

JEDEC MANUAL

JEDEC COMMITTEE SCOPE MANUAL

JM18T (Revision of JM18S, April 2018)

JUNE 2022

JEDEC SOLID STATE TECHNOLOGY ASSOCIATION



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JEDEC COMMITTEE SCOPE MANUAL

(From JCB-96-73, JCB-98-94, JCB-98-97, JCB-98-102, JCB-98-105, JCB-98-107, JCB-99-03, JCB-00-19, JCB-00-60, JCB-01-61, JCB-01-86, JCB-02-137, JCB-04-65, JCB-04-91, JCB-05-130, JCB-05-132, JCB-06-31, JCB-06-58, JCB-07-26A, JCB-07-54, JCB-07-55, JCB-07-63, JCB-07-71, JCB-07-75, JCB-08-06, JCB-08-08, JCB-08-15, JCB-08-31, JCB-08-38, JCB-08-64, JCB-08-89, JCB-08-90, JCB-10-87, JCB-11-69, JCB-11-70, JCB-11-83, JCB-12-28, JCB-12-30, JCB-14-42, JCB-15-07, JCB-15-50, JCB-17-26, JCB-18-17, JCB-21-19, JCB-21-45, and JCB-22-04 formulated by the JEDEC Solid State Technology Association.)

1 Introduction

JEDEC is an independent incorporated Association governed by a Board of Directors (Board). The Association facilitates standardization within the solid-state, microelectronics, and associated industries, and other related activities through special purpose committees.

The Association and its members are committed to foster open competition in the development of products and services.

The scope of JEDEC includes but is not necessarily limited to areas relating to (1) solid state devices, (2) integrated circuits, (3) electronic modules and associated electronic components, and (4) various manufacturing functions/processes.

The governing body of JEDEC is the JEDEC Board of Directors which is comprised of individual Directors (or their alternates) representing JEDEC member companies. The JEDEC Board of Directors is responsible for establishing appropriate committees to conduct its standardization activities. These committees are assigned either service or product responsibilities.

Service committees address a specific subject that may impact several product types. Activities include package outlines, terms and definitions, government standards, and international standards. Service committees establish liaison with other JEDEC committees and with agencies outside JEDEC. For service committees, the first digit of the two-digit committee designator is the number 1.

Product committees address a specific type product. Examples include test methods, device specification format and minimum content, pinouts, interface requirements, and applications. Product committees establish liaison with other JEDEC committees and with agencies outside JEDEC. For product committees, the first digit of the two-digit committee designator is the number 2 or higher.

It is a primary function of each committee to propose JEDEC Standards and to formulate policies, procedures, formats, and other documents that are then submitted to the Board of Directors for action or approval. This publication identifies the service and product committees established by the Board of Directors and defines their scopes.

For more information about JEDEC policies, refer to JM21: JEDEC Manual of Organization and Procedure.

2 Service committees

JC-11 Committee: Mechanical Standardization

Activities within JC-11's scope cover all aspects of the mechanical design, integration, interoperability and standardization of all devices covered within JEDEC. These activities include generating design guidelines, standardized measuring methods for mechanical features, and standard- or registration-type mechanical outlines for microelectronic packages and assemblies, corresponding socket outlines, mechanical, environmental and ergonomic performance specifications, footprints and land patterns, and development of designators for semiconductor device packages. To accomplish these functions, the committee provides technical support and design recommendations to establish and define parameters that ensure mechanical interchangeability of parts. In addition, JC-11's includes standardization of the mechanical definition of all electronic, electrical, and hardware components to enable process efficiencies throughout the electronic design and manufacturing process and includes but is not limited to the standardization of 3D models. JC-11 is further responsible for a parametric XML format to communicate all electronic, electrical, and hardware part model characteristics to enable these efficiencies.

Other items, such as the materials, surface finish, and temper, that may affect the form, fit, function, and/or reliability of the interfaces of the product are also included. These parts are limited to the following: discrete, monolithic, multichip, and hybrid circuits; microcircuit modules; intermediate package carriers and containers; uncased devices; and certain package-related assembly or fabrication items. The committee maintains liaison with other JEDEC committees and outside organizations engaged in activities related to similar mechanical standardization work.

- **JC-11.1 Subcommittee: Editorial Practices and Procedures**

Reviews, corrects, and gives editorial approval for distribution and publication of ballots and outlines.

- **JC-11.2 Subcommittee: Design Requirements**

Establish guidelines and methods for obtaining the desired dimensions and tolerancing for various classes of packages and related items, (JEDEC Standard No. 95-1, *Design Handbook*.), and develops designators for semiconductor-device packages, (JEDEC Standard No. 30, Descriptive Designation System for Semiconductor-Device Packages.)

- **JC-11.4 Subcommittee: Uncased Devices**

Prepare mechanical outlines for uncased devices including, but not limited to, the following configurations: uncased discrete or integrated circuits, flip chip, beam lead, and tape mounted, and chip scale in general.

- **JC-11.5 Subcommittee: Package Interface (Inactive)**

Prepares mechanical outlines for device test and transport mediums such as test carriers, matrix trays and shipping tubes, test sockets, and contactors.

2 Service committees (cont'd)

JC-11 Committee: Mechanical (Package Outlines) Standardization (cont'd)

- **JC-11.7 Subcommittee: IEC Interface**

Coordinates with the International Electrotechnical Commission (IEC) Subcommittee 47D on work affecting mechanical outlines.

Reference information only:

IEC SC47D: Mechanical standardization of semiconductor devices

- **WG-1 — Package outlines**

Tasks include the generation of outline drawings to ensure mechanical interchangeability, automatic handling, and mounting.

- **WG-2 — Terms, definitions, practices, and procedures**

Tasks include the generation, coordination, and review of terms, definitions, and symbols. In addition, the working group establishes drawing formats and methods of dimensioning and tolerancing.

