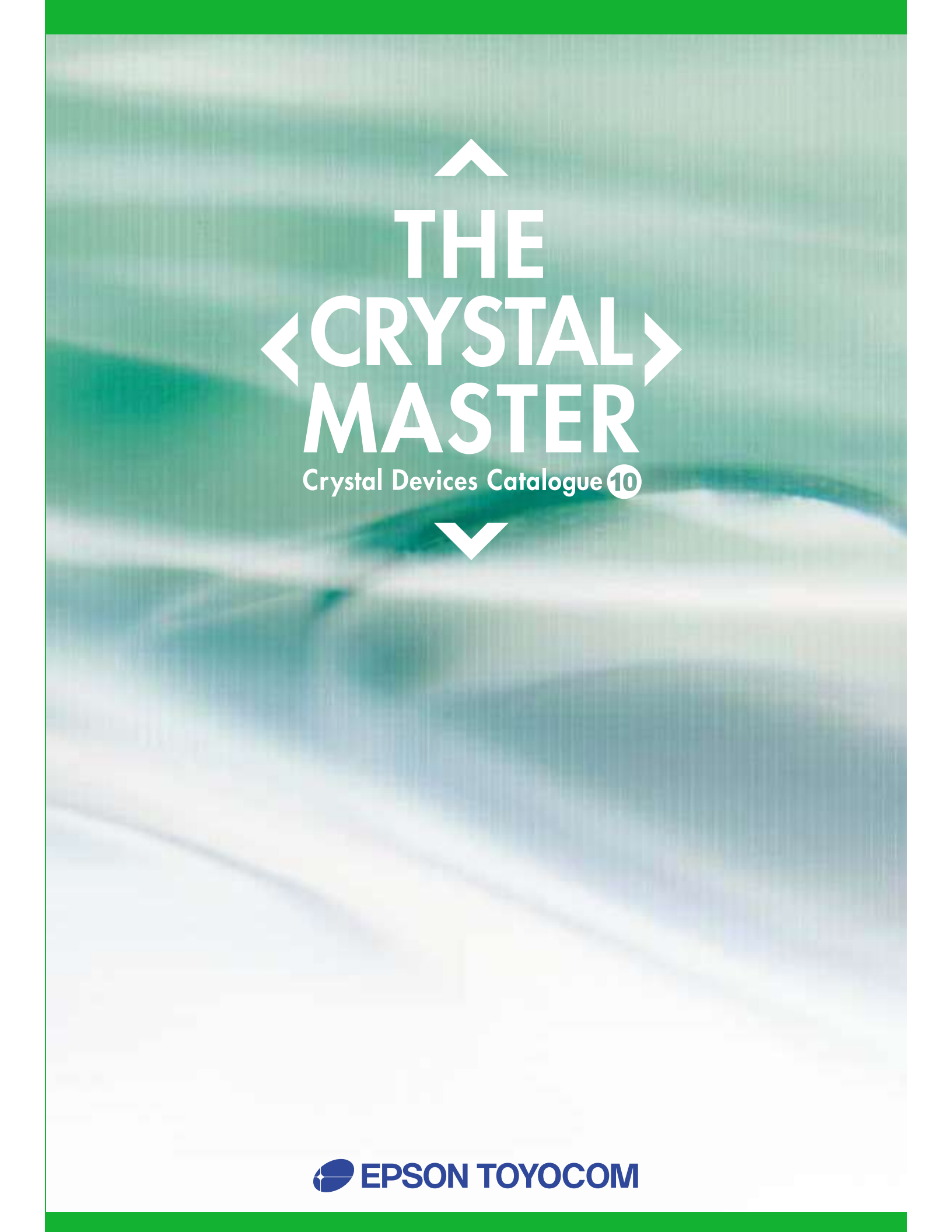




^

THE ◀ CRYSTAL ▶ MASTER

Crystal Devices Catalogue 10

▼



Crystal Unit / Resonator

► kHz Range Crystal Unit (Tuning fork)

