

# The Global Market for Advanced Electronic Displays 2022-2032

<https://marketpublishers.com/r/GE01D31642E0EN.html>

Date: May 2022

Pages: 0

Price: US\$ 1,400.00 (Single User License)

ID: GE01D31642E0EN

## Abstracts

The global display industry is worth in excess of \$165 billion and will continue to grow as the industry expands into next generation technologies and TV display performance improves. The Advanced Display market includes next generation digital displays for electronics devices such as High Definition smart TVs, notebooks, tablets, large screen displays & signage, in-vehicle displays, wearables and near-eye displays such as virtual reality and augmented reality. Demand for high performance displays has increased in the past 18 months and QD-OLED and MiniLED backlights for LCD TVs have emerged recently.

The display industry is constantly evolving and developing new, better technologies in the quest for improved visual experience and reduced power consumption. Manufacturers are seeking next generation displays that will deliver the best performance and meet challenging demands set by the booming applications such as VR/AR.

MiniLED and microLED display are emerging and have potential to become disruptive technologies. The display market has witnessed a great deal of innovation over the past 2 years. Players are seeking to improve market size and additional value via developing innovative new display technologies.

Report contents include:

Display products and technologies by major brands and display makers.

Market analysis of applications and markets for flexible and printed displays, automotive displays & lighting, Smart glasses and AR/VR, quantum dot displays,

advanced OLED displays, MicroLED and MiniLED.

Smartphone display technologies including foldable, rollable and multi-fold technologies.

Global revenues, historical and forecast to 2032

Profiles of more than 275 companies. Companies profiled include Amorphyx Inc., BOE Technology, eMagin Corporation, Etulipa, FlexEnable, Jade Bird Display, Kubos Semiconductors, Kura Technologies, Kyulux, LetinAR, LG Display, Mojo Vision, Nanoco, Nanolumi, Nanosys, Noctiluca, OTI Lumionics, Porotech, Royole Corporation, Samsung, Sony, VueReal, X-Display.

## Contents

### 1 THE GLOBAL DISPLAY MARKET

#### 1.1 Display technologies assessment

### 2 FLEXIBLE AND PRINTED DISPLAYS

#### 2.1 Current state of the art

##### 2.1.1 Flexible and printed display prototypes and products

##### 2.1.2 Organic LCDs (OLCDs)

##### 2.1.3 Printed OLEDs

###### 2.1.3.1 Performance

###### 2.1.3.2 Challenges

###### 2.1.3.3 Commercial inkjet-printed OLED displays

#### 2.2 Flexible inorganic light emitting diodes

#### 2.3 Foldable and rollable displays

##### 2.3.1 Smartphones

##### 2.3.2 Laptops, tablets and other displays

##### 2.3.3 Products and prototypes

#### 2.4 Flexible lighting

##### 2.4.1 OLED lighting

##### 2.4.2 Automotive applications

###### 2.4.2.1 Commercial activity

#### 2.5 Flexible electrophoretic displays

##### 2.5.1 Commercial activity

#### 2.6 Electrowetting displays

#### 2.7 Electrochromic displays

#### 2.8 Perovskite light-emitting diodes (PeLEDs)

##### 2.8.1 Types

##### 2.8.2 Challenges

##### 2.8.3 White PeLEDs

##### 2.8.4 Printable and flexible electronics

#### 2.9 Metamaterials

##### 2.9.1 Metasurfaces

###### 2.9.1.1 Meta-Lens

###### 2.9.1.2 Metasurface holograms

###### 2.9.1.3 Stretchable displays

###### 2.9.1.4 Soft materials

- 2.10 Global market revenues 2018-2032
  - 2.10.1 Flexible and printed displays
  - 2.10.2 Foldable smartphone market
- 2.11 Company profiles 77 (66 company profiles)

