

## MHz Range Crystal unit

FA-238V

SEIKO EPSON CORPORATION

Product name FA-238V 12.000000 MHz 8.0 +50.0-50.0

Product Number / Ordering code Q22FA23V00136xx

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

Pb free / Complies with EU RoHS directive

Reference weight Typ. 16 mg

**1.Absolute maximum ratings**

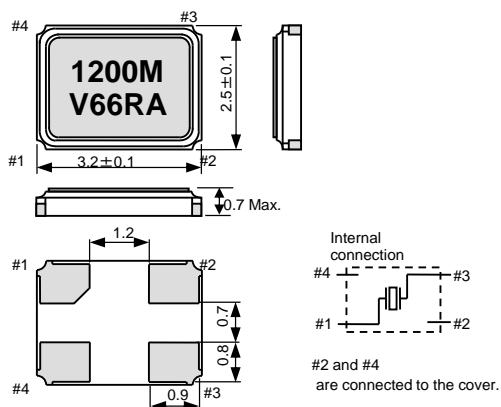
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Storage temperature	T_stg	-40	-	+125	°C	Storage as single product
Operating temperature	T_use	-40	-	+105	°C	

**2.Specifications(characteristics)**

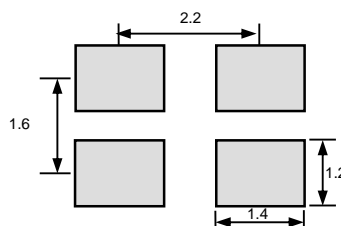
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions / Remarks
Nominal frequency	f_nom	—	12.000000	—	MHz	Fundamental
Frequency tolerance	f_tol	-50	-	+50	x 10 <sup>-6</sup>	@+25°C
Frequency Stability over temperature	f_tem	-30	-	+30	x 10 <sup>-6</sup>	-20°C to +70°C
Operating temperature	T_use	-20	-	+70	°C	
Level of drive	DL	10	100	200	μW	
Load capacitance	CL	—	8	—	pF	
Motional resistance (ESR)	R1	-	-	100	Ω	
Motional capacitance	C1	-	2.01	-	fF	
Motional inductance	L1	-	87.68	-	mH	
Shunt capacitance	C0	-	0.96	-	pF	
Frequency aging	f_age	-5	—	+5	x10 <sup>-6</sup> / 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 "17"

Q22FA23V00136xx

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	17	4000pcs / Reel

[ 2 ] Taping specification

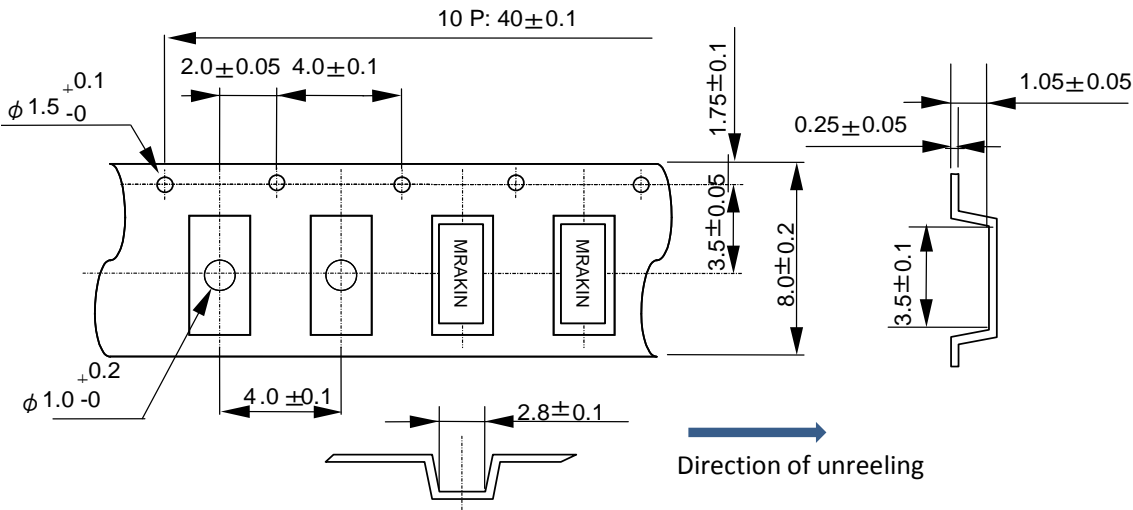
Subject to EIA-481 & IEC-60286

(1) Tape dimensions TE0804L

Material of the Carrier Tape : PS

Material of the Top Tape : PET+PE

Unit: mm



(2) Reel dimensions

Center material : PS

Material of the Reel : PS

Unit: mm



## 6.Reflow profile

### Reflow condition

Pre Heating Temperature

Tp1 ~ Tp2 = + 170 ° C

Heating Temperature

TMit = + 220 ° C

Peak Temperature

TMax. = + 260 ° C

Point of measuring

In case of Solderability  
Terminal.

In case of Resistance to soldering heat  
Surface.

Temperature



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