

# High Resolution Polymer Transducer

## Technical Information

ISL Polymer Transducers with elements in frequency range of 25MHz to 140MHz have been developed in order to obtain higher resolution power than ceramics transducers. Unlike the conventional ceramics transducers, our transducers do not use a lens for focusing. The element films can be curved so that a sharp focus is obtained. Due to this feature, the electro-acoustic energy conversion efficiency of the Polymer transducers might be half that of ceramics transducers, but they are much effective for detection of fine defects than ceramics transducer.



Since the polymer withstands higher voltage than ceramics - even 50MHz transducer has an electrical strength of 1KV or more - it is possible to use a pulser with higher transmitter voltage for excitation of ultrasounds. In this case, the total gain of polymer transducers will be much higher than ceramics transducers.

Since the Q value of Polymer transducers is very low, it might be possible to generate damped waveforms without using a damping material, but if a proper backing material is attached, higher resolution power can be obtained. The combination with a spike type pulser/receiver on the market allows sounds of about one wave to be transmitted and sounds of about 1.5 waves to be received. When using the ISL step-function type pulser BLP21, it is possible to generate and receive ultrasounds of half wave(unipolar).

The polymer material which is used for ISL Polymer Transducers, is not usual PVDF but the P(VDCN/VAc) which has better adhesion properties than PVDF, therefore, the electrodes and protection membrane will hardly be peeled off. In addition, this material is electrically polarized at high temperature and will not often de-polazised at normal temperature.

### **Technical Data**

\*For polymer type transducers. Composite type transducers provide differ data.

No.	Description	Specifications
0	Piezoelectric material	P(VCN/VAc)
1	No. of waves	With our step function-type pulser, almost a half wave to be generated.
2	Temperature in continuous operation of piezoelectric element	120°C or higher
3	Density of piezoelectric material	1.2
4	Elasticity coefficient of piezoelectric material	$2 \times 10^3 \text{ kg/m}^2$
5	Piezoelectric modules	$d^{31} = 20 \text{ pC/N}$ , $g^{31} = 18000 \text{ V}\cdot\text{m/N}$
6	Acoustic impedance of piezoelectric element	3.2
7	Production frequency range	25~140MHz (nominal)
8	Production range of element diameter	$\varnothing$ (or $\bullet$ ) 1mm ~ $\varnothing$ (or $\bullet$ ) 30mm 0.3mm pitch for Array transducer.
9	Curvature of element	$\infty$ ~ 7.5mmR(depend on element size)

10	Protection membrane	Not attached. Gold electrodes substitute for it.
11	Matching layer	Unnecessary because the impedance of the Element is very similar to that of water. For lower frequency 1/4 $\lambda$ or fine layer.
12	Connector type	UHF, Microdot, LEMO
13	Withstand voltage	-1000V
14	Temperature range in continuous operation	0~50°C
15	Case size	Ø16x40mm or Ø9.6x31mm (typical)

The appearance and specifications are subject to change for modifications without notice.

Variations of frequency, element diameter and focusing type allow many combination of specifications. But some combinations can not be produced, or can not provide required performance. We offer the standard transducers listed below at low prices. The standard transducers will meet any requirements in normal applications. Call us for special applications.

### Standard Transducers(our favorite and a parts of standard transducers)

	Order code	Nominal Frequency	material	Resonance frequency of element	Element diameter Dia.	Curvature of element (~Focal length)
	ISL-N25P-5-R25	25MHz	P(VCN/VAc)	20~30MHz	5mm	25mmR
	ISL-N35P-5-R25	35MHz	P(VCN/VAc)	30~40MHz	5mm	25mmR
	ISL-N45P-5-R25	45MHz	P(VCN/VAc)	40~50MHz	5mm	25mmR
	ISL-N55P-5-E25	50MHz	P(VCN/VAc)	55~60MHz	5mm	25mmR
	ISL-N55P-3-R17	50MHz	P(VCN/VAc)	55~60MHz	3mm	17mmR
*	ISL-N65P-3-R25	65MHz	P(VCN/VAc)	60~70MHz	3mm	25mmR
	ISL-N65P-3-R17	65MHz	P(VCN/VAc)	60~70MHz	3mm	17mmR
*	ISL-N75P-3-R25	75MHz	P(VCN/VAc)	70~80MHz	3mm	25mmR
	ISL-N75P-3-R17	75MHz	P(VCN/VAc)	70~80MHz	3mm	17mmR
	ISL-N100P-2-R12.5	100MHz	P(VCN/VAc)	80~110MHz	2mm	17mmR
	ISL-N130P-2-R12.5	130MHz	P(VCN/VAc)	110~140MHz	2mm	12.5mmR

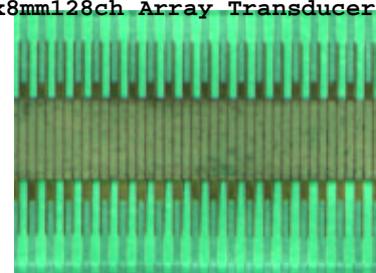
\*:Long Focus type. The appearance and specifications are subject to change for modifications without notice.

ISL-N[Freq in MHz]-[diameter in mm]-[Point/Line]- R [Curvature in mm] -[Case & con.type]

### Special Polymer Transducers

A part of 15MHz0.4x8mm128ch Array Transducer

- The material is electrically polarized at high temperature, and will not often repolazised at normal temperature even when a reverse voltage to normal pulser is applied. Therefore, it is possible to generate a pulse which starts with a positive pressure wave.
- Small boreside transducer with which ultrasounds are generated from a side wall of a 4mm outer diameter tube.
- Multi-element/Array transducer allowing the electronic rotation scanning on the circumference of tube.
- Super-broadband transducer with Dealy. The element is sandwiched between two dampers.



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