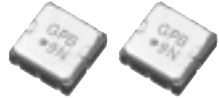
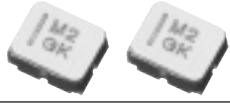


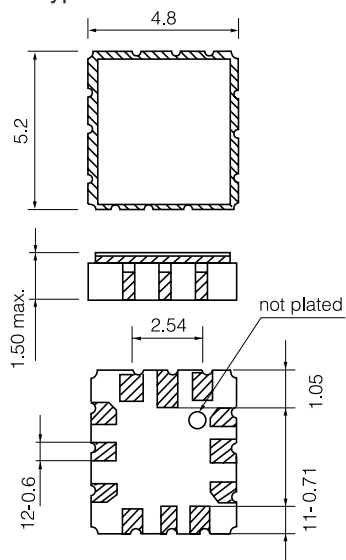
## SAW Devices

| Products                  | Part No.      | System                 | Package |                                                                                       |
|---------------------------|---------------|------------------------|---------|---------------------------------------------------------------------------------------|
| SAW Duplexers             | EFSD836MB1□□  | AMPS                   | ND      |    |
|                           | EFSD836MC1□□  | AMPS                   | C       |    |
| SAW Filters<br>(RF-Stage) | EFCHJ2140MN4  | W-CDMA Rx              | J1      |    |
|                           | EFCHJ897MMT1  | E-GSM Tx               | J3      |                                                                                       |
|                           | EFCHJ942MMT2  | E-GSM Rx               | J3      |                                                                                       |
|                           | EFCHJ1842MT2  | DCS Rx                 | J3      |                                                                                       |
|                           | EFCHJ960MT2   | PCS Rx                 | J4      |                                                                                       |
|                           | EFCHJ1575MT□  | GPS                    | J4      |                                                                                       |
|                           | EFCH1950MTE□  | W-CDMATx               | E       |   |
|                           | EFCH906MMTEK  | J-CDMATx               | E       |                                                                                       |
|                           | EFCH1575MTE3  | GPS (LowLoss)          | E       |                                                                                       |
|                           | EFCH1575MTE4  | GPS (High Attenuation) | E       |                                                                                       |
|                           | EFCH1880DTE9  | PCS TX Half Band Dual  | EA      |                                                                                       |
|                           | EFCH851MMTE2  | J-CDMA Rx              | EA      |                                                                                       |
|                           | EFCH9418MMTY2 | E-GSM/DCSRx Dual       | Y       |  |
|                           | EFCHK9418MT2  | E-GSM/DCSRx Dual       | K       |  |
| SAW Filters<br>(IF-Stage) | EFCH225MDQA1  | E-GSM/DCS              | A2      |  |
|                           | EFCH270MDQA4  | E-GSM/DCS              | A3      |                                                                                       |
|                           | EFCH282MDQA4  | E-GSM/DCS              | A3      |                                                                                       |
|                           | EFCH360MDQY3  | E-GSM/DCS              | Y       |  |
|                           | EFCH400MDQY2  | E-GSM/DCS              | Y       |                                                                                       |
|                           | EFCH440MDQY1  | E-GSM/DCS              | Y       |                                                                                       |
|                           | EFCH109MDQT1  | J-CDMA                 | T       |  |
|                           | EFCH110MDQT1  | J-CDMA                 | T       |                                                                                       |
|                           | EFCHK110MDN2  | GPS                    | K       |  |
|                           | EFCHK183MDN2  | GPS                    | K       |                                                                                       |
| SAW Resonators            | EFOH315MQR3   | Remote controller      | RS      |  |
|                           | EFOH434MQR3   | Remote controller      | RS      |                                                                                       |

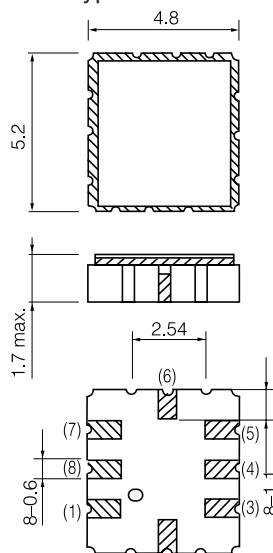
### ■ Precautions for Safety (See Page 223)

■ Dimensions in mm (not to scale)

