



# Thin Film Transistors: *Global Markets to 2022*

April 2018

*Mayank Jain*

Report Code: SMC110A

# Table of Contents

<b>Chapter 1: Introduction</b> .....	<b>1</b>
Study Goals and Objectives.....	1
Reasons for Doing This Study.....	1
Scope of Report.....	2
Research Methodology .....	2
Intended Audience.....	3
Information Sources.....	3
Geographic Breakdown.....	3
Analyst's Credentials.....	6
Related BCC Research Reports.....	6
<b>Chapter 2: Summary and Highlights</b> .....	<b>8</b>
<b>Chapter 3: Market and Technology Background</b> .....	<b>11</b>
Market Definition and Evolution of Thin Film Transistors (TFTs) .....	11
Outlook and Expectations .....	12
Quotes by Key Opinion Leaders .....	12
Value Chain .....	12
Raw Material Providers .....	13
Thin Film Transistor Manufacturers .....	13
Assemblers .....	13
End-use Industries .....	14
Competitive Analysis .....	14
<b>Chapter 4: Market Breakdown by Type</b> .....	<b>16</b>
Introduction .....	16
Market Dynamics .....	16
Drivers .....	17
Restraints.....	17
Amorphous Silicon TFT.....	17
Polysilicon TFT.....	21
Metal Oxide TFT .....	25
Organic Thin Film Transistors.....	28
Others (Mesa Type TFT, Paste Type TFT, etc.).....	32
<b>Chapter 5: Market Breakdown by Integration Type</b> .....	<b>37</b>
Introduction .....	37
Market Dynamics .....	38
Drivers .....	38
Restraints.....	38
Opportunities .....	39
LCD TVs.....	39
LCD Monitors .....	42
Notebooks.....	46
Smartphones.....	49
Tablets.....	53
Others .....	56
<b>Chapter 6: Market Breakdown by Application</b> .....	<b>61</b>

Introduction .....	61
Market Dynamics .....	62
Drivers .....	62
Restraints.....	62
Opportunities .....	62
Flexible Electronics.....	63
Sensors .....	66
Detectors.....	70
LEDs.....	73
Integrated Circuits.....	77
Others .....	80
<b>Chapter 7: Market Breakdown by Region .....</b>	<b>85</b>
Introduction .....	85
Market Dynamics .....	85
Drivers .....	85
Restraints.....	86
Opportunities .....	86
North America.....	86
Overview .....	86
North American Thin Film Transistor Market, by Type .....	87
North American Thin Film Transistor Market, by Integration Type .....	88
North American Thin Film Transistor Market, by Application .....	89
Europe.....	90
Overview .....	90
European Thin Film Transistor Market, by Type .....	90
European Thin Film Transistor Market, by Integration Type .....	91
European Thin Film Transistor Market, by Application.....	92
Asia-Pacific .....	94
Overview .....	94
Asia-Pacific Thin Film Transistor Market, by Type .....	94
Asia-Pacific Thin Film Transistor Market, by Integration Type.....	95
Asia-Pacific Thin Film Transistor Market, by Application .....	96
Rest of the World .....	97
Overview .....	97
Rest of the World Thin Film Transistor Market, by Type .....	97
Rest of the World Thin Film Transistor Market, by Integration Type .....	98
Rest of the World Thin Film Transistor Market, by Application.....	99
<b>Chapter 8: Patent Review/ New Developments .....</b>	<b>102</b>
Patent Review by Country .....	102
Important Thin Film Transistor (TFT) Patents .....	103
Thin Film Transistor .....	103
Thin Film Transistor .....	104
Thin Film Transistor .....	105
Thin Film Transistor Substrate.....	105
N-Type Thin Film Transistor .....	106
Thin Film Transistor Substrate and Display .....	107
Thin film transistor array substrate.....	107
Thin Film Transistor and Manufacturing Method Thereof.....	108
Thin Film Activation Method Using Electrical Energy and Thin Film Transistor Fabrication Method...	109

