	Frequency Stability Operating Temp. Range		Frequency	Package specification		CITIZEN management code
Please specify the model by referring to STANDARD SPECIFICATIONS.	B	±50ppm (−20℃ ～ +70℃)	Please specify the frequency in Hz.	T	Only Tape & Reel	Ref. Code for internal use.
	C	±100ppm (−20℃ ～ +70℃)				
	E	±50ppm (−40℃ ～ +85℃)				
	F	±100ppm (−40℃ ～ +85℃)				

*Please contact us for specifications available.

■ Part Marking [standard]



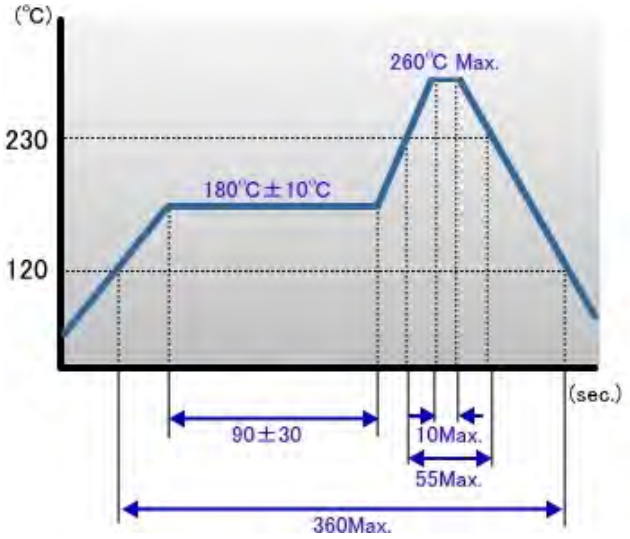
CTZ : Manufacture's ID Code

*** : Model

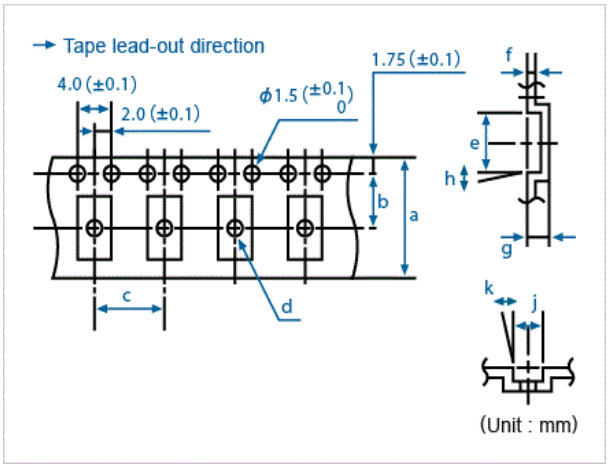
f : Frequency

: Production Lot No.

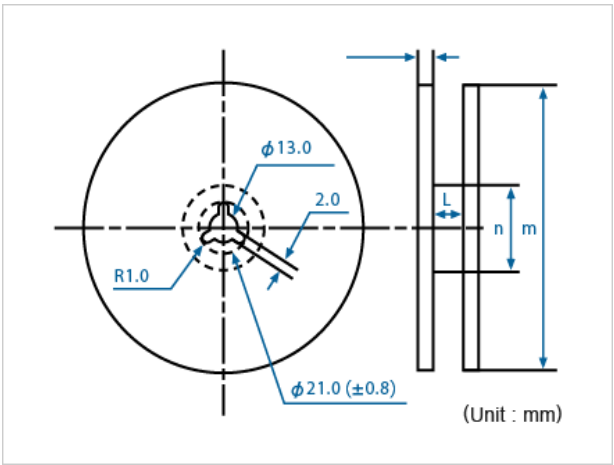
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