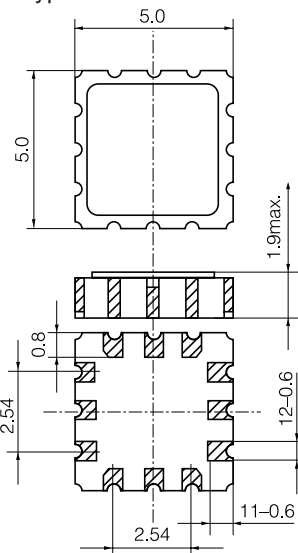
A2 type



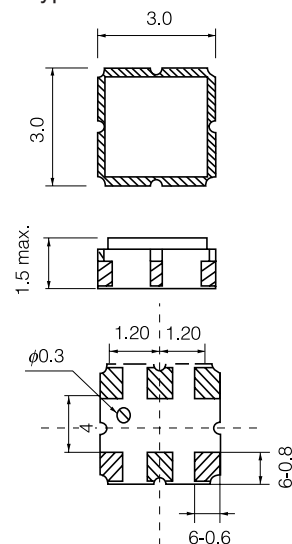
A3 type



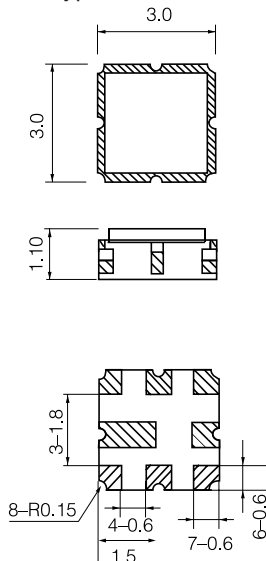
C type



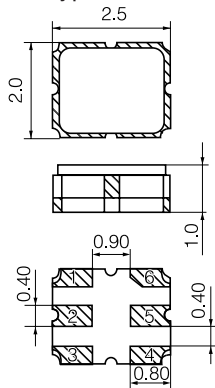
E type



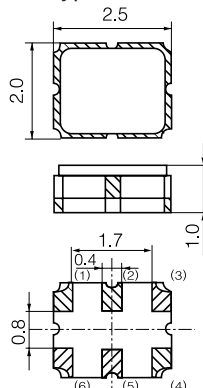
EA type



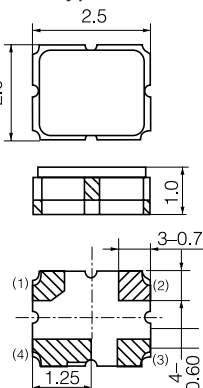
J1 type



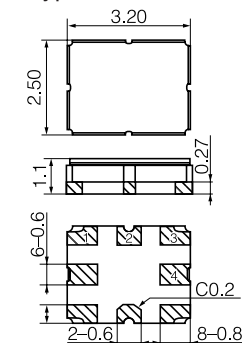
J3 type



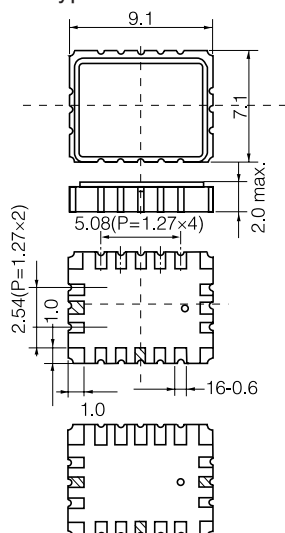
J4 type



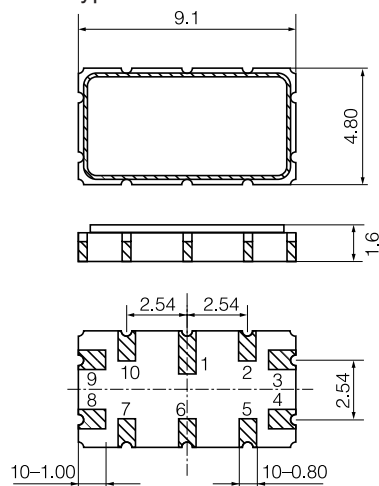
K type



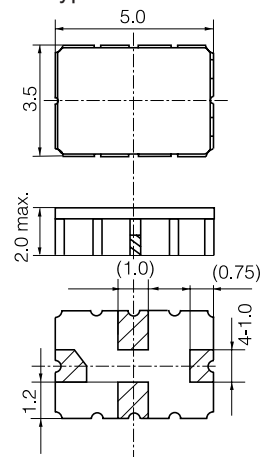
ND type



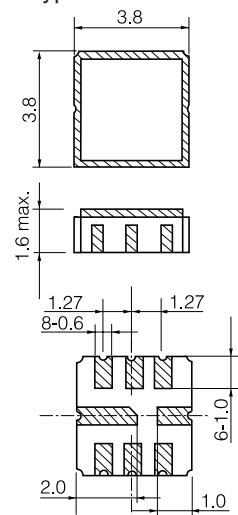
T type



RS type

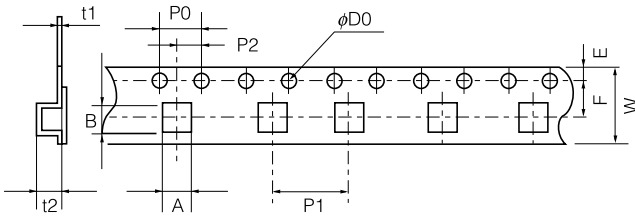


Y type



## ■ Dimensions in mm (not to scale)

### ● Embossed Taping



#### A, A2, A3 type

| Symbol   | W        | F        | E         | P0      | P1      | P2      |
|----------|----------|----------|-----------|---------|---------|---------|
| Dim.(mm) | 12.0±0.2 | 5.50±0.1 | 1.75±0.10 | 4.0±0.1 | 8.0±0.1 | 2.0±0.1 |

| Symbol   | D0                                 | t1        | t2      | A       | B       |
|----------|------------------------------------|-----------|---------|---------|---------|
| Dim.(mm) | φ1.5 <sup>+0.1</sup> <sub>-0</sub> | 0.30±0.05 | 1.9±0.1 | 5.3±0.1 | 6.0±0.1 |

#### C type

| Symbol   | W        | F       | E        | P0      | P1      | P2       |
|----------|----------|---------|----------|---------|---------|----------|
| Dim.(mm) | 12.0±0.2 | 7.5±0.1 | 1.75±0.1 | 4.0±0.1 | 8.0±0.1 | 2.0±0.05 |

| Symbol   | D0                                 | t1        | t2      | A       | B       |
|----------|------------------------------------|-----------|---------|---------|---------|
