

RWS

SAE #174 BA.

"Miniwatt"

DIGEST

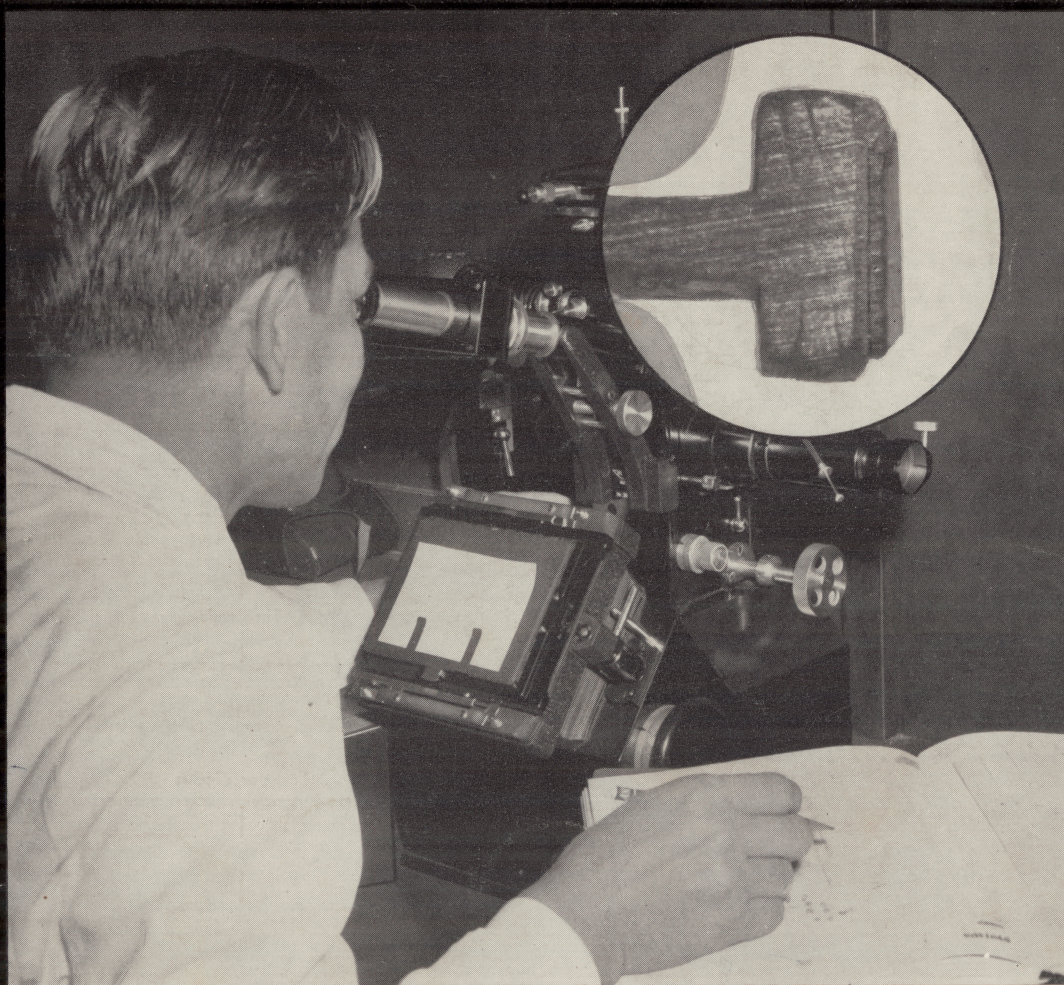
VOL. 2. No. 4
JANUARY 1963

— TECHNICAL AND COMMERCIAL TOPICS OF
CURRENT INTEREST TO THE ELECTRONICS INDUSTRY

CONTENTS

	Page
PRODUCTION OF MINIATURE GERMANIUM DIODES IN AUSTRALIA	50
CLASS B COMPLEMENTARY- SYMMETRY AMPLIFIERS (using AC127/132)	54
INTRODUCING PHILIPS PELTIER DEVICES FOR THERMO- ELECTRIC COOLING	60