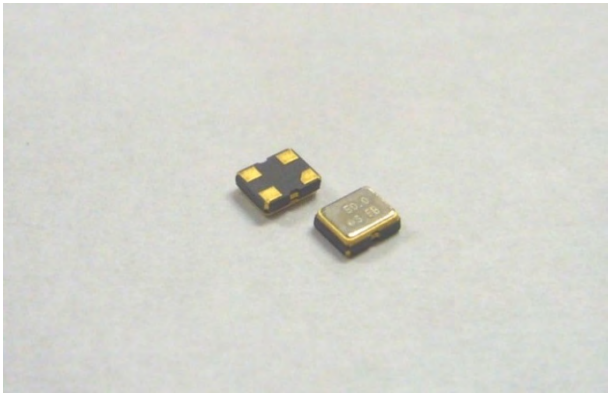
Q'ty/reel	a	b	c	d (φ)	e	f	g	h	j	k	l	m (φ)	n (φ)
1,000	16.0	7.5	8.0	1.5	7.4	0.3	1.9	5°	5.4	5°	16.0	180	62

Rev.1

CITIZEN

CRYSTAL CLOCK OSCILLATORS (SMD · Ceramic Package)

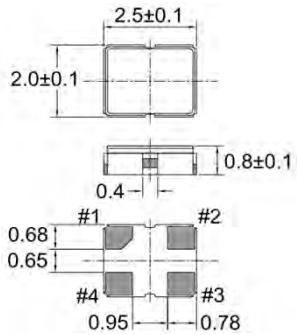
RoHS compliant / Pb free | **CSX-252F** | 3,000pcs/reel



■ FEATURES

- Low current consumption type
- Frequency range : 1.0 ～ 39.9MHz
- External dimensions (mm)
  L : 2.6 x W : 2.1 x H : 0.9
- Applications
  Small mobile devices / Consumer products

■ DIMENSION [mm]



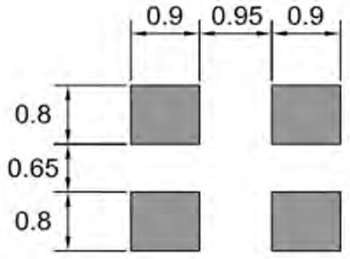
Pin Assignment

Terminal	Connection
#1	Stand By
#2	GND
#3	OUTPUT
#4	Vdd

Function

#1 Input	#3 Output Condition
High	Oscillation out
Open	Oscillation out
Low	Oscillation stop

■ SOLDER PAD LAYOUT [mm]



■ STANDARD SPECIFICATIONS

Item \ Model	OE / STAND-BY	CSX-252FM(＊)	CSX-252FH(＊)	CSX-252FJ(＊)	CSX-252FA(＊)
Frequency Range		32.768kHz, 2.000MHz ～ 60.000MHz			
Supply Voltage		1.8V±5%	2.5V±5%	3.3V±0.3V	1.8V ～ 3.3V
Frequency Stability	(＊)	B : ±50ppm(−20℃ ～ +70℃), E : ±50ppm(−40℃ ～ +85℃) P : ±25ppm(−40℃ ～ +85℃) ＊Only 32.768kHz			
Operating Temperature Range		−20℃ ～ +70℃ / (−40℃ ～ +85℃)			
Storage Temperature Range		−45℃ ～ +90℃			
Current consumption		2.5mA Max : ～30MHz	4.5mA Max : ～19MHz	6mA Max : ～19MHz	
		3.0mA Max : ～40MHz	5.5mA Max : ～40MHz	7mA Max : ～40MHz	
		3.5mA Max : ～60MHz	6.5mA Max : ～60MHz	8mA Max : ～60MHz	
Duty	TTL level (1.4V)	−			
	CMOS level (1/2 Vdd)	45% ～ 55%			
Output Voltage	V_{OH}	0.9Vdd Min.			
	V_{OL}	0.1Vdd Max.			
Output Load	TTL	−			
	CMOS	15pF Max.			
Rise and Fall Time CMOS (20%Vdd ⇔ 80%Vdd)		10nsec Max.			
Start-up time		10msec Max. (Time at minimum operating voltage to be 0sec.)			
Input Voltage (ST)	V_{IH}	0.7Vdd Min.			
	V_{IL}	0.2Vdd Max.			
Disable current		−			
Stand-by current		50 μA Max.			

CITIZEN

■ PART NUMBERING SYSTEM

CSX-252F M B 20000000 T - □□□

Model	Frequency Stability Operating Temp. Range		Frequency	Package specification		CITIZEN management code
Please specify the model by referring to STANDARD SPECIFICATIONS.	B	±50ppm (−20℃ ～ +70℃)	Please specify the frequency in Hz.	T	Only Tape & Reel	Ref. Code for internal use.
	E	±50ppm (−40℃ ～ +85℃)				
	P	±25ppm (−40℃ ～ +85℃)				

*Please contact us for specifications available.