| Dim.(mm) | φ1.5 <sup>+0.1</sup> <sub>-0</sub> | 0.25±0.05 | 1.8±0.1 | 5.3±0.1 | 5.5±0.1 |

#### E, EA type

| Symbol   | W        | F         | E        | P0      | P1      | P2        |
|----------|----------|-----------|----------|---------|---------|-----------|
| Dim.(mm) | 12.0±0.3 | 5.50±0.03 | 1.75±0.1 | 4.0±0.1 | 8.0±0.1 | 2.00±0.05 |

| Symbol   | D0                                 | t1        | t2        | A       | B       |
|----------|------------------------------------|-----------|-----------|---------|---------|
| Dim.(mm) | φ1.5 <sup>+0.1</sup> <sub>-0</sub> | 0.30±0.05 | 1.55±0.10 | 3.4±0.1 | 3.4±0.1 |

#### J, J1, J3, J4 type

| Symbol   | W       | F        | E        | P0      | P1      | P2       |
|----------|---------|----------|----------|---------|---------|----------|
| Dim.(mm) | 8.0±0.2 | 3.5±0.05 | 1.75±0.1 | 4.0±0.1 | 4.0±0.1 | 2.0±0.05 |

| Symbol   | D0                                 | t1        | t2       | A       | B       |
|----------|------------------------------------|-----------|----------|---------|---------|
| Dim.(mm) | φ1.5 <sup>+0.1</sup> <sub>-0</sub> | 0.25±0.05 | 1.15±0.1 | 2.3±0.1 | 2.8±0.1 |

#### K type

| Symbol   | W        | F       | E        | P0      | P1      | P2       |
|----------|----------|---------|----------|---------|---------|----------|
| Dim.(mm) | 12.0±0.2 | 5.5±0.1 | 1.75±0.1 | 4.0±0.1 | 4.0±0.1 | 2.0±0.05 |

| Symbol   | D0                                 | t1        | t2      | A       | B       |
|----------|------------------------------------|-----------|---------|---------|---------|
| Dim.(mm) | φ1.5 <sup>+0.1</sup> <sub>-0</sub> | 0.30±0.05 | 1.2±0.1 | 3.0±0.1 | 3.7±0.1 |

