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colour inside

Process management for avionics – Electronic components for aerospace, defence and high performance (ADHP) applications – Part 1: General requirements for high reliability integrated circuits and discrete semiconductors

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CONTENTS

FOREWORD 6
INTRODUCTION 8
1 Scope 9
2 Normative references 9
3 Terms, definitions and abbreviated terms 10
3.1 Terms and definitions 10
3.2 Abbreviated terms 12
4 Technical requirements 15
4.1 General 15
4.1.1 Overview 15
4.1.2 Automotive components 15
4.2 Procedures 15
4.2.1 General 15
4.2.2 Product discontinuance 16
4.2.3 ESD protection during manufacture 16
4.2.4 Specification control 16
4.2.5 Traceability including anti-counterfeit measures 16
4.3 Product or process change notification (PCN) 16
4.3.1 General 16
4.3.2 Notification 17
4.3.3 Notification details 17
4.3.4 Notifiable changes 17
4.4 Shipment controls 17
4.4.1 General 17
4.4.2 Shipping container and date code marking 18
4.4.3 Date code remarking 18
4.4.4 Inner container formation 18
4.4.5 Date code age on delivery 18
4.4.6 ESD marking 18
4.4.7 MSL 18
4.4.8 Lead-free marking 18
4.4.9 Labels 18
4.5 Electrical 19
4.5.1 General 19
4.5.2 Electrical test 19
4.5.3 Electrical parameter assessment 20
4.5.4 SDRAM memories 20
4.5.5 Logic families 20
4.5.6 Power MOSFETs 20
4.5.7 Silicon rectifier diodes 20
4.6 Mechanical 20
4.6.1 General 20
4.6.2 Device marking 20
4.6.3 Small packages 20
4.6.4 Moisture sensitivity 21
4.6.5 Robustness of hermetic seals 21

4.6.6 Termination finishes 21
4.7 Audit capability 21
4.7.1 General 21
4.7.2 Internal quality audits 21
4.7.3 Subcontract manufacturing 22
4.8 Quality assurance 22
4.8.1 General 22
4.8.2 Quality system 22
4.8.3 Sampling plans 22
4.8.4 Failure analysis support 23
4.8.5 Outgoing quality 23
~~4.9 Supplier performance monitoring by the user .....~~
~~4.9.1 General .....~~
~~4.9.2 Lot acceptance .....~~
~~4.9.3 Suspension of deliveries .....~~
~~4.9.4 Loss of approval .....~~
~~4.9.5 AQL figures .....~~
~~4.9.6 100 % screening .....~~
~~4.9.7 Termination determination .....~~
4.9 Qualification 25
4.9.1 General 25
4.9.2 Methodology 25
4.9.3 Test samples 27
4.9.4 Qualification categories 27
4.9.5 Maintenance of qualification standards 27
4.9.6 In-process test results 27
4.9.7 Product monitor results 32
4.9.8 References 32
4.9.9 Qualification report 32
4.9.10 Archiving 32
4.9.11 Qualification by similarity 32
4.9.12 Similarity assessment 32
4.10 Reliability 33
4.10.1 General 33
4.10.2 Operating reliability 33
4.10.3 Failure criteria 33
4.10.4 Corrective action 34
4.10.5 Warranty 34
~~Suspension of certification .....~~
4.10.6 Single event effects (SEEs) 34
4.11 Product monitor 34
4.11.1 General 34
4.11.2 Monitor programme 34
4.11.3 Problem notification 35
4.11.4 Data reporting 35
4.11.5 Samples 35
4.11.6 Corrective action 35
4.11.7 Product monitor results 35
4.11.8 Accumulated test data 35

