



## Introduction

This report looks at Samsung's patent portfolio and provides analytics and insights into its various aspects. It takes a closer look at the publishing trends driving the growth of Samsung's portfolio in different technology and sub-technology areas. The report also attempts to determine which of the granular segments in Samsung's portfolio have shown the fastest rates of growth in the past six years.

## Portfolio Insights

We studied a total of 324,122 patent applications currently in force for Samsung, of which 188,589 are granted. Unless otherwise stated, we have used and displayed numbers for patent applications.

### Portfolio Growth

Publishing trends indicate that there was a dip in the number of published patents in the 2007-2009 period. The publishing trend subsequently picked up post 2009 and was significantly higher in this period as compared to that in the pre-2007 period, both in terms of the number of patent applications published each year as well as the year-on-year growth of the total number published.

### Key Technologies

The top technologies addressed by the patents currently held by Samsung relate to semi-conductor devices, digital data processing, pictorial communication (primarily television technologies), data transmission, wireless networks and signal transmission.

The top sub-technologies covered by Samsung's current patent assets are,

- Semi-conductor related
  - Multiple semiconductor or solid-state devices components formed on a common substrate.
  - Manufacturing or treatment of integrated circuits and semiconductor devices.
  - Solid state devices with an active organic material.
  - Multistep manufacturing processes for rectifiers, oscillators, capacitors and resistors.
- Optics
  - Optical devices for controlling light characteristics, non-linear optics.
- Digital interface arrangements
- Television related
  - Circuits for flat panel displays.
  - Hardware and software aspects of TV signals.

The number of published patents in each of the above technologies and sub-technologies along with their trends are given in subsequent sections.

## Geographical Coverage

Samsung follows the strategy of filing primarily in its home country of Korea and then in the U.S. These two jurisdictions account for just under two-thirds of its published patent applications, and are followed by China, Europe and Taiwan.

The publishing trends by jurisdiction clearly indicate that the U.S. became a higher priority for Samsung post 2009. In the post 2009 period to the present, the number of published U.S. applications have been on par with those published in Korea and even exceed them in certain years.

## Portfolio Quality

Samsung holds 14993 patent applications (a 4.6% portfolio share) that are “high quality” with a Relecura Star Rating of 3.0 or more out of 5.0. A chart showing the distribution of patent applications, by both quality and sub-technologies, is shown in a following section.

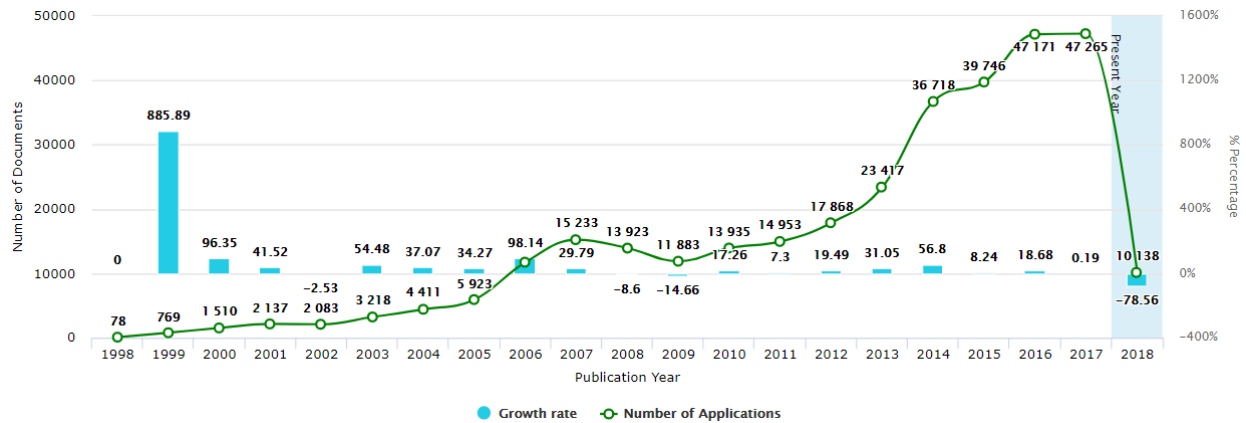
## Forward Citing (FC) Assignees

The top forward citing assignees are listed in a subsequent sections, ranked by the number of patent applications they cite within the Samsung portfolio. The distribution of the sub-technologies based on the cited documents is also shown for each of the FC assignees.