#### ND type

| Symbol   | W        | F       | E         | P0      | P1       | P2      |
|----------|----------|---------|-----------|---------|----------|---------|
| Dim.(mm) | 16.0±0.2 | 7.5±0.1 | 1.75±0.10 | 4.0±0.1 | 12.0±0.1 | 2.0±0.1 |

| Symbol   | D0                                 | t1        | t2      | A       | B       |
|----------|------------------------------------|-----------|---------|---------|---------|
| Dim.(mm) | φ1.5 <sup>+0.1</sup> <sub>-0</sub> | 0.30±0.05 | 2.0±0.1 | 7.4±0.1 | 9.4±0.1 |

#### T type

| Symbol   | W        | F       | E        | P0      | P1      | P2      |
|----------|----------|---------|----------|---------|---------|---------|
| Dim.(mm) | 16.0±0.2 | 7.5±0.1 | 1.75±0.1 | 4.0±0.1 | 8.0±0.1 | 2.0±0.1 |

| Symbol   | D0                                 | t1        | t2      | A       | B       |
|----------|------------------------------------|-----------|---------|---------|---------|
| Dim.(mm) | φ1.5 <sup>+0.1</sup> <sub>-0</sub> | 0.30±0.05 | 1.9±0.1 | 5.5±0.1 | 9.8±0.1 |

#### Y type

| Symbol   | W        | F         | E       | P0      | P1      | P2      |
|----------|----------|-----------|---------|---------|---------|---------|
| Dim.(mm) | 12.0±0.2 | 5.65±0.10 | 1.5±0.1 | 4.0±0.1 | 8.0±0.1 | 2.0±0.1 |

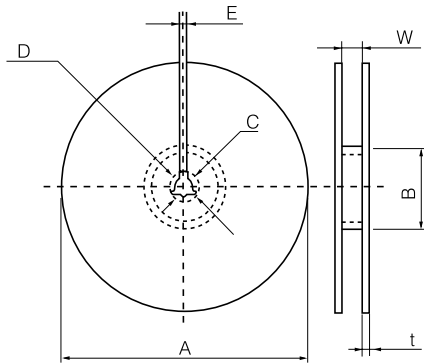
| Symbol   | D0                                 | t1        | t2      | A       | B       |
|----------|------------------------------------|-----------|---------|---------|---------|
| Dim.(mm) | φ1.5 <sup>+0.1</sup> <sub>-0</sub> | 0.30±0.05 | 1.8±0.1 | 4.9±0.1 | 4.5±0.1 |

#### RS type

| Symbol   | W        | F         | E       | P0      | P1      | P2      |
|----------|----------|-----------|---------|---------|---------|---------|
| Dim.(mm) | 12.0±0.2 | 5.65±0.10 | 1.5±0.1 | 4.0±0.1 | 8.0±0.1 | 2.0±0.1 |

| Symbol   | D0                                 | t1        | t2      | A       | B       |
|----------|------------------------------------|-----------|---------|---------|---------|
| Dim.(mm) | φ1.5 <sup>+0.1</sup> <sub>-0</sub> | 0.30±0.05 | 1.8±0.1 | 3.8±0.1 | 5.4±0.1 |

### ● Reel Taping



#### A, E, Y, K, A2, A3, EA, RS type

| Symbol   | A      | B       | C         | D         | E       | W        | t     |
|----------|--------|---------|-----------|-----------|---------|----------|-------|
| Dim.(mm) | φ180±3 | φ60±1.0 | φ13.0±0.5 | φ21.0±1.0 | 2.0±0.5 | 13.0±1.0 | 3 max |

#### C type

| Symbol   | A      | B        | C         | D         | E       | W        | t     |
|----------|--------|----------|-----------|-----------|---------|----------|-------|
| Dim.(mm) | φ330±2 | φ100±1.0 | φ13.0±0.5 | φ21.0±1.0 | 2.0±0.5 | 13.0±1.0 | 3 max |

#### J, J1, J3, J4 type

| Symbol   | A      | B         | C         | D         | E       | W       | t     |
|----------|--------|-----------|-----------|-----------|---------|---------|-------|
| Dim.(mm) | φ180±3 | φ60.0±1.0 | φ13.0±0.5 | φ21.0±1.0 | 2.0±0.5 | 9.0±1.0 | 3 max |