Thin Film Activation Method Using Electrical Energy and Thin Film Transistor Fabrication Method...	109
Thin-Film Transistor Substrate and Display Device Comprising the Same.....	110
Thin Film Transistor and Display Device Using the Same.....	111
Manufacturing Method of Thin Film Transistor Substrate .....	112
Thin Film Transistor Substrate and Display Apparatus .....	112
Thin Film Transistor Substrate and Display Using the Same .....	113
Thin-Film Transistor Substrate and Display Device Comprising the Same.....	114
Thin-Film Transistor and Preparation Method Therefor, Array Substrate, and Display Device .....	115
Thin Film Transistor Substrate and Method for Manufacturing the Same .....	115
Thin Film Transistor Substrate for Organic Light Emitting Diode Display .....	116
Thin Film Transistor Substrate and Display Using the Same .....	117
Thin Film Transistor Board .....	118
Thin Film Transistor .....	118
Thin Film Transistor .....	119
Thin Film Transistor .....	119
Thin Film Transistor Board .....	120
<b>Chapter 9: Company Profiles .....</b>	<b>122</b>
<b>About BCC Research.....</b>	<b>150</b>
About BCC Research.....	151
BCC Membership .....	151
BCC Custom Research .....	151

# List of Tables

Summary Table: Global Market for Thin Film Transistors, by Integration Type, Through 2022 (\$ Thousands).....	9
Table 1 Global Market Share Analysis of Thin Film Transistors, by Company, 2016 (%).....	14
Table 2 Global Market for Amorphous Silicon TFTs, by Integration Type, Through 2022 (\$ Thousands)..	18
Table 3 Global Market for Amorphous Silicon TFTs, by Application, Through 2022 (\$ Thousands) .....	19
Table 4 Global Market for Amorphous Silicon TFTs, by Region, Through 2022 (\$ Thousands).....	20
Table 5 Global Market for Polysilicon TFTs, by Integration Type, Through 2022 (\$ Thousands) .....	21
Table 6 Global Market for Polysilicon TFTs, by Application, Through 2022 (\$ Thousands).....	22
Table 7 Global Market for Polysilicon TFTs, by Region, Through 2022 (\$ Thousands).....	24
Table 8 Global Market for Metal Oxide TFTs, by Integration Type, Through 2022 (\$ Thousands).....	25
Table 9 Global Market for Metal Oxide TFTs, by Application, Through 2022 (\$ Thousands) .....	26
Table 10 Global Market for Metal Oxide TFTs, by Region, Through 2022 (\$ Thousands) .....	27
Table 11 Global Market for Organic TFTs, by Integration Type, Through 2022 (\$ Thousands).....	29
Table 12 Global Market for Organic TFTs, by Application, Through 2022 (\$ Thousands) .....	30
Table 13 Global Market for Organic TFTs, by Region, Through 2022 (\$ Thousands) .....	31
Table 14 Global Market for Other TFTs, by Integration Type, Through 2022 (\$ Thousands).....	32
Table 15 Global Market for Other TFTs, by Application, Through 2022 (\$ Thousands) .....	33