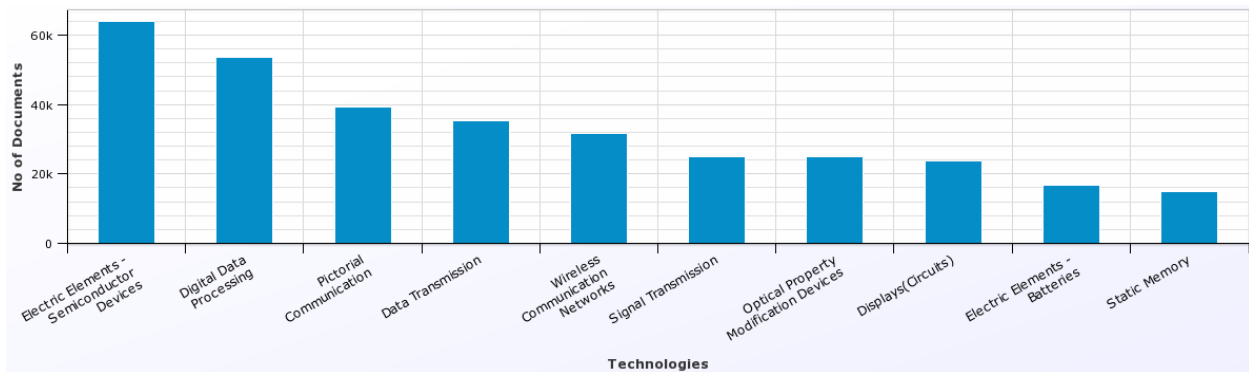
## Fast Growing Segments within Sub-technologies

We determine the fastest growing segments within each of the top five sub-technology areas in the Samsung portfolio. These segments are identified based on their rates of growth. The data for this is presented in the final table.

