

FAMILY NUMBER	DOCKET REFERENCE NUMBER	CNTRY CODE	APPLICATION OR SERIAL NUMBER	PATENT NUMBER	TITLE	STATUS	Technology Family	Technology Cluster (Subgroup)
1	001CN	CN	200780045506.2		Template For Three-Dimensional Thin-Film Solar Cell Manufacturing And Methods Of Use	ABANDONED	#1 EPI/Porous Si Wafer Technology	b. 3D
1	001EP	EP	07868383.6		Template For Three-Dimensional Thin-Film Solar Cell Manufacturing And Methods Of Use	ABANDONED	#1 EPI/Porous Si Wafer Technology	b. 3D
1	001IN	IN	1756/KOLNP/2009		Template For Three-Dimensional Thin-Film Solar Cell Manufacturing And Methods Of Use	ABANDONED	#1 EPI/Porous Si Wafer Technology	b. 3D
1	001JP	JP	2009-532512	5528809	Template For Three-Dimensional Thin-Film Solar Cell Manufacturing And Methods Of Use	ISSUED	#1 EPI/Porous Si Wafer Technology	b. 3D
1	001US0	US	11/868,488	8,129,822	Template For Three-Dimensional Thin-Film Solar Cell Manufacturing And Methods Of Use	ISSUED	#1 EPI/Porous Si Wafer Technology	b. 3D
1	001US1	US	12/879,871		Template For Three-Dimensional Thin-Film Solar Cell Manufacturing And Methods Of Use	ABANDONED	#1 EPI/Porous Si Wafer Technology	b. 3D
1	001US2	US	13/099,825		Template For Three-Dimensional Thin-Film Solar Cell Manufacturing And Methods Of Use	ABANDONED	#1 EPI/Porous Si Wafer Technology	b. 3D
1	001US3	US	13/099,837		Template For Three-Dimensional Thin-Film Solar Cell Manufacturing And Methods Of Use	ABANDONED	#1 EPI/Porous Si Wafer Technology	b. 3D
1	001US4	US	13/345,861		Template For Three-Dimensional Thin-Film Solar Cell Manufacturing And Methods Of Use	ABANDONED	#1 EPI/Porous Si Wafer Technology	b. 3D
1	001USP	US	60/828,678		High-Performance, Three-Dimensional (3D) Thin-Film, Solar Cell Device Structures, Fabrication Processes, and Mass Manufacturing Methods, as well as Solar Module Structures and Assembly Methods Using Such 3D Solar Cells	EXPIRED	#1 EPI/Porous Si Wafer Technology	b. 3D
1	001USP1B	US	60/886,303		Low-Cost, High-Efficiency, Lightweight, Three-Dimensional (3-D), Prism-Array, Thin-Film Solar Cells and Manufacturing Methods, as well as Solar Module Structures and Assembly Methods Using Such Solar Cells	EXPIRED	#1 EPI/Porous Si Wafer Technology	b. 3D
1	001WO	WO	PCT/US2007/080654		Template For Three-Dimensional Thin-Film Solar Cell Manufacturing And Methods Of Use	EXPIRED	#1 EPI/Porous Si Wafer Technology	b. 3D
2	002US0	US	11/868,489		High-Performance, Three-Dimensional (3D) Thin-Film, Solar Cell Device Structures, Fabrication Processes, and Mass Manufacturing Methods, as well as Solar Module Structures and Assembly Methods Using Such 3D Solar Cells	ABANDONED	#1 EPI/Porous Si Wafer Technology	b. 3D
2	002US1	US	12/767,791		Shadow Mask Methods For Manufacturing Three-Dimensional Thin-Film Solar Cells	ABANDONED	#1 EPI/Porous Si Wafer Technology	b. 3D
2	002WO	WO	PCT/US2007/080655		Methods For Manufacturing Three-Dimensional Thin-Film Solar Cells	EXPIRED	#1 EPI/Porous Si Wafer Technology	b. 3D
3	003US0	US	11/868,490	8,084,684	Three-Dimensional Thin-Film Solar Cells	SOLD	#2 IBC Cell Technology	b. 3D
3	003US1	US	13/355,237	8,324,499	Three-Dimensional Thin-Film Solar Cells	SOLD	#2 IBC Cell Technology	b. 3D
3	003US2	US	13/692,599	9,349,887	Three-Dimensional Thin-Film Solar Cells	SOLD	#2 IBC Cell Technology	b. 3D
3	003WO	WO	PCT/US2007/080656		Three-Dimensional Thin-Film Solar Cells	SOLD	#2 IBC Cell Technology	b. 3D
4	004US0	US	11/868,491	7,999,174	Solar Module Structures And Assembly Methods For Three-Dimensional Thin-Film Solar Cells	SOLD	#3 Module Technology	b. 3D
4	004US1	US	13/187,291	8,742,249	Solar Module Structures And Assembly Methods For Three-Dimensional Thin-Film Solar Cells	SOLD	#3 Module Technology	b. 3D
4	004US2	US	14/293,676		Solar Module Structures And Assembly Methods For Three-Dimensional Thin-Film Solar Cells	SOLD	#3 Module Technology	b. 3D
4	004US2D1	US	15/602,906		Solar Module Structures And Assembly Methods For Three-Dimensional Thin-Film Solar Cells	SOLD	#3 Module Technology	b. 3D
4	004WO	WO	PCT/US2007/080657		Solar Module Structures And Assembly Methods For Three-Dimensional Thin-Film Solar Cells	SOLD	#3 Module Technology	b. 3D
5	005US0	US	11/841,629	7,786,376	High Efficiency Solar Cell	ISSUED	#2 IBC Cell Technology	b. 3D
5	005USP	US	60/823,200		High Efficiency Solar Cell	EXPIRED	#2 IBC Cell Technology	b. 3D
6	006US0	US	11/868,492		Template For Pyramidal Three-Dimensional Thin-Film Solar Cell Manufacturing And Methods Of Use	ABANDONED	#1 EPI/Porous Si Wafer Technology	b. 3D

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6	006WO	WO	PCT/US2007/080658		Template For Pyramidal Three-Dimensional Thin-Film Solar Cell Manufacturing And Methods Of Use	ABANDONED	#1 EPI/Porous Si Wafer Technology	b. 3D
7	007CN	CN	200780045520.2	ZL200780045520.2	Pyramidal Three-Dimensional Thin-Film Solar Cells	SOLD	#2 IBC Cell Technology	b. 3D
7	007EP	EP	07868386.9		Pyramidal Three-Dimensional Thin-Film Solar Cells	SOLD	#2 IBC Cell Technology	b. 3D
7	007IN	IN	1725/KOLNP/2009		Pyramidal Three-Dimensional Thin-Film Solar Cells	SOLD	#2 IBC Cell Technology	b. 3D
7	007JP	JP	2009-532513	5519285	Pyramidal Three-Dimensional Thin-Film Solar Cells	SOLD	#2 IBC Cell Technology	b. 3D
7	007JPD1	JP	2014-076786	5739037	Pyramidal Three-Dimensional Thin-Film Solar Cells	SOLD	#2 IBC Cell Technology	b. 3D
7	007US0	US	11/868,493	8,035,028	Pyramidal Three-Dimensional Thin-Film Solar Cells	SOLD	#2 IBC Cell Technology	b. 3D
7	007US1	US	13/188,156		Pyramidal Three-Dimensional Thin-Film Solar Cells	SOLD	#2 IBC Cell Technology	b. 3D
7	007WO	WO	PCT/US2007/080659		Pyramidal Three-Dimensional Thin-Film Solar Cells	SOLD	#2 IBC Cell Technology	b. 3D
8	008US0	US	11/868,494	8,035,027	Solar Module Structures And Assembly Methods For Pyramidal Three-Dimensional Thin-Film Solar Cells	ISSUED	#3 Module Technology	b. 3D
8	008US1	US	13/188,303	8,847,060	Solar Module Structures And Assembly Methods For Pyramidal Three-Dimensional Thin-Film Solar Cells	ISSUED	#3 Module Technology	b. 3D
8	008US2	US	14/500,757		Structures And Fabrication Methods For Solar Cells And Modules	PUBLISHED	#3 Module Technology	b. 3D
8	008WO	WO	PCT/US2007/080660		Solar Module Structures And Assembly Methods For Pyramidal Three-Dimensional Thin-Film Solar Cells	EXPIRED	#3 Module Technology	b. 3D
8	009EP1	EP	10749454.4		Method For Releasing A Thin-Film Substrate	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
9	009US0	US	12/473,811	7,745,313	Substrate Release Methods And Apparatus	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
9	009US1	US	12/719,766	8,293,558	Method For Releasing A Thin-Film Substrate	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
9	009US2	US	12/826,641	8,193,076	Method For Releasing A Thin Semiconductor Substrate From A Reusable Template	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
9	009US3	US	13/463,757	9,397,250	A Releasing Apparatus For Separating A Semiconductor Substrate From A Semiconductor Template	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
9	009US3C1	US	15/212,447		Methods For Releasing A Semiconductor Substrate From A Template	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
9	009US4	US	13/657,718		Method For Releasing A Thin-Film Substrate	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
9	009USP	US	61/056,722		Substrate Release Methods And Apparatus	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
9	009WO1	WO	PCT/US2010/026570		Method For Releasing A Thin-Film Substrate	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
10	010US0	US	12/193,415	8,512,581	Methods For Liquid Transfer Coating Of Three-Dimensional Substrates	ISSUED	#2 IBC Cell Technology	b. 3D
10	010US1	US	13/942,150	9,093,323	Methods For Selectively Coating Three-Dimensional Features On A Substrate	ISSUED	#2 IBC Cell Technology	b. 3D
10	010US1C1	US	14/810,417		Methods For Selectively Coating Three-Dimensional Features On A Substrate	ABANDONED	#2 IBC Cell Technology	b. 3D
10	010USP	US	60/956,388		Liquid Transfer Coating Apparatus and Methods	EXPIRED	#2 IBC Cell Technology	b. 3D
10	010WO	US	PCT/US2008/073499		Methods For Liquid Transfer Coating Of Three-Dimensional Substrates	EXPIRED	#2 IBC Cell Technology	b. 3D
11	011US0	US	12/477,095		Alternate Use For Low Viscosity Liquids And Method To Gel Liquid	EXPIRED	#2 IBC Cell Technology	b. 3D
11	011US1	US	12/626,363		Alternate Use For Low Viscosity Liquids And Method To Gel Liquid	ABANDONED	#2 IBC Cell Technology	b. 3D
11	011USP	US	61/007,549		Alternate Use For Low Viscosity Liquids And Method To Gel Liquid	EXPIRED	#2 IBC Cell Technology	b. 3D

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12	012US0	US	12/477,094		Method And Apparatus To Transfer Coat Uneven Surface	ABANDONED	#2 IBC Cell Technology	b. 3D
12	012US1	US	12/620,162		Method And Apparatus To Transfer Coat Uneven Surface	ABANDONED	#2 IBC Cell Technology	b. 3D
12	012USP	US	61/195,620		Method And Apparatus To Transfer Coat Uneven Surface	EXPIRED	#2 IBC Cell Technology	b. 3D
13	013USP	US	61/077,259		Alternate Use For Low Viscosity Liquids And Method To Gel Liquid	EXPIRED	EXPIRED	EXPIRED
14	014USP	US	61/077,418		Method And Apparatus To Transfer Coat Uneven Surface	ABANDONED	#2 IBC Cell Technology	b. 3D
15	015USP	US	61/158,223		Method And Apparatus For Releasing Thin-Film Silicon Substrates	EXPIRED	#2 IBC Cell Technology	b. 3D
16						ABANDONED	Unknown	Unknown
17	017DE	DE	09826880.8	EP2356675	Methods And Systems For Manufacturing Thin-Film Solar Cells	ISSUED	#1 EPI/Porous Si Wafer Technology	b. 3D
17	017EP	EP	09826880.8	EP2356675	Methods And Systems For Manufacturing Thin-Film Solar Cells	ISSUED	#1 EPI/Porous Si Wafer Technology	b. 3D
17	017FR	FR	09826880.8	EP2356675	Methods And Systems For Manufacturing Thin-Film Solar Cells	ISSUED	#1 EPI/Porous Si Wafer Technology	b. 3D
17	017GB	GB	09826880.8	EP2356675	Methods And Systems For Manufacturing Thin-Film Solar Cells	ISSUED	#1 EPI/Porous Si Wafer Technology	b. 3D
17	017NL	NL	09826880.8	EP2356675	Methods And Systems For Manufacturing Thin-Film Solar Cells	ISSUED	#1 EPI/Porous Si Wafer Technology	b. 3D
17	017US0	US	12/618,649	8,168,465	Three-Dimensional Semiconductor Template For Making High Efficiency Thin-Film Solar Cells	ISSUED	#1 EPI/Porous Si Wafer Technology	b. 3D
17	017US1	US	13/345,935	8,664,737	Three-Dimensional Semiconductor Template For Making High Efficiency Thin-Film Solar Cells	ISSUED	#1 EPI/Porous Si Wafer Technology	b. 3D
17	017US2	US	14/195,748	9,590,035	Three-Dimensional Semiconductor Template For Making High Efficiency Solar Cells	ISSUED	#1 EPI/Porous Si Wafer Technology	b. 3D
17	017USP	US	61/114,378		Re-Usable Crystallographically-Etched Silicon Template For Making Three-Dimensional Thin-Film Solar Cells	EXPIRED	#1 EPI/Porous Si Wafer Technology	b. 3D
17	017WO	WO	PCT/US2009/064484		Methods And Systems For Manufacturing Thin-Film Solar Cells	EXPIRED	#1 EPI/Porous Si Wafer Technology	b. 3D
18	018EP	US	09829825.0		Truncated Pyramid Structures For See-Through Solar Cells	ABANDONED	#2 IBC Cell Technology	b. 3D
18	018MY	MY	PI2011002341		Truncated Pyramid Structures For See-Through Solar Cells	PENDING	#2 IBC Cell Technology	b. 3D
18	018US0	US	12/626,778	8,053,665	Truncated Pyramid Structures For See-Through Solar Cells	ISSUED	#2 IBC Cell Technology	b. 3D
18	018US1	US	13/010,655		Truncated Pyramid Structures For See-Through Solar Cells	ABANDONED	#2 IBC Cell Technology	b. 3D
18	018US2	US	13/193,302	8,853,521	Truncated Pyramid Structures For See-Through Solar Cells	ISSUED	#2 IBC Cell Technology	b. 3D
18	018US3	US	14/507,786		Truncated Pyramid Structures For See-Through Solar Cells	ABANDONED	#2 IBC Cell Technology	b. 3D
18	018USP	US	61/118,243		Truncated Pyramid Structures For See-Through Solar Cells	EXPIRED	#2 IBC Cell Technology	b. 3D
18	018WO	WO	PCT/US2009/066011		Truncated Pyramid Structures For See-Through Solar Cells	EXPIRED	#2 IBC Cell Technology	b. 3D
19	019US0	US	12/728,772	8,828,517	Structure And Method For Improving Solar Cell Efficiency And Mechanical Strength	ISSUED	#2 IBC Cell Technology	b. 3D
19	019US1	US	14/479,523		Structure And Method For Improving Solar Cell Efficiency And Mechanical Strength	PUBLISHED	#2 IBC Cell Technology	b. 3D
19	019USP	US	61/162,546		Structure And Method For Improving Solar Cell Efficiency And Mechanical Strength Using Variable Aperture Size And Wall Thickness	EXPIRED	#2 IBC Cell Technology	b. 3D
20	020DE	DE	10732153.1	EP2387458	Porous Silicon Electro-Etching System And Method	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
20	020DK	DK	10732153.1	EP2387458	Porous Silicon Electro-Etching System And Method	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO

