

# **SPEL Semiconductor Limited**

Chennai , India

## **Corporate Presentation**

1. About Us
2. OSAT Services
  - Turnkey Solutions & Value Added services
  - Package Portfolio
  - Bill of Material
  - Assembly & Test Capability
  - Road Map
  - Cost & Communication
3. Quality
4. Customers
5. Team
6. Logistics
7. Our USP
8. Contact

- First IC Assembly & Test facility in India
- IPO company listed in Bombay Stock Exchange (BSE), India
- Commenced commercial production in 1989
- ISO 9001, ISO 14001 & IATF (TS) 16949 Certified
- 100% Export Oriented – Tax incentives & Easy logistics
- Customer covering major application segments which includes Computing, Consumer electronics, Communication, Automotive, Aerospace & Industrial

## **Vision**

To be the *Natural Destination* for Global Customers  
Seeking Cost-Effective Offshore Turnkey  
IC Assembly & Test Services.

## **Mission**

SPEL Semiconductor Limited, an IC Assembly & Test Subcontractor for over 20 years, works as one Team to achieve Zero defect, Just-in-time, Cost-effective solutions with Service that is uncompromised.

SPEL's Partners → Customers, Suppliers, Employees & Shareholders, are confident in the knowledge that we are consistently meeting and exceeding their expectations.

## Values

1. Business Ethics - defines us as a company
2. Professionalism - defines us as individuals
3. Citizenship - defines our contribution to society

## Corporate Objectives

1. Profit - earnings that enable achieving our other 4 objectives
2. Client satisfaction
3. Competence
4. Employee satisfaction
5. Growth





SPEL®

**SPEL Quality Policy**  
Consistently provide products and services that will exceed the quality expectations of our customers.  
Implement process improvement programs which will enable each Employee to do their job  
**RIGHT THE FIRST TIME.**  
Work towards continual quality improvement through training and teamwork.

## Full Turnkey Solutions

- Wafer sort
- Assembly
- Testing & Packing

## Value Added Services

### 1. Design :

- Package design
- Lead frame design

### 2. Assembly :

- Tin / Lead plating
- Open Cavity Packaging
- Die level Tape and reel process

### 3. Others :

- Failure analysis & Reliability testing
- Test Program Development & Product Characterization
- Drop shipments across the globe

<b>QFN Capability</b>		Process	Package Thickness	Body Size in mm	Lead-Pitch	Lead-Count
		Saw Singulated QFN / DFN	0.40 mm 0.50 mm 0.75 mm 0.90 mm	0.6 x 1 to 12 x 12	0.40 mm 0.50 mm 0.65 mm	4 ~ 100 pins

<b>Leaded</b>	<b>PACKAGE</b>	150 MIL ; 300 MIL SOIC	<b>LEAD COUNT</b>	7/8/14/16; 16/20	<b>JEDEC STANDARD</b>	MS-012 ; MS-013
		150 MIL QSOP ; VSOP		16/20/24/28; 40/48		MS-137 ; MS-154
		173; 240 MIL TSSOP		8/20/24/38; 48/56/64		MO-153
		300 MIL SSOP		48/56		MO-118
		150 MIL MILLIPAQ		80		MO-154
		300 MIL PDIP		8/14/16		MS-001
		225 MIL SIP		8		NA

<b>Test Platforms</b>		TEST PLATFORM	Credence ASL 1000	Eagle ETS 364 / 88	Verigy V50
		DIGITAL			
		MIXED SIGNAL			
		ANALOG			

