# PERFORMS DEFINITIVE DECAPSULATION OF PLASTIC MOLD I.C. PACKAGES.

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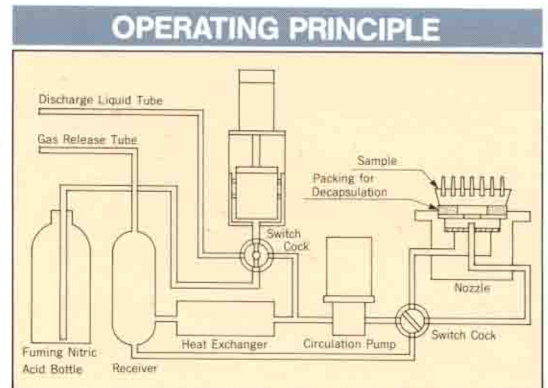
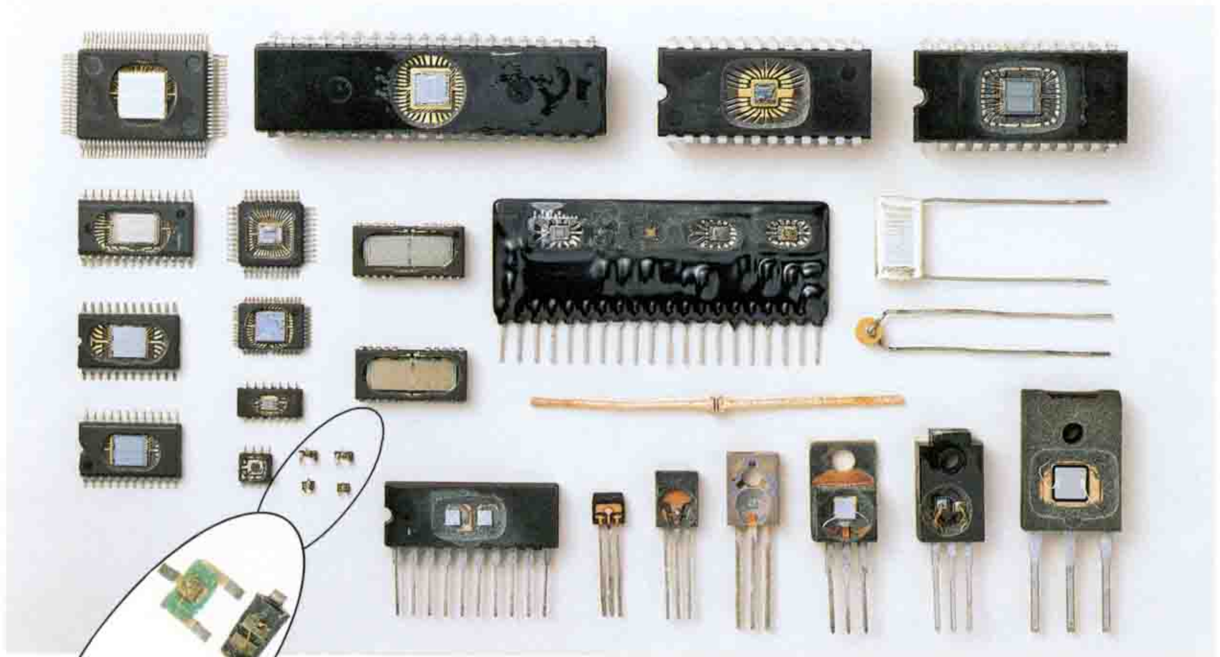
## PLASTIC MOLD DECAPSULATION SYSTEM

# PA103




Decapsulation of IC/LSI is the first step for failure analysis. Vital internal information of devices under test is exposed by decapsulation. PA103 is a self-contained system that performs the definitive decapsulation of plastic mold IC packages. Since the etchant and method are based upon proven manual process, previous data and failure analysis procedures can be used on PA103. PA103 is developed for not only outstanding decapsulation quality, but also safety, reliability, and ease of operation. Results enable accurate inspection and failure analysis.

