

TABLE S8-12

## USPTO patents and patent families granted in semiconductors, by region, country, or economy: 1998–2018

(Number)

Region, country, or economy	1998		1999		2000		2001		2002		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018	
	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families		
World	5,721	12,276	7,155	16,312	8,505	14,334	10,131	14,260	10,518	12,680	10,608	13,043	10,742	12,507	9,311	14,578	10,033	19,389	9,566	19,913	9,201	16,619	10,354	15,393	14,153	17,378	14,415	20,497	13,849	21,821	15,829	21,820	17,897	22,332	18,393	19,324	18,988	22,362	19,117	22,038	17,477	19,901
North America	2,462	1,836	3,099	2,256	3,782	2,547	4,443	2,777	4,578	2,742	4,597	2,675	4,463	2,513	3,881	2,080	3,968	2,156	3,712	1,956	3,367	1,737	3,448	1,813	4,626	2,359	4,476	4,290	1,749	4,877	2,059	5,592	2,329	5,545	2,335	5,782	2,518	5,691	2,338	5,095	1,868	
Canada	20	17	21	14	25	13	25	17	25	17	35	18	40	27	29	21	32	17	31	25	31	21	39	30	54	28	64	34	55	28	66	25	79	32	73	24	76	25	67	20	53	16
Mexico	0	0	0	0	0	0	1	1	1	0	0	0	0	0	2	1	0	0	1	2	0	0	0	0	0	1	0	2	0	1	0	1	0	0	0	6	2	3	0	1		
Puerto Rico	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
United States	2,442	1,819	3,078	2,241	3,756	2,535	4,417	2,759	4,551	2,724	4,561	2,657	4,423	2,486	3,851	2,059	3,935	2,139	3,679	1,929	3,335	1,716	3,408	1,782	4,572	2,331	4,411	1,954	4,233	1,721	4,810	2,034	5,512	2,296	5,470	2,311	5,705	2,487	5,622	2,314	5,041	1,852
All others	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Central and South America	0	0	1	0	0	0	1	1	0	1	0	1	0	2	0	1	0	0	0	0	2	0	1	1	1	0	2	0	2	1	3	2	2	3	2	3	2	3	2	3	7	
Argentina	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	1		
Brazil	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	1	1	1	1	1	2	1	3	0	1	2	1	3	0	2	1	2	6		
All others	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	2	1	
Europe	353	541	416	542	473	471	646	589	708	704	779	801	800	702	725	857	762	1,014	721	1,028	674	924	781	939	1,147	1,047	1,177	1,022	1,214	1,104	1,421	1,089	1,590	1,238	1,668	1,152	1,703	1,170	1,676	1,213	1,494	1,257
EU	341	421	400	446	453	406	614	513	673	610	754	669	774	568	702	736	861	698	848	656	754	750	680	857	1,115	848	1,140	857	896	1,527	991	1,609	933	1,637	993	1,606	1,213	993	1,606	985	1,427	1,013
Austria	4	7	7	13	12	6	13	11	9	18	16	16	14	21	11	34	13	24	32	18	37	29	31	42	32	57	41	65	50	79	128	91	164	98	186	104	149	77				
Belgium	2	3	7	2	11	3	19	3	19	9	37	9	35	7	22	2	29	9	22	2	31	8	39	5	61	13	56	13	64	13	70	10	69	22	83	21	108	41	102	45	88	42
Denmark	0	1	1	0	0	0	2	0	2	1	3	1	4	1	2	1	5	4	1	0	2	2	3	2	4	1	3	1	5	0	3	2	3	1	5	1	3	1	4	1		
Finland	5	6	4	2	5	2	5	2	6	4	4	4	10	4	12	11	10	11	9	13	7	10	11	10	14	9	14	14	8	12	4	16	10	11	23	10	23	5	21	8		
France	51	85	69	88	64	70	96	119	93	119	101	217	111	109	99	178	123	144	116	152	94	150	131	133	169	150	185	207	193	223	241	240	255	215	266	175	251	246	267	226	238	352
Germany	141	197	166	196	196	192	252	241	301	354	347	286	402	277	396	394	386	542	382	546	352	437	366	373	612	490	587	418	397	659	397	770	488	769	471	739	441	715	413	639	369	
Hungary	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	1	0	0	1	0	0	1	0	1	0	1	0	0	1	0		
Ireland	4	5	3	3	1	2	7	6	3	2	4	0	4	3	3	2	6	4	2	2	8	3	6	2	6	1	11	8	10	5	7	4	14	7	6	4	17	8	13	6	16	9
Italy	57	40	61	80	64	56	96	45	87	46	80	38	54	57	37	33	39	25	29	31	34	20	38	20	40	33	27	31	74	23	96	26	106	26	93	18	87	60	87	52		
Netherlands	28	15	29	15	26	19	42	17	55	12	63	23	45	17	36	24	43	41	35	24	34	15	32	20	58	34	69	38	71	38	76	45	70	34	73	20	99	34	79	28	69	20
Spain	0	5	1	5	2	5	1	6	3	2	2	0	4	2	8	2	8	1	9	3	10	3	13	2	12	2	11	4	18	5	18	6	12	5	12	4	15	5	11	5	10	
Sweden	21	22	26	22	35	25	33	36	28	21	20	28	8	24	14	6	14	7	8	9	7	13	6	13	12	13	16	13	17	11	15	6	22	11	22	6	25	11	24	17	15	8
United Kingdom	28	13	27	13	36	14	47	16	62	16	76	37	85	34	67	28	61	30	66	14	62	24	77	31	86	29	82	49	81	39	103	56	93	45	117	45	96	28	96	40	86	35
All others	0	21	1	9	1	13	2	12	3	7	1	9	2	10	0	14	4	13	1	15	3	29	3	35	6	29	4	18	9	41	8	42	11	44	16	44	12	41	9	31		
Other Europe	12	121	16	96	20	65	32	76	35	93	25	131	26	134	23	121	26	153	23	180	18	169	31	259	31	198	37	165	39	201	60	194	63	247	69	219	66	228	67	244		
Former Soviet Union	0	8	1	4	1	1	0	3	1	8	1	15	0	41	0	20	0	13	0	22	0	20	0	29	0	30	0	26	1	15	0	13	1	16	0	13	0	10	1	18	2	11
Norway	0	0	0	0	1	1	0	1	2	1	0	1	4	1	2	2	1	2	2	1	2	1	2	3	1	3	2	3	1	3	4	1	3	4	1	4	1	4	2	4	3	
Russia	4	104	3	87	6	57	10	63	6	78	3	102	2	88	3	96	121	3	140	3	134	2	205	3	154	4	123	3	167	4	216	3	167	4	190	4	152	185	3	210		
Switzerland	8	8	12	5	12	5	20	8	26	7	20	13	20	4	17	4	20	17	19	15	14	14	27	21	27	11	30	13	32	12	53	10	47	10	48	13	53	13	57	21	56	19
All others	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	0	1	2	1	1	2	1	3	2	1	3	2	4	1	3	2	3	1	
Asia	2,894	9,885	3,621	13,450	4,229	11,195	5,009	10,857	5,203	9,203	5,194	9,548																														