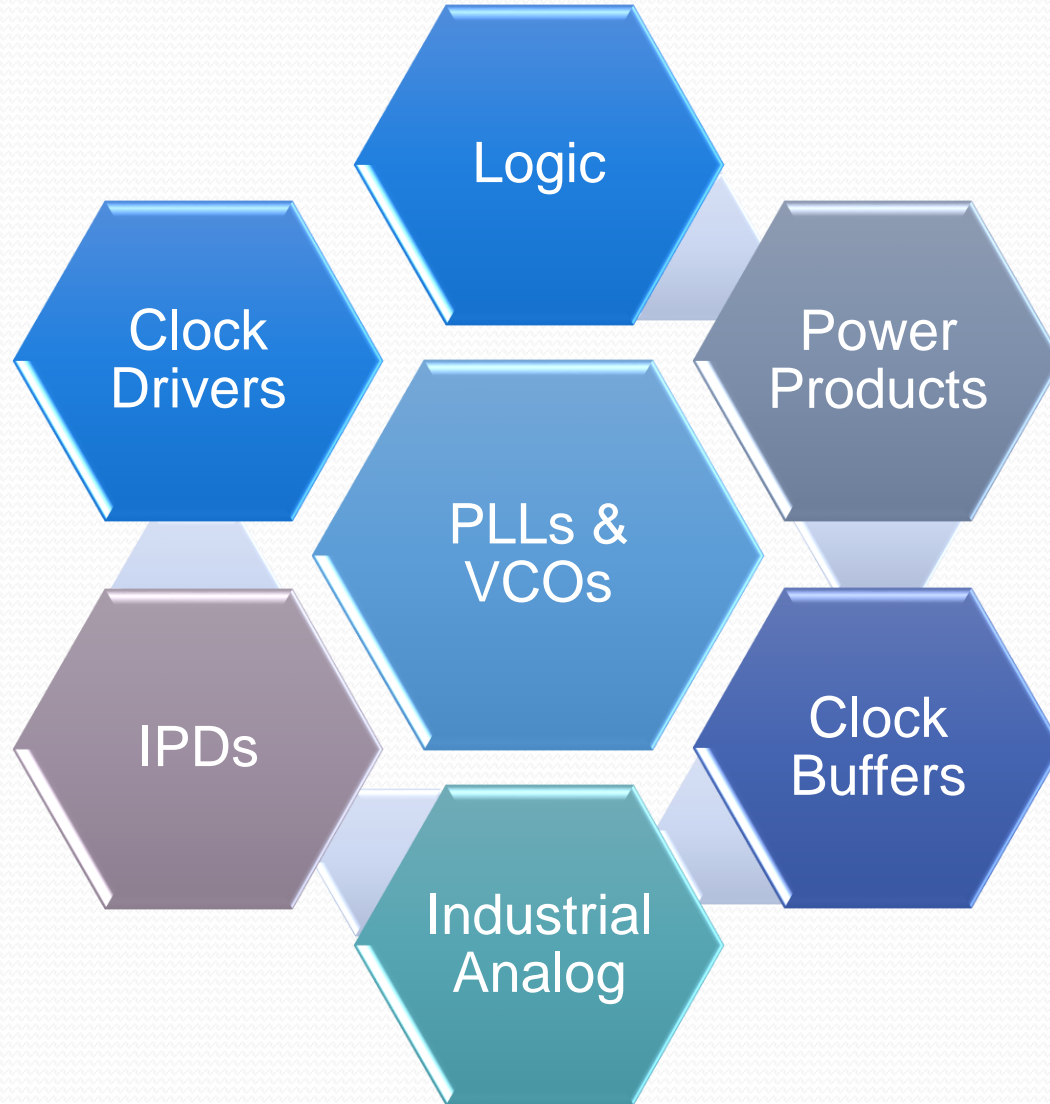


Material	Leaded / QFN / DFN	Supplier
Lead frame	C7025, C151, Olin 194, EFTECH & NiPdAu Pre-plated	ASM (China), DCI (Malaysia), QPL (HK), NKQ (China), Fullriver (China)
Die Attach Epoxy	CRM1076NS	Sumitomo (Singapore)
Screen print Epoxy	Non Conductive 8006 Conductive 8008	Henkel (Korea)
Gold Wire	0.8 to 2.0 mil	Tanaka, Heraeus (Singapore)
Copper Wire	0.8 to 2.0 mil	Tanaka (Singapore), Heraeus (Malaysia)
Mold Compound	G600, G633 & G770HCD CEL 8240 & CEL 9220	Sumitomo (Singapore) Hitachi (Malaysia)

- Minimum die size : 10 Mils square
- 12" wafer assembly capability
- Epoxy screen print capability
- Copper wire bonding (Bare Cu & Pd Coated) – 0.8 mil to 2.0 mil
- Bond Pad Pitch : 40 microns
- Low loop bonding : 4 mils
- Ultra Thin packages : 0.4mm
- Wafer mapping at Die Attach
- Multi-die package assembly
- Multi-site Test capability

Package Category	Capacity / Month (Mln Units)	Remarks
Leaded	15	Twenty Lead Equivalent
QFN / DFN	35	Three MM Equivalent

- 32% of the Total Capacity is available for Copper Bonding





Sl. #	Equipment	Manufacturer	Model
1	Testers	Verigy Teradyne Credence MCT	V50 ETS364/ETS88 ASL1000 2010, 2020
2	Handlers	Micro Comp Tech Micro Handling Corp Tesec Mapper & Picker Muehlbaeur Picker Multitest SRM	MCT 3608E, 5105 MH 240, 245 3270-IH & 3572-PK DS8000 8704, 9710 & 9928 XD248, XD244
3	Wafer Prober	Electroglas	EG 2001X / 4080X

