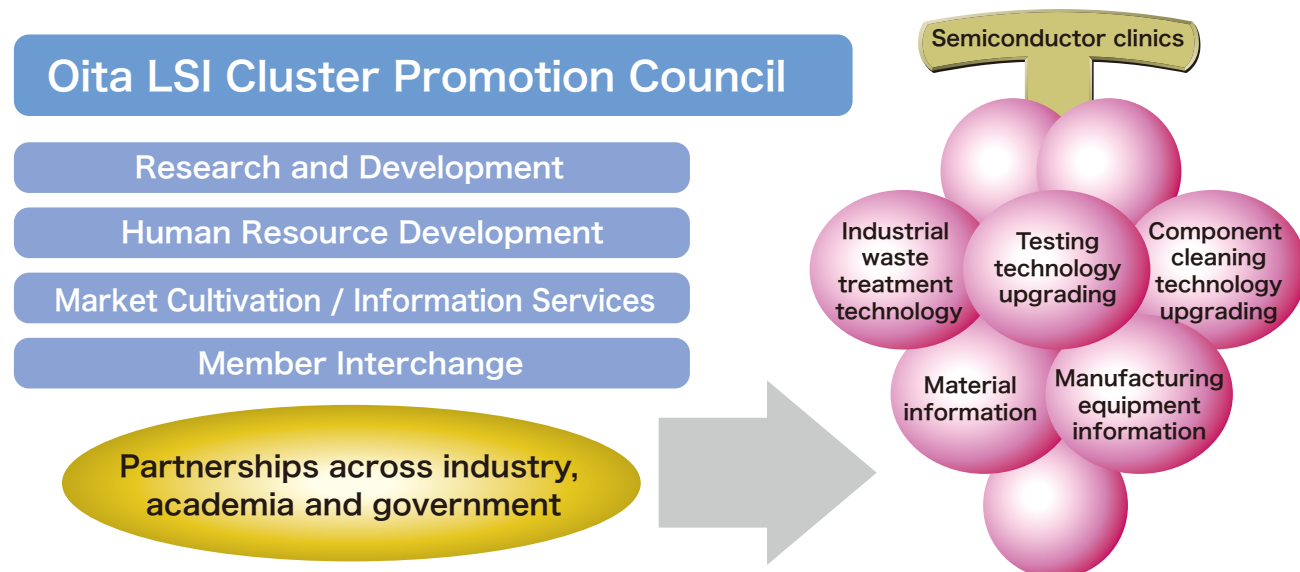# OITA LSI CLUSTER

OITA LSI CLUSTER

- Oita LSI Cluster's Concept
- Oita LSI Cluster's Vision
- Companies Regional Map
- Companies Technology Map

OITA LSI Cluster Concept

The OITA LSI Cluster concept was formulated with the aim of generating more dynamic industrial activity in Oita Prefecture and achieving community and enterprise development and revitalization through both collaboration and competition. Oita LSI Cluster Promotion Council, established in April 2005, seeks to develop clusters of locally-based enterprises and major firms that have established operations in the prefecture, and utilize their technological strengths to create a 21st-century hub for semiconductor production that is internationally competitive in terms of quality, cost and turnaround time. This task involves the development of networks bringing together partners from industry, academia and government, and strategic initiatives to further integrate our prefecture's advanced manufacturing technologies.

OITA LSI Cluster Concept

Oita LSI Cluster Promotion Council

- Research and Development
- Human Resource Development
- Market Cultivation / Information Services
- Member Interchange

Partnerships across industry, academia and government

Semiconductor clinics

- Industrial waste treatment technology
- Testing technology upgrading
- Component cleaning technology upgrading
- Material information
- Manufacturing equipment information

The core element of the Oita LSI Cluster concept is engagement with the testing technologies (evaluation processes) essential to the manufacture of semiconductors. We aim to create a "semiconductor clinic" that delivers solutions based on scientific diagnosis and systematic technology development, accumulates and disseminates information and the results of impartial evaluation, and offers counseling as appropriate. To this end, we are implementing a range of specific initiatives around the four functional pillars of Research and Development, Human Resource Development, Market Cultivation / Information Supplement, and Member Interchange.

The acronym "LSI" used in the concept's title stands for the Large Scale Integrated circuits in semiconductors, but also incorporates the idea of Large Scale Integration of semiconductor-related enterprises in Oita prefecture for the purpose of advancing industrial activity.

Oita LSI Cluster Promotion Council

Members
- Enterprises
- Educational institutions
- Financial institutions
- Governmental organs