Table 16 Global Market for Other TFTs, by Region, Through 2022 (\$ Thousands) .....	34
Table 17 Global Market for TFTs in LCD TVs, by Type, Through 2022 (\$ Thousands) .....	39
Table 18 Global Market for TFTs in LCD TVs, by Application, Through 2022 (\$ Thousands).....	40
Table 19 Global Market for TFTs in LCD TVs, by Region, Through 2022 (\$ Thousands) .....	41
Table 20 Global Market for TFTs in LCD Monitors, by Type, Through 2022 (\$ Thousands) .....	43
Table 21 Global Market for TFTs in LCD Monitors, by Application, Through 2022 (\$ Thousands).....	44
Table.22 Global Market for TFTs in LCD Monitors, by Region, Through 2022 (\$ Thousands).....	45
Table 23 Global Market for TFTs in Notebooks, by Type, Through 2022 (\$ Thousands).....	46
Table 24 Global Market for TFTs in Notebook, by Application, Through 2022 (\$ Thousands).....	47
Table 25 Global Market for TFTs in Notebooks, by Region, Through 2022 (\$ Thousands) .....	48
Table 26 Global Market for TFTs in Smartphones, by Type, Through 2022 (\$ Thousands).....	50
Table 27 Global Market for TFTs in Smartphones, by Application, Through 2022 (\$ Thousands) .....	51
Table 28 Global Market for TFTs in Smartphones, by Region, Through 2022 (\$ Thousands) .....	52
Table 29 Global Market for TFTs in Tablets, by Type, Through 2022 (\$ Thousands).....	53
Table 30 Global Market for TFTs in Tablets, by Application, Through 2022 (\$ Thousands) .....	54
Table 31 Global Market for TFTs in Tablets, by Region, Through 2022 (\$ Thousands) .....	55
Table 32 Global Market for TFTs in Other Devices, by Type, Through 2022 (\$ Thousands).....	57
Table 33 Global Market for TFTs in Other Devices, by Application, Through 2022 (\$ Thousands) .....	58
Table 34 Global Market for TFTs in Other Devices, by Region, Through 2022 (\$ Thousands) .....	59
Table 35 Global Market for TFTs in Flexible Electronics, by Type, Through 2022 (\$ Thousands) .....	63
Table 36 Global Market for TFTs in Flexible Electronics, by Integration Type, Through 2022 (\$ Thousands) .....	64
Table 37 Global Market for TFTs in Flexible Electronics, by Region, Through 2022 (\$ Thousands) .....	65
Table 38 Global Market for TFTs in Sensors, by Type, Through 2022 (\$ Thousands).....	67
Table 39 Global Market for TFTs in Sensors, by Integration Type, Through 2022 (\$ Thousands).....	68
Table 40 Global Market for TFTs in Sensors, by Region, Through 2022 (\$ Thousands) .....	69
Table 41 Global Market for TFTs in Detectors, by Type, Through 2022 (\$ Thousands) .....	70
Table 42 Global Market for TFTs in Detectors, by Integration Type, Through 2022 (\$ Thousands).....	71
Table 43 Global Market for TFTs in Detectors, by Region, Through 2022 (\$ Thousands) .....	72
Table 44 Global Market for TFTs in LEDs, by Type, Through 2022 (\$ Thousands).....	74