### **3 AUTOMOTIVE DISPLAYS AND LIGHTING**

- 3.1 LCDs in automotive displays
- 3.2 OLEDs in automotive displays
  - 3.2.1 Passive-matrix OLEDs (PMOLED) in automotive
  - 3.2.2 Active-matrix OLED (AMOLED) in automotive
- 3.3 Mini LED in automotive displays
- 3.4 Micro LED in automotive displays
- 3.5 Autonomous vehicles, EVs and AI/AR
- 3.6 Interior displays
  - 3.6.1 Touchscreens
  - 3.6.2 Large screens
  - 3.6.3 Enhanced safety with in-vehicle displays
  - 3.6.4 Curved and flexible displays for automotive
    - 3.6.4.1 Flexible OLED
      - 3.6.4.1.1 Advantages
      - 3.6.4.1.2 Challenges
    - 3.6.4.2 Flexible LCD displays
  - 3.6.5 Micro-LED automotive displays
    - 3.6.5.1 Interior displays
    - 3.6.5.2 Head-up display (HUD)
    - 3.6.5.3 Headlamps
  - 3.6.6 Interior OLED lighting
  - 3.6.7 Smart dimming windows
  - 3.6.8 Metamaterials
- 3.7 Exterior displays and lighting
  - 3.7.1 OLED lighting
    - 3.7.1.1 Position lamps/ Marker Lamps
  - 3.7.2 MiniLEDs lighting
  - 3.7.3 Digital side-view mirrors
- 3.8 3D Display Technology
- 3.9 Head-up displays (HUDs)
  - 3.9.1 AR-HUDs
  - 3.9.2 Transparent OLEDs

- 3.10 Global market revenues 2018-2032
- 3.11 Company profiles 163 (16 company profiles)

## **4 SMART GLASSES AND HEAD-MOUNTED DISPLAYS (VR, AR, MR, VISION LOSS AND EYE TRACKERS)**

- 4.1 Metaverse
- 4.2 Commercialization
- 4.3 Virtual Reality (VR) devices
  - 4.3.1 VR headset products
- 4.4 Augmented (AR) headsets and smart glasses
  - 4.4.1 Laser Beam Scanning
  - 4.4.2 Products
- 4.5 Mixed Reality (MR) smart glasses
  - 4.5.1 Mixed Reality (MR) smart glass products
- 4.6 OLED microdisplays
- 4.7 MiniLED
- 4.8 MicroLED
  - 4.8.1 Product developers
- 4.9 Global market revenues 2018-2032
- 4.10 Company profiles 192 (69 company profiles)

## **5 QUANTUM DOTS IN ADVANCED DISPLAYS**

- 5.1 Market overview
- 5.2 QD advantages
- 5.3 Market growth since 2013
- 5.4 QD-TVs market
- 5.5 The Quantum Dot market in 2021 and future outlook
  - 5.5.1 Samsung QD Display
- 5.6 Cadmium vs. cadmium free
  - 5.6.1 Cadmium QDs
  - 5.6.2 Cadmium-free QDs
  - 5.6.3 European commission ban use of cadmium in TVs and displays
  - 5.6.4 Perovskite quantum dots
  - 5.6.5 Carbon and graphene quantum dots
  - 5.6.6 Quantum Dot Revenues
  - 5.6.7 Market drivers and trends
  - 5.6.8 Market challenges

- 5.7 Quantum dot properties, synthesis, types
  - 5.7.1 Properties
  - 5.7.2 Synthesis
  - 5.7.3 Types
    - 5.7.3.1 Cadmium Selenide, Cadmium Sulfide and other materials
    - 5.7.3.2 Cadmium free quantum dots
  - 5.7.4 Graphene quantum dots (GQDs)
    - 5.7.4.1 Properties
    - 5.7.4.2 Synthesis
    - 5.7.4.3 Applications
  - 5.7.5 Perovskite quantum dots (PQDs)
    - 5.7.5.1 Properties
    - 5.7.5.2 Comparison to conventional quantum dots
    - 5.7.5.3 Synthesis methods
    - 5.7.5.4 Applications
      - 5.7.5.4.1 Displays
    - 5.7.5.5 Producers
- 5.8 Licensing, collaborations and partnerships
- 5.9 Supply chain
- 5.10 Quantum dots in TVs/displays
  - 5.10.1 Market drivers and trends
  - 5.10.2 LCDS vs. OLEDs vs. QD-LCDs/QLEDs
    - 5.10.2.1 Liquid Crystal Displays (LCD)
  - 5.10.3 QD-LCD TVs/QLEDs
  - 5.10.4 Quantum dot enhancement film (QDEF) for current QLEDs
  - 5.10.5 Quantum Dot on Glass (QDOG)
  - 5.10.6 Quantum dot colour filters
  - 5.10.7 Quantum dots on-chip
  - 5.10.8 Electroluminescent quantum dots
    - 5.10.8.1 QD-Micro-LEDs
  - 5.10.9 Flexible QD displays
    - 5.10.9.1 Flexible QLEDs
  - 5.10.10 LG's 'QNED' LCD TVs
  - 5.10.11 QD-OLED
    - 5.10.11.1 Samsung
    - 5.10.11.2 Sony
    - 5.10.11.3 TCL
  - 5.10.12 Alienware
  - 5.10.13 Industry and research developments 2013-2022