Working groups

- Chairperson — Advisors
- Vice Chairperson — Engineer Advisors
- Executive Director
- Trustees (Administrative Board) — Planning Committee
- Expert Subcommittee — Assessment and Screening Committee
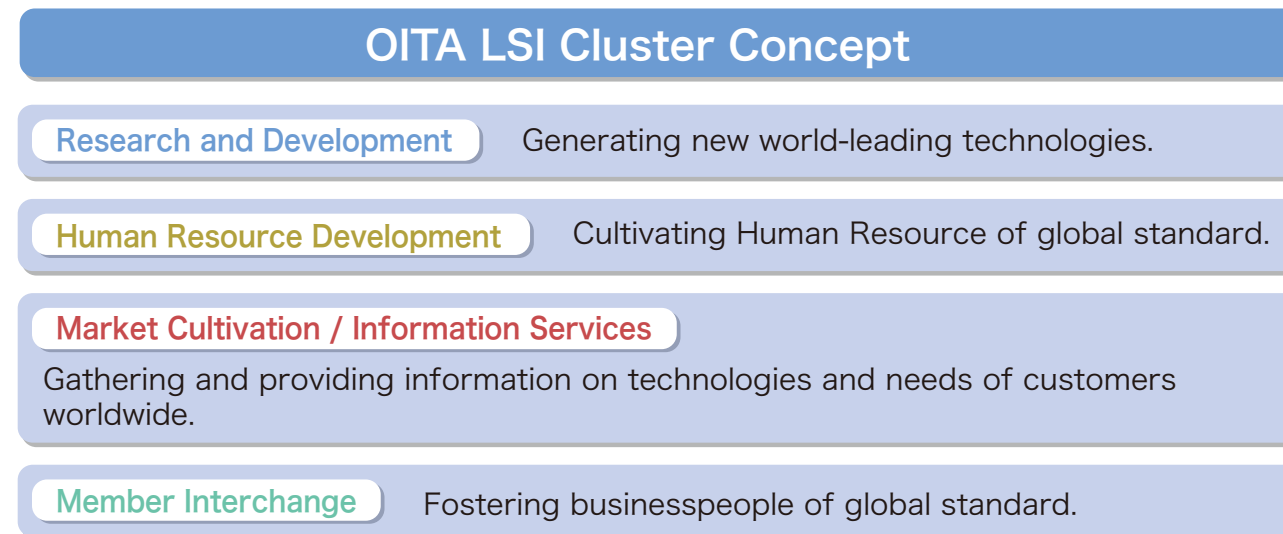- Secretariat — Technical consulting

OITA LSI Cluster Projects

Oita LSI Cluster Promotion Council has instituted a medium-range vision formulated primarily through its Planning Committee in the 2008 fiscal year.

OITA LSI Cluster Medium-Range Vision

Slogan: Importing global information, exporting Oita's innovations!

OITA LSI Cluster Concept

Research and Development — Generating new world-leading technologies.

Human Resource Development — Cultivating Human Resource of global standard.

Market Cultivation / Information Services — Gathering and providing information on technologies and needs of customers worldwide.

Member Interchange — Fostering businesspeople of global standard.

The specialist divisions for Research and Development, Human Resource Development, Market Cultivation / Information Services, and Member Interchange are each pursuing specific initiatives under the following sub-themes (strategies) developed in line with the medium-range vision.

Research and Development
1. Realizing successful case models for business linkage and development of new technologies.
2. Proposing developments in screening and evaluation systems.
3. Organizing mid-term reporting sessions and performance briefings for working groups.
4. Market research and market development assistance in relation to research themes.
5. Research and development for productivity improvements, etc.
6. Periodical information exchange with the academic sector.

Human Resource Development
1. Cultivating and developing engineers with broad outlooks.
2. Operating projects led by working groups.
3. Augmenting training for technical personnel based on the needs of member enterprises.
4. Bolstering partnerships with universities, etc.
5. Engaging expert instructors from other organizations.
6. Expanding basic education and training for new personnel.
7. Supporting the maintenance of employment opportunities.

Market Cultivation / Information Services
1. Surveys and research on Joint tendering and other business models.
2. Formulating systems for self-diagnosis of commercial position.
3. Increasing knowledge-gathering and provision of information to member enterprises.
4. Supporting business matching.
5. Bolstering information dissemination functions.

Member Interchange
1. Organizing meetings for interaction among top-level executives from both within and beyond the prefecture.
2. Exchange and network-building with clusters in other regions and beyond Japan.
3. Collaboration with the Kyushu Semiconductor Industries and Technology Innovation Association.