Page	Model	Actual size (mm)	Max.	Frequency	20 kHz	32 kHz	100 kHz	200 kHz	300 kHz
4	FC-12M		2.05×1.2×0.6 t			32 kHz	77.5 kHz		
5	FC-13D	NEW	3.2×1.5×0.38 t			● 32.768 kHz			
	FC-13E		3.2×1.5×0.48 t			● 32.768 kHz			
6	FC-13A		3.2×1.5×0.9 t			● 32.768 kHz			
7	FC-13F		3.2×1.5×0.6 t			● 32.768 kHz			
8	FC-135		3.2×1.5×0.9 t		32 kHz	77.5 kHz			
	FC-145		4.1×1.5×0.9 t			● 32.768 kHz			
	FC-255		4.9×1.8×0.9 t						
9	MC-146		7.0×1.5×1.4 t		32 kHz	100 kHz			
	MC-156		7.1×3.3×1.5 t						
10	MC-306		8.0×3.8×2.54 t	20 kHz			165 kHz		
	MC-405/406		10.41×4.06×3.6 t	20 kHz			165 kHz		● 307.2 kHz
11	MC-30A		8.0×3.8×2.54 t	20 kHz			165 kHz		
12	C-001R		Φ3.1						
	C-002RX		Φ2.0						
	C-004R		Φ1.5			● 32.768 kHz			
	C-005R		Φ1.2						
	C-2-TYPE		Φ2.0	20 kHz			165 kHz		● 307.2 kHz
	C-4-TYPE		Φ1.5		32 kHz		120 kHz	● 192 kHz	

► MHz Range Crystal Unit (AT)

Page	Model	Actual size (mm)	Max.	Frequency	1 MHz	10 MHz	20 MHz	64 MHz
13	FA-118	NEW	1.6×1.2×0.4 t				26 MHz	29.999 MHz
	FA-118T	NEW	1.6×1.2×0.35 t				30 MHz	54 MHz
14	FA-128		2.0×1.6×0.5 t				24 MHz	54 MHz
15	FA-20H		2.5×2.0×0.55 t		12 MHz		48 MHz	
16	FA-238V		3.2×2.5×0.7 t		12 MHz	15.999 MHz		
	FA-238		3.2×2.5×0.7 t			16 MHz	60 MHz	
	TSX-3225		3.2×2.5×0.6 t			16 MHz	48 MHz	
17	TSX-4025		4.0×2.5×0.7 t		12 MHz	32 MHz		
	TSX-5032		5.0×3.2×0.8 t		10 MHz	32 MHz		
18	FA-365		6.0×3.5×1.4 t			● 12 MHz		
						14 MHz	41 MHz	
19	MA-306		8.0×3.8×2.54 t			● 14.31818 MHz		
						17.734 MHz	41 MHz	
20	MA-406		11.7×4.8×3.7 t		4 MHz			64 MHz*
	MA-505/506		13.46×5.08×4.6 t					
21	CA-301		Φ3.1					

* 8.0 MHz < f_{nom} < 8.2 MHz : Unavailable.
Available frequencies from 4 MHz to less than 5.5 MHz
(4 MHz , 4.032 MHz , 4.096 MHz , 4.19 MHz , 4.194304 MHz ,
4.433619 MHz , 4.5 MHz , 4.8 MHz , 4.9152 MHz)

► Resonator (SAW)

Page	Model	Actual size (mm)	Typ.	Frequency	200 MHz	500 MHz	700 MHz	1 GHz
22	NS-21R		2.5×2.0×0.86 t		300 MHz	500 MHz		
23	NS-32R		3.8×3.8×0.98 t		312 MHz	870 MHz		
	FS-335		3.8×3.8×0.98 t		300 MHz	870 MHz		
	FS-555		4.8×5.2×1.5 t	230 MHz	500 MHz			
24	FS-585		4.8×5.2×1.5 t		300 MHz	500 MHz		

**SAW RESONATOR**

1 port-type

NS-21R

- Frequency range : 300 MHz to 500 MHz
- External dimensions : 2.5 × 2.0 × 0.86 t (mm) Typ.
- Overtone order : Fundamental
- Applications : RKE (Small wireless equipment)
- High reliability and excellent temperature characteristic.
- The smallest package size in the world.