- **JC-11.10 Subcommittee: Microelectronic Ceramic Packages**

Prepare mechanical outlines for ceramic packages.

- **JC-11.11 Subcommittee: Microelectronic Plastic Packages**

Prepare mechanical outlines for plastic packages.

- **JC-11.13 Subcommittee: Gauges and Tools for Semiconductor Packages and Related Parts (Inactive)**

Specifies mechanical measuring methods, mechanical gauges, fixtures, and overlays that are recommended for use in verifying the dimensions of uncased devices, semiconductor packages, and package interface media.

- **JC-11.14 Subcommittee: Microelectronic Assemblies**

Prepare mechanical outlines for assemblies of microelectronic packages.

2 Service committees (cont'd)

JC-13 Committee: Government Liaison

JC-13 Committee is responsible for standardizing quality and reliability methodologies for solid state products used in military, space, and other environments requiring special-use condition capabilities beyond standard commercial practices. This includes long-term reliability and/or special screening requirements.

Implementation:

The purpose of the JC-13 Committee is to provide the member companies and their customers with uniform, cost-effective, proven, customer-accepted methodologies for specifying and evaluating special-use products, with the end goal of enhancing the performance and reliability of those products. Activities within the JC-13 Committee include the development, coordination, and maintenance of standards documents regarding product quality and reliability, validation systems, and process management. The committee also contributes to similar and related documents that are generated and maintained by other organizations. To accomplish this charter, the committee maintains liaisons with customers, other JEDEC committees, government agencies, and interested parties that have special application needs.

- **JC-13.1 Subcommittee: Discrete Devices**

Provide technical support and recommendations to the Department of Defense (DoD) concerning environmental and electrical test methods and procedures for discrete solid state electronic components. This subcommittee also develops quality assurance programs and methods.

- **JC-13.2 Subcommittee: Microelectronic Devices**

Provide technical support and recommendations to the U.S. Government and Space agencies concerning electrical, environmental, and quality and reliability assurance test methods for microelectronic devices. Members of the subcommittee contribute technical expertise in quality control and reliability engineering, environmental and simulated lifetesting, and electronic design and wafer fabrication, assembly, testing techniques.

- **JC-13.4 Subcommittee: Radiation Hardness: Assurance and Characterization**

Maintain liaison between component manufacturers, users, and government agencies on all issues related to the radiation hardness assurance and characterization of solid state devices. All considerations of specifications, standards, methods of testing, and other technical issues related to the behavior of solid state devices in a radiation environment are within the scope of this subcommittee. The subcommittee promotes uniform standards, methods, and specifications acceptable to manufacturers, users, and government agencies through the solicitation of technical help and advice from appropriate experts. The subcommittee provides a forum where manufacturers' capabilities can be discussed.

2 Service committees (cont'd)

JC-13 Committee: Government Liaison (cont'd)

- **JC-13.5 Subcommittee: Hybrid, RF/Microwave, and MCM Technology**

Provide technical support and develops standards concerning hybrid microcircuits, rf/microwave, and multi-chip module (MCM) technologies for commercial, industrial, military, and space applications. Activities also include the generation of terms and definitions, review of specifications, establishment of new specification criteria, and maintenance of existing criteria relating to hybrid, rf/microwave, and MCM technologies. To accomplish these functions, the subcommittee maintains liaison with and utilizes technical information from other JEDEC committees, government agencies, industry, various professional organizations, participating members, and guests.

- **JC-13.7 Subcommittee: New Technology Evaluation and Method Development**

Provide technical evaluation, quality and reliability assurance, and screening/qualification test method development for new technologies with respect to rugged or harsh environments for new or emerging electronic devices for use in Military, Aerospace, Space, or other special use applications.

JC-14 Committee: Quality and Reliability of Solid State Devices and Associated Microelectronic Products

The JC-14 Committee is responsible for standardizing quality, reliability, and qualification methodologies for solid state devices and associated microelectronics products and the constituent components of each used in commercial applications such as computers, automobiles, telecommunications equipment, consumer electronics, etc. The committee develops reliability test methods and standards for quality management systems for commercial and other applications of solid state devices and associated microelectronics products and the constituent components of each. The committee also develops standards for board-level reliability of solid state devices and associated microelectronics products used in commercial equipment.

Implementation:

The purpose of the JC-14 Committee is to utilize relevant information and expertise from available sources, develop objectives and goals for measuring and improving quality and reliability, and to promote better communications between and within supplier/user communities. The committee is comprised of both suppliers and users and furnishes a forum where concerns of the industry for solid state devices and associated microelectronics products and the constituent components of each, regarding quality and reliability issues can be resolved. The committee maintains liaisons with other JEDEC committees whose tasks are related to quality and reliability issues. In addition, the committee coordinates activities with other standards organizations such as IPC, IEC, and JEITA to help develop industry and worldwide standardization.

2 Service committees (cont'd)

JC-14 Committee: Quality and Reliability of Solid State Devices and Associated Microelectronic Products (cont'd)

- **JC-14.1 Subcommittee: Reliability Test Methods for Packaged Devices**

Establish uniform methods and procedures for evaluating the reliability of packaged solid state devices. The subcommittee develops and publishes test methods for determining the reliability of packaged devices and for establishing the physical, electrical, mechanical, and environmental conditions under which these packaged devices are to be tested. The subcommittee is comprised of both suppliers and users and furnishes a forum where concerns of the industry for solid state device test conventions can be resolved. It fulfills this role in cooperation with other JEDEC committees that specify electrical and/or mechanical conditions.

