

References on diode design and development.
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- 1.0 Quick reference manual for Silicon integrated circuit design, W.E. Beadle, J.C.C Tsai, R.D. Plummer, Editors. Published by John Wiley and Sons.
- 2.0 Physics of semiconductor devices, second edition. S.M. Sze. Published by John Wiley and sons.
- 3.0 Analog integrated circuit design. Alan B. Grebene. Van Nostrand Reinhold Company.
- 4.0 "Determination of the threshold failure levels of semiconductor diodes and transistors due to pulse voltages." D.C Wunsch and R.R. Bell. Braddock, Dunn and McDonald, Inc. El Paso, Texas.
- 5.0 "Resistivity and carrier transport parameters in silicon". Virginia Semiconductor, www.virginiasemi.com
- 6.0 "Resistivity of bulk silicon and diffused layers in silicon". J.C. Irwin. Bell System Technical Journal, vol. 41, pp 387 – 410, 1962
- 7.0 " Evaluation of voltage dependent series resistance of epitaxial varactor diodes at microwave frequencies". T.P Lee, IEEE Transactions on Electron Devices, Vol ED-12, No 8, pp 457 – 470, August 1965.
- 8.0 "Calculations of cutoff frequency, breakdown voltage and capacitance for diffused junctions in thin epitaxial silicon layers". T.P Lee, IEEE Transactions on Electron Devices, Vol ED-13, No 12, December 1966.
- 9.0 "Design of a pn junction diode". Safa Kasap, Department of Electrical Engineering, University of Saskatchewan, Canada. (Web article).
- 10.0" Second Breakdown Phenomena in Avalanching Silicon-on-Sapphire Diodes." Richard A. Sunshine and Murray A. Lampert. IEEE Transactions on Electron Devices, Vol ED-19, No. 7, July 1972.
- 11.0" Avalanche Breakdown Characteristics of a Diffused P-N Junction" D.P Kennedy and R.R O'Brien. IRE Transactions on Electron Devices. (Probably November 1962).
- 12.0" Numerical Calculations of the Capacitance of Linearly Graded Si p-n Junctions." Electronics Letters, 6th February 1969, Vol5, No 3. pp 54-55.
- 13.0" A new semiconductor junction diode space charge layer capacitance model". Paul Van Halen, Department of Electrical Engineering, Portland State University.

14.0” Capacitance of a PN junction”. Drexel University, ECE-E302, Electronic Devices Lab III: Capacitance of a PN junction.

15.0” Transient Response of Junction Diodes”. J.G. Linvill and W. Wunderlin. IEEE Transactions on Circuit Theory October 1963.

16.0” Analysis and Characterization of P-N Junction Diode Switching”. H.J Kuno. IEEE Transactions on Electron Devices, January 1964.

17.0” Characteristics of Low-Leakage Deep – Trench Diode for ESD protection Design in 0.18um SiGe BiCMOS process”. Shiao-Shien Chen, Tung-Yang Chen, Tien-Hao Tang, Jin-Lian Su, Tzer-Min Shen and Jen-Kon Chen.. IEEE Transactions on Electron Devices, Vol 50, No7, July 2003. pp 1683 – 1689

18.0”Carrier Lifetime”. Jong – Mun Park. Dated 2004-10-28. Web Article.

19.0” PIN diode structure”. T.Ayalew: SiC Semiconductor Devices Technology, Modeling and Simulation. Web article.

20.0” PIN diode simulation” T.Ayalew. SiC Semiconductor Devices technology, Modeling and Simulation. Web Article.

21.0” This Week’s Citation Classic”. Irwin J.C. Resistivity of Bulk Silicon and diffused layers in silicon. Bell System Technical Journal, 41: 2387 – 410, 1962.

22.0” Applications of PIN Diodes, Application Note 922”. Hewlett Packard Application Note.

23.0” Rectification effects in PIN Attenuators. Application Note 957-3”. Hewlett Packard Application Note.

24.0” Simulation and Modeling of the Low – Frequency Base Resistance of Bipolar Transistors and its Dependence on Current and Geometry” Michael Schroter. IEEE Transactions on Electron Devices, Vol 38, No 3, March 1991. pp 538 – 544.

25.0” Increased Junction Breakdown Voltages in Silicon – On – Insulator Diodes.” Hung-Sheng Chen, Sheng.S. Li, Robert M. Fox and Wade A. Krull. IEEE Transactions on Electron Devices, Vol 36, No. 3 March 1989. pp 488 – 492.

26.0” Characteristics of Diffused P-N Junctions in Epitaxial Layers.” K.G. Breitschwerdt, IEEE Transactions on Electron Devices.

27.0” Determination of Contact Parameters of Interconnecting Layers in VLSI Circuits. “Geoffrey Reeves and Barry Harrison. IEEE Transactions on Electron Devices, Vol ED-33. No 3, March 1986. pp 328 – 334.

