

kHz Range Crystal unit

MC-146

SEIKO EPSON CORPORATION

Product name

MC-146 32.768000 kHz 9.0 +20.0-20.0

Product Number / Ordering code

Q13MC14620004xx

Please refer to the 5.Packing information about xx (last 2 digits)

Complies with EU RoHS directive

Reference weight Typ. 29 mg

1.Absolute maximum ratings

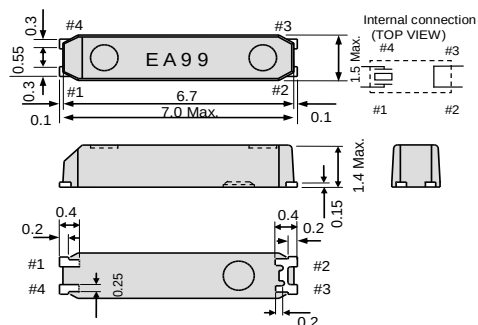
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Storage temperature	T_stg	-55	-	125	°C	Storage as single product
Maximum drive level	GL	-	-	1.0	μW	

2.Specifications(characteristics)

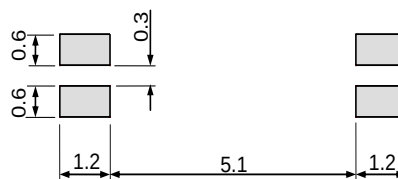
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Nominal frequency	f_nom	-	32.768	-	kHz	
Operating temperature	T_use	-40	-	85	°C	
Level of drive	DL	-	-	1.0	μW	
Frequency tolerance	f_tol	-20.0	-	+20.0	$\times 10^{-6}$	+25°C DL=0.1μW
Turnover temperature	Ti	20	25	30	°C	
Parabolic coefficient	B	-	-	-0.04	$\times 10^{-6}/^{\circ}\text{C}^2$	
Load capacitance	CL	-	9.0	-	pF	
Motional resistance (ESR)	R1	-	45	65	k Ω	
Motional capacitance	C1	-	1.9	-	fF	
Shunt capacitance	C0	-	0.8	-	pF	
Motional inductance	L1	-	11.7	-	kH	
Frequency aging	f_age	-3	-	3	$\times 10^{-6}$ /yea	@+25°C, First year

3.External dimensions

(Unit: mm)

**4.Footprint(Recommended)**

(Unit: mm)

**5.Packing information**

[1] Product number last 2 digits code (xx) description

The recommended code is "0X"

Q13MC14620004xx

Code	Condition	Code	Condition
01	Any Q'ty vinyl bag(Tape cut)	14	1000pcs / Reel
11	Any Q'ty / Reel	15	2000pcs / Reel
12	250pcs / Reel	00	3000pcs / Reel
13	500pcs / Reel	0X	9000pcs / Reel

