

**DETAILED SPECIFICATION FOR A SURFACE MOUNT 450 KHZ CERAMIC FILTER****1.0 PURPOSE**

This specification show cover the characteristics of a surface mount 450 KHz ceramic filter, which mainly used for FM broadcast receiver.

**2.0 MODEL NAME**

2.1 Part No. : LTWC450F

2.2 Specification No. : 2.832.404

2.3 Customer's Part No. :

2.4 Customer's Specification No. :

**3.0 ABSOLUTE MAXIMUM RATINGS**

"Absolute Maximum Ratings" are those values beyond which the life of the device cannot be guaranteed. They are not meant to imply that the device can or should be operated at these limited.

No.	Parameter	Rating	Unit
3.1	Withstanding Voltage	50	VDC
3.2	Ambient Operating Temperature Range	-20 ~ +80	°C
3.3	Lead Temperature for Soldering 1/16" from Body for 10sec	260	°C
3.4	Storage Temperature Range	-35 ~ +85	°C
3.5	Power Dissipation (Ta = 25°C)	100	mW
3.6	Isolation Resistance	100	MΩ

**4.0 ELECTRICAL CHARACTERISTICS Ta = 25°C**

No.	Parameter	Minimum	Typical	Maximum	Unit
4.1	Center Frequency Fo	NS	450	NS	KHz
4.2	Initial Tolerance	-	-	±1.5	KHz
4.3	3dB Bandwidth	±5.5	-	-	KHz
	6dB Bandwidth	±7.5	-	-	KHz
	50dB Bandwidth	-	-	±15.0	KHz
4.4	Stop Band Attenuation	50	-	-	dB
4.5	Insertion Loss	-	-	4.0	dB
4.6	Ripple in 450 ± 4KHz	-	-	2.0	dB
4.7	Spurious Response (0.1 to 1.0MHz)	20	-	-	dB
4.8	Group Delay Time	-	-	50	μsec
4.9	Temperature Characteristics	-	-	±0.5	%
	Over -20°C ~ +80°C	-	-	-	-
4.10	I/O Impedance	-	1.5	-	KΩ

NS = Not Specified

**5.0 TEST CIRCUIT****5.1 Measurement Condition:**

The reference temperature shall be 25°C ± 2°C. The measurement shall be performed at the temperature range of 5°C to 35°C unless otherwise the result is doubtful.

**5.2 Test Circuit and Equipment:**

Oscillating frequency shall be measured by the standard test circuit as shown in Figure 2. Resonant impedance shall be measured by HP87510A Network Analyzer.

## 6.0 PHYSICAL CHARACTERISTICS

No.	Item	Condition of Test	Requirements
6.1	Random Drop	The Filter shall be measured after 3 times random drops from the height of 1.0M on concrete floor.	No visible damage and the measured values shall meet Table 1.
6.2	Vibration	The Filter shall be measured after being applied vibration of amplitude of 1.5mm with 10 to 55Hz bands of vibration frequency to each of 3 perpendicular directions for 1 hour.	The measured values shall meet Table 1.
6.3	Resistance to Soldering Heat	Lead terminals are immersed up to 1.5mm from the Filter's body in solder bath of $350^{\circ}\text{C} \pm 10^{\circ}\text{C}$ for $3 \pm 0.5$ seconds or $260^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for $10 \pm 1$ seconds, and then the Filter shall be measured after being placed in natural condition for 1 hour.	The measured values shall meet Table 1.
6.4	Solderability	Lead terminals are immersed in resin for 5 seconds and then immersed in soldering bath of $260^{\circ}\text{C} \pm 10^{\circ}\text{C}$ for $25 \pm 1$ seconds.	95% min. lead terminals shall be wet with solder.
6.5	Substrate Bending Test	Apply pressure in the direction of arrow (see Figure 3) at a rate of about 0.5mm per second until it reaches a bend of 3mm and hold for 30 seconds.	No visible damage and the measured values shall meet Table 1.
6.6	Adhesion	A static load of 20N to the direction of the arrow (see Figure 4) shall be applied on the core of the filter and hold for 10 seconds.	
6.7	Reflow Soldering	Put on the solder paste on the printed wiring board (pattern is shown in Figure 5), then samples shall be mounted and soldered under the condition. Put on the printed wiring board (pattern is shown in Figure 6), then it shall be subjected to the room atmosphere for 24 hours prior to the measurement.	
6.8	Washability	Ultrasonic wash not available	

