

JEDEC STANDARD

Hybrids/MCM

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HYBRIDS/MCM

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Foreword

This standard was created to define requirements for and facilitate procurement of commercial grade non-QML MIL-PRF-38534 hybrid microcircuits, RF/microwave hybrid microcircuits, and multichip modules (MCMs). This document provides both requirements and guidance for device manufacturers regarding necessary controls and disciplines to design, manufacture, and characterize product.

This standard also reflects an understanding on the part of hybrid, RF/microwave and MCM manufacturers that quality and reliability cannot always be assured in the same fashion. As such, rather than dictating a singular flow, this document emphasizes communication of best practices for addressing critical segments of the design and manufacturing process.

HYBRIDS/MCM

(From JEDEC Board ballot JCB-03-63, formulated under the cognizance of the JC-13.5 Subcommittee on hybrid, RF/Microwave, and MCM Technology.)

1 Scope

This specification establishes the general requirements for hybrid microcircuits, RF/microwave hybrid microcircuits and MCMs (hereafter referred to as devices). Detailed performance requirements for a specific device are specified in the applicable device acquisition document. In the event of a conflict between this document and the device acquisition document, the device acquisition document will take precedence.

The purpose of this specification is to define requirements for and facilitate manufacturing and procurement of hybrid microcircuits, Radio Frequency (RF)/microwave hybrid microcircuits and multichip modules (MCMs) for a wide range of applications. This document is intended as a tool, for both device users and producers; which if properly used will result in the successful manufacture and delivery of devices that perform properly in the intended application.

2 General requirements

The general requirements for design and manufacturing of hybrid microcircuits, RF/microwave devices and MCMs are provided in the following paragraphs. This specification is intended for hermetic, cavity packaged devices. Devices delivered in accordance with this specification shall meet both the following general requirements and requirements specified by the device acquisition document, with the exception of those requirements specifically identified as deviations by either the device acquisition document or contract.

3 Terms and definitions

active element: A circuit element that contributes qualities to a circuit function other than those contributed by a passive circuit element, e.g., rectification, switching, gain, or conversion of energy from one form to another.

NOTE Examples include diodes, transistors, active integrated circuits, and light-sensing or light-emitting devices.

alternative method: For a device requirement that has a prescribed method to verify compliance, another method that has been verified through test and analysis to adequately verify compliance of the device with that requirement.

critical node: A node or step in the process flow whose output has a significant impact on the process.

3 Terms and definitions (cont'd)

device: For the purposes of this standard, a hybrid microcircuit, RF/microwave hybrid microcircuit, or multichip module (MCM).

device type: A single specific device design.

NOTE Within this standard, the term is meant to include only hybrid microcircuits, RF/microwave hybrid microcircuits, and MCM configurations.

element, (circuit): Any constituent part of a circuit that contributes directly to its operation and performs a definable function.

NOTE Examples include microcircuits, transistors, resistors, capacitors, and interconnections.

film microcircuit; film integrated circuit: A microcircuit consisting exclusively of elements that are films formed in situ upon an insulating substrate.

hybrid microcircuit: A microcircuit that contains two or more of a single type or a combination of types of the following elements, with at least one of the elements being active: film microcircuit, monolithic microcircuit, discrete semiconductor device, passive chip, or passive element printed or deposited on a substrate.

industry: For the purposes of this standard, the hybrid/MCM industry.

monolithic microcircuit; single-chip microcircuit: An integrated circuit or microcircuit consisting exclusively of elements formed in situ on or within a single semiconductor substrate with at least one of the elements formed within the substrate. (MIL-PRF-38535 definition)

multichip module (MCM): A multichip integrated circuit or hybrid microcircuit that contains two or more microcircuits.

passive element: A circuit element primarily contributing resistance, capacitance, inductance, ohmic interconnection, or a combination of these to a circuit function.

NOTE Examples include resistors, capacitors, inductors, passive filters, and interconnections.

radiofrequency (RF)/microwave hybrid: A hybrid microcircuit that meets one or more of the following criteria:

- it contains input and output terminals or connectors with matched impedance;
- it uses specific impedance transmission lines on an insulating substrate;
- its RF performance characteristics are affected by conductor length, width, or topology.