REVISIONS

REV	DESCRIPTION	ECO	DATE	APPROVED
A	Initial Release	0303	03/10/2006	Henry Chen
B	Revision and Add production number SBxxxxxxxC	0503	08/15/2007	J.G. Zhou

NO.:

DATE: 2007-08-15

PIEZO ACTUATOR

(Bimorph SBxxxxxxxC)

SPECIFICATION FOR APPROVAL

上海联能科技有限公司

SINOCERAMICS,INC.

Ceramics Division

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BIMORPH SPECIFICATION PURPOSE

The purpose of this specification is to define ceramics of bimorph series. The bimorph governed by this document are intended for use in devices for central office environments and shall be capable of meeting the reliability, quality, and performance intent of SBxxxxxxxC.This document can serve as a guideline for reliability assessment and the suppliers should target their design and processes to meet these reliability requirements in production.

1. SCOPE/OWNERSHIP

The specification addresses the bimorph actuator are a joint of two piezoelectric elements, which expand and compress towards the direction of length. When one side expands, the other side compress, and becomes bending type transducers. Conversely, the alternating electric field can be output by giving the bending force. This transducer has the frequency of audio, and uses as a sound sensor of high sensitivity or an actuator of the On-Off drive. The bimorph actuator have widely used in Braille, Micro Pump, Optical Chopper, Flapper of Valve, Audiphones, Vibration Switch, pedometers etc..

2. DEFINITIONS/CONDITIONS

Specification number: SBxxxxxxxC

Material: PZT 5X45, Carbon Fiber, silver, adhesive.

3. PIEZOCERAMIC MATERIAL 5X45

Model		PZT-5X
Materail No.		5X45
Coupling factors	K_p	0.72
	K_{33}	0.78
	K_{31}	0.4
Piezo Charge Constants(PC/N)	d_{33}	750
	d_{31}	-320
Piezo Voltage Constants (10^{-3}Vm/N)	g_{33}	19
	g_{31}	-8.2
Dielectric Constants	$\varepsilon^T_{33}/\varepsilon_0$	4500
Dissipation Factor(%)	tanδ	2.0
frequency Constants(Hz·m)	N_t	2200
	D_d	1960
	N_1	1430
Youngs Modulus(10^{10}N/m)	Y^E_{11}	6.1
	Y^E_{33}	4.3
Mechanical Q	Q_m	65
Poisson's Ratio	σ	0.35
Curie Point (°C)	T_c	180
Density(10^3kg/m^3)	ρ	7.4

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4. CHARACTERISTICS

4.1 Equivalent circuit of bimorph actuator

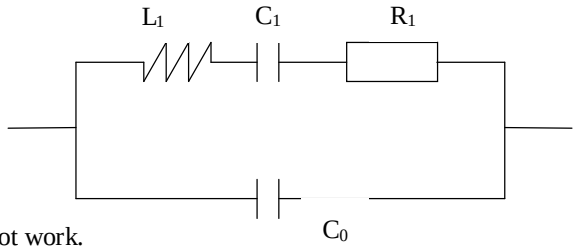
R_1:equivalent resistance

C_1:equivalent capacitance

L_1:equivalent inductance

C_0:capacitance of the elements

When importing the DC voltage,the inductance does not work.



4.2The following bable lists the characteristic values of the stacks made of the material PZT-5X45 with the standard size:

Type	Length (mm)	Width (mm)	Thickness (mm)	Free length (mm)	Voltage (DC v)	Deflection (mm)	Force (N)
SB6025008	60	25	0.8	53	150	2.6	0.35
SB6020008	60	20	0.8	53	150	2.6	0.3
SB6010008	60	10	0.8	53	150	2.6	0.2
SB5002508	50	2.5	0.8	43	150	1.5	0.08
SB5002108	50	2.1	0.8	43	150	1.6	0.07
SB4902108	49	2.1	0.8	42	150	1.5	0.07
SB4801808	19	1.8	0.8	42	150	1.5	0.05
SB4510008	45	10	0.8	38	150	1.3	0.2
SB4506508	45	6.5	0.8	38	150	1.3	0.15
SB4020008	40	20	0.8	33	150	1.1	0.4
SB4012008	40	12	0.8	33	150	1.1	0.2
SB4010008	40	10	0.8	33	150	1.1	0.18
SB3902108	39.5	2.1	0.8	32	200	1.2	0.15
SB3502508	35	2.5	0.8	28	150	0.7	0.08
SB2002508	20.5	2.5	0.8	15	200	0.08	0.14

The force is measured at the deflection equal to “0”. The outer cover can be chosen according to the customer’s demand. It can be bare or insulator varnish. Our engineer according to customers application or their requirement can freely design other size.

If not meet your requirement?

We can develop it only for you up to your requirement within 60days.

We can package with your device inside together.