- **JC-14.2 Subcommittee: Wafer-Level Reliability**

Generates, reviews and establishes specifications and standards relating to the wafer-level reliability or wear-out assessment of semiconductor devices. All considerations of terms, definitions, specifications, standards, methods of testing, and other technical issues relating to wafer level reliability and wear-out assessment lie within the scope of the subcommittee. To accomplish these functions the subcommittee maintains liaisons with and utilizes information and help from other groups and technical experts. The subcommittee also provides a forum for the discussion of wafer-level and wear-out reliability assessment.

- **JC-14.3 Subcommittee: Silicon Devices Reliability Qualification and Monitoring**

Responsible for establishing standards and procedures for evaluating and reporting the reliability of solid state devices and sub assemblies used in commercial applications. This includes, but is not limited to, qualification, monitoring, and field reliability.

- **JC-14.4 Subcommittee: Quality Processes and Methods**

Develops, publishes, and maintains standards and publications of quality management systems, processes, and methods as they pertain to solid state devices and associated microelectronics products and the constituent components of each.

The committee maintains liaisons with other JEDEC committees whose tasks are related to quality issues. The subcommittee is comprised of supplier and **user** representatives, and coordinates efforts with other organizations to minimize redundant standards development.

2 Service committees (cont'd)

JC-14 Committee: Quality and Reliability of Solid State Devices and Associated Microelectronic Products (cont'd)

- **JC-14.6 Subcommittee: Failure Analysis (Inactive)**

Establishes failure analysis standards and procedures that will improve understanding between customers and manufacturers and will benefit the industry through reducing analysis time and improving success rate. The subcommittee maintains close liaisons with the other JC-14 quality and reliability committees, as well as with outside organizations engaged in activities related to standardization work that may affect decisions or actions. It works to assure that its actions are widely acceptable, through the use of fair and equitable procedures. It manages its affairs so that its efforts remain productive and current with industry needs.

- **JC-14.7 Subcommittee: Gallium Arsenide Reliability and Quality Standards**

The subcommittee is responsible for developing and establishing industry guidelines and standards for discrete devices and integrated circuits (including monolithic microwave integrated circuits, MMICs), that employ semiconductor technologies used in radio frequency (RF), microwave and millimeter wave (mmW) amplification and signal conditioning applications such as radar, satellite communications and 5G and beyond. The scope focuses on reliability verification and qualification procedures, DC and RF stress/test methods and measurement techniques as well as unique packaging reliability aspects. In addition to standardization development, the subcommittee may sponsor workshops and develop databases.

Expected task groups resulting from the change in scope; not to be included in the JM18 scope.

Activities include coordination of task groups that will be formed as demand merits, by technology (such as GaAs, GaN, InP, SiGe, RF-CMOS, etc.) and by RF-specific packaging technology (air-cavity, glass, plastic, etc.). The task groups are responsible for the development of draft documents (guidelines, standards, etc.) to be proposed to JC-14.7, which will place the documents into vote by the JC-14.7 membership. Activities also include cataloging and consideration of mission profiles, and formulation of terms, definitions, and symbols for the devices defined above.

JC-15 Committee: Thermal Characterization Techniques for Semiconductor Packages

Activities within this committee's scope include the standardization of thermal characterization techniques, both testing and modeling, for electronic packages, components, and materials for semiconductor devices. These standards will satisfy the following criteria:

- These standards shall be meaningful, consistent, and shall be proven to be scientifically sound.
- These standards will provide a common means of comparison of thermal phenomena for users of microelectronic packaging.

The committee develops testing standards for semiconductor packages that include: Related terms and definitions, Test methods, Test conditions, Test environmental conditions, Test parameters for modeling and modeling tools, and Specific test methodology (including calibration of measurement tools). The committee also develops modeling standards for semiconductor packages that include: Related terms and definitions, Neutral file formats for the exchange of thermal modeling parameters, Modeling processes, Modeling validation processes and reporting requirements, and Experimental validation methods. Maintains close liaisons with other JEDEC committees as well as other industry-wide activities and assures that the Committee's work remains productive and current to meet industry needs.

JC-16 Committee: Interface Technology

The activities within JC-16's scope include the specification of power supply voltage levels for digital integrated circuits and the definition of electrical interfaces between the components of a system. The committee scope further encompasses interface protocols, modeling, simulation, testing environments, and verification. JC-16 also hosts efforts on operating environment specifications that are common to JC-40, JC-42, and JC-45. The committee maintains a liaison with other JEDEC committees and appropriate outside organizations, both in formulating standards and in promoting wide acceptance of the committee's activities.

NOTE No standards work requiring an electrical interface can move forward without first having an endorsement from JC-16, and not without having a JC-11 outline number assigned. (JEDEC BoD decision 08/07)

3 Product committees

JC-40 Committee: Digital Logic

The products within JC-40's scope include digital integrated circuits without regard to their fabrication technology. The committee develops the definition of test parameters and their methods of measurement, and registration formats to promote standardization of type designations. To accomplish these functions, the committee cooperates with other JEDEC committees and organizations on matters of terms and definitions, mechanical standardization, international standardization, and government liaison. The committee also maintains liaisons with user organizations to promote wide acceptance of the committee's output.

- **JC-40.1 Subcommittee: Digital Logic Families and Applications**

The products within the scope of JC-40.1 include all standard family logic devices, with the exception of products that are primarily intended for clock distribution. Subcommittee activities include the standardization of data sheets, applications, test procedures, emulation environments, and package pin-outs for family logic products.

- **JC-40.4 Subcommittee: Registered and Fully Buffered Memory Support Logic**

The products within JC-40.4 include buffering devices, defined for use on Fully Buffered DIMM or other universal applications.

- **JC-40.5 Subcommittee: Logic Validation and Verification**

JC-40.5 is responsible for test requirements and methodologies for logic components, including test boards/fixtures to verify conformance to specification requirements.