Oita Prefecture Semiconductor Affiliated Companies Regional Map

Information current as of August 1, 2011

Bungo-takada City

10 Kunisaki City

7 Kitsuki City

Oita Airport

3 Nakatsu City

8 Usa City

12 Kusu Town

11 Hiji Town

2 Beppu City

4 Hita City

9 Yufu City

Kokonoe Town

1 Oita City

Taketa City

6 Usuki City   Tsukumi City

Bungo-ono City

5 Saiki City

Region No.	Region	No.	Company Name	Telephone	Postal Code	Address
❶	Oita City	1	Agawa Mekki Inc. Industrial Park	097-558-3758	870-0138	3-2-18 Harukawa, Oita City
		2	Adachi Chemical Plants Co., Ltd.	097-521-1215	870-0274	1316-1 Tanegu Dainoue, Oita City
		3	Advantest Corporation	097-555-9570	870-0919	3-8 Shinsakae Machi, Oita City
		4	Aberuf Inc.	097-537-3811	870-0037	Astion Kasuga #610, 6-6 Higashi-Kasuga-machi, Oita City
		5	Ulvac Techno Co., Oita CS Center	097-522-3803	870-0278	1-12-41 Aosaki, Oita City
		6	Ishii Tool & Engineering Corp.	097-544-1001	870-0823	2-5-60 Higashi Omichi, Oita City
		7	InfoWave, Inc.	097-573-7478	870-0023	Coop Nakamura, 1F, 2-11-18 Nagahama, Oita City
		8	Willtec Kyushu Co., Oita Support Center	097-513-2488	870-0034	Oita Center Bldg., 8F, 3-1-1 Miyako-machi, Oita City
		9	Ueki Corporation, Oita Offices	097-520-5880	870-0125	4353 Oaza Matsuoka, Oita City
		10	SS-Avenue Co, Ltd.	097-573-3335	870-0037	Oita Sofia Plaza Bldg. 4F, 17-19 Higashi Kasuga Machi, Oita City
		11	SMC Corporation, Oita Branch Office	097-558-1807	870-0918	4-6 Hiyoshi Machi, Oita City
		12	S-Craft Co., Ltd.	097-521-0750	870-0242	1-1-5 Tsunoko Minami, Oita City
		13	STK Technology Co., Ltd.	097-527-2161	870-0108	2468-10 Oaza Misa, Oita City
		14	Espec Kyushu Corp., Oita Branch	097-551-7343	870-0921	4-4-38 Hagiwara, Oita City
		15	Eto Manufacturing Co., Ltd.	097-521-1834	870-0145	4-7 Otozu Machi, Oita City
		16	NYS Precision Co., Ltd., Oita Factory	097-521-8107	870-0278	1-8-28 Aosaki, Oita City
		17	Oita General Service Co.	097-523-1183	870-0106	2200 Oaza Tsurusaki, Oita City
		18	Oita Device Technology Co., Ltd.	097-588-1153	870-1203	1660 Oaza Notsuharu, Oita City
		19	Otsuka Diesel Co., Ltd.	097-558-9271	870-0901	1-1-32 Nishi Shinchi, Oita City
		20	ODDS/Oita Device Design Support	097-543-3293	870-0874	3-4-3 Nijigaoka, Oita City
		21	Kamimaru Co., Ltd., Kyushu Offices	097-522-2540	870-0278	1-12-14 Aosaki, Oita City
		22	Kawanodenki Corporation	097-544-3131	870-0816	8-33 Tamuro Machi, Oita City
		23	Kansetsu Co., Oita Offices	097-524-2121	870-0263	1-7-23 Yokota, Oita City
		24	Kyushu Yozai Co.	097-527-4031	870-0112	In the Oita Refinery Grounds, 1-1 Ichinosu, Oita City
		25	Kuritec Service Co., Oita Offices	097-521-7925	870-0278	1-5-24 Aosaki, Oita City
		26	Krone Co., Ltd.	097-521-2988	870-0133	686-1 Katsuragi, Oita City
		27	Copan Co., Ltd.	097-504-3397	870-0142	1-5-5 Mitugawa Shimo, Oita City
		28	Sard Electron Co. Ltd.	097-555-9792	870-0955	5-12-12 Shimogori Minami, Oita City
		29	Zynas Corporation	097-540-6650	870-0036	11-22 Kotobuki Machi, Oita City
		30	Shell Electronics Co., Ltd.	097-528-8826	870-0278	1-12-18 Aosaki, Oita City
		31	Suzuki Co., Ltd.	097-520-1414	870-0124	818-1 Oaza Kei, Oita City
		32	Sumika Chemical Analysis Service, Ltd. Business Headquarters, Oita Business Division	097-523-1181	870-0106	2200 Oaza Tsurusaki, Oita City
		33	Threedyne Corporation, Oita Service Center	097-574-4115	870-0125	8205-5 Oaza Matsuoka, Oita City
		34	Daiso Co.	097-568-5220	870-0943	2995-5 Oaza Katashima, Oita City
		35	Takaki Tools & Materials Co., Ltd.	097-569-3115	870-0941	3113-7 Oaza Shimogori, Oita City
		36	Tani Kogyo Co., Ltd.	097-528-8220	870-0278	1-14-23 Aosaki, Oita City
		37	TEC Engineering Corporation	097-593-4777	870-0316	1212-150 Oaza Ichigi, Oita City
		38	Toshiba Information Systems Technology, Inc.	097-524-6161	870-0197	Toshiba Oita Factory, 3500 Oaza Matsuoka, Oita City
		39	Toshiba Semiconductor & Storage Products Company	097-524-6002	870-0197	3500 Oaza Matsuoka, Oita City
		40	Tobu Kaihatsu Co., Ltd.	097-522-3111	870-0272	658-1 Oaza Sakomaru Yama, Oita City
		41	Todaka Corp.	097-521-1379	870-0278	1-3-21 Aosaki, Oita City
		42	Nittetsu Oita Techno Support Co., Ltd.	097-553-3119	870-0902	1 Oaza Nishinosu, Oita City
