

Förderverein für Elektrotechnische Normung (FEN) e. V.
Cenelec Electronic Components Committee

CECC

Système Harmonisé d'Assurance de la Qualité
des Composants Electroniques

SPECIFICATION PARTICULIERE CADRE:

**AMPLIFICATEURS
OPERATIONNELS
INTEGRES**

Harmonized System of Quality Assessment for
Electronic Components

BLANK DETAIL SPECIFICATION:

**INTEGRATED
OPERATIONAL
AMPLIFIERS**

Harmonisiertes Gütebestätigungssystem für
Bauelemente der Elektronik

VORDRUCK
FÜR BAUARTSPEZIFIKATION:

**INTEGRIERTE
OPERATIONS-
VERSTÄRKER**



2 Edition
Issue
Ausgabe

CECC 90 202

1989

Cette page bleue doit être insérée après la page de garde de la CECC 90 202 Edition 2 (1989)	This blue page shall be inserted after the title page of CECC 90 202 Issue 2 (1989)	Dieses blaue Blatt ist nach dem Titelblatt der CECC 90 202 Ausgabe 2 (1989) einzufügen
AMENDEMENT 1 A LA CECC 90 202 (Edition 2)	AMENDMENT 1 TO CECC 90 202 (Issue 2)	ÄNDERUNG 1 ZU CECC 90 202 (Ausgabe 2)
SPECIFICATION PARTICULIERE CADRE	BLANK DETAIL SPECIFICATION	VORDRUCK FÜR BAUARTSPEZIFIKATION
AMPLIFICATEURS OPERATIONNELS INTEGRES	INTEGRATED OPERATIONAL AMPLIFIERS	INTEGRIERTE OPERATIONS-VERSTÄRKER
La modification suivante doit être effectuée :	The following amendment shall be made :	EIN DEUTSCHER TEXT LIEGT NICHT VOR
Le paragraphe 4 concernant les exigences de contrôle doit être réécrit car les séquences d'essais sont introduites dans la Spécification Générique CECC 90 000.	Paragraph 4 related to Inspection requirements has to be reworded because the test sequences are now introduced in the Generic Specification CECC 90 000.	
Remplacer les pages 7/8 à 15/16 par les nouvelles pages 7/8 à 15/16 ci-jointes ; supprimer les pages 17 à 20 et renuméroter l'annexe A : pages 17/18.	Replace pages 7/8 to 15/16 by new pages 7/8 to 15/16 ; delete pages 17 to 20 and renumber the Annex A pages 17/18.	
Enregistrer cette modification sur la feuille jaune "Enregistrement des amendements".	Enter this amendment on the yellow "Record of amendments" sheet.	
Le texte de cet amendement a été soumis au vote du CECC dans les documents indiqués ci-dessous et a été ratifié par le Président du CECC pour être publié.	This amendment was circulated to the CECC for voting in the documents listed below and was ratified by the president of the CECC for publication.	
Document	Document	
Date de vote	Date of voting	
Rapport de vote	Report on the voting	
CECC(Secrétariat)2990 Février 1992 CECC(Secrétariat)3049	CECC(Secrétariat)2990 February 1992 CECC(Secrétariat)3049	
CECC 90 202 Edition 2 Amendement 1 1994	CECC 90 202 Issue 2 Amendment 1 1994	CECC 90 202 Ausgabe 2 Änderung 1 1994

Information about the System may be obtained from:



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or from the National Authorized Institutions
of the participating countries listed
who can supply copies of:

- 1 The Internal Regulations of the FEN e.V.
- 2 CECC Specifications of the FEN and National Specifications for the System
- 3 CECC 00 200: Qualified Products List (QPL)
- 4 CECC 00 300: CECC Publications and their related national documents

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FOREWORD

The CENELEC Electronic Components Committee (CECC) is composed of those member countries of the European Committee for Electrotechnical Standardization (CENELEC) who wish to take part in a harmonized System for electronic components of assessed quality.

