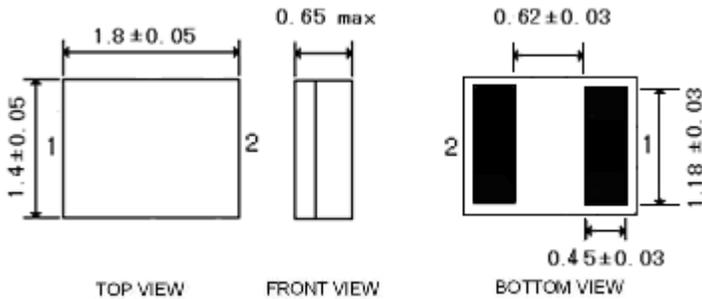


**Features**

- 1-port Resonator
- Provides reliable, fundamental mode, quartz frequency stabilization i.e. in transmitters or local oscillators
- Package size 1.8mm\*1.4mm
- Lead-free production and RoHS compliance

**Package Dimensions**

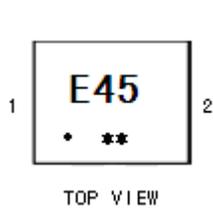
Ceramic Package(Unit: mm):



**Pin Configuration**

1	Input
2	Output

**Marking**



"E45" Part number

“.” Dot marking, indicates input 1

1,2 Terminal1, Terminal2

TOP VIEW

The first “\*”: Month Code (The code shown below varies in a 4-year cycle)

Month	1	2	3	4	5	6	7	8	9	10	11	12
2016/2020	n	p	q	r	s	t	u	v	w	x	y	z
2017/2021	A	B	C	D	E	F	G	H	J	□K	L	M
2018/2022	N	P	Q	R	S	T	U	V	W	X	Y	Z
2019/2023	a	b	c	d	e	f	g	h	i	j	k	m

The second “\*”: Date Code

<b>data</b>	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	
<b>code</b>	A	B	C	D	E	F	G	H	J	K	
<b>data</b>	11th	12th	13th	14th	15th	16th	17th	18th	19th	20th	
<b>code</b>	L	M	N	P	Q	R	S	T	U	V	
<b>data</b>	21st	22nd	23rd	24th	25th	26th	27th	28th	29th	30th	31st
<b>code</b>	W	X	Y	Z	a	b	d	e	f	g	h

**Maximum Ratings**

Rating		Value	Unit
CW RF power dissipation	$P$	10	dBm
DC voltage between any terminals	$V_{DC}$	$\pm 30$	V
Operating temperature range	$T_A$	-40 ~ +85	$^{\circ}C$
Storage temperature range	$T_{stg}$	-40 ~ +85	$^{\circ}C$

**Electrical Characteristics**

Characteristic		Sym	Minimum	Typical	Maximum	Unit
Center Frequency (+25 $^{\circ}C$ )	Absolute Frequency	$f_c$	433.82		434.02	MHz
	Tolerance from 433.920 MHz	$\Delta f_c$			$\pm 100$	kHz
Insertion Loss		IL		1.6	2	dB
Quality Factor	Unloaded Q	$Q_U$		9510		
	50 $\Omega$ Loaded Q	$Q_L$		1600		
Temperature Stability	Turnover Temperature	$T_0$	5	20	35	$^{\circ}C$
	Turnover Frequency	$f_0$		$f_c$		kHz
	Frequency Temperature Coefficient	FTC		-0.016		ppm/ $^{\circ}C$
Frequency Aging Absolute Value during the First Year		$ f_A $		$\leq 10$		ppm/yr
DC Insulation Resistance Between Any Two Terminals			1.0			M $\Omega$
RF Equivalent RLC Model	Motional Resistance	$R_M$		20.23	25	$\Omega$
	Motional Inductance	$L_M$		70.591		$\mu H$
	Motional Capacitance	$C_M$		1.908		fF
	Shunt Static Capacitance	$C_0$	1.8	2	2.2	pF

