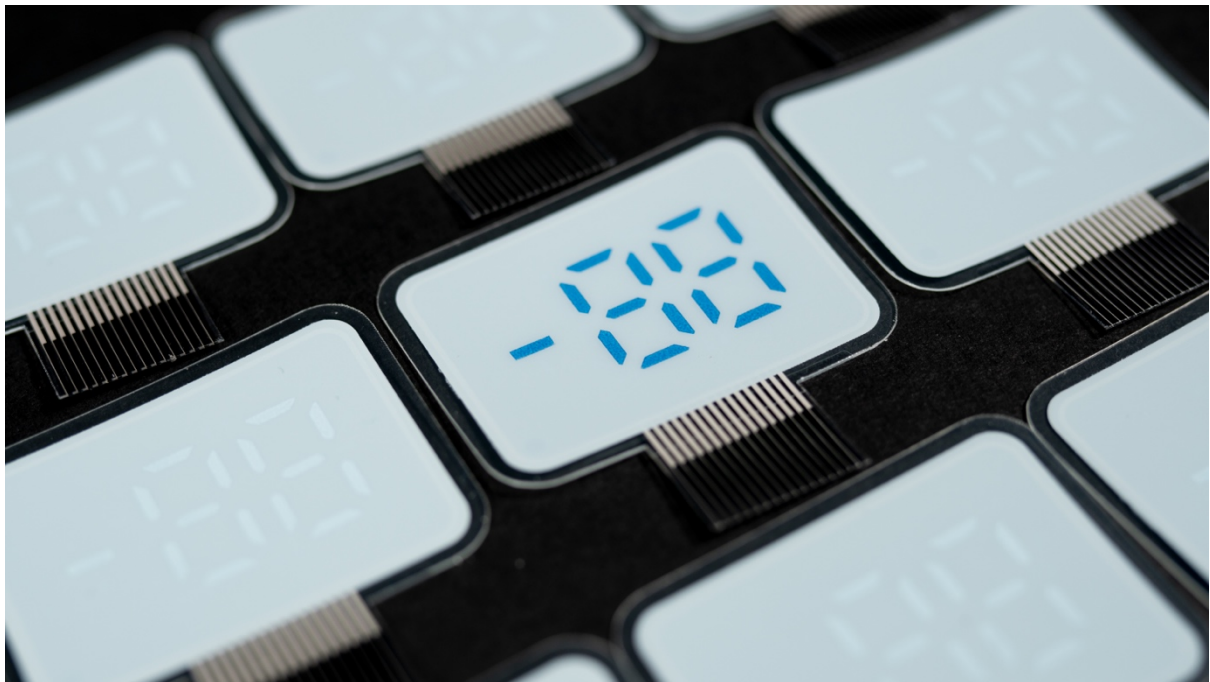


# Ynvisible Segment Display

D0430G01V01  
Datasheet



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## Version History

Version	Date	Description	Changed by
V1.0	2021-10-08	First issue	Philip Holgersson

## Notes

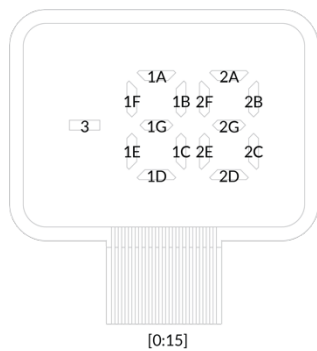
Ynvisible's displays shall not be used for equipment that requires extremely high reliability, such as nuclear power control equipment, medical equipment for life support, military and space applications, or aerospace equipment.

## 1. Introduction

This is an electrochromic seven-segment display. The display is reflective and has a very low angle dependency. It is ultra-low power and features semi-bistability, which means that the display mainly consumes power during display switches state but requires a short refresh pulse approximately once every 15 minutes. The display can be connected to and driven by almost all MCUs. The features are summarized in the list below:

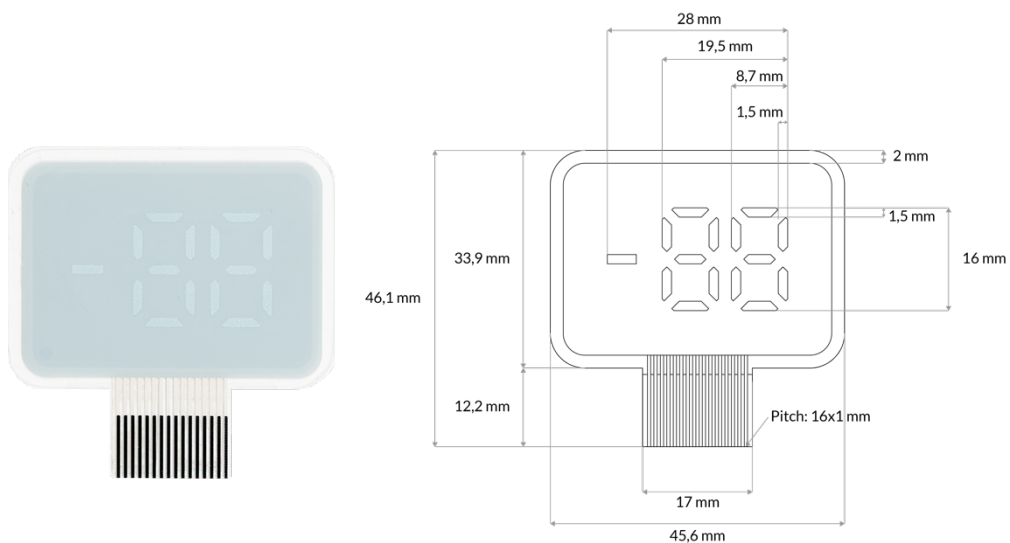
- A. Ultra-low power ( $< 1\mu\text{W}/\text{cm}^2$ )
- B. Reflective
- C. No viewing angle dependency
- D. Semi-bistable
- E. Flexible
- F. Environmentally friendly

## 2. Pinout



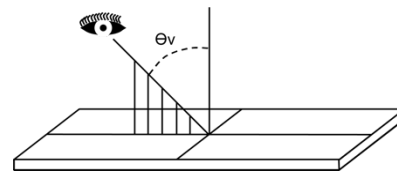
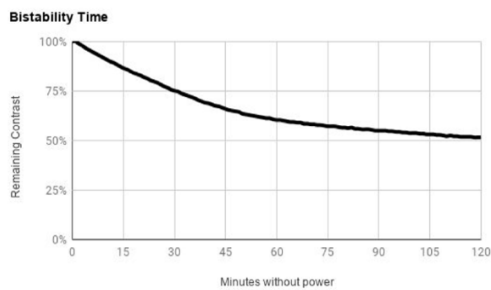
Pin	Segment	Pin	Segment
0	COM	8	1C
1	1B	9	2E
2	1A	10	2D
3	1F	11	2C
4	3	12	2G
5	1G	13	2B
6	1E	14	2A
7	1D	15	2F

## 3. Visual Appearance & Dimensions



## 4. Optical Characteristics

Parameter	Test condition	Min	Typical	Max	Unit
Contrast	25°C	27	30	32	$\Delta E$
Reflectance	Bright state	38%	40%	45%	Y-value
Reflectance	Dark state	8%	12%	14%	Y-value
Viewing angle ( $\Theta_v$ )			90		°
Bistability	25°C, 80%		15		Minutes



## 5. Mechanical Characteristics

Parameter	Min	Typical	Max	Unit
Thickness		350		$\mu\text{m}$
Weight		6,9		g
Bend radius		10		mm

## 6. Timing Characteristics

Parameter	Test Condition	Min	Typical	Max	Unit
Coloring	3V, 4 mm <sup>2</sup> , 25°C		200		ms
Bleaching	-3V, 4 mm <sup>2</sup> , 25°C		160		ms

## 7. Electrical Characteristics

Parameter	Test Condition	Min	Typical	Max	Unit
Energy consumption (switch)	3V, 25°C, All segments coloring		1,56		mJ
Supply Current (average)	3V, 25°C, All segments colored		0,14		µA
Recommended Coloring voltage		2,2	3	3,3	V
Recommended Bleaching voltage		-1,2	-3	3,3	V

## 8. Power Consumption

Parameter	Test Condition	Min	Typical	Max	Unit
Average power consumption	Static drive		0,44		µW
Average power consumption	Dynamic drive, 10 updates per day		0,59		µW
Average power consumption	Dynamic drive, 100 updates per day		2,00		µW
Average power consumption	Dynamic drive, 1000 updates per day		16,06		µW

## 9. Operating Conditions

Parameter	Min	Max	Unit	Method
Operating temperature	-20	60	°C	Internal
Operating humidity	5	95	RH	Internal
Storage temperature	-20	60	°C	Internal

### 9.1 UV Exposure

The display is mainly intended for indoor applications, extended UV exposure may cause degradation.