		43	Nippon Express, Oita Airport Branch	097-536-6043	870-0018	1-2-5 Toyomi, Oita City
		44	Micronics Japan Co., Ltd., Oita Technology Laboratory	097-596-7220	870-1117	2-5-1 Takae Nishi, Oita City
		45	Neos Company Limited, Oita Precision Workshop	097-527-3500	870-0278	1-6-10 Aosaki, Oita City
		46	Network Co., Ltd.	097-551-8500	870-0912	Sakura Bldg. 3F, 6-15 Haru Shinmachi, Oita City
		47	Britec Co., Ltd.	097-558-1125	870-0903	1-2-6 Mukaibaru Nishi, Oita City
		48	Pleson LLC	090-3192-4402	870-0027	United Suehiro Bldg 3F, 1-5-16 Suehiro Machi, Oita City
		49	Horiba Techno Service Co., Ltd., Oita Service Station	097-551-3982	870-0921	Tsuruha Bldg. 1F, 2-2-37 Hagiwara, Oita City
		50	Mobile Create Co., Ltd.	097-514-3720	870-0804	No. 4, Miyuki Machi, Oita City
		51	U.S.I Corp., Oita Offices	097-558-3181	870-0933	2-19 Hanazuru, Oita City
		52	YAC Co., Ltd., Photovoltaics Division (Oita Factory)	097-588-1333	870-1204	543-3 Tsujiharu, Oita City
❷	Beppu City	53	Kyushu Partner's Inc.	0977-21-9817	874-0839	2-1 Souen Cho, Beppu City
❸	Nakatsu City	54	Shimada Electronics Works Co., Ltd.	0979-32-5210	871-0152	512 Kaku, Nakatsu City
		55	Shinyei Technology Co., Ltd., Oita Factory	0979-84-8088	871-0101	311-10 Sanko Moriyama, Nakatsu City
		56	T-Plan Inc.	0979-53-8880	871-0015	362-1 Ushigami, Nakatsu City
		57	Renesas Semiconductor Kyushu Yamaguchi Co., Ltd., Oita Factory	0979-32-7111	879-0111	4200 Itouda, Nakatsu City
❹	Hita City	58	TDK Corporation, Mikumagawa Factory	0973-24-1111	877-0061	3-793-1 Ishii Machi, Hita City
❺	Saiki City	59	Asahi Plastic Kogyo Co., Ltd.	0972-23-7311	876-0823	10356-2 Mejima, Saiki City
		60	Koutec Co., Ltd.	0972-22-5678	876-0823	10833-186 Mejima-ku, Saiki City
		61	Nagao Seisakusho Co., Ltd.	0972-25-1200	876-1512	2134-24 Oaza Katata, Saiki City
❻	Usuki City	62	J-Devices Corporation	03-3437-2800	875-0053	1913-2 Oaza Fukura, Usuki City
❼	Kitsuki City	63	Daihen Technology Institute	0978-63-4567	873-0025	1660-7 Oaza Mizoi, Kitsuki City
		64	Takaki-Giken Co., Ltd.	0978-63-6420	873-0013	1680 Azasakai no Tsubo, Oaza Hino, Kitsuki City
❽	Usa City	65	Higashi Kyushu Electric Industry Co.	0978-33-3533	879-0308	2019 Oaza Shimotakei, Usa City
		66	World Precision Tooling Inc.	0978-37-0287	879-0453	1544-2 Oaza Ueda, Usa City
❾	Yufu City	67	AK System Co., Ltd.	097-582-3311	879-5413	1474 Otatsu, Shonai Cho, Yufu City
		68	Denken Co., Ltd.	097-583-5535	879-5513	97-1 Oaza Takazaki, Hasama Machi, Yufu City
❿	Kunisaki City	69	Sony Semiconductor Kyushu Corporation, Oita Technology Center	0978-72-5730	873-0511	3319-2 Oaza Owara, Kunisaki Machi, Kunisaki City
		70	USC Corporation, Oita QI Center	0978-64-8121	873-0412	240 Furuichi, Musashi Machi, Kunisaki City
⓫	Hiji Town	71	Add Technology	0977-72-9427	879-1504	9265-1 Oga, Hiji Machi, Hayami-gun
		72	AK Electronics Co., Ltd.	0977-72-0042	879-1502	1237 Oaza Fujiwara, Hiji Machi, Hayami-gun
		73	Mentor Analog Plus, Ltd	0977-73-0032	879-1502	2497-3 Oaza Fujiwara, Hiji Machi, Hayami-gun
		74	ELIA Co., Ltd..	0977-73-2485	879-1507	799-1 Oaza Toyo-oka Oaza Iwagaki, Hiji Machi, Hayami-gun
		75	Oita Denshi Co., Ltd.	0977-72-3477	879-1507	867 Oaza Toyo-oka, Hiji Machi, Hayami-gun
		76	Ohkawa Mould Designs & Engineering Co., Ltd.	0977-72-2845	879-1504	32-2 Oaza Oga, Hiji Machi, Hayami-gun
		77	Kyushu Semiconductor KAW Co., Ltd.	0977-72-1342	879-1505	15-10 Kawasaki, Hiji Machi, Hayami-gun
		78	KSK Co., Ltd.	0977-72-8330	879-1505	4321-1 Oaza Kawasaki, Hiji Machi, Hayami-gun
		79	CLI Co., Ltd.	0977-75-6454	879-1502	1910-21 Oaza Fujiwara, Hiji Machi, Hayami-gun
		80	Texas Instruments Japan Limited, Hiji Plant	0977-73-1528	879-1505	4260 Oaza Kawasaki, Hiji Machi, Hayami-gun
		81	Hiji High-Tech Co., Ltd.	0977-44-6300	879-1504	8133 Oaza Oga, Hiji Machi, Hayami-gun
		82	Fukumiya Denshi Co., Ltd.	0977-72-1144	879-1507	1154-1 Oaza Toyo-oka, Hiji Machi, Hayami-gun
		83	HOKS Co.	0977-72-6661	879-1504	9748-6 Oaza Oga, Hiji Machi, Hayami-gun
⓬	Kusu Town	84	KCHK Spring Industry Co., Ltd.	0973-72-2465	879-4521	500-1 Oaza Ota, Kusu Machi, Kusu-gun
		85	Fujita Chemical Industry Co., Ltd.	0973-73-8211	879-4331	6509-4 Oaza Tobata, Kusu Machi, Kusu-gun