## Publishing trends



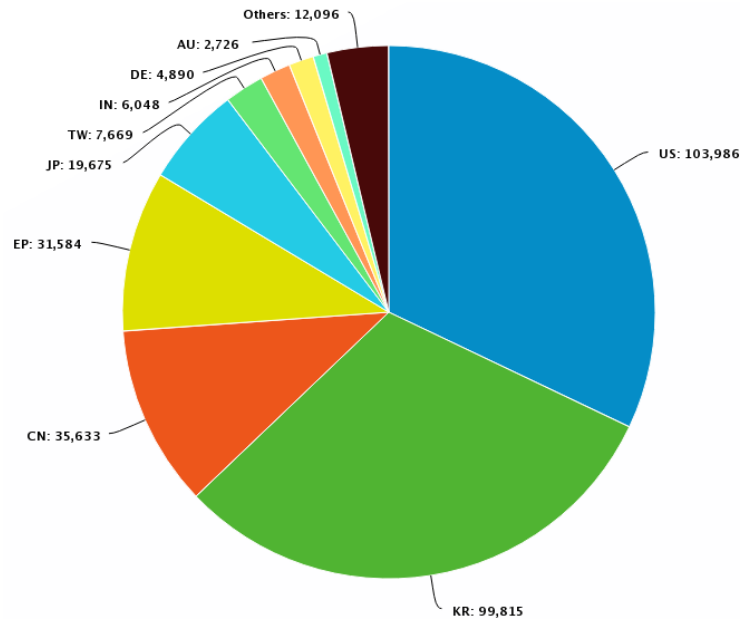
## Key Technologies



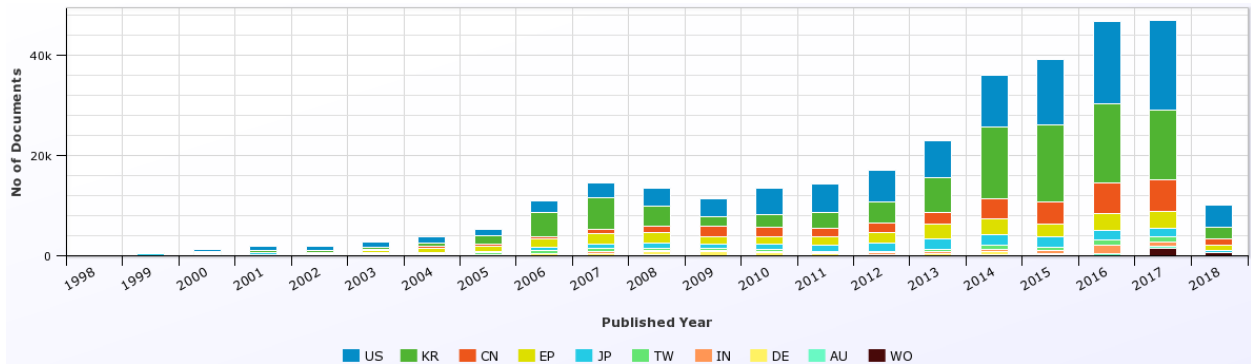
## Key Sub-technologies

Top Sub-Technologies	Number of Documents
Multiple semiconductor or solid-state devices components formed on a common substrate	31,834
Digital interface arrangements	27,878
Manufacturing or treatment of ICs and semiconductor devices	25,704
Optical devices for controlling light characteristics, non-linear optics	24,891
Solid state devices with active organic material	20,148
Circuits for flat panel display	19,287
Hardware or software aspects of TV signals	18,433
Multistep manufacturing process for rectifiers, oscillators, capacitors and resistors	16,110
Radio transmission	13,855
Secondary cells	11,969