Product Number (please contact us)
Q25NS21Rxxxxx00



Actual size

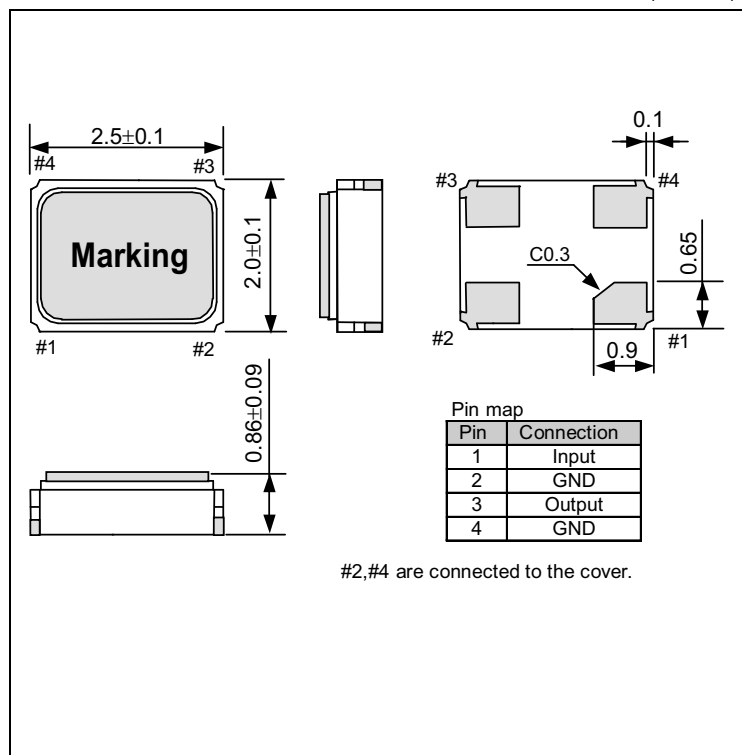
**Specifications (characteristics)**

Item	Symbol	Specifications	Remarks
Nominal frequency range	f_nom	300 MHz to 500 MHz	Please contact us for inquiries regarding available frequencies.
Temperature range	T_stg	-40 °C to +85 °C	Store as bare product after unpacking
	T_use	-40 °C to +85 °C	
Level of drive	DL	2 mW Max.	
Frequency tolerance (standard)	f_tol	$\pm 50 \times 10^{-6}$, $\pm 100 \times 10^{-6}$, $\pm 150 \times 10^{-6}$	+25 °C
Turnover temperature	Ti	+20 °C $\pm$ 20 °C	Please contact us for inquiries about Peak temperature
Parabolic coefficient	B	$-(1.6 \pm 0.4) \times 10^{-8} / ^\circ\text{C}^2$	
Harmonic ratio	Rs/ R1	2 Min.	
Motional resistance(ESR)	R1	20 Ω Max.	
Frequency aging	f_age	$\pm 10 \times 10^{-6}$ / year Max.	+25 °C
Shock resistance	S.R.	$\pm 10 \times 10^{-6}$ Max.	Nine drops on a concrete surface from 1500 mm

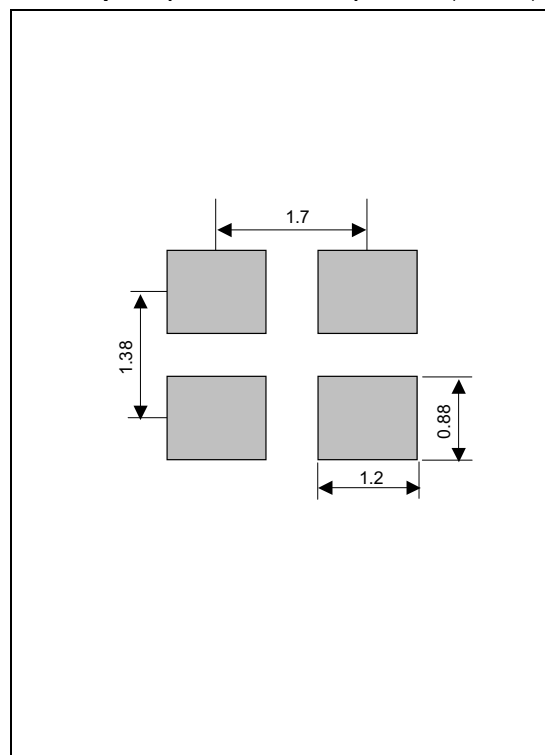
*Please contact us for except RKE use.

External dimensions

(Unit:mm)

**Footprint (Recommended)**

(Unit:mm)





SAW RESONATOR

HIGH-STABILITY

NS-32R

FS-335 / FS-555

- Frequency range : 230 MHz to 870 MHz
- External dimensions : 3.8 × 3.8 × 0.98 t (mm) ... NS-32R / FS-335
4.8 × 5.2 × 1.5 t (mm) ... FS-555
- Overtone order : Fundamental
- Applications : Small wireless equipment



Product Number (please contact us)
 NS-32R: Q25NS32R0xxxx00
 FS-335: Q25FS3350xxxx00
 FS-555: Q25FS5550xxxx00



Actual size

NS-32R

FS-335

FS-555

Specifications (characteristics)