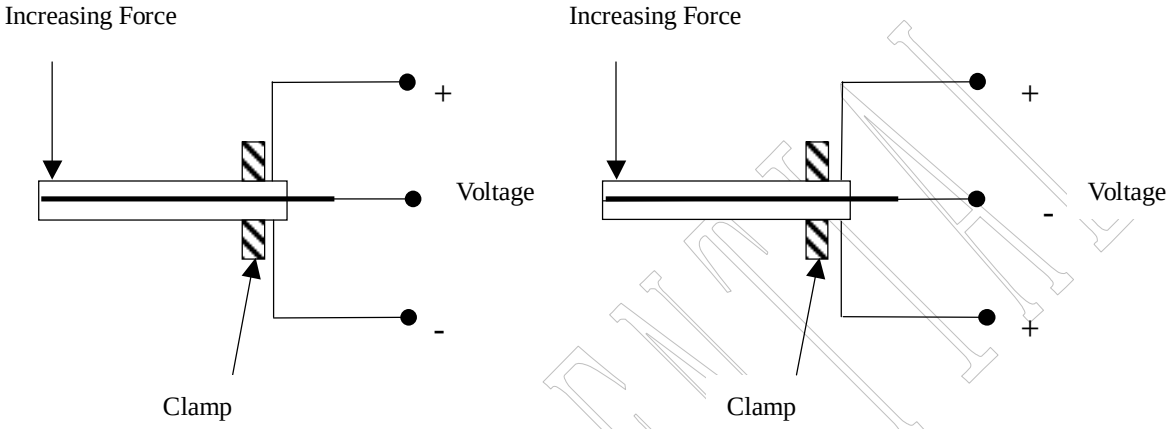
We can package according to your size.

5. TEST CONDITIONS

5.1 Temperature 25 +/-3°C

5.2 Humidity 70% RH max

5.3 Test voltage ≥100V.DC



Change of temperature 30minutes at -40°C and 30minutes at +65°C,5 cycles

*Displacement within 5% of value

*Capacitance within 20% of value

*Resistance more than 50Mohm

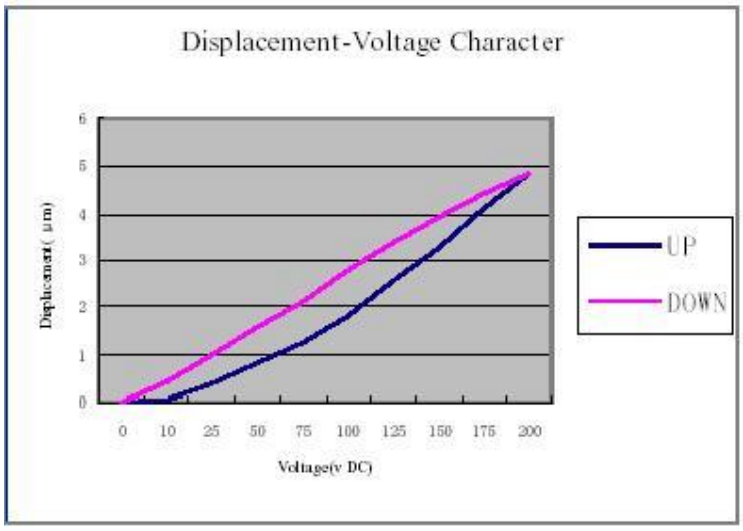
Damp heat 65°C,85%RH,24hr

*Displacement within 5% of value

*Capacitance within 20% of value

*Resistance more than 1Mohm

Character curve:(TYPE SB6025008)



6. DIMENSIONS

Reference Drawing

7.OTHER

A non removable, very clear marking on the "+" side of the bimorph is compulsory.

8.PACKAGE

The bimorph is packed in plastic bag with in carton.

Packing and labeling shall satisfy the legal regulations.

Each paid should be labeled with:

-Name of product

-Lot number

-Production date

-Inspection report

9.NUMBERING

Ex. lot no.:JP00001

J --- The code of A.D. (H:2006, I:2007, J:2008, K:2009, …)

P --- The bode of material (P: PZT)

00001 --- Manufacturing number

10.ENVIRONMENT PREVENTION CONCERNS

We certify we do not violation RoHS indicators in the production and supplied to users.

The Pb element of piezoelectric ceramics has exempt from RoHS.

11.NOTICE

The characteristic of a polarized piezoelectric element is secure from remarkable changes on the low temperature range. But on a high temperature range, it has limitation in operational temperature range as there is a metabolic point of crystal axis(Curie point). The crystal becomes unstable at the Curie point due to the permittivity may infinity increase, and the crystal structure made phase transition. Both voluntary polarizations and the residual polarizations disappear at that time, and piezoelectricity also disappeared.

Working temperature:-20℃ ~ 60℃

Storing temperature: -30°

The results of the reliability monitoring tests should be periodically updated to SINOCERA for review. Upon any failure, SINOCERA should be notified immediately and should conduct failure analysis, identify the root cause and implement the appropriate corrective actions.