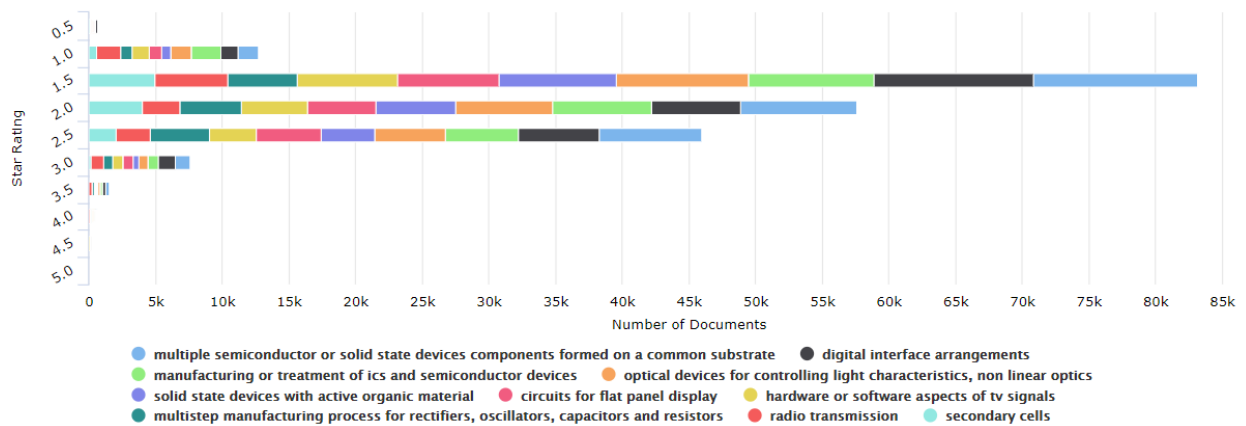
## Key Geographies



## Publishing Trends by Geography



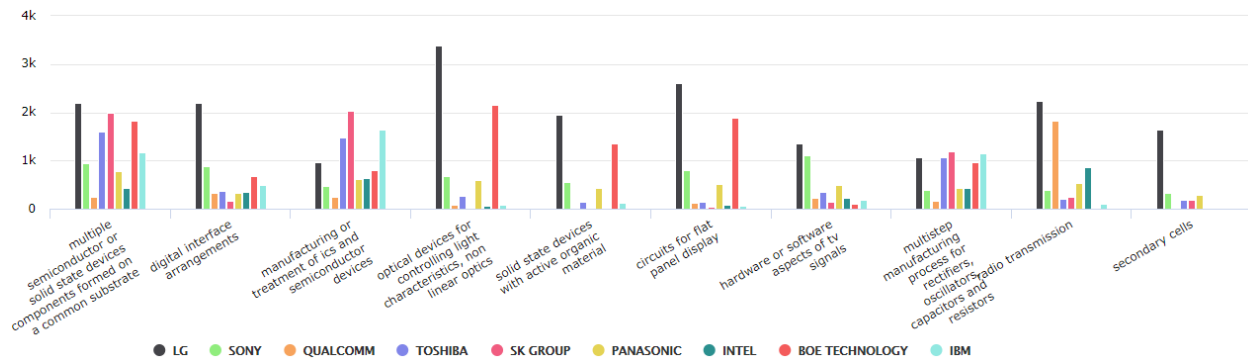
## Patent Quality



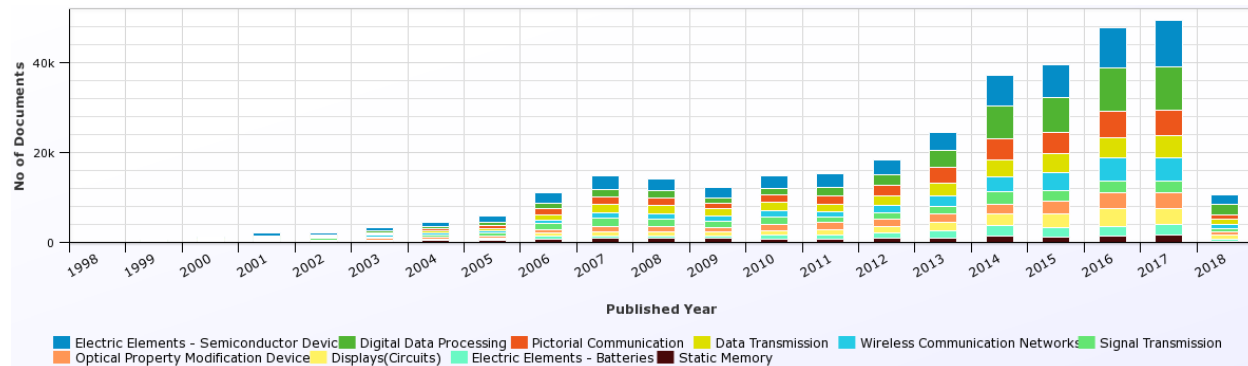
## Top Forward Citing (FC) Assignees

FC Assignees	Number of documents cited
LG	25,249
SONY	8,571
QUALCOMM	7,559
TOSHIBA	6,999
SK GROUP (HYNIX)	6,934
PANASONIC	6,850
INTEL	6,021
BOE TECHNOLOGY	5,984
IBM	5,600