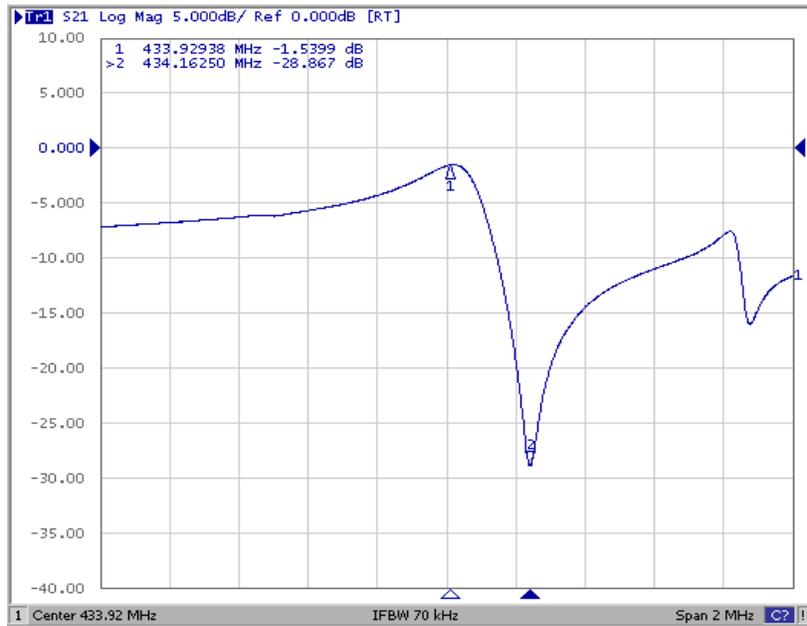
 **RoHS Compliant**

 **Electrostatic Sensitive Device**

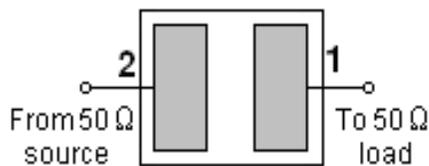
**NOTE:**

1. Unless noted otherwise, case temperature  $T_C = +25^{\circ}C \pm 2^{\circ}C$ .
2. The center frequency,  $f_c$ , is measured at the minimum insertion loss point with the resonator in the 50 $\Omega$  test system.
3. Frequency aging is the change in  $f_c$  with time and is specified at +65 $^{\circ}C$  or less. Aging may exceed the specification for prolonged temperatures above +65 $^{\circ}C$ . Typically, aging is greatest the first year after manufacture, decreasing in subsequent years.
4. Turnover temperature,  $T_0$ , is the temperature of maximum (or turnover) frequency,  $f_0$ . The nominal frequency at any case temperature,  $T_C$ , may be calculated from:  $f = f_0 [1 - FTC (T_0 - T_C)^2]$ .
5. This equivalent RLC model approximates resonator performance near the resonant frequency and is provided for reference only. The capacitance  $C_0$  is the static capacitance between the two terminals measured at low frequency (10MHz) with a capacitance meter. The measurement includes case parasitic capacitance.

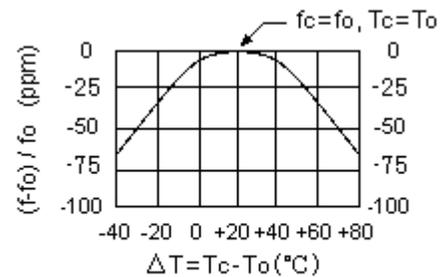
**Typical Frequency Response**  
**S21**



**Test Circuit**



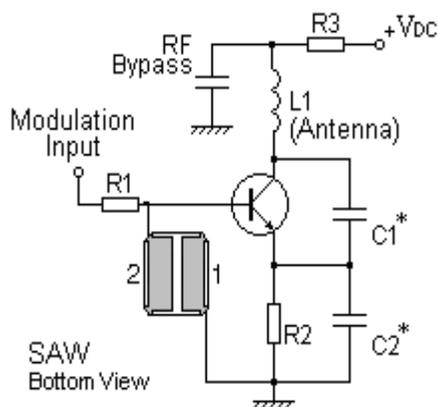
**Temperature Characteristics**



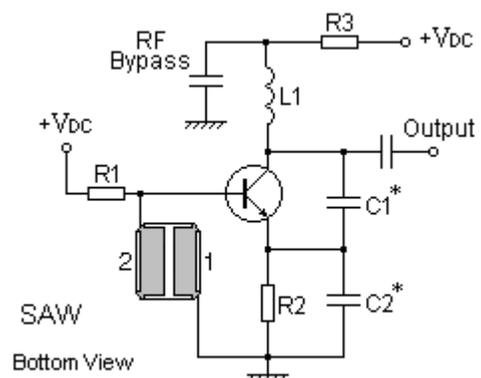
The curve shown above accounts for resonator contribution only.

