



Anderson Mauro da Silva <anderson.mauro123@gmail.com>

Propostas recompostas de Equipamentos de informática para análise

Geovan Dantas Ferraz <geovan@cmpa.mg.gov.br>

Wed, Jan 29, 2025 at 1:17 PM

To: Anderson Mauro da Silva <anderson.mauro123@gmail.com>

Cc: CDP CPD <cpd@cmpa.mg.gov.br>, marcela@cmpa.mg.gov.br

Boa tarde,

Conforme verificamos, no caso do item 1, a tecnologia SSD não possui problemas de magnetismo como os demais itens de armazenamento. Quanto aos itens 2, 3 e 4 após pesquisa nos sites dos fabricantes (Seagate e Toshiba), ambas possuem certificações IEC (International Electric Certification) com relação aos seus equipamentos e componentes eletrônicos.

Att.;

Geovan Dantas Ferraz Agente Administrativo (35) 3429-6526 www.cmpa.mg.gov.br facebook.com/cmpalegre	 Câmara Municipal de Pouso Alegre	Acompanhe o trabalho do Poder Legislativo:  TV CÂMARA Canal 18.4 Canal 8 Monitor Cabo	 967 LEGISLATIVA FM
---	--	--	--

"Esta mensagem, incluindo seus(s) anexos(s), pode conter informações privilegiadas e/ou de caráter confidencial - em especial, mas não somente, em decorrência da Lei nº 13.709/18 (Lei Geral de Proteção de Dados Pessoais - LGPD), não podendo ser retransmitida sem autorização expressa do remetente. Se você recebeu esta mensagem por engano, por favor, informe-nos e apague-a; não copie ou divulgue seu conteúdo. Antes de imprimir, lembre-se do seu compromisso com o meio ambiente."

[Quoted text hidden]



Anderson Mauro da Silva <anderson.mauro123@gmail.com>

Propostas recompostas de Equipamentos de informática para análise

Geovan Dantas Ferraz <geovan@cmpa.mg.gov.br>

Wed, Jan 29, 2025 at 1:44 PM

To: Anderson Mauro da Silva <anderson.mauro123@gmail.com>

Cc: CDP CPD <cpd@cmpa.mg.gov.br>, marcela@cmpa.mg.gov.br

Seguem os anexos:

Toshiba = The contents of each safety standard - página 08

Seagate = Safety Certification - página 05



"Esta mensagem, incluindo seus(s) anexos(s), pode conter informações privilegiadas e/ou de caráter confidencial - em especial, mas não somente, em decorrência da Lei nº 13.709/18 (Lei Geral de Proteção de Dados Pessoais - LGPD), não podendo ser retransmitida sem autorização expressa do remetente. Se você recebeu esta mensagem por engano, por favor, informe-nos e apague-a; não copie ou divulgue seu conteúdo. Antes de imprimir, lembre-se do seu compromisso com o meio ambiente."

[Quoted text hidden]

2 attachments **toshiba.pdf**
414K **seagate.pdf**
412K



HDD and SSD Regulatory Compliance and Safety

Abstract

This document describes regulatory compliance, safety, and disposal guidelines for Seagate HDDs, 2.5-inch SSDs, M.2 SSDs, and Add-in Cards.

100838899, Rev C
October, 2019

Revision History

Version and Date	Description of Changes
Rev C, October 2019	Metadata changes only.
Rev B, July 2019	Added regulation details to the following sections: ■ Section 2.1, Safety Certification ■ Section 2.1.1, Laser Products ■ Section 2.3, European Union (EU) CE Marking Requirements ■ Section 2.3.1, Product Environmental Compliance, EU/China RoHS Declaration of Conformity ■ Section 3.3.3, Product Environmental Compliance, EU/China RoHS Declaration of Conformity
Rev A, July 2018	First release of the document.

© 2019, Seagate Technology LLC All rights reserved. Publication number: 100838899, Rev C, October, 2019

Seagate Technology reserves the right to make changes to the product(s) or information disclosed herein at any time without notice.

Seagate, Seagate Technology and the Spiral logo are registered trademarks of Seagate Technology LLC in the United States and/or other countries. Nytro is either a trademark or registered trademark of Seagate Technology LLC or one of its affiliated companies in the United States and/or other countries. All other trademarks or registered trademarks are the property of their respective owners.

No part of this publication may be reproduced in any form without written permission of Seagate Technology LLC. Call 877-PUB-TEK1(877-782-8351) to request permission.

When referring to drive capacity, one gigabyte, or GB, equals one billion bytes and one terabyte, or TB, equals one trillion bytes. Your computer's operating system may use a different standard of measurement and report a lower capacity. In addition, some of the listed capacity is used for formatting and other functions, and thus will not be available for data storage. Actual quantities will vary based on various factors, including file size, file format, features and application software. Actual data rates may vary depending on operating environment and other factors. The export or re-export of hardware or software containing encryption may be regulated by the U.S. Department of Commerce, Bureau of Industry and Security (for more information, visit www.bis.doc.gov), and controlled for import and use outside of the U.S. Seagate reserves the right to change, without notice, product offerings or specifications.

Contents

Seagate Technology Support Services	4
1. Introduction	5
2. Agency and Safety Certifications	5
2.1 Safety Certification	5
2.1.1 Laser Products	5
2.2 Regulatory Model	5
2.3 European Union (EU) CE Marking Requirements	6
2.3.1 Product Environmental Compliance, EU/China RoHS Declaration of Conformity	7
2.4 Dodd-Frank Wall Street Reform and Consumer Protection Act, July 2010	7
2.5 Australian RCM Compliance Mark	8
2.6 Canada ICES-003	8
2.7 South Korean KC Certification Mark	8
2.8 Morocco Commodity Mark	8
2.9 Taiwanese BSMI	8
2.10 FCC Verification	9
2.11 Japan VCCI	9
3. Environmental Protection	10
3.1 European Union Restriction of Hazardous Substance Law	10
3.1.1 Restriction of Hazardous Substances in Electrical and Electronic Equipment	10
3.1.2 Substances of Very High Concern (SVHC)	10
3.2 China Requirements —China RoHS 2	11
3.3 Taiwan Requirements — Taiwan RoHS	11
3.3.1 Taiwan RoHS for HDDs	12
3.3.2 Taiwan RoHS for 2.5-inch SSDs	13
3.3.3 Product Environmental Compliance, EU/China RoHS Declaration of Conformity	14
3.3.4 Taiwan RoHS for M.2 SSDs	14
3.3.5 Taiwan RoHS for Add-in Card SSDs	15

Seagate Technology Support Services

For product support, visit: <https://www.seagate.com/support/by-product/ssd-and-pcie-flash/>

For Firmware Download and Tools Download for Secure Erase, visit: <https://www.seagate.com/support/downloads/>

For online support and services, visit: <https://www.seagate.com/contacts/>

For Warranty Support, visit: <https://www.seagate.com/support/warranty-and-replacements/>

For data recovery services, visit: <https://www.seagate.com/services-software/recover/>

For Seagate Distribution partner and Seagate reseller portal, visit: <http://www.seagate.com/partners>

1. Introduction

This document describes applicable safety, certification, and compliance requirements for Seagate hard disk drives (HDDs) and solid state devices (SSDs).