4.12 Environmental health and safety (EHS) 36
4.12.1 General 36
4.12.2 EHS compliance 36
4.12.3 Device handling 36
4.12.4 Device materials 36
4.13 Shipping containers 36
4.13.1 General 36
4.13.2 ESD requirements 37
4.13.3 Magazine reuse 38
4.13.4 Tubes 38
4.13.5 Trays 38
4.13.6 Tape and reel 39
4.14 Compliance with internal standards 39
Annex A (informative) Test code (TC) information 40
A.1 General 40
A.2 TC1 – Autoclave (~~AC~~ ATC) 40
A.3 TC2 – Bond strength, internal (BS) 40
A.4 TC3 – Die shear strength (DS) 40
A.5 TC4 – Electromigration (EM) 40
A.6 TC5 – Electrostatic discharge (ESD) 41
A.7 TC6 – Electrical test (ET) 41
A.8 TC7 – Electrical distributions (EDs) 41
A.9 TC8 – Flammability (FL) 42
A.10 TC9 – Hot carrier injection (HCI) 42
A.11 TC10 – Hermeticity (HE) 42
A.12 TC11 – High temperature bake (HTB) 42
A.13 TC12 – High temperature blocking bias (HTBB) 43
A.14 TC13 – High temperature gate bias (HTGB) 43
A.15 TC14 – High temperature reverse bias (HTRB) 43
A.16 TC15 – High temperature operating life (HTOL) 43
A.16.1 General 43
A.16.2 Qualification conditions 43
A.16.3 Test results assessment 44
A.16.4 Temperature acceleration factor 44
A.16.5 Supply voltage acceleration factor 45
A.17 TC16 – Latch-up (LU) 45
A.18 TC17 – Lead integrity (LI) 45
A.19 TC18 – Lid torque (LT) 45
A.20 TC19 – Mechanical sequence (MS) 45
A.20.1 General 45
A.20.2 Constant acceleration 46
A.20.3 Vibration (variable frequency) 46
A.20.4 Mechanical shock 46
A.21 TC20 – Marking permanency (MP) 46
A.22 TC21 – Non-volatile memory operating life (NVL) 46
A.23 TC22 – Time dependent dielectric breakdown (oxide integrity) (OI) 47
A.24 TC23 – Package dimensions (PD) 47
A.25 TC24 – Power cycling (PTC) 47
A.26 TC25 – Resistance to solder heat (RSH) 47

A.27 TC26 – Solder preconditioning (PC) 48
A.28 TC27 – Solderability (SD) 48
A.29 TC28 – Soft error rate (SER) 48
A.30 TC29 – Steady state operating life (SSOL) 49
A.31 TC30 – Temperature cycling (~~TP~~ TPC) 49
A.32 TC31 – Temperature humidity reverse bias (THRB) 50
A.33 TC32 – Temperature humidity bias (THB or HAST) 50
A.34 TC33 – Terminal strength (TS) 50
A.35 TC34 – Thermal resistance (thermal impedance) (TR) 50
A.36 TC35 – Visual inspection (VI) 51
A.36.1 TC35a – External visual inspection 51
A.36.2 TC35b – Internal visual inspection 51
A.37 TC36 – Water vapour content, internal (WV) 52
A.38 TC37 – X-ray inspection (XR) 52
A.39 TC38 – Moisture sensitivity level (MSL) 52
A.40 TC39 – Ball shear test (BST) 52
A.41 TC40 – Negative bias temperature instability (NBTI) 52
A.42 TC41 – Accelerated tin whisker test 53
~~Annex B (informative) Cross-reference to STACK Specification S/0001 revision 14 .....~~
Annex B (informative) Typical automotive component requirements 61
Annex C (informative) Requirement matrix for IEC TS 62686-1 verification 63
Bibliography 87

Table 1 – Label requirements 19
Table 2 – Internal quality audit requirements 22
Table 3 – Outgoing quality 23
~~Table 4 – Incoming test .....~~
Table 4 – Technology/family qualification and device qualification *(1 of 3)* 29
Table 5 – Product monitor tests 36
Table A.1 – Conditions of the DC over the voltage stress method of JP001.01 or IEC 62416 test 42
Table A.2 – Examples of temperature acceleration factors 44
Table A.3 – Dip and look test references 48
Table A.4 – Parameter values for consideration 49
Table A.5 – Test conditions 49
Table A.6 – Test methods 50
Table C.1 – Requirement matrix 63

