USSR/ Electronics - Transistors

Card 1/1 Pub. 89 - 20/40

Authors : Penin, N.

Title : Principles of physics underlying the operation of crystal triodes (transistors)

Periodical : Radio 10, 27-28, Oct 1954

Abstract : The physics principles and characteristics of crystal triodes are described. Two types of triodes are examined: The (n-p-n) and the (p-n-p) types. The functional relationship between the amplifying properties of transistors and their frequency-characteristics is analyzed. Diagrams.

Institution: .....

Submitted: .....

PENIN N.A.

FD-3118

USSR/Physics - Semiconductors

Card 1/1 Pub. 153 - 17/24

Author : Kalashnikov, S. G.; Penin, N. A.

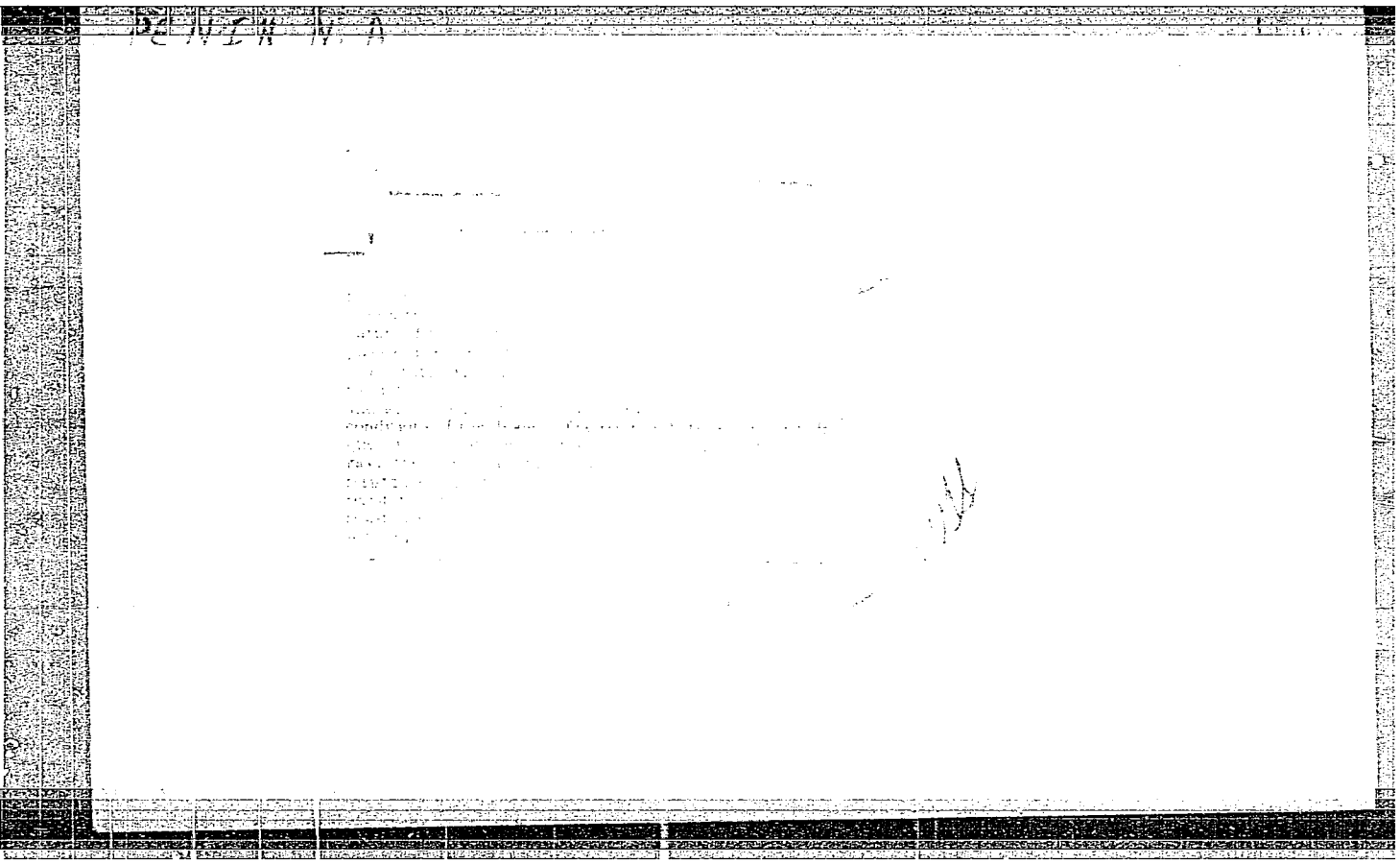
Title : Influence of frequency upon the rectifier properties of semiconductors diodes in the case of small variable voltage

Periodical : Zhur. tekh. fiz., 25, No 6 (June), 1955, 1111-1123

Abstract : The authors show that the frequency dependence of rectified current in semiconductor diodes with high degree of ionization of admixtures and considerable electrical conductivity of the semiconductor which are operating at small alternating voltage can be explained by the existance of a capacitance of electron-hole transition due to both injection of charge carriers and also displacement current. They obtain simple expressions for the limiting frequency and frequency dependence of rectified current for various regimes of operation, and consider the influence of the characteristics of the semiconductor upon the frequency properties of the diodes. He thanks V. L. Bonch-Bruyevich for discussions. Five references, including two USSR: A. I. Gubanov, ZhTF, 22, 1952 and 23, 1953.

Institution :

Submitted : February 15, 1955



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APPROVED FOR RELEASE: 06/15/2000 CIA-RDP86-00513R001239920009-6"

PENIN, N.A.

109-8-10/17

AUTHOR: Penin, N.A.

TITLE: Effect of the Recombination Velocity of a Non-rectifying Electrode on the Frequency Characteristics of a p-n Junction for the Case of Small AC Voltages. (Vliyaniye skorosti rekombinatsii u nevypryamlyayushchego elektroda na chastotnyye svoystva p-n-perekhoda dlya sluchaya malykh peremennykh napryazheniy)

PERIODICAL: Radiotekhnika i Elektronika, 1957, Vol.II, Nr 8, pp.1053 - 1061 (USSR)

ABSTRACT: A p-n diode, as shown in Fig.1, is considered. It is assumed that the hole region is unlimited while the electron region has a thickness w. A non-rectifying electrode, having a hole recombination velocity S is situated at the second boundary of the electron region. The hole region has a much higher conductivity than the electron region and the lifetime of the holes τ_p in the n-region is of the same order as the lifetime of the electrons τ_n in the p-region. This assumption is normally true for germanium junction diodes, in which it can be assumed that the whole current is due to the holes. The basic equation of the system is given by expression 3:

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Effect of the Recombination Velocity of a Non-rectifying Electrode on the Frequency Characteristics of a p-n Junction for the Case of Small AC Voltages.

Graphically these formulae can be represented as a function of w or frequency, as shown in Figs. 4, 5 and 6. From the above results it follows that for small base widths the recombination velocity has a considerable effect on the magnitude and the frequency dependence of the capacitance and resistance of a p-n junction. A decrease in the base width and an increase in the recombination velocity permits an improvement in the frequency characteristics of a semiconductor diode. There are 6 figures and 3 references, 2 of which are Slavic.

SUBMITTED: February 20, 1957.

AVAILABLE: Library of Congress.

Card 3/3

PENIN, N.A.

109-9-13/15

AUTHORS: Penin, N.A. and Yakunina, K.V.

TITLE: Dependence of the Capacitance and Resistance of Alloy Junction Germanium Diodes on the Frequency and the Positive Bias Current (Zavisimost' yemkosti i soprotivleniya splavnykh germanievykh diodov ot chastoty i toka polozhitel'nogo smeshcheniya)

PERIODICAL: Radiotekhnika i Elektronika, 1957, Vol.II, Nr 9, pp.1200 - 1210 (USSR)

ABSTRACT: It is assumed that the equivalent AC circuit of a p-n junction can be represented by a series resistance, r , followed by a resistance, $R(\omega)$ in parallel with a capacitance $C_D(\omega)$ and C_3 where C_D is the so-called diffusion capacitance and C_3 is the capacitance of the barrier layer. R , C_D and C_3 are given by (Refs.1 and 2) :

$$R = \frac{\sqrt{2}}{\alpha(I + I_S)} \frac{1}{\sqrt{\sqrt{1 + \omega^2\tau^2} + 1}} \quad (1) ,$$

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Dependence of the Capacitance and Resistance of Alloy Junction Germanium Diodes on the Frequency and the Positive Bias Current.

$$C_D = \frac{\alpha(I + I_S)}{\sqrt{2}} \frac{\tau}{\sqrt{\sqrt{1 + \omega^2\tau^2} + 1}} \qquad (2) \quad ,$$

$$C_3 = C_{30}\left[1 - \frac{1}{\alpha\varphi_K} \ln\left(\frac{I}{I_S} + 1\right)\right]^{-\frac{1}{2}} \quad , \quad (3)$$

where α is $\frac{q}{KT}$, I_S is the saturation current, I is the positive biasing current, τ is the lifetime of the holes and ω is the angular frequency. φ_K is expressed by Eq.(4) where p_p is the hole concentration in the p region and n_n is the electron concentration in the n region and n_i is the concentration of electrons or holes in germanium. From Eqs.(1) and (2) it is shown that :