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20	020EP	EP	10732153.1	EP2387458	Porous Silicon Electro-Etching System And Method	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
20	020FR	FR	10732153.1	EP2387458	Porous Silicon Electro-Etching System And Method	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
20	020GB	GB	10732153.1	EP2387458	Porous Silicon Electro-Etching System And Method	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
20	020JP	JP	2011-546393		Porous Silicon Electro-Etching System And Method	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
20	020MY	MY	PI2011003342		Porous Silicon Electro-Etching System And Method	PENDING	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
20	020NL	NL	10732153.1	EP2387458	Porous Silicon Electro-Etching System And Method	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
20	020US0	US	12/688,495	8,926,803	Porous Silicon Electro-Etching System And Method	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
20	020US1	US	14/589,667		Porous Silicon Electro-Etching System And Method	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
20	020US2	US	14/589,847	TBD	Porous Silicon Electro-Etching System And Method	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
20	020USP	US	61/145,018		Porous Silicon Electro-Etching System And Method	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
20	020WO	WO	PCT/US2010/021209		Porous Silicon Electro-Etching System And Method	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
21	021CN	CN	201080060493.8		Structures And Methods For High-Efficiency Pyramidal Three-Dimensional Solar Cells	ABANDONED	#2 IBC Cell Technology	b. 3D
21	021EP	EP	10830677.0		Structures And Methods For High-Efficiency Pyramidal Three-Dimensional Solar Cells	EXPIRED	#2 IBC Cell Technology	b. 3D
21	021US0	US	12/615,383	8,937,243	Structures And Methods For High-Efficiency Pyramidal Three-Dimensional Solar Cells	SOLD	#2 IBC Cell Technology	b. 3D
21	021US1	US	14/601,123	9,595,622	Structures And Methods For High-Efficiency Pyramidal Three-Dimensional Solar Cells	SOLD	#2 IBC Cell Technology	b. 3D
21	021WO	WO	PCT/US2010/056264		Structures And Methods For High-Efficiency Pyramidal Three-Dimensional Solar Cells	SOLD	#2 IBC Cell Technology	b. 3D
22	022EP	EP	10739242.5		Trench Formation Method For Releasing A Thin-Film Substrate From A Reusable Semiconductor Template	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
22	022MY	MY	PI2011700122		Trench Formation Method For Releasing A Thin-Film Substrate From A Reusable Semiconductor Template	PENDING	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
22	022US0	US	12/702,187	8,278,192	Trench Formation Method For Releasing A Thin-Film Substrate From A Reusable Semiconductor Template	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
22	022US1	US	13/633,723	9,343,299	Trench Formation Method For Releasing A Substrate From A Semiconductor Template	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
22	022US2	US	15/156,286		Trench Formation Method For Releasing A Substrate From A Semiconductor Template	PENDING	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
22	022USP	US	61/150,392		Methods Of Making Trenches For Defining And Releasing Structured Thin-Film Substrates From Re-Usable Semiconductor Templates	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
22	022WO	WO	PCT/US2010/023514		Trench Formation Method For Releasing A Thin-Film Substrate From A Reusable Semiconductor Template	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
23	023USP	US	61/162,830		Self-Supporting Three Dimensional Thin Film Semiconductor Substrate	EXPIRED	#1 EPI/Porous Si Wafer Technology	b. 3D
24	024CN	CN	201080021690.9	ZL201080021690.9	High Efficiency Epitaxial Chemical Vapor Deposition (Cvd) Reactor	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
24	024DE	DE	10765064.0	EP2419306	High Efficiency Epitaxial Chemical Vapor Deposition (Cvd) Reactor	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
24	024EP	EP	10765064.0	EP2419306	High Efficiency Epitaxial Chemical Vapor Deposition (Cvd) Reactor	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
24	024FR	FR	10765064.0	EP2419306	High Efficiency Epitaxial Chemical Vapor Deposition (Cvd) Reactor	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
24	024GB	GB	10765064.0	EP2419306	High Efficiency Epitaxial Chemical Vapor Deposition (Cvd) Reactor	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO

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24	024MY	MY	PI2011004789		High Efficiency Epitaxial Chemical Vapor Deposition (Cvd) Reactor	PENDING	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
24	024NL	NL	10765064.0	EP2419306	High Efficiency Epitaxial Chemical Vapor Deposition (Cvd) Reactor	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
24	024US0	US	12/759,820	8,656,860	High Efficiency Epitaxial Chemical Vapor Deposition (Cvd) Reactor	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
24	024USP	US	61/169,139		High Efficiency Epitaxial Chemical Vapor Deposition (Cvd) Reactor	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
24	024WO	WO	PCT/US2010/030991		High Efficiency Epitaxial Chemical Vapor Deposition (Cvd) Reactor	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
25	025US0	US	12/767,512	9,099,584	Integrated Three-Dimensional And Planar Metallization Structure For Thin Film Solar Cells	ISSUED	#2 IBC Cell Technology	b. 3D
25	025US0C1	US	14/817,038		Integrated Three-Dimensional And Planar Metallization Structure For Thin Film Solar Cells	ABANDONED	#2 IBC Cell Technology	b. 3D
25	025USP	US	61/172,335		Integrated 3-Dimension And Planar Metallization Structure For Thin Film Solar Cells	EXPIRED	#2 IBC Cell Technology	b. 3D
26						ABANDONED	Unknown	Unknown
27	027USP	US	61/172,275		Shadow Mask Nitride For Forming Selective Back Side And Front Side Contacts	EXPIRED	#2 IBC Cell Technology	c. Process
28	028US0	US	12/786,262	8,445,314	Method Of Creating Reusable Template For Detachable Thin Film Substrate	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
28	028US1	US	13/897,323	9,053,957	Structure And Method For Creating A Reusable Template For Detachable Thin Film Substrates	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
28	028US1C1	US	14/733,758		Structure And Method For Creating A Reusable Template For Detachable Thin Film Substrates	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
28	028USP	US	61/180,623		Method Of Creating Reusable Template For Detachable Thin Film Substrate	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
29	029CN	CN	201080030023.7	ZL201080030023.7	High-Productivity Porous Silicon Manufacturing Equipment	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
29	029EP	EP	10772799.2		High-Productivity Porous Silicon Manufacturing Equipment	PUBLISHED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
29	029JP	JP	2012-509957	5872456	High-Productivity Porous Silicon Manufacturing Equipment	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
29	029MY	MY	PI2011005354		High-Productivity Porous Silicon Manufacturing Equipment	ALLOWED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
29	029US0	US	12/774,667	8,999,058	High-Productivity Porous Silicon Manufacturing Equipment	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
29	029US0C1	US	14/679,731	9,869,031	High-Productivity Porous Silicon Manufacturing Equipment	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
29	029USP	US	61/175,535		High-Productivity Porous Silicon Manufacturing Equipment	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
29	029WO	WO	PCT/US2010/033792		High-Productivity Porous Silicon Manufacturing Equipment	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
30	030US0	US	12/774,713	8,420,435	Ion Implantation Fabrication Process For Thin-Film Crystalline Silicon Solar Cells	ISSUED	#2 IBC Cell Technology	a. IBC
30	030US1	US	13/688,062		Ion Implantation Fabrication Process For Thin-Film Crystalline Silicon Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
30	030USP	US	61/175,698		Application Of Ion Implantation Process In Thin-Film Crystalline Silicon Solar Cell Fabrication	EXPIRED	#2 IBC Cell Technology	a. IBC
31	031USP	US	61/182,635		Self-Supporting Three Dimensional Thin Film Semiconductor Substrate With Through-Holes For Making See-Through Solar Cells	EXPIRED	#1 EPI/Porous Si Wafer Technology	b. 3D
32	032DE	DE	10781392.5	EP2436028	Self-Supporting Three Dimensional Thin Film Semiconductor Substrate With Through-Holes For Making See-Through Solar Cells	ISSUED	#2 IBC Cell Technology	b. 3D
32	032EP	EP	10781392.5	EP2436028	Self-Supporting Three Dimensional Thin Film Semiconductor Substrate With Through-Holes For Making See-Through Solar Cells	ISSUED	#2 IBC Cell Technology	b. 3D

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32	032FR	FR	10781392.5	EP2436028	Self-Supporting Three Dimensional Thin Film Semiconductor Substrate With Through-Holes For Making See-Through Solar Cells	ISSUED	#2 IBC Cell Technology	b. 3D
32	032GB	GB	10781392.5	EP2436028	Self-Supporting Three Dimensional Thin Film Semiconductor Substrate With Through-Holes For Making See-Through Solar Cells	ISSUED	#2 IBC Cell Technology	b. 3D
32	032MY	MY	PI2011700177	MY159405-A1	Self-Supporting Three Dimensional Thin Film Semiconductor Substrate With Through-Holes For Making See-Through Solar Cells	ISSUED	#2 IBC Cell Technology	b. 3D
32	032NL	NL	10781392.5	EP2436028	Self-Supporting Three Dimensional Thin Film Semiconductor Substrate With Through-Holes For Making See-Through Solar Cells	ISSUED	#2 IBC Cell Technology	b. 3D
32	032US0	US	12/791,842	8,551,866	Three-Dimensional Thin-Film Semiconductor Substrate With Through-Holes And Methods Of Manufacturing	ISSUED	#2 IBC Cell Technology	b. 3D
32	032US1	US	13/962,291	8,916,772	Three-Dimensional Thin-Film Semiconductor Substrate With Through-Holes And Methods Of Manufacturing	ISSUED	#2 IBC Cell Technology	b. 3D
32	032US2	US	14/578,161	9,680,041	Three-Dimensional Thin-Film Semiconductor Substrate With Through-Holes And Methods Of Manufacturing	ISSUED	#2 IBC Cell Technology	b. 3D
32	032US3	US	15/620,719		THREE DIMENSIONAL THIN FILM SEMICONDUCTOR SUBSTRATE WITH THROUGH-HOLES AND METHOD OF MANUFACTURING	PENDING	#2 IBC Cell Technology	b. 3D
32	032USP	US	61/228,068		Three-Dimensional Solar Cell Structures And Methods Of Manufacturing	EXPIRED	#2 IBC Cell Technology	b. 3D
32	032WO	WO	PCT/US2010/036975		Three-Dimensional Thin-Film Semiconductor Substrate With Through-Holes And Methods Of Manufacturing	EXPIRED	#2 IBC Cell Technology	b. 3D
33	033USP	US	61/259,829		High-Productivity Substrate Edge Preparation Manufacturing Equipment	EXPIRED	#1 EPI/Porous Si Wafer Technology	c. Process
34	034EP1	EP	10756809.9		Method For Fabricating A Three-Dimensional Thin-Film Semiconductor Substrate From A Template	ABANDONED	#2 IBC Cell Technology	b. 3D
34	034MY1	MY	PI2011004548	MY-159267-A	Method For Fabricating A Three-Dimensional Thin-Film Semiconductor Substrate From A Template	ISSUED	#2 IBC Cell Technology	b. 3D
34	034US0	US	12/618,663		Thin-Film Solar Cells Based On Crystalline Templates Having Inverted Pyramidal Cavity.	ABANDONED	#2 IBC Cell Technology	b. 3D
34	034US1	US	12/731,058	8,288,195	Method For Fabricating A Three-Dimensional Thin-Film Semiconductor Substrate From A Template	ISSUED	#2 IBC Cell Technology	b. 3D
34	034US2	US	13/652,237		Method For Fabricating A Three-Dimensional Thin-Film Semiconductor Substrate From A Template	ABANDONED	#2 IBC Cell Technology	b. 3D
34	034WO1	WO	PCT/US2010/028534		Method For Fabricating A Three-Dimensional Thin-Film Semiconductor Substrate From A Template	EXPIRED	#2 IBC Cell Technology	b. 3D
35	035US0	US	12/618,668	8,294,026	High-Efficiency Thin-Film Solar Cells	ISSUED	#2 IBC Cell Technology	b. 3D
35	035US1	US	13/657,745		High-Efficiency Thin-Film Solar Cells	ABANDONED	#2 IBC Cell Technology	b. 3D
36	036CN	CN	201080063494.8	ZL201080063494.8	High-Efficiency Photovoltaic Back-Contact Solar Cell Structures And Manufacturing Methods Using Thin Planar Semiconductor Absorbers	ISSUED	#2 IBC Cell Technology	a. IBC
36	036CN1	CN	201080063303.8	ZL201080063303.8	High-Efficiency Photovoltaic Back-Contact Solar Cell Structures And Manufacturing Methods Using Semiconductor Wafers	ISSUED	#2 IBC Cell Technology	a. IBC
36	036CN2	CN	201080063496.7	ZL201080063496.7	High-Efficiency Photovoltaic Back-Contact Solar Cell Structures And Manufacturing Methods Using Three-Dimensional Semiconductor Absorbers	ISSUED	#2 IBC Cell Technology	a. IBC
36	036EP	EP	10836710.3	2510551	High-efficiency photovoltaic back-contact solar cell structures and manufacturing methods using thin planar semiconductors	ISSUED	#2 IBC Cell Technology	a. IBC
36	036EP1	EP	10836723.6		High-Efficiency Photovoltaic Back-Contact Solar Cell Structures And Manufacturing Methods Using Semiconductor Wafers	PUBLISHED	#2 IBC Cell Technology	a. IBC
36	036EP2	EP	10836703.8		High-Efficiency Photovoltaic Back-Contact Solar Cell Structures And Manufacturing Methods Using Three-Dimensional Semiconductor Absorbers	ALLOWED	#2 IBC Cell Technology	a. IBC