## 7.0 ENVIRONMENTAL CHARACTERISTICS

No.	Item	Condition of Test	Requirements
7.1	High Temperature	After being placed in a chamber with $+85^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for $96 \pm 4$ hours and then being placed in natural condition for 1 hour. The Filter shall be measured.	The measured values shall meet Table 1.
7.2	Low Temperature	After being placed in a chamber with $-20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for $96 \pm 4$ hours and then being placed in natural condition for 1 hour. The Filter shall be measured.	The measured values shall meet Table 1.
7.3	Humidity	After being placed in a chamber with 90 to 95% R.H. at $+40^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for $96 \pm 4$ hours and then being placed in natural condition for 1 hour. The Filter shall be measured.	The measured values shall meet Table 1.
7.4	Heat Shock	After being kept at room temperature, the Filter shall be placed at temperature of $-20^{\circ}\text{C}$ for 30 minutes, then the Filter shall be immediately placed at temperature of $80^{\circ}\text{C}$ , after 30 minutes at temperature of $80^{\circ}\text{C}$ , the Filter shall be returned to $-20^{\circ}\text{C}$ again. After 5 times above cycles, the Filter shall be returned to room temperature, after 1 hour in natural condition, the Filter shall be measured.	The measured values shall meet Table 1.

TABLE 1  
MEASURING REQUIREMENTS

Measurements	Requirements	Unit
Center Frequency	$450 \pm 1.5$ max	KHz
6dB Bandwidth	$\pm 7.5$ max	KHz
Insertion Loss	6.0 max	dB
Ripple ( $450 \pm 4$ KHz)	2.5 max	dB
Stop Band Attenuation	45 min	dB

#### 8.0 OUTLINE DIMENSIONS

8.1 Appearance: No visible damage and dirt.

8.2 Dimensions: See Figure 1

8.3 Packing and reeling dimensions: See Figure 7 and Figure 8.

8.4 Construction: Leads are soldered on electrode and body is molded by resin.

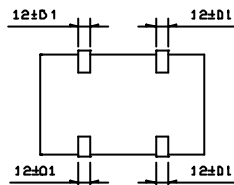
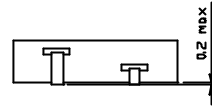
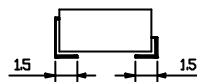
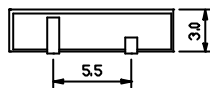
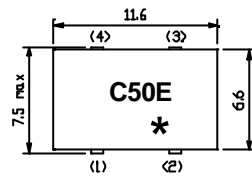
#### 9.0 REVIEW OF SPECIFICATIONS

When something gets doubtful with this specification, we shall jointly work to get an agreement.

#### APPENDIX: EIAJ CODE

Year\Month	1	2	3	4	5	6	7	8	9	10	11	12
2001	A	B	C	D	E	F	G	H	J	K	L	M
2002	N	P	Q	R	S	T	U	V	W	X	Y	Z
2003	a	b	c	d	e	f	g	h	j	k	l	m
2004	n	p	q	r	s	t	u	v	w	x	y	z

**FIGURE 1**  
**OUTLINE DIMENSIONS**



Pin Connection:

(1) Input

(2) Output

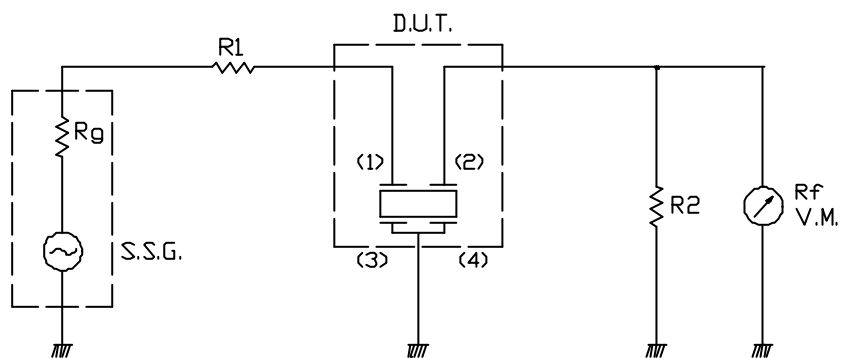
(3), (4) Ground

\* : EIAJ code

Unit: mm

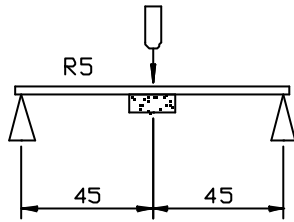
Dimension Tol.: ±0.3

**FIGURE 2**  
**TEST CIRCUIT**



$$R_g + R_1 = R_2 = 1.5K\Omega$$

**FIGURE 3**  
**SUBSTRATE BENDING**



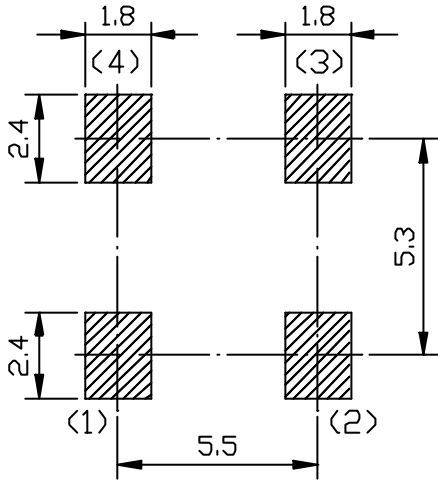
PCB: 0.8t x 100mm

**FIGURE 4**  
**ADHESION**

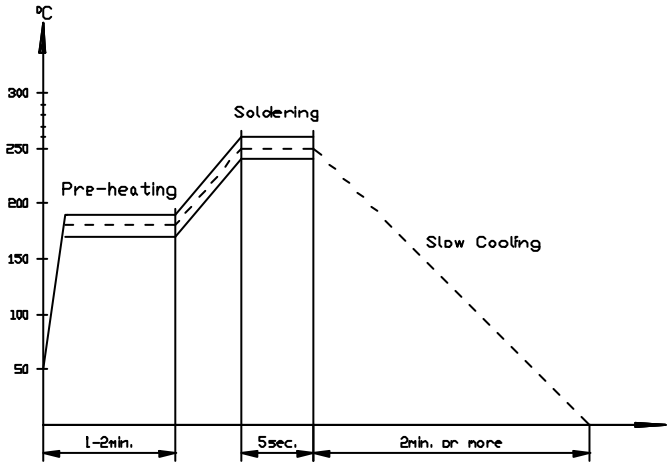


PCB: 0.8t x 100mm

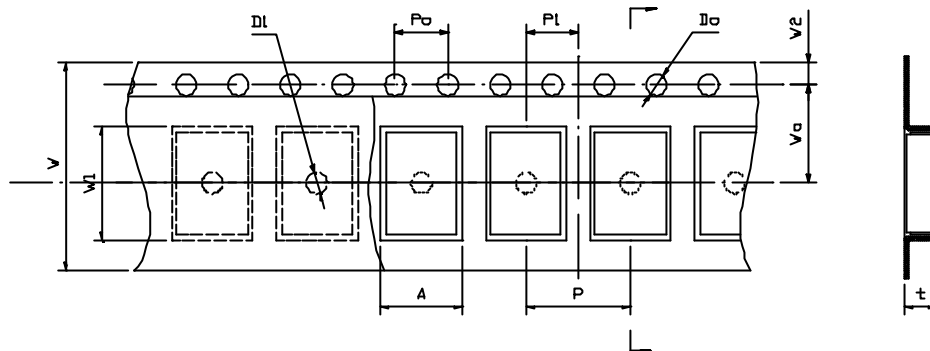
**FIGURE 5**  
**PRINTED WIRED BOARD**



**FIGURE 6**  
**REFLOW SOLDERING TEMPERATURE**



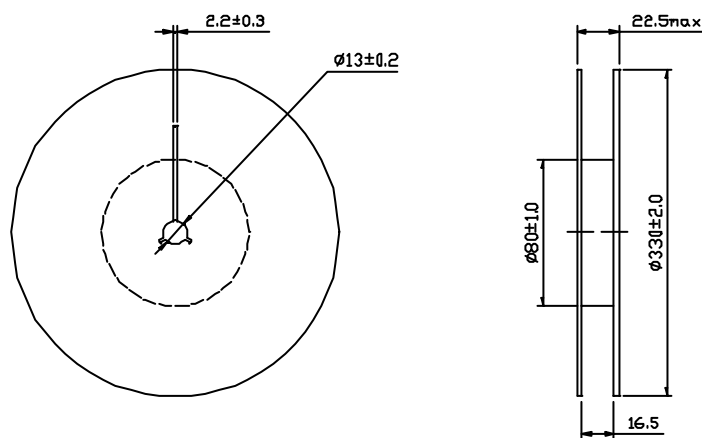
**FIGURE 7**  
**TAPING DIMENSIONS**



**DIMENSIONS**

Item	Code	Dimension	Tolerance	Remark
Pitch of components	P	12.0	$\pm 0.1$	
Pitch of sprocket hole (1)	Po	4.0	$\pm 0.1$	
Length from hole center to component center	P1	6.0	$\pm 0.1$	
Width of carrier tape	W	24.0	$\pm 0.1$	
Width of adhesive tape	Wo	11.5	$\pm 0.2$	
Gap of hold down tape and carrier tape	W2	1.75	$\pm 0.1$	
Diameter of sprocket hole	Do	$\varnothing 1.5$	$+ 0.1$	
Diameter of component hole	D1	$\varnothing 1.5$	$+ 0.1$	
Total tape thickness	t	3.6	$\pm 0.1$	

**FIGURE 8**  
**REELING DIMENSIONS**



All dimensions are in mm