2. Agency and Safety Certifications

Each HDD and SSD has a product label that includes certifications that apply to that specific device. The following information provides an overview of requirements and compliance that may apply to these devices.

2.1 Safety Certification

All Seagate HDD and SSDs are certified to meet the requirements of UL/cUL 60950-1, EN 60950-1, and may also include, IEC 62368, UL 62368, and EN 62368.

Seagate laser products also comply with IEC 60825.1:2014 and 21 CFR 1010.2/1040.10.

2.1.1 Laser Products

Devices that display the CE mark comply with the European Union (EU) requirements specified in the Electromagnetic Compatibility Directive (2014/ 30/ EU) put into force on 20 April 2016. Testing is performed to the levels specified by the product standards for Information Technology Equipment (ITE).

Emission levels for these devices are defined by EN 5 5032:20 1 2, Class B, and the immunity levels are defined by EN 55024.

These Seagate devices also meet the requirements of The Low Voltage Directive (LVD) 20 14/35/ EU.

Seagate devices are tested in representative end-user systems. Although CE-marked Seagate devices comply with all relevant regulatory requirements and standards for the devices, Seagate cannot guarantee that all system-level products into which the devices are installed comply with all regulatory requirements and standards applicable to the system-level products. These devices are designed for operation inside a properly designed system (for example, enclosure designed for the device), with properly shielded I/O cable (if necessary) and terminators on all unused I/O ports. Computer manufacturers and system integrators should confirm EMC compliance and provide CE marking for the system-level products.

For compliance with the RoHS "Recast" Directive 2011/65/EU (RoHS 2) as amended by Directive (EU) 2015/863

[Section 3.1.1, Restriction of Hazardous Substances in Electrical and Electronic Equipment.](#)

2.2 Regulatory Model

Regulatory model numbers for HDDs and SSDs are published in the product manuals for each device.

2.3 European Union (EU) CE Marking Requirements

Devices that display the CE mark comply with the European Union (EU) requirements specified in the Electromagnetic Compatibility Directive (2014/30/EU) put into force on 20 April 2016. Testing is performed to the levels specified by the product standards for Information Technology Equipment (ITE).

Emission levels for these devices are defined by EN 55032:2012, Class B, and the immunity levels are defined by EN 55024.

These Seagate devices also meet the requirements of The Low Voltage Directive (LVD) 2014/35/EU.

Seagate devices are tested in representative end-user systems. Although CE-marked Seagate devices comply with all relevant regulatory requirements and standards for the devices, Seagate cannot guarantee that all system-level products into which the devices are installed comply with all regulatory requirements and standards applicable to the system-level products. These devices are designed for operation inside a properly designed system (for example, enclosure designed for the device), with properly shielded I/O cable (if necessary) and terminators on all unused I/O ports. Computer manufacturers and system integrators should confirm EMC compliance and provide CE marking for the system-level products.

For compliance with the RoHS "Recast" Directive 2011/65/EU (RoHS 2) as amended by Directive (EU) 2015/863, [Section 3.1.1, *Restriction of Hazardous Substances in Electrical and Electronic Equipment*](#).

2.3.1 Product Environmental Compliance, EU/China RoHS Declaration of Conformity

Conformity with Harmonized Standards/Technical Specifications:

1. Directive 2011/65/EU RoHS "Recast" (RoHS 2) as amended by Directive (EU) 2015/863 and further amended by Directive 2018/739 and Directive 2018/740 EN 50581:2012
2. Management Methods for Controlling Pollution by Electronic Information Products, Ministry of Information Industry Order No. 39 (China RoHS)
3. Management Methods for the Restriction of the Use of Hazardous Substances in electrical and Electronic Products, Ministry of Industry and Information Technology Order No. 32 effective July 1, 2016 (China RoHS 2)
4. Joint JEDEC/ECA Standard, Definition of "Low-Halogen" for Electronic Products, JS709B

Seagate products rely on the following RoHS 2 exemptions for compliance:

Table 1 RoHS 2 Exemptions for Compliance

6(a)-I	Lead as an alloying element in steel for machining purposes containing up to 0.35% lead by weight and in batch hot dip galvanized steel components containing up to 0.2% lead by weight
6(b)-II	Lead as an alloying element in aluminum for machining purposes up to 0.4% lead by weight
6c	Copper alloy up to 4% lead by weight
7a	Lead in high melting temperature type solders (i.e. lead-based solder alloys containing 85 % by weight or more lead
7(c)-1	Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors (e.g. piezoelectronic devices) or in a glass or ceramic matrix compound

2.4 Dodd-Frank Wall Street Reform and Consumer Protection Act, July 2010

Section 1502

As one of the world's leading producers of high-performance RAID (redundant array of independent disks) storage products for the Open Systems computing environment, we work with our vendors to determine if their supplies of tin, tungsten, tantalum and gold (3TG) come from Conflict Regions.

Seagate has manufactured and contracted to manufacture products in which 3TG are necessary to the functionality or production of such products. Seagate communicates its policy regarding conflict minerals to all suppliers. If a supplier is found to be purchasing 3TG which directly or indirectly finances or benefits armed groups in the Democratic Republic of Congo or adjoining countries (DRC), Seagate will take actions, up to and including discontinuing doing business with that supplier.

2.5 Australian RCM Compliance Mark

Devices that display the RCM marking, comply with the Australia/New Zealand Standard AS/NZ CISPR32 and meet the Electromagnetic Compatibility (EMC) Framework requirements of the Australian Communication and Media Authority (ACMA).

2.6 Canada ICES-003

Devices that display the ICES-003:2016 marking comply with requirements of ICES tested per ANSI C63.4-2014.

2.7 South Korean KC Certification Mark

For devices that display the South Korean KC Certification Mark, this means the devices comply with paragraph 1 of Article 11 of the Electromagnetic Compatibility control Regulation and meet the Electromagnetic Compatibility (EMC) Framework requirements of the Radio Research Agency (RRA) Communications Commission, Republic of Korea. These devices have been tested and comply with the Electromagnetic Interference/Electromagnetic Susceptibility (EMI/EMS) for Class B products. Devices are tested in a representative, end-user system by a Korean-recognized lab.

