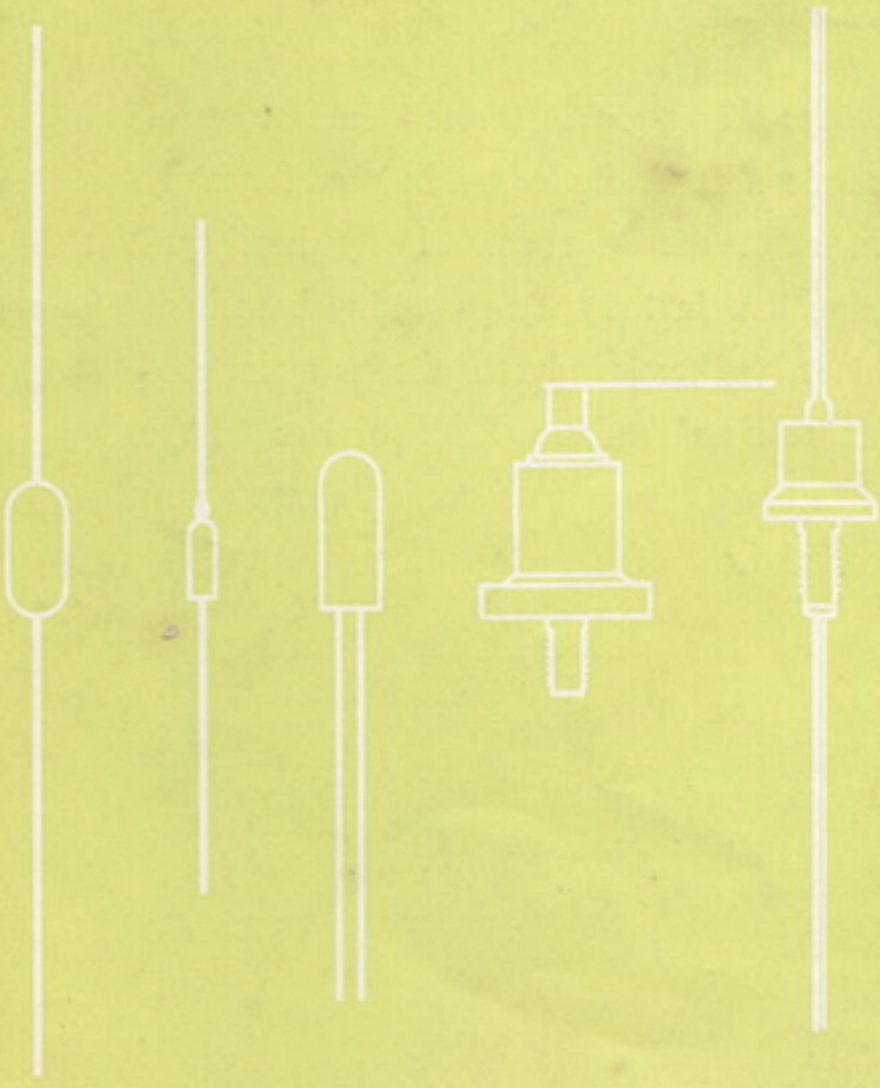
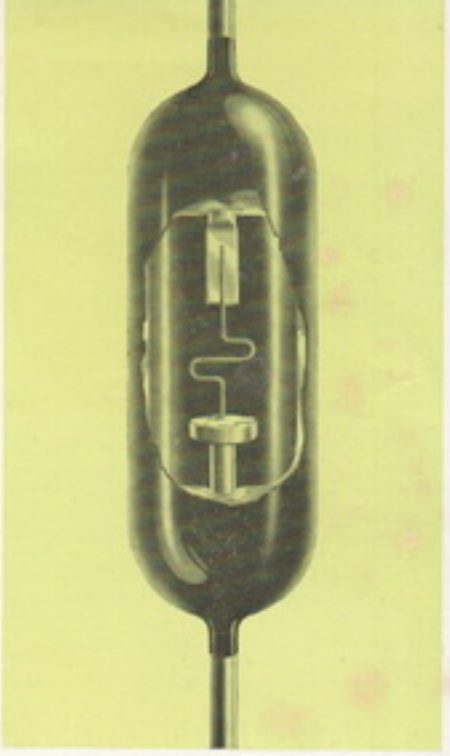
PHILIPS

semiconductor diodes



PHILIPS ELECTRON TUBE DIVISION



PHILIPS semiconductor diodes

The number of applications in which semiconductor diodes are used to advantage, has rapidly increased during the past years. In large measure this expansion is due to the electrical characteristics of these devices, a low forward resistance, high inverse resistance and very favourable characteristics at high frequencies, as well as to their specific properties, such as the absence of a heater, their small dimensions, their long life and rugged construction.

