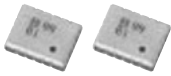









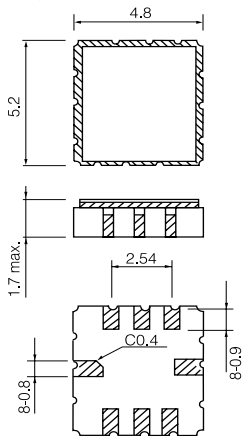
## SAW Devices

Products	Part No.	System		Package
SAW Duplexers	EFSD836MB1□□	AMPS	N	
SAW Filters (RF-Stage)	EFCH836MMTE3	AMPS Tx	E	
	EFCH836MMTEM	AMPS Tx	E	
	EFCH881MMTE4	AMPS Rx	E	
	EFCH881MMTED	AMPS Rx	E	
	EFCH942MMTE	E-GSM Rx	E	
	EFCH9017MMTY1	E-GSM/PCN Tx	Y	
	EFCH9418MMTY2	E-GSM/PCN Rx	Y	
SAW Filters (IF-Stage)	EFCH400MDQY2	E-GSM/PCN	Y	
	EFCH360MDQA1	E-GSM/PCN	A2	
	EFCH225MDQA1	E-GSM/PCN	A2	
	EFCH440MDQA1	E-GSM/PCN	A2	
	EFCH109MDQM1	J-CDMA	M	
	EFCH110MDQM1	J-CDMA	M	
	EFCH111MDQM1	J-CDMA	M	
SAW Resonators	EFOH315MA16	Remote controller	A1	
	EFOH434MA16	Remote controller	A1	
	EFOH315MQR1	Remote controller	RS	
	EFOH434MQR1	Remote controller	RS	

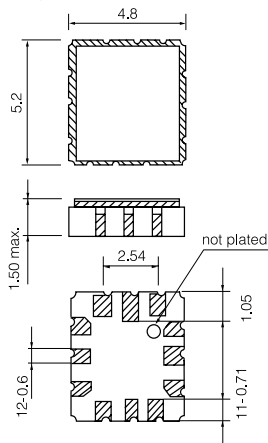
■ Precautions for Safety (See Page 43)

■ Dimensions in mm (not to scale)

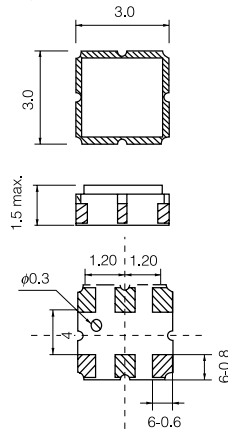
A1 type



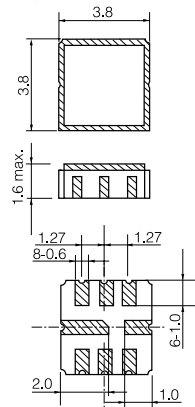
A2 type



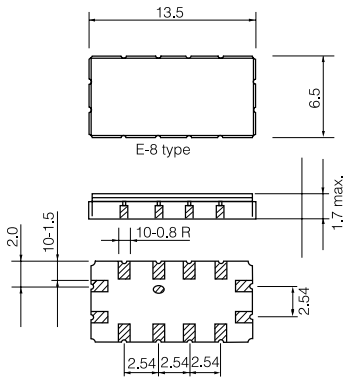
E type



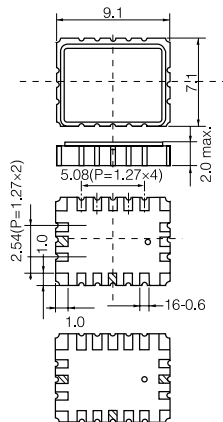
Y type



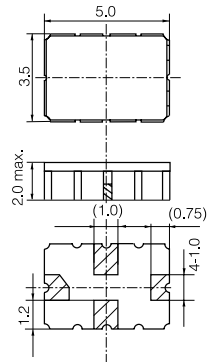
M type



N type

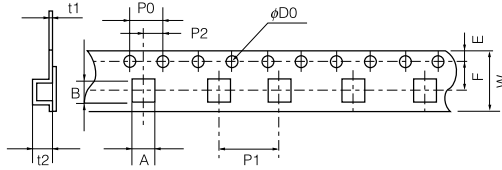


RS type



## ■ Dimensions in mm (not to scale)

### ● Embossed Taping



#### A type

Symbol	W	F	E	P0	P1	P2
Dim.(mm)	12.0±0.2	5.5±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)	$\phi 1.5_{-0}^{+0.1}$	0.30±0.05	1.9±0.1	5.3±0.1	6.0±0.1	