Dependence of the Capacitance and Resistance of Alloy Junction Germanium Diodes on the Frequency and the Positive Bias Current.

$$\sqrt{\frac{C_D}{R}} = \alpha(I + I_S)\sqrt{\frac{\tau}{2}} \quad , \qquad (9)$$

from which it is possible to determine the lifetime τ at a given I if the function $\sqrt{\frac{C_D}{R}}$ is known. The above theoretical formulae were checked experimentally. The following measurements were made: (1) impedance of the diode as a function of frequency at I = const (Fig.5), (2) relationship between the real and imaginary components of a p-n junction at ω = const (Fig.6), (3) total capacitance of the diode as a function of frequency for various biasing currents (see Figs.7 and 9), (4) resistance as a function of frequency for various biasing currents (see Figs.8 and 9), (5) resistance and capacitance as a function of I for various resistivities of the diode material (Figs.10 and 11), (6) function $\sqrt{\frac{C_D}{R}}$ as a function of I for various types of

Dependence of the Capacitance and Resistance of Alloy Junction Germanium Diodes on the Frequency and the Positive Bias Current.

diodes (Fig.12) and (7) the relationship between R and the total capacitance C for various I . It was found that the measured results are in very good agreement with the experimental values.
There are 13 figures, 1 table and 4 references, 2 of which are Slavic.

SUBMITTED: February 20, 1957.

AVAILABLE: Library of Congress.

Card 4/4

109-3-2-15/26

AUTHORS: Penin, N.A. and Skvortsova, N.Ye.

TITLE: Impedance of the Rectifying Junction of Germanium and Silicon Detectors at Ultrahigh Frequencies (Polnoye soprotivleniye vypryamlyayushchego kontakta germaniyevykh i kremniyevykh detektorov na sverkhvysokikh chastotakh)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol. 3, No.2, pp. 267 - 275 (USSR).

ABSTRACT: The impedance was measured by two methods. In the first method, the impedance was determined by measuring the high-frequency impedance of the coaxial detector (see Ref.1). In the second method, a special compensating transformer was employed. The transformer, tuned to a given wavelength in such a way as to obtain a transformation ratio equal to unity, was connected at the input of the detector holder. The tuning of the transformer was also arranged in such a way as to compensate all the reactive elements of the equivalent detector circuit. Under these conditions, the load of the coaxial line was equal to the impedance of the rectifying junction plus the series resistance of the semi-conductor wafer. The trimming of the transformer was done by means of three detector cartridges. The measurements were carried out at wavelengths ranging from 30 to 6 cm by means of a coaxial line having a wave impedance

Card1/3

Impedance of the Rectifying Junction of Germanium and Silicon Detectors at Ultrahigh Frequencies

of 50 Ω . The investigated detector was situated in a coaxial holder and the capacitance and resistance of the rectifying layer were determined by measuring the real and the imaginary components, x and y , of the rectifying junction impedance. The positive biassing currents employed in the investigations were in the range from 0 to 20 mA. The results are given in Figs. 1, 2, 3, 4 and 5. The curves of Fig.1 represent x and y components for a germanium detector having a soldered point contact and a resistivity of ρ = 0.006 Ωcm as a function of the biassing current I ; Curve 1 was taken at a wavelength λ = 6.12 cm, Curve 2 at λ = 21.2 cm and Curve 3 at λ = 30 cm Curves of x and y as a function of I , at λ = 6.12 cm, are shown in Fig.2 for the following values of ρ : 1) ρ = 0.006 Ωcm, 2) ρ = 0.02 Ωcm and 3) ρ = 0.2 Ωcm. Fig. 3 shows the same parameters as in Fig.2, except that the measurements were made at λ = 30 cm. Values of x and y as a function of I for a germanium detector fitted with a pressure-type contact are shown in Fig.4, while similar curves for a silicon detector type ДК-B2 are given in Fig.4. Theoretically, the impedance of a semi-conductor junction can be represented by

 the equivalent circuit shown in Fig.6, where R, C_D and C_3 can

Impedance of the Rectifying Junction of Germanium and Silicon Detectors at Ultrahigh Frequencies

be expressed by Eqs.(1), (2) and (3), respectively; in these equations, S is the area of the contact, ε is the permittivity of germanium, N_d is the donor concentration in the n-region, φ_k is the contact potential difference and

$$C_o = S\sqrt{\frac{\varepsilon q N_d}{8\pi\varphi_K}} \quad .$$

An analysis of the above expressions and a comparison with the experimental results show that the theory is in good agreement with the measurements. The theoretical and experimental results are compared in Fig.7. There are 7 figures, 1 table and 4 references, 3 of which are Russian and 1 English.

SUBMITTED: May 28, 1957

AVAILABLE: Library of Congress

Card3/3 1. Germanium-Detectors 2. Silicon-Detectors 3. Impedance-Measurement

SOV-109-3-4-12/28

AUTHORS: Penin, N. A., Rusin, F. S. and Skvortsova, N. Ye.

TITLE: Input Impedances of Germanium and Silicon Detectors at Centimetre Wavelengths (Vkhodnyye soprotivleniya germaniyevykh i kremniyevykh detektorov v diapazone santimetrovykh voln)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, Nr 4, pp 543-546 (USSR)

ABSTRACT: It is assumed that the equivalent input circuit of a rectifier diode can be represented by a parallel input capacitance $C_п$, a series inductance L and an RC circuit representing the impedance of the rectifying junction. The elements $C_п$ and L represent the inter electrode capacitance and the whisker inductance of the detector, and they are independent of the currents passing through the detector. The junction resistance R and the capacitance C_D plus C_z (see Fig.1) are functions of frequency and the biasing.

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Input Impedances of Germanium and Silicon Detectors at Centimetre Wavelengths

currents passing through the junction. The overall input impedance of the detector is expressed by Eq.(1). The elements R, C_D and C_z are expressed by Eqs.(2) and (3), where

$$C_{z0} = S\sqrt{\frac{\varepsilon q N_d}{8\pi\varphi_k}}$$

is the charge capacitance in the absence of an external bias, S is the contact area, φ_k is the contact potential difference, I is the current passing through the contact, I_s is the saturation current of the junction and τ is the effective lifetimes of the charges. Eq.(1) can be used to construct the impedance locus of the detector. The resulting impedance circle is expressed by Eq.(4); the centre of the circle is given by the coordinates expressed by Eqs.(5) and (6), while the radius of the circle is determined from Eq.(7). Eq.(4) was used to construct the impedance loci for a germanium detector having a resistivity of 0.006Ωcm

Input Impedances of Germanium and Silicon Detectors at Centimetre Wavelengths

for wavelengths of 21, 6.2 and 3.2 cm. The resulting curves are shown in Fig.2. The impedances of the same detector were measured experimentally and the results are also plotted in Fig.2. It was found that there was a good agreement between the calculated and the experimental results. Eqs.(1), (2) and (3) were used to determine the frequency dependence of the detector input impedance and the resulting curves are shown in Fig.3. The author expresses his gratitude to S. G. Kalashnikov for valuable advice and constructive criticism. The paper contains 3 figures and 4 references, of which 3 are Soviet and 1 English.

SUBMITTED: May 28, 1957

1. Detectors (RF)--Impedance 2. Impedance--Measurement 3. Germanium--Applications 4. Silicon--Applications 5. Mathematics --Applications

Card 3/3

SOV/109-3-12-8/13

AUTHORS: Penin, N.A. and Cherkas, K.V.