- 5.11 Global market for quantum dots in TVs and displays to 2032
  - 5.11.1.1 QD-TV unit sales 2016-2032
  - 5.11.1.2 QD Monitor Unit sales 2015-2032
- 5.12 Quantum dot display company profiles 303 (44 company profiles)

## **6 MINI AND MICRO LEDS**

- 6.1 Market overview
  - 6.1.1 The MiniLED market
  - 6.1.2 The MicroLED market
  - 6.1.3 Motivation for use of MiniLEDs and MicroLEDs
    - 6.1.3.1 MiniLED and MicroLEDs applications
  - 6.1.4 Market and technology challenges
  - 6.1.5 Industry developments 2020-2022
  - 6.1.6 CES 2021
  - 6.1.7 CES 2022
  - 6.1.8 Market activity in China
  - 6.1.9 Global shipment forecasts for Micro and MicroLEDs
    - 6.1.9.1 MiniLEDs
      - 6.1.9.1.1 Units
    - 6.1.9.2 MicroLEDs
      - 6.1.9.2.1 Units
- 6.2 Technology background
  - 6.2.1 MiniLED (mLED) vs MicroLED ( $\mu$ LED)
  - 6.2.2 MiniLED
    - 6.2.2.1 Comparison to LCD and OLED
    - 6.2.2.2 Advantages and disadvantages
    - 6.2.2.3 Backplane types
    - 6.2.2.4 Costs
  - 6.2.3 MicroLED
    - 6.2.3.1 Development
      - 6.2.3.1.1 Sony
    - 6.2.3.2 Types
    - 6.2.3.3 Comparison to LCD and OLED
    - 6.2.3.4 MicroLED displays
    - 6.2.3.5 Advantages
      - 6.2.3.5.1 Transparency
      - 6.2.3.5.2 Borderless
      - 6.2.3.5.3 Flexibility

- 6.2.3.6 Costs
- 6.2.3.7 Manufacturing
  - 6.2.3.7.1 Epitaxy and Chip Processing
    - 6.2.3.7.1.1 Uniformity
  - 6.2.3.7.2 Assembly Technologies
    - 6.2.3.7.2.1 Monolithic fabrication of microdisplays
    - 6.2.3.7.2.2 Mass transfer
    - 6.2.3.7.2.3 Mass Transfer Processes
  - 6.2.3.7.3 Full colour conversion
    - 6.2.3.7.3.1 Phosphor Colour Conversion LEDs
    - 6.2.3.7.3.2 Quantum dots colour conversion
- 6.3 Display backlights
  - 6.3.1 TVs
    - 6.3.1.1 The market in 2021
    - 6.3.1.2 MiniLED Quantum Dot TV
    - 6.3.1.3 Products with miniLED backlight
  - 6.3.2 Smartwatches and wearables
  - 6.3.3 Smartphones
  - 6.3.4 Samsung
    - 6.3.4.1 Wall display and microLED TV
    - 6.3.4.2 Neo QLED TV range
  - 6.3.5 LG
    - 6.3.5.1 LG mini QNED range
    - 6.3.5.2 MAGNIT MicroLED TV
  - 6.3.6 TCL
    - 6.3.6.1 8 Series and 6 Series
- 6.4 Laptops, monitors and tablets
  - 6.4.1 MiniLED
  - 6.4.2 Apple
- 6.5 Flexible and foldable microLED
  - 6.5.1 Foldable microLED displays
  - 6.5.2 Product developers
- 6.6 Biotechnology and medical displays
  - 6.6.1 MicroLEDS
  - 6.6.2 Product developers
- 6.7 Automotive
  - 6.7.1 MiniLED
  - 6.7.2 MicroLED
  - 6.7.3 Product developers