The range of Philips semiconductor diodes, which have now firmly established themselves in electronics, is the outcome of lengthened experience in mass-producing these diodes. Extensive research, a detailed knowledge of the widely diverging requirements that semi-conductor diodes have to meet in practice, combined with life and field tests over a period of many years, have resulted in diodes whose particular advantages can be utilised to the full.

An ever widening field for the application of diodes presents itself to the manufacturer of electronic equipment. In radio and television, semiconductor diodes can be used for many purposes, e.g. video detection, ratio detection, automatic gain control, flywheel synchronisation, d.c.-restoration and mains rectification. In the very promising branch of electronic computers and data processing machines, the semiconductor diodes make economical construction possible of apparatus that will be rendering vast services to the community. Furthermore, they are being used in a wide variety of communication and measuring equipment, as also in the more general field of electrical engineering.

The semiconductor diodes available for the applications mentioned above can be split up into two main groups, **germanium** diodes and **silicon** diodes.

To discriminate between these two types, it should be recognised that the silicon diode, as compared with the germanium diode, has a much lower leakage current at the same temperature. Moreover, the silicon diode can cope with higher temperatures than germa-

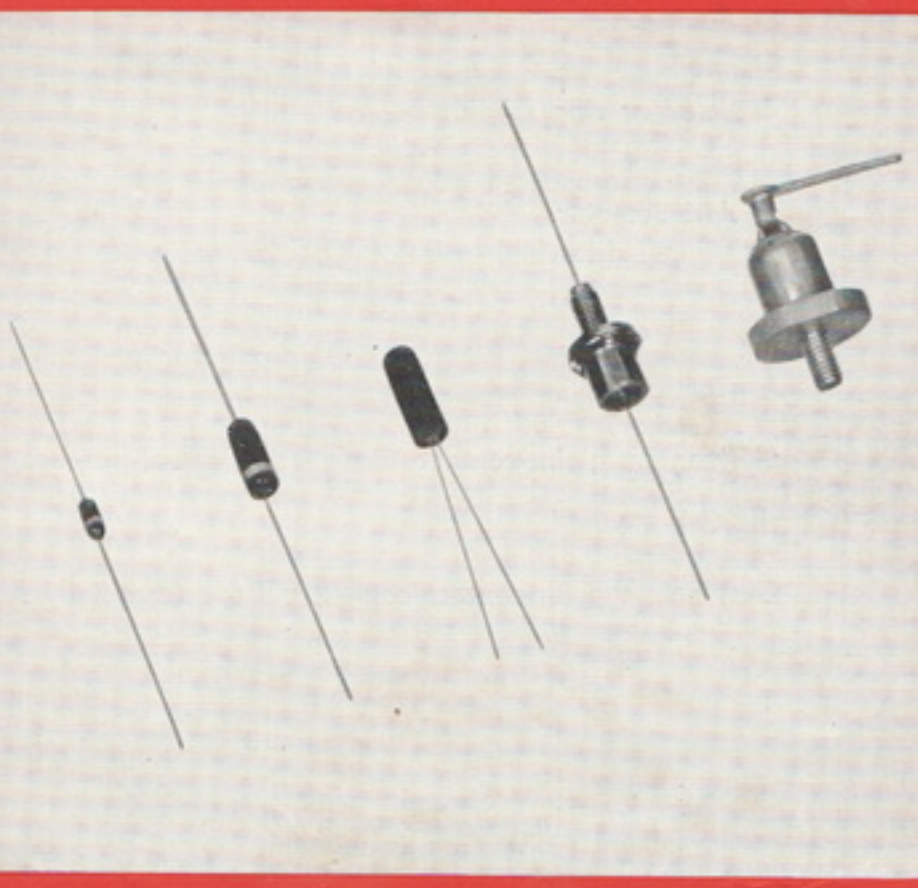
nium, so that it will be of great interest particularly in applications where high ambient temperatures occur.

The choice between silicon and germanium diodes for a given application, however, depends on many design factors which may differ greatly from case to case.

The range of diodes comprises four different executions:

1. double-ended all-glass envelope (70 and 80 series);
2. double-ended miniature all-glass envelope (90 series, OA 200, OA 202, OA 47);
3. single-ended all-glass envelope (OA 5, OA 7, OA 9);
4. metal case (OA 31, OA 210, OA 211, OA 214).