TITLE: Influence of Recombination in the Non-rectifying Electrode on the Characteristics of Alloyed Germanium Diodes (Vliyaniye rekombinatsii u nevypryamlyayushchego elektroda na svoystva splavnykh germaniyevykh diodov)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, Nr 12, pp 1495 - 1500 (USSR)

ABSTRACT: The results of an experimental investigation of the effect of the second electrode on the basic properties of alloyed diodes of variable base thickness are reported. The non-rectifying electrode in this experiment was either in the form of an alloyed tin contact or was formed by a thin layer of copper on the surface of germanium. The investigations were carried out on alloyed germanium-indium diodes in which the diameter of the rectifying contact was approximately equal to the diffusion length of the minority carriers. The thickness of the base was such that w/L varied from 2 to 0.1; w is the base thickness while L is the diffusion length. For each ratio w/L, a number of samples were investigated; these were fitted with the two types of contact. The saturation current of the diodes was measured as a function of w/L for

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Influence of Recombination in the Non-rectifying Electrode on the Characteristics of Alloyed Germanium Diodes

several values of the hole diffusion coefficient D and recombination velocity S . The results are shown in Figure 1. Here, the black dots on Curve 1 correspond to the diodes with copper electrodes, while the small circles on Curve 2 relate to the diodes with tin electrodes. The dependence of the diffusion capacitance of the diodes on the base thickness is illustrated (for both types of the contact) in Figure 2. The frequency dependence of the diffusion capacitance and the resistance of the diodes is illustrated in Figures 3 and 4. The curves of Figure 3 were taken for $w/L = 2$, $w/L = 0.3$ (with a tin electrode) and for $w/L = 0.3$ with a copper electrode; the resistances of the same diodes are shown in Figure 4. The frequency characteristics of the diodes can be represented by the so-called critical frequency, which is defined as the frequency at which the value of the rectified voltage (when employing the diode as a detector) was reduced to half, in comparison with the low-frequency value. The measurements of the critical frequency were effected by the circuit of Figure 5. The resulting data

Influence of Recombination in the Non-rectifying Electrode on the Characteristics of Alloyed Germanium Diodes

were used to determine the lifetime τ of the minority carriers in the bulk of the semiconductor. These lifetimes are shown in the table on p 1500 for both types of the electrode, for various values of w/L. The experimental results obtained in this work show that at small base thicknesses, the properties of p-n junctions depend on the recombination of non-equilibrium current carriers in the non-rectifying electrode. In particular, it was shown that the saturation current of the diodes increases with decreasing w, if the recombination velocity in the second electrode is $S > D/L$ and decreases if $S < D/L$. It was also found that the capacitance and the resistance of the diodes become less frequency-dependent if the base thickness is reduced. The authors express their gratitude to S.G. Kalashnikov for valuable advice and to A.N.Kovalev for help in the measurements.

SOV/109-3-12-8/13

Influence of Recombination in the Non-rectifying Electrode on the Characteristics of Alloyed Germanium Diodes

There are 5 figures, 1 table and 7 references, 4 of which are English and 3 Soviet.

SUBMITTED: May 5, 1958

Card 4/4

PENIN, N.A.

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PHASE I BOOK EXPLOITATION SOV/1765

Vsesoyuznoye nauchno-tekhnicheskoye obshchestvo radiotekhniki i elektrosvyazi

Poluprovodnikovaya elektronika (Semiconductor Electronics) Moscow, Gosenergoizdat, 1959. 222 p. 13,950 copies printed.

Ed.: V.I. Shamshur; Tech. Ed.: K.P. Voronin.

PURPOSE: The book is intended for engineering and technical personnel working with semiconductor devices.

COVERAGE: The book is a collection of lectures delivered at the All-Union Seminar on Semiconductor Electronics in March 1957. The seminar was organized by the Scientific and Technical Society of Radio Engineering and Electrical Communications imeni A.S. Popov. The authors of the lectures have attempted to systematize the basic information on the operation of semiconductor devices. The articles describe the operation and characteristics of crystal diodes and transistors and discuss their application in various low-frequency, high-frequency and pulse circuits. No personalities are mentioned. References appear at the end of each article.

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TABLE OF CONTENTS:

verter circuits using transistors. Special attention is given to the operation and design of inverter circuits with a signal generator. There are no references.

B.N. Kononov. Voltage Stabilizers Using Semiconductor Devices 215
The author discusses voltage stabilizing circuits using silicon crystal diodes and transistors. He also explains equations for series and feedback stabilization and discusses transistor stabilizing circuits with temperature compensation. There are 4 references of which 1 is Soviet and 3 English.

AVAILABLE: Library of Congress

JP/sfm
5-26-59

FEDOTOV, Ya.A., otv.red.; GAL'PERIN, Ye.I., zamestitel' otv.red.; BARKANOV, N.A., red.; BERGEL'SON, I.G., red.; BROYDE, A.M., red.; KAMENETSKIY, Yu.A., red.; KAUSOV, S.F., red.; KRASILOV, A.V., red.; KULIKOVSKIY, A.A., red.; NIKOLAYEVSKIY, I.F., red.; PEHIN, N.A., red.; STEPANENKO, I.P., red.; VOLKOVA, I.M., red.; SVESHNIKOV, A.A., tekhn.red.

[Transistor devices and their applications; collection of articles] Poluprovodnikovye pribory i ikh primenenie; sbornik statei. Moskva, Izd-vo "Sovetskoe radio." No.4. 1960. 423 p. (MIRA 13:5)
(Transistors) (Electronic circuits)

84620

S/181/60/002/010/050/051
B019/B056

9,4340 (1143,1160,1331)

AUTHORS: Belova, N. A., Kovalev, A. N., and Penin, N. A.

TITLE: The Effect of Carrier Production in the Blocking Layer Upon the Inverse Branch of the Volt-ampere Characteristic of Germanium Diodes

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 10, pp. 2647 - 2654

TEXT: The authors investigated the effect of carrier production in the blocking layer of the p-n-junction of germanium diodes upon the reverse current. In the first part of the paper, the carrier production in the blocking layer is estimated, after which the authors discuss the inverse branch of the volt-ampere characteristic of germanium diodes with nickel impurities. Finally, the volt-ampere characteristic of germanium diodes with a very low resistivity is discussed. The authors summarize their results as follows: The carrier production in the blocking layer of a p-n-junction may significantly influence the shape of the inverse branch of the volt-ampere characteristic, if impurities with deep levels are

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The Effect of Carrier Production in the Blocking Layer Upon the Inverse Branch of the Volt-ampere Characteristic of Germanium Diodes

S/181/60/002/010/050/051
B019/B056

introduced into the germanium. By a decrease of the volume lifetime in germanium, not only in low-ohmic, but also in the case of high-ohmic germanium diodes an influence of the generation current upon the volt-ampere characteristic was found to occur. Here the condition is that the thickness of the blocking layer is of the same order of magnitude as the diffusion length of the minority carrier. In diodes produced from pure indium melted in germanium and nickel, the production exerts no significant influence upon the reverse current. This is explained by extraction of nickel from that crystal region in which the blocking layer is located. This extraction sets in during the melting of indium as a consequence of diffusion of nickel in indium. For all investigated germanium diodes with a resistivity lower than 0.01 ohm.cm, a considerable change could be found: the reverse current increases with a decrease of resistivity and is practically independent of temperature. In the direct branch of the volt-ampere characteristic a considerable increase of the current could be observed at low voltages. This was explained by the tunnel effect in the p-n-junction. The authors thank

Card 2/3

Card 3/3

BOGOMOLOVA, L.D. [translator]; CHEPELEVA, I.V. [translator]; PENIN, N.A., red.; MAYKOVA, Ye.I., red.; BELEVA, M.A., tekhn.red.

[Electron spin resonance in semiconductors] Elektronnyi spinovyi rezonans v poluprovodnikakh; sbornik statei. Moskva, Izd-vo inostr.lit-ry, 1962. 380 p. Translated from the English. (MIRA 15:5)
(Semiconductors)
(Paramagnetic resonance and relaxation)

PENIN, N.A.

1

S/120/62/000/001/030/061
E140/E463

AUTHORS: Anufriyev, B.F., Dokhnovskiy, S.B., Zhurkin, B.G., Kopylovskiy, B.D., Penin, N.A.

TITLE: Transistor current regulator for electromagnets

PERIODICAL: Pribory i tekhnika eksperimenta, no.1, 1962, 129-131

TEXT: A classical current regulator is described using transistor circuitry for stabilizing currents 0 to 30 A for electromagnets used in physical experiments. The voltage reference is the drop across a manganin tape in an oil bath, cooled by circulating water. This voltage drop is compared with that from a dry battery. The stabilization factor per °C is 3.03×10^4. The bandwidth of the regulator is 20 kc. There are 2 figures.

V

ASSOCIATION: Fizicheskiy institut AN SSSR
(Physics Institute AS USSR)

SUBMITTED: May 8, 1961

Card 1/1

L 06439-67 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6026716 SOURCE CODE: UR/0181/66/008/008/2488/2490

AUTHOR: Galkina, T. I.; Penin, N. A.; Rassushin, V. A.