## 6.8 Transparent displays

6.8.1 Applications

6.8.2 MicroLEDs

6.8.3 Product developers

## 6.9 Supply chain

6.9.1 miniLEDs

6.9.2 microLEDs

## 6.10 Company profiles 405 (71 company profiles)

# 7 ADVANCED OLEDS

7.1 OLED compared to LCD and MicroLED

7.2 OLED tablets

7.3 Flexible AMOLEDs

7.4 Flexible PMOLED (Passive Matrix OLED)

7.5 Phosphorescent organic light-emitting diodes (PHOLED)

7.6 White OLED (WOLED)

7.7 TADF

7.8 Printed OLED displays

7.9 OLED displays with Artificial Intelligence (AI)

7.10 Transparent OLED display

7.10.1 Transparent suspended particle device (SPD) displays

7.11 Global market revenues 2018-2032 (Millions USD)

7.12 Company profiles 500 (19 company profiles)

# 8 REFERENCES

## List Of Tables

### LIST OF TABLES

- Table 1. Summary of display technologies.
- Table 2. Flexible and printed displays products.
- Table 3. Comparison of performance metrics between microLEDs and other commercial display technologies.
- Table 4. Foldable smartphones, laptops and tablets and other display products, on or near market.
- Table 5. Companies developing OLED lighting products.
- Table 6. Types of electrochromic materials and applications.
- Table 7. Schematic of Magic Glass.
- Table 8. Recent commercial activity in mini LED and micro LED for automotive displays.
- Table 9. Companies developing curved automotive displays.
- Table 10. Applications of microLED in automotive.
- Table 11. Properties of light sources used in vehicles.
- Table 12. Examples of OLED lighting in automobiles.
- Table 13. Companies developing 3D display technology for automobiles.
- Table 14. Commercial automotive HUDs.
- Table 15. Example smart glasses companies and products.
- Table 16. Example VR headset products.
- Table 17. Key requirements for AR wearable devices.
- Table 18. Augmented reality (AR) smart glass products.
- Table 19. Mixed Reality (MR) smart glass products.
- Table 20. Comparison of AR Display Light Engines.
- Table 21. VR and AR MicroLED products.
- Table 22. Quantum dot display products.
- Table 23. New quantum dot TVs 2021-2022.
- Table 24: Total QD-based component revenues 2015-2032 (\$M), conservative and optimistic estimates.
- Table 25: Market drivers and trends for quantum dots.
- Table 26: Market challenges for quantum dots.
- Table 27: Chemical synthesis of quantum dots.
- Table 28: Comparison of graphene QDs and semiconductor QDs.
- Table 29. Comparative properties of conventional QDs and Perovskite QDs.
- Table 30. Applications of perovskite QDs.
- Table 31. Development roadmap for perovskite QDs.
- Table 32. Properties of perovskite QLEDs comparative to OLED and QLED.

- Table 33: Quantum dots market structure.
- Table 34: Market drivers and trends for quantum dots in LCD TVs and Displays.
- Table 35: Advantages and disadvantages of LCDs, OLEDs and QDs.
- Table 36: Typical approaches for integrating QDs into displays.
- Table 37: Current and planned Quantum Dot TVs by manufacturer, availability, size range and price range.
- Table 38: QD colour filter options and advantages.
- Table 39: Commercial development and research highlights in quantum dots in LCDs and OLEDs 2013-2021.
- Table 40: QD-TV unit sales 2016-2032, conservative and optimistic estimate for QDEF film and Non-QDEF film.
- Table 41. MiniLED applications.
- Table 42. MicroLED applications.
- Table 43. Market and technology challenges for miniLED and microLED.
- Table 44. Micro and MicroLED industry developments 2020-2022.
- Table 45. MiniLED and microLED product announcements at CES 2021.
- Table 46. Mini/microLED activity in China.
- Table 47. MicroLED display forecast (thousands of units) to 2027.
- Table 48. Comparison between miniLED and microLED.
- Table 49. Comparison between miniLED displays and other display types.
- Table 50. Advantages and disadvantages of MiniLEDs.
- Table 51. MicroLED backlight costs.
- Table 52. Comparison to conventional LEDs.
- Table 53. Types of microLED.
- Table 54. Comparison to LCD and OLED.
- Table 55. Schematic comparison to LCD and OLED.
- Table 56. Commercially available microLED products and specifications.
- Table 57. microLED-based display advantages and disadvantages.
- Table 58. Mass transfer methods, by company.
- Table 59. Comparison of various mass transfer technologies.
- Table 60. Comparison of LED TV technologies.
- Table 61. MiniLED TV products.
- Table 62. Samsung Neo QLED TV range.
- Table 63. LG mini QNED range
- Table 64. TCL range of miniLED TVs.
- Table 65. MiniLED laptop, monitor and tablet products and prototypes.
- Table 66. Flexible miniLED and MicroLED products.
- Table 67. Medical display miniLED and MicroLED products.
- Table 68. Automotive display & backlight architectures