Oita Prefecture Semiconductor Affiliated Company Technology Map

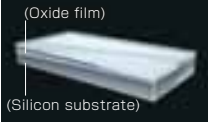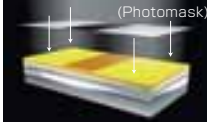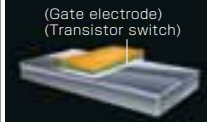| Process Category			No. of Companies	Company (Technological Expertise)				
A Semiconductor Manufacture	Design (Device/Package)		5	**13** STK Technology (Logic design)	**68** Denken (Substrate package (LGA/BGA, etc.), plastic package (QFP, etc.))	**73** Mentor Analog Plus (Analog/DA circuit design, layout design)	**79** CLI (Power source control IC planning, circuit design, customer support)	**81** Hiji High-Tech (Semiconductor circuit design)
	Manufacture	Front-end	2	**39** Toshiba Semiconductor & Storage Products Company, Oita Factory (System LSI,Image sensor fabrication)	**80** Texas Instruments Japan (High-voltage, high speed BiCMOS, SiN, HiPOX, SOI wafer processing, etc.)			
		Back-end (Overall)	11	**13** STK Technology (Package Molds, TF commissions)	**18** Oita Device Technology (DB/WB/MD/PO processing, ceramic/specialty packaging, general-purpose IC assembly)	**54** Shimada Electronics Works (Die bonding, wire bonding, molding)	**57** Renesas Semiconductor Kyushu Yamaguchi (Full QFP,SIP line from dicing to shipping, high-precision loop management)	**62** J-Devices (Lead packaging /BGA assembly, taping (various))
				77 Kyushu Semiconductor KAW (Dicing, die bonding, wire bonding, molding)	**68** Denken (Substrate package (LGA/BGA, etc.), plastic package (QFP, etc.))	**69** Sony Semiconductor Kyushu Corporation (LSI packaging, SiP assembly manufacture)	**75** Oita Denshi (logic LSI back-end processing/assembly processing)	**80** Texas Instruments Japan (Backgrinding, dicing, die bonding, Low-k wire bonding, molding, etc..)
				81 Hiji High-Tech (Dicing, die bonding, wire bonding, molding, etc.)				
		Back-end (Component-specific)	5	**13** STK Technology (Visual inspection, taping, packing operations commissions)	**30** Shell Electronics (BGA repair and ball soldering)	**64** Takaki-Giken (SOP, QFP, BGA, etc. taping, packaging dehumidification, microscope visual inspection, BGA substrate machine-assisted visual inspection)	**65** Higashi Kyushu Electric Industry (leadframe plating, TF and marking process)	**72** AK Electronics (IC chip cutting, visual inspection for sorting, taping)
	Evaluation (Testing)	Wafer Test	5	**13** STK Technology (Full-process contracting from production program development and manufacture to evaluation analysis, wafer testing commissions, test engineering services)	**39** Toshiba Semiconductor & Storage Products Company, Oita Factory (LSI wafer high-speed testing)	**62** J-Devices (Various kinds of wafer testing)	**77** Kyushu Semiconductor KAW (Wafer electrical property testing)	**80** Texas Instruments Japan (Technology for automation of networked production data)
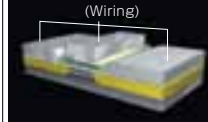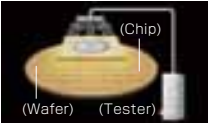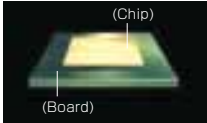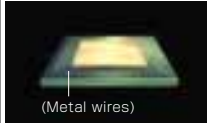
Process Category			No. of Companies	Company (Technological Expertise)				
A Semiconductor Manufacture	Evaluation (Testing)	Final Testing	12	**13** STK Technology (Full-process contracting from production program development and manufacture to evaluation analysis, final testing commissions, test engineering services)	**18** Oita Device Technology (marking/TF/testing/visual inspection/burn-in/taping)	**35** Takaki Tools & Materials (ball inspection, visual inspection)	**57** Renesas Semiconductor Kyushu Yamaguchi (High-speed multi-function measurement technology, capacity for small-batch manufacture of diverse products)	**54** Shimada Electronics Works (Specialized characterization testing for light sensors, etc.)
				62 J-Devices (lead packaging /BGA/WLCSP testing)	**77** Kyushu Semiconductor KAW (Electrical property testing (packaging))	**68** Denken (Logic testing)	**74** ELIA (Testing specification design, program and board development)	**75** Oita Denshi (Logic LSI final testing, 8-piece parallel testing)
				80 Texas Instruments Japan (Testing machinery maintenance and repair technology)	**81** Hiji High-Tech (Program development, characteristics evaluation, mass-production testing, etc.)			
	Analysis		13	**13** STK Technology (Trial production, mass production analysis, other analysis)	**18** Oita Device Technology (X-ray nondestructive inspection/SEM examination)	**32** Sumika Chemical Analysis Service (Morphological examination, surface analysis, clean room efficacy evaluation, chemical impurity analysis)	**38** Toshiba Information Systems Technology (Wafer yield improvement analysis, wafer defect location analysis)	**39** Toshiba Semiconductor & Storage Products Company, Oita Factory (Possesses various evaluation and analytical technologies)
				42 Nittetsu Oita Techno Support (Defect analysis, contamination analysis, topography analysis, particle analysis)	**62** J-Devices (Possesses various general purpose analytical equipment such as a SAM and a SEM)	**68** Denken (X-ray, SAT, SEM, EDX, decap, V/I, deprocessing, EMMI, OBIRCH, Xsection, liquid crystals, laser displacement metering, repackaging, temperature property evaluation, BGA ball restoration, etc.)	**70** USC Corporation, Oita QI Center (package opening, chemical analysis, examination)	**73** Mentor Analog Plus (Circuit design evaluation analysis)
				74 ELIA (Testing specification design, evaluation board development and testing, evaluation reporting)	**80** Texas Instruments Japan (Evaluation of the mechanical and thermal properties of IC packaging through computer simulation)	**81** Hiji High-Tech (Semiconductor measurement systems)		
	Reliability Testing		7	**13** STK Technology (Burn-in commissions, test program development and evaluation)	**18** Oita Device Technology (Temperature cycle test(TCT)/Pressure cooker test (PCT))	**32** Sumika Chemical Analysis Service (Environmental testing, nondestructive inspection, package opening, electrical testing)	**39** Toshiba Semiconductor & Storage Products Company, Oita Factory (Possesses various reliability testing facilities)	**68** Denken (Environmental testing, solder thermal resistance evaluation, board mounting evaluation, ESD-MM/HBM/CDM evaluation, latchup evaluation, burn-in, etc.)
				80 Texas Instruments Japan (IC packaging environmental testing technology)	**81** Hiji High-Tech (Semiconductor testing systems)			
	Human Resources/Contracting		7	**8** Willtec Kyushu (Contracting of semiconductor manufacture front-end, testing, and shipping processes)	**26** Krone (Semiconductor machinery assembly, liquid crystal testing machinery assembly, miscellaneous machinery assembly, piping, and wiring)	**27** Copan (Human resources support to each factory)	**53** Kyushu Partner's (Manufacturing and defect analysis, quality assurance, contracting and dispatch for manufacturing machinery assembly)	**56** T·Plan (Introduction and dispatch of specialized technicians)
				68 Denken (Specialized dispatch (analysts, reliability testers), contracting (analysis, reliability evaluation), and other services)	**71** Add Technology (Comprehensive work contracting for semiconductor electronic circuit design, evaluation, and analysis)			