ORG: Physics Institute im. P. N. Lebedev, AN SSSR, Moscow (Fizicheskiy institut AN SSSR)

TITLE: Determination of the energetic position of the acceptor level of cadmium in indium arsenide

SOURCE: Fizika tverdogo tela, v. 8, no. 8, 1966, 2488-2490

TOPIC TAGS: arsenide, indium compound, cadmium, ionization

ABSTRACT: The ionization energy of cadmium atoms in InAs was determined from the spectral position of the recombination radiation line of indium arsenide diffusion diodes. The observations were made by transillumination through the n-region of the material, which had an electron concentration $n_0 = 2 \times 10^{16}$ cm^{-3}. It is postulated that the radiation of the diodes arises in the p-region due to radiative capture of an electron from the conduction zone by a neutral cadmium atom. In this case, the spectral characteristic of radiation for direct transitions between the conduction band and the acceptor level is expressed by the formula

$$G(y) = y^{-1/2} e^{y},$$

where $y = \frac{\hbar\omega - \epsilon_d + \epsilon_a}{kT}$ and $\hbar\omega$ is the energy of a radiation quantum. It follows that the maximum of the radiation intensity lies at $y = 1/2$, i. e., at $\hbar\omega_{max} = \epsilon_d - \epsilon_a$

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L 06439-67

ACC NR: AP6026716

+ kT/2. It was found graphically that $\epsilon_d - \epsilon_a = 0.395$ eV. The forbidden gap width of InAs, necessary for the calculation of the ionization energy of cadmium ϵ_d, was obtained from the photoluminescence spectra of InAs at 78°K. At this temperature, the forbidden gap width of indium arsenide $\epsilon_d \approx 0.405$ eV, and the ionization energy of cadmium $\epsilon_a \simeq 0.010$ eV. Authors thank N. N. Ponomarev and D. A. Vlasov, on the staff of GIREDMET, for providing InAs samples of the highest degree of purity. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 14Feb66/ ORIG REF: 001/ OTH REF: 006

Card 2/2

L 06132-67 EWT(m)/EWP(t)/ETI LJP(c) JD

ACC NR: AP6026709 SOURCE CODE: UR/0181/66/008/008/2473/2475

AUTHOR: Galkina, T. I.; Kornilova, N. B.; Penin, N. A.

ORG: Physical Institute im. P. N. Lebedev, AN SSSR, Moscow (Fizicheskiy institut AN SSSR)

TITLE: Structure of the recombination emission spectrum of indium arsenide diffused diodes

SOURCE: Fizika tverdogo tela, v. 8, no. 8, 1966, 2473-2475

TOPIC TAGS: emission spectrum, indium compound, arsenide, semiconductor diode

ABSTRACT: The spontaneous recombination emission of indium arsenide upon injection of charge carriers through a p-n junction was studied at 78°K and below. The diodes were prepared by diffusing cadmium into n-type material with a donor concentration of 3.8×10^{17} cm^{-3}. The emission spectrum of a diode immersed in liquid nitrogen (78°K) with a current passing through the diode (2 A and above) was found to change considerably with changing injection current: as the latter increases, the intensity of the main peak increases linearly and shifts toward higher energies, whereas the intensity of well-resolved secondary peaks (0.350 and 0.360 eV) on the long-wave side of the main peak tends toward saturation, and the position of these peaks is independent of the current. As the temperature is lowered to 24°K, the resolution of the secondary structure does not improve. The main peak (0.380 eV) is attributed to radiative tran-

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L 06432-67

ACC NR: AP6026709

sitions from the conduction band to the acceptor level of cadmium. The secondary peaks are thought to be formed in the forbidden band of InAs as a result of defects arising upon diffusion of Cd into InAs under conditions where there is a high excess pressure of arsenic (above 0.3 atm), which is usually placed in the ampoule during diffusion. Authors thank V. A. Rassushin for discussing the work. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 03Feb66/ ORIG REF: 001/ OTH REF: 001

Card 2/2

ACC NR: AP6037022 (A,N) SOURCE CODE: UR/0181/66/008/011/3445/3447

AUTHOR: Zhurkin, B. G.; Kucherenko, I. V.; Penin, N. A.

ORG: Physics Institute im. P. N. Lebedev, AN SSSR, Moscow (Fizicheskiy institut AN SSSR)

TITLE: Influence of uniaxial compression on the jump conductivity in p-Si

SOURCE: Fizika tverdogo tela, v. 8, no. 11, 1966, 3445-3447

TOPIC TAGS: silicon semiconductor, semiconductor conductivity, pressure effect, activation energy, temperature dependence

ABSTRACT: The purpose of the investigation was to determine the dependence of the activation energies ϵ_2 and ϵ_3 on the pressure in p-Si. The measurements of the electric conductivity were made in a sample with boron impurity 1.6×10^{18} cm^{-3} at pressures 0.37 kg/mm^2 and temperature 4.2 - 77K. The pressure and the current through the sample were both parallel to the [110] direction. The tests showed that the temperature dependence of the conductivity can be represented as a sum of exponentials in the activation energy,

$$\sigma = \sum_{i=1}^{3} \sigma_i \exp\left(-\frac{\epsilon_i}{kT}\right).$$

The conductivity with activation energy ϵ_1 corresponds to transition of holes from

Card 1/2

Card 2/2

ACC NR: AP7005840 SOURCE CODE: UR/0181/66/008/012/3550/3554

AUTHOR: Zhurkin, B. G.; Penin, N. A.; Svarup, P.

ORG: Physics Institute im. P. N. Lebedev, AN SSSR, Moscow (Fizicheskiy institut AN SSSR)

TITLE: Influence of jumplike motion of the electrons on the EPR spectrum of phosphorus in strongly doped n-type silicon

SOURCE: Fizika tverdogo tela, v. 8, no. 12, 1966, 3550-3554

TOPIC TAGS: electron motion, epr spectrum, phosphorus, silicon semiconductor, semiconductor impurity, spectral line, line width

ABSTRACT: This is a continuation of earlier work (FTT v. 7, 3204, 1965 and elsewhere) where a strong dependence of the EPR spectra of phosphorus in n-Si on the impurity-atom concentration, temperature, and degree of compensation was established. The present article reports results of research on the shape and width of the central line in strongly doped samples as functions of the concentration of the phosphorus atom, the temperature, and the degree of compensation by boron. The samples were grown by the Czochralski method and the EPR spectra were measured in the interval 2 - 20K with a superheterodyne spectrometer operating at 9.4 GHz. The line shape was analyzed by comparison with standard Lorentz and Gaussian curves. The results show that an increase of the phosphorus concentration from 4×10^{17} to 1×10^{18} cm^{-3} and of the temperature from 2 to 20K produces narrowing of the line, which has a Lorentz shape at

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ACC NR: AP7005840

these concentrations and temperatures. It was found further that strong compensation ($K \approx 0.8 - 0.9$) causes line broadening and a change in the line shape on the edges from Lorentz to Gaussian. The Bohr radius is estimated at 18 ± 2 Å and this is in good agreement with the theoretical value. The causes of the observed line narrowing and broadening are discussed and certain discrepancies with results by others are explained. Orig. art. has: 3 figures, 2 formulas, and 1 table.

SUB CODE: 20/ SUBM DATE: 03May66/ ORIG REF: 005/ OTH REF: 008

Card 2/2

L 5039-66 EWT(l)/EWT(m)/EWP(t)/EWP(b) IJP(c) JD

ACC NR: AP5027391 SOURCE CODE: UR/0181/65/007/011/3188/3193

AUTHOR: Penin, N. A.; Zhurkin, B. G.; Volkov, B. A.

ORG: Physics Institute im. P. N. Lebedev, AN SSSR, Moscow (Fizicheskiy institut AN SSSR)

TITLE: The influence of concentrations of donors and acceptors on the electric conductivity of high-alloyed n-type silicon

SOURCE: Fizika tverdogo tela, v. 7, no. 11, 1965, 3188-3193

TOPIC TAGS: electric conductivity, impurity conductivity, crystal impurity, impurity band, silicon alloy

ABSTRACT: An investigation was made of the influence of the concentration of phosphorus and the degree of compensation by boron on the electric conductivity of a high-alloyed n-type silicon with weak and strong compensation in a range of temperatures from 4.2 to 78K. The activation energy ε_1 of the impurity conductivity and the activation energy ε_3 of the hopping conductivity were measured. The measurements were performed on weakly and strongly compensated silicon specimens with basic impurity concentrations N_D of 2×10^{17}, 6×10^{17}, and 1×10^{18} atoms of phosphorus per cm^3. Specimens were cut from noncompensated and compensated parts of the same silicon single crystal. Compensation was accomplished by introducing boron into the melt during the growth of the crystals. The degree of compensation $K = N_A/N_D$ in the specimens was determined by measuring both the tempera-

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ACC NR: AP5027391

ture of the Hall effect and the electroconductivity. An increase in the compensating impurity (boron) in silicon alloyed with phosphorus changed the activation energy ε_1 of the impurity conductivity more strongly than the corresponding increase in the phosphorus concentration. A decrease of the activation energy ε_1 with the concentration of phosphorus was observed at concentrations at which a substantial overlap of wave functions of impurity atoms occurred. This overlap caused the bottom of the conductivity zone to decrease. The strong influence of a minor impurity on the activation energy ε_1 is limited by the electric fields of charged atoms of minor impurity, which are effective at large distances. With an increased concentration of phosphorus atoms at a small degree of compensation, the activation energy ε_3 of the hopping conductivity increased initially and then at a concentration above 6×10^{17} cm^{-3} began to decrease. At a small degree of compensation, the dependence of conductivity on temperature has definite values for the activation energies ε_1 and ε_2. For instance, at a strong compensation in specimens with a high concentration of donors, the activation energies ε_1 and ε_3 depend on temperature. This can be attributed to the emergence of a strongly fluctuating electric field generated by the charged donors and acceptors. Orig. art. has: 3 figures, 6 formulas, and 1 table. [JA]