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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PROCESS MANAGEMENT FOR AVIONICS – ELECTRONIC COMPONENTS FOR AEROSPACE, DEFENCE AND HIGH PERFORMANCE (ADHP) APPLICATIONS –

Part 1: General requirements for high reliability integrated circuits and discrete semiconductors

FOREWORD

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- the required support cannot be obtained for the publication of an International Standard, despite repeated efforts, or
- the subject is still under technical development or where, for any other reason, there is the future but no immediate possibility of an agreement on an International Standard.

Technical Specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62686-1, which is a Technical Specification, has been prepared by IEC technical committee 107: Process management for avionics.

This third edition cancels and replaces the second edition, published in 2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) update related to obsolescence of STACK Specification S/0001 revision 14 notice 3;
b) addition of alternative automotive methods of compliance and revision of Annex B initially related to cross-reference to STACK Specification S/0001;
c) addition of an Annex C to include a requirement matrix for IEC TS 62686-1 verification.

The text of this Technical Specificationis based on the following documents:

Draft TS	Report on voting
107/349/DTS	107/361A/RVDTS 107/361/RVDTS

Full information on the voting for the approval of this Technical Specification can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62686 series, published under the general title *Process management for avionics – Electronic components for aerospace, defence and high performance (ADHP) applications,* can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

This part of IEC 62686 includes all the requirements of the now obsolete STACK Specification S/0001 revision 14 notice 3 and also contains revisions for alternative ~~IEC~~ strategies using for example automotive standards together with the option of using various qualification test methods and additional test information.

This document complements IEC TS 62564-1 which is used for ADHP applications when additional manufacturers' data is required beyond the publicly available ~~manufacturer~~ original component manufacturers' published data sheets (for example when additional thermal performance data is required for thermally challenging applications or when additional verification data ~~are~~ is needed, for example to comply with the requirements of RTCA DO-254/EUROCAE ED-80 for complex components for flight critical applications, etc.).

This document can also be used to comply with the typical qualification requirements of IEC TS 62564-1. Further guidance is given in IEC ~~TS~~ 62239-1.

NOTE ~~With the adoption of the STACK Specification S/0001 revision 14 notice 3 it will be possible for all~~ Existing STACK certified manufacturers ~~to~~ can be audited by IECQ under the new STACK-IECQ joint venture or alternatively to the new IECQ automotive scheme.

PROCESS MANAGEMENT FOR AVIONICS – ELECTRONIC COMPONENTS FOR AEROSPACE, DEFENCE AND HIGH PERFORMANCE (ADHP) APPLICATIONS –

Part 1: General requirements for high reliability integrated circuits and discrete semiconductors

1 Scope

This part of IEC 62686, which is a Technical Specification, defines the minimum requirements for general purpose "off the shelf" COTS (commercial off-the-shelf) integrated circuits and discrete semiconductors for ADHP (aerospace, defence and high performance) applications.

This document applies to all components that can be operated in ADHP applications within the manufacturers' publicly available data sheet limits in conjunction with IEC ~~TS~~ 62239-1. It ~~may~~ can be used by other high performance and high reliability industries, at their discretion.

ADHP application requirements ~~may~~ are not necessarily ~~be~~ fulfilled by this document alone. ADHP OEMs (original equipment manufacturers) ~~may~~ might need to consider redesigning their products or conducting further testing to verify suitability in ADHP applications using their IEC ~~TS~~ 62239-1 ECMP procedures. Alternatively, a component in accordance with IEC TS 62564-1 ~~may~~ can be more suitable.

NOTE Component qualification and outgoing quality discussed herein do not addres component atmospheric radations SEE effects per IEC 62396-1.