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36	036MY	MY	PI2012700546		High-Efficiency Photovoltaic Back-Contact Solar Cell Structures And Manufacturing Methods Using Thin Planar Semiconductor Absorbers	PENDING	#2 IBC Cell Technology	a. IBC
36	036MY1	MY	PI2012700547		High-Efficiency Photovoltaic Back-Contact Solar Cell Structures And Manufacturing Methods Using Semiconductor Wafers	PENDING	#2 IBC Cell Technology	a. IBC
36	036NOC1	NO	14/629,273	9,196,759	High-Efficiency Photovoltaic Back-Contact Solar Cell Structures And Manufacturing Methods	ISSUED	#2 IBC Cell Technology	a. IBC
36	036NOC2	NO	14/949,602		High-Efficiency Photovoltaic Back-Contact Solar Cell Structures And Manufacturing Methods	ABANDONED	#2 IBC Cell Technology	a. IBC
36	036USN0	US	13/057,104	8,962,380	High-Efficiency Photovoltaic Back-Contact Solar Cell Structures And Manufacturing Methods Using Thin Planar Semiconductor Absorbers	ISSUED	#2 IBC Cell Technology	a. IBC
36	036USN1	US	13/057,115		High-Efficiency Photovoltaic Back-Contact Solar Cell Structures And Manufacturing Methods Using Semiconductor Wafers	ABANDONED	#2 IBC Cell Technology	a. IBC
36	036USN2	US	13/057,123		High-Efficiency Photovoltaic Back-Contact Solar Cell Structures And Manufacturing Methods Using Three-Dimensional Semiconductor Absorbers	PUBLISHED	#2 IBC Cell Technology	a. IBC
36	036USP	US	61/285,140		High-Efficiency Photovoltaic Solar Cell Structures and Manufacturing Methods	EXPIRED	#2 IBC Cell Technology	a. IBC
36	036WO	WO	PCT/US2010/059759		High-Efficiency Photovoltaic Back-Contact Solar Cell Structures And Manufacturing Methods Using Thin Planar Semiconductor Absorbers	EXPIRED	#2 IBC Cell Technology	a. IBC
36	036WO1	WO	PCT/US2010/059783		High-Efficiency Photovoltaic Back-Contact Solar Cell Structures And Manufacturing Methods Using Semiconductor Wafers	EXPIRED	#2 IBC Cell Technology	a. IBC
36	036WO2	WO	PCT/US2010/059748		High-Efficiency Photovoltaic Back-Contact Solar Cell Structures And Manufacturing Methods Using Three-Dimensional Semiconductor Absorbers	EXPIRED	#2 IBC Cell Technology	a. IBC
37	037CN	CN	201080063771.5		Mobile Vacuum Carriers For Thin Wafer Processing	ABANDONED	#1 EPI/Porous Si Wafer Technology	d. Fixturing
37	037EP	EP	10842566.1		Mobile Vacuum Carriers For Thin Wafer Processing	ABANDONED	#1 EPI/Porous Si Wafer Technology	d. Fixturing
37	037USN	US	13/515,848		Mobile Vacuum Carriers For Thin Wafer Processing	PUBLISHED	#1 EPI/Porous Si Wafer Technology	d. Fixturing
37	037USP	US	61/286,638		Mobile Vacuum Carriers For Thin Wafer Processing	EXPIRED	#1 EPI/Porous Si Wafer Technology	d. Fixturing
37	037WO	WO	PCT/US2010/060591		Mobile Vacuum Carriers For Thin Wafer Processing	EXPIRED	#1 EPI/Porous Si Wafer Technology	d. Fixturing
38	038CN	CN	201080064953.4	ZL201080064953.4	Mobile Electrostatic Carriers For Thin Wafer Processing	SOLD	#1 EPI/Porous Si Wafer Technology	d. Fixturing
38	038DE	DE	10841770.0	EP2519967	Mobile Electrostatic Carriers For Thin Wafer Processing	SOLD	#1 EPI/Porous Si Wafer Technology	d. Fixturing
38	038DK	DK	10841770.0	EP2519967	Mobile Electrostatic Carriers For Thin Wafer Processing	SOLD	#1 EPI/Porous Si Wafer Technology	d. Fixturing
38	038EP	EP	10841770.0	EP2519967	Mobile Electrostatic Carriers For Thin Wafer Processing	SOLD	#1 EPI/Porous Si Wafer Technology	d. Fixturing
38	038FR	FR	10841770.0	EP2519967	Mobile Electrostatic Carriers For Thin Wafer Processing	SOLD	#1 EPI/Porous Si Wafer Technology	d. Fixturing
38	038GB	GB	10841770.0	EP2519967	Mobile Electrostatic Carriers For Thin Wafer Processing	SOLD	#1 EPI/Porous Si Wafer Technology	d. Fixturing
38	038NL	NL	10841770.0	EP2519967	Mobile Electrostatic Carriers For Thin Wafer Processing	SOLD	#1 EPI/Porous Si Wafer Technology	d. Fixturing
38	038USN	US	13/520,139	9,330,952	Bipolar Mobile Electrostatic Carriers For Wafer Processing	SOLD	#1 EPI/Porous Si Wafer Technology	d. Fixturing
38	038USNOC1	US	14/991,772		Bipolar Mobile Electrostatic Carriers For Wafer Processing	SOLD	#1 EPI/Porous Si Wafer Technology	d. Fixturing
38	038USP	US	61/291,156		Mobile Electrostatic Carriers For Thin Wafer Processing	SOLD	#1 EPI/Porous Si Wafer Technology	d. Fixturing

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38	038WO	WO	PCT/US2010/062614		Mobile Electrostatic Carriers For Thin Wafer Processing	SOLD	#1 EPI/Porous Si Wafer Technology	d. Fixturing
39	039USP	US	61/300,219		Reinforcement Of Thin Semiconductor Substrates For Solar Cell, Microelectronics, And Related Applications	EXPIRED	#1 EPI/Porous Si Wafer Technology	d. Fixturing
40	040USP	US	61/303,770		High-Efficiency Photovoltaic Solar Cell Structures And Manufacturing Methods	EXPIRED	#1 EPI/Porous Si Wafer Technology	d. Fixturing
41	041CN	CN	201180018589.2	ZL201180018589.2	Double-Sided Reusable Template For Fabrication Of Semiconductor Substrates For Photovoltaic Cell And Microelectronics Device Manufacturing	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
41	041EP	EP	11742933.2		Double-Sided Reusable Template For Fabrication Of Semiconductor Substrates For Photovoltaic Cell And Microelectronics Device Manufacturing	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
41	041US0	US	13/026,239	8,241,940	Double-Sided Reusable Template For Fabrication Of Semiconductor Substrates For Photovoltaic Cell And Microelectronics Device Manufacturing	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
41	041US1	US	13/554,103	9,401,276	Apparatus For Forming Porous Silicon Layers On At Least Two Surfaces Of A Plurality Of Silicon Templates	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
41	041US2	US	15/219,213		Double-Sided Reusable Template For Fabrication Of Semiconductor Substrates For Photovoltaic Cell And Microelectronics Device Manufacturing	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
41	041USP	US	61/304,340		Double-Sided Reusable Template For Fabrication Of Semiconductor Substrates For Photovoltaic Cell And Microelectronics Device Manufacturing	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
41	041WO	WO	PCT/US2011/024670		Double-Sided Reusable Template For Fabrication Of Semiconductor Substrates For Photovoltaic Cell And Microelectronics Device Manufacturing	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
42	042USP	US	61/304,349		Double-Sided Reusable Template For Fabrication Of Semiconductor Substrates For Photovoltaic Cell And Microelectronics Device Manufacturing	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
43	043EP	EP	11772838.6		Passivation Methods For Achieving Ultra-Low Surface Recombination Velocities For High-Efficiency Solar Cells	ABANDONED	#2 IBC Cell Technology	c. Process
43	043KR	KR	10-2012-7030770	10-1381305	Passivation Methods For Achieving Ultra-Low Surface Recombination Velocities For High-Efficiency Solar Cells	ISSUED	#2 IBC Cell Technology	c. Process
43	043KR-DIV	KR	10-2013-7012059		Passivation Methods For Achieving Ultra-Low Surface Recombination Velocities For High-Efficiency Solar Cells	ALLOWED	#2 IBC Cell Technology	c. Process
43	043US0	US	13/092,942		Passivation Methods For Achieving Ultra-Low Surface Recombination Velocities For High-Efficiency Solar Cells	ABANDONED	#2 IBC Cell Technology	c. Process
43	043USP	US	61/327,506		Passivation Methods For Achieving Ultra-Low Surface Recombination Velocities For High-Efficiency Solar Cells	EXPIRED	#2 IBC Cell Technology	c. Process
43	043WO	WO	PCT/US2011/033706		Passivation Methods For Achieving Ultra-Low Surface Recombination Velocities For High-Efficiency Solar Cells	EXPIRED	#2 IBC Cell Technology	c. Process
44	044USP	US	61/327,563		Methods For Releasing A Thin-Film Substrate From A Reusable Template	EXPIRED	#1 EPI/Porous Si Wafer Technology	b. 3D
45	045EP	EP	11787543.5		Laser Processing For High-Efficiency Thin Crystalline Silicon Solar Cell Fabrication	EXPIRED	#2 IBC Cell Technology	a. IBC
45	045EP3	EP	11853473.4		Laser Processing Methods For Photovoltaic Solar Cells	PUBLISHED	#2 IBC Cell Technology	a. IBC
45	045KR	KR	10-2012-7033876	10-1289787	Laser Processing For High-Efficiency Thin Crystalline Silicon Solar Cell Fabrication	ISSUED	#2 IBC Cell Technology	a. IBC
45	045KR3	KR	10-2013-7020198	10-1384853	Laser Processing Methods For Photovoltaic Solar Cells	ISSUED	#2 IBC Cell Technology	a. IBC
45	045MY	MY	PI2013701141		Laser Processing For High-Efficiency Thin Crystalline Silicon Solar Cell Fabrication	PENDING	#2 IBC Cell Technology	a. IBC
45	045US0	US	13/118,295	8,399,331	Laser Processing For High-Efficiency Thin Crystalline Silicon Solar Cell Fabrication	ISSUED	#2 IBC Cell Technology	a. IBC
45	045US1	US	13/271,212	9,508,886	Method For Making A Crystalline Silicon Solar Cell Substrate Utilizing Flat Top Laser Beam	ISSUED	#2 IBC Cell Technology	a. IBC
45	045US1C1	US	15/361,832		Method For Making A Crystalline Silicon Solar Cell Substrate Utilizing Flat Top Laser Beam	PENDING	#2 IBC Cell Technology	a. IBC

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45	045US2	US	13/303,488		Method For Forming A Photovoltaic Solar Cell Comprising Laser Annealing The Front Surface Of Silicon Substrate Having A Passivation Layer Covered Thereon.	ABANDONED	#2 IBC Cell Technology	a. IBC
45	045US3	US	13/340,877	8,637,340	Patterning Of Silicon Oxide Layers Using Pulsed Laser Ablation	ISSUED	#2 IBC Cell Technology	a. IBC
45	045US4	US	13/340,887		Laser Doping Techniques For High-Efficiency Crystalline Semiconductor Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
45	045US5	US	13/340,903	9,455,362	Laser Irradiation Aluminum Doping For Monocrystalline Silicon Substrates	ISSUED	#2 IBC Cell Technology	a. IBC
45	045US5C1	US	15/276,740		Laser Irradiation Aluminum Doping For Monocrystalline Silicon Substrates	PENDING	#2 IBC Cell Technology	a. IBC
45	045US6	US	13/846,230	9,419,165	Laser Processing For Back Contact Crystalline Silicon Solar Cell Fabrication	ISSUED	#2 IBC Cell Technology	a. IBC
45	045US6C1	US	15/237,526		Laser Processing For Back Contact Crystalline Silicon Solar Cell Fabrication	ABANDONED	#2 IBC Cell Technology	a. IBC
45	045US7	US	14/137,172	9,236,510	Patterning Of Silicon Oxide Layers Using Pulsed Laser Ablation	ISSUED	#2 IBC Cell Technology	a. IBC
45	045US7C1	US	14/991,789		Patterning Of Silicon Oxide Layers Using Pulsed Laser Ablation	ABANDONED	#2 IBC Cell Technology	a. IBC
45	045USP	US	61/349,120		Laser Processing For High-Efficiency Solar Cell Fabrication	EXPIRED	#2 IBC Cell Technology	a. IBC
45	045WO	WO	PCT/US2011/038444		Laser Processing For High-Efficiency Thin Crystalline Silicon Solar Cell Fabrication	EXPIRED	#2 IBC Cell Technology	a. IBC
45	045WO2	WO	PCT/US2011/062019		Laser Annealing Applications In High-Efficiency Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
45	045WO3	WO	PCT/US2011/068037		Laser Processing Methods For Photovoltaic Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
46	046EP	EP	11793204.6		High Productivity Thin Film Deposition Method And System	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
46	046KR	KR	10-2013-7000556	10-1369282	High Productivity Thin Film Deposition Method And System	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
46	046KRD1	KR	10-2013-7009928		High Productivity Thin Film Deposition Method And System	PENDING	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
46	046US0	US	13/157,250	9,870,937	High Productivity Thin Film Deposition Method And System	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
46	046USP	US	61/353,042		Parallel-Architecture High-Productivity Depletion-Mode Epitaxial Semiconductor Deposition Reactor Apparatus and Method	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
46	046WO	WO	PCT/US2011/039877		High Productivity Thin Film Deposition Method And System	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
47	047EP	EP	11871380.9		Backplane Reinforcement And Interconnects For Solar Cells	SOLD	#3 Module Technology	d. Backplane
47	047EP1	EP	12765891.2	EP2691990	Active Backplane For Thin Silicon Solar Cells	SOLD	#3 Module Technology	d. Backplane
47	047KR	KR	10-2013-7005704		Backplane Reinforcement And Interconnects For Solar Cells	SOLD	#3 Module Technology	d. Backplane
47	047KR1	KR	10-2013-7028432		Active Backplane For Thin Silicon Solar Cells	SOLD	#3 Module Technology	d. Backplane
47	047MY	MY	PI2013700332	MY-158500-A	Backplane Reinforcement And Interconnects For Solar Cells	SOLD	#3 Module Technology	d. Backplane
47	047MY1	MY	PI2014700151		Active Backplane For Thin Silicon Solar Cells	SOLD	#3 Module Technology	d. Backplane
47	047US0	US	13/204,626	8,946,547	Backplane Reinforcement And Interconnects For Solar Cells	SOLD	#3 Module Technology	d. Backplane
47	047US0C1	US	14/611,982		Backplane Reinforcement And Interconnects For Solar Cells	SOLD	#3 Module Technology	d. Backplane
47	047US1	US	13/433,280		Active Backplane For Thin Silicon Solar Cells	SOLD	#3 Module Technology	d. Backplane
47	047US1C1	US	14/615,335		Active Backplane For Thin Silicon Solar Cells	SOLD	#3 Module Technology	d. Backplane