SUB CODE: SS/ SUBM DATE: 16Apr65/ ORIG REF: 002/ OTH REF: 008/ ATD PRESS: 4132

EC

L 5400-66 EWT(m)/T/EWP(t)/EWP(b)/EWA(h) IJP(c) JD/JG/AT

ACC NR: AP5027394 SOURCE CODE: UR/0181/65/007/011/3204/3208

AUTHOR: Zhurkin, B. G.; Penin, N. A. 44,55

ORG: Physics Institute AN SSSR, Moscow (Fizicheskiy institut im. P. N. Lebedeva AN SSSR) 44,55

TITLE: Effect of compensation on the exchange interaction of donors in heavily doped *n*-silicon

SOURCE: Fizika tverdogo tela, v. 7, no. 11, 1965, 3204-3208

TOPIC TAGS: semiconductor theory, silicon semiconductor, epr spectrometry

ABSTRACT: Analysis of electron paramagnetic resonance spectra of compensated silicon shows a new compensation effect which occurs in heavily doped semiconductors: the exchange interaction of the majority impurity atoms is interrupted in the electrical fields of minority impurity charge centers. The authors give experimental data on this effect observed by the electron paramagnetic resonance method in heavily doped *n*-silicon with a phosphorus concentration of 10^{17}-10^{18} cm^{-3}, compensated with boron. Both weakly and heavily compensated specimens were studied. The boron was added to the melt while the specimens were being grown by the Czochralski method.

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ACC NR: AP5027394

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The degree of compensation was determined from the relationship between temperature and electrical conductivity in weakly compensated specimens, and by measuring the Hall effect and electrical conductivity at room temperature for heavily compensated specimens. The electron paramagnetic resonance spectrum for a weakly compensated specimen with a phosphorus concentration of 10^{18} cm^{-3} at 2°K is an isolated line with a width of 6 oe and no traces of hyperfine interaction. The spin density in this specimen was reduced by a factor of ~5 after 80% compensation while the line width increased to 8 oe. The greatest change in the form of the electron paramagnetic resonance spectrum was observed in a specimen with a phosphorus concentration of $6 \cdot 10^{17}$ cm^{-3}. In this case, 90% compensation reduced the total spin density by a factor of ~10, while the intensity of lines for hyperfine structure was approximately doubled. A theoretical explanation of these phenomena is given based on attenuation of the volume interaction of phosphorus atoms in the electric fields of the negatively charged acceptors. In conclusion, the authors express their gratitude to L. V. Keldysh for discussion of the results. Orig. art. has: 2 figures, 1 table. 44,55

SUB CODE: SS/ SUBM DATE: 28Apr65/ ORIG REF: 003/ OTH REF: 006

BVK

Card 2/2

L 4439-66 EWT(m)/EWP(t)/EWP(b) IJP(c) JD

ACC NR: AP5021143 UR/0386/65/002/001/0021/0023

AUTHOR: Zhurkin, B. G.; Penin, N. A.

TITLE: Temperature dependence of hyperfine interaction lines in EPR spectra of phosphorus in silicon

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 1, 1965, 21-23

TOPIC TAGS: EPR spectrum, silicon, hyperfine structure, impurity center, wave function

ABSTRACT: The authors investigated the temperature dependence of the spectra of electron paramagnetic resonance in n-type silicon doped with phosphorus, and observed that the hyperfine interaction lines behaved differently in spectra of samples with different phosphorus concentrations. The measurements were made at two temperatures (2 and 20K) for samples with donor concentration 2, 4.5, and 6 x 10^{17} cm^{-3}. In the last two samples the intensity of the hyperfine interaction lines decreased rapidly with increasing temperature. This difference is attributed to the different nature of the paramagnetic centers which make the main contribution to these lines at different phosphorus concentrations. At 2 x 10^{17} cm^{-3} the hyperfine interaction lines are due principally to the isolated atoms of the phosphorus, since the overlap of the wave functions is insignificant at this concentration. At higher concentrations there is considerable overlapping of the wave functions, and the hyperfine interaction lines

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49
B

L 4439-66

ACC NR: AP5021143

are then due to groups of interacting atoms. An increase in temperature causes an increase in the frequency of the jump between the atoms, i.e., an intensification of the delocalization of the electrons, and is therefore accompanied by a decrease in the hyperfine-interaction intensity. Orig. art. has: 1 figure.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences, SSSR)

SUBMITTED: 19May65 ENCL: 00 SUB CODE: SS, OP

NR REF SOV: 001 OTHER: 001

Card 2/2

IVANOV, Sergey Nikolayevich; PENIN, Nikolay Alekseyevich; SKVORTSOVA, Nera Yefimovna; SOKOLOV, Yuriy Fedorovich; VOLKOVA, I.M., red.

[Physical principles of the operation of superhigh frequency semiconductor diodes] Fizicheskie osnovy raboty poluprovodnikovykh SVCh diodov. Moskva, Sovetskoe radio, 1965. 190 p. (MIRA 18:7)

IVANOV, Sergey Nikolayevich; PENIN, Nikolay Alekseyevich; SKVORTSOVA, Nera Yefimovna; SOKOLOV, Yuriy Fedorovich; VOLKOVA, I.M., red.

[Physical principles of the operation of semiconductor microwave diodes] Fizicheskie osnovy raboty poluprovodnikovykh SVCh diodov. [By] S.N.Ivanov i dr. Moskva, Sovetskoe radio, 1965. 190 p. (MIRA 18:5)

ACCESSION NR: AP4028443 S/0181/64/006/004/1141/1144

AUTHORS: Zhurkin, B. G.; Penin, N. A.

TITLE: The effect of concentration of impurity atoms on the spectrum of electron paramagnetic resonance of donors in silicon

SOURCE: Fizika tverdogo tela, v. 6, no. 4, 1964, 1141-1144

TOPIC TAGS: electron paramagnetic resonance, silicon, impurity atom, doped semiconductor, Czochralski method, impurity concentration

ABSTRACT: The authors describe the results of studying changes in the EPR spectrum in single crystals of Si doped with various concentrations of P or As. Measurements were made in the temperature interval 2-20K. The crystals were grown by the Czochralski method, and impurity concentrations were determined by measuring the Hall coefficient at room temperature. These concentrations ranged from 10^{17}-$3 \cdot 10^{18}$ cm^{-3}. It was found that increase in donor concentration leads to gradual disappearance of lines representing hyperfine interaction in the EPR spectrum and results in the appearance of a single line, the width decreasing with increase in concentration

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ACCESSION NR: AP4028443

and in temperature, within the limits of the experimental ranges of these two factors. The observed changes in the EPR spectrum are explained by delocalization of electrons as the impurity band develops and as metallic conductivity begins to appear. Compression of the single EPR line with increasing concentration of As was found to take place at higher concentrations than with P. The nature of the spectral change also indicates chaotic interaction of the impurity atoms. The EPR spectrum shows lines of isolated atoms, lines due to different grouping of atoms associated with exchange interaction, and also lines of mobile electrons. The chaotic distribution of impurities (in forming an impurity band) gives rise to set of energy levels near the conduction band, each at a different depth and corresponding to different groups of atoms, with wave functions of the donor electrons overlapping to various extents. "In conclusion, the authors express their thanks to M. G. Mil'vidskiy for preparing the single crystals of silica doped with phosphorus and arsenic." Orig. art. has: 4 figures.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR, Moscow (Physical Institute AN SSSR)

Card 2/3

ACCESSION NR: AP4028443

SUBMITTED: 01Nov63 DATE ACQ: 27Apr64 ENCL: 00

SUB CODE: EC, SS NO REF SOV: 000 OTHER: 005

Card 3/3

ACCESSION NR: AP4043402 S/0181/64/006/008/2558/2560

AUTHORS: Zhurkin, B. G.; Penin, N. A.; Volkov, V. A.

TITLE: Influence of compensation on the form of the epr spectra in n-type silicon

SOURCE: Fizika tverdogo tela, v. 6, no. 8, 1964, 2558-2560

TOPIC TAGS: electron paramagnetic resonance, line broadening, phosphorus, silicon, boron, crystal growth, spectrometry, impurity content, spin balance

ABSTRACT: In view of the confusion still existing with respect to the distribution of the energy states in the impurity band, the authors experimented with phosphorus-doped n-silicon. The measurements were made for three values of the phosphorus concentration: 2.3×10^{17}, 6.0×10^{17}, and 1.0×10^{18} cm^{-3}, with the phosphorus concentration in the compensated samples being equal to the concen-

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tration in the corresponding uncompensated samples. The compensation was effected by introducing boron in crystals grown by the Czochralski method. The samples for the measurements were cut from compensated and uncompensated parts of the same single crystal. The experiments were carried out with a superheterodyne EPR spectrometer at 9.4 Gc and 2K. The results show that at 2.3×10^{17} cm^{-3} the width of the impurity band is still narrow and probably does not exceed kT (1.74×10^{-4} eV). At 6.0×10^{17} cm^{-3} apparently at least 90% of the states of the impurity band lie above the level corresponding to the isolated impurity atoms. This was in contradiction with the theoretical predictions which call for the states of the impurity band to be symmetrical with respect to this energy level. At 1×10^{18} cm^{-3}, the compensation decreases the spin concentration by approximately a factor 5 and broadens the EPR line to 8 Oe. This indicates that the electrons of the lower states in the impurity band are more strongly localized than the electrons of the higher states. "In conclusion the authors are grateful to A. N.

