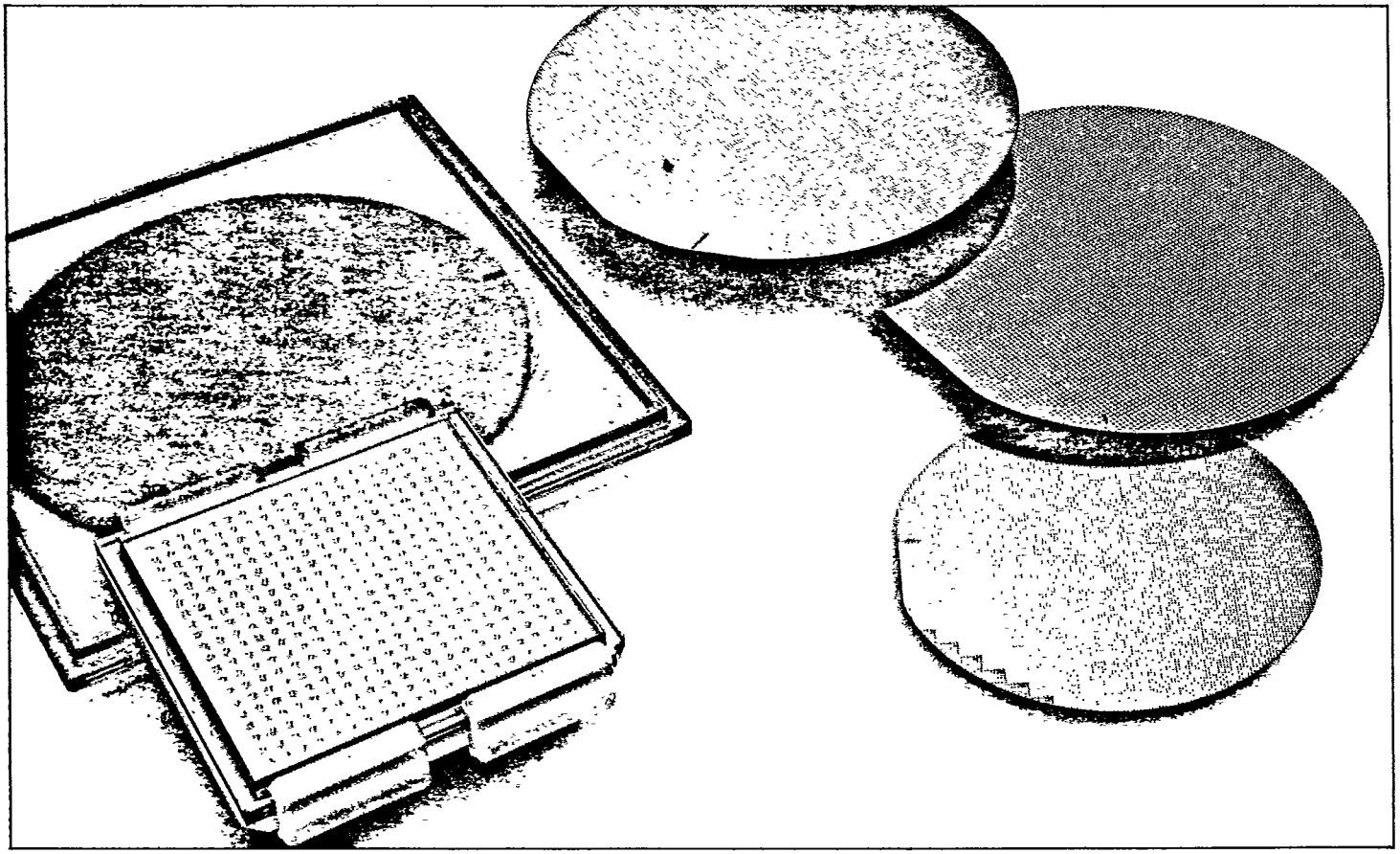
Raytheon Company
Semiconductor Division

T-27-99

Raytheon

Transistor Dice Catalog



Features

- Wafer size 2¼ inches, 3 inches
- Aluminum metallization 12 to 15K Angstroms
- Gold backing on all types 2 to 3K Angstroms
- Glassivation 6 to 7K Angstroms
- Wafer/Die Thickness 4 to 6 mils
- Available in dice or wafer form; sample tested or 100% tested
- Dice form is waffle packed or glass vial packed and vacuum sealed in anti-static bags
- Wafers are packed in plastic trays and vacuum sealed in anti-static bags
- Actual probe specifications can be tailored to customer requirements
- Visual quality of dice and wafers guaranteed to 30% LTPD except 100% inspected dice which is guaranteed to 5% LTPD.
- 100% tested dice in waffle or vial pack guaranteed to 10% LTPD for key parameters.

For any special requirements consult the Raytheon Sales Office in your area.

Shipping Formats

- **Prefix Meanings:**
  AT — Standard JEDEC Type
  SC — Special Customer Requirements

  Use only these prefixes. Do not use 2N prefix.
- **Suffix Meanings:**
  WD — Sample Probed, Wafer Form, Unscribed, Packed in Individual Plastic Trays
  WE — 100% DC Probed, Wafer Form, Unscribed, Rejects Inked, Packed in Individual Plastic Trays
  EB — 100% DC Probed, Individual Dice, Rejects Removed, Packed in Vials
  EA — 100% DC Probed, Individual Dice, Rejects Removed, Packed Individually in Waffle Pack Trays
- **Examples:**

AT 2222A WE
- WE — Suffix WD, WE, EB, or EA
- 2222A — JEDEC Part Type
- AT — Prefix for JEDEC Types

SC 2300 EA
- EA — Suffix WD, WE, EB, or EA
- 2300 — Sequentially Assigned Numbers for Each Customer Drawing
- SC — Prefix for Customer Specials