Process Category			No. of Companies	Company (Technological Expertise)				
B Technologies Related to Semiconductor Manufacture	Material Manufacture	Direct Materials (Leadframes, etc.)	1	**16** NYS Precision (Leadframe (downset cutting, visual inspection))				
		Indirect Materials (Gases, solutions, tape, packing, etc.)	6	**9** Ueki Corporation (Gases, related instruments, metal materials)	**24** Kyushu Yozai (Petrochemical solvent manufacture and sales)	**35** Takaki Tools & Materials (Carrier tape molding)	**58** TDK (Applicable films such as clear conductive films)	**59** Asahi Plastic Kogyo (Plastic irregular extrusion shape forming, shipping tubes for semiconductors packages and electronic components, general plastic extrusion manufacture)
				84 KCHK Spring Industry (Metal fabrication)				
	Machine Manufacture	Front-end	2	**5** Ulvac Techno Kyushu (Comprehensive vacuum technology, semiconductor manufacturing instruments, vacuum device manufacture)	**12** Threedyne (Semiconductor wafer cleaning machines)			
	Machine Manufacture	Back-end	3	**6** Ishii Tool & Engineering (Soft pressing equipped lead processing machines (TF), laser marking, handlers, etc.)	**35** Takaki Tools & Materials (Taping machines, visual inspection machines, laser marking machines, general machinery)	**76** Ohkawa Mould Designs & Engineering (Machines for visual inspection using 3-D image processing)		
		Evaluation Process (Testers, probers, handlers)	5	**13** STK Technology (Burn-in testers, IC handling machines)	**30** Shell Electronics (IC chip visual inspection machines)	**35** Takaki Tools & Materials (Handling machines, semiconductor inspection machines)	**41** Todaka (Taping machines, visual inspection machines, laser marking machines, general machinery)	**68** Denken (OS testers, IC handlers, LD testers, DC testers, visual inspection machines, etc.)
		Misc. Machines	10	**15** Eto Manufacturing (Design and manufacture of mechatronics instruments, precision inspection instruments, etc.)	**23** Kansetsu (Designing semiconductor manufacture machines (especially cleaning machines))	**30** Shell Electronics (Clean booth manufacture)	**33** Threedyne (Semiconductor manufacture related equipment)	**35** Takaki Tools & Materials (Customized development)
				36 Tani Kogyo (Environmental related equipment, machine development, design, and construction)	**41** Todaka (Handling machine special order manufacture)	**51** U.S.I (Measurement systems development and manufacture)	**63** Daihen Technology Institute (Design and assembly of automated machinery and automatic particle free transport machines)	**67** AK System (Commission production of air conditioning related machines, automatic transport machines, labor saving machines, etc.)
	Parts/Tools Manufacture	Tools (Probe cards, etc.)	11	**4** Aberuf (Probe cards, performance board design, high-reliability sockets)	**13** STK Technology (Burn-in board design and production, change kit design and manufacture)	**27** Copan (Tools, labor saving instrument semiconductors)	**35** Takaki Tools & Materials (Burn-in boards, inserter/extractor machines)	**41** Todaka (Tools design and development)
				44 Micronics Japan (Probe card manufacture, probe card inspection machines, wafer prober, sockets)	**66** World Precision Tooling (Electrode manufacture and sales)	**68** Denken (Burn-in boards, Manual measurement tool development, etc.)	**70** USC Corporation, Oita QI Center (Aging boards, metal molds)	**74** ELIA (Development of general testing boards, measurement sockets, and tools)
				81 Hiji High-Tech (Development of performance boards and manual measurement tools)				
		Machine Parts	10	**1** Agawa Mekki (Wet electroplating, non-ferrous metal surface processing)	**2** Adachi Chemical Plants (Welding, piping, and can manufacturing technologies)	**13** STK Technology (Precision sheet metal work, machining)	**21** Kamimaru (Gas supply machine design and manufacture, gas piping manufacture)	**35** Takaki Tools & Materials (Planning, processing, and surfacing of parts, precision sheet metal work, machine frames, etc.)
				37 TEC Engineering (Comprehensive gas supply equipment)	**44** Micronics Japan (Metallic rod processing including W, Re-W, and Be-Cu, ceramic plate thin film lamination, sockets)	**61** Nagao Seisakusho (Precision sheet metal work)	**76** Ohkawa Mould Designs & Engineering (Plastic molded parts manufacture for semiconductors)	**85** Fujita Chemical Industry (Precision plastic molding)
		Metal Mold Manufacture	4	**6** Ishii Tool & Engineering (Precision metal molding)	**66** World Precision Tooling (Metal molding precision parts)	**76** Ohkawa Mould Designs & Engineering (Metal mold design and manufacture)	**78** KSK (Metal mold parts manufacture for TF machines (Lead pitch with precision of 0.3, ± 0.001 mm))	