ACCESSION NR: AP4043402

Nelyubova for preparing the compensated samples of silicon." Orig. art. has: 1 figure.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute, AN SSSR)

SUBMITTED: 06Apr64 ENCL: 01

SUB CODE: SS NR REF SOV: 003 OTHER: 003

Card 3/4

ANUFRIYEV, B.F.; DOKHNOVSKIY, S.B.; ZHURKIN, B.G.; KOPYLOVSKIY, B.D.; PENIN, N.A.

Transistor current regulator for electromagnets. Prib.i tekh.eksp. 7 no.1:129-131 Ja-F '62. (MIRA 15:3)

1. Fizicheskiy institut AN SSSR.
(Transistor circuits)(Voltage regulators)

84497
S/112/59/000/014/078/085
A052/A001

6,4410 also 2204/1154

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1959, No. 14, pp. 250-251, # 30327

AUTHOR: Penin, P. I.

TITLE: Some Properties of the Ideal Signal Receiver With Two Discrete Values

PERIODICAL: Tr. Mosk. energ. in-ta, 1958, No. 31, pp. 189-195

TEXT: Some properties of the ideal receivers for the cases of signals with two discrete values S_1 and S_2 are clarified. The values of error probabilities of the first (β_I) and the second discrete value (β_{II}) are derived and investigated; they represent the reproduction of S_2 instead of S_1 and of S_1 instead of S_2. Diagrams showing the relations between β_I and β_{II} and distortion probabilities caused by the errors β_I and β_{II} at different values of the ratio of a priori probabilities ξ, are given. It is shown that the effect of the error probability β_I at $\xi < 1$ on the general distortion probability the ideal receiver is greater than that of the error probability β_{II}. For the case $\xi < 1$, the effect of the

Card 1/2

PENIN, P.I.

Effect of limited noise on an inertial linear detector. Nauch. dokl. vys. shkoly; radiotekh. i elektron. no.2:234-242 '59. (MIRA 14:5)

1. Kafedra radiopriyemnykh ustroystv Moskovskogo energeticheskogo instituta.

(Radio detectors—Noise)

PENIN, P.I., kand. tekhn. nauk

Accumulation of d.c. pulses. Trudy MEI no.31:179-188 '56 (MIRA 13:3)
(Pulse techniques (Electronics))

PENIN, P.I., kand. tekhn. nauk

Some characteristics of an ideal reiver of signals of two discrete magnitudes. Trudy MEI no.31:189-195 '56 (MIRA 13:3)
(Radio--Interference)

L 14039-65 EWT(1)/EEC(b)-2/EWA(h) Pm-4/Po-4/Pi-4/Pg-4/Peb/Pl-4
ACCESSION NR: AP

AUTHOR: Raykin, A. L. (Moscow); Rubtsov, A. F. (Moscow); Penin, V. B. (Moscow)

TITLE: Reliability of an engineering system with regularly restorable reserve

SOURCE: AN SSSR. Izvestiya. Tekhnicheskaya kibernetika, no. 4, 1964, 13-18

TOPIC TAGS: engineering system reliability, redundant system, regularly restorable reserve, hot reserve, cold reserve, double system

ABSTRACT: The reliability of a redundant system with a regularly restorable reserve at the end of an arbitrary interval of time (0, t) is sought as a function of the number (m - 1) of units in the hot reserve, of the number n of units in the cold reserve, and of the length of the interval of time τ under the assumption that for every individual unit in the hot reserve the distribution of nonfailure operation time is equal to $R_1 = e^{-\lambda t}$ and for every unit in the cold

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L 14039-65
ACCESSION NR: AP4044818

reserve the distribution is equal to $R_2 = e^{-\alpha\lambda t}$ $(0 \leq \alpha \leq 1)$, where λ is a constant. A method is presented for deriving the reliability formula at the end of an arbitrary interval of time for a finite n. The case when $n \to \infty$ is also analyzed. A more detailed analysis is carried out for a two-unit redundant system (m = 2). The reliability formula and the mathematical expectation of the number of failures in time t for m = 2 are derived. Reliability values are calculated on electronic digital computers for the following sets of parameters: m = 3, 4, 5,; n = 1, 2, 3, 4, 5; $\lambda\tau$ = .01, .03, .05, .1, .2, .3, .4, .5. Reliability curves are plotted on the basis of the calculated results. Orig. art. has: 30 formulas.

ASSOCIATION: none

SUBMITTED: 03Jan64 ENCL: 00 SUB CODE: MA

NO REF SOV: 001 OTHER: 001

Card 2/2

MAMONKIN, Igor' Grigor'yevich, kand. tekhn. nauk, dots.; PENIN, T.I., kand. tekhn.nauk, dots., red.

[Low-frequency transistor amplifiers] Poluprovodnikovye usiliteli nizkoi chastoty. Moskva, Mosk. energeticheskii in-t, 1961. 105 p. (MIRA 17:8)

RAYKIN, A.L. (Moskva); RUBTSOV, A.F. (Moskva); PENIN, V.S. (Moskva)

Reliability of technological systems with regularly renewable reserve. Izv. AN SSSR. Tekh. kib. no.4:13-18 Jl-Ag '64. (MIRA 17:12)

PENINA, L.O.

Characteristics of the tree flora in the parks of Kiev. Visnyk Bot.sada AN URSR no.1:102-109 '59. (MIRA 13:8)
(Kiev--Trees)

SOV/137-59-1-520

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 1, p 67 (USSR)

AUTHOR: Penionzhek, E. K.

TITLE: Dust-collecting Apparatus of the "Electrotsink" Plant (Pyleulavlivayushchiye ustanovki zavoda "Elektrotsink")

PERIODICAL: Sb. materialov po pyleulavlivaniyu v tsvetn. metallurgii. Moscow, Metallurgizdat, 1957, pp 106-113

ABSTRACT: 1. Lead production. Gases of sintering machines, shaft furnaces, and reverberatory furnaces for reprocessing refinery returns are blended and purified in bag filters (BF). There are two types of BF: a) RFG-2 type, with an 0.86 m^3/m^2/min load on the cloth and 96.4% efficiency; b) im. Vorobiyev-plant type, with an 0.98 m^3/m^2/min load on the cloth and 97.7% efficiency. Before entering the BF the gases are cooled to 100°C by heat emission through the gas-duct walls and by the entry of added air. Dust from BF is transferred in closed containers for processing. 2. Zinc production. Gases from multi-hearth kilns and fluidized-bed (FB) furnaces are purified in type GK-30 (horizontal, 2-stage, 3-field) electrostatic precipitators (EP). The dust content of gases entering an EP from FB furnaces is

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Dust-collecting Apparatus of the "Electrotsink" Plant

5 - 10 g/nm^3, that from mechanical furnaces is 9 - 14 g/nm^3. The speed of gases in an EP is 0.65 - 0.98 m/sec. The dust content of gases leaving an EP is 0.16 - 0.28 g/nm^3; the efficiency of an EP is 96 - 97%. Data on the temperatures in the gas ducts of EB furnaces are adduced. The author points out the necessity of insulation of gas ducts of FB furnaces before an EP. Gases of tubular furnaces are cooled in coolers and then purified in im. Vorobiyev-plant-type BF. The dust content of gases entering a BF is 23.9 - 24.1 g/nm^3, that of gases leaving a BF is 0.09 - 0.12 g/nm^3, the efficiency of a BF is 98.6 - 99.08%. The load on the cloth of the BF of the first tubular furnace is 1.4, that of the second one is 1.0 m^3/m^2/min.

G.G.

Card 2/2

PENIONZHKEVICH, A. Ye.

Geese - White Russia

Hatching goose eggs at White Russian hatcheries. Ptitsevodstvo No. 3, 1953.

Monthly List of Russian Accessions, Library of Congress, June 1953. Uncl.

PENIONZHKEVICH, A. YE.

Effect of the incubation conditions on the accumulation of glycogen in duck embryo. A. E. Penionzhkevich. *Trudy Nauch.-Issledovatel. Inst. Ptitsevodstva* 24, 119-25(1954); *Referat. Zhur., Khim.* 1956, No. [illegible]—The abs. amt. of glycogen (I) in duck embryo increases to the [illegible] day of incubation; the I concn. in the embryo increases to the 22nd day, followed by a decrease. By increasing the temp. and humidity of the incubation chamber the I concn. in the embryo increases. In the embryos showing a retarded development the accumulation of I is less than in the normal ones.

B. Wierbicki

PENIONZHKEVICH, E.E.

"Death Rate Variation in Fowls as Dependent on Geographic Latitude," Dok. AN, 32, No. 8, 1941 Inst. Poultry Breeding, Ptizegrad, Moscow District, -c1941-.