Product Information

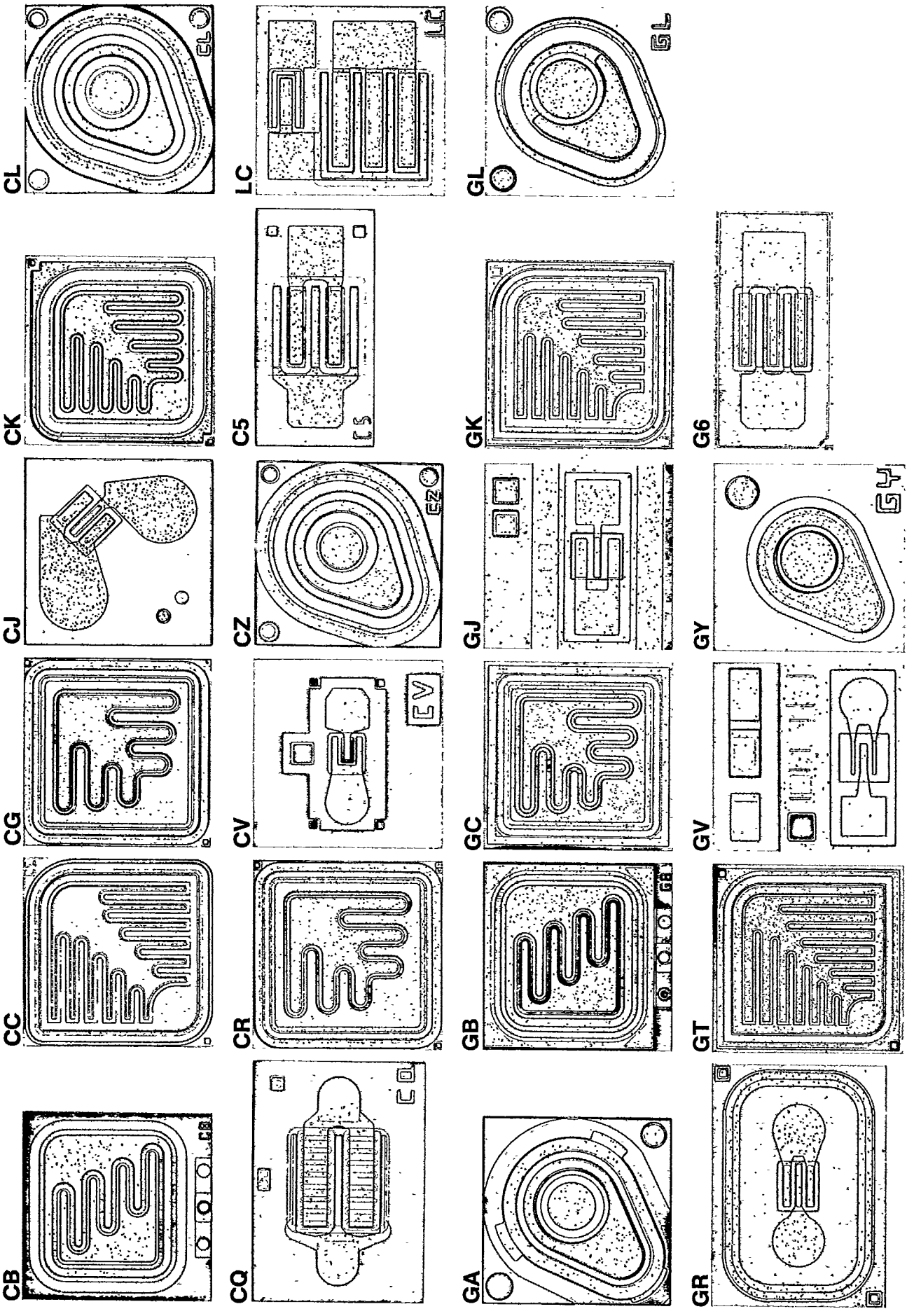
NPN

Product	Die Size	Bonding Pad Size (mils)	
		Base	Emitter
CB	21 × 21	3.8 × 5.6	3.80 × 5.60
CC	27 × 27	4.0D	4.0D
CG	27 × 27	6.2 × 6.2	5.30 × 5.30
CJ	16 × 16	4.6D	4.6D
CK	25 × 25	4.0 × 4.0	4.3D
CL	19 × 19	3.2D	3.3D
CQ	15 × 20	2.8D	2.8D
CR	27 × 27	6.2 × 6.2	5.30 × 5.30
CV	17 × 17	3.0 × 2.7	2.75 × 2.70
CZ	19 × 19	3.2D	3.3D
C5	11 × 19	3.3 × 3.3	3.30 × 3.30
LC	20 × 20	6.5 × 3.5	3.50 × 3.50

PNP

Product	Die Size	Bonding Pad Size (mils)	
		Base	Emitter
GA	19 × 19	3.3D	3.4D
GB	21 × 21	3.8 × 5.6	3.80 × 5.60
GC	27 × 27	4.5D	4.5D
GJ	17 × 17	3.5 × 3.5	3.50 × 3.50
GK	27 × 27	4.0D	4.0D
GL	17 × 17	4.0D	3.8D
GR	15 × 20	3.2D	3.2D
GT	30 × 30	4.5D	4.0D
GV	16 × 16	2.5D	2.25 × 2.25
GY	20 × 20	4.2D	4.50 × 4.70
G6	11 × 20	3.5 × 4.0	3.50 × 4.00