3 Product committees (cont'd)

JC-42 Committee: Solid State Memories

The products within JC-42's scope include all memory integrated circuits and programmable logic devices, whether static or dynamic, without regard to their fabrication technology or application. Examples include large static and dynamic RAMs, ROMs, EEPROMs, and PLDs. Activities include the development of technical information and standards pertaining to pinouts, operational characteristics including reading and writing algorithms, test parameters, characterization, and registration formats. The committee maintains liaisons with other JEDEC committees and outside organizations to promote wide acceptance of the committee's actions. The JC-42 Committee is comprised of the following four subcommittees:

- **JC-42.1 Subcommittee: Graphic RAMs (GDDRx)**

The subcommittee is responsible for developing standards and compliance for all memory technologies in solder-down applications where maximizing signaling data rate to achieve performance is the primary objective. The proposed documents include but are not limited to specifications, outlines, test methods and procedures. The documents will be developed with the expertise and approval of related JEDEC committees as well as with external standards organizations when needed to address architectural, electrical or mechanical related aspects of the standards

- **JC-42.2 Subcommittee: High Bandwidth Memory (HBM)**

The subcommittee is responsible for developing standards and compliance for all memory technologies where maximizing performance per area is a primary objective. Solutions are anticipated to require high pin counts and advanced packaging and test solutions to enable SOC integration. The proposed documents include but are not limited to specifications, outlines, test methods and procedures. The documents will be developed with the expertise and approval of related JEDEC committees as well as with external standards organizations when needed to address architectural, electrical or mechanical related aspects of the standards.

- **JC-42.3 Subcommittee: Dynamic RAMs (DDRx)**

The subcommittee is responsible for developing standards for DRAM memory technologies, where maximizing performance and capacity is the primary objective. Standards developed in this subcommittee will be closely collaborated with of committees that mostly focus on developing digital logic devices, DRAM modules, mechanical outlines of raw cards, or power devices. Final products will be in the form of either memory modul or individual component. Targeted applications include, but not limited to, servers, workstations, desktops, and laptops.

- **JC-42.3B Letter Committee on Functions, Features, and Pinouts**

Responsible for developing function and feature standards for all JC-42.3 products.

- **JC-42.3C Letter Committee on DRAM Parametrics**

Responsible for developing timing and parametric standards for all JC-42.3 products.

- **JC-42.4 Subcommittee: Nonvolatile Memory Devices**

The subcommittee is responsible for developing standards for nonvolatile data storage class devices (NVM) including but not limited to NOR Flash, NAND Flash, and Serial NVM.

- **JC-42.5 Subcommittee: Emerging and Alternative Memory**

The subcommittee is responsible for investigating future memory technologies and future solutions. The responsibilities include researching new memory technologies, developing protocols and compliance standards and exploring system level solutions. New technologies include but are not limited to emerging memory and smart memory technologies. Protocols and compliance standards exclude protocols developed in other JC-42 subcommittees. System level solution topics include but are not limited to security and data integrity.

- **JC-42.6 Subcommittee: Low Power Memories**

Subcommittee has the responsibility for developing standards for RAM and NVM products where minimizing power is the primary objective. Examples include compatible execute-inplace style bus LPDRAM, and Nonvolatile devices primarily for hand held battery powered applications including cell phones, PDAs, etc.

3 Product committees (cont'd)

JC-45 Committee: DRAM Modules

The scope of JC-45 is to develop standards for modules, cards, and socket interfaces. Memory technology is primarily concentrating on, but not limited to, DRAM technology. These standards are to address architectural, electrical, test, and SPD issues relating to memory design and manufacturing for commercial applications.

NOTE Memory module is defined as a single or multiple PCBs that predominantly include multiple memory, logic, and passive devices in a planar or 3D layout for use with sockets.

- **JC-45.1 Subcommittee: Registered DRAM Modules**

The scope of JC-45.1 is to develop standards for Registered socketed DRAM modules. These standards are to address architectural, electrical, and test issues relating to memory design and manufacturing for commercial applications. Reference design board files are designed and registered.

- **JC-45.3 Subcommittee: Unbuffered DRAM Modules**

The scope of JC-45.3 is to develop standards for unbuffered socketed DRAM modules. These standards are to address architectural, electrical, and test issues relating to memory design and manufacturing for commercial applications. Reference design board files are designed and registered.

- **JC-45.4 Subcommittee: Fully Buffered DRAM Modules**

The scope of JC-45.4 is to develop standards for Fully Buffered socketed DRAM modules. These standards are to address architectural, electrical, and test issues relating to memory design and manufacturing for commercial applications. Reference design board files are designed and registered.

- **JC-45.5 Subcommittee: Module Interconnect**

The scope of JC-45.5 is to develop standards for module interconnect specifications including sockets. These standards are developed and published for AC electrical performance requirements with test methodology including test boards to verify conformance to the specification requirements.

- **JC-45.6 Subcommittee: Hybrid Modules**

The Scope of JC-45.6 is to develop standards for Hybrid socketed modules. These standards are to address architectural, electrical, and test issues relating to memory technology design and manufacture for commercial applications. Reference design board files are designed and registered. Hybrid module is defined as a memory module presenting a DRAM-style interface to the memory controller and containing one or more non-volatile memory technologies. A Hybrid module may or may not include DRAM memory in addition to non-volatile memory.

3 Product committees (cont'd)

JC-63 Committee: Multiple Chip Packages

Define/propose standards for mixed-technology MCP that address unique electrical, mechanical, test, and architecture issues relating to die-to-die design and manufacturing for commercial applications.

NOTE MCP is defined as multichip package, a single package that contains multiple dice, including memory-memory, logic-memory, logic-logic, and/or passive components.