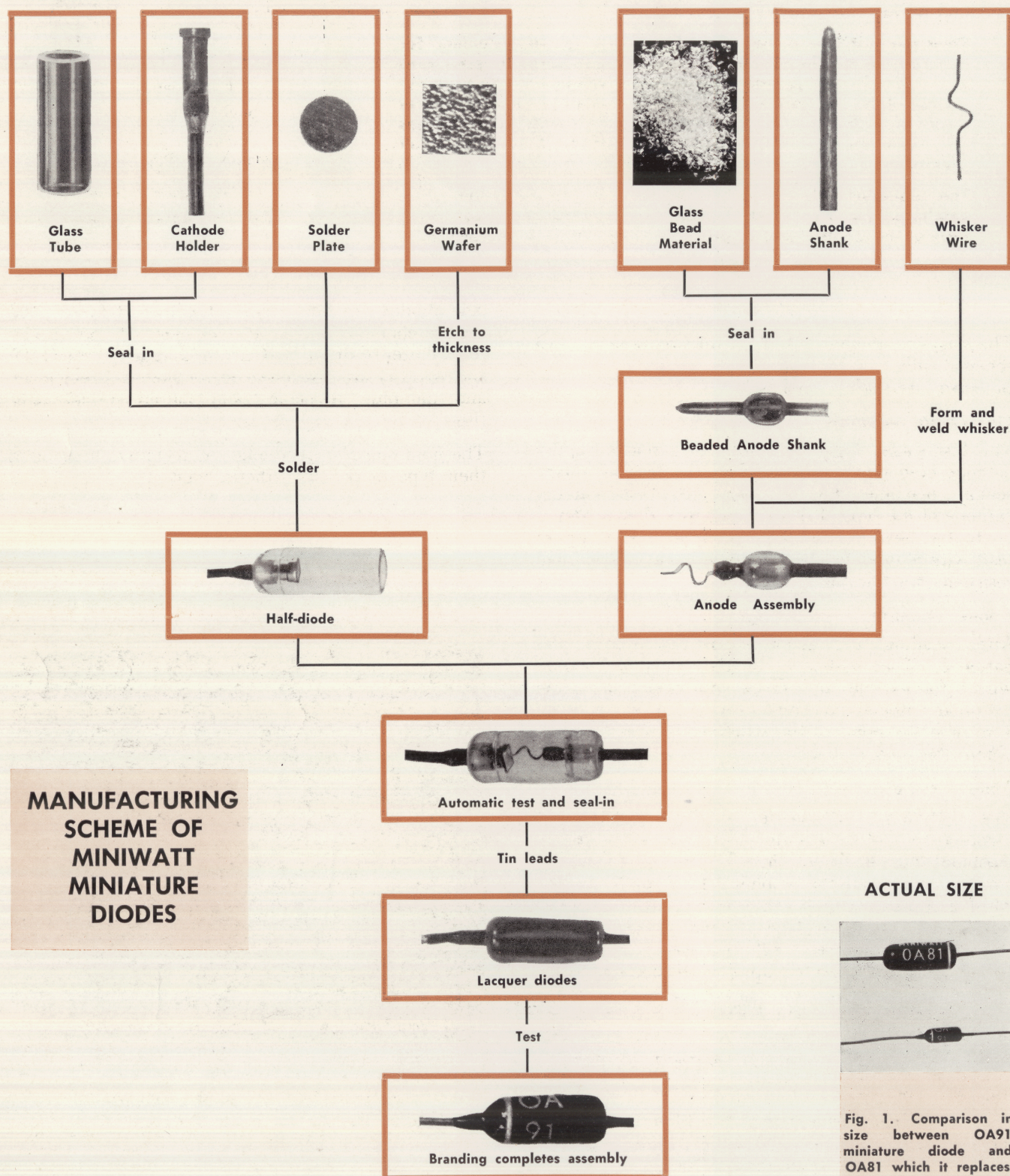
Published by the
Miniwatt
Electronics Division of
Philips Electrical Industries
Pty. Limited,
20 Herbert Street,
Artarmon,
N.S.W., Australia



QUALITY CONTROL OF MINIATURE GERMANIUM DIODES

Physical investigation of prepared section of cathode assembly
using specialised microscope

Production of Miniature Germanium Diodes



in Australia

Germanium diode production commenced at the Hendon, South Australia, plant in September 1959. Since then millions of the "OA80" series diodes have been produced for both entertainment and professional applications.