The object of the System is to facilitate international trade by the harmonization of the specifications and quality assessment procedures for electronic components, and by the grant of an internationally recognized Mark, or Certificate, of Conformity. The components produced under the System are thereby acceptable in all member countries without further testing.

This specification has been formally approved by the CECC, and has been prepared for those countries taking part in the System who wish to issue national harmonized specifications for INTEGRATED OPERATIONAL AMPLIFIERS. It should be read in conjunction with the current regulations for the CECC System.

At the date of printing of this specification the member countries of the CECC are Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom, and copies of it can be obtained from the addresses shown on the blue fly sheet.

PREFACE

This blank detail specification (BDS) was prepared by CECC WG9 "INTEGRATED CIRCUITS".

It is based, wherever possible, on the Publications of the International Electrotechnical Commission and in particular on IEC 747 : Semiconductor devices : Discrete devices and integrated circuits, IEC 748 : Semiconductor devices : Integrated circuits, IEC 749 : Semiconductor devices : Mechanical and climatic test methods.

The text of this second Issue consists of the text of CECC 90 202 Issue 1 (1985) amended in accordance with the ratified new material introduced by the following document.

<u>Document</u>	<u>Date of Voting</u>	<u>Report on the Voting</u>
CECC(Secretariat)2166	February 1988	CECC(Secretariat)2297

It is recognized that the layout proposed cannot apply to all detail specifications based on this document. For example when several similar devices are covered by the same detail specification, it may be convenient to give the limiting values in a table.

In accordance with the decision of the CECC Management Committee this specification is published initially in French and English. The German text will follow as soon as it has been prepared.

EFFECTIVE DATE

This second Issue of CECC 90 202 shall become effective for all new qualification approvals on 18 December 1989. Issue 1 will continue to remain effective to cover all past approvals.

1 FRONT PAGE

The front page of the DS shall be laid out as shown on the following page.

The numbers between square brackets correspond to the following indications which shall be given :

Identification of the DS and of the component :

- [1] The name of the National Standards Organization under whose authority the DS is published and, if applicable, the organization from whom the DS is available.
- [2] The CECC Symbol and the CECC number allotted to the DS by the CECC General Secretariat.
- [3] The number and issue number of the CECC generic or sectional specification as relevant ; also national reference if different.
- [4] If different from the CECC number, the national number of the DS, date of issue and any further information required by the national system, together with any amendment numbers.
- [5] Type number, a short description of the type by :
 - function (for example differential inputs operational amplifier)
 - number of independent circuits per package
 - number and kind of inputs and outputs
 - material and type of construction (silicon, monolithic, multichip, bipolar, MOS, etc.)
 - performance, for example high output power, high speed, low power consumption
 - electrostatic sensitivity (where appropriate).

- [6] Information on typical construction (if applicable)

For [5] and [6] the text to be given in the DS should be suitable for an entry in CECC 00 200 or CECC 00 300.

- [7] An outline drawing with main dimensions which are of importance for interchangeability, and/or reference to the appropriate national or international document for outlines. Alternatively, this drawing may be given in an annex to the DS.

- [8] Quality assessment level(s)

- [9] Reference data giving information on the most important properties of the component, which allow comparison between the various component types intended for the same, or for similar, applications.

Identification of the component and supplementary information :

Description of the materials for the package (for example, glass, ceramic, silicone) and information relating to the mounting (welding, soldering), lead material and finish.

Inside the sketch of the package, the terminal connections to the inputs, outputs or other important points of the circuit shall be identified. This can be shown by a functional block diagram.

Description of the numbering of the terminals with the identification of pin number 1.

Marking on the device in accordance with the GS (see 2.5 of CECC 90 000).