기종별	사용자안내문
B급 기기 (가정용 방송통신기자재)	이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

2.8 Morocco Commodity Mark

Seagate devices are tested for compliance and complies with the European Union (EU) Electromagnetic Compatibility (EMC) Directive 2014/30/EU and the Low Voltage Directive (LVD) 2014/35/EU. Accordingly, these devices also meet the requirements of Morocco's Order of the Minister of Industry, Trade, Investment and Digital Economy No. 2574-14 of 29 Ramadan 1436 (16 July 2015) on electromagnetic compatibility of equipment.

For devices that display the Morocco Mark, Seagate has added the Moroccan Commodity Mark to the devices provided to the OEM for the sale of Customer Kits produced by our OEM customers that are intended to be incorporated into the OEM's finished system-level product by an end user. The Customer Kits are considered 'devices' under Morocco's Order of the Minister of Industry, Trade, Investment and Digital Economy No. 2574-14 of 29 Ramadan 1436 (16 July 2015) on electromagnetic compatibility of equipment.

2.9 Taiwanese BSMI

Devices that display the Taiwanese certification mark comply with Chinese National Standard, CNS13438.

For compliance with the Taiwan Bureau of Standards, Metrology and Inspection's (BSMI) requirements, [Section 3.3, Taiwan Requirements — Taiwan RoHS](#).

2.10 FCC Verification

For devices that display the FCC mark, these devices are intended to be contained solely within a personal computer, server, or similar enclosure (not attached as an external device). As such, each device is considered to be a subassembly even when it is individually marketed to the customer. As a subassembly, no Federal Communications Commission verification or certification of the device is required.

Seagate has tested these devices in enclosures as described above to ensure that the total assembly (enclosure, disk drive, motherboard, power supply, and so on.) does comply with the limits for a Class B computing device, pursuant to Subpart J, Part 15 of the FCC rules. Operation with noncertified assemblies is likely to result in interference to radio and television reception.

Radio and television interference. This device generates and uses radio frequency energy and if not installed and used in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception.

This device is designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this device does cause interference to radio or television, which can be determined by turning the equipment on and off, users are encouraged to try one or more of the following corrective measures:

- Reorient the receiving antenna.
- Move the device to one side or the other of the radio or TV.
- Move the device farther away from the radio or TV.
- Plug the computer into a different outlet so that the receiver and computer are on different branch outlets.

If necessary, users should consult a dealer or an experienced radio/television technician for additional suggestions. Users may find helpful the following booklet prepared by the Federal Communications Commission: *How to Identify and Resolve Radio-Television Interference Problems*. This booklet is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Refer to publication number 004-000-00345-4.

2.11 Japan VCCI

All Seagate HDD and SSDs are Class B products based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If these devices are used near a radio or television receiver in a domestic environment, they may cause radio interference. Install and use the device according to the instruction guide.

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラス B 情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。

3. Environmental Protection

Seagate designs its products to meet environmental protection requirements worldwide, including regulations restricting certain chemical substances.

3.1 European Union Restriction of Hazardous Substance Law

3.1.1 Restriction of Hazardous Substances in Electrical and Electronic Equipment

All Seagate HDD and SSDs are compliant with the European Union RoHS "Recast" Directive 2011/65/EU (RoHS 2) as amended by Directive (EU) 2015/863. The RoHS2 restricts the use of certain hazardous substances such as Lead, Cadmium, Mercury, Hexavalent Chromium, Polybrominated Biphenyls (PBB) and Polybrominated Diphenyl Ether (PBDE), BisBis(2-Ethylhexyl) phthalate (DEHP), Benzyl butyl phthalate (BBP), Dibutyl phthalate (DBP), and Diisobutyl phthalate (DIBP) in electrical and electronic equipment (EEE).

3.1.2 Substances of Very High Concern (SVHC)

All Seagate HDDs and SSDs are compliant with the European Union REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) Regulation (EC) 1907/2006, which regulates chemicals shipped into and used in Europe. A number of parts and materials in Seagate products are procured from external suppliers. We rely on the representations of our suppliers regarding the presence of REACH substances in these articles and materials. Our supplier contracts require compliance with our chemical substance restrictions, and our suppliers document their compliance with our requirements by providing full-disclosure material content declarations that disclose inclusion of any REACH-regulated substance in such articles or materials. Product-specific REACH declarations are available upon request through your Seagate Sales Representative.

3.2 China Requirements — China RoHS 2



All Seagate HDDs and SSDs are China RoHS 2-compliant. China RoHS 2 refers to the Ministry of Industry and Information Technology Order No. 32, effective July 1, 2016, titled Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products. To comply with China RoHS 2, Seagate determines this device's Environmental Protection Use Period (EPUP) to be 20 years in accordance with the *Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products*, SJ/T 11364-2014.

Table 2 China - Hazardous Substances

部件名称 Part Name	有害物质 Hazardous Substances					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr ⁺⁶)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
硬盘驱动器 PCBA	X	O	O	O	O	O
印刷电路板组装 Chassis	X	O	O	O	O	O
本表格依据 SJ/T 11364 的规定编制。 This table is prepared in accordance with the provisions of SJ/T 11364-2014 O: 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。 O: Indicates that the hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T26572. X: 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。 X: Indicates that the hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement of GB/T26572.						

3.3 Taiwan Requirements — Taiwan RoHS

All Seagate HDDs and SSDs are Taiwan RoHS-compliant. Taiwan RoHS refers to the Taiwan Bureau of Standards, Metrology, and Inspection's (BSMI) requirements in standard CNS 15663, Guidance to reduction of the restricted chemical substances in electrical and electronic equipment. Seagate devices must comply with the "Marking of presence" requirements in Section 5 of CNS 15663, effective January 1, 2018.

3.3.1 Taiwan RoHS for HDDs

The following table meets the Section 5 "Marking of presence" requirements for 2.5-inch HDDs.

Table 3 Taiwan - Restricted Substances for HDDs

設備名稱：硬碟設備，型號： Equipment Name: Hard Disk Device, Type Designation:						
單元 Unit	限用物質及其化學符號 Restricted Substance and its chemical symbol					
	鉛 Lead (Pb)	汞 Mercury (Hg)	鎘 Cadmium (Cd)	六價鉻 Hexavalent Chromium (Cr ⁺⁶)	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
頂蓋 Top Cover	O	O	O	O	O	O
磁碟 Magnetic disk	O	O	O	O	O	O
電機底座組件 Motor Base Assembly	—	O	O	O	O	O
印刷電路板總成 PCB Assembly	—	O	O	O	O	O
備考1. "O"係指該項限用物質之百分比含量未超出百分比含量基準值 Note 1. "O" indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence. 備考2. "—"係指該項限用物質為排除項目。 Note 2. "—" indicates that the restricted substance corresponds to the exemption.						