Table 45 Global Market for TFTs in LEDs, by Integration Type, Through 2022 (\$ Thousands).....	75
Table 46 Global Market for TFTs in LEDs, by Region, Through 2022 (\$ Thousands) .....	76
Table 47 Global Market for TFTs in Integrated Circuits, by Type, Through 2022 (\$ Thousands) .....	77
Table 48 Global Market for TFTs in Integrated Circuits, by Integration Type, Through 2022 (\$ Thousands) .....	78
Table 49 Global Market for TFTs in Integrated Circuits, by Region, Through 2022 (\$ Thousands) .....	79
Table 50 Global Market for TFTs in Other Applications, by Type, Through 2022 (\$ Thousands) .....	81
Table 51 Global Market for TFTs in Other Applications, by Integration Type, Through 2022 (\$ Thousands) .....	82
Table 52 Global Market for TFTs in Other Applications, by Region, Through 2022 (\$ Thousands).....	83
Table 53 North American Market for TFTs, by Type, Through 2022 (\$ Thousands).....	87
Table 54 North American Market for TFTs, by Integration Type, Through 2022 (\$ Thousands).....	88
Table 55 North American Market for TFTs, by Application, Through 2022 (\$ Thousands) .....	89
Table 56 European Market for TFTs, by Type, Through 2022 (\$ Thousands) .....	90
Table 57 European Market for TFTs, by Integration Type, Through 2022 (\$ Thousands) .....	91
Table 58 European Market for TFTs, by Application, Through 2022 (\$ Thousands) .....	93
Table 59 Asia-Pacific Market for TFTs, by Type, Through 2022 (\$ Thousands) .....	94
Table 60 Asia-Pacific Market for TFTs, by Integration Type, Through 2022 (\$ Thousands) .....	95
Table 61 Asia-Pacific Market for TFTs, by Application, Through 2022 (\$ Thousands).....	96
Table 62 Rest of the World Market for TFTs, by Type, Through 2022 (\$ Thousands) .....	98
Table 63 Rest of the World Market for TFTs, by Integration Type, Through 2022 (\$ Thousands) .....	99
Table 64 Rest of the World Market for TFTs, by Application, Through 2022 (\$ Thousands).....	100
Table 65 Developments of Alcatel-Lucent S.A. ....	123
Table 66 Developments of AU Optronics Corp. ....	124
Table 67 Developments of BOE Technology Group Co.....	125
Table 68 Developments of Foxconn Technology .....	127
Table 69 Developments of IBM Corp. ....	130
Table 70 Developments of Impika SAS .....	131
Table 71 Developments of Innolux Corp. ....	133
Table 72 Developments of Japan Display Inc.....	135
Table 73 Developments of Kyocera Corp.....	136
Table 74 Developments of LG Corp. ....	137
Table 75 Developments of Merck Group.....	139
Table 76 Developments of Panasonic Corp. ....	141
Table 77 Developments of Robert Bosch GmbH .....	142
Table 78 Developments of Samsung Display Co. Ltd.....	143
Table 79 Developments of Shenzhen China Star Optoelectronics Technology Co. Ltd.....	144
Table 80 Developments of Texas Instruments Inc.....	145
Table 81 Developments of Thin Film Electronics ASA .....	147
Table 82 Developments of Tianma Micro-electronics Co. Ltd.....	148
Table 83 Developments of Toshiba Corp.....	149