Product Pattern



Transistor Product Selection Guide

Dice Model	Polarity	Description	Target Types	Other Popular JEDEC and Pro-Electron Types	*Parameters																Design Parameters (Worse Case) For Information Only						
					Breakdown Voltage			Leakage	Saturation Voltage				H_{FE} Current Gain														
					B_{VCBO} I_C = 10μA Min [V]	B_{VCEO} I_C = 10mA Min [V]	B_{VEBO} I_C = 10μA Min [V]	I_{CES}, I_{CBO} Max [nA], V_{CB} [V]	I_C mA	I_B mA	V_{CE} Max [V]	V_{BE} Max [V]	V_{CE}/I_C [V]/[mA]	H_{FE} Min	H_{FE} Max	V_{CE}/I_C [V]/[mA]	H_{FE} Min	H_{FE} Max	V_{CE}/I_C [V]/[mA]	H_{FE} Min	H_{FE} Max	C_{OB} pF V_{CB} Max/V	C_{IB} pF V_{EB} Max/V	Noise Figure [dB]	T_S [nS]	T_{OFF} Max [nS]	f_t Min MHz	Maximum Collector Current Rating mA
CB	NPN	General purose medium power amplifier and switch	AT2222A/2219A AT2221A/2218A	BSY51-54, AT4401, AT4400	75	40	6.0	10 @ 60	150	15	0.3	1.2	10/0.1	38		10/10	80		10/150	40	300	8/10	30/0.5			350	225	500
CC	NPN	General purpose amplifier and switch for high voltage applications	AT3501, AT3500, AT3499, AT3498	AT3114, AT5550, AT5551, AT5830, AT5832	155	150	6.0	50 @ 80	150	15	0.4	1.1	10/0.1	40		10/1	84		10/150	40	300	8/10	80/0.5	6		1150	100	300
CG	NPN	General purpose amplifier, high current applications	AT3019/3700	AT2102 BC140, BC141	100	70	7.0	10 @ 90	150	15	0.35	1.2	10/0.1	35		10/150	40	300	10/500	25		8/10	80/0.5				100	1000
CJ	NPN	Gold doped silicon epitaxial transistor high speed switching applications up to 100mA	AT2369A, AT2368, AT706A	BSX88	40	15	5.0	400 @ 20	10	1	0.2	0.85	1/1	30		1/10	40	120	1/100	15		4/10	5/0.5		15	20	500	100
CK	NPN	Gold doped high speed switching and core driver applications. Useful current up to 1A	AT3724, AT3725, AT3734/3735	AT4013, AT4014, BSX32	50	30	6.0	500 @ 50	500	50	0.5	1.1	1/100	60		1/500	35		1/500	25		10/10	55/0.5			70	250	1000
CL	NPN	Low level, low noise and high gain for general purpose amplifier applications	AT930, AT2484A, AT2484	AT5962, AT5963 BC317, BC318 BC319A,B,C	75	40	6.0	10 @ 50	10	1	0.35	0.85	5/0.01	100		5/1	250		5/10	250		5/5	6/0.5	5			100	50
CQ	NPN	RF amplifier applications to 1GHz	AT3866A, AT5109 AT5108		40	30	4.5	1000 @ 50	100	10	1.0	1.2	5/10	30		5/50	25		5/360	8		4.5/10	15/0.5	6			500	360
CR	NPN	General purpose amplifier, non-epi CG model	AT1711, AT720, AT1890		100	70	7.0	50 @ 60	150	15	1.5	1.5	10/0.01	10		10/150	40	300	10/500	25		15/10	60/0.5				70	1000
CV	NPN	Ultra high frequency RF amp. Mixers, low noise amplifier.	AT917, AT918		30	15	4.5	10 @ 25	10	1	0.35	1.0	1/0.1	30		1/3	20		1/30	25		2/10	2/0.5	4.5			750	50
