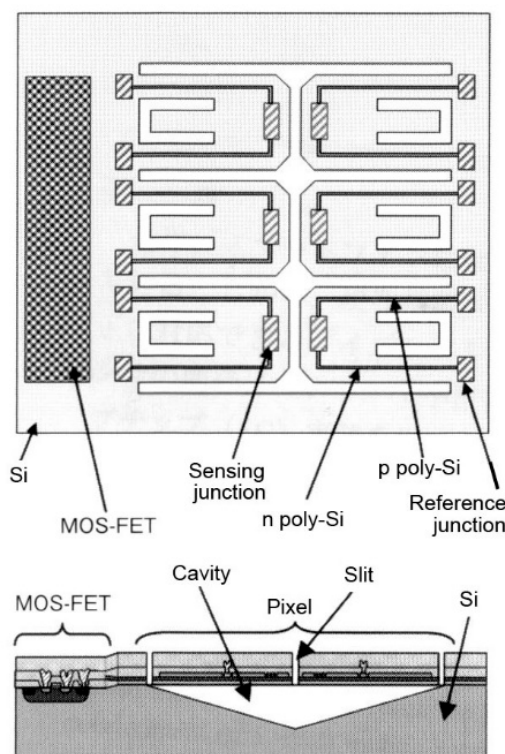
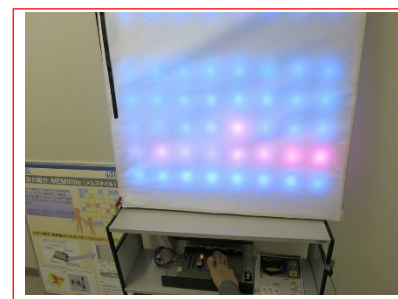
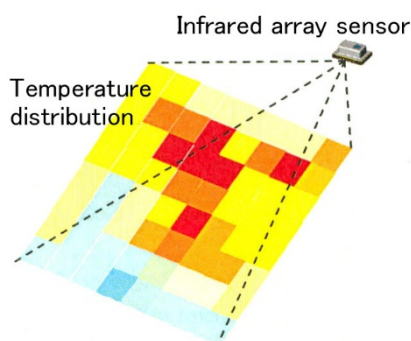
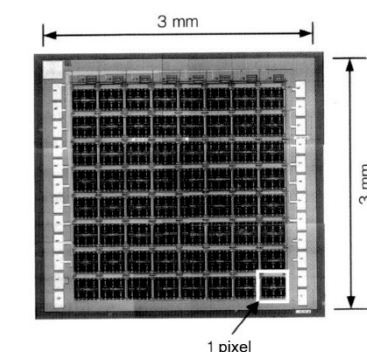


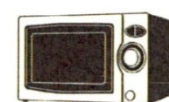
## N1 Infrared array sensor (Panasonic)