Layout for front page of detail specification

Specification available from : [1]	CECC 90 202-xxx  [2]	
ELECTRONIC COMPONENTS OF ASSESSED QUALITY IN ACCORDANCE WITH : [3]	[4]	
OUTLINE AND DIMENSIONS : [7]	[5]	
[9]	[6]	
	[8]	
	[9]	
Information about manufacturers who have components qualified to this detail specification is available in the current CECC 00 200 : Qualified Products List.		

2 RATINGS (LIMITING VALUES) (Not for inspection purposes)

These apply over the operating temperature range, unless otherwise stated (see CECC 90 200).

- | | | |
|------|---|------------------|
| 2.1 | Maximum (and where appropriate minimum) value of voltage between the reference terminal and each of the other terminals. | |
| 2.2 | Any other limiting value(s) of voltage between any specified terminals as appropriate. | |
| 2.3 | Maximum continuous output current. | I_O |
| 2.4 | Maximum continuous internal power dissipation with reference to a derating curve or factor related to the reference point temperature or ambient temperature. | P_D |
| 2.5 | Maximum common mode input voltage. | V_{IC} |
| 2.6 | Maximum differential mode input voltage. | V_{ID} |
| 2.7 | Maximum and minimum ambient or reference point operating temperature. | T_{amb} |
| 2.8 | Maximum and minimum storage temperature. | T_{stg} |
| 2.9 | Any specific mechanical or environmental ratings peculiar to the device. | |
| 2.10 | Any interdependence of limiting conditions. | |
| 2.11 | Maximum value of output short-circuit current and duration (where appropriate). | I_{OS}, t_{OS} |

3 RECOMMENDED CONDITIONS OF USE AND ASSOCIATED CHARACTERISTICS (Not for inspection purpose)

The following characteristics shall apply over the full ambient operating temperature range unless otherwise specified. Where the stated performance of the circuit varies over the ambient operating temperature range the values of the input and output voltages and their associated currents shall be stated at 25 °C and at the extremes of the operating temperature range.

Where it is necessary to use external elements to ensure stable operation of the amplifier, the values of the characteristics specified refer to the amplifier with such elements connected.

CHARACTERISTICS	SYMBOL	METHOD (See 4.1.1 of CECC 90 200)
3.0 General measurement conditions and corresponding figures.	$+V_{CC} - V_{EE}$	
3.1 Input voltage(s).	V_I	
3.2 Output voltage.	V_O	
3.3 Output current (if applicable).	I_O	
3.4 Power supply currents.	I_S	A-01

CHARACTERISTICS	SYMBOL	METHOD (See 4.1.1 of CECC 90 200)
3.5 Small signal input impedance (if applicable).	Z_i	A-02
3.6 Output impedance (if applicable).	Z_o	A-03
3.7 Input offset voltage of a differential input integrated amplifier (where appropriate)	V_{IO}	A-04
3.8 Bias voltage of a single ended input integrated amplifier (where appropriate)	V_{IB}	A-04
3.9 Input offset current.	I_O	A-05
3.10 Input bias current.	I_{IB}	A-06
3.11 Input offset voltage temperature coefficient (if applicable).	αV_{IO}	A-07
3.12 Input offset current temperature coefficient (if applicable).	αI_{IO}	A-08
3.13 Open-loop voltage amplification (where appropriate).	A_V	A-09
3.14 Open-loop differential mode voltage amplification (where appropriate).	A_{VD}	A-09
3.15 Cut-off frequency (frequencies, high and low) (if applicable, see note 5 of Sub-Group A5).	f_a, f_b	A-10
3.16 Common mode rejection ratio (at 25 °C only) of differential input operational amplifier (where appropriate).	k_{CMR}	A-11
3.17 Supply voltage(s) rejection ratio (at 25 °C only).	k_{SVR}	A-12
3.18 Output voltage range for differential amplifiers (d.c. measurement only).	V_{OPP}	A-13
3.19 Response times (if applicable) delay time rise time fall time ripple time total response time	t_d t_r t_f t_{rip} t_{tot}	A-14
3.20 Noise (if applicable) noise voltage noise current and burst noise	V_n I_n V_{bn}	A-15
3.21 Average rate of change of the output voltage (if applicable : see note 5 of Sub-Group A5).	S_{VOAV}	A-16
3.22 Real Gain-Bandwidth product (where appropriate).	GW_r	A-17