# VERSATILITY……

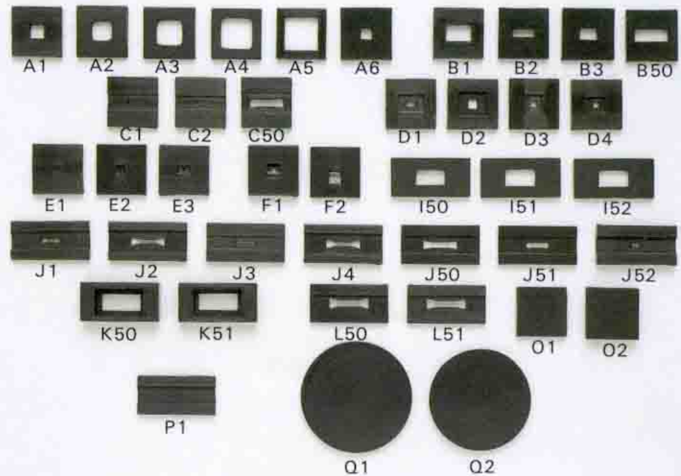


SURFACE MOUNTED TRANSISTOR
(ACTUAL DIMENSIONS2.0×1.5mm)

## ACCURATE DECAPSULATION OF A WIDE VARIETY OF I.C. PACKAGES

The area intended for decapsulation is controlled by using acid resistant fluoric rubber packings. The aperture (pattern) of these packings comes in a variety of shapes and sizes. Currently 40 types are available to accurately decapsulate included 4Mbit DRAM, surface mounted transistor, etc. NO MILLING OR OTHER SURFACE PREPARATION IS REQUIRED.

