ISO/IEC 10373-3:2001-02 (E)

Identification cards - Test methods - Part 3: Integrated circuit(s) cards with contacts and related interface devices

Contents

Page

Foreword vi

1 Scope 1

2 Normative references 1

3 Terms and definitions 2

4 General items applicable to the test methods 3
4.1 Test environment 3
4.2 Pre-conditioning 3
4.3 Default tolerance 3
4.4 Total measurement uncertainty 3
4.5 Conventions for electrical measurements 3
4.6 Apparatus 3
4.6.1 Default ICC-holder, reference axes and default measurement position 3
4.6.2 Apparatus for testing the integrated circuit(s) cards with contacts (ICC-test-apparatus) 5
4.6.3 Apparatus for testing the interface device (IFD-test-apparatus) 11
4.6.4 Test Scenario 17
4.7 Relationship of test methods versus base standard requirements 17

5 Test methods for physical characteristics of ICCs with contacts 21
5.1 Dimension and Location of Contacts 21
5.1.1 Apparatus 21
5.1.2 Procedure 21
5.1.3 Test report 22
5.2 Static electricity 22
5.2.1 Test Report 22
5.3 Electrical surface resistance of contacts 22
5.3.1 Apparatus 22
5.3.2 Procedure 23
5.3.3 Test report 23
5.3.4 Preliminary requirement 23
5.4 Surface profile of contacts 24
5.4.1 Apparatus 24
5.4.2 Procedure 24
5.4.3 Test report 25

6 Test methods for electrical characteristics of ICCs with contacts 25
6.1 VCC contact 25
6.1.1 Apparatus 25
6.1.2 Procedure 25
6.1.3 Test report 26
6.2 I/O contact 27
6.2.1 Apparatus 27
6.2.2 Procedure 27
6.2.3 Test report 29
6.3 CLK contact 29
6.3.1 Apparatus 29
6.3.2 Procedure 29
6.3.3 Test report 31

6.4 RST contact 31
6.4.1 Apparatus 31
6.4.2 Procedure 31
6.4.3 Test report 32
6.5 VPP contact 32

7 Test methods for logical operations of ICCs with contacts 33
7.1 Answer to Reset (ATR) 33
7.1.1 Cold Reset and Answer-to-Reset (ATR) 33
7.1.2 Warm Reset 33
7.1.3 Selection of the operation class A 34
7.2 T=0 Protocol 35
7.2.1 I/O transmission timing for T=0 protocol 35
7.2.2 I/O character repetition for T=0 protocol 36
7.2.3 I/O reception timing and error signaling for T=0 protocol 37
7.3 T=1 Protocol 38
7.3.1 I/O transmission timing for T=1 protocol 38
7.3.2 I/O reception timing for T=1 protocol 39
7.3.3 ICC Character Waiting Time (CWT) behavior 41
7.3.4 ICC-reaction to IFD exceeding character waiting time (CWT) 41
7.3.5 Block Guardtime (BGT) 42
7.3.6 Block sequencing by the ICC 43
7.3.7 Reactions of the ICC to protocol errors 45
7.3.8 Recovery of a transmission error by the ICC 46
7.3.9 Resynchronization 47
7.3.10 IFSD negotiation 48
7.3.11 Abortion by the IFD 49

8 Test methods for physical and electrical characteristics of the IFD 50
8.1 Activation of contacts 50
8.1.1 Apparatus 50
8.1.2 Procedure 50
8.1.3 Test report 51
8.2 VCC contact 51
8.2.1 Apparatus 51
8.2.2 Procedure 51
8.2.3 Test report 53
8.3 I/O contact 53
8.3.1 Apparatus 53
8.3.2 Procedure 53
8.3.3 Test report 55
8.4 CLK contact 55
8.4.1 Apparatus 56
8.4.2 Procedure 56
8.4.3 Test report 58
8.5 RST contact 58
8.5.1 Apparatus 58
8.5.2 Procedure 58
8.5.3 Test report 59
8.6 VPP contact 59
8.7 Deactivation of the contacts 59
8.7.1 Apparatus 60
8.7.2 Procedure 60
8.7.3 Test report 60

9 Test methods for logical operations of the IFD 60
9.1 Answer to Reset (ATR) 60
9.1.1 ICC Reset (cold reset) 60
9.1.2 ICC Reset (warm reset) 61
9.2 T=0 Protocol 61
9.2.1 I/O transmission timing for T=0 protocol 61
9.2.2 I/O character repetition for T=0 protocol 62

9.2.3 I/O reception timing and error signaling for T=0 protocol 63
9.3 T=1 Protocol 65
9.3.1 I/O transmission timing for T=1 protocol 65
9.3.2 I/O reception timing for T=1 protocol 66
9.3.3 IFD Character Waiting Time (CWT) behavior 67
9.3.4 IFD-reaction to ICC exceeding CWT 68
9.3.5 Block Guardtime (BGT) 68
9.3.6 Block sequencing by the IFD 69
9.3.7 Recovery of a transmission error by the IFD 73
9.3.8 IFSC negotiation 73
9.3.9 Abortion by the ICC 74

Annex A (informative) Additional Test Methods 76

A.1 ICC -- Mechanical strength: 3 wheel test 76
A.1.1 Apparatus 76
A.1.2 Method 78
A.1.3 Test Report 79
A.2 IFD -- Reaction of the IFD to invalid PCBs 79
A.2.1 Apparatus 79
A.2.2 Procedure 79
A.2.3 Test report 80