## 10. Lifetime

Parameter	Test Condition	Min	Typical	Max	Unit	Method
Number of switches	25°C	10 000	100 000	-	Switch cycles	Internal

## 11. Integration

### 11.1 Connectors

Name	Pitch	Type
FH12-16-1SH	1000 µm	ZIF Connector
HFW16R-1STE1H1LF	1000 µm	Non-ZIF Connector

### 11.2 Anisotropic Conductive Film

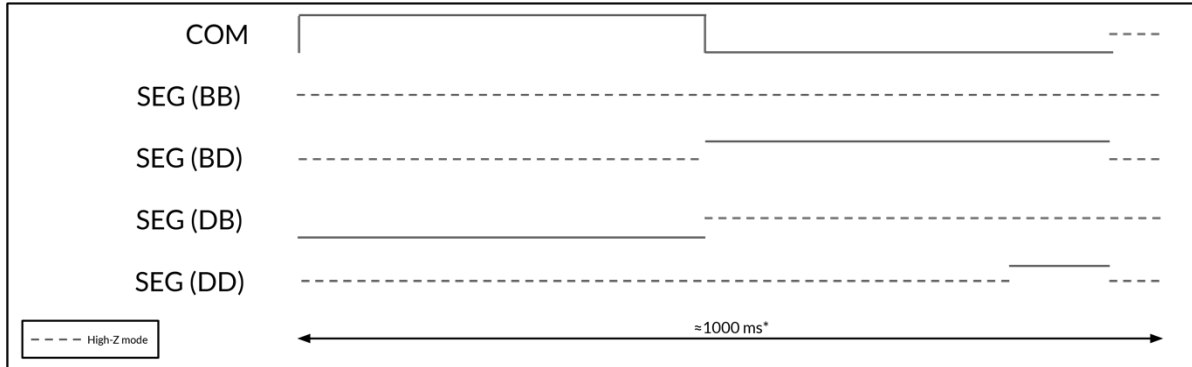
Product name	Comments
3M Electrically Conductive Adhesive Transfer Tape 9703	Can be applied by hand in room temperature conditions, good for prototyping.

### 11.3 Anisotropic Glue

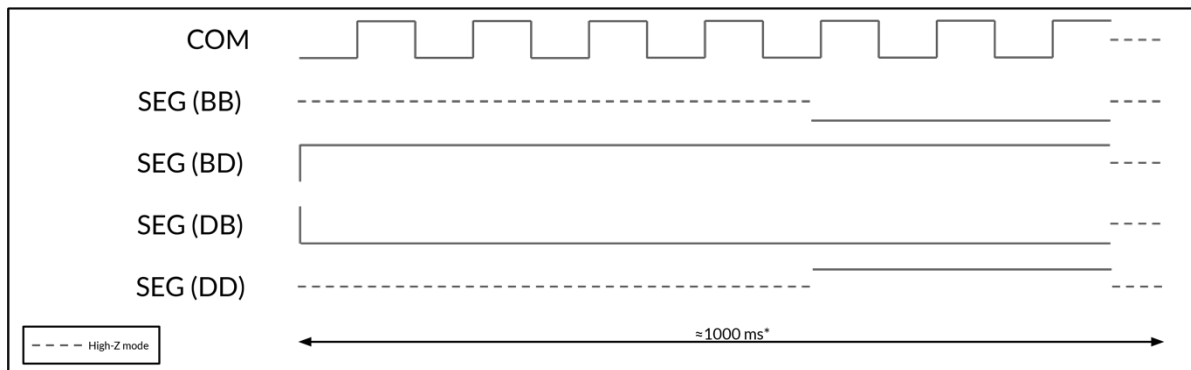
Product Name	Comments
Delo IC343	Isotropic conductive