- Table 69. Automotive display miniLED and MicroLED products.
- Table 70. Applications of miniLED and microLED transparent displays.
- Table 71. Companies developing MicroLED transparent displays.
- Table 72. microLED supply chain.
- Table 73. LG mini QNED range
- Table 74. Samsung Neo QLED TV range.
- Table 75. San'an Mini and Micro LED Production annual target.
- Table 76. NPQDTM vs Traditional QD based Micro-LEDs.
- Table 77. TCL miniLED product range.
- Table 78. Advantages and disadvantages of LCD, OLED and MicroLED.
- Table 79. Technology specifications comparison.
- Table 80. OLED display tablets.
- Table 81. Companies developing transparent display products.

## List Of Figures

### LIST OF FIGURES

- Figure 1. The progress of display technology.
- Figure 2. LG Signature OLED TV R.
- Figure 3. Flexible display.
- Figure 4. DELL Ori.
- Figure 5. LG Media Chair.
- Figure 6. LG Virtual Ride.
- Figure 7. Organic LCD with a 10-mm bend radius.
- Figure 8. OLED structure.
- Figure 9. TCL printed OLED panel.
- Figure 10. OLEDIO 32-inch printed display by JOLED.
- Figure 11. Stamp-based transfer-printing techniques.
- Figure 12. Samsung S-foldable display.
- Figure 13. Samsung slideable display.
- Figure 14. Samsung foldable battery patent schematic.
- Figure 15. Rollable 65RX OLED TV.
- Figure 16. Lenovo ThinkPad X1 Fold.
- Figure 17. LG Chem foldable display.
- Figure 18. Samsung Display Flex G folding smartphones.
- Figure 19. Asus Foldable Phone.
- Figure 20. Asus Zenbook 17 Fold.
- Figure 21. Dell Concept Ori.
- Figure 22. Intel Foldable phone.
- Figure 23. ThinkPad X1 Fold.
- Figure 24. Motorola Razr.
- Figure 25. Oppo Find N folding phone.
- Figure 26. Royole FlexPai 2.
- Figure 27. Galaxy Fold 3.
- Figure 28. Samsung Galaxy Z Flip 3
- Figure 29. TCL Tri-Fold Foldable Phone
- Figure 30. TCL rollable phone.
- Figure 31. Xiaomi Mi MIX Flex.
- Figure 32. LG OLED flexible lighting panel.
- Figure 33. Flexible OLED incorporated into automotive headlight.
- Figure 34. Audi 2022 A8 .
- Figure 35. Electrophoretic display applications.