JC-64 Committee: Embedded Memory Storage and Removable Memory Cards

Define/propose standards for embedded memory storage and removable memory cards that utilize an electrical and protocol abstraction layer independent of memory technology, primarily concentrating on, but not limited to, solid state flash technology. Standardize the electrical interface specification, the command protocols, the mechanical outlines, and the host controller specification. The responsibilities of this committee also include quality, reliability, and durability methodologies and procedures. The proposed documents (outlines, test methods, procedures, etc.) will be developed with the expertise and approval of related JEDEC committees such as JC-11, JC-14, and JC-16, as well as with external standards organizations when needed.

NOTE No standards work requiring an electrical interface can move forward without first having an endorsement from JC-16, and not without having a JC-11 outline number assigned. (JEDEC BoD decision 08/07)

- **JC-64.1 Subcommittee: Electrical Specifications and Command Protocols**

Define/propose standards for embedded memory storage and removable memory cards. Standardize the electrical interface specification and the command protocols. The responsibilities of this subcommittee also include quality, reliability, and durability methodologies and procedures. Applicable portions will be done in cooperation with other JC-64 subcommittees. The proposed documents (outlines, test methods, procedures, etc.) will be developed with the expertise and approval of related JEDEC committees such as JC-11, JC-14, and JC-16, as well as with external standards organizations when needed.

- **JC-64.2 Subcommittee: Form, Fit and Climatic/Environmental Methodologies**

Define/propose standards for form, fit (mechanical outlines), and climatic/environmental (quality, reliability, and durability) methodologies for embedded memory storage and removable memory cards. The development includes, but is not limited to, mechanical outlines, test methods, and quality and reliability procedures. Applicable portions will be done in cooperation with other JC-64 subcommittees. The proposed documents (outlines, test methods, procedures, etc.) will be developed with the expertise and approval of related JEDEC committees such as JC-11, JC-14, and JC-16, as well as with external standards organizations when needed.

- **JC-64.5 Subcommittee: UFS Measurement**

Develop test setups and procedures for accurate and repeatable measurement of the electrical properties, behavior and performance of devices, hosts, and interfaces that implement the UFS standard.

3 Product committees (cont'd)

JC-64 Committee: Embedded Memory Storage and Removable Memory Cards (cont'd)

- **JC-64.7 Subcommittee: Ecosystems**

Define/propose documents for building ecosystem including but not limited to application notes and technical white papers related to the features in the standard defined in JC-64 and its subcommittees. Communicate with the external ecosystem organization related to realizing the features defined in the JEDEC standards.

- **JC-64.8 Subcommittee: Solid State Drives**

Define/propose standards for solid state drives used for embedded or removable memory storage leveraging the existing storage infrastructure. The responsibilities of this subcommittee include defining new form factors leveraging existing interface standards (command protocols and electrical interfaces), mechanical interconnects, environmental aspects, and electrical quality, reliability, and durability methods and procedures that are not included in the interface standards. Applicable portions will be done in cooperation with other JC-64 subcommittees. The proposed documents (outlines, test methods, unique interface requirements, procedures, etc.) will be developed with the expertise and approval of related JEDEC committees such as JC-11, JC-14 and JC-16, as well as with external standards organizations, such as T-10, T-13, SATA-IO, USB 3.0, etc.

3 Product committees (cont'd)

JC-70 Committee: Wide Bandgap Power Electronic Conversion Semiconductors

The products within scope include discrete devices and integrated circuits that employ wide bandgap and ultra-wide bandgap semiconductors and are intended for use in power conversion circuits regardless of device type, polarity, mode of operation, packaging, electrical ratings, and end applications. This also includes bare die devices and modules that incorporate at least one such bare die device. In addition, the scope includes packaging unique to the products.

Products intended for use in RF/microwave amplification and signal conditioning applications are generally not covered by this committee, as the operating conditions and performance requirements of these devices are fundamentally different from those of power conversion circuits. Quality and reliability standards for these products are covered by the JEDEC subcommittee JC-14.7.

The committee is responsible for the development and establishment of industry standards concerned with reliability verification and qualification procedures, test methods and measurement techniques, data sheet elements and device specifications, unique packaging considerations, and other related engineering issues. Activities also include cataloging and consideration of mission profiles, and formulation of terms, definitions, and symbols for the products defined above.

The committee cooperates with and utilizes relevant technical information and standards from other JEDEC committees on matters of terms and definitions, mechanical standardization, international standardization, and government liaison. The committee maintains liaison with other professional, national, or international organizations for the exchange of technical information and acceptance of the committee's output.

- **JC-70.1 Subcommittee: GaN Power Electronic Conversion Semiconductor Standards**

The subcommittee is responsible for the development and establishment of industry standards for SiC Power Electronic Conversion devices. Activities include coordination of the task groups. The task groups are responsible for the development of draft documents (guidelines, standards, etc.) to be proposed to JC-70.1 which will place the documents into vote by the JC-70.1 membership.

- **JC-70.2 Subcommittee: SiC Power Electronic Conversion Semiconductor Standards**

The subcommittee is responsible for the development and establishment of industry standards for SiC Power Electronic Conversion devices. Activities include coordination of the task groups. The task groups are responsible for the development of draft documents (guidelines, standards, etc.) to be proposed to JC-70.2 which will place the documents into vote by the JC-70.2 membership.

4 Inactive committees and subcommittees

4.1 Inactive committees

The following committees, that are inactive as of this writing, are listed here for historical reasons.

NOTE If a committee remains inactive for a period of five (5) years the committee number will be recycled into the available numbers to be reassigned to a new committee:

JC-10 Committee: Terms, Definitions, and Symbols

Activities within JC-10's scope include the generation, coordination, and review of terms, definitions, and symbols relating to discrete solid state devices, integrated circuits, modules, and various semiconductor manufacturing support functions. The committee also assists in the formulation and standardization of type designation systems. To accomplish these functions, the committee maintains liaison with and uses technical information from other groups. These groups include other JEDEC committees and national and international standards and professional organizations.