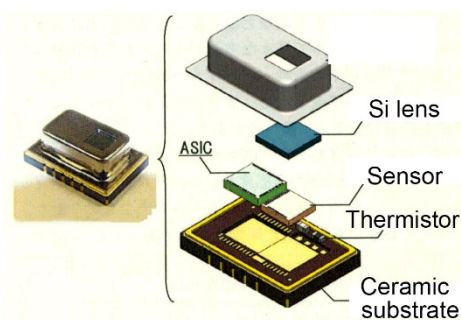
Structure



Air conditioner

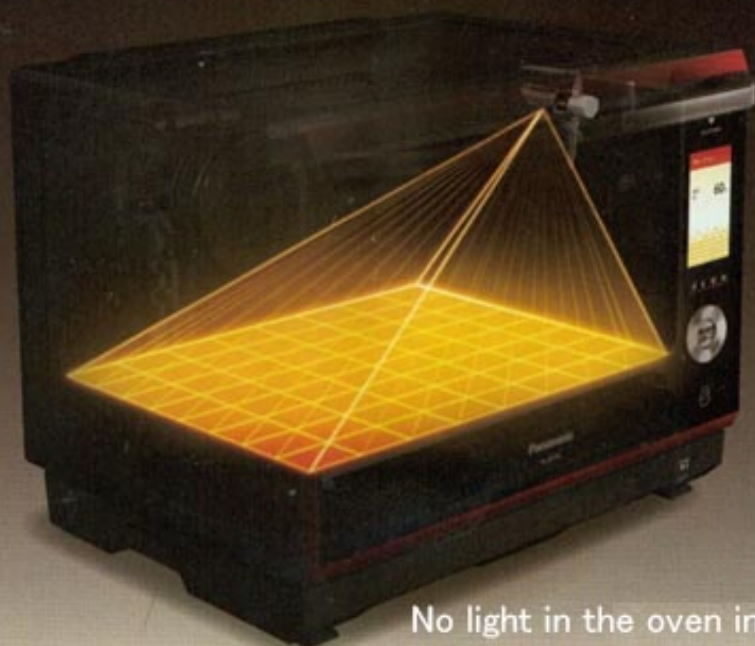


Microwave oven



Applications

64 eyes (sensors) measure the temperature distribution simultaneously and foods, its size and volume are recognized and automatically control the heating.



No light in the oven in practice

Old product in 2013  
NE-BS1000



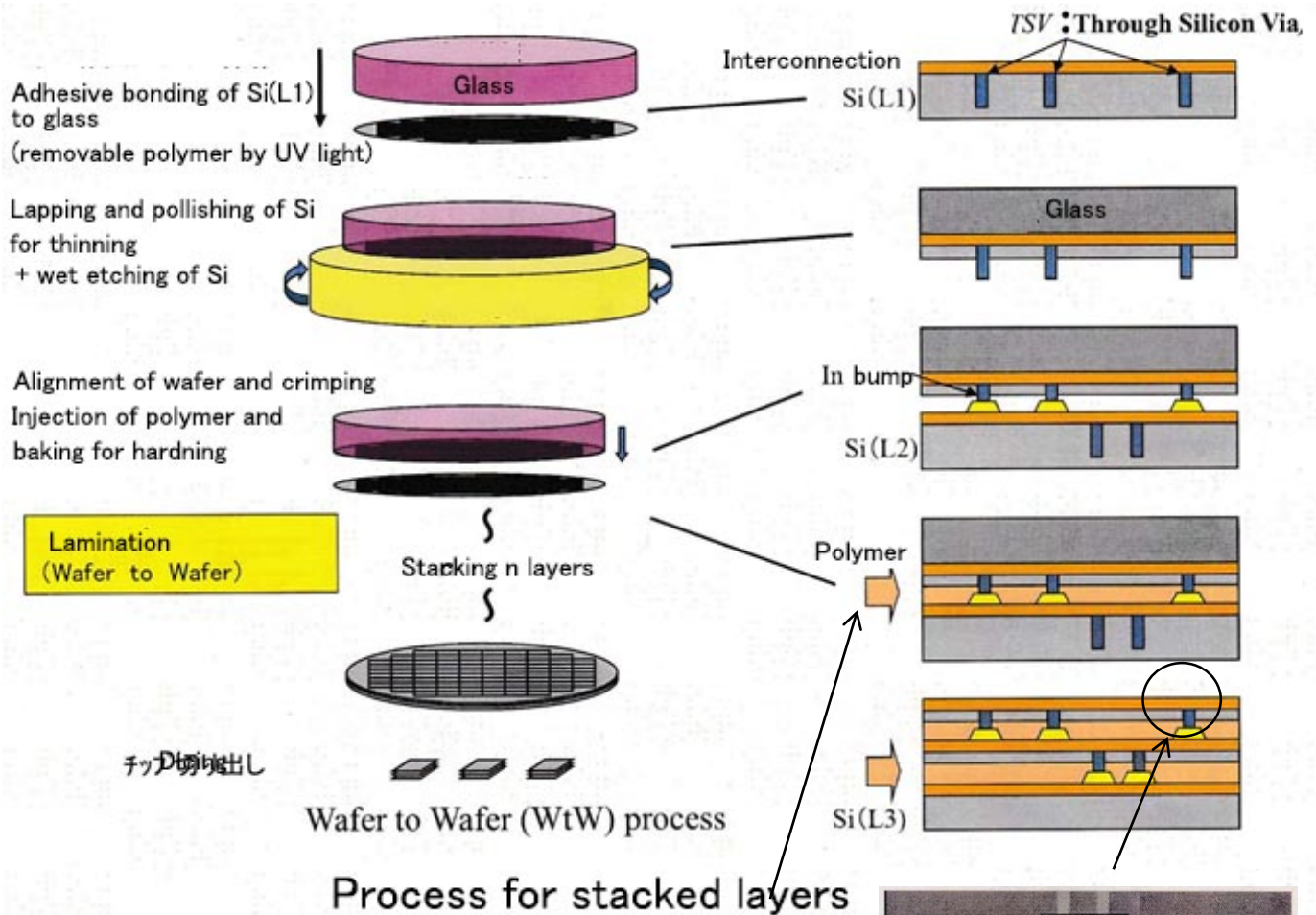
Temperature distribution is measured by scanning with 8 sensors