- Figure 36. Passive reflective displays with flexibility.
- Figure 37. Plastic Logic 5.4" Iridis display.
- Figure 38. Argil electrochromic film integrated with polycarbonate lenses.
- Figure 39. Scanning electron microscope (SEM) images of several metalens antenna forms.
- Figure 40. Design concepts of soft mechanical metamaterials with large negative swelling ratios and tunable stress-strain curves.
- Figure 41. Global flexible displays market revenues, 2018-2032 (billion US\$) 2018-2032.
- Figure 42. Foldable smartphone market 2019-2032 (units).
- Figure 43. e-Tint® cell in the (a) OFF and in the (b) ON states.
- Figure 44. Printed electroactive polymers.
- Figure 45. 1.39-inch full-circle microLED display
- Figure 46. 9.4' flexible MicroLED display.
- Figure 47. f-OLED N-shaped folding display.
- Figure 48. Transparent 3D touch control with LED lights and LED matrix.
- Figure 49. Application of Magic Glass in office.
- Figure 50. Installation schematic of Magic Glass.
- Figure 51. noDiffusion OLED encapsulation film.
- Figure 52. Helio materials incorporated into flexible displays.
- Figure 53. Flexible microLED.
- Figure 54. Hyperfluorescence OLED display.
- Figure 55. 110-inch flexible AM mini LED display developed by PanelSemi.
- Figure 56. Beyolex film.
- Figure 57. 9.4' flexible MicroLED display.
- Figure 58. 7.56-inch transparent Micro LED display.
- Figure 59. Micro-LED stretchable display.
- Figure 60. Samsung Flex Slidable.
- Figure 61. Samsung Flex S.
- Figure 62. Samsung Flex Note.
- Figure 63. TCL phone and tablet concepts.
- Figure 64. 7.56" Transparent Display.
- Figure 65. Ynvisible display module with integrated PragmatIC flexible integrated circuit.
- Figure 66. Passive-matrix OLED schematic.
- Figure 67. Active-matrix OLED (AMOLED) schematic.
- Figure 68. 2022 Mercedes EQE electric car.
- Figure 69. Levels of driving automation.
- Figure 70. Automotive model with large touchscreen displays.
- Figure 71. Curved OLED display as a side-view mirror replacement.

- Figure 72. MicroLED automotive display.
- Figure 73. Issues in current commercial automotive HUD.
- Figure 74. Rear lamp utilizing flexible MicroLEDs.
- Figure 75. BOE Side Window Dimming Concept.
- Figure 76. Anti-reflective metamaterials plastic.
- Figure 77. Audi Q5 OLED taillight schematic.
- Figure 78. Audi 2022 A8 and S8 digital OLED rear lights.
- Figure 79. Rohini LightThread flexible Mini LEDs.
- Figure 80. Continental 3D automotive display.
- Figure 81. AR HUD display.
- Figure 82. LG OLED Car Infotainment Demo.
- Figure 83. Transparent OLED schematic.
- Figure 84. Global market for automotive displays, 2018-2032 (Billion USD).
- Figure 85. LG automotive displays.
- Figure 86. LG Mercedes Hyperscreen.
- Figure 87. Royole's micro-LED based stretchable display technology.
- Figure 88. Vuzix Blade.
- Figure 89. AR operation.
- Figure 90. TCL Leiniao Air.
- Figure 91. Engo Eyewear.
- Figure 92. Lenovo ThinkReality A3.
- Figure 93. Magic Leap 1.
- Figure 94. Microsoft HoloLens 2.
- Figure 95. Snap Spectacles AR (4th gen).
- Figure 96. Vuzix Blade Upgraded.
- Figure 97. NReal Light MR smart glasses.
- Figure 98. Vuzix microLED microdisplay Smart Glasses
- Figure 99. Global market revenues for smart glasses 2018-2032-AR/VR and MR (million units).
- Figure 100. Dapeng DPVR P1 Pro 4k VR all-in-one VR glasses.
- Figure 101. Huawei smart glasses.
- Figure 102. Kura Technologies' AR Glasses.
- Figure 103. Smart contact lenses schematic.
- Figure 104. OQmented technology for AR smart glasses.
- Figure 105. VISIRIUM® Technology smart glasses prototype.
- Figure 106. JioGlass mixed reality glasses type headset.
- Figure 107. Xiaomi Smart Glasses.
- Figure 108: QLED TV from Samsung.
- Figure 109. QD display products.