# List of Figures

Summary Figure Global Market for Thin Film Transistors, by Integration Type, 2016-2022 (\$ Thousands)	9
Figure 1 Value Chain for Thin Film Transistors (TFT)	13
Figure 2 Global Market for Thin Film Transistors, by Type	16
Figure 3 Global Market for Amorphous Silicon TFTs, by Integration Type, 2016-2022 (\$ Thousands)	18
Figure 4 Global Market for Amorphous Silicon TFTs, by Application, 2016-2022 (\$ Thousands)	19
Figure 5 Global Market for Amorphous Silicon TFTs, by Region, 2016-2022 (\$ Thousands)	20
Figure 6 Global Market for Amorphous Silicon TFTs, by Integration Type, 2016-2022 (\$ Thousands)	22
Figure 7 Global Market for Polysilicon TFTs, by Application, 2016-2022 (\$ Thousands)	23
Figure 8 Global Market for Polysilicon TFTs, by Region, 2016-2022 (\$ Thousands)	24
Figure 9 Global Market for Metal Oxide TFTs, by Integration Type, 2016-2022 (\$ Thousands)	26
Figure 10 Global Market for Metal Oxide TFTs, by Application, 2016-2022 (\$ Thousands)	27
Figure 11 Global Market for Metal Oxide TFTs, by Region, 2016-2022 (\$ Thousands)	28
Figure 12 Global Market for Organic TFTs, by Integration Type, 2016-2022 (\$ Thousands)	29
Figure 13 Global Market for Organic TFTs, by Application, 2016-2022 (\$ Thousands)	30
Figure 14 Global Market for Organic TFTs, by Region, 2016-2022 (\$ Thousands)	31
Figure 15 Global Market for Other TFTs, by Integration Type, 2016-2022 (\$ Thousands)	33
Figure 16 Global Market for Other TFTs, by Application, 2016-2022 (\$ Thousands)	34
Figure 17 Global Market for Other TFTs, by Region, 2016-2022 (\$ Thousands)	35
Figure 18 Global Market for Thin Film Transistors, by Integration Type	37
Figure 19 Global Market for TFTs in LCD TVs, by Type, 2016-2022 (\$ Thousands)	40
Figure 20 Global Market for TFTs in LCD TVs, by Application, 2016-2022 (\$ Thousands)	41
Figure 21 Global Market for TFTs in LCD TVs, by Region, 2016-2022 (\$ Thousands)	42
Figure 22 Global Market for TFTs in LCD Monitors, by Type, 2016-2022 (\$ Thousands)	43
Figure 23 Global Market for TFTs in LCD Monitors, by Application, 2016-2022 (\$ Thousands)	44
Figure 24 Global Market for TFTs in LCD Monitors, by Region, 2016-2022 (\$ Thousands)	45
Figure 25 Global Market for TFTs in Notebooks, by Type, 2016-2022 (\$ Thousands)	47
Figure 26 Global Market for TFTs in Notebooks, by Application, 2016-2022 (\$ Thousands)	48
Figure 27 Global Market for TFTs in Notebooks, by Region, 2016-2022 (\$ Thousands)	49
Figure 28 Global Market for TFTs in Smartphones, by Type, 2016-2022 (\$ Thousands)	50
Figure 29 Global Market for TFTs in Smartphones, by Application, 2016-2022 (\$ Thousands)	51
Figure 30 Global Market for TFTs in Smartphones, by Region, 2016-2022 (\$ Thousands)	52
Figure 31 Global Market for TFTs in Tablets, by Type, 2016-2022 (\$ Thousands)	54
Figure 32 Global Market for TFTs in Tablets, by Application, 2016-2022 (\$ Thousands)	55
Figure 33 Global Market for TFTs in Tablets, by Region, 2016-2022 (\$ Thousands)	56
Figure 34 Global Market for TFTs in Other Devices, by Type, 2016-2022 (\$ Thousands)	57
Figure 35 Global Market for TFTs in Other Devices, by Application, 2016-2022 (\$ Thousands)	58
Figure 36 Global Market for TFTs in Other Devices, by Region, 2016-2022 (\$ Thousands)	59
Figure 37 Global Market for Thin Film Transistors, by Application	61
Figure 38 Global Market for TFTs in Flexible Electronics, by Type, 2016-2022 (\$ Thousands)	64
Figure 39 Global Market for TFTs in Flexible Electronics, by Integration Type, 2016-2022 (\$ Thousands)	65
Figure 40 Global Market for TFTs in Flexible Electronics, by Region, 2016-2022 (\$ Thousands)	66
Figure 41 Global Market for TFTs in Sensors, by Type, 2016-2022 (\$ Thousands)	67
Figure 42 Global Market for TFTs in Sensors, by Integration Type, 2016-2022 (\$ Thousands)	68
Figure 43 Global Market for TFTs in Sensors, by Region, 2016-2022 (\$ Thousands)	69
Figure 44 Global Market for TFTs in Detectors, by Type, 2016-2022 (\$ Thousands)	71
Figure 45 Global Market for TFTs in Detectors, by Integration Type, 2016-2022 (\$ Thousands)	72
Figure 46 Global Market for TFTs in Detectors, by Region, 2016-2022 (\$ Thousands)	73