JC-12 Committee: International Standardization

Activities within JC-12's scope include representing JEDEC in international standardization programs, primarily those of the International Electrotechnical Commission (IEC). To accomplish this function, the committee will draw membership from other JEDEC committees and organizations as necessary. It will act through the US National Committee of the IEC and the American National Standards Institute (ANSI) in maintaining liaison with the appropriate IEC Technical committees, primarily TC-47 and its subcommittees.

NOTE IEC activities are being handled at the present time in the applicable JEDEC Service Committees.

JC-17 Committee: Microelectromechanical Systems (MEMS)

Activities within JC-17's scope include the generation of standards applicable to micro-engineered semiconductor devices and the development of fabrication techniques for their manufacture. The committee will publish standards and guidelines for the benefit of both manufacturers and users of such devices: these should reflect the minimum requirement, taking the form of preferred options rather than absolute requirements. To accomplish these functions, the committee maintains liaison with, and uses technical information from, other JEDEC committees and outside organizations engaged in similar activities related to standardization.

4.1 Inactive committees (cont'd)

JC-22 Committee: Diodes and Thyristors

The products within JC-22's scope include all semiconductor rectifier diodes and thyristors, as well as small-signal, regulator, reference, p-i-n, varactor tuning diodes, avalanche breakdown diodes (ABD) or transient voltage suppressors (TVS), polymer ESD suppressors (PES), avalanche rectifiers, metal oxide varistors (MOV), all selenium rectifiers, all nonthyristor trigger diodes, and assemblies including modules using all such devices regardless of mounting, power level, or packaging. Activities include registration formats, standardization of test methods and procedures, and industry coordination for rectifiers and regulating diodes, thyristors, and transient voltage suppressors. The committee maintains liaisons with other professional, national, or international organizations for the exchange of technical informational or data as may be necessary. This committee also provides assistance in the formulation of terms, symbols, and definitions. This committee is organized into the following subcommittees to deal with all the various products that fall within its scope:

- **JC-22.1 Subcommittee: Thyristors**
- **JC-22.2 Subcommittee: Rectifier Diodes**
- **JC-22.4 Subcommittee: Signal and Regulator Diodes (combined with JC-22.2)**
- **JC-22.5 Subcommittee: Transient Voltage Suppressors**

4.1 Inactive committees (cont'd)

JC-23 Committee: Optoelectronic Devices

The products within JC-23's scope include (1) semiconductor devices that detect, or are responsive to, optical radiation, including visible, infrared or ultraviolet spectral regions, or both, and (2) electronic devices that emit or modify noncoherent or coherent optical radiation under input conditions such as electrical excitation or injection, optical stimulation, and electron beam excitation. Category (1) includes photovoltaic cells, photoconductive cells, photodiodes, infrared detectors, solar cells, phototransistors, optocouplers, and similar types of devices, except those specifically assigned to any other product committee. Category (2) includes diodes that emit optical radiation, semiconductor injection lasers, and other types of solid state lasers, liquid crystal devices, modulators, and detectors, except those specifically assigned to any other product committee. Devices incorporating more than one of the above mentioned units within the same package are also included. Inactivation of this committee includes its' subcommittees:

JC-23.1 Subcommittee: Liquid Crystal Devices

JC-23.2 Subcommittee: Photovoltaic Devices

4.1 Inactive committees (cont'd)

JC-25 Committee: Transistors

The products within JC-25's scope include all silicon transistors, such as bipolar transistors, field-effect transistors and insulated gate bipolar transistors, and all intelligent power devices. Intelligent power devices are defined as semiconductor devices of hybrid or single-chip construction that are capable of performing signal conditioning and a power-control function including fault management or diagnostics. They are capable of a peak output current rating of at least one ampere (sum for multiple outputs) and have both a supply voltage and an output load voltage rating of at least 30 V.

Activities include the generation of registration formats, the standardization of test methods and procedures, and industry coordination for the products mentioned above. The committee maintains communications with other professional, national, or international organizations for the exchange of technical informational or data as may be necessary. The committee also provides assistance in the formulation of terms, definitions, and symbols.

JC-30 Committee: Hybrid Microcircuits

The products within JC-30's scope include all commercial hybrid microcircuits. The committee will utilize technical information from other JEDEC committees and from organizations such as ISHM and cooperate with them on matters of terms and definitions, mechanical standardization, international standardization, and government liaison.

JC-41 Committee: Linear Integrated Circuits

The products within JC-41's scope include linear integrated circuits, without regard to their fabrication technology. The committee will develop the definition of test parameters and their methods of measurement, and registration formats to promote standardization of type designations. To accomplish these functions, the committee will cooperate with other JEDEC committees and organizations on matters of terms and definitions, mechanical standardization, international standardization, and government liaison. The committee will also maintain liaison with user organizations to promote wide acceptance of the committee's output.

JC-43 Committee: Microprocessors and Microcomputers

The products within JC-43's scope include all microprocessors and microcomputers, without regard to their fabrication technology. Activities include technical considerations and definition of electromechanical interface, user interface, I/O interface, protocol, interrupt structuring, memories, direct memory access, development hardware, software, classes of machines, bus structures, tests, RFI, user education, and similar types of activity.

4.1 Inactive committees (cont'd)

JC-44 Committee: Semicustom Integrated Circuits

The products within JC-44's scope include all semicustom (application-specific) integrated circuits, such as gate arrays and standard cell circuits, without regard to their fabrication technology or application.