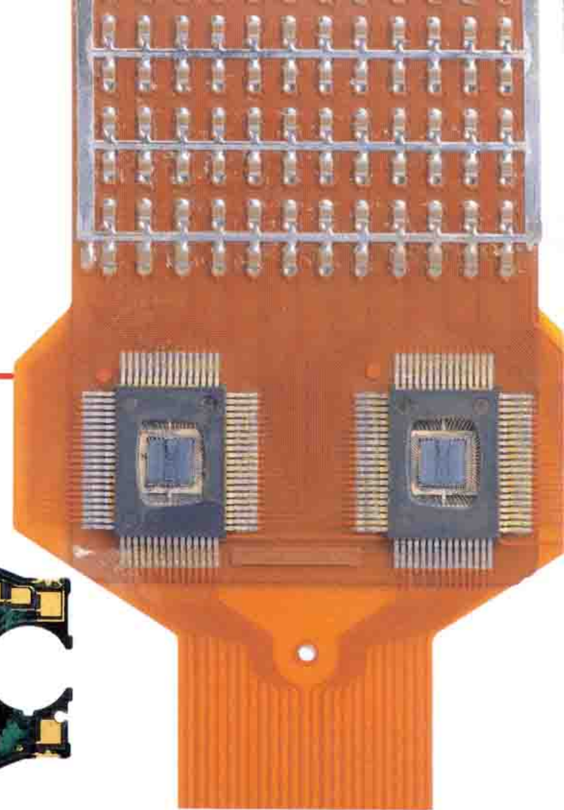
## SELECTION OF DECAPSULATION PACKINGS




## APPLICATIONS

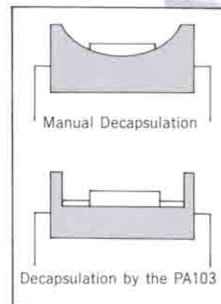
| Model number | PERFORMANCE/SPECIFICATIONS | Model number | PERFORMANCE/SPECIFICATIONS | Model number | PERFORMANCE/SPECIFICATIONS |
|---|---|---|---|---|---|
| A1 | FP, PLCC, etc. | D2 | TO-220, etc. | J4 | DIP 300 mil 1Mbit DRAM, 256Kbit DRAM, etc |
| A2 | FP, PLCC, etc. | D3 | SO 225 mil 8 pin, etc. | J50 | DIP 300 mil 1Mbit DRAM, etc. |
| A3 | FP, PLCC, etc. | D4 | SO 200 mil 8 pin, etc. | J51 | DIP 300 mil 256Kbit DRAM, etc. |
| A4 | FP, PLCC, etc. | E1 | SMD (for package size 2.0 × 1.3 mm approx.), etc. | J52 | DIP 300 mil (for deep decapsulation), etc. |
| A5 | FP, PLCC, etc. | E2 | SMD (for package size 2.9 × 1.5 mm approx.), etc. | K50 | SOJ 4Mbit DRAM, etc. |
| A6 | FP, PLCC, SO, etc. | E3 | SMD (for package size 4.5 × 2.5 mm approx.), etc. | K51 | SOJ 300 mil 4Mbit DRAM, etc. |
| B1 | DIP 600 mil, FP, etc. | F1 | TO-92, etc. | L50 | ZIP 1Mbit DRAM, etc. |
| B2 | SIP, SO, FP, etc. | F2 | Small signal Tr, etc. | L51 | ZIP 4Mbit DRAM, etc. |
| B3 | DIP 600 mil, FP, PLCC, etc. | I50 | DIP 600 mil, COB, HIC, etc. | O1 | Spare (for user processing : l = 2 mm) |
| B50 | FP, PLCC, etc. | I51 | DIP 600 mil, COB, HIC, etc. | O2 | Spare (for user processing : l = 4 mm) |
| C1 | SO 225 mil, etc. | I52 | JI, J50, J51, etc. for spacer. | P1 | Spare (for user processing : for DIP 300 mil) |
| C2 | SO 200 mil, etc. | J1 | DIP 300 mil, SIP, etc. | Q2 | Spare (for user processing) |
| C50 | SOJ 1Mbit DRAM, etc. | J2 | SOJ, etc. | | |
| D1 | DIP 300 mil 8 pin, etc. | J3 | SIP, etc. | | |

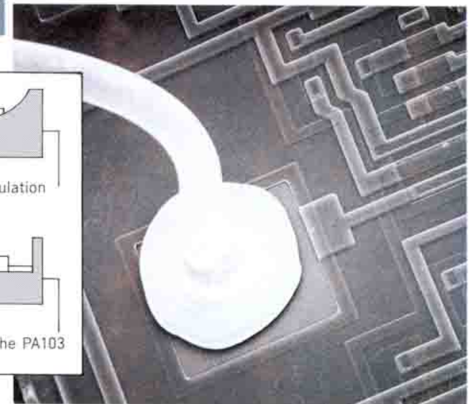
# *ACCURACY*······



## SUPERIOR DECAPSULATION QUALITY

PA103 uses fuming nitric acid as etchant in a heated (65°C ~ 70°C) circulating system. A new original circulation pump was developed for circulation of etchant. This circulation pump dispenses acid to expose a clean die surface and maximizes opening area up to lead frame. For plastic package having copper alloy lead frame the recommendation is a solution of fuming nitric acid mixed with concentrated sulfuric acid at ratio 9:1 to 5:1 and a temperature of 75°C

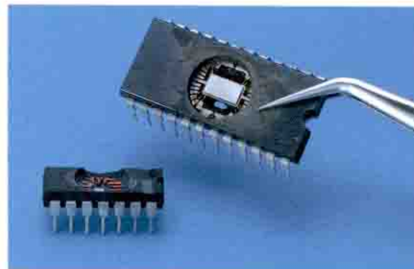


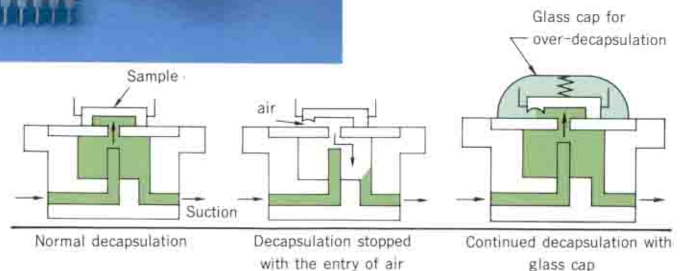



Bonding Pad Normalcy

## EMPLOYS NEGATIVE PRESSURE INJECTION FOR SAFETY

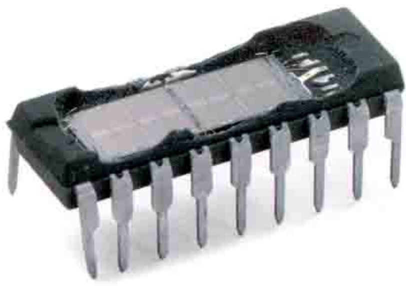
The etchant is safely pulled through the nozzle towards the sample, so in case the IC package sidewall is cracked or ruptured due to inadvertent over-decapsulation, the pump begins to pull air and the operation automatically ceases. The interrupted flow of acid by air will also be visible in a glass sighting tube. When over-decapsulation is desired, a special glass cap is applied to create a sealed condition thereby allowing continued operation.