CZ	NPN	RF amplifier applications	AT915, AT916		45	45	5.0	20 @ 25	10	1	1.0	1.0	5/1	35		5/10	40					4.5/10	12/0.5				200	300
CS	NPN	General purpose amplifier, medium	AT3903, AT3904	AT4123, AT4124	60	40	5.0	25 @ 50	50	5	0.35	1.1	1/0.1	40		1/10	50		1/100	20		4/10	10/0.5				250	200
LC	NPN	Monolithic Darlington medium current	AT997, AT998, AT999		60	60	10.0	50 @ 60	100	1	1.6	2.0	10/0.1	1K		10/10	2K		10/100	5K	75K	10/10	10/0.5					150
GA	PNP	General purpose low power amplifier and switch up to 100mA	AT3251, AT3251A, AT3250, AT3250A		65	65	6.0	20 @ 40	10	1	0.2	0.85	1/0.1	80		1/10	90	300	1/50	30		5/10	8/0.5		250		300	100
GB	PNP	General purpose medium power amplifier and switch	AT2907A/2905A AT2906A/2904A	BFX87,8 AT3485, AT3486, AT4403, AT4402	80	40	6.0	10 @ 60	150	15	0.30	1.0	10/0.1	40		10/10	80		10/150	40	300	8/10	30/2			300	250	600
GC	PNP	General purpose amplifier and switch for high voltage applications	AT3636, AT3637	AT3635, AT3634	175	150	5.0	100 @ 100	50	5	0.6	1.0	10/1	60		10/50	100		10/150	30		10/10	60/0.5		500	700	150	1000
GJ	PNP	Ultra high speed platinum doped epitaxial device useful for high speed switching applications	AT3209, AT2894		20	15	4.0	100 @ 10	10	1	0.2	1.0	1/10	30	150	1/30	30	150	1/500	15		4/10	7/0.5		45	90	500	150
GK	PNP	Platinum doped transistor, useful for high current high speed applications	AT3467, AT3468	AT5022, AT5023	40	40	5.0	200 @ 30	150	15	0.35	1.0	1/150	25	200	1/500	25	200	5/1000	20		25/10	100/0.5		90	120	150	1000
GL	PNP	Low level, low noise and high gain for general purpose amplifier applications	AT2604, AT2605	AT3799, AT3962 AT3964, AT3965, BC177-9	80	60	6.0	10 @ 50	10	1	0.35	0.85	5/0.01	100		5/1	150		5/10	150		5/5	6/0.5				150	50
GR	PNP	Platinum doped silicon epitaxial transistor high speed switching and saturated logic switches applications	AT4208, AT4209, AT2894A	AT5771, AT3639, AT3640	15	12	4.5	10 @ 6	10	1	0.2	1.0	0.5/1	15		0.5/10	30		1/100	15		3/10	3.5/0.5		30	25	700	100
GT	PNP	General purpose amplifier high current to 1A application	AT4033, AT4032	AT4027, AT4028, AT4029	90	80	5.0	50 @ 60	500	50	0.5	1.0	5/100	100	300	5/500	70		5/1000	25		20/10	80/0.5				150	1000
GV	PNP	Ultra high speed current mode logic switch, RF amplifier applications	AT4260, AT4261	AT4957	15	12	4.5	100 @ 15	10	1	0.35	1.2	1/0.1	30		1/10	30		1/30	20		2.5/10	2/0.5		10		800	50
GY	PNP	Chopper applications	AT2945A, AT3910 AT2946A, AT328A	AT329A, BCY17-34	60	50	35	10 @ 35	10	1	0.15	0.85	0.5/0.1	40		0.5/1	50		0.5/10	70		6/10	7/0.5		350		3	50
G6	PNP	General purpose amplifier medium current applications	AT3906, AT3905	AT4125, AT4126	50	40	6.0	20 @ 30	10	1	0.20	0.80	1/0.1	60		1/10	90	300	1/100	25		4.5/5	10/0.5		200		250	200