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47	047USP	US	61/370,956		Backplane Reinforcement And Interconnects For Solar Cells	SOLD	#3 Module Technology	d. Backplane
47	047WO	WO	PCT/US2011/046873		Backplane Reinforcement And Interconnects For Solar Cells	SOLD	#3 Module Technology	d. Backplane
47	047WO1	WO	PCT/US2012/031043		Active Backplane For Thin Silicon Solar Cells	SOLD	#3 Module Technology	d. Backplane
48	048KR	KR	10-2013-7005997	10-1289789	Apparatus And Method For Repeatedly Fabricating Thin Film Semiconductor Substrates Using A Template	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
48	048US0	US	13/209,390		Apparatus And Method For Repeatedly Fabricating Thin Film Semiconductor Substrates Using A Template	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
48	048USP	US	61/373,793		Apparatus And Method For Repeatedly Fabricating Thin Film Semiconductor Substrates Using A Template	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
48	048WO	WO	PCT/US2011/047699		Apparatus And Method For Repeatedly Fabricating Thin Film Semiconductor Substrates Using A Template	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
49	049EP	EP	11827704.5		High-Throughput Batch Porous Silicon Manufacturing Equipment Design and Processing Methods	SOLD	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
49	049EP1	EP	11876396.0		Apparatus And Method For Uniformly Forming Porous Semiconductor On A Substrate	SOLD	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
49	049KR	KR	10-2013-7010390	10-1347681	High-Throughput Batch Porous Silicon Manufacturing Equipment Design and Processing Methods	SOLD	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
49	049KR1	KR	10-2013-7014255		Apparatus And Method For Uniformly Forming Porous Semiconductor On A Substrate	SOLD	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
49	049US0	US	13/244,466	9,076,642	High-Throughput Batch Porous Silicon Manufacturing Equipment Design And Processing Methods	SOLD	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
49	049US0C1	US	14/792,412	9,771,662	High-Throughput Batch Porous Silicon Manufacturing Equipment Design And Processing Methods	SOLD	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
49	049US0C2	US	15/398,681		High-Throughput Batch Porous Silicon Manufacturing Equipment Design And Processing Methods	SOLD	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
49	049US1	US	13/288,721	8,906,218	Apparatus And Method For Uniformly Forming Porous Semiconductor On A Substrate	SOLD	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
49	049US2	US	13/470,237		High-Throughput Batch Porous Silicon Manufacturing Equipment Design And Processing Methods	SOLD	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
49	049US3	US	14/563,888		Apparatus And Method For Uniformly Forming Porous Semiconductor On A Substrate	SOLD	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
49	049USP	US	61/386,318		High-Throughput Batch Porous Silicon Manufacturing Equipment Design and Processing Methods	SOLD	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
49	049WO	WO	PCT/US2011/053183		High-Throughput Batch Porous Silicon Manufacturing Equipment Design and Processing Methods	SOLD	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
49	049WO1	WO	PCT/US2011/059177		Apparatus And Method For Uniformly Forming Porous Semiconductor On A Substrate	SOLD	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
50	050USP	US	61/389,154		Methods And Apparatus For High-Productivity Batch Wafer Processing	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
51	051USP	US	61/391,863		Flat-Top Laser Beams For High-Throughput Processing Of Back Contact Solar Cells	EXPIRED	#2 IBC Cell Technology	e. Laser
52	052USP	US	61/409,940		Apparatus And Method For Uniformly Forming Porous Semiconductor On A Substrate	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
53	053USP	US	61/417,181		Laser Annealing Applications In High-Efficiency Solar Cells	EXPIRED	#2 IBC Cell Technology	e. Laser
54	054USP	US	61/428,600		Patterning Of Silicon Oxide Layers Using Pulsed Laser Ablation	EXPIRED	#2 IBC Cell Technology	e. Laser
55	055USP	US	61/428,953		Laser Doping Techniques For High-Efficiency Crystalline Semiconductor Solar Cells	EXPIRED	#2 IBC Cell Technology	e. Laser
56	056USP	US	61/428,957		Laser Annealing For Aluminum Doping And Formation Of Back-Surface Field In Solar Cell Contacts	EXPIRED	#2 IBC Cell Technology	e. Laser
57	057EP	EP	11856289.1		Deposition Systems And Processes	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
57	057KR	KR	10-2013-7020188	10-1368598	Deposition Systems And Processes	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
57	057MY	MY	PI2013701140		Deposition Systems And Processes	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO

FAMILY NUMBER	DOCKET REFERENCE NUMBER	CNTRY CODE	APPLICATION OR SERIAL NUMBER	PATENT NUMBER	TITLE	STATUS	Technology Family	Technology Cluster (Subgroup)
57	057US0	US	13/341,965		Deposition Systems And Processes	PUBLISHED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
57	057USP	US	61/429,032		Apparatus And Method For Reducing The Cost And Improving Uniformity Of Deposition Systems And Processes	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
57	057WO	WO	PCT/US2011/068267		Deposition Systems And Processes	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
58	058KR	KR	10-2013-7020199	10-1384872	Method For Reconstructing A Semiconductor Template	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
58	058MY	MY	PI2013701139		Method For Reconstructing A Semiconductor Template	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
58	058US0	US	13/341,976		Method For Reconstructing A Semiconductor Template	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
58	058USP	US	61/429,033		Methods For Reconstructing, Thickening, Repairing, Smoothing, And Reconditioning Of A Semiconductor Substrate	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
58	058WO	WO	PCT/US2011/068270		Method For Reconstructing A Semiconductor Template	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
59	059USP	US	61/468,548		Active Backplane For Thin Silicon Solar Cells	EXPIRED	#2 IBC Cell Technology	d. Backplane
60	060AU	AU	2012258898		Self-Activated Front Surface Bias For A Solar Cell	ABANDONED	#2 IBC Cell Technology	c. Process
60	060AUD1	AU	2015200219		Self-Activated Front Surface Bias For A Solar Cell	ABANDONED	#2 IBC Cell Technology	c. Process
60	060EP	EP	12790369.8		Self-Activated Front Surface Bias For A Solar Cell	PUBLISHED	#2 IBC Cell Technology	c. Process
60	060KR	KR	10-2013-7033627	10-1449891	Self-Activated Front Surface Bias For A Solar Cell	ISSUED	#2 IBC Cell Technology	c. Process
60	060US0	US	13/476,955		Self-Activated Front Surface Bias For A Solar Cell	ISSUED	#2 IBC Cell Technology	c. Process
60	060USP	US	61/488,668		Front Surface Bias Plus Bypass Protection For A Solar Cell With Back Surface Contacts	EXPIRED	#2 IBC Cell Technology	c. Process
60	060USPDNU	US	61/488,628		Front Surface Bias Plus Bypass Protection For A Solar Cell With Back Surface Contacts	ABANDONED	#2 IBC Cell Technology	c. Process
60	060WO	WO	PCT/US2012/038895		Self-Activated Front Surface Bias For A Solar Cell	EXPIRED	#2 IBC Cell Technology	c. Process
61	061KR	KR	10-2013-7034083	10-1532721	Spatially Selective Laser Annealing Applications In High-Efficiency Solar Cells	ISSUED	#2 IBC Cell Technology	e. Laser
61	061US0	US	13/477,008		Spatially Selective Laser Annealing Applications In High-Efficiency Solar Cells	ABANDONED	#2 IBC Cell Technology	e. Laser
61	061USP	US	61/488,684		Spatially Selective Laser Annealing Technique For High-Efficiency Crystalline Semiconductor Solar Cells	EXPIRED	#2 IBC Cell Technology	e. Laser
61	061WO	WO	PCT/US2012/038907		Spatially Selective Laser Annealing Applications In High-Efficiency Solar Cells	EXPIRED	#2 IBC Cell Technology	e. Laser
62	062KR	KR	10-2013-7034593	10-1389030	Method And Apparatus For Reconditioning A Carrier Wafer For Reuse	ISSUED	#1 EPI/Porous Si Wafer Technology	c. Process
62	062MY	MY	PI2013702563		Method And Apparatus For Reconditioning A Carrier Wafer For Reuse	PENDING	#1 EPI/Porous Si Wafer Technology	c. Process
62	062P1	US				EXPIRED	#1 EPI/Porous Si Wafer Technology	c. Process
62	062US0	US	13/482,963		Method And Apparatus For Reconditioning A Carrier Wafer For Reuse	ABANDONED	#1 EPI/Porous Si Wafer Technology	c. Process
62	062USP	US	61/490,562		Structures, Apparatuses, And Methods For Fabricating Thin Solar Cells Including The Reconditioning And Reuse Of Carrier Wafers	EXPIRED	#1 EPI/Porous Si Wafer Technology	c. Process
62	062WO	WO	PCT/US2012/039891		Method And Apparatus For Reconditioning A Carrier Wafer For Reuse	EXPIRED	#1 EPI/Porous Si Wafer Technology	c. Process
63	063EP	EP	12793962.7		Ion Implantation And Annealing For High Efficiency Back-Contact Back-Junction Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
63	063KR	KR	10-2013-7034723	10-1396027	Ion Implantation And Annealing For High Efficiency Back-Contact Back-Junction Solar Cells	ISSUED	#2 IBC Cell Technology	a. IBC

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63	063US0	US	13/483,024	9,318,644	Ion Implantation And Annealing For Thin-Film Crystalline Solar Cells	ISSUED	#2 IBC Cell Technology	a. IBC
63	063US1	US	15/131,190		Ion Implantation And Annealing For Thin-Film Crystalline Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
63	063USP	US	61/490,859		High Efficiency Back-Contact, Back-Junction, Solar Cells Fabricated By Ion Implantation And Laser Annealing	EXPIRED	#2 IBC Cell Technology	a. IBC
63	063WO	WO	PCT/US2012/039901		Ion Implantation And Annealing For High Efficiency Back-Contact Back-Junction Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
64						ABANDONED	Unknown	Unknown
65						ABANDONED	Unknown	Unknown
66						ABANDONED	Unknown	Unknown
67	067USP	US	61/521,743		Backside Reinforcement of Thin Crystalline Si Solar Cells	EXPIRED	#2 IBC Cell Technology	c. Process
68	068AU	AU	2012294932	2012294932	High-Efficiency Solar Photovoltaic Cells And Modules Using Thin Crystalline Semiconductor Absorbers	PENDING	#3 Module Technology	d. Backplane
68	068CN	CN	201280049551.6	ZL201280049551.6	High-Efficiency Solar Photovoltaic Cells And Modules Using Thin Crystalline Semiconductor Absorbers	ISSUED	#3 Module Technology	d. Backplane
68	068EP	EP	12822670.1		High-Efficiency Solar Photovoltaic Cells And Modules Using Thin Crystalline Semiconductor Absorbers	PUBLISHED	#3 Module Technology	d. Backplane
68	068JP	JP	2014-525003		High-Efficiency Solar Photovoltaic Cells And Modules Using Thin Crystalline Semiconductor Absorbers	PENDING	#3 Module Technology	d. Backplane
68	068JPD1	JP	2017-120887		HIGH-EFFICIENCY SOLAR PHOTOVOLTAIC CELLS AND MODULES USING THIN CRYSTALLINE SEMICONDUCTOR ABSORBERS	PENDING	#3 Module Technology	d. Backplane
68	068KR	KR	10-2014-7006376		High-Efficiency Solar Photovoltaic Cells And Modules Using Thin Crystalline Semiconductor Absorbers	PUBLISHED	#3 Module Technology	d. Backplane
68	068MY	MY	PI2014700259		High-Efficiency Solar Photovoltaic Cells And Modules Using Thin Crystalline Semiconductor Absorbers	PENDING	#3 Module Technology	d. Backplane
68	068USN	US	13/807,631	9,842,949	High-Efficiency Solar Photovoltaic Cells And Modules Using Thin Crystalline Semiconductor Absorbers	ISSUED	#3 Module Technology	d. Backplane
68	068USP	US	61/521,754		High-Efficiency Solar Cells Using Thin Crystalline Semiconductor Absorbers	EXPIRED	#3 Module Technology	d. Backplane
68	068WO	WO	PCT/US2012/000348		High-Efficiency Solar Photovoltaic Cells And Modules Using Thin Crystalline Semiconductor Absorbers	EXPIRED	#3 Module Technology	d. Backplane
69	069AU	AU	2012340098	2012340098	Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module
69	069CN	CN	201280067268.6		Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module
69	069CN1	CN	201480033927.3		Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module
69	069EP	EP	12850632.6		Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module
69	069JP	JP	2014-542579		Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module
69	069JP1	JP	2016-507903		Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module
69	069KR	KR	10-2014-7016608		Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module
69	069MY	MY	PI2014701287		Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module
69	069MY1	MY	PI2015703627		Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module
69	069US0	US	13/682,674	9,293,619	Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module
69	069US0C1	US	14/991,841		Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module
69	069US0C1T	US	15/076,577		Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module
69	069US1	US	14/252,776		Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module

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69	069USN1	US	14/426,921		Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module
69	069USP	US	61/561,928		Smart Photovoltaic Cells And Modules For Increased Power Harvesting, Enhanced Energy Yield, Remote Access Performance Monitoring And Control	SOLD	#3 Module Technology	a. Smart Module
69	069WO	WO	PCT/US2012/066150		Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module
69	069WO1	WO	PCT/US2014/034057		Smart Photovoltaic Cells And Modules	SOLD	#3 Module Technology	a. Smart Module
70	070AU	AU	2012358174		High Productivity Spray Processing For Semiconductor Metallization And Interconnects	ABANDONED	#3 Module Technology	d. Backplane
70	070AUD1	AU	2015210451		High Productivity Spray Processing For Semiconductor Metallization And Interconnects	ALLOWED	#3 Module Technology	d. Backplane
70	070JP	JP	2014-548999		High Productivity Spray Processing For Semiconductor Metallization And Interconnects	ABANDONED	#3 Module Technology	d. Backplane
70	070JPD1	JP	2017-70753		High Productivity Spray Processing For Semiconductor Metallization And Interconnects	PUBLISHED	#3 Module Technology	d. Backplane
70	070KR	KR	10-2014-7020690		High Productivity Spray Processing For Semiconductor Metallization And Interconnects	ABANDONED	#3 Module Technology	d. Backplane
70	070MY	MY	PI2014702373		High Productivity Spray Processing For Semiconductor Metallization And Interconnects	PENDING	#3 Module Technology	d. Backplane
70	070US0	US	13/726,169	9,337,374	High Productivity Spray Processing For The Metallization Of Semiconductor Workpieces	ISSUED	#3 Module Technology	d. Backplane
70	070US1	US	15/150,235		High Productivity Spray Processing For The Metallization Of Semiconductor Workpieces	ABANDONED	#3 Module Technology	d. Backplane
70	070USP	US	61/579,819		High-Productivity Atmospheric-Pressure Thermal Spray Processing Equipment For Solar Cell Metallization and Interconnects Applications	EXPIRED	#3 Module Technology	d. Backplane
70	070WO	WO	PCT/US2012/071561		High Productivity Spray Processing For Semiconductor Metallization And Interconnects	EXPIRED	#3 Module Technology	d. Backplane
71	071AU	AU	2012362505	2012362505	Systems And Methods For Enhanced Light Trapping In Solar Cells	ISSUED	#2 IBC Cell Technology	e. Laser
71	071JP	JP	2014-550436		Systems And Methods For Enhanced Light Trapping In Solar Cells	PUBLISHED	#2 IBC Cell Technology	e. Laser
71	071KR	KR	10-2014-7020992	10-1654548	Systems And Methods For Enhanced Light Trapping In Solar Cells	ISSUED	#2 IBC Cell Technology	e. Laser
71	071US0	US	13/727,393	9,583,651	Systems And Methods For Enhanced Light Trapping In Solar Cells	ISSUED	#2 IBC Cell Technology	e. Laser
71	071USP	US	61/580,290		Laser Texture Of Frontside And Backside Of Crystalline Silicon Solar Cells For Enhanced Trapping Of Solar Radiation	EXPIRED	#2 IBC Cell Technology	e. Laser
71	071WO	WO	PCT/US2012/071677		Systems And Methods For Enhanced Light Trapping In Solar Cells	EXPIRED	#2 IBC Cell Technology	e. Laser
72	072AU	AU	2014208227		Multi-Level Solar Cell Metallization	ABANDONED	#2 IBC Cell Technology	d. Backplane
72	072AUD1	AU	2016265969		Multi-Level Solar Cell Metallization	PENDING	#2 IBC Cell Technology	d. Backplane
72	072JP	JP	2014-550535		Multi-Level Solar Cell Metallization	ALLOWED	#2 IBC Cell Technology	d. Backplane
72	072MY	MY	PI2014702439		Multi-Level Solar Cell Metallization	ABANDONED	#2 IBC Cell Technology	d. Backplane
72	072US0	US	13/731,112		Multi-Level Solar Cell Metallization	ABANDONED	#2 IBC Cell Technology	d. Backplane
72	072US0C1	US			Multi-Level Solar Cell Metallization	PENDING	#2 IBC Cell Technology	d. Backplane
72	072USP	US	61/582,184		Structure And Method For Multi-Level Metallization Of Solar Cells	PENDING	#2 IBC Cell Technology	d. Backplane
72	072WO	WO	PCT/US2012/072249		Multi-Level Solar Cell Metallization	EXPIRED	#2 IBC Cell Technology	d. Backplane
73	073AU	AU	2013222069		Systems And Methods For Laser Splitting And Device Layer Transfer	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO

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73	073EP	EP	13752284.3		Systems And Methods For Laser Splitting And Device Layer Transfer	PUBLISHED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
73	073JP	JP	2014-558952		Systems And Methods For Laser Splitting And Device Layer Transfer	PENDING	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
73	073KR	KR	10-2014-7027309		Systems And Methods For Laser Splitting And Device Layer Transfer	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
73	073US0	US	13/778,047	9,214,353	Systems And Methods For Laser Splitting And Device Layer Transfer	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
73	073US0C1	US	14/968,685	9,929,054	Systems And Methods For Laser Splitting And Device Layer Transfer	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
73	073USP	US	61/603,370		Laser Splitting Apparatus And Method For Device Layer Transfer	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
73	073WO	WO	PCT/US2013/027826		Systems And Methods For Laser Splitting And Device Layer Transfer	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
74	074USP	US	61/603,894		High Throughput Wafering Tool Using Laser Splitting And Separation Process	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
75	075AU	AU	2013225860	2013225680	Structures And Methods For High Efficiency Compound Semiconductor Solar Cells	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
75	075JP	JP	2014-560068	6199323	Structures And Methods For High Efficiency Compound Semiconductor Solar Cells	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
75	075KR	KR	10-2014-7027472		Structures And Methods For High Efficiency Compound Semiconductor Solar Cells	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
75	075US0	US	13/781,708		Structures And Methods For High Efficiency Compound Semiconductor Solar Cells	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
75	075USP	US	61/605,186		Structures And Methods For High-Efficiency Compound Semiconductor Solar Cells Based On A Reusable Silicon Template And Porous Silicon Lift-Off Platform	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
75	075WO	WO	PCT/US2013/028468		Structures And Methods For High Efficiency Compound Semiconductor Solar Cells	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
75	075WO-DNU	WO	PCT/US2013/028465		Structures And Methods For High Efficiency Compound Semiconductor Solar Cells	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
76	076USP	US	61/609,347		High Throughput Laser Splitting Tools And Processing Methods For Device Layer Transfer	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
77	077AU	AU	2013237911		Back Contact Solar Cells Using Aluminum-Based Alloy Metallization	ABANDONED	#2 IBC Cell Technology	c. Process
77	077JP	JP	2015-503623		Back Contact Solar Cells Using Aluminum-Based Alloy Metallization	PENDING	#2 IBC Cell Technology	c. Process
77	077KR	KR	10-2014-7030233		Back Contact Solar Cells Using Aluminum-Based Alloy Metallization	PUBLISHED	#2 IBC Cell Technology	c. Process
77	077US0	US	13/853,031		Back Contact Solar Cells Using Aluminum-Based Alloy Metallization	ABANDONED	#2 IBC Cell Technology	c. Process
77	077USP	US	61/617,023		Manufacturing Methods Of Backcontact Thin Silicon Solar Cells With Printable Aluminum-Silicon Alloy Paste For Selective Emitter	EXPIRED	#2 IBC Cell Technology	c. Process
77	077WO	WO	PCT/US2013/034503		Back Contact Solar Cells Using Aluminum-Based Alloy Metallization	EXPIRED	#2 IBC Cell Technology	c. Process
78	078AU	AU	2013237992		End Point Detection For Back Contact Solar Cell Laser Via Drilling	ABANDONED	#2 IBC Cell Technology	e. Laser
78	078JP	JP	2015-503615		End Point Detection For Back Contact Solar Cell Laser Via Drilling	PENDING	#2 IBC Cell Technology	e. Laser
78	078US0	US	13/852,966		End Point Detection For Back Contact Solar Cell Laser Via Drilling	PUBLISHED	#2 IBC Cell Technology	e. Laser
78	078USP	US	61/617,033		Real-Time Via Drilling End-Point Detection and Process Control During Laser Via Drilling of Backplane Used in High-Efficiency Crystalline Semiconductor Solar Cells	EXPIRED	#2 IBC Cell Technology	e. Laser
78	078WO	WO	PCT/US2013/034483		End Point Detection For Back Contact Solar Cell Laser Via Drilling	EXPIRED	#2 IBC Cell Technology	e. Laser
79	079AU	AU	2013289151		High Efficiency Solar Cell Structures And Manufacturing Methods	ABANDONED	#2 IBC Cell Technology	d. Backplane

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79	079JP	JP	2015-504686		High Efficiency Solar Cell Structures And Manufacturing Methods	PUBLISHED	#2 IBC Cell Technology	d. Backplane
79	079US0	US	13/855,657		High Efficiency Solar Cell Structures And Manufacturing Methods	ABANDONED	#2 IBC Cell Technology	d. Backplane
79	079US1	US	15/478,140		High Efficiency Solar Cell Structures And Manufacturing Methods	PENDING	#2 IBC Cell Technology	d. Backplane
79	079USP	US	61/619,300		High Efficiency Solar Cell Structures And Manufacturing Methods	EXPIRED	#2 IBC Cell Technology	d. Backplane
79	079WO	WO	PCT/US2013/035029		High Efficiency Solar Cell Structures And Manufacturing Methods	EXPIRED	#2 IBC Cell Technology	d. Backplane
80	080US0	US	13/866,990		Temperature Calibration And Control For Semiconductor Reactors	ABANDONED	#1 EPI/Porous Si Wafer Technology	c. Process
80	080USP	US	61/635,824		Temperature Calibration Method And Apparatus For Epitaxial Semiconductor Reactors	EXPIRED	#1 EPI/Porous Si Wafer Technology	c. Process
80	080WO	US	PCT/US2013/037481		Temperature Calibration And Control For Semiconductor Reactors	EXPIRED	#1 EPI/Porous Si Wafer Technology	c. Process
81	081JP	JP	2015-509090		Resistance Component Extraction For Back Contact Back Junction Solar Cells	PUBLISHED	#2 IBC Cell Technology	a. IBC
81	081US0	US	13/868,987	8,828,784	Resistance Component Extraction For Back Contact Back Junction Solar Cells	ISSUED	#2 IBC Cell Technology	a. IBC
81	081US1	US	14/479,540	9,461,582	Electrical Parametric Testing For Back Contact Semiconductor Solar Cells	ISSUED	#2 IBC Cell Technology	a. IBC
81	081US2	US	15/284,475		Electrical Parametric Testing For Back Contact Semiconductor Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
81	081USP	US	61/637,126		Structures And Methods Of Resistance Component Extraction From Back Contacted/Back Junction Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
81	081WO	WO	PCT/US2013/037863		Resistance Component Extraction For Back Contact Back Junction Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
82	082AU	AU	2013272248		Manufacturing Methods And Structures For Large-Area Thin-Film Solar Cells And Other Semiconductor Devices	ABANDONED	#1 EPI/Porous Si Wafer Technology	c. Process
82	082US0	US	13/869,928		Manufacturing Methods And Structures For Large-Area Thin-Film Solar Cells And Other Semiconductor Devices	ABANDONED	#1 EPI/Porous Si Wafer Technology	c. Process
82	082USP	US	61/637,831		Manufacturing Methods And Structures For Large-Area Thin-Film Solar Cells And Other Semiconductor Devices	EXPIRED	#2 IBC Cell Technology	d. Backplane
82	082WO	WO	PCT/US2013/038085		Manufacturing Methods And Structures For Large-Area Thin-Film Solar Cells And Other Semiconductor Devices	EXPIRED	#2 IBC Cell Technology	d. Backplane
82	082WO1	WO	PCT/US2013/038081		Manufacturing Methods And Structures For Large-Area Thin-Film Solar Cells And Other Semiconductor Devices	ABANDONED	#2 IBC Cell Technology	d. Backplane
83	083USP	US	61/638,474		High-Productivity Atmospheric-Pressure Thermal And Plasma Spray Processing Equipment For Solar Cell Metallization And Interconnect Applications	EXPIRED	#2 IBC Cell Technology	d. Backplane
84	084AU	AU	2013267481		Structures And Methods Of Formation Of Contiguous And Non-Contiguous Base Regions For High Efficiency Back-Contact Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
84	084AUD1	AU	2016200610		Structures And Methods Of Formation Of Contiguous And Non-Contiguous Base Regions For High Efficiency Back-Contact Solar Cells	LAPSED, BUT CAN BE REINSTATED	#2 IBC Cell Technology	a. IBC
84	084CN	CN	201380040222.X		Structures And Methods Of Formation Of Contiguous And Non-Contiguous Base Regions For High Efficiency Back-Contact Solar Cells	PUBLISHED	#2 IBC Cell Technology	a. IBC
84	084EP	EP	13798110.6		Structures And Methods Of Formation Of Contiguous And Non-Contiguous Base Regions For High Efficiency Back-Contact Solar Cells	PUBLISHED	#2 IBC Cell Technology	a. IBC
84	084JP	JP	2015-515163		Structures And Methods Of Formation Of Contiguous And Non-Contiguous Base Regions For High Efficiency Back-Contact Solar Cells	PUBLISHED	#2 IBC Cell Technology	a. IBC
84	084KR	KR	10-2014-7036595	10-1528447	Structures And Methods Of Formation Of Contiguous And Non-Contiguous Base Regions For High Efficiency Back-Contact Solar Cells	ISSUED	#2 IBC Cell Technology	a. IBC

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84	084MY	MY	PI2014703566		Structures And Methods Of Formation Of Contiguous And Non-Contiguous Base Regions For High Efficiency Back-Contact Solar Cells	PENDING	#2 IBC Cell Technology	a. IBC
84	084US0	US	13/905,113		Structures And Methods Of Formation Of Contiguous And Non-Contiguous Base Regions For High Efficiency Back-Contact Solar Cells	PUBLISHED	#2 IBC Cell Technology	a. IBC
84	084USP	US	61/652,833		Structures And Methods Of Formation Of Non-Contiguous Distributed Base And Emitter Contacts For High Efficiency Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
84	084WO	WO	PCT/US2013/043193		Structures And Methods Of Formation Of Contiguous And Non-Contiguous Base Regions For High Efficiency Back-Contact Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
85	085USP	US	61/696,725		Texture Structures And Methods For Producing Diffuse Rear Mirrors On The Backsides Of Crystalline Silicon Solar Cells For Enhanced Trapping Of Solar Radiation	EXPIRED	#2 IBC Cell Technology	a. IBC
86	086USP	US	61/708,477		Method and Apparatus for Compound Semiconductor Solar Cells by Device Layer Transfer with Laser Splitting	EXPIRED	#2 IBC Cell Technology	a. IBC
87	087AU	AU	2013331304	2013331304	Systems And Methods For Monolithically Integrated Bypass Switches In Photovoltaic Solar Cells And Modules	ISSUED	#3 Module Technology	a. Smart Module
87	087CN	CN	2013800592188	ZL2013800592188	Systems And Methods For Monolithically Integrated Bypass Switches In Photovoltaic Solar Cells And Modules	ISSUED	#3 Module Technology	a. Smart Module
87	087EP	EP	13847902.7		Systems And Methods For Monolithically Integrated Bypass Switches In Photovoltaic Solar Cells And Modules	PUBLISHED	#3 Module Technology	a. Smart Module
87	087JP	JP	2015-537802	6063577	Systems And Methods For Monolithically Integrated Bypass Switches In Photovoltaic Solar Cells And Modules	ISSUED	#3 Module Technology	a. Smart Module
87	087KR	KR	10-2015-7012565	10-1563851	Systems And Methods For Monolithically Integrated Bypass Switches In Photovoltaic Solar Cells And Modules	ISSUED	#3 Module Technology	a. Smart Module
87	087MY	MY	PI2015000994		Systems And Methods For Monolithically Integrated Bypass Switches In Photovoltaic Solar Cells And Modules	PENDING	#3 Module Technology	a. Smart Module
87	087US0	US	14/055,813	9,219,171	Systems And Methods For Monolithically Integrated Bypass Switches In Photovoltaic Solar Cells And Modules	ISSUED	#3 Module Technology	a. Smart Module
87	087US0C1	US	14/975,496		Systems And Methods For Monolithically Integrated Bypass Switches And Photovoltaic Solar Cells	PUBLISHED	#3 Module Technology	a. Smart Module
87	087USP	US	61/714,723		Monolithically-Integrated Bypass Switch (MIBS) For Distributed Shade Management And Enhanced Energy Yield In Photovoltaic Modules	EXPIRED	#3 Module Technology	a. Smart Module
87	087WO	WO	PCT/US2013/065316		Systems And Methods For Monolithically Integrated Bypass Switches In Photovoltaic Solar Cells And Modules	EXPIRED	#3 Module Technology	a. Smart Module
88	088AU	AU	2013337262		Systems And Methods For Monolithically Isled Solar Photovoltaic Cells And Modules	PENDING	#3 Module Technology	a. Smart Module
88	088CN	CN	2013800692877		Systems And Methods For Monolithically Isled Solar Photovoltaic Cells And Modules	PUBLISHED	#3 Module Technology	a. Smart Module
88	088EP	EP	13850237.2		Systems And Methods For Monolithically Isled Solar Photovoltaic Cells And Modules	PUBLISHED	#3 Module Technology	a. Smart Module
88	088IN	IN	1444/MUMNP/2015		Systems And Methods For Monolithically Isled Solar Photovoltaic Cells And Modules	PENDING	#3 Module Technology	a. Smart Module
88	088JP	JP	2015-540876		Systems And Methods For Monolithically Isled Solar Photovoltaic Cells And Modules	PUBLISHED	#3 Module Technology	a. Smart Module
88	088KR	KR	10-2015-7014822		Systems And Methods For Monolithically Isled Solar Photovoltaic Cells And Modules	PUBLISHED	#3 Module Technology	a. Smart Module
88	088MY	MY	PI2015001179		Systems And Methods For Monolithically Isled Solar Photovoltaic Cells And Modules	PENDING	#3 Module Technology	a. Smart Module
88	088US0	US	14/072,759		Monolithic Isled (Tiled) Solar Cell (Icell) For Low-Cost High-Performance Photovoltaics Modules	PUBLISHED	#3 Module Technology	a. Smart Module
88	088US0C1T1	US	14/659,235		Systems And Methods For Monolithically Isled Solar Photovoltaic Cells	ABANDONED	#3 Module Technology	a. Smart Module
88	088US0C2T1	US	14/666,303		Monolithic Isled (Tiled) Solar Cell (Icell) For Low-Cost High-Performance Photovoltaics Modules	ABANDONED	#3 Module Technology	a. Smart Module
88	088US0Con1	US	15/417,804		Monolithic Isled (Tiled) Solar Cell (Icell) For Low-Cost High-Performance Photovoltaics Modules	PENDING	#3 Module Technology	a. Smart Module