Item		Symbol	Specifications			Remark
			NS-32R	FS-335	FS-555	
Nominal frequency range		f_nom	312 MHz to 870 MHz	300 MHz to 870 MHz	230 MHz to 500 MHz	Please contact us regarding available frequencies
Temperature range	Storage temperature	T_stg	-40 °C to +85 °C			Store as bare product after unpacking
	Operating temperature	T_use				
Level of drive		DL	1 mW Typ.	2 mW Typ.		FS-335 : f_nom >500 MHz 0.1 mW Typ.
Frequency tolerance (standard)		f_tol	As per below table			+25 °C
Turnover temperature		Ti	+25 °C±20 °C	+25 °C±15 °C		Please specify
Parabolic coefficient		B	$-(1.6 \pm 0.4) \times 10^{-8} / ^\circ\text{C}^2$	$-(3.4 \pm 0.8) \times 10^{-8} / ^\circ\text{C}^2$		
Harmonic ratio		Rs/R1	2 Min.			
Motional resistance (ESR)		R1	As per below table			
Frequency aging		f_age	$\pm 10 \times 10^{-6} / \text{year Max.}$			+25 °C
Shock resistance		S.R.	$\pm 10 \times 10^{-6} \text{ Max.}$			Nine drops on a concrete surface from 1500 mm

Frequency tolerance / Motional resistance

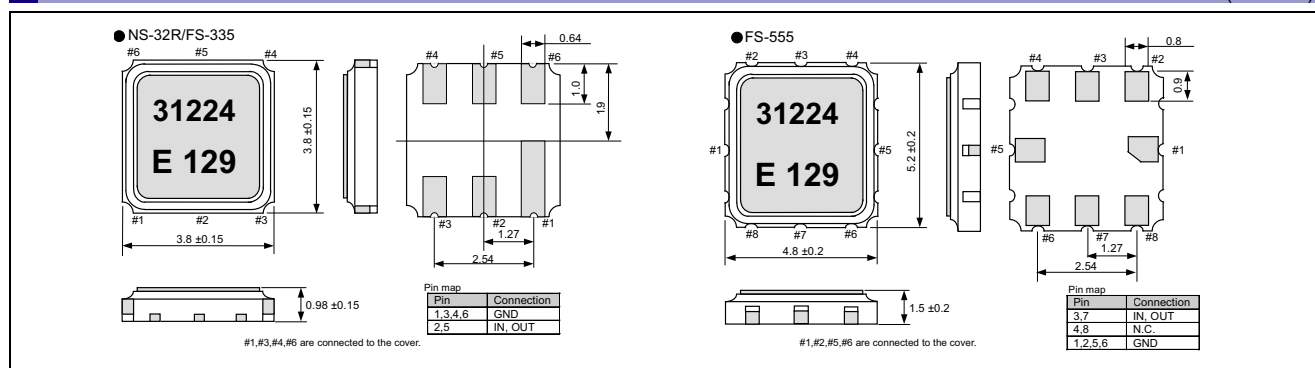
Model	Item	312 MHz to 500 MHz		500 MHz to 870 MHz	
NS-32R	Frequency tolerance (standard)	±50 × 10 ⁻⁶ , ±100 × 10 ⁻⁶ *1		±100 × 10 ⁻⁶	
	Motional resistance (ESR)	30 Ω Max.			

Model	Item	230 MHz to 250 MHz	250 MHz to 300 MHz	300 MHz to 500 MHz	500 MHz to 870 MHz
FS-335	Frequency tolerance (standard)	—	—	±50 × 10 ⁻⁶ , ±100 × 10 ⁻⁶ *1	±100 × 10 ⁻⁶
	Motional resistance (ESR)	—	—	25 Ω Max.	40 Ω Max.
FS-555	Frequency tolerance (standard)	±50 × 10 ⁻⁶ , ±100 × 10 ⁻⁶ *1			—
	Motional resistance (ESR)	40 Ω Max.	25 Ω Max.		—

*1 Please contact us regarding frequency tolerance (< ±50 × 10⁻⁶)

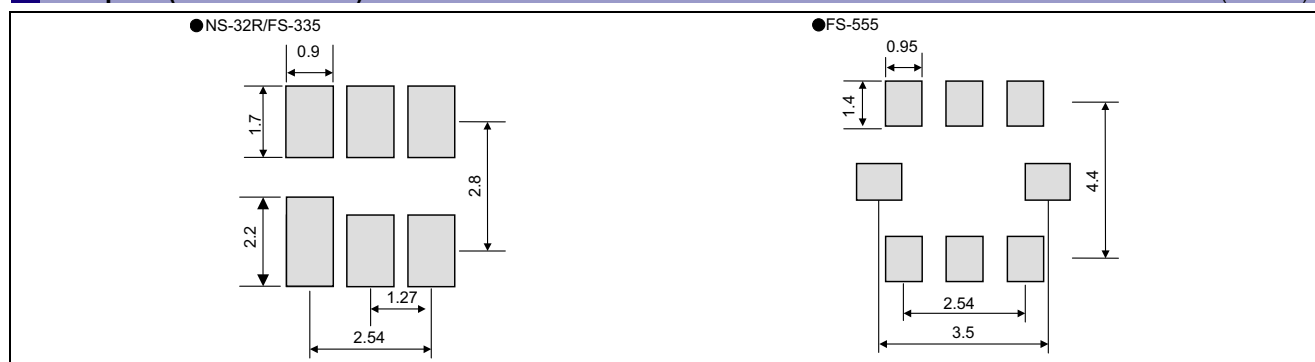
External dimensions

(Unit:mm)