3.3.2 Taiwan RoHS for 2.5-inch SSDs

The following table meets the Section 5 "Marking of presence" requirements for 2.5-inch SSDs.

Table 4 Taiwan - Restricted Substances for 2.5-inch SSDs

設備名稱：固態硬碟， Equipment Name: 2.5 inch SSDs				型號（型式） Type Designation (Type)		
單元 Unit	限用物質及其化學符號 Restricted Substance and its chemical symbol					
	鉛 Lead (Pb)	汞 Mercury (Hg)	鎘 Cadmium (Cd)	六價鉻 Hexavalent Chromium (Cr ⁺⁶)	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
快閃記憶體 Flash Memory	O	O	O	O	O	O
連接器 Connector	O	O	O	O	O	O
頂蓋 Product Cover	O	O	O	O	O	O
印刷電路板總成 PCB Assembly	—	O	O	O	O	O
備考1. “超出0.1 wt %”及“超出0.01 wt %”係指限用物質之百分比含量超出百分比含量基準值。 Note 1: "Exceeding 0.1 wt %" and "exceeding 0.01 wt %" indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition. 備考2. "O" 係指該項限用物質之百分比含量未超出百分比含量基準值。 Note 2. "O" indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence. 備考3. “—” 係指該項限用物質為排除項目。 Note 3. "—" indicates that the restricted substance corresponds to the exemption.						

3.3.3 Product Environmental Compliance, EU/China RoHS Declaration of Conformity

[Section 2.3.1, Product Environmental Compliance, EU/China RoHS Declaration of Conformity](#)

3.3.4 Taiwan RoHS for M.2 SSDs

The following table meets the Section 5 “Marking of presence” requirements for M.2 SSDs.

Table 5 Taiwan - Restricted Substances for M.2 SSDs

設備名稱：固態硬碟， Equipment Name: M.2 SSDs				型號（型式） Type Designation (Type)		
單元 Unit	限用物質及其化學符號 Restricted Substance and its chemical symbol					
	鉛 Lead (Pb)	汞 Mercury (Hg)	鎘 Cadmium (Cd)	六價鉻 Hexavalent Chromium (Cr ⁺⁶)	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
電容 Capacitor	O	O	O	O	O	O
動態隨機存取記 憶體 DRAM	O	O	O	O	O	O
接口控制器 Interface Controller	O	O	O	O	O	O
印刷電路板總成 PCB Assembly	—	O	O	O	O	O
備考1. “超出0.1 wt %” 及 “超出0.01 wt %” 係指限用物質之百分比含量超出百分比含量基準值。 Note 1: "Exceeding 0.1 wt %" and "exceeding 0.01 wt %" indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition. 備考2. "O" 係指該項限用物質之百分比含量未超出百分比含量基準值。 Note 2. "O" indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence. 備考3. “—” 係指該項限用物質為排除項目。 Note 3. "—" indicates that the restricted substance corresponds to the exemption.						

3.3.5 Taiwan RoHS for Add-in Card SSDs

The following table meets the Section 5 "Marking of presence" requirements for Add-in Card SSDs.

Table 6 Taiwan - Restricted Substances for Add-in Card SSDs

設備名稱：固態硬碟， Equipment Name: Add-in Cards				型號（型式） Type Designation (Type)		
單元 Unit	限用物質及其化學符號 Restricted Substance and its chemical symbol					
	鉛 Lead (Pb)	汞 Mercury (Hg)	鎘 Cadmium (Cd)	六價鉻 Hexavalent Chromium (Cr ⁺ ₆)	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
連接器 Connector	O	O	O	O	O	O
快閃記憶體 Flash Memory	O	O	O	O	O	O
散熱片 Heat Sink	O	O	O	O	O	O
印刷電路板總成 PCB Assembly	—	O	O	O	O	O
備考1. “超出0.1 wt %” 及 “超出0.01 wt %” 係指限用物質之百分比含量超出百分比含量基準值。 Note 1: "Exceeding 0.1 wt %" and "exceeding 0.01 wt %" indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition. 備考2. “O” 係指該項限用物質之百分比含量未超出百分比含量基準值。 Note 2. "O" indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence. 備考3. “—” 係指該項限用物質為排除項目。 Note 3. "—" indicates that the restricted substance corresponds to the exemption.						



Seagate Technology LLC

AMERICAS Seagate Technology LLC 10200 South De Anza Boulevard, Cupertino, California 95014, United States, 408-658-1000

Publication Number: 100838899, Rev C

October 2019

Safety Standards for Digital Isolator

Description

This application note explains an overview of safety standards for Digital Isolator.

Toshiba Electronic Devices & Storage Corporation

Table of Contents

Description..... 1

Table of Contents..... 2

1. Structure of standards 4

2. Component standards and equipment standards..... 6

3. The contents of each safety standard..... 8

 3.1. UL1577 8

 3.2. DIN EN IEC 60747-17 (VDE 0884-17)..... 8

 3.3. IEC 62368-1 9

 3.4. IEC 60355-1 9

4. Main parameters and terms 10

 4.1. Overvoltage category 10

 4.2. Pollution degree 11

 4.3. CTI (Comparative Tracking Index) 11

 4.4. Types of insulation 12

 4.5. Insulation protection class 12

5. Structural parameters for digital isolators 13

 5.1. Types of insulation 14

 5.2. Clearance distance 14

 5.3. Insulation thickness 14

6. Conclusion 14

Revision history 15

RESTRICTIONS ON PRODUCT USE 16

List of Figures

Figure 1-1 Major certification authorities and associated standards 4

Figure 3-1 DEN EN IEC 60747-17 test voltage waveform (DCL54xx01 Series) 8

Figure 4-1 The overview of overvoltage categories..... 10

Figure 5-1 Structural parameters for digital isolators..... 13

List of Tables

Table 2-1 Component standards and equipment standards..... 6

Table 2-2 Main safety standards for digital isolators 7

Table 3-1 Insulation test voltage in IEC 60335-1 9

Table 4-1 Acceptable transient voltage values 10

Table 4-2 Insulation protection class marks 12

Table 5-1 Structural parameters for digital isolators 13

Table 5-2 Minimum creepage distance based on IEC 62368-1 definitions 14

Digital isolators are signal transmission devices with electrical "isolation".