- Figure 110: Samsung QDs utilized in range of QLED TVs.
- Figure 111. Schematic of QD-OLED hybrid.
- Figure 112: Perovskite quantum dots under UV light.
- Figure 113: Total QD component revenues 2013-2032 (\$M), conservative and optimistic estimates.
- Figure 114: Quantum dot schematic.
- Figure 115. Quantum dot size and colour.
- Figure 116: Schematic of (a) CQDs and (c) GQDs. HRTEM images of (b) C-dots and (d) GQDs showing combination of zigzag and armchair edges (positions marked as 1–4).
- Figure 117: Green-fluorescing graphene quantum dots.
- Figure 118: Graphene quantum dots.
- Figure 119. A pQLED device structure.
- Figure 120: Perovskite quantum dots under UV light.
- Figure 121: InP/ZnS, perovskite quantum dots and silicon resin composite under UV illumination.
- Figure 122: Schematic of typical commercialization route for quantum dots producer.
- Figure 123: QD-TV supply chain.
- Figure 124: Quantum dot LED backlighting schematic.
- Figure 125. Quantum dot film schematic.
- Figure 126: Quantum Dots on Glass schematic.
- Figure 127: Samsung 8K 65' QD Glass.
- Figure 128: QD/OLED hybrid schematic.
- Figure 129: Electroluminescent quantum dots schematic.
- Figure 130: The Wall microLED display.
- Figure 131: Individual red, green and blue microLED arrays based on quantum dots.
- Figure 132: Ink-jet printed 5-inch AM-QLED display (80 dpi).
- Figure 133: Carbon nanotubes flexible, rechargeable yarn batteries incorporated into flexible, rechargeable yarn batteries.
- Figure 134: Flexible & stretchable LEDs based on quantum dots.
- Figure 135. Samsung QD-OLED.
- Figure 136. Sony's AK95 series.
- Figure 137. 98-inch QLED from TCL.
- Figure 138. Alienware QD-OLED.
- Figure 139: QD-TV unit sales 2016-2032, conservative estimates.
- Figure 140: QD-TV unit sales 2016-2032, optimistic estimates.
- Figure 141: QD Monitor Unit sales 2015-2032.
- Figure 142. AU 85' bezel-less quantum dot TV.
- Figure 143: Quantum dot sheet.
- Figure 144. SQ dots production process.



- Figure 145. TCL QLED TVs.
- Figure 146. MiniLED and microLED product announcements at CES 2022.
- Figure 147. MiniLEDs backlights to 2027, by market (Million units).
- Figure 148. MicroLED display forecast (thousands of units) to 2026.
- Figure 149. Display system configurations.
- Figure 150. Schematic of LCD with MicroLED backlight.
- Figure 151. Schematic for configuration of full colour microLED display
- Figure 152. BOE glass-based backplane process.
- Figure 153. MicroLED schematic.
- Figure 154. Pixels per inch roadmap of  $\mu$ -LED displays from 2007 to 2019.
- Figure 155. Comparison of microLED with other display technologies.
- Figure 156. Lextar 10.6 inch transparent microLED display.
- Figure 157. Transition to borderless design.
- Figure 158. Schematics of a elastomer stamping, b electrostatic/electromagnetic transfer, c laser-assisted transfer and d fluid self-assembly.
- Figure 159. Schematics of Roll-based mass transfer.
- Figure 160. Schematic of laser-induced forward transfer technology.
- Figure 161. Schematic of fluid self-assembly technology.
- Figure 162. Schematic of colour conversion technology.
- Figure 163. Process flow of a full-colour microdisplay.
- Figure 164. LG QNED miniLED TV.
- Figure 165. microLED wearable display prototype.
- Figure 166. APHAEA Watch.
- Figure 167. Samsung Wall display system.
- Figure 168. Samsung Neo QLED 8K.
- Figure 169. MAGNIT MicroLED TV.
- Figure 170. Acer Predator X32 Mini-LED Gaming Monitor.
- Figure 171. Acer EI491CRG9 curved miniLED display.
- Figure 172. 12.9-inch iPad Pro.
- Figure 173. Apple Pro Display XDR.
- Figure 174. Asus ProArt PA32UCX.
- Figure 175. Lenovo ThinkVision Creator Extreme P27.
- Figure 176. Creator 17 gaming laptop.
- Figure 177. Samsung Odyssey G9 Neo gaming monitor.
- Figure 178. AU Optonics Flexible MicroLED Display.
- Figure 179. Schematic of the TALT technique for wafer-level microLED transferring.
- Figure 180. Foldable 4K C SEED M1.
- Figure 181. MicroLEDs for medical applications
- Figure 182. 2023 Cadillac Lyriq EV incorporating mini-LED display.

