

AS 1955, Part 1—1977
RECONFIRMED 1983

Australian Standard[®]

SEMICONDUCTOR CONVERTORS

Part 1-GENERAL

The following scientific, industrial and governmental organizations and departments were officially represented on the committee entrusted with the preparation of this standard:

Associated Chambers of Manufacturers of Australia
Australian Electrical Manufacturers Association
Bureau of Steel Manufacturers of Australia
Department of Defence
Electricity Supply Association of Australia
Railways of Australia Committee
Telecom Australia
Universities

This standard, prepared by the Committee EL/27, Power Electronics, was approved on behalf of the Council of the Standards Association of Australia on 22 July 1976, and was published on 1 July 1977.

Review of Australian Standards. *To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.*

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

AS 1955, Part 1—1977

Australian Standard®

SEMICONDUCTOR CONVERTORS
Part 1-GENERAL

First published	1977
Reconfirmed and reprinted	1983

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 1070 6

PREFACE

This standard was originally prepared by the Association's Committee EL/27, Power Electronics, in 1977. In 1983 the committee reviewed the standard and reconfirmed it as an Australian standard without change. It is based on Publication 146, Semiconductor Convertors, published by the International Electrotechnical Commission (IEC). Acknowledgement is made of the assistance received from this source.

The IEC standard was examined in terms of Australian practice and amended where necessary. In the main the amendments consist of editorial changes not involving change in basic meanings, renumbering of clauses and re-arrangement of Section 1 to ensure conformity with the style of Australian standards.

Technical changes are few, but where the standard does deviate technically from the IEC standard by way of actual change, or cross-reference to an appropriate Australian standard, this change is indicated by a rule in the margin.

The purpose of the standard is to define the terminology and specify the symbols, requirements and test methods appropriate to semiconductor convertors and transformers. Information is also given on individual semi-conductor diodes and thyristors. Further information on these components may be obtained by reference to the Australian equivalents of IEC Publication 147, Part 0, 1 and 2 and 148. These documents are listed below.

Attention is drawn to the need to cross-refer to the following Australian standards to amplify the information given herein:

AS 1102	Graphical Symbols for Electrotechnology Part 5—Semiconductor Devices Part 10—Signal Transmission Symbols
AS 1852	International Electrotechnical Vocabulary (05) Fundamental Definitions (11) Static Convertors
AS C61	Power Transformers
AS C320	Classification of Insulating Materials for Electrical Machinery and Apparatus on the Basis of Thermal Stability in Service
AS C366	Essential Ratings and Characteristics of Semiconductor Devices and General Principles of Measuring Methods Part 0—General and Terminology Part 1—Essential Ratings and Characteristics Part 2—General Principles of Measuring Methods
AS C367	Letter Symbols for Semiconductor Devices and Integrated Microcircuits

© Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

CONTENTS

	<i>Page</i>		<i>Page</i>
SECTION 1. GENERAL		4.9	Circulating Alternating Currents in Double Convertors 51
1.1	Scope 4	4.10	Interference with other Electrical Equipment 51
1.2	Application 4	4.11	Protection 52
1.3	Reference to Other Specifications 4	4.12	Overvoltage Protection 53
1.4	List of Principal Letter Symbols 5	4.13	Rated Values for Assemblies and Equipments 53
1.5	General Terms 8	4.14	Rated Current Values 54
1.6	Definitions of Rated Values 12	4.15	Particular Remarks for Double Convertors 58
1.7	Efficiency Definitions 14	4.16	Tests for Diode Assemblies and Rectifier Equipments 58
1.8	Terms used in connection with Converter Faults 14	4.17	Tests on Small Converter Equipments 63
1.9	Factors on A.C. Side 15	4.18	Tests for Thyristor Assemblies and Thyristor Converter Equipments 64
1.10	Terms used in connection with Voltage Regulation 16	4.19	Test Specifications 65
1.11	Terms used in connection with Cooling 18		
1.12	Service Conditions 19	SECTION 5. TOLERANCES	70
1.13	A.C. System Conditions 19	SECTION 6. PERFORMANCE REQUIREMENTS AND APPLICATION INFORMATIONS	
1.14	Temperature and Cooling Conditions 20	6.1	Parallel or Series Connection of Diodes or Thyristors 71
1.15	Character of Load 20	6.2	Current Balancing of Parallel Connected Devices 71
1.16	Usual Service Conditions 20	6.3	Voltage Division for Series Connected Devices 71
1.17	Unusual Service Conditions 21	6.4	Parallel or Series Operation of Assemblies and Equipments 71
1.18	Performance of Tests 22	6.5	Auxiliaries to Rectifier or Converter Equipments 71
1.19	Classification of Tests 22	6.6	Voltage Limits for Reliable Commutation in Inverter Mode of Operation 72
SECTION 2. SEMICONDUCTOR RECTIFIER DIODES AND THYRISTORS		6.7	Overload Conditions 72
2.1	General 23	6.8	Stabilization 73
SECTION 3. TRANSFORMERS AND REACTORS		6.9	Mode of Operation of Single and Double Convertors 74
3.1	General 24	6.10	Principle of Operation of Reversible Convertors for Control of D.C. Motors 79
3.2	Rated Values for Converter Transformers 24	6.11	Circuit Operating Conditions Affecting the Voltage applied across Converter Circuit Elements 81
3.3	Temperature Limits of Cooling Media 24		
3.4	Losses and Voltage Drops in Transformers and Reactors 25	SECTION 7. MARKING ON CONVERTOR EQUIPMENTS AND ASSEMBLIES	
3.5	Losses in Interphase Transformers, Current-balancing Reactors, Series-smoothing Reactors, Transductors and other Current-regulating Accessories 25	7.1	Marking 82
3.6	Voltage Drops in Transformers and Reactors 26	7.2	Rating Plate 82
3.7	Tests for Converter Transformers 26		
3.8	Measurement of Commutating Reactance and Determination of Inductive Voltage Drop (Type Test) 26	APPENDICES	
3.9	Short-circuit Test (Type Test and Routine Test) 27	A	Semiconductor Rectifier Diodes and Diode Stacks 84
3.10	Temperature-rise Test (Type Test) 27	B	Thyristors and Thyristor Stacks 100
SECTION 4. CONVERTOR EQUIPMENTS AND ASSEMBLIES		C	Corrections to be applied when Cooling Medium Temperature is Higher than Standard 129
4.1	Electrical Connections and Calculation Factors 29	D	Determination of Overload Capability through Calculation of Virtual Junction Temperature 130
4.2	Losses and Efficiency, Power Factor and Conversion Factor 33		
4.3	Power Factor 34		
4.4	Conversion Factor 39		
4.5	Voltage Regulation 40		
4.6	Harmonics in Currents and Voltages and Associated Effects 45		
4.7	Symbols Used in Figures 9 to 17 50		
4.8	Alternating Current Components in D.C. Load with Low A.C. Impedance (Capacitive Load) 51		

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- Looking for additional Standards? Visit Intertek Inform Infostore
 - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-