**Typical Application Circuits**

1) Low-Power Transmitter Application



2) Local Oscillator Application



Stability Characteristics

Item No.	Test Item	STD Reference	Test Conditions	per lot
Preconditioning		JESD22-A113	1) Temperature Cycling, 5 cycles -40°C to 85°C 2) Bake, 24 hrs @125±5°C; 3) Reflow, 3 reflow cycles using profiles per IPC/JEDEC J-STD-020, SnPb or Pb-free profile based on device end use process 4) Drying, Room ambient temperature	177
1	Temperature Cycling	JESD22-A104	-40°C / +85°C, 40min dwell, <1 min transfer time, 500cycles	23
2	High Temperature Storage	JESD22-A103	85°C, 240hr	23
3	Low Temperature Storage	JESD22-A119	-40°C, 240hr	23
4	High Temp. High Humidity Storage	JESD22-A106B	85°C, 85%RH, 240hr	23
5	High Temperature Operating	JESD22-A102C	+121°C 100%RH 96hr	23
6	Human Body Mode ESD	JESD22-A114	Measure to get the ESD limits level or margin beyond specification	5
7	Drop Test	IEC 68-2-32	100 cm 3times Steel floor JIG(110g~150g)	6
8	Solder ability	JESD22-B102	Characterization per JESD22-B102	5
9	Vibration, Variable Frequency	JESD22-B103	20 Hz to 2 kHz (log variation) in > 4 minutes, 4X in each orientation, 50g peak acceleration	23
10	Mechanical Shock	JESD22-B104	Y1 plane only, 5 pulses, 0.5 ms duration, 1500 g peak acceleration	23

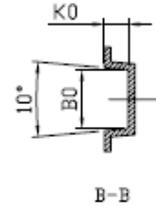
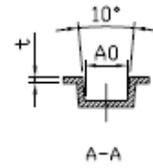
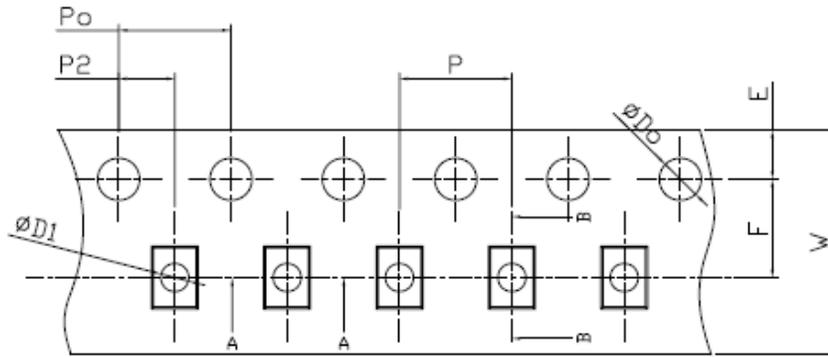
**Requirements:** The SAW filer shall remain within the electrical specifications after tests.

**Remarks**

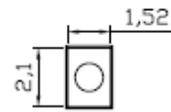
- SAW devices should not be used in any type of fluid such as water, oil, organic solvent, etc.
- Be certain not to apply voltage exceeding the rated voltage of components.
- Do not operate outside the recommended operating temperature range of components.
- Sudden change of temperature shall be avoided, deterioration of the characteristics can occur.
- Be careful of soldering temperature and duration of components when soldering.
- Do not place soldering iron on the body of components.
- Be careful not to subject the terminals or leads of components to excessive force.
- SAW devices are electrostatic sensitive. Please avoid static voltage during operation and storage.
- Ultrasonic cleaning shall be avoided. Ultrasonic vibration may cause destruction of components.