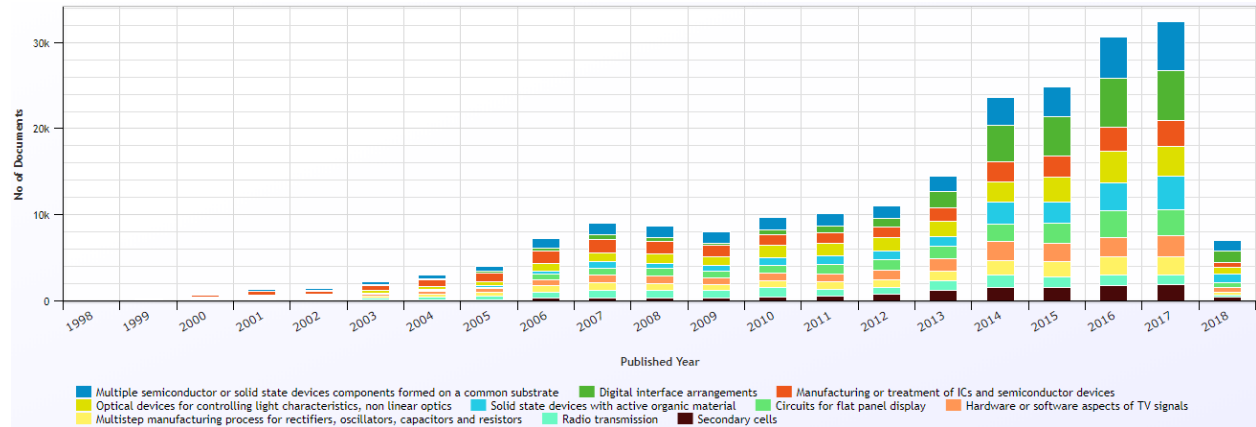
## Sub-technologies cited by FC Assignees



## Evolution of Key Technologies



## Evolution of Key Sub-technologies



## Fast Growing Segments within Sub-technologies

Numbers shown are for patent families.

Sub-technology	Details	2012	2013	2014	2015	2016	2017	Trend
Multiple semiconductor or solid state devices components formed on a common substrate	Field effect components - e.g. FinFET, MuGFET	3	16	42	87	218	245	
	Devices controlled by radiation - Colour imagers	19	22	21	32	47	68	
	OLED + touch screen	22	18	41	69	103	130	
	Multistep processes for ROMs - Characterised by the peripheral circuit region	28	19	29	45	58	84	
	Multistep processes for AMOLED	52	71	126	125	198	255	
Digital interface arrangements	Interfaces to storage systems - In relation to data integrity, e.g. data losses, bit errors	12	11	15	35	43	91	
	Interfaces to storage systems - Command handling arrangements, e.g. command buffers, queues, command scheduling	14	16	36	55	79	141	
	Interfaces to storage systems - Data transfer between one or more hosts and one or more storage devices	26	29	48	89	117	196	
	Interfaces to storage systems - Improving or facilitating administration and storage management	6	19	23	23	53	77	
Manufacturing or treatment of ICs and semiconductor devices	Interfaces to storage systems - Non-volatile semiconductor memory arrays	10	12	17	34	58	79	
	Manufacturing field effect components, e.g. FinFET, MuGFET	104	100	173	196	348	423	
	Aspects relating to the layout of the pattern or to the size of vias or trenches	24	37	35	32	53	63	
	Filling of holes, grooves or trenches, e.g. vias, with conductive material	20	36	46	57	69	80	
Optical devices for controlling light characteristics, non linear optics	Etching - By chemical means	26	20	18	40	65	63	
	Liquid crystals - Light generated by photoluminescence	8	11	16	37	59	74	
	Liquid crystals - Characterised by their electrical, optical, physical properties	43	43	38	67	94	128	
	Liquid crystals - Insulating layers	58	23	48	92	135	177	
	Liquid crystals - Surface-induced orientation of molecules by organic films, e.g. polymeric films	28	27	34	74	90	98	
Solid state devices with active organic material	Liquid crystals - Spacers regularly patterned on the cell substrate, e.g. walls, pillars	54	56	57	86	103	122	
	OLED, PLED - Electron injection layer	15	24	42	50	72	109	
	OLED, PLED - Electron transporting layer	17	28	82	123	144	218	
	Organic semiconductors - Comprising only oxygen in the heteroaromatic polycondensed ringsystem, e.g. cumarine dyes	6	12	41	93	159	175	
	Flexible substrates	20	33	102	113	159	217	
	Organic semiconductors - comprising only nitrogen as heteroatom	25	32	85	131	192	233	

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