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 9001, *Quality management systems – Requirements*~~

~~ISO TS 16949, *Quality management systems – Particular requirements for the application of ISO 9001:2008 for automotive production and relevant service part organizations*~~

ANSI/EIA-556, *Outer Shipping Container Bar Code Label Standard*

ANSI/ESD S541, *Packaging Materials Standards for ESD Sensitive Items*

~~AS/EN/JISQ 9100, *Aerospace series – Quality management systems – Requirements for aviation, space and defense organisations*~~

~~IPC/JEDEC J-STD-020, *Moisture/Reflow Sensitivity Classification for Nonhermetic Solid State Surface Mount Devices*~~

~~IPC/JEDEC J-STD-033, *Handling, Packing, Shipping and Use of Moisture/Reflow Sensitive Surface Mount Devices*~~

IPC/JEDEC J-STD-609, *Marking and Labeling of Components, PCBs and PCBAs to Identify Lead (Pb), Lead-Free (Pb-Free) and Other Attributes*

JEDEC/IPC/ECIA J-STD-048, *Notification Standard for Product Discontinuance*

JEP130, *Guidelines for Packing and Labeling of Integrated Circuits in Unit Container Packing*

JESD471, *Symbol and Label for Electrostatic Sensitive Devices*

~~TL 9000, *Quality management system*[1]~~

~~JESD46~~ J-STD-046, *Customer Notification of Product/Process Changes by Solid-State Suppliers*

~~[1] For the telecommunications industry.~~

IEC TS 62686-1

Edition 3.0 2020-04

TECHNICAL SPECIFICATION

Process management for avionics – Electronic components for aerospace, defence and high performance (ADHP) applications –
Part 1: General requirements for high reliability integrated circuits and discrete semiconductors



IEC TS 62686-1:2020-04(en)

CONTENTS

FOREWORD 6
INTRODUCTION 8
1 Scope 9
2 Normative references 9
3 Terms, definitions and abbreviated terms 10
3.1 Terms and definitions 10
3.2 Abbreviated terms 12
4 Technical requirements 14
4.1 General 14
4.1.1 Overview 14
4.1.2 Automotive components 15
4.2 Procedures 15
4.2.1 General 15
4.2.2 Product discontinuance 15
4.2.3 ESD protection during manufacture 15
4.2.4 Specification control 16
4.2.5 Traceability including anti-counterfeit measures 16
4.3 Product or process change notification (PCN) 16
4.3.1 General 16
4.3.2 Notification 16
4.3.3 Notification details 16
4.3.4 Notifiable changes 17
4.4 Shipment controls 17
4.4.1 General 17
4.4.2 Shipping container and date code marking 17
4.4.3 Date code remarking 17
4.4.4 Inner container formation 17
4.4.5 Date code age on delivery 18
4.4.6 ESD marking 18
4.4.7 MSL 18
4.4.8 Lead-free marking 18
4.4.9 Labels 18
4.5 Electrical 19
4.5.1 General 19
4.5.2 Electrical test 19
4.5.3 Electrical parameter assessment 19
4.5.4 SDRAM memories 20
4.5.5 Logic families 20
4.5.6 Power MOSFETs 20
4.5.7 Silicon rectifier diodes 20
4.6 Mechanical 20
4.6.1 General 20
4.6.2 Device marking 20
4.6.3 Small packages 20
4.6.4 Moisture sensitivity 20
4.6.5 Robustness of hermetic seals 21