[2] Taping specification

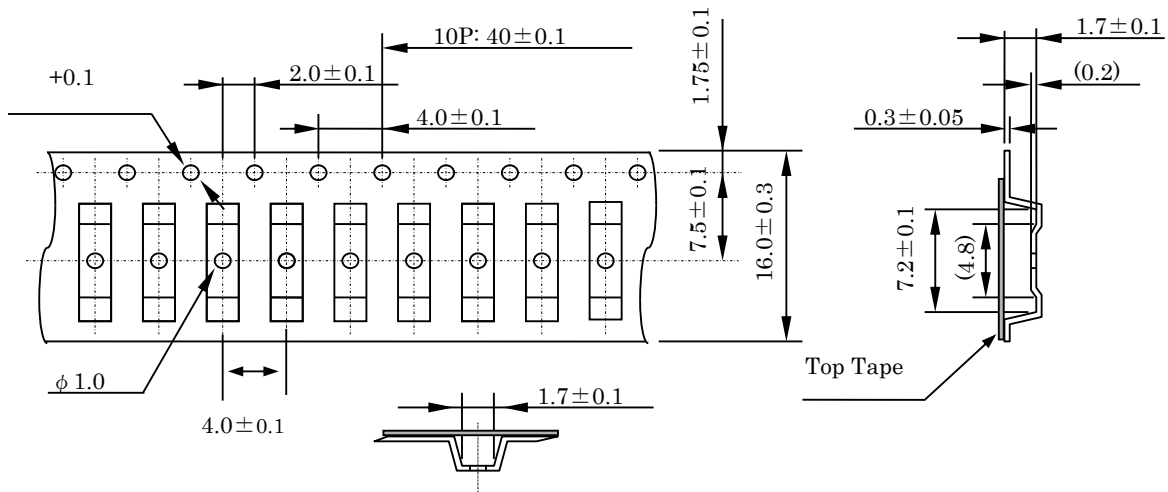
Subject to EIA-481 & IEC-60286

(1) Tape dimensions TE1604L

Material of the Carrier Tape : PS

Material of the Top Tape : PET+PE

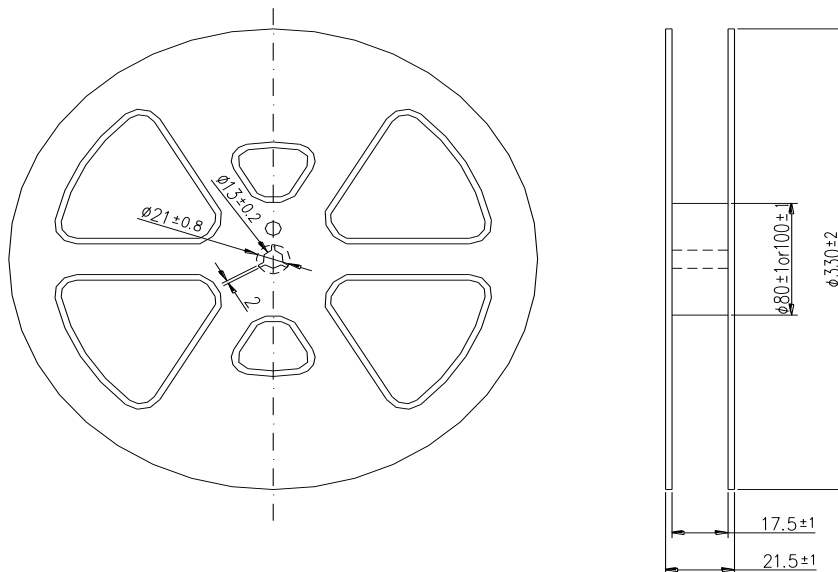
Unit: mm



(2) Reel dimensions

Material of the Reel : PS

Unit: mm



Reflow profile

Pre Heating Temperature

Tp1 ~ Tp2 = + 170 °C

Heating Temperature

TMI = + 220 °C

Peak Temperature

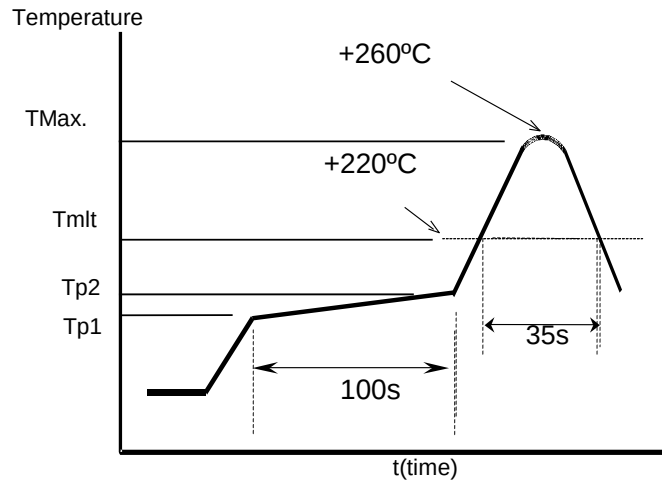
TMax. = + 260 °C

Point of measuring

In case of Solder ability

Terminal.

In case of Resistance to soldering heat
Surface.

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