Process Category			No. of Companies	Company (Technological Expertise)				
B Technologies Related to Semiconductor Manufacture	Analysis		2	**42** Nittetsu Oita Techno Support (High temperature/low temperature tensile testing, fatigue testing, wear testing, chemical analysis, surface formation measurement)	**32** Sumika Chemical Analysis Service (Formation examination, surface analysis, clean room efficacy evaluation, chemical impurity analysis)			
	Reliability		3	**32** Sumika Chemical Analysis Service (Environmental testing, nondestructive inspection, package opening, electrical testing)	**35** Takaki Tools & Materials (Capable of micron-level accurate parts management)	**70** USC Corporation, Oita QI Center (Reliability testing and environmental testing (high/low temperature, high/low humidity, temperature cycling, etc.), mechanical strength testing (vibration, shock, dropping))		
	Maintenance	Manufacture Machinery Cleaning	5	**16** NYS Precision (Precision cleaning of semiconductor manufacture machine parts)	**21** Kamimaru (Cleaning of semiconductor manufacture machine parts)	**25** Kuritec Service (Precision cleaning of semiconductor manufacture machine parts)	**45** Neos (Precision cleaning of manufacture machine internal parts (dust reduction in vacuum chamber techniques))	**65** Higashi Kyushu Electric Industry (Burn-in board and socket cleaning, burn-in board inspection and repair, cleaning of tray magazines, etc.)
		Misc.	5	**5** Ulvac Techno Kyushu (Comprehensive vacuum technology, semiconductor device manufacture machine maintenance, vacuum instrument maintenance)	**17** Oita General Service (Precision cleaning of clean suits, IC trays, etc.)	**33** Threedyne (Contract maintenance for automated instruments)	**46** Network (Semiconductor related machine maintenance)	**49** Horiba Techno Service (Analytical instrument maintenance)
	Misc.		5	**16** NYS Precision (Semiconductor manufacture materials sales)	**31** Suzuki (Source and indirect materials supply firm)	**35** Takaki Tools & Materials (Procurement of processed resin products, specialized materials, etc.)	**48** Pleson (Comprehensive semiconductor manufacture machine implementation technologies)	**60** Koutec (Dry ice cleaning)
C Mounting (Board Set)	Board design and manufacture		4	**4** Aberuf (50 Ω impedance matching board design and manufacture)	**6** Ishii Tool & Engineering (Control board manufacture)	**12** S-Craft (High-speed transmission PCB design)	**30** Shell Electronics (PCB design)	
	Mounting		9	**4** Aberuf (Test board assembly)	**30** Shell Electronics (PCB mounting, lead-free compliant reflow machines installed)	**35** Takaki Tools & Materials (Burn-in boards, inserter/extractor machines)	**47** Britec (Probe card processing, PCB mounting)	**55** Shinyei Technology (SMT/RA/AX mounting, various assembly)
				68 DENKEN (Power modules, fingerprint sensors, AC adapters, etc.)	**69** Sony Semiconductor Kyushu (Semiconductor packaging)	**82** Fukumiya Denshi (Board mount and semiconductor machines assembly)	**83** HOKS (Lead-free compliance, SMT technology (BGA, CSP, 0.4 pitch QFP, 0603 chips))	
	Evaluation		4	**42** Nittetsu Oita Techno Support (Joint interface analysis, soldering evaluation, packaging opening and testing, destructive analysis, heat cycle testing)	**30** Shell Electronics (Electrical inspection after PCB mounting)	**68** DENKEN (CMOS sensors, power modules, fingerprint sensors, etc.)	**69** Sony Semiconductor Kyushu (Packaging product testing)	
	Reliability		1	**68** DENKEN (CMOS sensors, power modules, fingerprint sensors, etc.)				
D Software	Integration Systems		9	**7** InfoWave (Web systems design and development, image processing technologies)	**10** SS-Avenue (Evaluation programs)	**13** STK Technology (Communications integration systems)	**28** Sard Electron (Machine development (Wiring design, software development), control instrument development)	**29** Zynas (Embedding and control application development)
				50 Mobile Create (System design and development)	**68** DENKEN (H8, SH, etc. microcomputer hardware and software development)	**74** ELIA (Custom-designed system support)	**81** Hiji High-Tech (Embedded systems (hardware, software) development)	