PENIONSHKEVICH, E. E.

Penionshkevich, E. E. "The development of methods of increasing the fertility of goose eggs," Trudy Nauch.-issled. in-ta ptitsevodstva, Vol. XIX, 1948, p. 7-31 - Bibliog: 6 items

SO: U-2888, Letopis Zhurnal'nykh Statey, No. 1, 1949

PENIONSHKEVICH, E. E.

Penionshkevich, E. E. "Regional 'mokshansk' geese of the Narovchatsk Rayon of the Peneznsk Oblast," Trudy Nauch.-issled. in-ta ptitsevodstva, Vol. XIX, 1948, p. 32-44 Agriculture

SO: U-2888, Letopis Zhurnal'nykh Statey, No. 1, 1949

PENIONZHKEVICH, E. E.

Plemennaia rabota na kolkhoznoi ptitsevodcheskoi ferme [Breeding work on a collective-farm poultry farm]. Moskva, Sel'khozgiz, 1952. 116 p.

SO: Monthly List of Russian Accessions, Vol. 6, No. 5, August 1953

1. PENIONZHKEVICH, Ye Ye, Prof.
2. USSR (600)
4. Poultry Breeding
7. Breeding methods in improving Russian poultry. Pittsevodstvo no. 11, 1952.

9. Monthly List of Russian Accessions, Library of Congress, March 1953. Unclassified.

1. PENIONZHKEVICH, YE. YE.

2. USSR 600

4. Poultry

7. Increasing the productivity and breeding qualities of domestic poultry, Trudy NIIP, 22, 1952.

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

PENIONZHKEVICH, Ye. Ye.

Poultry

Methods for increasing the productivity of hens. Ptitsevodstvo No. 3, 1953.

Monthly List of Russian Accessions, Library of Congress, June 1953. Uncl.

PENIONKEVICH, E. E. (Prof.)

Race of Ducks in USSR, Moscow, 1954

PENIYANZHKEVICH, E.E., prof. doktor biologicheskikh nauk; NALIBOTSKIY, S. [NALIBOTSKI,S.], red.; STSYAPANAVA,N.,tekhn.red.

[Poultry raising] Ptushkahadoulia. Minsk, Dzirzh.vyd-va BSSR, 1955. 375 p. (MIRA 11:8)
(Poultry)

SMETNEV, S.I., prof., doktor sel'skokhoz.nauk; BOGDANOV, M.N., zootekhnik; GOFMAN, M.B., zootekhnik; GRIGOR'YEV, G.K., zootekhnik; ZHIDKIKH, Z.A., kand.sel'skokhoz.nauk; PENIONZHKEVICH, E.E., doktor biolog. nauk, prof.; PREVO, A.A., kand.biolog.nauk; TRET'YAKOV, N.P., doktor sel'skokhoz.nauk, prof.; USPENSKIY, A.A., kand.sel'skokhoz.nauk; USHAKOV, A.A., kand.veterin.nauk; SHAPOVALOV, Ya.Ya., kand.sel'skokhoz.nauk; YAGODIN, P.Ye., zootekhnik; YATSYNIN, N.N., zootekhnik; FEDOROVSKIY, N.P., kand.biol.nauk; SYCHIK, Ye.V., red.; PAVLOVA, M.M., tekhred.

[Poultry raising; a manual for farm managers] Ptitsevodstvo; rukovodstvo dlia zaveduiushchego fermoi. Izd.5, perer.i dop. Moskva, Gos.izd-vo sel'khoz.lit-ry, 1957. 495 p. (Bibliotechka po ptitsevodstvu, no.1) (MIRA 12:4)

1. Deystvitel'nyy chlen Vsesoyuznoy akademii sel'skokhozyaystvennykh nauk im. V.I.Lenina (for Smetnev).
(Poultry)

USSR / Farm Animals. Poultry. Q

Abs Jour : Ref Zhur - Biologiya, No 5, 1959, No. 21300

Author : Penionzhkevich, E. E.; Savel'yev, I. K.; Chmutova, A. P.

Inst : All-Union Scientific Research Institute of Poultry Farming

Title : A New Zagorskaya Purebred Group of Hens

Orig Pub : Tr. Vses. n.-i. in-ta ptitsevodstva, 1958, 25, 49-100

Abstract : This purebred group of hens was raised on the basis of crossing Russian White, Yurlovskaya, Rhode Island and New Hampshire breed hens. The chicks were bred at times which were more favorable for their growth and development. The keeping conditions of young and fully grown fowl are described. The producers of the original breeds were selected from farms with varied climatic, economic and zootechnical conditions. Group

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USSR / Farm Animals. Poultry. Q

Abs Jour : Ref Zhur - Biologiya, No 5, 1959, No. 21300

matings were performed until the 3rd generation and from the 4th generation on, matings within families. The fowl was selected and chosen according to the complex of desirable traits, and then according to the comb's form and feather cover. When the mother flock was recruited, young chickens were selected which weighed not less than 2 kg at the age of 6 months, roosters not less than 3 kg and the egglaying capacity of the mothers was taken into consideration. Two varieties were created, a white one with rose-formed comb and a salmon colored one with a leaf-shaped comb, of generally useful, viable hens with an average egg-laying capacity of 150 - 140 eggs, with a live weight of 2200 - 2300 g, of a fertility not smaller than 90 percent and hatching incidence of 75 percent. The new purebred group possesses good meat qualities. At

Card 2/3

PENIONZHKEVICH, E.

GENERAL

PERIODICALS: VESTIS, NO. 6, 1958

PENIONZHKEVICH, E. Vitamin feeding of agricultural animals and poultry; a book review. In Russian. p. 145.

Monthly list of East European Accessions (EEAI) LC, VOL, 8, No. 2, February 1959, Unclass.

PENIONZHKEVICH, E.E., prof., doktor biologicheskikh nauk; SAVEL'YEV, I.K., kand.sel'skokhozyaystvennykh nauk; TRET'YAKOV, N.P., prof., doktor sel'skokhozyaystvennykh nauk; MAKHLUPINA, A.G., kand. sel'skokhozyaystvennykh nauk

Zagorsk group of chicken breeds. Ptitsevodstvo 8 no.8:23-29 Ag '58. (MIRA 11:10)

(Poultry breeds)

PENIONZHKEVICH, E.E., prof., doktor biol.nauk

A valuable book on vitamins in feeding livestock and poultry ("Role of vitamins in the nutrition of livestock and poultry" by A.R.Valdman. Reviewed by E.E.Penionzhkevich). Ptitsevodstvo 8 no.11:44 N '58. (MIRA 11:11)
(Feeding and feeding stuffs) (Vitamins) (Valdman, A.R.)

PENIONZHKEVICH, N.E., prof., doktor biolog. nauk

Chicken breeds and breeding for meat production. Ptitsevodstvo 9 no.6:23-26 Je '59. (MIRA 12:10)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut ptitsevodstva.
(Poultry breeds)

PENIONZHKEVICH, E.E., prof., doktor biolog.nauk; MISHIN, G.A.

Hereditary changes in White Leghorns produced by injection of blood from gray guinea hens. Ptitsevodstvo 9 no.8:32-33 Ag '59. (MIRA 12:12)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut ptitsevodstva.
(Poultry breeding) (Blood--Transfusion)

VOLKOV, V.A.; FEDOROVSKIY, N.P., kand.biolog.nauk; PENIONZHKEVICH, E.E., prof., doktor biolog.nauk; MASLIYEV, I.T., kand.sel'skokhoz.nauk; KRIKUN, A.A., kand.sel'skokhoz.nauk; PATRIK, I.A., kand.sel'skokhoz. nauk; MALINOVSKAYA, A.S., kand.biolog.nauk; DAKHNOVSKIY, N.V., kand.biolog.nauk; ORLOV, M.V., kand.sel'skokhoz.nauk; REDIKH, V.K., kand.sel'skokhoz.nauk; GOFMAN, M.B., zootekhnik; GRIGOR'YEV, G.K., starshiy nauchnyy sotrudnik; GORIZONTOVA, Ye.A., starshiy nauchnyy sotrudnik; FEOKTISTOV, P.I., kand.veter.nauk; KOTEL'NIKOV, G.A., kand.veterin.nauk; SHKUDOVA, R.I., red.; BALAKIN, V.M., red.; GRADUSOV, Yu.N., red.; SOKOLOVA, G.S., red.; SAYTANIDI, L.D., tekhn.red.

[Duck raising] Utkovodstvo. Izd-vo M-va sel'khoz. R.S.F.S.R., 1959. 284 p. (MIRA 13:12)

1. Nachal'nik Glavnogo upravleniya ptitsevodstva Ministerstva sel'skogo khozyaystva RSFSR (for Volkov). 2. Vsesoyuznyy nauchno-issledovatel'skiy institut ptitsepromyshlennosti (for Grigor'yev). 3. TSentral'nyy nauchno-issledovatel'skiy institut ptitseperera-batyvayushchey promyshlennosti (for Gorizontova).
(Ducks)

PENIONZHKEVICH, Erast Erastovich, prof.; ZELENSKAYA, Klavdiya Vasil'yevna, kand.sel'skokhoz.nauk; DOBYCHINA, I.N., red.; ZUBRILINA, Z.P., tekhn.red.