There are types of isolation methods like "magnetic coupling" and "capacitive coupling", and TOSHIBA's digital isolators adopt "magnetic coupling". Digital isolators with magnetic coupling transmit signals by utilizing magnetic energy.

Examples of applications are industrial automation (programmable logic controllers, I/O interfaces), and motor control. Digital isolators are mainly used to isolate and transmit signals between low voltage and high voltage line, so the designs are needed to follow specified safety standards to keep human safeties.

Safety standards are established in each country based on international standards. Typical examples are the German VDE and DIN standards, the U.S. UL standards, and the Chinese GB standards.

This manual explains summaries of safety standards for Digital Isolator.

1. Structure of standards

International Electrotechnical Commission (IEC) has established international standards in the electric, electronic, and telecommunications fields. Regional standards have been established based on these international standards including the regional voltages and other factors. In addition, national standards (Figure 1.1) have been established based on international and regional standards. To obtain certification of these standards, it is necessary to apply to the certification organizations in each country and pass the tests based on each standard.

International standard (IEC standards)

- : International standards established by IEC nations
IEC: International Electrotechnical Commission)

Regional standard (e.g. EN (European Norm) in Europe)

- : Applicable to a particular region based on IEC standard and standardized to regional conditions

National standard (e.g. UL in the United States, DIN in Germany)

- : Applicable to particular nations or region based on IEC and regional standards, standardized to local conditions

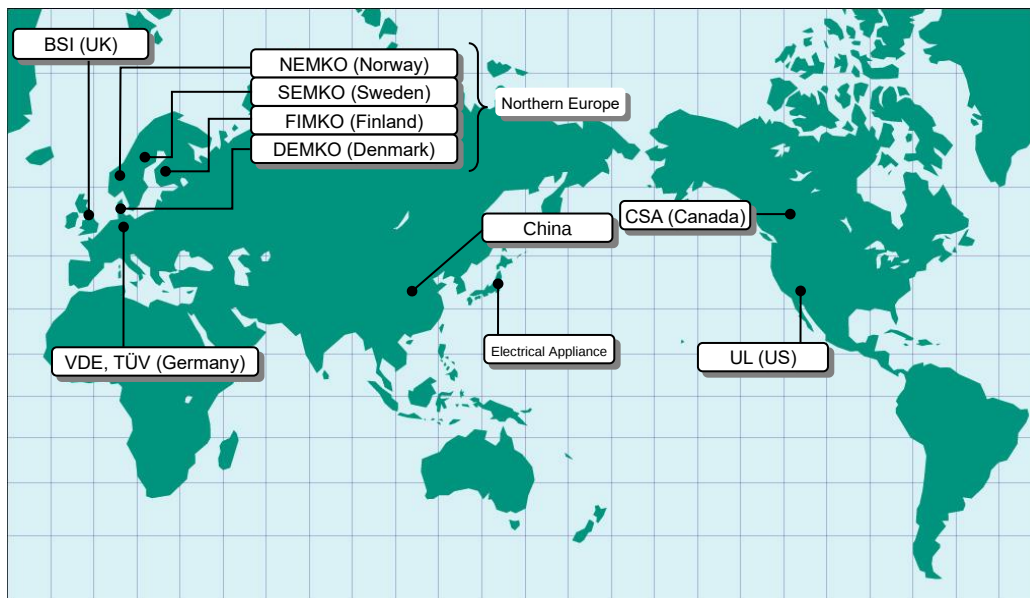


Figure 1-1 Major certification authorities and associated standards

Next, the representative organizations for certification are explained.

UL: Underwriters Laboratories Inc.

UL has conducted establishments, tests, and certifications of various safety standards ranging from materials to products. Products certified by UL should be marked with UL markings on their packaging, etc. UL certification should be obtained when exporting products including electric products and electric components to the U.S.

CSA: Canadian Standard Association

CSA has established the safety of the equipment connected to a commercial power supply in Canada. U.S. and Canada can be mutually approved by MRA(Multi Recognition Agreement), so UL (U.S.) certified products for Canada can use cUL marking to indicate that the product meets CSA safety standards.

VDE: Verband Der Elektrotechnik Elektronik Informationstechnik e.V.

(Association of German Electrical Engineers)

VDE has established and certified its own and national standards (DIN standards).

CQC (China Quality Certification center)

CQC conducts the inspections and approvals of the national standards compliance management system [CCC (China Compulsory Certification)] for products imported into China.

2. Component standards and equipment standards

Safety standards related to digital isolators include Component standards and equipment standards. Table 2.1 shows each example.

The equipment standards are established in consideration of the safety of the entire equipment. The standards such as IEC 62368-1 apply to the equipment for information / communication and audio/video, and IEC 61800-5 apply to variable speed drive systems (inverters, servo amplifiers, and electric motors). These safety standards define insulation spacing, insulation strength etc. Digital isolators used for the isolation in the equipment have been certified based on the tests for these requirements.

Component standards ensure the functional safety of individual components. The component standards related to digital isolators are UL 1577 and IEC 60747-17.

Component standards and equipment ones are independent, but the contents of the standards are mutually compatible in some cases. Details will be explained in the following section 3.

Table 2-1 Component standards and equipment standards

Safety standards		International standards	Regional standards (EN: European standards)	National standards
Equipment standards	Information / communication and audio/video equipment	IEC 62368-1	EN IEC 62368-1	DIN EN IEC 62368-1 GB4943.1 etc.
	Household electrical appliance	IEC 60335-1	EN IEC 60335-1	DIN EN IEC 60335-1 etc.
	Variable speed drive system	IEC 61800-5	EN IEC 61800-5	DIN EN IEC 61800-5 etc.
	Solar power system	IEC 62109-1	EN IEC 62109-1	DIN EN IEC 62109-1 etc.
	Industrial controller	IEC 61010-1	EN IEC 61010-1	DIN EN IEC 61010-1 etc.
	Low-voltage system	IEC 60664-1	EN IEC 60664-1	DIN EN IEC 60664-1 etc.
Component standards	Photocouplers	-	-	UL1577 (Note1) CSA component acceptance notice No.5A (CA5A)
		IEC 60747-5-5	EN IEC 60747-5-5	DIN EN IEC 60747-5-5
	Magnetic / Capacitive coupler (Digital isolator)	IEC 60747-17	EN IEC 60747-17	DIN EN IEC 60747-17 (VDE 0884-17)

Note1: UL1577 includes digital isolators as applicable products

IEC 62368-1:	Audio/video, information and communication technology equipment - Part 1: Safety requirements
IEC 60335-1:	Household and similar electrical appliances - Safety - Part 1 General requirements
IEC 61800-5-1:	Adjustable speed electrical power drive systems - Part 5-1 Safety requirements - Electrical, thermal and energy
IEC 62109-1:	Safety of power converters for use in photovoltaic power systems - Part 1 General requirements
IEC 61010-1:	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1 General requirements
IEC 60664-1:	Insulation coordination for equipment within low-voltage systems - Part 1 Principles, requirements, and tests
IEC 60747-5-5:	Semiconductor devices - Discrete devices - Part 5-5 Optoelectronic devices – Photocoupler
IEC 60747-17:	Semiconductor devices - Part 17 Magnetic and capacitive coupler for basic and reinforced insulation

Each country's certification organization judges the conformities for safety standards and issues certifications. Table 2.2 shows the main safety standards for digital isolators. Each digital isolator has acquired safety standards according to its application. Please refer to our website or individual datasheets.