Process Category		No. of Companies	Company (Technological Expertise)			
E Miscellaneous	LCD Display-related	3	**32** Sumika Chemical Analysis Service (Formation examination, surface analysis, clean room efficacy evaluation, chemical impurity analysis)	**44** Micronics Japan (Panel probing, automated alignment, contact technology, panel electrode cutting, image processing inspection technology)	**68** DENKEN (Aging machines, FC, etc.)	
	Solar Cell-related	2	**52** YAC (Solar cell-related machine development and manufacture)	**68** DENKEN (Solar cell inspection machine development and manufacture)		
	Recycling	2	**34** Daiso (Recycling an disposal, from planning to execution)	**40** Tobu Kaihatsu (Disassembly, industrial waste processing)		
	Semiconductor Manufacturing Machine Sales/ Representation	3	**3** Advantest (Memory device, SOC test machine, and test handler manufacture and sales)	**11** SMC (Manufacture and sales of temperature control products such as Thermo-chillers and Thermo-controllers, and air pressure driving devices)	**14** Espec Kyushu (Semiconductor manufacture machine sales, inspection and reliability evaluation machine sales)	
	Misc.	4	**19** Otsuka Diesel (Diesel engine and dynamo sales and maintenance)	**20** ODDS (Semiconductor technology literature writing, translation, and software development)	**22** Kawanodenki (Design and production of power distribution boards, panelboards, and control boards, etc.)	**43** Nippon Express (Logistics, liquid crystal/semiconductor manufacture machine transportation and installation)

Manufacturing Process

1 Oxidization

Wafers are placed in a high-temperature furnace while exposed to an oxidizing atmosphere to form an oxide film on the wafer's surface.

(Oxide film)

(Silicon substrate)

2 Thin Film Formation

Using the chemical vapor deposition (CVD) method, gases react chemically in CVD chamber to form a polycrystalline silicon film over the oxide film.

(Polycrystalline silicon film)

3 Photolithography

In photolithography, a photomask is used to form a resist pattern for circuits on the surface of the wafer.

(Photomask)

4 Dry Etching

Ions of reactive gases in a plasma state are shot in pulses at the wafer using electric field, etching along the resist pattern for aluminum film or other materials.

(Gate electrode)
(Transistor switch)

5 Ion implantation

Impurities are ionized in a vacuum and electromagnetically charged to energies of tens or hundreds of keV which are then implanted into the surface of the wafer.

6 Wiring

An aluminum "target" (source) is sputtered with inert gas plasma and deposited as a thin metallic film onto the wafer to form circuitry wiring.

(Wiring)

7 Wafer Testing

Each chip on the wafer is tested, viable chips are sorted from defective chips, and defective chips are marked in memory data

(Chip)

(Wafer) (Tester)

8 Dicing

Each chip is separated from the wafer using a diamond blade.

9 Mounting

The chip is mounted onto a specific location of board.

(Chip)

(Board)

10 Bonding

The chip is connected to the board using gold wires and other materials.

(Metal wires)

11 Molding

The chip is sealed in resin or other package materials.

12 Product Inspection

Tests are performed, such as electronic property inspection and visual inspection, and defective products are removed.

(Tester)

Contact

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