

Semiconductor devices — Integrated circuits —

**Part 2-20: Digital integrated circuits —
Family specification — Low voltage
integrated circuits**

ICS 31.200

National foreword

This British Standard is the UK implementation of IEC 60748-2-20:2008. It supersedes BS IEC 60748-2-20:2000 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee EPL/47, Semiconductors.

A list of organizations represented on this committee can be obtained on request to its secretary.

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 September 2008

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ISBN 978 0 580 57380 4

Amendments/corrigenda issued since publication

Date	Comments

INTERNATIONAL STANDARD

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INTRODUCTION

The dimensions of integrated circuit devices are continuing to be reduced, both vertically and horizontally, to obtain better performance and higher density. However, if the supply voltages and interface levels are not reduced, the electric fields within the die (chip) will increase, which leads to reduced reliability. These increased fields will also, together with the higher system-clock rate, lead to increased electromagnetic interference and noise induced on the supply leads and the ground plane, which leads to lower noise immunity and a higher probability of malfunction. To continue this trend of scaling down the size of semiconductor devices, lower power supply voltages are essential.

For systems operating at lower supply voltage, the tolerances on the supply voltage and the input and output voltages must be specified more closely. Also, since the market for battery-operated equipment is expected to grow considerably, it is important to include specifications that cover this field. By setting standard values at this stage, manufacturing costs can be reduced and users can design systems more economically.

After the publication of first edition of this standard, scaling of digital ICs has still been drastically proceeding, and nowadays, state-of-the art digital ICs are operated at 1,2 V, and Schmitt trigger interface is widely used. In light of the situation, this second edition expands the specification of nominal power supply voltage down to 1,0 V and includes specifications of Schmitt trigger interface.

SEMICONDUCTOR DEVICES – INTEGRATED CIRCUITS –

Part 2-20: Digital integrated circuits – Family specification – Low voltage integrated circuits

1 Scope

This standard aims at giving DC interface specifications for various sets of values, where each comprises the nominal value of power supply voltage, its tolerance, and the worst-case limit values of the input and output voltages for low voltage integrated circuits.

It also provides two categories of interface specification for each nominal supply voltage – normal range and wide range. The normal range is based on the nominal industry standard with typical tolerance of about 10 %. The wide range covers battery operation that extends the lower limit to a practical value at which the battery will continue to operate.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60748-2:1997, *Semiconductor devices – Integrated circuits – Part 2: Digital integrated circuits*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

absolute maximum continuous ratings

conditions from which damage to the circuit may occur, if the circuit is exposed to such conditions

3.2

operating conditions

conditions under which the circuit functions normally with appropriate degree of reliability

3.3

output characteristics

requirements for the circuit to fulfil under the operating condition