

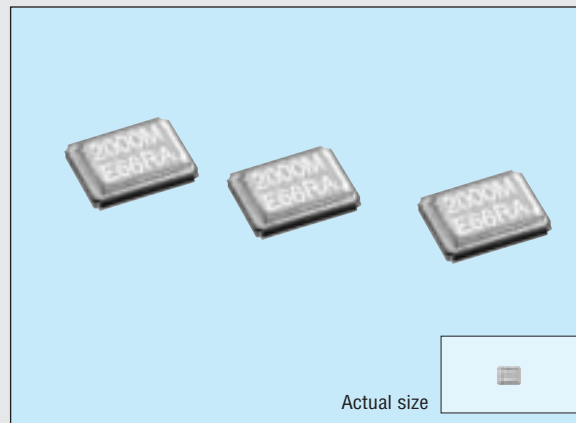
## THIN SMD HIGH-FREQUENCY CRYSTAL UNIT

## FA-238

Product number (please refer to page 1)

Q22FA238xxx00

- High-density mounting-type SMD.
- Excellent shock resistance.
- Capable of covering a wide frequency range. (from 16 MHz to 50 MHz)
- 0.7 mm Max. thickness is equal to SMD-type IC.
- Most suitable for small communication devices.



## ■ Specifications (characteristics)

Item	Symbol	Specifications	Remarks	
Nominal frequency range	f	16.000 MHz to 50.000 MHz	Fundamental mode *1	
Temperature range	Storage temperature	T <sub>STG</sub>	-40 °C to +125 °C	Stored as bare product after unpacking
	Operating temperature	T <sub>OPR</sub>	-40 °C to +85 °C	Specified equivalent series must be satisfied.
	Operable temperature	T <sub>USE</sub>	As per below table	Specified equivalent series and frequency temperature characteristics must be satisfied.
Drive level	Maximum drive level	GL	2 mW Max.	Only crystal oscillation is guaranteed
	Recommended drive level	DL	10 μW to 100 μW	
Frequency tolerance	Δf/f	±50 × 10 <sup>-6</sup> (standard) (±15 × 10 <sup>-6</sup> to ±50 × 10 <sup>-6</sup> is available)	T <sub>a</sub> =+25 °C±3 °C For the out of standard specifications, please contact us for inquiries. *1	
Frequency temperature characteristics		±30 × 10 <sup>-6</sup> (standard) As per below table	-20 °C to +70 °C For the out of standard specifications, please contact us for inquiries. *1	
Load capacitance	C <sub>L</sub>	7 pF to ∞ (standard:12 pF)	Please specify	
Series resistance	R <sub>1</sub>	As per below table	Operable temperature range , DL=100 μW	
Shunt capacitance	C <sub>0</sub>	5.0 pF Max.		
Insulation resistance	IR	500 M Ω Min.		
Aging	f <sub>a</sub>	±5 × 10 <sup>-6</sup> /year Max.	T <sub>a</sub> =+25 °C ±3 °C, first year	
Shock resistance	S. R.	±10 × 10 <sup>-6</sup> Max.	100 g dummy (Seiko Epson Standard) drop from 1500 mm height on to the concrete 3 directions 10 times.	

\*1 f &gt; 40 MHz : Only standard specifications

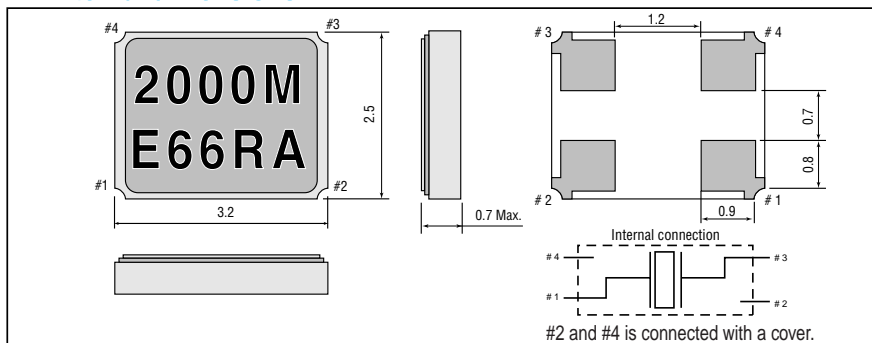
## ■ Frequency temperature characteristics

Operable temperature	Frequency tolerance
0 °C to +50 °C	± 8 × 10 <sup>-6</sup> Min.
-10 °C to +60 °C	± 12 × 10 <sup>-6</sup> Min.
-20 °C to +70 °C	± 15 × 10 <sup>-6</sup> Min.
-30 °C to +80 °C	± 20 × 10 <sup>-6</sup> Min.
-40 °C to +85 °C	± 30 × 10 <sup>-6</sup> Min.

## ■ Series resistance (R1)

Frequency	Series resistance
16.0 MHz ≤ f < 20.0 MHz	80 Ω Max.
20.0 MHz ≤ f < 25.0 MHz	60 Ω Max.
25.0 MHz ≤ f < 30.0 MHz	50 Ω Max.
30.0 MHz ≤ f ≤ 50.0 MHz	40 Ω Max.

## ■ External dimensions



(Unit: mm)

## ■ Recommended soldering pattern

(Unit: mm)