## ENCLOSED ETCHANT SUPPLY

The etchant supply is safety located inside the system. Moreover the bottle of fuming nitric acid is used as purchased without requiring any potentially hazardous chemical repackaging. Installing a new supply is a simple and safe matter of changing caps.



# *RELIABILITY, SAFETY*......

## HIGH RELIABILITY DESIGN

PA103 operates under severe conditions caused by corrosive fuming nitric acid and silica powder in mold plastic. The new circulation pump employs direct drive silicon carbide gears and alumina protector. This provides corrosion resistance and wear resistance. Also, electronic components are enclosed in a separate housing safely avoiding potential exposure of delicate printed circuit boards and power supplies to acid fumes.

## WATER CLEANING IS AVAILABLE

Automatic water cleaning program is available. Periodic flushing of internal tubing with water reduces potential corrosive damage due to fumes remaining in system when not in use. Process is simple, quick, and easy.

## VARIABLE DOWN PRESSURE

The IC holder is raised and lowered by electric drive. Five levels of down pressure are available to adjust to the special requirements of various IC packages.

## Specifications

| | | | |
|---|---|---|---|
| Product name | Plastic mold decapsulation system | | |
| Method | Dissolving by reduced-pressure injection of fuming nitric acid | | |
| Dimension | 570(W) × 450(D) × 355(H)mm | | |
| Power source | 90 – 130VAC or 200 – 240VAC | | |
| Weight | Approx. 27kg | | |
| Etchant | Fuming nitric acid, mixed acid (fuming nitric acid: concentrated sulfuric acid = 9:1 – 5:1) | | |
| Quantity of etchant | Approx. 40ml/operation | | |
| Temperature range | 50 – 80°C | | |
| Timer setting | 0 – 59 min. 59 sec. | | |
| Temperature control | PD control | | |
| Temperature sensor | Platinum thermo sensor (Pt 100 ohms) | | |
| Operation sequence | Etchant supply – heating – repeatable decapsulation (within 30 min.) – etchant discharge | | |
| Cleaning support system | Water cleaning program, Restart program | | |
| Times of etchant discharge | 0 – 99 Number of drains (presettable; buzzer sound for alarm) | | |
| IC holder | Electric drive type with 5 step | | |
| Safety device (alarms) | Short etchant, leakage, abnormal pump pressure, abnormal drive circuit malfunction, disconnection (heater, sensor), overheat, no sample (or incorrect sample setting), abnormal electronic circuit malfunction. | | |
| Accessories | Packing guide | 1 | Stainless steel |
| | Packing | 40 | Acid resistant fluorine rubber |
| | Nozzle cover | 1 | Stainless steel, acid resistant fluorine rubber |
| | Nut for intake | 2 | Fluorine resin |
| | Discharge liquid tube | 1 | Fluorine resin |
| | Gas release tube | 1 | Fluorine resin |
| | Discharge tank | 1 | 5.5 lit, polyethylene |
| | Glass cap | 1 | For over-decapsulation |
| | Fluorine grease | 1 | 50 g |

## PERIPHERAL EQUIPMENTS

- Ultrasonic cleaning system
- Ductless filtration fume hood
- Work table

**During operation or bottle changes, some fumes may leak. The PA103 must be operated in an appropriate fume hood.**

*Protective clothing, gloves, and safety glasses should be worn by operators.

*Specifications may change for improvement without notice.

**SESA, Inc.**
1700 Wyatt Drive
Suite 11
Santa Clara, CA 95054
Tel: 408.988.5816
Fax: 408.988.5817
**WWW.SESA.COM**

**Nippon Scientific Co., Ltd.**
**Head Office**
1-28-6,Toshincho, Itabashi-ku,
Tokyo 174-0074 Japan
TEL 81-3-3958-1411, FAX 81-3-3958-1412
**Singapore Branch**
76,PLAYFAIR ROAD,#02-01A,LHK2 BUILDING,
SINGAPORE 367996
TEL 65-7444776, FAX 65-7444786
**http://www.nscnet.co.jp**