New product  
NE-BS1100

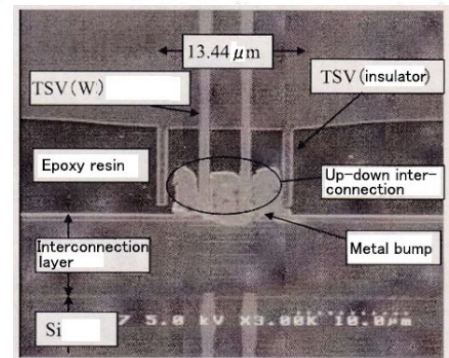
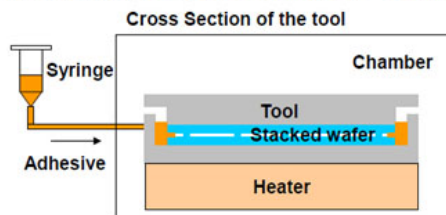


64 sensors measure the temperature distribution simultaneously

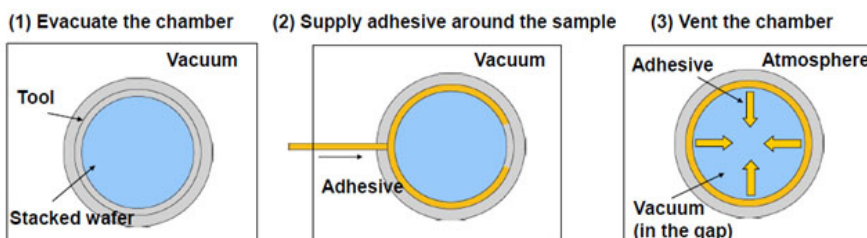
Measurement of temperature distribution in microwave oven



Evacuate in a gap between the Stacked wafer, and then an adhesive is injected in the tool. The adhesive is injected in the gap after the vacuum in the chamber is changed to a atmosphere.

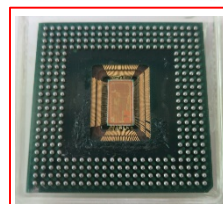


Cross section photo of TSV

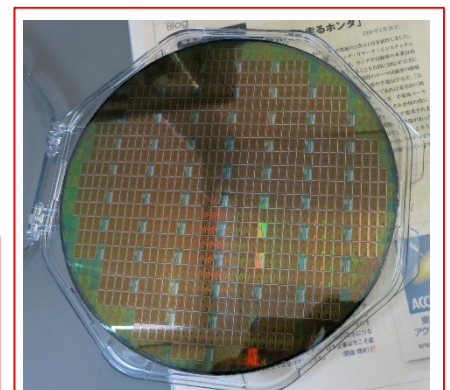


Adhesive injection method

(Nobuaki Miyakawa et.al . Multilayer stacking Technology using wafer-to-wafer stacked method, ACM J. on Engineering Technologies in Computing Systems, Vol.4, No.4 (2008):)



3D LSI chip



3D LSI wafer (8 inch)

