

# INTERNATIONAL STANDARD

**Organic light emitting diode (OLED) displays –  
Part 2-1: Essential ratings and characteristics of OLED display modules**

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Part 2-1: Essential ratings and characteristics of OLED display modules**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ORGANIC LIGHT EMITTING DIODE (OLED) DISPLAYS –****Part 2-1: Essential ratings and characteristics of OLED display modules**

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International Standard IEC 62341-2-1 has been prepared by technical committee 110: Electronic display devices.

The text of this standard is based on the following documents:

FDIS	Report on voting
110/651/FDIS	110/666/RVD

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

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

A list of all parts in the IEC 62341 series, published under the general title *Organic light emitting diode (OLED) displays*, can be found on the IEC website.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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## INTRODUCTION

IEC 62341 consists of the following parts, under the general title *Organic light emitting diode (OLED) displays*:

- Part 1-1: Generic specifications
- Part 1-2: Terminology and letter symbols
- Part 2-1: Essential ratings and characteristics of OLED display modules
- Part 5: Environmental testing methods
- Part 5-2: Mechanical endurance testing methods
- Part 5-3: Measuring methods of image sticking and lifetime
- Part 6-1: Measuring methods of optical and electro-optical parameters
- Part 6-2: Measuring methods of visual quality and ambient performance
- Part 6-3: Measuring methods of image quality

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# ORGANIC LIGHT EMITTING DIODE (OLED) DISPLAYS –

## Part 2-1: Essential ratings and characteristics of OLED display modules

### 1 Scope

This part of IEC 62341 describes the essential ratings and characteristics of organic light emitting diode (OLED) display modules.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

Void.

### 3 Organic light emitting diode (OLED) display modules

#### 3.1 Types of OLED display modules

The OLED display modules include the following types:

- passive matrix monochrome OLED display modules,
- passive matrix colour OLED display modules,
- active matrix colour OLED display modules.

#### 3.2 Principles and structure

The OLED display modules consist of OLED display panels, electronic circuits, and usually bezels.

EXAMPLE A thin film transistor (TFT) (polycrystalline silicon, oxide, organic materials) active matrix display cell with electronic circuits and connector pins.

#### 3.3 Modes of operation

##### 3.3.1 Addressing mode of operation

The addressing mode of operation for OLED display modules includes the following types:

- passive matrix,
- active matrix, etc.

##### 3.3.2 Optical mode of operation

The addressing mode of operation for OLED display modules includes the following types:

- illumination mode: for example top-emission, bottom-emission,
- number of colours,
- number of grey scales.

### 3.4 Details of outline

#### 3.4.1 Material and mechanical description

The material and mechanical description of OLED display modules is as follows:

- substrate material: for examples glass, plastic, etc.,
- bezel material: for example plastic, metal, etc.

#### 3.4.2 Connection types

The connection types of OLED display modules are as follows:

- connector,
- flex cable,
- connection pins, etc.

#### 3.4.3 Outline drawing and dimensions

The outline drawing and dimensions of OLED display modules are as follows:

- overall dimensions,
- bezel dimensions,
- active display area and display centre.

### 3.5 Limiting values (absolute maximum rating system) over the operating temperature range, unless otherwise stated

The following limiting values should be specified in Table 1.

**Table 1 – Limiting values of OLED modules**

Subclause	Characteristics	Symbol	Requirements		Unit
			Min.	Max.	
3.5.1	Operating temperature	$T_{op}$	Min.	Max.	°C
3.5.2	Operating humidity	$H_{op}$		Max.	%
3.5.3	Storage temperature	$T_{stg}$	Min.	Max.	°C
3.5.4	Storage humidity	$H_{stg}$		Max.	%
3.5.5	Supplied voltages				
	Supply voltage for logic drive	$V_{DD} - V_{SS}$	Min.	Max.	V
	Supply voltage(s) for EL	$V_{EL}$	Min.	Max.	
3.5.6	Input signal voltages	$V_{IN}$	Min.	Max.	V

### 3.6 Electrical and optical characteristics

The following characteristics should be specified in Table 2.

**Table 2 – Electrical and optical characteristics of OLED modules**

Subclause	Characteristics	Condition at $T_{op} = 25\text{ °C}$ unless otherwise specified	Symbol	Requirements		Unit
				Min.	Max.	
3.6.1	Supplied voltages					
	Supply voltage for logic drive		$V_{DD} - V_{SS}$	Min.	Max.	V
3.6.2	Supply voltage(s) for EL		$V_{EI}$	Min.	Max.	
	Input signal voltages		$V_{IN}$	Min.	Max.	V
High level input signal voltage		$V_{INH}$	Min.	Max.		
Low level input signal voltage		$V_{INI}$	Min.	Max.		
Input analogue video signals (where appropriate)		$V_{VID}$	Min.	Max.		
3.6.3	Operating frequency (where appropriate)		$f_{op}$	Min.	Max.	Hz
	Frame frequency		$f_{FRM}$			
3.6.4	Supply currents	Conditions chosen to achieve maximum supply current, e.g. operating supply voltage, display pattern, etc. as appropriate	$I_{tot}$ or $I_{DD}$ and/or $I_{EE}$		Max.	mA
3.6.5	High level input signal current (where appropriate)		$I_{INH}$		Max.	mA
3.6.6	Low level input signal current (where appropriate)		$I_{INL}$		Max.	mA
3.6.7	Dark-room contrast ratio	Specified measuring method and conditions	$DRCR$	Min.		-
3.6.8	Ambient contrast ratio	Specified measuring method and conditions	$ACR$	Min.		-
3.6.9	Luminance (where appropriate)	Specified measuring method and conditions	$L$	Min.		cd/m <sup>2</sup>
	Luminance uniformity (where appropriate)		$L_{uni}$	Min.		-
	Color uniformity (where appropriate)		$\Delta u'v'$		Max.	-
3.6.10	Viewing angle range	Specified definition of viewing direction and specified contrast ratio	$\theta_V$ and $\theta_H$	Min.	Max.	°
3.6.11	Half luminance lifetime	Specified measuring method and conditions	$T_{50}$	Min.		h
3.6.12	Power consumption	Specified measuring method and conditions	$P$		Max.	W
3.6.13	Reflectance (where appropriate)	Specified measuring method and conditions	$\rho$		Max.	-
3.6.14	Chromaticity of white (x,y) (where appropriate)		$x_W, y_W$	a	a	-
	Chromaticity of red (x,y) (where appropriate)		$x_R, y_R$	a	a	
	Chromaticity of blue (x,y) (where appropriate)		$x_B, y_B$	a	a	
	Chromaticity of green (x,y) (where appropriate)		$x_G, y_G$	a	a	
3.6.15	Image sticking (where appropriate)	Specified measuring method and conditions	IS		Max.	-

<sup>a</sup> Items of value (i.e., minimum, maximum, typical or average) are determined in a detail specification.