28.0” Specific Contact Resistivity of Metal – Semiconductor Contacts – A New, Accurate Method Linked to Spreading Resistance.” Gary P. Carver, Joseph J. Kopanski, Donald B. Novotny and Richard A. Forman. IEEE Transactions on Electron Devices, Vol 35, No. 4, April 1988. pp 489 – 497.

29.0” Modeling and Measurement of Contact Resistances.” William M . Loh, Stanley E. Swirhun, Tim A. Schreyer, Richard M. Swanson and Krishna C. Saraswat. IEEE Transactions on Electron Devices, Vol 34, No 3 March 1987 pp 512 – 524.

30.0” A Theory of Voltage Breakdown of Cylindrical P-N Junctions, with Applications. Harold L. Armstrong. IRE Transactions on Electron Devices, January 1957, pp 15 – 16.

31.0” On the Extraction of PIN Diode Design Parameters for Validation of Integrated Power Converter Design.” Hatem Garrab, Bruna Allard, Herve Morel, Kaicar Ammous, Sami Ghedira, Adel Amimi, Kamel Besbes and Jean-Michael Guichon. IEEE Transactions on Power Electronics, Vol 20, No 3, May2005. pp 660 – 669.

32.0” PIN Diodes” Hewlett Packard article.

33.0” On the Determination of Minority Carrier Lifetime from the Transient Response of a MOS Capacitor.” Frederic P. Heiman. IEEE Transactions on Electron Devices, Vol ED-14, No 11. November 1967. pp 781 – 784.

34.0” Minority Carrier Lifetime Analysis of Silicon Epitaxy and Bulk Crystals with Nonuniformly Distributed Defects.” Zbigniew Radzimski, Jeffrey Honeycutt and George Rozgonyi. IEEE Transactions on Electron Devices. Vol ED-35, No 1. January 1988. pp 80-84.

35.0” Microsemi SPICE Model Data” (for PIN diodes). Microsemi Microwave Products, 2007, Rev A. 2007 – 10 -23.

36.0” Measurement of the Effective Minority Carrier Lifetime in the Floating Region of a P-N-P-N Device”.Correspondence. IEEE Transactions on Electron Devices, May 1966, pp 511 – 512.

37.0” Very Narrow Base Diode”. R.H. Rediker and D.E. Sawyer. Proceedings of the IRE, July 1957. pp 944 – 953.

38.0” Low – Loss, High-Voltage 6H-SiC Epitaxial p-i-n Diode.” Keiko Fujihira, Santoshi Tamura, Tsunenobu Kimoto and Hiroyuki Matsunami. IEEE Transactions on Electron Devices, Vol 49, No 1 January 2002. pp 150 – 154.

39.0” Microsemi Micronotes, Series 701”. Bill Doherty.

40.0” A Charge Control Model of the PIN Diode”. Klaus Schunemann and Jorg Muller, IEEE Transactions on Electron Devices, Vol ED-23, No 10, October 1976.

Signal Processing Group Inc., website: www.signalpro.biz. By the technical team at SPG April 24th, 2009

- 41.0” Design with PIN Diodes” Macom Application Note by Gerald Hiller. # AG312.
- 42.0” On the Validity of the Standard SPICE Model of the Diode for Simulation in Power Electronics”. Nouri Massmoudi, Djebe M’ bairi, Bruno Allard and Herve Morel. Letters to the Editor, IEEE Transactions on Industrial Electronics, Vol 48, No 4, August 2001. pp 864- 867.
- 43.0” A Precise Model for the Transient Characterisitcs of Power Diodes.” R. Kraus, K. Hoffman, H.J. Mattausch. University of Bundeswehr Munich.
- 44.0” Resistance of Narrow Diffused Layers.” Takayuki Yanagawa. IEEE Transactions on Electron Devices., Vol ED-19, No 11, November 1972. pp 1166 – 1171.
- 45.0” Physics Based Models of Power Semiconductor Devices for the Circuit Simulator SPICE”. R. Kraus, P. Turkes and J. Sigg. Siemens Power Semiconductor Application Note No. An_PSM3e.
- 46.0” A Simple Power Diode Model with Forward and Reverse Recovery”. Cliff L. Ma and Peter O. Lauritzen. Department of Electrical Engineering, FT-10, University of Washington, Seattle, WA 98195.
- 47.0” SPICE Modeling of Microwave and RF Control Diodes”. Robert H. Caverly, Nikolai V. Drozdovski, Lioudmila M. Drozdovskaia and Michael J. Quinn. Proceedings of the 43rd IEEE Midwest Symposium on Circuits and Systems, Lansing MI, August 8 - 11, 2000.
- 48.0” Minority Carrier Transport Parameters in n – Type Silicon.” Chih Hsin Wang, Konstantinos Misiakos and Arnost Neugroschel. IEEE Transactions on Electron Devices, Vol 37, No 5, May 1990. pp 1314 – 1322.