## 12. Driving Schemes

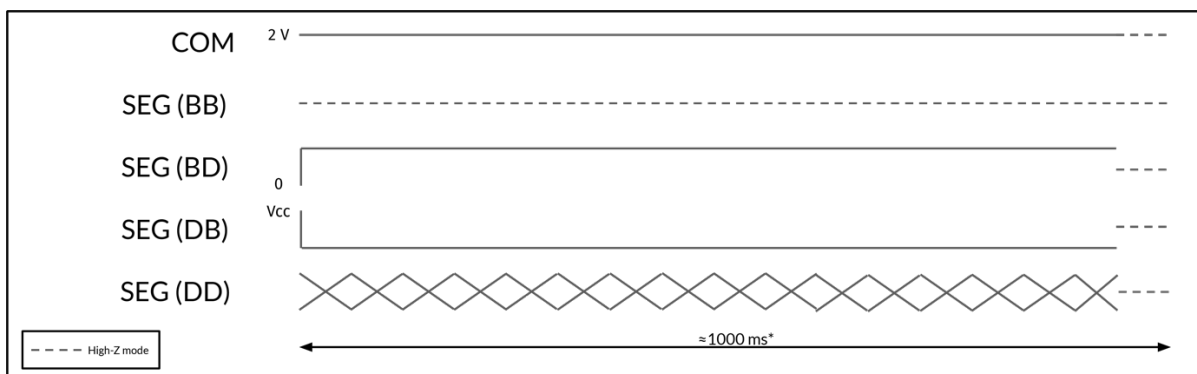
### 12.1 Driving Scheme A



### 12.2 Driving Scheme B



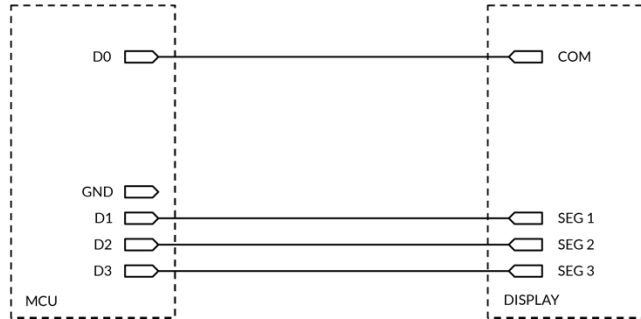
### 12.3 Driving Scheme C



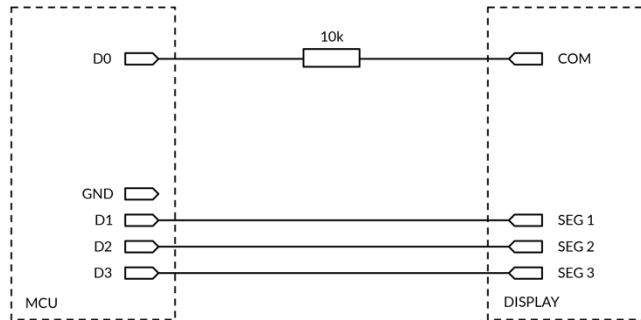


## 13. Circuit Suggestions

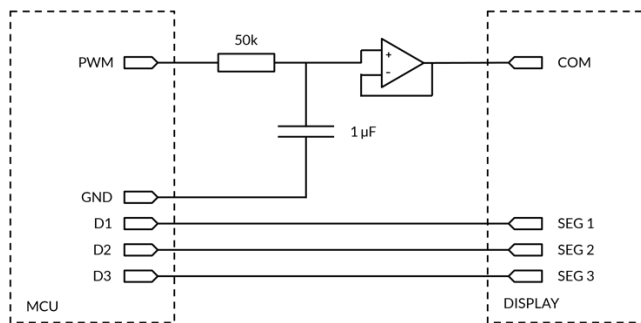
### 13.1 – Circuit Example 1



### 13.2 – Circuit Example 2



### 13.3 – Circuit Example 3



Component	Example	Value	Unit	Comment
Resistor		50	kΩ	Different resistor values may be used dependent on PWM frequency and required response time.
Capacitor		0,1	µF	Different capacitors may be used dependent on PWM frequency and required response time.
Operational amplifier	Texas Instruments TLV9001SIDBVR			Used to maintain a stable com potential at different loads.