4.6.6 Termination finishes 21
4.7 Audit capability 21
4.7.1 General 21
4.7.2 Internal quality audits 21
4.7.3 Subcontract manufacturing 22
4.8 Quality assurance 22
4.8.1 General 22
4.8.2 Quality system 22
4.8.3 Sampling plans 22
4.8.4 Failure analysis support 22
4.8.5 Outgoing quality 22
4.9 Qualification 23
4.9.1 General 23
4.9.2 Methodology 24
4.9.3 Test samples 25
4.9.4 Qualification categories 26
4.9.5 Maintenance of qualification standard 26
4.9.6 In-process test results 26
4.9.7 Product monitor results 30
4.9.8 References 30
4.9.9 Qualification report 30
4.9.10 Archiving 30
4.9.11 Qualification by similarity 30
4.9.12 Similarity assessment 30
4.10 Reliability 31
4.10.1 General 31
4.10.2 Operating reliability 31
4.10.3 Failure criteria 31
4.10.4 Corrective action 32
4.10.5 Warranty 32
4.10.6 Single event effects (SEEs) 32
4.11 Product monitor 32
4.11.1 General 32
4.11.2 Monitor programme 32
4.11.3 Problem notification 32
4.11.4 Data reporting 33
4.11.5 Samples 33
4.11.6 Corrective action 33
4.11.7 Product monitor results 33
4.11.8 Accumulated test data 33
4.12 Environmental health and safety (EHS) 34
4.12.1 General 34
4.12.2 EHS compliance 34
4.12.3 Device handling 34
4.12.4 Device materials 34
4.13 Shipping containers 34
4.13.1 General 34
4.13.2 ESD requirements 34
4.13.3 Magazine reuse 36

4.13.4 Tubes 36
4.13.5 Trays 36
4.13.6 Tape and reel 37
4.14 Compliance with internal standards 37
Annex A (informative) Test code (TC) information 38
A.1 General 38
A.2 TC1 – Autoclave (ATC) 38
A.3 TC2 – Bond strength, internal (BS) 38
A.4 TC3 – Die shear strength (DS) 38
A.5 TC4 – Electromigration (EM) 38
A.6 TC5 – Electrostatic discharge (ESD) 39
A.7 TC6 – Electrical test (ET) 39
A.8 TC7 – Electrical distributions (EDs) 39
A.9 TC8 – Flammability (FL) 40
A.10 TC9 – Hot carrier injection (HCI) 40
A.11 TC10 – Hermeticity (HE) 40
A.12 TC11 – High temperature bake (HTB) 40
A.13 TC12 – High temperature blocking bias (HTBB) 41
A.14 TC13 – High temperature gate bias (HTGB) 41
A.15 TC14 – High temperature reverse bias (HTRB) 41
A.16 TC15 – High temperature operating life (HTOL) 41
A.16.1 General 41
A.16.2 Qualification conditions 41
A.16.3 Test results assessment 42
A.16.4 Temperature acceleration factor 42
A.16.5 Supply voltage acceleration factor 43
A.17 TC16 – Latch-up (LU) 43
A.18 TC17 – Lead integrity (LI) 43
A.19 TC18 – Lid torque (LT) 43
A.20 TC19 – Mechanical sequence (MS) 43
A.20.1 General 43
A.20.2 Constant acceleration 44
A.20.3 Vibration (variable frequency) 44
A.20.4 Mechanical shock 44
A.21 TC20 – Marking permanency (MP) 44
A.22 TC21 – Non-volatile memory operating life (NVL) 44
A.23 TC22 – Time dependent dielectric breakdown (oxide integrity) (OI) 45
A.24 TC23 – Package dimensions (PD) 45
A.25 TC24 – Power cycling (PTC) 45
A.26 TC25 – Resistance to solder heat (RSH) 45
A.27 TC26 – Solder preconditioning (PC) 46
A.28 TC27 – Solderability (SD) 46
A.29 TC28 – Soft error rate (SER) 46
A.30 TC29 – Steady state operating life (SSOL) 47
A.31 TC30 – Temperature cycling (TPC) 47
A.32 TC31 – Temperature humidity reverse bias (THRB) 48
A.33 TC32 – Temperature humidity bias (THB or HAST) 48
A.34 TC33 – Terminal strength (TS) 48
A.35 TC34 – Thermal resistance (thermal impedance) (TR) 48