[Raising geese] Razvedenie gusei. Izd.3., perer. Moskva, Gos. izd-vo sel'khoz.lit-ry, 1960. 92 p. (MIRA 13:11)
(Geese)

PENIONZHKEVICH, E. E.; POLETSKIY, V. A.; NIKOLSKIY, E. S.

"Effect of Heterogeneous Blood on Recipient's Organism under Vegetative Hybridization of Farm Poultry"

Report submitted for the Twelfth' World's Poultry Congress, Sydney, Australia 10-18 Aug 1962

PENIONZHKEVICH, E.E., doktor biol. nauk, prof.; KADIYEVA, Ye.V., red.; GOR'KOVA, Z.D., tekhn. red.; PEVZNER,V.I., tekhn.red.;MAKHOVA, N.N., tekhn. red.

[Poultry]Sel'skokhoziaistvennaia ptitsa. Moskva, Sel'khoz-izdat. Vols.1-2. 1962. (MIRA 15:10)

(Poultry)

PENIONZHKEVICH, E.O., prof., red.; PODLAZOV, K.M., red.; PROKOF'YEVA, L.N., tekhn. red.

[Raising broilers abroad; collection of translations from foreign periodical literature]Proizvodstvo broilerov za rubezhom; sbornik perevodov iz inostrannoi periodicheskoi literatury. Pod red. i s predisl. E.O.Penionzhkevicha. Moskva, Sel'khozizdat, 1962. 366 p. (MIRA 15:11)
(Broilers (Poultry))

PENIONZHKEVICH E.E.

PENIONZHKEVICH, E. E.,

"Heritability in the Progeny of Hens with Contrasting and Similar Constitution and Productiveness."

report submitted for the 11th Intl. Congress of Genetics;. The Hague, Ntherlands, 2-10 Sep 63

IPATENKO, N.G.; NESTEROV, T.S., dotsent; KUTILOV, I.N., dotsent; AKOPYAN, Ye.Sh., kand.veterin.nauk; KARAVAYEV, V.M.; PENIONZHKO, A.M.; MAKAROV, V.A., assistent.

Veterinary sanitation expertise. Veterinariia 41 no.3:83-93 Mr '64. (MIRA 18:1)

1. Upravleniye tsentra Ministerstva proizvodstva i zagotovok sel'skokhozyaystvennykh produktov RSFSR (for Ipatenko). 2. Vitebskiy veterinarnyy institut (for Nesterov, Kutilov). 3. Vsesoyuznyy nauchno-issledovatel'skiy institut veterinarnoy sanitarii (for Akopyan). 4. Moskovskaya veterinarnaya akademiya (for Makarov).

17(2,6)

SOV/177-58-1-14/25

AUTHORS: Penionzhko, A.M., Major-General of the Veterinary Corps, Gradyushko, G.M., Colonel of the Veterinary Corps

TITLE: Co-operation Between the Military Medical Corps and the Military Veterinary Corps (O kontakte mezhdu voyenno-meditsinskoy i voyenno-veterinarnoy sluzhbami)

PERIODICAL: Voyenno-meditsinskiy zhurnal, 1958, Nr 1, pp 57 - 61 (USSR)

ABSTRACT: The authors appeal to Medical Corps and Veterinary Corps officers to cooperate in order to prevent infectious diseases among soldiers. In one third of the cases, infectious diseases are communicated to the men by parasites from animals, in particular from farm animals. The best prophylaxis consists in improving the sanitary conditions of animals and in supplying soldiers with pure meat. In 1957, the functions of food control of the sanitary epidemic stations were transferred to meat control stations

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Co-operation Between the Military Medical Corps and the Military Veterinary Corps

of the Ministerstvo sel'skogo khozyaystva (Ministry of Agriculture). The net of laboratories and veterinary staff of the military veterinary Corps is not large enough to cope with the situation without the help of the medical corps. In this connection, it is also hoped that there will be a better understanding of such little-known diseases as Q-fever, ornithoses, listerellosis, leptospirosis, influenza in pigs, and the better-known brucellosis, tuberculosis, rabies and anthrax through a closer cooperation of the two corps.

PENIONZHKO, A.M., general-mayor veterinarnoy slyzhby.

Forty years of military veterinary medicine in the armed forces of the Soviet Union. Veterinariia 35 no.2:12-19 F '58. (MIRA 11:2)

(Veterinary service, Military)

PENIONZHKO A.M.

ALICHKIN, S.L.; AGRINSKIY, N.I.; ANDREYEV, G.F.; BAKUMENKO, G.D.; VORONTSOV, S.M.; VOYSTRIKOV, I.V.; GRADYUSHKO, G.M.; ZYKOV, A.V. IVANOVTSEV, P.V.; KINBURG, M.Ya.; KOVALEV, P.A.; KOZLOVSKIY, Ye.V. KORNIYENKO, A.P.; KOLYAKOV, Ya.Ye.; LAKTIONOV, A.M.; LEVADNYY, B.A. MEDVEDEV, I.D.; NOVIKOV, N.V.; ORLOV, F.M.; OSTROVSKIY, A.A.; ORTSEV, V.P.; PENIONZHKO, A.M.; POLOZ, D.D.; PRITULIN, P.I.; PETUKHOVSKIY, A.A.; ROGALEV, G.T.; RYBAK, P.Ya.; SUTYAGIN, G.P. TUKOV, R.A.; KHAVCHENKO, D.F.; CHERNETSKIY, T.I.; SHPAYER, N.M. SHUSTOVSKIY, F.A.

Nikolai Vasil'evich Spesivtsev. Veterinariia 35 no.2:96 F '58. (MIRA 11:2)
(Spesivtsev, Nikolai Vasil'evich, 1901-1957)

RYBAK, Prokofiy Yakovlevich; PENIONZHKO, A.M., red.; USACHEVA, I.G., red.; SOKOLOVA, N.N., tekhn.red.; PEVZNER, V.I., tekhn.red.

[Fundamentals of radiation pathology in animals] Osnovy radiatsionnoi patologii u zhivotnykh. Pod red. A.M.Penionzhko. Moskva, Gos.izd-vo sel'khoz.lit-ry, 1959. 230 p. (MIRA 13:1)
(RADIATION SICKNESS)

PENIONZHKO, A.M., general-leytenant veterinarnoy sluzhby; KALUGIN, V.I., kand. veterin. nauk; ENDZIN, A.K., polkovnik veterinarnoy sluzhby v otstavke; SIKORSKIY, A.N.

From the history of veterinary medicine. Veterinariia 41 no.2:114-118 F '64. (MIRA 17:12)

HABIY, L.T., kand. sel'khoz. nauk; STOLLYAR, T.A., kand. sel'khoz. nauk; ASANOV, P.M., assistent; SELYANSKIY, V.M., kand. sel'-khoz. nauk; LOBIN, N.V., kand. sel'khoz. nauk; KOVIN'KO, D.A., kand. biol. nauk; MASLIYEVA, O.I., kand. sel'khoz. nauk; PETROV, V.M., kand. veter. nauk; ANAN'YEV, P.K., kand. veter. nauk; PENIONZHKEVICH, E.E., doktor biol. nauk, prof.; SERGEYEVA, A.M., kand. sel'khoz. nauk; BALANINA, O.V., kand. sel'khoz. nauk; GRIGOR'YEV, G.K., st. nauchnyy sotr.; KRIKUN, A.A., Geroy Sotsialisticheskogo Truda, kand. sel'khoz. nauk; YAROVOY, P.F., kand. veter. nauk; BELOKOBYLENKO, V.T., na-uchnyy sotr.; GROMOV, A.M., kand. sel'khoz. nauk; MOSIYASH, S., red.; NAGIBIN, P., tekhn. red.

[Handbook for poultrymen] Kniga ptitsevoda. Alma-Ata, Kaz-sel'khozgiz, 1962. 354 p. (MIRA 16:5)
(Kazakhstan--Poultry)

PENIZOV, N.

Future miners study progressive work methods. Prof.-tekh. obr. 20 no.8:14-15 Ag '63. (MIRA 16:9)

1. Zamestitel' gornopromyshlennogo uchilishcha No.22 Luganskoy obl.

(Miners—Education and training)

SOV-27-58-8-8/27

AUTHOR: Penizov, N., Senior Foreman of the Mining School Nr 55

TITLE: Training Section for Miners (Uchebnyy uchastok dlya gornyakov)

PERIODICAL: Professional'no-tekhnicheskoye obrazovaniye, 1958, Nr 8, pp 15-16 (USSR)

ABSTRACT: The author describes the location and method of on-the-job training for young miners.

1. Mining industry--USSR 2. Personnel--Traning

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