Over the past year or two there has been a growing demand for miniature diodes in portable radios, ratio and video detector cans and professional equipment. With the development of new types to complete the range of Miniwatt miniature diodes it was decided to change over from the normal ("OA80") diode series to the miniature ("OA90") diode series, and these are now in full production at Hendon.

The manufacturing scheme is broadly as shown below. The emphasis placed on product quality is indicated by the extensive testing and quality control procedures described in the article.

MANUFACTURING PROCESSES

The stages in miniature diode manufacture are shown schematically on the opposite page, and the major processes are outlined below.

Half-Diode Assembly

The first stage of this assembly is to seal a copper cathode holder into a glass tube on a 12-head rotary sealing machine (Fig. 2). An etched germanium cathode of the type of diode required is then soldered on to the head of the cathode holder. The copper lead wire is used to give the lowest possible thermal resistance for the small diode.

Anode Assembly

After beading, the anode shank is cropped and flattened. Then either a tungsten or molybdenum wire is formed into an S-shape and welded on to the flat on an automatic machine (Fig. 3). The final stage is to etch the point of the whisker electrolytically to obtain the correct shape.

Final Assembly

The half-diode and anode assembly are brought together on a 48-head automatic testing and sealing machine (Fig. 4) which in sequence positions the whisker on the cathode, applies a fixed tension to the whisker, forms the junction with a powering pulse, tests the junction for forward and reverse voltage characteristics and rejects it if it is unsatisfactory. This sequence can be repeated up to three times in order to find a spot on the wafer which gives the correct characteristic. Diodes which pass all these tests are then sealed in and unloaded by the machine. The finally sealed diode is shown in the insert to Fig. 4.

Finishing and Testing

The sealed diodes have next to be finished by tinning the lead wires for easy solderability, and lacquered black to make them insensitive to light.

REPLACEMENT LIST

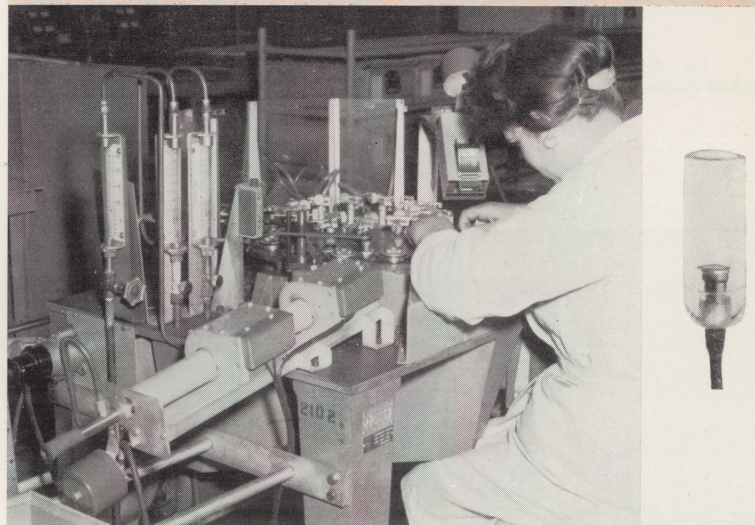
Miniature Type		Electrically Equivalent Type
OA90	replaces	OA80 and OA70*
OA91	replaces	OA81 and OA74
OA95	replaces	OA85
AA119	replaces	OA79
2-AA119	replaces	2-OA79

* video detector service

The diodes are then tested for their forward and reverse characteristics, and dynamically to detect any loop, flutter or drift. Certain diodes (namely the OA90 and AA119) are also checked for detection efficiency and damping resistance and paired if necessary (Fig. 5).

The final stage of production is to brand them with their type mark and cathode band.

Semiconductor Factory—Hendon



▲ Fig. 2. Twelve-head rotary machine for sealing glass tubes to cathode holders during manufacture of half-diodes. On right is a completely assembled half-diode.