Footprint (Recommended)

(Unit:mm)



**SAW RESONATOR
FOR TPMS****Product Number (please contact us)**
Q25FS5850xxxx00**FS - 585**

- Frequency range : 300 MHz to 500 MHz
- External dimensions : 4.8 × 5.2 × 1.5 t (mm) Typ.
- Overtone order : Fundamental
- Applications : TPMS, Small wireless equipment



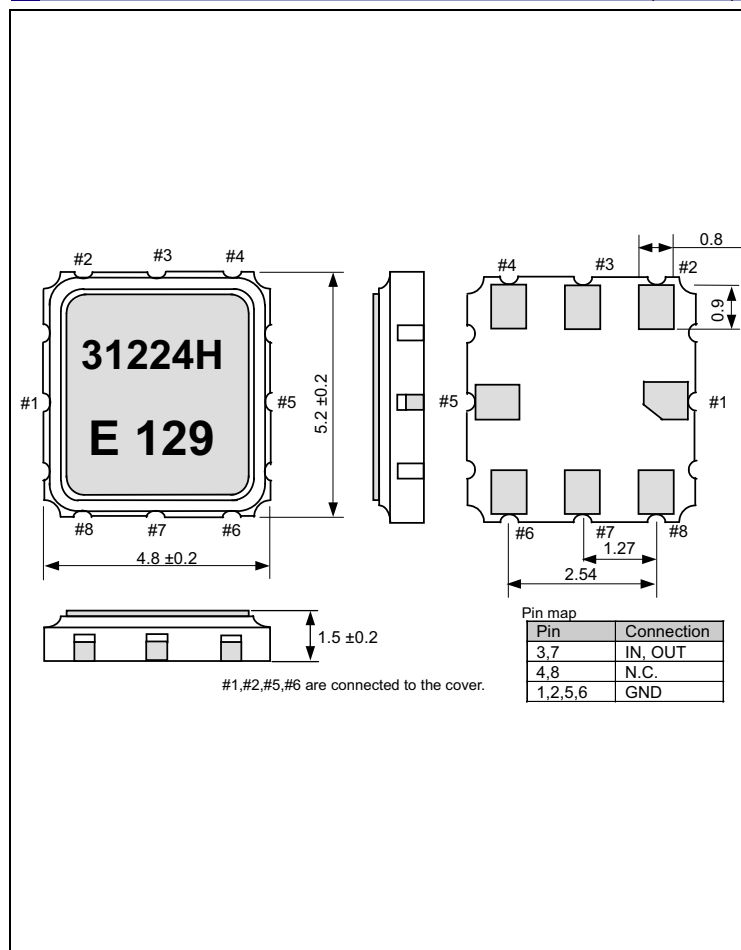
Actual size

**Specifications (characteristics)**

Item		Symbol	Specifications	Remarks
Nominal frequency range		f_nom	300 MHz to 500 MHz	Please contact us for inquiries regarding available frequencies.
Temperature range	Storage temperature	T_stg	-40 °C to +125 °C	Store as bare product after unpacking
	Operating temperature	T_use	-40 °C to +120 °C	
Level of drive		DL	2 mW Typ.	
Frequency tolerance (standard)		f_tol	$\pm 50 \times 10^{-6}$, $\pm 100 \times 10^{-6}$	+25 °C
Turnover temperature		Ti	+40 °C $\pm$ 10 °C	Please contact us for inquires about Peak temperature
Parabolic coefficient		B	$-(3.4 \begin{smallmatrix} +0.8 \\ -0.6 \end{smallmatrix}) \times 10^{-8} / ^\circ\text{C}^2$	
Harmonic ratio		Rs/ R1	2 Min.	
Motional resistance (ESR)		R1	18 Ω Max.	
Frequency aging		f_age	$\pm 10 \times 10^{-6} / \text{year Max.}$	+25 °C
Shock resistance		S.R.	$\pm 10 \times 10^{-6} \text{ Max.}$	Nine drops on a concrete surface from 1500 mm

External dimensions

(Unit:mm)

**Footprint (Recommended)**

(Unit:mm)

