

IDENTIFITSEERIMISKAARDID

Katsemeetodid

**Osa 3: Kontaktidega kiipkaardid ja seotud
liideseseadmed**

Identification cards

Test methods

**Part 3: Integrated circuit cards with contacts and related
interface devices
(ISO/IEC 10373-3:2018, identical)**

EESTI STANDARDI EESSÕNA**NATIONAL FOREWORD**

<p>See Eesti standard EVS-ISO/IEC 10373-3:2020 „Identifitseerimiskaardid. Katsemeetodid. Osa 3: Kontaktidega kiipkaardid ja seotud liideseseadmed“ sisaldab rahvusvahelise standardi ISO/IEC 10373-3:2018 „Identification cards. Test methods. Part 3: Integrated circuit cards with contacts and related interface devices“ identset ingliskeelset teksti.</p>	<p>This Estonian Standard EVS-ISO/IEC 10373-3:2020 consists of the identical English text of the International Standard ISO/IEC 10373-3:2018 „Identification cards. Test methods. Part 3: Integrated circuit cards with contacts and related interface devices“.</p>
<p>Ettepaneku rahvusvahelise standardi ümbertrüki meetodil ülevõtuks on esitanud EVS/TK 4, standardi avaldamist on korraldanud Eesti Standardikeskus.</p>	<p>Proposal to adopt the International Standard by reprint method has been presented by EVS/TK 4, the Estonian Standard has been published by the Estonian Centre for Standardisation.</p>
<p>Standard EVS-ISO/IEC 10373-3:2020 on jõustunud sellekohase teate avaldamisega EVS Teataja 2020. aasta veebruarikuu numbris.</p>	<p>Standard EVS-ISO/IEC 10373-3:2020 has been endorsed with a notification published in the February 2020 issue of the official bulletin of the Estonian Centre for Standardisation.</p>
<p>Standard on kättesaadav Eesti Standardikeskusest.</p>	<p>This standard is available from the Estonian Centre for Standardisation.</p>

Käsitlusala

See dokument defineerib kontaktidega kiipkaartide ja seotud liideseseadmete karakteristikute katsemeetodid standardis ISO/IEC 7816-3 esitatud määratluse kohaselt. Iga katsemeetodi puhul on antud viide ühele või mitmele põhistandardile, milleks võib olla ISO/IEC 7810, mis defineerib identifitseerimiskaardi rakendustes kasutatavad infosalvestustehnoloogiad.

MÄRKUS Vastuvõetavuse kriteeriumid ei moodusta osa sellest dokumendist, aga on leitavad ülalmainitud rahvusvahelistest standarditest.

See dokument määratleb katsemeetodid, mis on eriomased kontakt-kiibitehnoloogiale. ISO/IEC 10373-1 määratleb katsemeetodid, mis on tavalised ühe või enama kaarditehnoloogia jaoks, ja standardisarja ISO/IEC 10373 teised osad määratlevad teisi tehnoloogiakatseid.

Selles dokumendis määratletud katsemeetodid on mõeldud eraldi ja sõltumatult teostamiseks. Üks konkreetne kaart ei pea järjest kõiki katseid läbima. Selles dokumendis määratletud katsemeetodid põhinevad standardil ISO/IEC 7816-3.

Selles dokumendis defineeritud katsemeetodite abil kindlaks määratud kaartide ja IFD-de vastavus ei välista rikkeid väljal. Töökindluse katsetamine on väljaspool selle dokumendi käsitlusala.

See dokument ei defineeri ühtegi katset, et saavutada kontaktidega kiipkaartide täielik funktsioneerimine. Katsemeetodid nõuavad ainult seda, et miinimumfunktsionaalsus oleks õigeks tunnistatud. Miinimumfunktsionaalsus on määratletud allpool.

— Mis tahes kaardis olev integraallülitus jätkab algseadistuse tagasisidele vastuse kuvamist, mis on vastavuses põhistandardiga.

- Mis tahes kontaktid, mis on ühenduses ükskõik missuguse kaardis oleva integraallülitusega, jätkavad põhistandardiga vastavuses oleva elektritakistuse näitamist.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 35.240.15

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:

Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact the Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

Contents

	Page
Foreword.....	vi
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
4 General items applicable to the test methods.....	2
4.1 Test environment.....	2
4.2 Pre-conditioning.....	2
4.3 Selection of test methods.....	2
4.4 Default tolerance.....	3
4.5 Total measurement uncertainty.....	3
4.6 Conventions for electrical measurements.....	3
4.7 Apparatus.....	3
4.7.1 Apparatus for testing the integrated circuit cards with contacts (card-test-apparatus).....	3
4.7.2 Apparatus for testing the interface device (IFD-test-apparatus).....	6
4.7.3 Test Scenario.....	10
4.8 Relationship of test methods versus base standard requirements.....	10
5 Test methods for electrical characteristics of cards with contacts.....	12
5.1 VCC contact.....	12
5.1.1 General.....	12
5.1.2 Apparatus.....	12
5.1.3 Procedure.....	12
5.1.4 Test report.....	13
5.2 I/O contact.....	13
5.2.1 General.....	13
5.2.2 Apparatus.....	13
5.2.3 Procedure.....	13
5.2.4 Test report.....	14
5.3 CLK contact.....	14
5.3.1 General.....	14
5.3.2 Apparatus.....	14
5.3.3 Procedure.....	15
5.3.4 Test report.....	15
5.4 RST contact.....	15
5.4.1 General.....	15
5.4.2 Apparatus.....	16
5.4.3 Procedure.....	16
5.4.4 Test report.....	16
5.5 SPU (C6) contact.....	16
6 Test methods for logical operations of cards with contacts.....	17
6.1 Answer to reset.....	17
6.1.1 Cold reset and answer-to-reset (ATR).....	17
6.1.2 Warm reset.....	17
6.2 T=0 Protocol.....	18
6.2.1 General.....	18
6.2.2 I/O transmission timing for T=0 protocol.....	18
6.2.3 I/O character repetition for T=0 protocol.....	19
6.2.4 I/O reception timing and error signalling for T=0 protocol.....	19
6.3 T=1 Protocol.....	20
6.3.1 General.....	20
6.3.2 I/O transmission timing for T=1 protocol.....	20
6.3.3 I/O reception timing for T=1 protocol.....	21