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	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families	USPTO patents	Patent families		
China	2	13	9	33	5	55	12	47	26	44	32	143	48	396	57	558	69	677	105	905	109	1,473	121	2,203	179	1,909	191	2,236	239	3,151	372	2,909	500	2,469	640	4,562	832	6,248	1,131	7,128	1,061	6,817
India	1	0	1	1	2	0	2	1	2	1	5	5	4	4	1	2	3	4	5	5	4	2	3	3	4	5	7	14	8	22	16	18	13	15	14	34	29	34	29	40	21	
Japan	1,867	6,966	2,218	6,694	2,384	5,273	2,730	5,634	3,099	4,863	3,248	4,797	3,358	4,231	2,826	4,043	3,078	4,134	2,836	5,738	2,684	5,541	3,211	6,130	4,408	7,096	4,545	8,217	4,292	8,989	4,769	9,237	5,009	8,852	4,931	5,231	4,561	5,883	4,446	5,242	4,036	4,476
Malaysia	1	1	3	1	4	5	11	11	17	18	11	8	24	15	27	29	32	48	44	32	30	34	23	34	53	42	47	39	40	32	63	53	81	67	54	45	55	55	46	42		
Singapore	30	21	40	30	69	61	125	143	163	131	148	101	134	77	102	55	122	59	117	55	100	45	102	60	200	113	245	139	251	122	269	130	275	135	255	130	249	115	237	103	210	90
South Korea	451	1,947	516	5,390	544	3,230	621	1,326	705	1,773	686	2,345	748	2,605	732	4,990	952	9,505	1,056	8,743	1,221	5,725	1,647	3,209	2,231	3,793	2,342	5,541	2,001	2,559	4,427	2,747	2,932	2,846	3,304	2,745	3,261	2,495	3,556			
Taiwan	542	936	829	1,299	1,215	2,567	1,504	3,691	1,179	2,364	1,049	2,136	1,108	1,921	909	1,925	1,001	1,783	923	1,413	970	1,094	960	991	1,229	989	1,312	1,268	1,428	2,202	2,774	2,418	2,858	2,820	3,001	2,976	2,621	2,899	1,725			
All others	0	0	6	2	5	2	5	4	12	9	17	13	17	9	14	9	18	7	13	11	8	12	5	26	9	21	14	20	9	17	10	28	13	27	17	35	21	32	17			
Middle East	10	6	13	9	16	10	30	22	24	13	27	10	26	17	24	12	18	11	22	7	20	8	22	9	29	11	23	8	35	9	33	10	44	15	44	14	56	19	68	20	51	17
Israel	10	5	13	9	16	10	30	18	23	13	26	10	25	14	22	11	18	9	21	7	19	7	21	9	29	11	20	5	31	7	44	13	37	11	46	13	59	14	38	11		
All others	0	1	0	0	0	0	1	4	1	0	1	0	1	4	2	1	1	3	1	0	1	1	0	0	1	3	3	4	2	4	3	3	2	8	3	10	6	9	6	13	6	
Africa	0	1	1	2	2	0	0	1	1	0	1	1	1	2	0	0	0	1	0	1	1	1	1	2	1	2	2	0	2	4	7	4	3	2	4	2	4	2	1	3		
South Africa	0	1	1	1	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	1	0	5	0	2	0	4	0	1	0	0	0	
All others	0	0	0	1	1	0	0	1	1	0	1	1	1	2	0	0	0	1	0	1	0	1	0	1	0	2	0	2	0	2	4	2	4	1	2	0	2	2	1	0	3	
Australia and Oceania	3	1	4	1	3	4	2	4	5	8	9	5	12	7	11	7	9	4	8	4	8	3	12	6	16	7	23	11	16	14	9	17	16	12	15	10	14	11	17	3	13	4
Australia	2	1	4	1	2	3	2	4	3	8	8	5	11	7	11	7	9	4	8	4	8	3	11	6	16	7	23	11	15	14	8	17	14	11	14	8	14	11	16	4	12	4
New Zealand	1	1	0	0	1	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	1	0	0	0	1	0	1	
All others	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Unclassified	0	4	0	53	0	107	0	8	0	7	1	1	0	7	0	0	5	1	2	0	27	0	0	2	0	0	0	0	0	0	1	1	0	0	1	0	1	2	0	1	0	