Table 2-2 Main safety standards for digital isolators

Certification Organization	Safety standards	Description
UL	UL 1577 CA5A (cUL)	Certified based on dielectric strength, etc.
VDE	DIN EN 60747-17 EN 62368-1	Certified based on partial-discharge test, TDDB test(Note2), etc.
CQC	GB4943.1 GB8898	Certified based on insulation distance, insulation resistance, dielectric strength test, etc.

Note2: TDDB Test (Time Dependent Dielectric Breakdown):

A test to evaluate the breakdown phenomena of a semiconducting oxide over time, continuously energizing it.

3. The contents of each safety standard

This section explains an overview of the safety standards for digital isolators.

3.1. UL1577

UL 1577 is a component standard for digital isolators and photocouplers. The certification involves the tests for isolation voltages, where a high AC sine wave voltage of 50Hz or 60Hz is applied for one minute to determine if there is any insulation breakdown between the input and output. The isolation voltages of our digital isolators are examined in accordance with the requirements of UL 1577.

3.2. DIN EN IEC 60747-17 (VDE 0884-17)

DIN EN IEC 60747-17 is a component standard for digital isolators. Isolation performance is specified by partial discharge and TDDb tests. Partial discharge tests confirm that the electric charges generated by corona discharge are less than 5 pC under the test condition shown in Fig. 3.1 Method B.

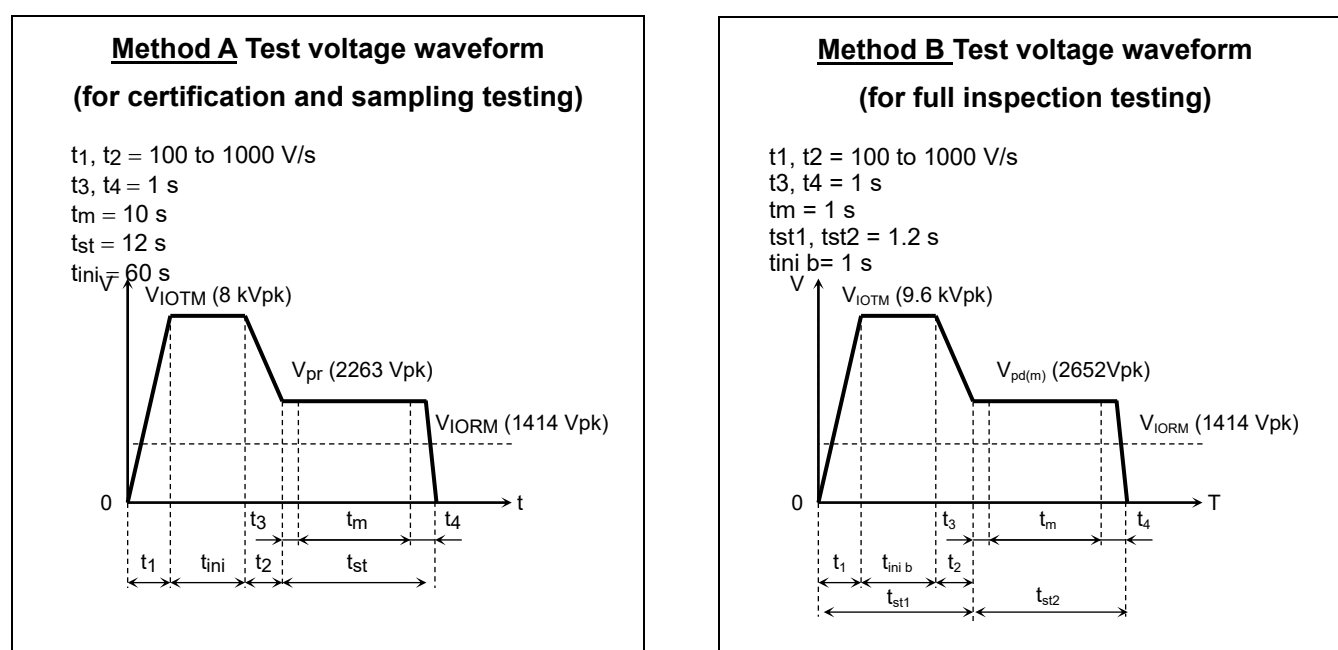


Figure 3-1 DEN EN IEC 60747-17 test voltage waveform (DCL54xx01 Series)

3.3. IEC 62368-1

IEC 62368-1 is defined for the information/communication and audio/video equipment and specified to reduce the risk of electric shock and damage to persons. The creepage distance and clearance for isolation components are varied depending on the surrounding environments and the classification of insulating materials. The physical parameter specifications are defined in IEC 60664-1.

3.4. IEC 60355-1

IEC 60335-1 is a safety standard for equipment applied to household electrical appliances. The isolation tests under the voltage conditions specified in Table 3.2. are required.

Table 3-1 Insulation test voltage in IEC 60335-1

Rated voltage	Basic insulation	Supplementary insulation	Reinforced insulation
Safety extra-low voltage (SELV) <25Vac/60Vdc	500 Vac	—	—
≤ 130V	1000 Vac	1500 Vac	2500 Vac
> 130V	1000 Vac	2750 Vac	3750 Vac

4. Main parameters and terms

This section explains the main parameters and terminologies related to the safety standard for digital isolator.

4.1. Overvoltage category

The overvoltage category is a classification that indicates the permissible value of transient overvoltage that electrical equipment can withstand. Categories are divided into the following four categories. The higher overvoltage category means the greater the risk of overvoltage exposure. Overvoltage category IV is for equipment installed in areas that may be exposed to high voltages from transmission lines such as power meters. In overvoltage category III, the overvoltage is reduced by a protective circuit, such as a distribution board. In general, fixed installations such as air conditioners are designed for category III overvoltage. Household appliances such as televisions and refrigerators that are plugged into wall outlets are usually classified as overvoltage category II.