*Note: Actual Probe specifications will vary by type and can be tailored to customer requirements.

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Packaging Methods

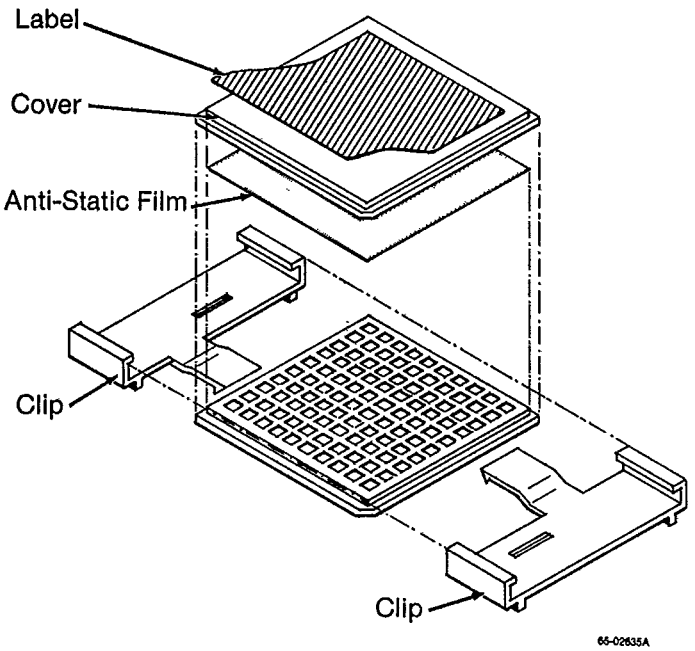

Figure 1. Waffle Pack

Dice are placed in individual compartments. The plastic snap clips permit inspection and resealing.

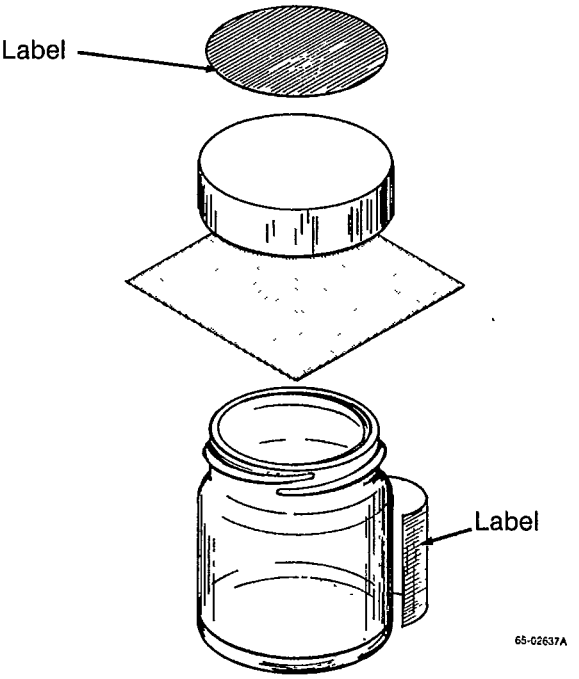

Figure 2. Vial Pack

The vial is sealed with filter paper and taped.

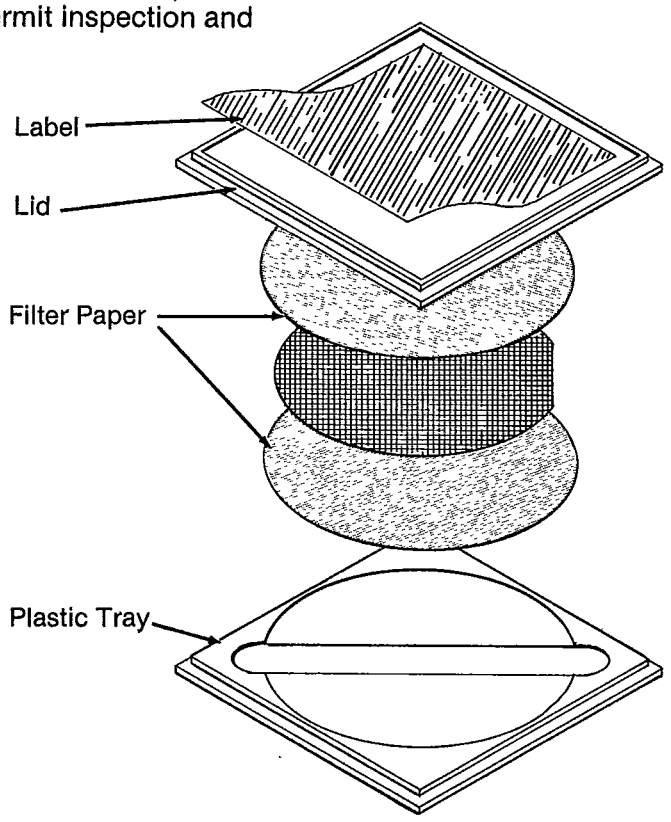

Figure 3. Plastic Tray Pack

Entire wafer is sandwiched between two pieces of filter paper then stacked in plastic trays and vacuum sealed in a plastic envelope.