- Figure 183. Different transparent displays and transmittance limitations.
- Figure 184. 7.56' high transparency & frameless MicroLED display.
- Figure 185. Supply Chain of miniLED Backlight.
- Figure 186. WireLED in 12" Silicon Wafer.
- Figure 187. Typical GaN-on-Si LED structure.
- Figure 188. 300 mm GaN-on-silicon epiwafer.
- Figure 189. MicroLED chiplet architecture.
- Figure 190. 1.39-inch full-circle microLED display
- Figure 191. 9.4' flexible MicroLED display.
- Figure 192. BOE MiniLED display TV.
- Figure 193. BOE miniLED automotive display.
- Figure 194. Image obtained on a blue active-matrix WVGA (wide video graphics array) microdisplay.
- Figure 195. Fabrication of the 10- $\mu$ m pixel pitch LED array on sapphire.
- Figure 196. A 200-mm wafer with CMOS active matrices for GaN 873 ? 500-pixel microdisplay at 10- $\mu$ m pitch.
- Figure 197. IntelliPix design for 0.26? 1080p microLED display.
- Figure 198. C Seed 165-inch M1 microLED TV.
- Figure 199. Flexible microLED.
- Figure 200. Jade Bird Display microdisplays.
- Figure 201. JBD's 0.13-inch panel.
- Figure 202. Prototype microLED display.
- Figure 203. APHAEA MicroLED watch.
- Figure 204. Lextar 2021 micro LED and mini LED products.
- Figure 205. LSAB009 microLED display.
- Figure 206. Schematic of Micro Nitride chip architecture.
- Figure 207. Nationstar Mini LED IMD Package P0.5mm.
- Figure 208. 9.4' flexible MicroLED display.
- Figure 209. 7.56-inch transparent Micro LED display.
- Figure 210. 48 x 36 Passive Matrix microLED display.
- Figure 211. The Wall.
- Figure 212. Samsung Neo QLED 8K.
- Figure 213. NPQD Technology for MicroLEDs.
- Figure 214. Wicop technology.
- Figure 215. B-Series and C-Series displays.
- Figure 216. Photo-polymer mass transfer process.
- Figure 217. Vuzix uLED display engine.
- Figure 218. TCL MiniLED TV schematic.
- Figure 219. The Cinema Wall MicroLED display.

Figure 220. 7.56" Transparent Display.

Figure 221. UMini0.9 4K.

Figure 222. VueReal Flipchip microLED (30x15  $\mu\text{m}^2$ ).

Figure 223. Mi TV Master series.

Figure 224. Comparative schematic of LCD, OLED and Micro LEDs.

Figure 225. AMOLED schematic.

Figure 226. Mirage smart speaker with wraparound touch display.

Figure 227. LG rollable OLED TV.

Figure 228. AU Optronics inkjet-printed OLED prototype.

Figure 229. AU Optronics inkjet-printed OLED prototype.

Figure 230. LG Display transparent OLED touch display.

Figure 231. Transparent display in subway carriage window.

Figure 232. SPD smart windows schematic.

Figure 233. LG Display 55-inch Transparent OLED incorporating Gauzy technology.

Figure 234. Xiaomi Mi TV LUX OLED Transparent Edition.

Figure 235. LG Display transparent display.

Figure 236. Global market revenues for OLEDs, 2018-2032 (Billions USD).

## I would like to order

Product name: The Global Market for Advanced Electronic Displays 2022-2032

Product link: <https://marketpublishers.com/r/GE01D31642E0EN.html>

Price: US\$ 1,400.00 (Single User License / Electronic Delivery)

If you want to order Corporate License or Hard Copy, please, contact our Customer Service:

[info@marketpublishers.com](mailto:info@marketpublishers.com)

## Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page <https://marketpublishers.com/r/GE01D31642E0EN.html>

To pay by Wire Transfer, please, fill in your contact details in the form below:

First name:  
Last name:  
Email:  
Company:  
Address:  
City:  
Zip code:  
Country:  
Tel:  
Fax:  
Your message:

**\*\*All fields are required**

Customer signature \_\_\_\_\_

Please, note that by ordering from marketpublishers.com you are agreeing to our Terms & Conditions at <https://marketpublishers.com/docs/terms.html>

To place an order via fax simply print this form, fill in the information below and fax the completed form to +44 20 7900 3970