A.36 TC35 – Visual inspection (VI) 49
A.36.1 TC35a – External visual inspection 49
A.36.2 TC35b – Internal visual inspection 49
A.37 TC36 – Water vapour content, internal (WV) 50
A.38 TC37 – X-ray inspection (XR) 50
A.39 TC38 – Moisture sensitivity level (MSL) 50
A.40 TC39 – Ball shear test (BST) 50
A.41 TC40 – Negative bias temperature instability (NBTI) 50
A.42 TC41 – Accelerated tin whisker test 51
Annex B (informative) Typical automotive component requirements 52
Annex C (informative) Requirement matrix for IEC TS 62686-1 verification 54
Bibliography 78

Table 1 – Label requirements 19
Table 2 – Internal quality audit requirements 21
Table 3 – Outgoing quality 23
Table 4 – Technology/family qualification and device qualification *(1 of 3)* 27
Table 5 – Product monitor tests 34
Table A.1 – Conditions of the DC over voltage stress method of JP001.01 or IEC 62416 test 40
Table A.2 – Examples of temperature acceleration factors 42
Table A.3 – Dip and look test references 46
Table A.4 – Parameter values for consideration 47
Table A.5 – Test conditions 47
Table A.6 – Test methods 48
Table C.1 – Requirement matrix 54

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This part of IEC 62686 includes all the requirements of the now obsolete STACK Specification S/0001 revision 14 notice 3 and also contains revisions for alternative strategies using for example automotive standards together with the option of using various qualification test methods and additional test information.

This document complements IEC TS 62564-1 which is used for ADHP applications when additional manufacturers' data is required beyond the publicly available original component manufacturers' published data sheets (for example when additional thermal performance data is required for thermally challenging applications or when additional verification data is needed, for example to comply with the requirements of RTCA DO-254/EUROCAE ED-80 for complex components for flight critical applications, etc.).

This document can also be used to comply with the typical qualification requirements of IEC TS 62564-1. Further guidance is given in IEC 62239-1.

NOTE Existing STACK certified manufacturers can be audited by IECQ under the new STACK-IECQ joint venture or alternatively to the new IECQ automotive scheme.

PROCESS MANAGEMENT FOR AVIONICS – ELECTRONIC COMPONENTS FOR AEROSPACE, DEFENCE AND HIGH PERFORMANCE (ADHP) APPLICATIONS –

Part 1: General requirements for high reliability integrated circuits and discrete semiconductors

1 Scope

This part of IEC 62686, which is a Technical Specification, defines the minimum requirements for general purpose "off the shelf" COTS (commercial off-the-shelf) integrated circuits and discrete semiconductors for ADHP (aerospace, defence and high performance) applications.

This document applies to all components that can be operated in ADHP applications within the manufacturers' publicly available data sheet limits in conjunction with IEC 62239-1. It can be used by other high performance and high reliability industries, at their discretion.

ADHP application requirements are not necessarily fulfilled by this document alone. ADHP OEMs (original equipment manufacturers) might need to consider redesigning their products or conducting further testing to verify suitability in ADHP applications using their IEC 62239-1 ECMP procedures. Alternatively, a component in accordance with IEC TS 62564-1 can be more suitable.

NOTE Component qualification and outgoing quality discussed herein do not addres component atmospheric radations SEE effects per IEC 62396-1.

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.

ANSI/EIA-556*, Outer Shipping Container Bar Code Label Standard*

ANSI/ESD S541, *Packaging Materials Standards for ESD Sensitive Items*

IPC/JEDEC J-STD-609, *Marking and Labeling of Components, PCBs and PCBAs to Identify Lead (Pb), Lead-Free (Pb-Free) and Other Attributes*

JEDEC/IPC/ECIA J-STD-048, *Notification Standard for Product Discontinuance*

JEP130, *Guidelines for Packing and Labeling of Integrated Circuits in Unit Container Packing*

JESD471, *Symbol and Label for Electrostatic Sensitive Devices*

J-STD-046, *Customer Notification of Product/Process Changes by Solid-State Suppliers*