Figure 47 Global Market for TFTs in LEDs, by Type, 2016-2022 (\$ Thousands).....	74
Figure 48 Global Market for TFTs in LEDs, by Integration Type, 2016-2022 (\$ Thousands).....	75
Figure 49 Global Market for TFTs in LEDs, by Region, 2016-2022 (\$ Thousands) .....	76
Figure 50 Global Market for TFTs in Integrated Circuits, by Type, 2016-2022 (\$ Thousands) .....	78
Figure 51 Global Market for TFTs in Integrated Circuits, by Integration Type, 2016-2022 (\$ Thousands) 79	
Figure 52 Global Market for TFTs in Integrated Circuits, by Region, 2016-2022 (\$ Thousands) .....	80
Figure 53 Global Market for TFTs in Other Applications, by Type, 2016-2022 (\$ Thousands) .....	81
Figure 54 Global Market for TFTs in Other Applications, by Integration Type, 2016-2022 (\$ Thousands) 82	
Figure 55 Global Market for TFTs in Other Applications, by Region, 2016-2022 (\$ Thousands).....	83
Figure 56 Global Market for Thin Film Transistors, by Region.....	85
Figure 57 North American Market for TFTs, by Type, 2016-2022 (\$ Thousands).....	87
Figure 58 North American Market for TFTs, by Integration Type, 2016-2022 (\$ Thousands).....	88
Figure 59 North American Market for TFTs, by Application, 2016-2022 (\$ Thousands) .....	89
Figure 60 European Market for TFTs, by Type, 2016-2022 (\$ Thousands) .....	91
Figure 61 European Market for TFTs, by Integration Type, 2016-2022 (\$ Thousands) .....	92
Figure 62 European Market for TFTs, by Application, 2016-2022 (\$ Thousands) .....	93
FIGURE 63 Asia-Pacific Market for TFTs, by Type, 2016-2022 (\$ Thousands) .....	95
Figure 64 Asia-Pacific Market for TFTs, by Integration Type, 2016-2022 (\$ Thousands) .....	96
Figure.65 Asia-Pacific Market for TFTs, by Application, 2016-2022 (\$ Thousands).....	97
Figure 66 Rest of the World Market for TFTs, by Type, 2016-2022 (\$ Thousands) .....	98
Figure 67 Rest of the World Market for TFTs, by Integration Type, 2016-2022 (\$ Thousands) .....	99
Figure 68 Rest of the World Market for TFTs, by Application, 2016-2022 (\$ Thousands) .....	100
Figure 69 Global Patent Share for Thin Film Transistors, by Region, 2015-2017 (%) .....	102
Figure 70 Patent Share for Thin Film Transistors, by Year, 2013-2017 (%) .....	103





*About BCC Research*

## *About BCC Research*

With our unparalleled 45-year history, BCC Research provides comprehensive analysis of global market sizing, forecasting and industry intelligence, covering markets where advances in science and technology are improving the quality, standard and sustainability of businesses, economies and lives.

## *BCC Membership*

From market sizing and forecasts, to opportunity assessments and competitive analyses, our ever-expanding library gives you the data, insights and intelligence required to ensure your project is a success. Members benefit from ongoing, unlimited access to the category or collections of their choice, and most membership packages pay for themselves within two to three reports being accessed.

Did you buy this report? You may qualify to apply your purchase price toward a full membership. Call 866/285-7215 or e-mail [info@bccresearch.com](mailto:info@bccresearch.com) to request a demo.

## *BCC Custom Research*

Our experts provide custom research projects to those working to identify new markets, introduce new products, validate existing market share, analyze competition and assess the potential for products to impact existing markets. With impressive academic credentials and broad and deep knowledge of global industrial markets, our independent analysts and consultants develop the facts, figures, analysis and assessments to inform the decisions that will move your company ahead. Confidential inquiries to: [custom@bccresearch.com](mailto:custom@bccresearch.com) or 781/205-2429.

## DISCLAIMER

The information developed in this report is intended to be as reliable as possible at the time of publication and is of a professional nature. This information does not constitute managerial, legal or accounting advice, nor should it be considered as a corporate policy guide, laboratory manual or an endorsement of any product, as much of the information is speculative in nature. BCC Research and the author assume no responsibility for any loss or damage that might result from reliance on the reported information or from its use.

ISBN: 978-1-62296-687-5  
April 2018