EU = European Union; USPTO = U.S. Patent and Trademark Office.

## Note(s)

USPTO patents are allocated according to patent inventorship information. USPTO patents are fractionally allocated among regions, countries, or economies based on the proportion of residences of all named inventors. Patents are classified under the World Intellectual Property Organization (WIPO) classification of patents, which classifies International Patent Classification (IPC) codes under 35 technical fields. IPC reformed codes take into account changes that were made to the WIPO classification in 2006 under the eighth version of the classification and were used to prepare these data. However, because PatentsView only provides the original IPC codes as they appeared on patents and not the IPC reformed codes, current Cooperative Patent Classification codes on patents were converted back to the most recent IPC classification to prepare these statistics. Fractional counts of patents were assigned to each technological field on patents to assign the proper weight of a patent to the corresponding technological fields under the classification. International Patent Documentation (INPADOC) patent families across all patent offices covered in the Worldwide Patent Statistical Database (PATSTAT) are counted according to the year of the first granted patent in the patent family. Patent families are allocated according to patent inventorship information found on the priority patent of the INPADOC patent families. To account for missing ownership information in PATSTAT for some offices, a method designed by de Rassenfosse et al. (2012) is used to fill in missing information on priority patents using information in successive filings within the patent families (see technical documentation for details). Patent families are fractionally allocated among regions, countries, or economies based on the proportion of residences of all named inventors. Because of data coverage issues for some patent offices in PATSTAT, statistics for some countries may be underestimated partially for some years or across the whole trend. Countries with identified issues include India (missing data) and South Africa (no data for 2018). For Italy, because of data gaps regarding information on granted patents, patent applications are used instead, which slightly overestimates Italy's output and creates a small shift in the year for which its output is accounted. The EU includes 28 member countries. China includes Hong Kong.

## Source(s)

Science-Metrix; PATSTAT, accessed April 2019; PatentsView, USPTO, accessed June 2019.