For a survey of the various types of diode we refer to the table in which the technical data and the specific applications of each type have been entered.



Various executions of Philips semiconductor diodes

Sealing-in of semiconductor diodes

SEMICONDUCTOR DIODES

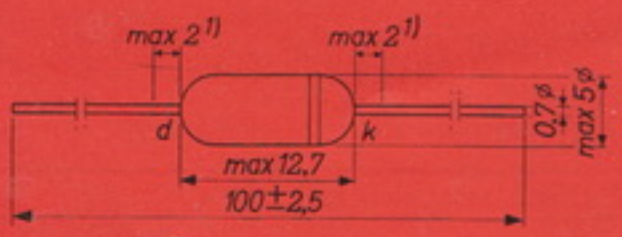
Type number	Absolute maximum ratings					
	Peak inverse voltage (volts)	D.C. inverse voltage (volts)	Average forward current (milliamps)	Peak forward current (milliamps)	Surge current 1 sec (milliamps)	Forward voltage at 0.1 mA (volts)
Germanium						
OA 5 [1])	100	100	115	350	500	0.1—0.25
OA 7 [3])	25	15	50	50	400	0.18
OA 9 [3])	25	25	65 [4])	500	800	0.16
OA 47 [3])	25	15	50	50	300	0.17
OA 90 [3])	30	20	8	45	200	0.1—0.25
OA 91 [1])	115	90	50	150	500	0.1—0.25
OA 95 [1])	115	90	50	150	500	0.1—0.25
OA 70 [3])	22.5	15	50	150	400	
OA 73 [3])	30	20	50	150	400	0.1—0.2
OA 79 [3]) 2-OA 79 [3])	45	30	35	100	200	0.2
OA 81 [1])	115	90	50	150	500	0.1—0.25
OA 85 [1])	115	90	50	150	500	0.1—0.25
OA 86 [1])	90	60	35	150	200	0.14—0.25
Silicon						
OA 200	50	50	50	150		0.53
OA 202	150	150	30	100		0.53

Type numbers	Absolute maximum ratings			
	Peak inverse voltage (volts)	Average forward current (amps)	Peak forward current (amps)	Maximum load capacitance (μF)
Germanium				
OA 31	85	12	12	1000
Silicon				
OA 210	400	0.5 [4])	5	200
OA 211 [5])	800	0.4 [4])	4	100
OA 214 [5])	700	0.5 [4])	5	100

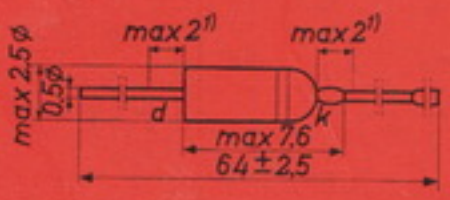
[1]) Ratings at an ambient temperature of 25 °C.
[2]) Average values.
[3]) Absolute maximum ratings at an ambient temperature of 75 °C.
[4]) Sinusoidal input voltage and capacitive load.
[5]) A heat sink of min. 5 cm^2 is required.

Electrical characteristics [1]			Description
Forward voltage at 0.1 mA (volts)	Forward voltage at 10 mA (volts)	Inverse current at specified voltage microamps [2]	
0.1—0.25	0.25—0.55	8 at $-V_D$ = 100 V	Germanium gold-bonded 100 V diode in single-ended all-glass execution for general-purpose applications
0.18	0.42	1.9 at $-V_D$ = 25 V	Germanium gold-bonded diode in single-ended all-glass execution especially suitable for high forward current switching applications
0.16	0.32	3.3 at $-V_D$ = 25 V	Germanium gold-bonded diode in single-ended all-glass execution with high forward conductance, suitable for high forward current switching applications
0.17	0.40	30 at $-V_D$ = 25 V	Miniature double-ended execution of type OA 7
0.1—0.25	0.5—1.5	300 at $-V_D$ = 30 V	Miniature execution of the OA 70
0.1—0.25	0.65—1.9	75 at $-V_D$ = 100 V	Miniature execution of the OA 81
0.1—0.25	0.65—1.5	80 at $-V_D$ = 100 V	Miniature execution of the OA 85
	0.55—2.0	150 at $-V_D$ = 22.5 V	Germanium point-contact diode in all-glass construction, designed for video detection
0.1—0.2	0.6—1.1	280 at $-V_D$ = 30 V	Germanium point-contact diode designed for use as video detector or ring modulator
0.2	1.4	130 at $-V_D$ = 45 V	OA 79: Germanium point-contact diode intended for use as AM detector. 2-OA 79: Matched pair of OA 79 designed for use as ratio detector (damping resistance > 13.5 kΩ)
0.1—0.25	1—2.3	75 at $-V_D$ = 100 V	Germanium point-contact 100 V diode for general-purpose applications
0.1—0.25	0.65—1.5	80 at $-V_D$ = 100 V	Germanium point-contact diode for general-purpose applications (electrical characteristics are better than those of the OA 81)
0.14—0.25	0.82—1.47	130 at $-V_D$ = 90 V	Germanium point-contact computer-diode (especially suitable for switching applications)
0.53	0.80	5 at $-V_D$ = 50 V	Silicon-alloy 50 V diode in miniature envelope
0.53	0.80	5 at $-V_D$ = 150 V	Silicon-alloy 150 V diode in miniature envelope