Activities include the development of technical information and standards pertaining to:

- Macro and cell libraries
- Programming
- Operational characteristics
- Test parameters and their methods of measurement
- Pinouts and registration formats
- Interfaces for the CAD tools used in designing

To accomplish these functions, the committee will cooperate with other JEDEC committees and organizations on matters of terms and definitions, mechanical standardization, international standardization, and government liaison. The committee will also maintain liaison with industry service and user organizations to ensure that the committee recommendations are appropriate and widely accepted.

JC-50 Committee: Gallium Arsenide Compound Semiconductors

The products within JC-50's scope include all solid state devices that use gallium arsenide or gallium arsenide/compound semiconductor composites as the base semiconductor material. This includes discrete devices such as FETs and IMPATT diodes, as well as analog and digital integrated circuits, both microwave and high speed. It will also include devices whose principal function is light emission or optical signal processing such as LEDs, lasers, or optical sensing circuits. The committee will be responsible for the development and establishment of engineering standards concerned with testing and measurement techniques, device specification formats, unique packaging considerations, reliability verification procedures, and other related engineering issues. The committee will cooperate with and utilize relevant technical information from other JEDEC committees or organizations on matters of terms and definitions, mechanical standardization, international standardization, and government liaison. The committee will also maintain liaison with user organizations to promote acceptance of the committee's output. Inactivation of this committee includes its' subcommittees:

JC-50.2 Subcommittee: Gallium Arsenide and Compound Semiconductor Products

JC-60 Committee: Universal Docking

Define a universal expansion architecture by consolidating multiple industry standards into a unified interconnect between a computer and its peripherals. The architecture will support interchangeable docking and expansion solutions for server, desktop, portable, ultraportable, tablet and handheld categories.

JC-61 Committee: Wireless Interface Network Group

To define/propose interface standards between radio-baseband and Media Access Controller (MAC)-baseband including Upper-Lower MAC partitioning for wireless networking systems.

4.1 Inactive committees (cont'd)

JC-65 Committee: Radio Frequency Identification Tags (RFIDs)

The products within JC-65's scope include all radio frequency identification (RFID) tags, without regard to the IC, fabrication technology, strap configuration, inlay/antennae assembly technology, or application. All frequency ranges and passive, active, sensor, and battery assisted types are included. Activities include the development of technical information and standards pertaining to pinouts, test parameters, characterization, registration formats, form, fit (mechanical outlines of straps/carriers), and climatic/environmental (quality/reliability/durability) methodologies. The proposed documents (outlines, test methods, procedures, etc.) are developed with the expertise and approval of related JEDEC committees such as the JC-11 and JC-14 committees. It also maintains liaisons with other JEDEC committees and outside organizations to promote wide acceptance of the committee's actions.

4.2 Inactive subcommittees

The following subcommittees (point committees) have become inactive:

JC-11.5 Subcommittee: Package Interface

JC-11.9 Subcommittee: Government Coordination

JC-11.12 Subcommittee: Hybrid Packages

JC-11.13 Subcommittee: Gauges and Tools for Semiconductor Packages and Related Parts

JC-13.3 Subcommittee: Advanced Solid State Products (*merged into JC-13.2*)

JC-14.5 Subcommittee: NEQPS for Solid State Products (*merged into JC-14.4*)

JC-14.6 Subcommittee: Failure Analysis

JC-15.1 Subcommittee: Thermal Characterization (*merged in JC-15*)

JC-15.2 Subcommittee: Electrical Characterization (*merged in JC-15*)

JC-16.1 Subcommittee: Interfaces and Power Supply Voltages

JC-16.2 Subcommittee: Modeling and Test

JC-40.2 Subcommittee: Bus Switch Logic Products

JC-40.3 Subcommittee: RDIMM Support Components (*September 2011*)

JC-42.1 Subcommittee: Program Logic Devices (PLD) (Subcommittee number recycled 4/2021)

JC-42.3D Letter Committee on DRAM Pinouts (*December 2011*)

JC-42.5 Subcommittee: Memory Modules (*changed to JC-45, January 2004*)(*Recycled 4/2021*)

JC-45.2 Subcommittee: Unbuffered DRAM Modules (*merged with JC-45.3, December 2010*)

JC-64.3 Subcommittee: Host Controllers (*noted: April 2014*)

JC-64.9 Subcommittee: Wireless Memory (*noted: July 2015*)

Annex A (Informative) Differences between JM18T and JM18S (April 2018)

This following briefly describes most of the changes made to entries that appear in this manual, JM18T, compared to its predecessor, JM18S (April 2018). If the change to a concept involves any words added or deleted (excluding deletion of accidentally repeated words), it is included. Some punctuation changes are not included.

Clause	Description of change
2	Revised JC-14.7 subcommittee scope.
3	Added JC-42.1 subcommittee and scope.
3	Revised JC-42.2 subcommittee title and scope.
3	Revised JC-42.3 subcommittee title and scope.
3	Revised JC-42.3 subcommittee scope.
3	Added JC-42.5 subcommittee and scope.
3	Added JC-64.7 subcommittee and scope.

A.1 Differences between JM18S and JM18R (June 2017)

Clause	Description of change
2	JC-10 Moved to Inactive Committees
2	JC-11, first paragraph, added 4 th and 5 th sentence.
3	JC-70 and subcommittees added.

A.2 Differences between JM18R and JM18Q (August 2015)

Clause	Description of change
1	JC-11 name updated, and modified first sentence to making two sentences for clarification (JCB-15-60)

A.3 Differences between JM18Q and JM18P (January 2015)

Clause	Description of change
1	Revised introduction to align with JM21R (July 2015)
3	JC-40.4, JC-42.3B, and JC-42.3C Subcommittee name changed
3	JC-64.9, move to inactive subcommittee
3	JC-45.6 Subcommittee scope change: removed “mixed” from 1 st paragraph and expanded 2 nd paragraph (JCB-15-07).
Annex A	Removed.