#### E type

Symbol	W	F	E	P0	P1	P2
Dim.(mm)	12.0±0.3	5.50±0.03	1.75±0.10	4.0±0.1	8.0±0.1	2.00±0.05
Symbol	D0	t1	t2	A	B	
Dim.(mm)	$\phi 1.5_{-0}^{+0.1}$	0.30±0.05	1.55±0.10	3.4±0.1	3.4±0.1	

#### M type

Symbol	W	F	E	P0	P1	P2
Dim.(mm)	24.0±0.2	11.5±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)	$\phi 1.5_{-0}^{+0.1}$	0.30±0.05	2.2±0.1	6.9±0.1	13.7±0.1	

#### N 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)	$\phi 1.5_{-0}^{+0.1}$	0.30±0.05	2.0±0.1	7.4±0.1	9.4±0.1	

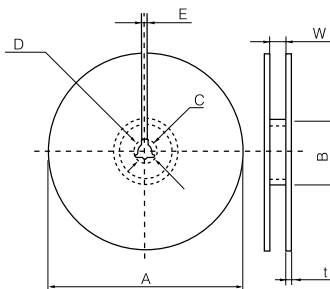
#### Y type

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)	$\phi 1.5_{-0}^{+0.1}$	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)	$\phi 1.5_{-0}^{+0.1}$	0.30±0.05	1.8±0.1	3.8±0.1	5.4±0.1	

### ● Reel Taping



#### A, E, Y, RS type

Symbol	A	B	C	D	E	W	t
Dim.(mm)	$\phi 178 \pm 3$	$\phi 60.0 \pm 1.0$	$\phi 13.0 \pm 0.5$	$\phi 21.0 \pm 0.8$	2.0±0.5	$12.4_{-0}^{+2.0}$	3 max

#### M type

Symbol	A	B	C	D	E	W	t
Dim.(mm)	$\phi 178 \pm 5$	$\phi 60.0 \pm 1.0$	$\phi 13.0 \pm 0.5$	$\phi 21.0 \pm 1.0$	2.0±0.6	$25.4_{-0}^{+3.0}$	2 max

#### N type

Symbol	A	B	C	D	E	W	t
Dim.(mm)	$\phi 330 \pm 5$	$\phi 100.0 \pm 1.0$	$\phi 13.0 \pm 0.5$	$\phi 21.0 \pm 1.0$	2.0±0.6	$17.15 \pm 1.50$	2.0±0.5

## Handling Precautions

### Application Notes

SAW Devices (SAW Filters and SAW Resonators) may breakdown or stop working due to problems caused by design of peripheral circuits, mounting conditions to the circuit board, working environment conditions, and storage conditions. These application notes will help you prevent those problems. If you have questions which are not answered, contact us.

Do not use SAW devices for any applications other than those specified in these application notes. Please design any equipment that uses a SAW device so that it fails safe if the SAW device fails.

#### 1. Design Engineering Notes

1-1 Do not apply current over the maximum rated drive current. The SAW Device's characteristics may deteriorate or be destroyed when current over the maximum rated drive current is applied. Please take special care not to apply current over the maximum rated drive current.

1-2 Do not apply DC voltage.  
Applying DC voltage between terminals while operating your circuit may cause 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 considering matching its impedance with the SAW Devices.

1-4 The influence of Parasitic.  
Due to high frequency, operating characteristics are influenced by parasitic of PCB arrangement and the pattern of circuit grounds.  
Please design your circuit considering those points.

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

#### 2. Mounting Notes

2-1 Please arrange so as not to apply static electricity while mounting.  
SAW Devices, which have extremely narrow spacing between their interdigital 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) Place an electricity rejecting sheet on the working table.

2-2 Please ground apparatus.  
When the AC voltage of mounting apparatus, or the induced AC voltage from measuring equipment is applied to SAW devices, SAW devices may deteriorate or be destroyed. Please ground apparatus to avoid those conditions.

2-3 Do not solder to the metallic case or lid to avoid deterioration or damage.

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

2-5 Do not reuse SAW Devices once mounted on and removed from a circuit board.

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

#### 3. Working Environmental Notes

3-1 Do not subject to vibration or shock over the maximum rated vibration and shock to avoid damage to the SAW Devices.

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

3-3 Do not use SAW Devices in corrosive atmospheres 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 condensation.

4-6 SAW Devices which are over one year old from production day must be checked for solderability before use.