**Packing Information**

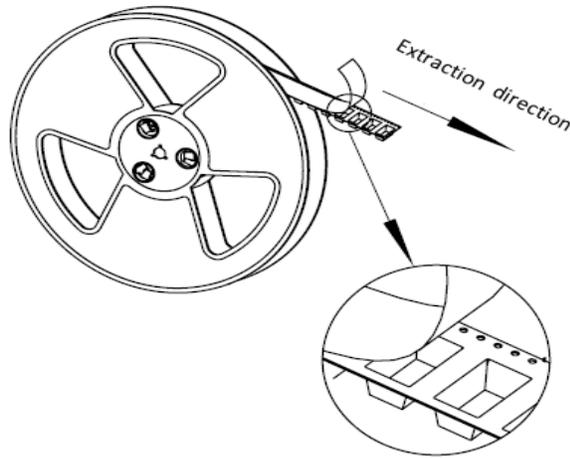
Carrier Tape



SYMBOL	E	F	P2	D0	D1	P0
SPEC	1.75±0.10	3.50±0.05	2.00±0.05	1.55±0.05	0.60±0.05	4.00±0.10
SYMBOL	W	P	A0	B0	K0	t
SPEC	8.00±0.10	4.00±0.10	1.60±0.05	2.10±0.10	0.80±0.05	0.30±0.10



Reel Dimensions



Material	PS
Unit	mm
Tolerance	±0.20 mm
Quantity	3000/reel

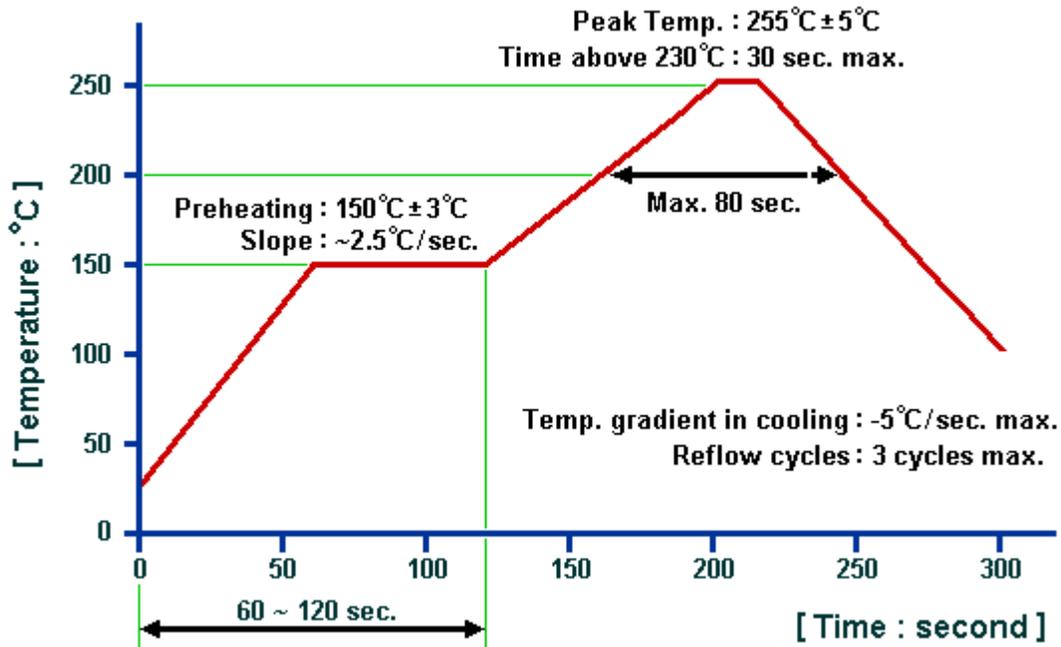
Outer Packing

Type	Quantity	Dimension	Description	Weight
Carton Box I	10000	200×200×100	anti-static plastic bag & carton box 1 reel / bag	0.85
Carton Box II	20000	200×200×200	5 bags / box (15000 pcs) 10 bags / box (30000 pcs)	1.80

Unit: mm

Unit: kg

Recommended Soldering Profile



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1. The specifications of this device are subject to change or obsolescence without notice.
2. Typically, equipment utilizing this device requires emissions testing and government approval, which is the responsibility of the equipment manufacturer.
3. Our liability is only assumed for the Surface Acoustic Wave (SAW) component(s) per se, not for applications, processes and circuits implemented within components or assemblies.
4. For questions on technology, prices and delivery, please contact our sales offices or e-mail [winnsky@winnsky.com](mailto:winnsky@winnsky.com).