A.4 Differences between JM18P and JM18N (April 2014)

Clause	Description of change
2	Added JC-13.7 Subcommittee and Scope.
3	Added JC-64.9 Subcommittee and Scope
3	Remove JC-65 Committee
3	Removed subcommittees: JC-40.3, JC-42.3D, and JC-64.3
4.1	Added JC-65 Committee to Inactive committee
4.2	Added subcommittees: JC-40.3, JC-42.3D, and JC-64.3, now inactive
Annex A.4	Added document number prefix for clarification.
Annex A.4	Removed “Specifications”, JEDEC has not published JEDEC Specification “JES” documents since early 1990’s to opt for a more specific document classification, i.e., JEDEC Standard (JESD) or JEDEC Publication (JEP).

A.5 Differences between JM18M.01 and JM18M (March 2009)

Clause	Description of change
Introduction	First paragraph, 1 st sentence, removed “industry in the United States” and added “microelectronics, and associated industries”.
2	New JC-14.4 scope
2	JC-14 Scope: Changed committee name and revised scope.
2	Under JC-14, Implementation, added “and associated microelectronics products and the constituent components of each. Regarding” to 2 nd sentence.
2	Under the JC-16 Scope, per the original ballot, JCB-07-55, it was voted and approved to remove JC-16.1 and JC-16.2. This was overlooked at time of revision.
3	JC-22 and JC-25 Committee and Subcommittees moved to 4.1
3	Moved JC-45.2 to inactive clause 4.2
3	Under JC-45.3, committee name changed “Small” to “Unbuffered”, and in scope changed “small form factor” to “unbuffered”
3	Added JC-64.5 Subcommittee and scope
3	Under the JC-45 committee scope, in 1 st sentence removed “DRAM” added 2 nd sentence.
3	Added new JC45.6 Subcommittee and scope
Annex A	At end of 2 nd paragraph added “processes, etc.”

A.6 Differences between JM18M and JM18L (October 2006)

In 2008 JEDEC requested that each committee review its scope and either reaffirm it or revise it based on current activities. This revision reflects the results of this review process.

Committee	Action	Comments
JC-10	Reaffirmed	
JC-11	Reaffirmed	
JC-11.1	Reaffirmed	This activity has been handed over to point committee chairs
JC-11.2	Reaffirmed	
JC-11.4	Reaffirmed	
JC-11.5	Reaffirmed	At time of publication there is no activity in this subcommittee
JC-11.7	Reaffirmed	
JC-11.10	Reaffirmed	
JC-11.11	Reaffirmed	
JC-11.13	Reaffirmed	At time of publication there is no activity in this subcommittee
JC-11.14	Reaffirmed	
JC-13	Reaffirmed	Editorial: term “products” changed to “practices”, removed “reducing the cost while”
JC-13.1	Reaffirmed	
JC-13.2	Reaffirmed	Editorial: added “, assembly, testing”
JC-13.4	Reaffirmed	
JC-13.5	Reaffirmed	Editorial: changed “and military applications” to “, military, and space applications”
JC-14	Reaffirmed	
JC-14.1	Reaffirmed	Minor editorial edits
JC-14.2	Revised	Scope changed, JCB-08-64
JC-14.3	Reaffirmed	Minor editorial edits
JC-14.4	Reaffirmed	Editorial: term “semiconductor” changed to “Solid State”
JC-14.6	Inactive	
JC-14.7	Reaffirmed	Editorial: term “GaAs” changed to “compound semiconductors”
JC-15	Revised	Scope and Title changed, JCB-08-90

A.6 Differences between JM18M and JM18L (October 2006) (cont'd)

JC-15.1	Inactive	Removed, JCB-08-90
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JC-15.2	Inactive	Removed, JCB-08-90
JC-16	Revised	Scope changed, JCB-07-55
JC-22	Revised	Scope changed, JCB-08-06
JC-22.1		In JC-22
JC-22.2		In JC-22
JC-22.4	Inactive	Removed, JCB-08-06
JC-22.5		In JC-22
JC-25	Reaffirmed	
JC-40	Reaffirmed	March 2007
JC-40.1	Reaffirmed	March 2007
JC-40.3	Revised	Scope and Title changed, JCB-07-71
JC-40.4	Revised	Scope and Title changed, JCB-07-75
JC-40.5	New	Scope added, JCB-07-63
JC-42	Revised	Scope changed, JCB-08-89
JC-42.2	New	Scope added, JCB-07-54
JC-42.3	Revised	Scope and Title changed, JCB-08-89
JC-42.3B	New	Scope added, Title changed, JCB-08-89
JC-42.3C	New	Scope added, Title changed, JCB-08-89
JC-42.3D	Revised	Scope added, Title changed, JCB-08-89
JC-42.4	New	Scope added, Title changed, JCB-08-89
JC-42.6	New	Scope added, JCB-08-89
JC-45	Revised	Scope changed, JCB-08-08
JC-45.1	New	Scope added, JCB-08-08
JC-45.2	New	Scope added, JCB-08-08
JC-45.3	New	Scope added, JCB-08-08
JC-45.4	New	Scope added, JCB-08-08
JC-45.5	New	Scope added, JCB-08-08
JC-61	Inactive	
JC-63	Revised	Scope changed, JCB-08-15
JC-64	New	Scope added, JCB-08-31
JC-64.1	Revised	Scope changed, JCB-08-31
JC-64.2	Revised	Scope changed, JCB-08-31
JC-64.3	New	Scope added, JCB-08-31
JC-64.8	New	Scope added, JCB-08-38
JC-65	Reaffirmed	

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The logo features the word "JEDEC" in a bold, italicized, sans-serif font. A red underline is positioned below the text, starting from the left and tapering to a point on the right.