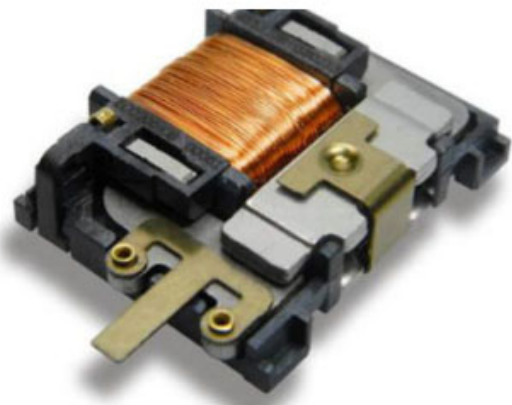


### N3 Remote control switch using energy harvester (EnOcean GmpH)



Remote control switch

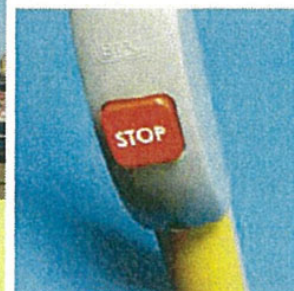
ECO 200 (Not recommended for new designs)



Energy converter for motion energy harvesting

Energy harvester for the switch

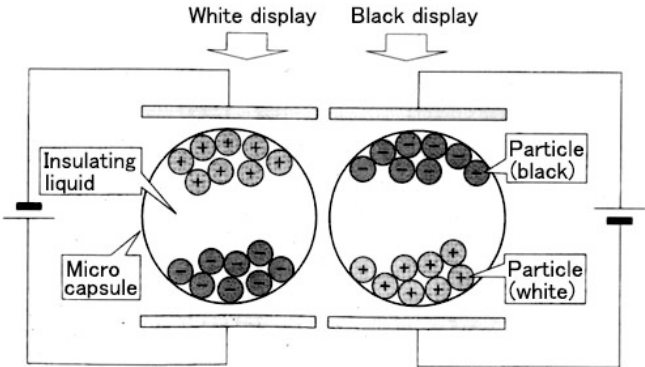
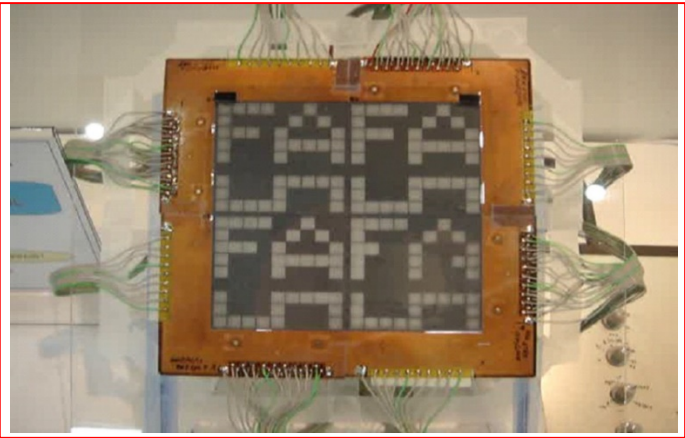
<https://www.enocean.com/en/product/eco-260/?ts=1696510449>