CHARACTERISTICS	SYMBOL	METHOD (See 4.1.3 of CECC 90 200)
3.23 Crosstalk attenuation between any two channels (where appropriate)	a_{ct}	S-05
		(See 4.1 of CECC 90 100)
3.24 Output short-circuit current	I_{OS}	4.1.4

4 TEST CONDITIONS AND INSPECTION REQUIREMENTS

See 3.6 of CECC 90 000 with the following special requirements:

The values and exact test conditions to be used shall be specified as required in the detail specification relevant to a given type, in line with the indications given in CECC 90 200 for the relevant test.

External elements necessary to ensure stable operation shall be specified and shall be connected for all electrical tests.





EXAMINATION OR TEST	D ND	CONDITIONS OF TEST	LIMITS TO BE SPECIFIED
GROUP A INSPECTION			
<u>Sub-Group A2</u> Verification of the function at 25 °C GS/Note 5 Open loop voltage amplification Method SS2/A-09 OR Open loop differential mode voltage amplification Method SS2/A-09	ND	See relevant DS	A_{VB} OR A_{VDB}
<u>Sub-Group A3</u> Static characteristics at 25 °C Power supply current(s) Method SS2/A-01	ND	See relevant DS	I_{SA}
Input offset voltage Method SS2/A-04		See relevant DS	V_{IOA}
Input offset current Method SS2/A-05		See relevant DS	I_{IOA}
Input bias current Method SS2/A-06		See relevant DS	I_{IBA}
Output voltage range Method SS2/A-13		See relevant DS	V_{OPPB}
Output short-circuit current Method SS1/4.1.4		See relevant DS	I_{OSA} , if applicable: I_{OSB}



EXAMINATION OR TEST	D ND	CONDITIONS OF TEST	LIMITS TO BE SPECIFIED
Sub-Group A3 (contd)			
Common mode rejection ratio (where appropriate) Method SS2/A-11		See relevant DS	k_{CMRB}
Supply voltage rejection ratio Method SS2/A-12		See relevant DS	k_{SVRB}
Sub-Group A4a			
Static characteristics at maximum operating temperature	ND	$T_{\text{amb}} = T_{\text{amb max.}}$ Electrical conditions as for Sub-Group A3	Limits may be different from those in Sub-Group A3
Power supply current(s) Method SS2/A-01			
Output short-circuit current Method SS1/4.1.4			
Input offset voltage Method SS2/A-04			
Input offset current Method SS2/A-05			
Input bias current Method SS2/A-06			
Output voltage range Method SS2/A-13			
Input offset voltage temperature coefficient (if applicable) Method SS2/A-07		See relevant DS	α_{VIOA}
Input offset current temperature coefficient (if applicable) Method SS2/A-08		See relevant DS	α_{IIOA}



EXAMINATION OR TEST	D ND	CONDITIONS OF TEST	LIMITS TO BE SPECIFIED
Sub-Group A4b			
Static characteristics at minimum operating temperature	ND	$T_{amb} = T_{amb \text{ min.}}$ Electrical conditions as for Sub-Group A3	Limits may be different from those in Sub-Group A3
Power supply current(s) Method SS2/A-01			
Output short-circuit current Method SS1/4.1.4			
Input offset voltage Method SS2/A-04			
Input offset current Method SS2/A-05			
Input bias current Method SS2/A-06			
Output voltage range Method SS2/A-13			
Input offset voltage temperature coeffi- cient (if applicable) Method SS2/A-07		See relevant DS	σ_{VIOA}
Input offset current temperature coeffi- cient (if applicable) Method SS2/A-08		See relevant DS	σ_{IIOA}