#### ND type

| Symbol   | A      | B        | C         | D         | E       | W          | t     |
|----------|--------|----------|-----------|-----------|---------|------------|-------|
| Dim.(mm) | φ330±5 | φ100±1.0 | φ13.0±0.5 | φ21.0±1.0 | 2.0±0.5 | 17.15±1.50 | 3 max |

#### T type

| Symbol   | A      | B       | C         | D         | E       | W        | t     |
|----------|--------|---------|-----------|-----------|---------|----------|-------|
| Dim.(mm) | φ180±3 | φ60±1.0 | φ13.0±0.5 | φ21.0±1.0 | 2.0±0.5 | 17.0±1.0 | 3 max |

## Precautions for Handling

### Application Notes

SAW Devices (SAW Filters and SAW Resonators) will cause operation breakdown or stop in the case of occurring troubles caused by design engineering conditions of peripheral circuit, mounting conditions of circuit board, working environmental conditions, and storage conditions. We mention application notes to prevent those troubles. If you have questions which doesn't mention, ask our person in charge.

Do not apply SAW devices except applications specified at this application.

Please design your set on which SAW device mounted as it's fail safe if SAW device would be deteriorated.

#### 1. Design Engineering Notes

1-1 Do not apply over maximum rated drive current.  
SAW Devices may cause characteristic deterioration or destruction, when over maximum rated drive current is applied.  
Please take special care not to apply over maximum rated drive current.

1-2 Do not apply DC voltage.  
Applying DC voltage between terminals while operating your circuit may cause the interdigital transducer damage and characteristic deterioration.  
Ex.) DC voltage shall be cut by a capacitor.

1-3 Matching of impedance with peripheral circuit.  
Rating of SAW Devices is measured by measurement circuit and circuit constant prescribed on the specifications. Please design your circuit considered the matching of impedance with SAW Devices.

1-4 The influence of Parasitic.  
Due to high frequency, operation characteristic is influenced by parasitic of PCB, arrangement of earth and pattern.  
Please design your circuit considered those points.

1-5 Electrostatic Discharge.  
Do not apply over static electricity to the products.

#### 2. Mounting Notes

2-1 Please arrange not to be applied static electricity while mounting.  
SAW Devices, which have extremely narrow spacing between their interdigitated electrodes, shall be free from high voltage spikes such as "Electrostatic Discharge", to prevent failures and damages of the devices.  
Following countermeasures are recommended;  
a) Ground human body via earth band.  
b) Set electricity rejecting sheet to working table.

2-2 Please ground apparatus.  
When the AC voltage of mounting line, apparatus for mounting and the induced voltage from AC voltage like measurement apparatus is applied to SAW Devices, SAW Devices may be

deteriorated or destroyed. Please ground apparatus to avoid those things.

2-3 Do not solder to the metallic case or lid to avoid deteriorations or damages.

2-4 Do not conduct the ultrasonic washing to avoid characteristic deterioration and destruction.

2-5 Do not use SAW Devices once mounted on and taken away from a circuit board.

2-6 Do not apply excess mechanical stress such as pulling or bending forces to SAW Devices to avoid failures and damages of the devices.

#### 3. Working Environmental Notes

3-1 Do not put over maximum rated vibration or shock to avoid damage of SAW Devices.

3-2 Do not use SAW Devices under conditions of dewdrops to avoid damage and deterioration of SAW Devices.

3-3 Do not use SAW Devices under conditions of corrosive atmosphere such as ammonia (NH<sub>3</sub>), chlorine (Cl<sub>2</sub>), hydrogen chloride (HCl), hydrogen sulfide (H<sub>2</sub>S), sulfur oxide (SO<sub>x</sub>) or nitrogen oxide (NO<sub>x</sub>) etc.

#### 4. Storage Notes

4-1 Keep SAW Devices packaged as we deliver.

4-2 Keep SAW Devices away from shock and vibration.

4-3 Keep SAW Devices away from corrosive atmosphere such as ammonia (NH<sub>3</sub>), chlorine (Cl<sub>2</sub>), hydrogen chloride (HCl), hydrogen sulfide (H<sub>2</sub>S), sulfur oxide (SO<sub>x</sub>) or nitrogen oxide (NO<sub>x</sub>) etc.

4-4 Keep SAW Devices under conditions of 40 °C max. and 75 % RH max..

4-5 Keep SAW Devices away from direct sunlight and dewdrops.

4-6 SAW Devices which has past over one year from production day must be checked the solderability before use.