Overvoltage category I: Secondary circuit of equipment plugged into hard-wired outlet or equivalent

Overvoltage category II: Primary circuit of equipment plugged into hard-wired outlet or equivalent, such as common and household appliances

Overvoltage category III: Equipment connected to building distribution board either directly or through a power outlet or equivalent, such as industrial equipment

Overvoltage category IV: Equipment connected outside the distribution board, for instance, to wiring between the pole transformer and the switchboard, such as power meter.

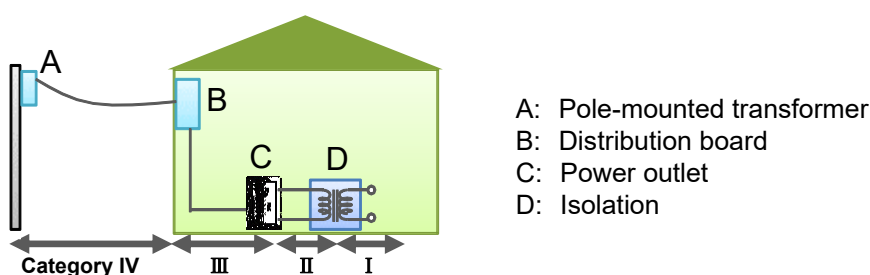


Figure 4-1 The overview of overvoltage categories

Table 4-1 Acceptable transient voltage values

Nominal voltage Vrms	Acceptable transient voltage values (V)			
	Category I	Category II	Category III	Category IV
50	330	500	800	1500
100	500	800	1500	2500
150	800	1500	2500	4000
300	1500	2500	4000	6000
600	2500	4000	6000	8000
1000	4000	6000	8000	12000

4.2. Pollution degree

This section classifies the pollution degree based on the operating environment of electrical equipment. As the pollution degree increases, higher parameters such as creepage distance and clearance are required.

Pollution degree 1:	Pollutants are either non-existent or present only in dry, non-conductive form, for example, potted and fully sealed devices that prevent ingress of dust and humidity.
Pollution degree 2:	Pollutants are entirely non-conductive but could potentially be rendered conductive by condensation, for example, at the typical office or home environment.
Pollution degree 3:	Either conductive pollutants are present, or condensation could cause dry, non-conductive pollutants to become conductive; for example, at a manufacturing facility.
Pollution degree 4:	Conductive matter is present on an ongoing basis (such as dust particles, rain or snow), for example, in an outdoor environment.

4.3. CTI (Comparative Tracking Index)

Tracking is a phenomenon in which repeated micro-discharges on the surface of an insulating material create conductive paths that lead to dielectric breakdown. IEC 60112 defines CTI as the maximum possible voltage before droplets of ammonium chloride solution on the surface of the insulating material cause tracking, under the given test conditions. IEC 60664-1 groups molded materials according to CTI value

Material Group I:	$600 \leq \text{CTI}$
Material Group II:	$400 \leq \text{CTI} < 600$
Material Group IIIa:	$175 \leq \text{CTI} < 400$
Material Group IIIb:	$100 \leq \text{CTI} < 175$
IEC 60664-1:	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements, and tests
IEC 60112:	Method for the determination of the proof and the comparative tracking indices of solid insulating materials

4.4. Types of insulation

Types of insulation are classified into five types in IEC 62368-1.

- Functional insulation : Minimum level of insulation required to ensure intended operation. Will not prevent electric shock but should reduce the likelihood of sparking.
- Basic insulation : Base level of protection from electric shock.
- Supplementary insulation : Additional independent insulation designed to decrease the risk of electric shock in the event of damage to the basic insulation.
- Double insulation : Combination of basic and supplementary insulation.
- Reinforced insulation : Single insulation layer deemed equivalent to double insulation in terms of protection from electric shock.

4.5. Insulation protection class

IEC 62368-1 classifies the insulation-protection classes for electric shock into three classes.

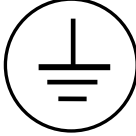
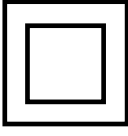
- Class I: Provides basic insulation against electric shock, and conductive parts that people may contact are connected to protective ground in building wiring in the event of damage to the basic insulation.
- Class II: Protection against electric shock is not only provided by basic insulation, but also separated by double insulation consisting of basic insulation and additional insulation or reinforced insulation.
- Class III: Uses a SELV power supply to ensure that voltage cannot cause electric shock.

Class I electrical equipment must be connected to protective earth. For permanently connected equipment, the protective earth terminal must be labeled as shown in Table 4.2.

Class II equipment should be provided with supplementary insulation to prevent dangerous voltage in the event of damage to the basic insulation, and normally labeled as table4.2

Class III electrical equipment fitted with a SELV (Separated Extra Low Voltage) power supply is incapable of causing an electric shock, so the safety requirements do not apply. Types of insulation are classified into five types in IEC 62368-1.

Table 4-2 Insulation protection class marks

Class I protection earth	Class II
	

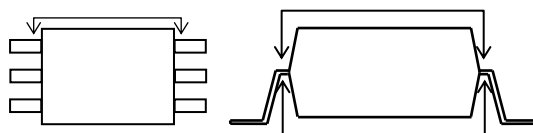
5. Structural parameters for digital isolators

The required physical separation for insulated parts varies depending on the operating environment and type of insulation. The structural parameters of a digital isolator are shown in Table 5.1 and Figure 5.1.

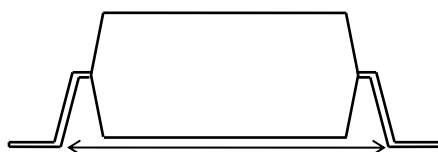
Table 5-1 Structural parameters for digital isolators

Parameter	Description
Creepage Distance	Shortest distance along the surface of insulating material between the two conductors (input and output)
Clearance Distance	Shortest distance in air clearance between the two conductors (input and output)
Internal isolation thickness	Thickness of the insulating layer (oxide) formed on IC chip

Creepage Distance



Clearance Distance



Internal isolation thickness

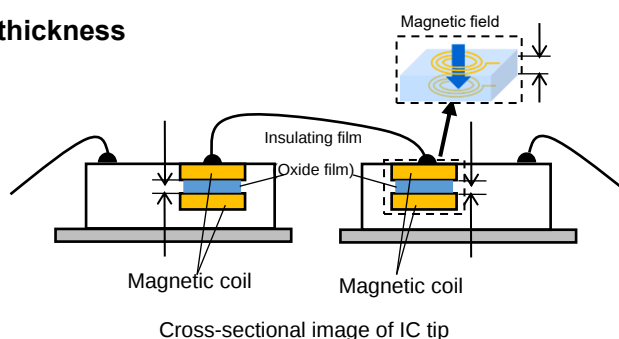


Figure 5-1 Structural parameters for digital isolators

5.1. Types of insulation

Defined as the creepage distance of the package, and required distance is decided including CTI value of the package material (material grouping). In addition, the creepage distance must be equal to or greater than the clearance distance. For example, the smallest creepage length for Group I with a CTI of 600 or greater is shown in Table 5.2. Basically, the space distance required for reinforced insulation is twice the distance required for basic insulation.