FAMILY NUMBER	DOCKET REFERENCE NUMBER	CNTRY CODE	APPLICATION OR SERIAL NUMBER	PATENT NUMBER	TITLE	STATUS	Technology Family	Technology Cluster (Subgroup)
88	088USP	US	61/722,620		Monolithic Isled (Tiled) Solar Cell (Icell) For Low-Cost High-Performance Photovoltaics Modules	EXPIRED	#3 Module Technology	a. Smart Module
88	088WO	WO	PCT/US2013/068599		Systems And Methods For Monolithically Isled Solar Photovoltaic Cells And Modules	EXPIRED	#3 Module Technology	a. Smart Module
89	089USP	US	61/725,434		Control And Optimization Of Via Drilling Of Backplane Used In High-Efficiency Crystalline Semiconductor Solar Cells Using Real-Time End-Point Detection During Laser Via Drilling Or In-Line Inspection Of Drilled Holes	EXPIRED	#3 Module Technology	c. Process
90	090USP	US	61/725,981		Manufacturing Methods Of Backcontact Thin Silicon Solar Cells With Printable Aluminum-Silicon Alloy Paste For Selective Emitter	EXPIRED	#2 IBC Cell Technology	c. Process
91						ABANDONED	Unknown	Unknown
92						ABANDONED	Unknown	Unknown
93	093CN	CN	2014800204647		Monolithically Isled Back Contact Back Junction Solar Cells Using Bulk Wafers	LAPSED, BUT CAN BE REINSTATED	#2 IBC Cell Technology	a. IBC
93	093KR	KR	10-2015-7025078		Monolithically Isled Back Contact Back Junction Solar Cells Using Bulk Wafers	PUBLISHED	#2 IBC Cell Technology	a. IBC
93	093MY	MY	PI2015002028		Monolithically Isled Back Contact Back Junction Solar Cells Using Bulk Wafers	PENDING	#2 IBC Cell Technology	a. IBC
93	093US0	US	14/179,526	9,515,217	Monolithic Isled (Tiled) Solar Cell (Icell) For Low-Cost High-Performance Photovoltaics Modules	ISSUED	#2 IBC Cell Technology	a. IBC
93	093USP	US	61/763,580		Back Contact Back Junction Solar Cells Using Bulk Wafers	EXPIRED	#2 IBC Cell Technology	a. IBC
93	093WO	WO	PCT/US2014/016140		Monolithically Isled Back Contact Back Junction Solar Cells Using Bulk Wafers	EXPIRED	#2 IBC Cell Technology	a. IBC
94	094USP	US	61/764,210		PV Mounting System	SOLD	#4 Sprint System	a. Preliminary
95	095USP	US	61/764,217		PV Mounting System Utilizing Special MSR UV Protect Layer	SOLD	#4 Sprint System	a. Preliminary
96	096USP	US	61/764,228		Quick Mount PV Composition Mount	SOLD	#4 Sprint System	a. Preliminary
97	097USP	US	61/764,243		Photovoltaic Array Flashing	SOLD	#4 Sprint System	a. Preliminary
98	098USP	US	61/764,255		Photovoltaic Attachment Panel	SOLD	#4 Sprint System	a. Preliminary
99	099USP	US	61/764,264		PV Installation System	SOLD	#4 Sprint System	a. Preliminary
100	100USP	US	61/806,262		Method For Producing An Ultra Smooth Silicon Surface For Solar Cell Applications	EXPIRED	#2 IBC Cell Technology	c. Process
101	101CN	CN	201480031613.X		Solar Photovoltaic Module Power Control And Status Monitoring System Utilizing Laminate-Embedded Remote Access Module Switch	PUBLISHED	#3 Module Technology	a. Smart Module
101	101JP	JP	2016-507902		Solar Photovoltaic Module Power Control And Status Monitoring System Utilizing Laminate-Embedded Remote Access Module Switch	PUBLISHED	#3 Module Technology	a. Smart Module
101	101MY	MY	PI2015703632		Solar Photovoltaic Module Power Control And Status Monitoring System Utilizing Laminate-Embedded Remote Access Module Switch	PENDING	#3 Module Technology	a. Smart Module
101	101US0	US	14/252,750		Solar Photovoltaic Module Power Control And Status Monitoring System Utilizing Laminate-Embedded Remote Access Module Switch	ABANDONED	#3 Module Technology	a. Smart Module
101	101USN0	US	14/428,598		Solar Photovoltaic Module Power Control And Status Monitoring System Utilizing Laminate-Embedded Remote Access Module Switch	ABANDONED	#3 Module Technology	a. Smart Module
101	101USP	US	61/811,736		Embedded Power Electronics For Smart Photovoltaic Modules	EXPIRED	#3 Module Technology	a. Smart Module
101	101WO	WO	PCT/US2014/034054		Solar Photovoltaic Module Power Control And Status Monitoring System Utilizing Laminate-Embedded Remote Access Module Switch	EXPIRED	#3 Module Technology	a. Smart Module
102	102MY	MY	PI2015703772		Solar Cell Metallization	PENDING	#2 IBC Cell Technology	g. iCell
102	102US0	US	14/260,272	9,911,875	Solar Cell Metallization	ISSUED	#2 IBC Cell Technology	g. iCell
102	102USP	US	61/815,106		Bus-Bars And Metal 2 Exclusions For 2-Level Metallized Solar Cells	EXPIRED	#2 IBC Cell Technology	g. iCell

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102	102WO	WO	PCT/US2014/035209		Solar Cell Metallization	EXPIRED	#2 IBC Cell Technology	g. iCell
103	103MY	MY	PI2015703888		Damage Free Laser Patterning Of Transparent Layers For Forming Doped Regions On A Solar Cell Substrate	PENDING	#2 IBC Cell Technology	a. IBC
103	103MYLA	MY	PI2015002647		Annealing For Damage Free Laser Processing For High Efficiency Solar Cells	PENDING	#2 IBC Cell Technology	a. IBC
103	103USHM	US	14/265,351		Damage Free Laser Patterning Of Transparent Layers For Forming Doped Regions On A Solar Cell Substrate	ABANDONED	#2 IBC Cell Technology	a. IBC
103	103USLA	US	14/265,331	9,214,585	Annealing For Damage Free Laser Processing For High Efficiency Solar Cells	ISSUED	#2 IBC Cell Technology	a. IBC
103	103USLAC1	US	14/968,855		Annealing For Damage Free Laser Processing For High Efficiency Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
103	103USLAC1-DNP	US	14/968,672		Annealing For Damage Free Laser Processing For High Efficiency Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
103	103USN0HM	US	14/787,858	9,768,343	Damage Free Laser Patterning Of Transparent Layers For Forming Doped Regions On A Solar Cell Substrate	ISSUED	#2 IBC Cell Technology	a. IBC
103	103USP	US	61/816,830		Damage Free Laser Patterning Of Transparent Layers For High-Efficiency Crystalline Semiconductor Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
103	103WOHM	WO	PCT/US2014/035965		Damage Free Laser Patterning Of Transparent Layers For Forming Doped Regions On A Solar Cell Substrate	EXPIRED	#2 IBC Cell Technology	a. IBC
103	103WOLA	WO	PCT/US2014/035961		Annealing For Damage Free Laser Processing For High Efficiency Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
104	104MY	MY	PI2015704055		Solar Photovoltaic Blinds And Curtains For Residential And Commercial Buildings	PENDING	#3 Module Technology	f. Application
104	104US0	US	14/275,869		Solar Photovoltaic Blinds And Curtains For Residential And Commercial Buildings	ABANDONED	#3 Module Technology	f. Application
104	104USP	US	61/822,426		BIPV Solar Curtains And Blinds Using Flexible Thin Crystalline Semiconductor Solar Cells	EXPIRED	#3 Module Technology	f. Application
104	104WO	WO	PCT/US2014/037746		Solar Photovoltaic Blinds And Curtains For Residential And Commercial Buildings	EXPIRED	#3 Module Technology	f. Application
105	105USP	US	61/827,252		Pulsed Laser Processing For High Efficiency Crystalline Semiconductor Solar Cells	EXPIRED	#2 IBC Cell Technology	c. Process
106	106MY	MY	PI2015704775		High-Throughput Thermal Processing Methods For Producing High-Efficiency Crystalline Silicon Solar Cells	PENDING	#2 IBC Cell Technology	c. Process
106	106US0	US	14/321,802		High-Throughput Thermal Processing Methods For Producing High-Efficiency Crystalline Silicon Solar Cells	ABANDONED	#3 Module Technology	f. Application
106	106USP	US	61/841,501		Enhanced-Throughput Thermal Processing Methods For Producing High-Efficiency Crystalline Silicon Solar Cells	EXPIRED	#2 IBC Cell Technology	c. Process
106	106WO	WO	PCT/US2014/045169		High-Throughput Thermal Processing Methods For Producing High-Efficiency Crystalline Silicon Solar Cells	EXPIRED	#2 IBC Cell Technology	c. Process
107	107US0	US	14/325,356		Passivation Methods For Achieving Ultra-Low Surface Recombination Velocities For High-Efficiency Solar Cells	ABANDONED	#2 IBC Cell Technology	c. Process
107	107US0C1	US	15/490,494		SURFACE PASSIVATION OF HIGH-EFFICIENCY CRYSTALLINE SILICON SOLAR CELLS	PENDING	#2 IBC Cell Technology	c. Process
107	107USP	US	61/843,429		Material Structures and Process Methods for High-Performance Surface Passivation of High-Efficiency Crystalline Silicon Solar Cells	EXPIRED	#2 IBC Cell Technology	c. Process
107	107WO	WO	PCT/US2014/045630		Surface Passivation Of High-Efficiency Crystalline Silicon Solar Cells	EXPIRED	#2 IBC Cell Technology	c. Process
108	108US0	US	14/326,461		Thin Film Solar Cell Lamination Stack For High Volume Manufacturing	ABANDONED	#3 Module Technology	c. Process
108	108USP	US	61/843,849		Thin Crystalline Silicon Solar Cell Lamination Stack For High Volume Manufacturing	EXPIRED	#3 Module Technology	c. Process
108	108WO	WO	PCT/US2014/045836		Thin Film Solar Cell Lamination Stack For High Volume Manufacturing	EXPIRED	#3 Module Technology	c. Process
109	109USP	US	61/843,856		Backplane Attached Thin-Silicon Cells Using Multicrystalline Silicon Wafers	EXPIRED	#3 Module Technology	d. Backplane
110	110USP	US	61/859,166		Pulsed Laser Processing For High Efficiency Crystalline Semiconductor Solar Cells	EXPIRED	#2 IBC Cell Technology	e. Laser

FAMILY NUMBER	DOCKET REFERENCE NUMBER	CNTRY CODE	APPLICATION OR SERIAL NUMBER	PATENT NUMBER	TITLE	STATUS	Technology Family	Technology Cluster (Subgroup)
111	111USP	US	61/859,602		Structures and Manufacturing Methods for High-Efficiency, Thin Semiconductor Absorber, Back-Contact, Back-Junction Photovoltaic Solar Cells and Modules Using Bulk Wafers	EXPIRED	#2 IBC Cell Technology	c. Process
112	112CN	CN	2014800433769		Laminated Backplane For Solar Cells	LAPSED, BUT CAN BE REINSTATED	#3 Module Technology	d. Backplane
112	112KR	KR	10-2016-7005028		Laminated Backplane For Solar Cells	PUBLISHED	#3 Module Technology	d. Backplane
112	112USN0	US	14/903,273		Laminated Backplane For Solar Cells	ABANDONED	#3 Module Technology	d. Backplane
112	112USP	US	61/860,216		Flexible Backplane Materials And Related Lamination Processes For Backplane-Attached High-Efficiency Solar Cells And Modules	EXPIRED	#3 Module Technology	d. Backplane
112	112USS	US	14/447,597		Laminated Backplane For Solar Cells	ABANDONED	#3 Module Technology	d. Backplane
112	112WO	WO	PCT/US2014/048989		Laminated Backplane For Solar Cells	EXPIRED	#3 Module Technology	d. Backplane
112	112WO1	WO	PCT/US2014/048983		Laminated Backplane For Solar Cells	ABANDONED	#3 Module Technology	d. Backplane
113	113USP	US	07868383.6		Structures And Manufacturing Methods For High Efficiency Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
114	114CN	CN	201480059502X		Monolithic Solar Cell Arrays And Fabrication Methods	ABANDONED	#3 Module Technology	d. Backplane
114	114KR	KR	10-2016-7008511		Monolithic Solar Cell Arrays And Fabrication Methods	PUBLISHED	#3 Module Technology	d. Backplane
114	114MY	MY	PI2016700686		Monolithic Solar Cell Arrays And Fabrication Methods	PENDING	#3 Module Technology	d. Backplane
114	114US0	US	14/475,566		Monolithic Solar Cell Arrays And Fabrication Methods	ABANDONED	#3 Module Technology	d. Backplane
114	114USP	US	61/872,035		Contiguous-Backplane-Attached Photovoltaic Module Structures and Manufacturing Methods Using Monolithic Cell-Level and Module-Level Metallization	EXPIRED	#3 Module Technology	d. Backplane
114	114WO	WO	PCT/US2014/053759		Monolithic Solar Cell Arrays And Fabrication Methods	EXPIRED	#3 Module Technology	d. Backplane
115	115CN	CN	2014800618816		Laser Processing For Solar Cell Base And Emitter Regions	ABANDONED	#2 IBC Cell Technology	a. IBC
115	115KR	KR	10-2016-7010013		Laser Processing For Solar Cell Base And Emitter Regions	PUBLISHED	#2 IBC Cell Technology	a. IBC
115	115US0	US	14/488,263		Laser Processing For Solar Cell Base And Emitter Regions	ABANDONED	#2 IBC Cell Technology	a. IBC
115	115US0C1	US	15/491,882		Laser Processing For Solar Cell Base And Emitter Regions	PENDING	#2 IBC Cell Technology	a. IBC
115	115USP	US	61/878,573		Damage Free Laser Patterning Of Aluminum Oxide For Solar Cell Applications	EXPIRED	#2 IBC Cell Technology	a. IBC
115	115WO	WO	PCT/US2014/055964		Laser Processing For Solar Cell Base And Emitter Regions	EXPIRED	#2 IBC Cell Technology	a. IBC
116	116US0	US	14/493,341	9,379,258	Fabrication Methods For Back Contact Back Junction Solar Cells	ISSUED	#2 IBC Cell Technology	a. IBC
116	116US0C1	US	15/193,107		Fabrication Methods For Back Contact Back Junction Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
116	116US1	US	14/493,335		Fabrication Methods For Back Contact Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
116	116USP	US	61/880,777		High-Efficiency, Thin-Crystalline-Silicon-Absorber Back-Contact Solar Cells And Manufacturing Methods	EXPIRED	#2 IBC Cell Technology	a. IBC
117	117US0	US	14/495,883		Photovoltaic Monolithic Solar Module Connection And Fabrication Methods	PUBLISHED	#3 Module Technology	d. Backplane
117	117USP	US	61/881,594		Monolithic Module Using Contiguous Backplane and Monolithic Cell and Module Metallization for Reduction of Installed Photovoltaic System Balance-Of-System (BOS) Wiring Cost	EXPIRED	#3 Module Technology	d. Backplane