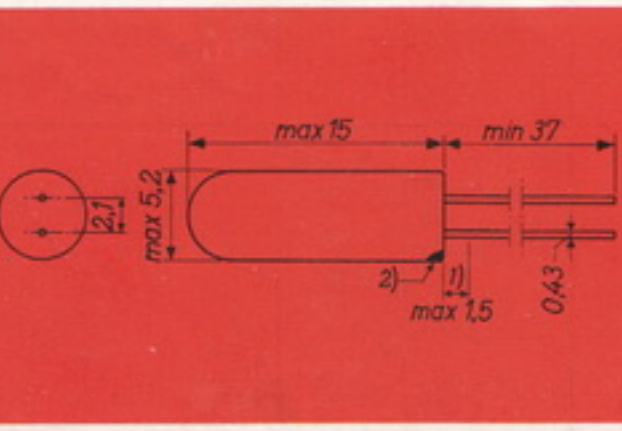
Maximum load capacitance (μF)	Minimum circuit resistance (ohms)	Description
1000		Germanium junction diode for use as power rectifier
200	4	Silicon-alloy 400 V diode, forward current 500 mA max., in metal case for use as power rectifier
100	8	Silicon-alloy 800 V diode, forward current 400 mA max., in metal case for use as power rectifier
100	7	Silicon-alloy 700 V diode, forward current 500 mA max., in metal case for use as power rectifier



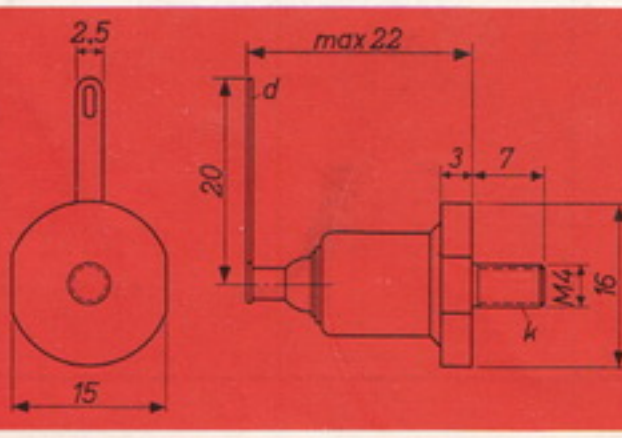
OA 70



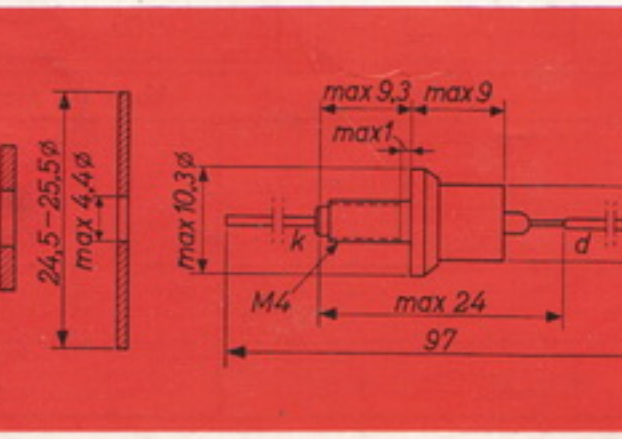
OA 90



OA 9



OA 31



OA 214

[1]) Not tin-plated.
[2]) Red dot indicates cathode.

PHILIPS ELECTRON TUBE DIVISION

PRINTED IN HOLLAND

20/752/8/E-7.58