

# TECHNICAL REPORT

# IEC TR 62014-3

First edition  
2002-12

---

---

## Electronic design automation libraries –

### Part 3: Models of integrated circuits for EMI behavioural simulation

iTeh Standards

(<https://standards.iteh.ai>)

Document Preview

IEC TR 62014-3:2002

<https://standards.iteh.ai/catalog/standards/iec/15795167-894b-4a61-8ddd-ff7ba93ca81e/iec-tr-62014-3-2002>



Reference number  
IEC/TR 62014-3:2002(E)

## Publication numbering

As from 1 January 1997 all IEC publications are issued with a designation in the 60000 series. For example, IEC 34-1 is now referred to as IEC 60034-1.

## Consolidated editions

The IEC is now publishing consolidated versions of its publications. For example, edition numbers 1.0, 1.1 and 1.2 refer, respectively, to the base publication, the base publication incorporating amendment 1 and the base publication incorporating amendments 1 and 2.

## Further information on IEC publications

The technical content of IEC publications is kept under constant review by the IEC, thus ensuring that the content reflects current technology. Information relating to this publication, including its validity, is available in the IEC Catalogue of publications (see below) in addition to new editions, amendments and corrigenda. Information on the subjects under consideration and work in progress undertaken by the technical committee which has prepared this publication, as well as the list of publications issued, is also available from the following:

- **IEC Web Site** ([www.iec.ch](http://www.iec.ch))

- **Catalogue of IEC publications**

The on-line catalogue on the IEC web site ([http://www.iec.ch/searchpub/cur\\_fut.htm](http://www.iec.ch/searchpub/cur_fut.htm)) enables you to search by a variety of criteria including text searches, technical committees and date of publication. On-line information is also available on recently issued publications, withdrawn and replaced publications, as well as corrigenda.

- **IEC Just Published**

This summary of recently issued publications ([http://www.iec.ch/online\\_news/justpub/jp\\_entry.htm](http://www.iec.ch/online_news/justpub/jp_entry.htm)) is also available by email. Please contact the Customer Service Centre (see below) for further information.

- **Customer Service Centre**

If you have any questions regarding this publication or need further assistance, please contact the Customer Service Centre:

Email: [custserv@iec.ch](mailto:custserv@iec.ch)  
Tel: +41 22 919 02 11  
Fax: +41 22 919 03 00

# TECHNICAL REPORT

# IEC TR 62014-3

First edition  
2002-12

---

---

## Electronic design automation libraries –

### Part 3: Models of integrated circuits for EMI behavioural simulation

iTeh Standards  
(<https://standards.iteh.ai>)  
Document Preview

<https://standards.iteh.ai/catalog/standards/iec/15795167-894b-4a61-8ddd-ff7ba93ca81e/iec-tr-62014-3-2002>

© IEC 2002 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission, 3, rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland  
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: [inmail@iec.ch](mailto:inmail@iec.ch) Web: [www.iec.ch](http://www.iec.ch)



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

PRICE CODE

**N**

*For price, see current catalogue*

## CONTENTS

FOREWORD .....	3
1 Scope .....	5
1.1 General .....	5
1.2 Philosophy .....	6
2 Normative references .....	7
3 Definitions .....	7
4 ICEM models description .....	8
4.1 ICEM power-supply line model .....	8
4.2 ICEM Input/output .....	9
4.3 ICEM direct radiation .....	10
5 ICEM models parts details .....	11
5.1 Passive parts parameters .....	11
5.2 The current sources $I_b$ and $I_{i/o}$ .....	12
Annex A Simulation tools implementation .....	14
Figure 1 – Mechanisms for parasitic emission covered by ICEM .....	5
Figure 2 – The basic mechanism for parasitic emission is due to the current driving by all the gates .....	6
Figure 3 – Number of switching gates versus time .....	6
Figure 4 – Model of the IC supply lines .....	8
Figure 5 – Origin of primary and secondary resonance in the IC model .....	9
Figure 6 – Comparison between simulation and measurements (IEC 61967-4, 1 Ω method) ...	9
Figure 7 – Coupling between core and I/Os .....	10
Figure 8 – Coupling between core and I/Os in the case of separate supplies .....	10
Figure 9 – IC direct emissions measured in TEM cell .....	11
Figure 10 – Current source definition as a PWL description versus time .....	13
Table 1 – Value range of the model parameters .....	12

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRONIC DESIGN AUTOMATION LIBRARIES –****Part 3: Models of integrated circuits  
for EMI behavioural simulation**

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this technical report may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC 62014-3, which is a technical report, has been prepared by IEC technical committee 93: Design automation.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
93/146/DTR	93/157/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until 2005. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

Withdrawn

iTech Standards  
(<https://standards.iteh.ai>)  
Document Preview

<https://standards.iteh.ai/catalog/standards/iec/15795167-894b-4a61-8ddd-ff7ba93ca81e/iec-tr-62014-3-2002>