FAMILY NUMBER	DOCKET REFERENCE NUMBER	CNTRY CODE	APPLICATION OR SERIAL NUMBER	PATENT NUMBER	TITLE	STATUS	Technology Family	Technology Cluster (Subgroup)
117	117USP1	US	62/140,397		Multi-Connector Junction Box	EXPIRED	#3 Module Technology	d. Backplane
117	117USP1.1	US	62/140,408		Multi-Connector Junction Box	EXPIRED	#3 Module Technology	d. Backplane
118	118USP	US	61/891,364		Surface Morphology Detection	EXPIRED	#2 IBC Cell Technology	c. Process
119	119USP	US	61/895,326		Smart Photovoltaic Modules With Distributed Embedded Maximum Power Point Tracking (MPPT) For Enhanced Power Harvesting	EXPIRED	#3 Module Technology	a. Smart Module
120	120USP	US	61/898,504		Damage Free Laser Patterning Of Aluminum Oxide For Solar Cell Applications	EXPIRED	#2 IBC Cell Technology	e. Laser
121	121CN	CN	2014800726558		Dielectric-Passivated Metal Insulator Photovoltaic Solar Cells	LAPSED, BUT CAN BE REINSTATED	#2 IBC Cell Technology	a. IBC
121	121US0	US	14/538,760		Dielectric-Passivated Metal Insulator Photovoltaic Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
121	121USP	US	61/902,526		Multiple Dielectric Passivation Based Metal Insulator Semiconductor Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
121	121WO	WO	PCT/US2014/065091		Dielectric-Passivated Metal Insulator Photovoltaic Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
122	122CN	CN	2014800728426		Metal Foil Metallization For Backplane-Attached Solar Cells And Modules	PENDING	#3 Module Technology	d. Backplane
122	122MY	MY	PI2016701707		Metal Foil Metallization For Backplane-Attached Solar Cells And Modules	PENDING	#3 Module Technology	d. Backplane
122	122US0	US	14/539,978	9,806,220	Metal Foil Metallization For Backplane-Attached Solar Cells And Modules	ISSUED	#3 Module Technology	d. Backplane
122	122USP	US	61/903,267		Multi-Level Metallization Structures And Methods for High-Efficiency Solar Cells	EXPIRED	#3 Module Technology	d. Backplane
122	122WO	WO	PCT/US2014/065312		Metal Foil Metallization For Backplane-Attached Solar Cells And Modules	EXPIRED	#3 Module Technology	d. Backplane
123	123MY	US	PI2016001006		Aluminum Oxide Passivation For Solar Cells	PENDING	#2 IBC Cell Technology	c. Process
123	123US0	US	14/557,096		Aluminum Oxide Passivation For Solar Cells	ABANDONED	#2 IBC Cell Technology	c. Process
123	123US1	US	14/632,696	9,799,522	Aluminum Oxide Passivation And Damage Removal For Solar Cells	ISSUED	#2 IBC Cell Technology	c. Process
123	123US0C1	US	15/491,906		Aluminum Oxide Passivation For Solar Cells	PENDING	#2 IBC Cell Technology	c. Process
123	123USP	US	61/910,271		Al ₂ O ₃ Passivation For Back Contact Back Junction Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
123	123WO	WO	PCT/US2014/067946		Aluminum Oxide Passivation For Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
123	123WO1	WO	PCT/US2015/017773		Aluminum Oxide Passivation And Damage Removal For Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
124	124CN	CN	2014800743869		Passivated Contacts For Back Contact Back Junction Solar Cells	PENDING	#2 IBC Cell Technology	a. IBC
124	124KR	KR	10-2016-7017831		Passivated Contacts For Back Contact Back Junction Solar Cells	PUBLISHED	#2 IBC Cell Technology	a. IBC
124	124US0	US	14/558,707		Passivated Contacts For Back Contact Back Junction Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
124	124US1	US	15/465,458		Passivated Contacts For Back Contact Back Junction Solar Cells	PENDING	#2 IBC Cell Technology	a. IBC
124	124USP	US	61/910,936		Insulator and Wide Bandgap Semiconductor Based Passivated Contacts	EXPIRED	#2 IBC Cell Technology	a. IBC
124	124WO	WO	PCT/US2014/068242		Passivated Contacts For Back Contact Back Junction Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
125	125US0	US	14/576,161		Single Passivated Contacts For Back Contact Back Junction Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
125	125USP	US	61/917,919		Insulator and Wide Bandgap Semiconductor Based Passivated Contacts	EXPIRED	#2 IBC Cell Technology	a. IBC

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125	125WO	WO	PCT/US2014/071322		Single Passivated Contacts For Back Contact Back Junction Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
126	126US0	US	14/582,090		Amorphous Silicon Passivated Contacts For Back Contact Back Junction Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
126	126USP	US	61/920,209		Amorphous Silicon Passivated (ASP) Contacts for Back Contact Back Junction Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
126	126WO	WO	PCT/US2014/072294		Amorphous Silicon Passivated Contacts For Back Contact Back Junction Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
127	127US0	US	14/582,142		Self Aligned Contacts for Monolithically Isled Back Contact Back Junction Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
127	127US1	US	14/582,168		Self Aligned Contacts For Back Contact Back Junction Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
127	127US2	US	14/582,177		Self Aligned Contacts for Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
127	127US3	US	15/464,186		Self Aligned Contacts for Solar Cells	PENDING	#2 IBC Cell Technology	a. IBC
127	127USP	US	61/920,271		Structures And Methods Of Forming Self Aligned Contacts For High Efficiency Back Contacted Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
127	127USP3	US	62/327,430		High-Efficiency Back-Contact Photovoltaic Solar Cell Structures And Manufacturing Process Flows	EXPIRED	#2 IBC Cell Technology	a. IBC
127	127WO	WO	PCT/US2014/072299		Self Aligned Contacts For Back Contact Back Junction Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
127	127WO1	WO	PCT/US2014/072301		Self Aligned Contacts For Back Contact Back Junction Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
128	128CN	CN	2015800137223		Discontinuous Emitter And Base Islands For Back Contact Solar Cells	PENDING	#2 IBC Cell Technology	a. IBC
128	128KR	KR	10-2016-7022086		Discontinuous Emitter And Base Islands For Back Contact Solar Cells	PENDING	#2 IBC Cell Technology	a. IBC
128	128US0	US	14/596,213		Discontinuous Emitter And Base Islands For Back Contact Solar Cells	PENDING	#2 IBC Cell Technology	a. IBC
128	128USP	US	61/926,852		Structures And Methods For Back-Contact Solar Cells Using Discontinuous Emitter And Base Islands	EXPIRED	#2 IBC Cell Technology	a. IBC
128	128WO	WO	PCT/US2015/011279		Discontinuous Emitter And Base Islands For Back Contact Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
129	129US0	US	14/601,202	9,130,076	Trench Isolation For Monolithically Isled Solar Photovoltaic Cells And Modules	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
129	129US0C1	US	14/846,537	9,929,288	Trench Isolation For Monolithically Isled Solar Photovoltaic Cells And Modules	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
129	129USP	US	61/929,097		Trench Isolation Structures And Manufacturing Process Methods For Monolithically Isled Solar Photovoltaic Cells And Modules	EXPIRED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
129	129WO	WO	PCT/US2015/012104		Trench Isolation For Monolithically Isled Solar Photovoltaic Cells And Modules	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
130	130USP	US	61/941,995		High-Efficiency Backplane-Attached Solar Cells Using High-Conductivity Metal-Foil Metallization	EXPIRED	#3 Module Technology	d. Backplane
131	131USP	US	61/943,332		Smart Photovoltaic Modules Using Embedded Distributed MPPT Power Optimizers	EXPIRED	#3 Module Technology	a. Smart Module
132	132CN	CN	201580022322.9		Self Aligned Contacts For Back Contact Solar Cells	PUBLISHED	#2 IBC Cell Technology	a. IBC
132	132EP	EP	15755082.3		Self Aligned Contacts For Back Contact Solar Cells	PUBLISHED	#2 IBC Cell Technology	a. IBC
132	132JP	JP	2016-554365		Self Aligned Contacts For Back Contact Solar Cells	PENDING	#2 IBC Cell Technology	a. IBC
132	132KR	KR	10-2016-7026447		Self Aligned Contacts For Back Contact Solar Cells	PUBLISHED	#2 IBC Cell Technology	a. IBC
132	132USP	US	61/945,116		Structures And Methods Of Forming Self Aligned Contacts For High Efficiency Back Contacted Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
132	132WO	WO	PCT/US2015/017852		Self Aligned Contacts For Back Contact Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC

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133	133USP	US	61/945,126		Al2O3 Passivation For Back Contact Back Junction Solar Cells	EXPIRED	#2 IBC Cell Technology	c. Process
134	134USP	US	62/010,980		Monolithic Module Cell To Cell Interconnection For Improved Fault Tolerance	EXPIRED	#3 Module Technology	a. Smart Module
135	135USO	US	14/817,185		Solar Cell Surface Passivation Using Photo-Anneal	ABANDONED	#2 IBC Cell Technology	c. Process
135	135USP	US	62/032,414		Front Passivation Stabilization Using Photo-Chemical Anneal for Solar Cells	EXPIRED	#2 IBC Cell Technology	c. Process
135	135WO	WO	PCT/US2015/043507		Solar Cell Surface Passivation Using Photo-Anneal	EXPIRED	#2 IBC Cell Technology	c. Process
136	136USO	US	14/818,294		Impact Resistant Solar Cells	ABANDONED	#3 Module Technology	f. Application
136	136USP	US	62/033,091		Impact Resistant Solar Cells	EXPIRED	#3 Module Technology	f. Application
136	136WO	WO	PCT/US2015/043689		Impact-Resistant Photovoltaic Modules	EXPIRED	#3 Module Technology	f. Application
137	137USO	US	14/825,163		Amorphous Silicon Based Laser Doped Solar Cells	PUBLISHED	#2 IBC Cell Technology	e. Laser
137	137USP	US	62/036,609		Amorphous Silicon Based Laser Doped High Performance Solar Cell Structures And Methods	EXPIRED	#2 IBC Cell Technology	e. Laser
137	137WO	WO	PCT/US2015/044935		Amorphous Silicon Based Laser Doped Solar Cells	EXPIRED	#2 IBC Cell Technology	e. Laser
138	138USO	US	14/826,171		Rear Wide Band Gap Passivated (RGP) PERC Cell Architecture	EXPIRED	#2 IBC Cell Technology	c. Process
138	138USP	US	62/037,094		Rear Wide Band Gap Passivated (RGP) PERC Cell Architecture	EXPIRED	#2 IBC Cell Technology	c. Process
138	138WO	WO	PCT/US2015/045160		Rear Wide Band Gap Passivated Parc Solar Cells	EXPIRED	#2 IBC Cell Technology	c. Process
139	139USO	US	14/829,635		Photovoltaic Solar Module Metallization And Distributed Shade Management Connection And Fabrication Methods	PUBLISHED	#3 Module Technology	e. Backplane/Smart Module
139	139USP	US	62/038,787		Macro Isled Cell And Monolithic Module Metallization	EXPIRED	#3 Module Technology	e. Backplane/Smart Module
139	139WO	WO	PCT/US2015/045775		Photovoltaic Solar Module Metallization And Distributed Shade Management Connection And Fabrication Methods	PUBLISHED	#3 Module Technology	e. Backplane/Smart Module
140	140US1	US	14/841,690		Laser Doping For Making Back Contact Back Junction Solar Cells	ABANDONED	#2 IBC Cell Technology	e. Laser
140	140USP	US	62/044,312		Laser Doping Based Efficient Manufacturing Methods For Making High Efficiency Back Contacted Back Junction Solar Cells	EXPIRED	#2 IBC Cell Technology	e. Laser
140	140WO	WO	PCT/US2015/047837		Laser Doping For Making Back Contact Back Junction Solar Cells	PUBLISHED	#2 IBC Cell Technology	e. Laser
141	141USO	US	14/843,991		Dual Level Solar Cell Metallization Having First Level Metal Busbars	ABANDONED	#3 Module Technology	d. Backplane
141	141USP	US	62/044,997		Multiple Metal 1 Busbar Solutions For Solar Cells	EXPIRED	#3 Module Technology	d. Backplane
141	141WO	WO	PCT/US2015/048211		Dual Level Solar Cell Metallization Having First Level Metal Busbars	EXPIRED	#3 Module Technology	d. Backplane
141	141WO1	WO	PCT/US2015/048210		Dual Level Solar Cell Metallization Having First Level Metal Busbars	ABANDONED	#3 Module Technology	d. Backplane
142	142USO	US	14/936,673		Temporary Field Assisted Passivation For Testing Of Partially Processed Photovoltaic Solar Cells	ABANDONED	#2 IBC Cell Technology	f. Test
142	142USP	US	62/077,150		In-Line Test And Sort For Photovoltaic Monolithic Modules	EXPIRED	#2 IBC Cell Technology	f. Test
142	142USN	US	15/524,929		Temporary Field Assisted Passivation For Testing Of Partially Processed Photovoltaic Solar Cells	PENDING	#2 IBC Cell Technology	f. Test