Table 5-2 Minimum creepage distance based on IEC 62368-1 definitions

Unit : [mm]

Maximum working voltage Vrms	Basic insulation	Reinforced insulation
160	0.8	1.6
200	1.0	2.0
250	1.25	2.5
320	1.6	3.2
400	2.0	4.0
630	3.2	6.4
800	4.0	8.0

Above chart is assuming Group I materials and pollution degree 2,

Linear interpolation can be used for voltages between the figures given above.

5.2. Clearance distance

Clearance distances are specified in IEC 60664-1 and determined by various conditions such as overvoltage category and pollution degree. The higher isolation voltage requires the longer distances. In the case of the altitudes of 2000m or higher, increase the clearance distance by a certain factor is needed.

5.3. Insulation thickness

The IEC 62368-1 equipment standard does not specify a minimum insulation thickness for functional and basic insulation, but it specifies that a minimum insulation thickness is more than 0.4mm for supplementary and reinforced insulation. However, minimum insulation thickness requirements do not apply to products that are compliant with IEC 60747-17.

6. Conclusion

This document explains overview of safety standards for Digital Isolator, but there may be other conditions what is not mentioned in this document. When selecting a digital isolator, please refer to the original text of the most suitable and latest safety standards.

Revision history

Version	Date	Details
Rev. 1.0	2024-12-11	First Edition

RESTRICTIONS ON PRODUCT USE

Toshiba Corporation and its subsidiaries and affiliates are collectively referred to as "TOSHIBA".
Hardware, software and systems described in this document are collectively referred to as "Product".

- TOSHIBA reserves the right to make changes to the information in this document and related Product without notice.
- This document and any information herein may not be reproduced without prior written permission from TOSHIBA. Even with TOSHIBA's written permission, reproduction is permissible only if reproduction is without alteration/omission.
- Though TOSHIBA works continually to improve Product's quality and reliability, Product can malfunction or fail. Customers are responsible for complying with safety standards and for providing adequate designs and safeguards for their hardware, software and systems which minimize risk and avoid situations in which a malfunction or failure of Product could cause loss of human life, bodily injury or damage to property, including data loss or corruption. Before customers use the Product, create designs including the Product, or incorporate the Product into their own applications, customers must also refer to and comply with (a) the latest versions of all relevant TOSHIBA information, including without limitation, this document, the specifications, the data sheets and application notes for Product and the precautions and conditions set forth in the "TOSHIBA Semiconductor Reliability Handbook" and (b) the instructions for the application with which the Product will be used with or for. Customers are solely responsible for all aspects of their own product design or applications, including but not limited to (a) determining the appropriateness of the use of this Product in such design or applications; (b) evaluating and determining the applicability of any information contained in this document, or in charts, diagrams, programs, algorithms, sample application circuits, or any other referenced documents; and (c) validating all operating parameters for such designs and applications. **TOSHIBA ASSUMES NO LIABILITY FOR CUSTOMERS' PRODUCT DESIGN OR APPLICATIONS.**
- **PRODUCT IS NEITHER INTENDED NOR WARRANTED FOR USE IN EQUIPMENTS OR SYSTEMS THAT REQUIRE EXTRAORDINARILY HIGH LEVELS OF QUALITY AND/OR RELIABILITY, AND/OR A MALFUNCTION OR FAILURE OF WHICH MAY CAUSE LOSS OF HUMAN LIFE, BODILY INJURY, SERIOUS PROPERTY DAMAGE AND/OR SERIOUS PUBLIC IMPACT ("UNINTENDED USE").** Except for specific applications as expressly stated in this document, Unintended Use includes, without limitation, equipment used in nuclear facilities, equipment used in the aerospace industry, lifesaving and/or life supporting medical equipment, equipment used for automobiles, trains, ships and other transportation, traffic signaling equipment, equipment used to control combustions or explosions, safety devices, elevators and escalators, and devices related to power plant. **IF YOU USE PRODUCT FOR UNINTENDED USE, TOSHIBA ASSUMES NO LIABILITY FOR PRODUCT.** For details, please contact your TOSHIBA sales representative or contact us via our website.
- Do not disassemble, analyze, reverse-engineer, alter, modify, translate or copy Product, whether in whole or in part.
- Product shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable laws or regulations.
- The information contained herein is presented only as guidance for Product use. No responsibility is assumed by TOSHIBA for any infringement of patents or any other intellectual property rights of third parties that may result from the use of Product. No license to any intellectual property right is granted by this document, whether express or implied, by estoppel or otherwise.
- **ABSENT A WRITTEN SIGNED AGREEMENT, EXCEPT AS PROVIDED IN THE RELEVANT TERMS AND CONDITIONS OF SALE FOR PRODUCT, AND TO THE MAXIMUM EXTENT ALLOWABLE BY LAW, TOSHIBA (1) ASSUMES NO LIABILITY WHATSOEVER, INCLUDING WITHOUT LIMITATION, INDIRECT, CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OR LOSS, INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, LOSS OF OPPORTUNITIES, BUSINESS INTERRUPTION AND LOSS OF DATA, AND (2) DISCLAIMS ANY AND ALL EXPRESS OR IMPLIED WARRANTIES AND CONDITIONS RELATED TO SALE, USE OF PRODUCT, OR INFORMATION, INCLUDING WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, ACCURACY OF INFORMATION, OR NONINFRINGEMENT.**
- Do not use or otherwise make available Product or related software or technology for any military purposes, including without limitation, for the design, development, use, stockpiling or manufacturing of nuclear, chemical, or biological weapons or missile technology products (mass destruction weapons). Product and related software and technology may be controlled under the applicable export laws and regulations including, without limitation, the Japanese Foreign Exchange and Foreign Trade Law and the U.S. Export Administration Regulations. Export and re-export of Product or related software or technology are strictly prohibited except in compliance with all applicable export laws and regulations.
- Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. Please use Product in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. **TOSHIBA ASSUMES NO LIABILITY FOR DAMAGES OR LOSSES OCCURRING AS A RESULT OF NONCOMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS.**