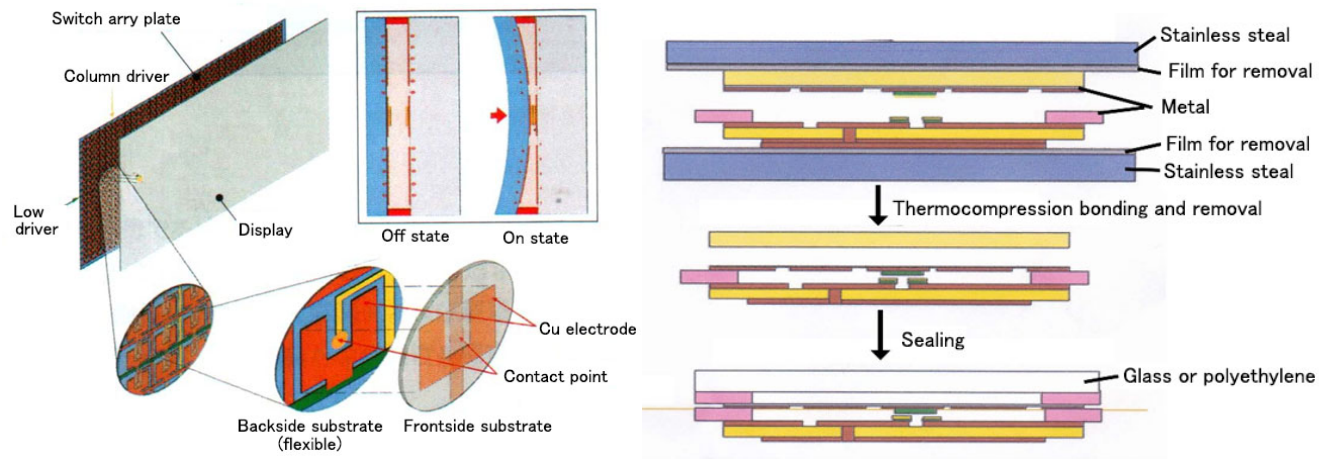
Application of the remote switch for bus in London

(Kazumi Itagaki (enocean alliance) : Battery-less wireless switch and sensor by energy harvesting and applications of MEMS devices, 2012/9/20 Research meeting on microsystem fusion)

# N4 Membrane switch array for electrophoresis display and oscillometric blood pressure monitor (E-paper, Tokyo Sanyo Electric Co. Ltd, K. Senda)



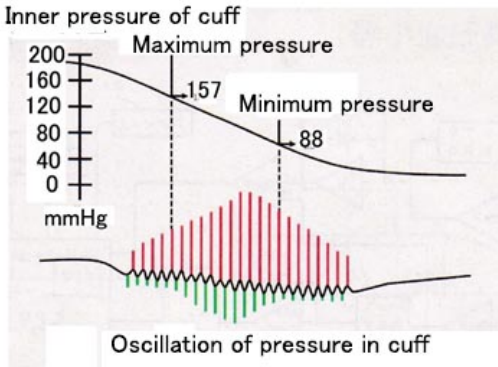
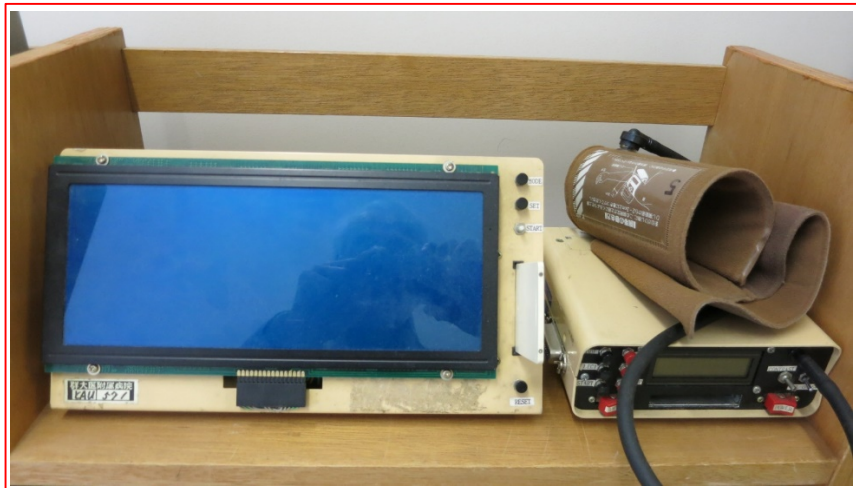
Photograph and principle of electrophoresis display



Principle of electrostatic switch and fabrication process

(K.Senda, B.S.Bae and M.Esashi : MEMS Membrane switches Backplane for Matrix Driven Large Sign Display [The 15<sup>th</sup> Internl. Display Workshops (IDW' 08), Niigata (2008, Dec.4) 1349-1353]

(K. Senda, M. Esashi : Application of membrane switch array on polymer plate to MEMS display, 25<sup>th</sup> Sensor micromachine and system application symposium, Late news, Okinawa (2008/10/23) 121.



Holter oscillometric blood pressure monitor