■ Part Marking [standard]

f : The first 4 digits of Frequency including the decimal point

C : Manufacture's ID Code

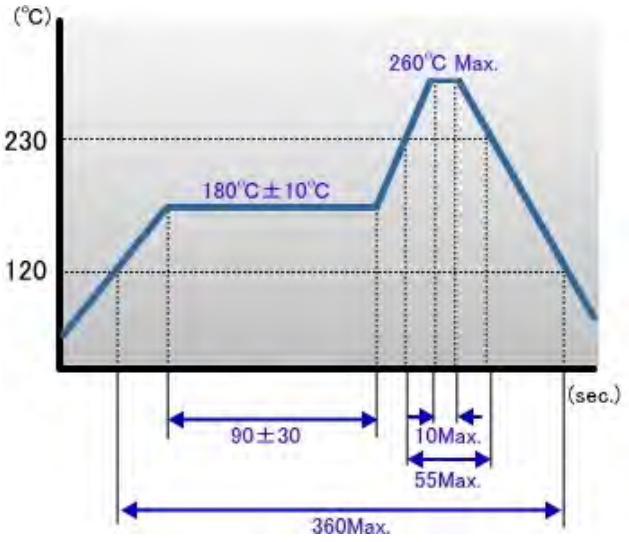
y : The last digit of production year

m : Production month (See Table.1)

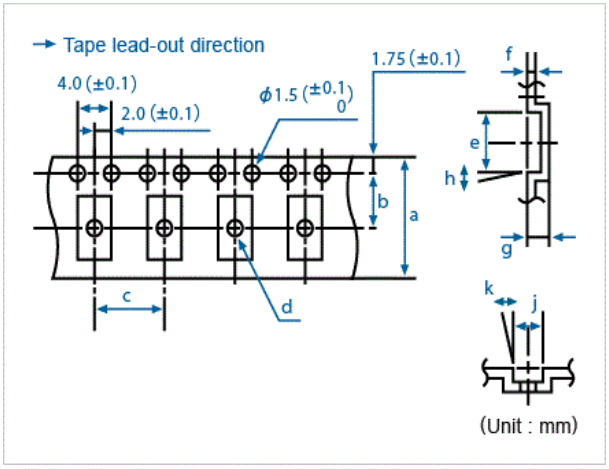
Table.1

Month	Jan	Feb	Mar	···	Oct	Nov	Dec
Code	A	B	C	···	J	K	L

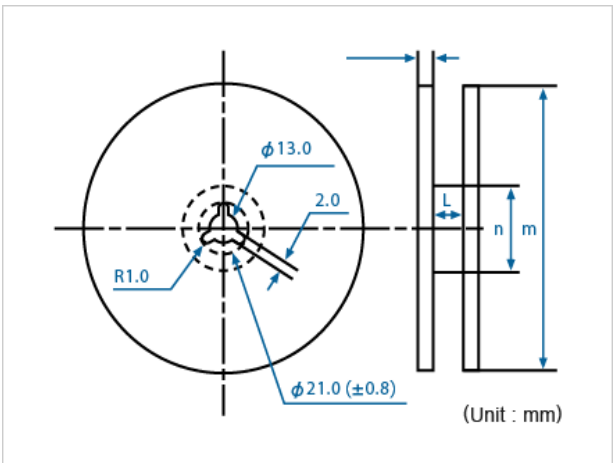
■ Reflow profile



■ Packing



Conforming to JIS C 0806 TB1208NEIAJ and RC-1009B TE1208N



Conforming to JIS C 0806 R12R and EIAJ RC-1009B R15

Q'ty/reel	a	b	c	d (φ)	e	f	g	h	j	k	l	m (φ)	n (φ)
3,000	8.0	3.5	4.0	1.1	2.7	0.25	1.15	5°	2.25	5°	9.0	180	60

Rev.1

BÜROS IN EUROPA

Deutschland
Nagold (Zentrale)

Österreich

Frankreich

Spanien

Italien

Ungarn

Bulgarien

Rumänien

Schweiz

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