6.3.4	Character Waiting Time (CWT) behaviour.....	22
6.3.5	Card-reaction to IFD exceeding CWT.....	22
6.3.6	Block Guard time (BGT).....	23
6.3.7	Block sequencing by the card.....	24
6.3.8	Reaction of the card to protocol errors.....	26
6.3.9	Recovery of a transmission error by the card.....	26
6.3.10	Resynchronization.....	27
6.3.11	IFSD negotiation.....	28
6.3.12	Abortion by the IFD.....	29
7	Test methods for physical and electrical characteristics of the IFD.....	29
7.1	Activation of contacts.....	29
7.1.1	General.....	29
7.1.2	Apparatus.....	29
7.1.3	Procedure.....	30
7.1.4	Test report.....	30
7.2	VCC contact.....	30
7.2.1	General.....	30
7.2.2	Apparatus.....	30
7.2.3	Procedure.....	30
7.2.4	Test report.....	31
7.3	I/O contact.....	32
7.3.1	General.....	32
7.3.2	Apparatus.....	32
7.3.3	Procedure.....	32
7.3.4	Test report.....	33
7.4	CLK contact.....	33
7.4.1	General.....	33
7.4.2	Apparatus.....	33
7.4.3	Procedure.....	33
7.4.4	Test report.....	34
7.5	RST contact.....	34
7.5.1	General.....	34
7.5.2	Apparatus.....	35
7.5.3	Procedure.....	35
7.5.4	Test report.....	36
7.6	SPU (C6) contact.....	36
7.7	Deactivation of the contacts.....	36
7.7.1	General.....	36
7.7.2	Apparatus.....	36
7.7.3	Procedure.....	36
7.7.4	Test report.....	36
8	Test methods for logical operations of the IFD.....	37
8.1	Answer to reset.....	37
8.1.1	Card reset (cold reset).....	37
8.1.2	Card reset (warm reset).....	37
8.2	T=0 Protocol.....	38
8.2.1	General.....	38
8.2.2	I/O transmission timing for T=0 protocol.....	38
8.2.3	I/O character repetition for T=0 protocol.....	38
8.2.4	I/O reception timing and error signaling for T=0 protocol.....	39
8.3	T=1 Protocol.....	40
8.3.1	General.....	40
8.3.2	I/O transmission timing for T=1 protocol.....	40
8.3.3	I/O reception timing for T=1 protocol.....	41
8.3.4	IFD Character Waiting Time (CWT) behaviour.....	42
8.3.5	IFD-reaction to card exceeding CWT.....	42
8.3.6	Block Guard Time (BGT).....	43

8.3.7	Block sequencing by the IFD	43
8.3.8	Recovery of a transmission error by the IFD	46
8.3.9	IFSC negotiation	47
8.3.10	Abortion by the card	47
8.4	IFD — Reaction of the IFD to invalid PCBs	48
8.4.1	General	48
8.4.2	Apparatus	48
8.4.3	Procedure	48
8.4.4	Test report	49
Bibliography		50

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by ISO/IEC JTC 1, *Information technology, SC 17, Cards and personal identification*.

This third edition cancels and replaces the second edition (ISO/IEC 10373-3:2010), which has been technically revised. It also incorporates the Technical Corrigendum ISO/IEC 10373-3:2010/Cor 1:2013.

The main changes compared to the previous edition are as follows:

- editorial clarification of scenario 6 (6.3.6.2.3 in the previous edition) with addition of supported PCB values;
- miscellaneous editorial improvement on e.g. symbols, notes and references.

A list of all the parts in the ISO 10373 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Identification cards — Test methods —

Part 3:

Integrated circuit cards with contacts and related interface devices

1 Scope

This document defines test methods for characteristics of integrated circuit cards with contacts and related interface devices according to the definition given in ISO/IEC 7816-3. Each test method is cross-referenced to one or more base standards, which can be ISO/IEC 7810 that defines the information storage technologies employed in identification card applications.

NOTE Criteria for acceptability do not form part of this document but can be found in the International Standards mentioned above.

This document defines test methods which are specific to integrated circuit technology with contacts. ISO/IEC 10373-1 defines test methods which are common to one or more card technologies and other parts of the ISO/IEC 10373 series define other technology-specific tests.

Test methods defined in this document are intended to be performed separately and independently. A given card is not required to pass through all the tests sequentially. The test methods defined in this document are based on ISO/IEC 7816-3.

Conformance of cards and IFDs determined using the test methods defined in this document does not preclude failures in the field. Reliability testing is outside the scope of this document.

This document does not define any test to establish the complete functioning of integrated circuit cards. The test methods require only that the minimum functionality be verified. The minimum functionality is defined as follows.

- Any integrated circuit present in the card continues to show an Answer to Reset response which conforms to the base standard.
- Any contacts associated with any integrated circuit present in the card continue to show electrical resistance which conforms to the base standard.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO/IEC 7816-3:2006, *Identification cards — Integrated circuit cards — Part 3: Cards with contacts — Electrical interface and transmission protocols*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>