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142	142WO	WO	PCT/US2015/059796		Temporary Field Assisted Passivation For Testing Of Partially Processed Photovoltaic Solar Cells	National Phase in CA ONLY	#2 IBC Cell Technology	f. Test
143	143US0	US	14/937,861		Impact Resistant Lightweight Photovoltaic Modules	ABANDONED	#2 IBC Cell Technology	f. Test
143	143USP	US	62/077,878		Impact Resistant Lightweight Module Design	EXPIRED	#3 Module Technology	d. Backplane
143	143USN	US	15/525,513		Impact Resistant Lightweight Photovoltaic Modules	PENDING	#3 Module Technology	d. Backplane
143	143WO	WO	PCT/US2015/060046		Impact Resistant Lightweight Photovoltaic Modules	National Phase in CA ONLY	#3 Module Technology	d. Backplane
144	144USP	US	62/110,387		Macro-iCell and Monolithic Smart Module Metallization	EXPIRED	#3 Module Technology	e. Backplane/Smart Module
144	144USP1	US	62/111,652		Macro-iCell And Monolithic Smart Module Metallization Designs	EXPIRED	#3 Module Technology	e. Backplane/Smart Module
144	144USP2	US	62/117,418		Macro-iCell And Monolithic Smart Module Metallization Designs	EXPIRED	#3 Module Technology	e. Backplane/Smart Module
144	144USP3	US	62/164,992		Macro-iCell And Monolithic Smart Module Metallization Designs	EXPIRED	#3 Module Technology	e. Backplane/Smart Module
144	144WO	WO	PCT/US2016/016025		Shade Management Of Solar Cells And Solar Cell Regions	EXPIRED	#3 Module Technology	e. Backplane/Smart Module
144	144USNP	US	15/547,719		Shade Management Of Solar Cells And Solar Cell Regions	PENDING	#3 Module Technology	e. Backplane/Smart Module
145	145USP	US	62/159,947		High-Performance Solar Photovoltaic Modules Using Distributed Shade Management SBRs And MPPT Power Optimizers	EXPIRED	#3 Module Technology	a. Smart Module
146	146USP	US	62/168,803		Photovoltaic Modules Using Embedded Blocking Diodes And Magnetic Reed Switches	EXPIRED	#3 Module Technology	a. Smart Module
147	147US0	US	15/172,146		Electroluminescence Testable Photovoltaic Modules Having Shade Management Solutions	PENDING	#3 Module Technology	a. Smart Module
147	147US1	US	15/172,149		Electroluminescence Testable Photovoltaic Modules Having Shade Management Solutions	ABANDONED	#3 Module Technology	a. Smart Module
147	147USP	US	62/170,100		High-Performance Solar Photovoltaic Systems Using Parallel-Connected Array Of High-Voltage Solar Modules	EXPIRED	#3 Module Technology	a. Smart Module
148	148US	US	15/202,557		Discrete Carrier Selective Passivated Contacts For Solar Cells	ABANDONED	#2 IBC Cell Technology	a. IBC
148	148USP	US	62/188,456		Discrete Carrier-Selective Passivated Contacts Using Silicon Nanoparticles For High-Efficiency Crystalline Silicon Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
148	148USP1	US	62/317,377		Discrete Carrier-Selective Passivated Contacts Using Silicon Nanoparticles For High-Efficiency Crystalline Silicon Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
148	148USP2	US	62/327,426		High-Efficiency Back-Contact Photovoltaic Solar Cell Structures And Manufacturing Process Flows	EXPIRED	#2 IBC Cell Technology	a. IBC
148	148USP3	US	62/489,988		HIGH-EFFICIENCY BACK-CONTACT PHOTOVOLTAIC SOLAR CELL STRUCTURES AND MANUFACTURING PROCESS FLOWS	PENDING	#2 IBC Cell Technology	a. IBC
148	148USP2-DNP	US	62/327,424		High-Efficiency Back-Contact Photovoltaic Solar Cell Structures And Manufacturing Process Flows	REFILE USP	#2 IBC Cell Technology	a. IBC
148	148WO	WO	PCT/US2016/041018		Discrete Carrier Selective Passivated Contacts For Solar Cells	PUBLISHED	#2 IBC Cell Technology	a. IBC
149	149USP	US	62/190,235		Landscape Macro-iCell And Monolithic Smart Module Metalization Designs	EXPIRED	#3 Module Technology	e. Backplane/Smart Module

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150	150P	US	62/202,749		Photovoltaic Module Mounting And Installation System (title, inventors, ref# & assignee need to be checked on Private PAIR)	SOLD	#4 Sprint System	b. Sprint 1
150	150P3	US	62/352,015		Solar Panel Mounting System	SOLD	#4 Sprint System	b. Sprint 1
150	150USP4	US	62/521,919		Solar Panel Mounting System	SOLD	#4 Sprint System	b. Sprint 1
150	150US0	US	15/231,768		Photovoltaic Module Mounting And Installation System	SOLD	#4 Sprint System	b. Sprint 1
150	150USP.1	US	62/257,695		Photovoltaic Module Mounting And Installation System (title, inventors, ref# & assignee need to be checked on Private PAIR)	SOLD	#4 Sprint System	b. Sprint 1
150	150USP2	US	62/301,978		Solar Module Mount	SOLD	#4 Sprint System	b. Sprint 1
150	150WO	WO	PCT/US2016/046085		Photovoltaic Module Mounting And Installation System	SOLD	#4 Sprint System	b. Sprint 1
151	151P1	US	62/372,298		Flash Lamp Annealing And Light Soaking Of Frontside Passivation Layer	PENDING	#2 IBC Cell Technology	c. Process
151	151USP	US	62/202,759		Flash Lamp Annealing And Light Soaking Of Frontside Passivation Layer	EXPIRED	#2 IBC Cell Technology	c. Process
151	151USP2	US	62/503,260		FLASH LAMP ANNEALING AND LIGHT SOAKING OF FRONTSIDE PASSIVATION LAYER	PENDING	#2 IBC Cell Technology	c. Process
152	152USP	US	62/202,776		Low Voltage Module	EXPIRED	#3 Module Technology	a. Smart Module
153	153US0	US	15/250,881		Solar Cell Current And Voltage Characteristic Measurement	PENDING	#2 IBC Cell Technology	f. Test
153	153US0_PY	US	15/250,895		Solar Cell Current And Voltage Characteristic Measurement	ABANDONED	#2 IBC Cell Technology	f. Test
153	153USP	US	62/211,622		Method For Measuring Current/Voltage Characteristics Of A Solar Cell Under A Constant Temperature	EXPIRED	#2 IBC Cell Technology	f. Test
153	153WO	WO	PCT/US2016/049333		Solar Cell Current And Voltage Characteristic Measurement	ABANDONED	#2 IBC Cell Technology	f. Test
154	154USP	US	62/220,861		Second Level M2 Metallization Stack	EXPIRED	#3 Module Technology	d. Backplane
155	155USP	US	62/221,553		Color-Adjusted Photovoltaic Modules Using Backplane-Laminated Monolithic Module Sheets: Backplane-Selective Powder Coating	EXPIRED	#3 Module Technology	a. Smart Module
156	156USP	US	62/257,698		Power Optimization For Solar Cells	EXPIRED	#3 Module Technology	a. Smart Module
156	156WO	WO	PCT/US2016/063209		Multi-Modal Maximum Power Point Tracking Optimization Solar Photovoltaic System	PENDING	#3 Module Technology	a. Smart Module
157	157USP	US	62/257,702		Smart Building-Integrated Photovoltaic (BIPV) Rooftop Tiles	EXPIRED	#3 Module Technology	a. Smart Module
158	158USP	US	62/265,953		Rear Contact and Infrared Mirrors for Back-Contact Solar Cells	EXPIRED	#2 IBC Cell Technology	a. IBC
158	158WO	WO	PCT/US2016/066243		Rear Contact And Infrared Mirror Structures And Manufacturing Methods For Back Contact Solar Cells	PENDING	#2 IBC Cell Technology	a. IBC
159	159US0	US	15/405,273		Solar Photovoltaic Module Remote Access Module Switch And Real-Time Temperature Monitoring	PENDING	#3 Module Technology	a. Smart Module
159	159USP	US	62/277,845		Real-Time Measurement of Photovoltaic Module Temperature Using Remote-Access Module Switch (RAMS)	EXPIRED	#3 Module Technology	a. Smart Module
159	159WO	WO	PCT/US2017/013265		Solar Photovoltaic Module Remote Access Module Switch And Real-Time Temperature Monitoring	EXPIRED	#3 Module Technology	a. Smart Module
160	160USP	US	62/292,218		Smart Building Integrated Photovoltaic (BIPV) Rooftop Tiles and Shingles	EXPIRED	#3 Module Technology	a. Smart Module
161	161USP	US	62/302,796		Reduced Contact Area Contacts for Photovoltaic Solar Cells	EXPIRED	#2 IBC Cell Technology	d. Backplane
162	162USP	US	62/401,857		Photovoltaic Module Mounting and Installation Systems	SOLD	#4 Sprint System	b. Sprint 1
162	162USP1	US	62/565,463		Photovoltaic Module Mounting and Installation Systems	SOLD	#4 Sprint System	b. Sprint 1
163	163USP	US	62/401,868		Reverse Current Protection, Electroluminescence (EL) Testability, and Flash Current-Voltage Testability of Photovoltaic Modules Comprising MPPT Optimizers	ABANDONED	#3 Module Technology	a. Smart Module
163	163USP1	US	62/405,866		Reverse Current Protection, Electroluminescence (EL) Testability, And Flash Current-Voltage Testability Of Photovoltaic Modules Comprising MPPT Optimizers	EXPIRED	#3 Module Technology	a. Smart Module

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163	163USP2	US	62/505,328		Reverse Current Protection, Electroluminescence (EL) Testability, and Flash Current-Voltage Testability of Photovoltaic Modules Comprising MPPT Optimizers	PENDING	#3 Module Technology	a. Smart Module
164	164P	US	62/408,592		High-Performance IBC Solar Cell And Module Technology	EXPIRED	#3 Module Technology	e. Backplane/Smart Module
164	164USP1	US	62/512,405		HIGH-PERFORMANCE IBC SOLAR CELL AND LIGHTWEIGHT MODULE TECHNOLOGY; REDUCED COST, ENHANCED PV MODULE & SYSTEM PERFORMANCE, AND ENHANCED HARMONIZATION WITH EXISTING MAINSTREAM SOLAR CELL FAB LINE	PENDING	#3 Module Technology	e. Backplane/Smart Module
165	165USP	US	62/438,467		Ballasted Fast Installation Solar Photovoltaic Systems	SOLD	#4 Sprint System	b. Sprint 1
166	166USP	US	62/441,198		East West Orientation Solar Photovoltaic Systems	SOLD	#4 Sprint System	b. Sprint 1
167	167USP	US	62/442,860		High-Performance Low-Cost Solar Photovoltaic Systems for Commercial and Industrial Rooftop Applications	SOLD	#4 Sprint System	c. Sprint 2
168	168USP	US	62/508,225		HIGH-PERFORMANCE LOW-COST SOLAR PHOTOVOLTAIC SYSTEMS FOR COMMERCIAL AND INDUSTRIAL ROOFTOP APPLICATIONS	SOLD	#4 Sprint System	c. Sprint 2
D1	D1CN0	CN	201630629953.4		Mount Foot for Solar Panels	SOLD	#4 Sprint System	b. Sprint 1
D1	D1EP	EP	003526813-000		Mount Foot for Solar Panels	SOLD	#4 Sprint System	b. Sprint 1
D1	D1US0	US	29/568,494		Mount Foot for Solar Panels	SOLD	#4 Sprint System	b. Sprint 1
D10	D10US0	US	29/568,506		Solar Panel Array	SOLD	#4 Sprint System	b. Sprint 1
D11	D11CN0	CN	201630629186.7		Solar Panel Array	SOLD	#4 Sprint System	FILE A RE
D11	D11US0	US	29/568,507		Solar Panel Array	SOLD	#4 Sprint System	b. Sprint 1
D11	D11US01	US	29/568,508		Solar Panel Array	SOLD	#4 Sprint System	b. Sprint 1
D12	D12US0PY	US	29/568,511		Solar Panel Array	SOLD	#4 Sprint System	b. Sprint 1
D13	D13US0	US	29/568,509		Mount System for Photovoltaics	SOLD	#4 Sprint System	b. Sprint 1
D14	D14US0	US	29/568,510		Mount System for Photovoltaics	SOLD	#4 Sprint System	b. Sprint 1
D15	D15CN0	US	201630629207.5		Mount Foot for Solar Panels	SOLD	#4 Sprint System	b. Sprint 1
D15	D15US0	US	29/568,702		Mount Foot for Solar Panels	SOLD	#4 Sprint System	b. Sprint 1
D15	D15US1	US	29/568,836		Mount Foot for Solar Panels	SOLD	#4 Sprint System	b. Sprint 1
D2	D2US0	US	29/568,495		Mount Foot for Solar Panels	SOLD	#4 Sprint System	b. Sprint 1
D3	D3CN0	CN	201630629530.2		Mount Body for a Solar Panel	SOLD	#4 Sprint System	b. Sprint 1
D3	D3US0	US	29/568,497		Mount Body for a Solar Panel	SOLD	#4 Sprint System	b. Sprint 1
D4	D4US0	US	29/568,500		Mount Body for a Solar Panel	SOLD	#4 Sprint System	b. Sprint 1
D5	D5US0	US	29/568,499		Mount Body for a Solar Panel	SOLD	#4 Sprint System	b. Sprint 1
D6	D6CN0	CN	201630629964.2		Mount System for Photovoltaics	SOLD	#4 Sprint System	b. Sprint 1
D6	D6US0	US	29/568,502		Mount System for Photovoltaics	SOLD	#4 Sprint System	b. Sprint 1
D7	D7US0	US	29/568,503		Mount System for Photovoltaics	SOLD	#4 Sprint System	b. Sprint 1
D8	D8CN0	CN	201630629952.X		Mount System for Photovoltaics	SOLD	#4 Sprint System	b. Sprint 1
D8	D8US0	US	29/568,504		Mount System for Photovoltaics	SOLD	#4 Sprint System	b. Sprint 1
D9	D9CN	CN	201630629956.8		Solar Panel Array	SOLD	#4 Sprint System	b. Sprint 1
D9	D9US0	US	29/568,505		Solar Panel Array	SOLD	#4 Sprint System	b. Sprint 1
JD1	JD1	US	13/310,083	8,992,746	Anodizing Apparatus	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
JD1	JD1AJP	JP	2010-269416		Anodizing Apparatus	PUBLISHED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
JD1	JD1BJP	JP	2010-269417		Anodizing Apparatus	PUBLISHED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
JD1	JD1C1	US	14/673,611		Anodizing Apparatus	ABANDONED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
JDD	JDDainippon2	US	13/688,645		Anodizing Apparatus, An Anodizing System Having The Same, And A Semiconductor Wafer	PUBLISHED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
JDD	JDDainippon2CN	CN	201210505374.X	ZL201210505374.X	Anodizing Apparatus, An Anodizing System Having The Same, And A Semiconductor Wafer	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO
JDD	JDDainippon2JP	JP	2011-262421	5908266	Anodizing Apparatus, An Anodizing System Having The Same, And A Semiconductor Wafer	ISSUED	#1 EPI/Porous Si Wafer Technology	a. EPI/Porous/ELO