SI #	Reliability Test	Test Specifications	Jedec Standard
1	Burn-in Test	125°C, 1000 Hrs	JESD22-A108
2	Unbiased Temperature & Humidity	85°C, 85% RH, 1000 Hrs	JESD22-A101
3	Temperature Cycling Test	-65°C to 150°C, 500 cycles	JESD22-A104
4	High Temperature Storage Life Test	150°C, 1000 Hrs	JESD22-A103
5	Unbiased HAST (UHAST)	130°C , 85% RH, 96 Hrs	JESD22-A118
6	Autoclave Test	100% RH, 121°C, 96 Hrs	JESD22-A102
7	Preconditioning & MSL Tests	-	JESD22-A113 & JESD-020
8	Drop Test	-	JESD22-B111

SI #	Reliability Equipment	Manufacturer
1	Burn-in	Blue-M, USA
2	Temperature & Humidity	Blue-M, USA
3	Temperature Cycler	ESPEC, Japan
4	Dry Heat (Class 100) Oven	Lab line, USA
5	HAST	Hirayama, Japan
6	Autoclave	Hirayama, Japan
7	Solder Pot	HMP, USA
8	Reflow Oven	Heller, USA
9	Drop Test	Avex, USA

SI #	Equipment	Manufacturer
1	LCR Meter	HP, USA
2	Data Acquisition Unit	HP, USA
3	RF MUX	HP, USA
4	40 Channel MUX	HP, USA
5	V/I Source Meter	Keithley, USA
6	Oscilloscope	Keithley, USA
7	Pulse Generator	HP, Singapore
8	Real Time X-Ray	Phoenix, USA
9	De-Capping	Nisene, USA
10	C-Sam	Sonix, USA





**Site Area**  
**Built Up Area**

**856,550 Sq Ft**  
**92,191 Sq Ft**



- 300+ Employees
- Daily production capacity of 1.0Mln units of QFN's and leaded packages
- Copper wire package capacity – 26% scalable to double in 6 weeks time
- **100% Power back up**





# Package Roadmap

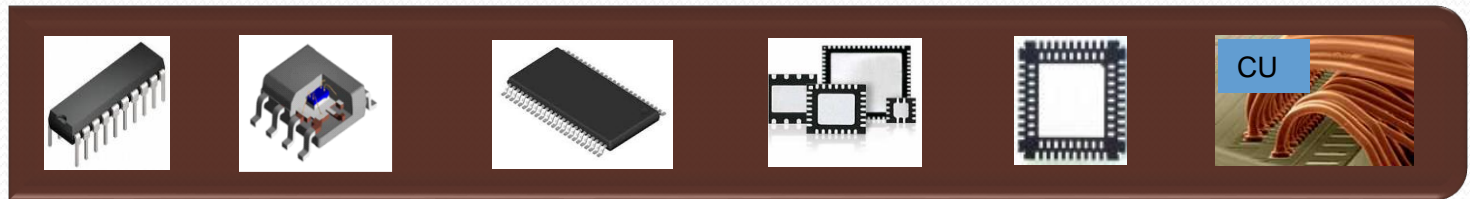
Planned  
"2020-22"



WLCSP

BGA

Existing



Leaded Package

QFN / DFN

## Packaging Cost

- Substantial Cost Savings
- Low Cost for new package development in QFN / DFN
- Attractive amortization proposals for new package tooling

## Test Cost

- Low Development Charges – Onsite or Offshore
- Low Production Costs
- Attractive pricing for the consigned testers



- English is the standard Business Language
- Ease of Communicating, you can reach us 24/7
- Dedicated Account Engineers for every Customer
- Quick Response with complete solutions

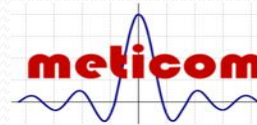
Consistently provide products and services that will exceed the quality expectations of our Customers.

Implement process improvement programs which will enable each Employee to do their job

**Right the first time.**

Work towards continual quality improvement through training and teamwork.

- Quality methodologies are guided by International standards
- Quality endeavour is to deliver best in high-class, defect-free solutions and services
- Standardizing development activities to align with Customers requirements
- Process robustness are built through ISO 9001:2008 standards accreditation
- Zero Customer Return
- Continuous Improvements through Industry Benchmarking
- Effectively Implement PPAP, APQP, MSA, SPC & FMEA to ensure Outgoing Product Quality



## End Customers



## Customers

ON Semiconductor®



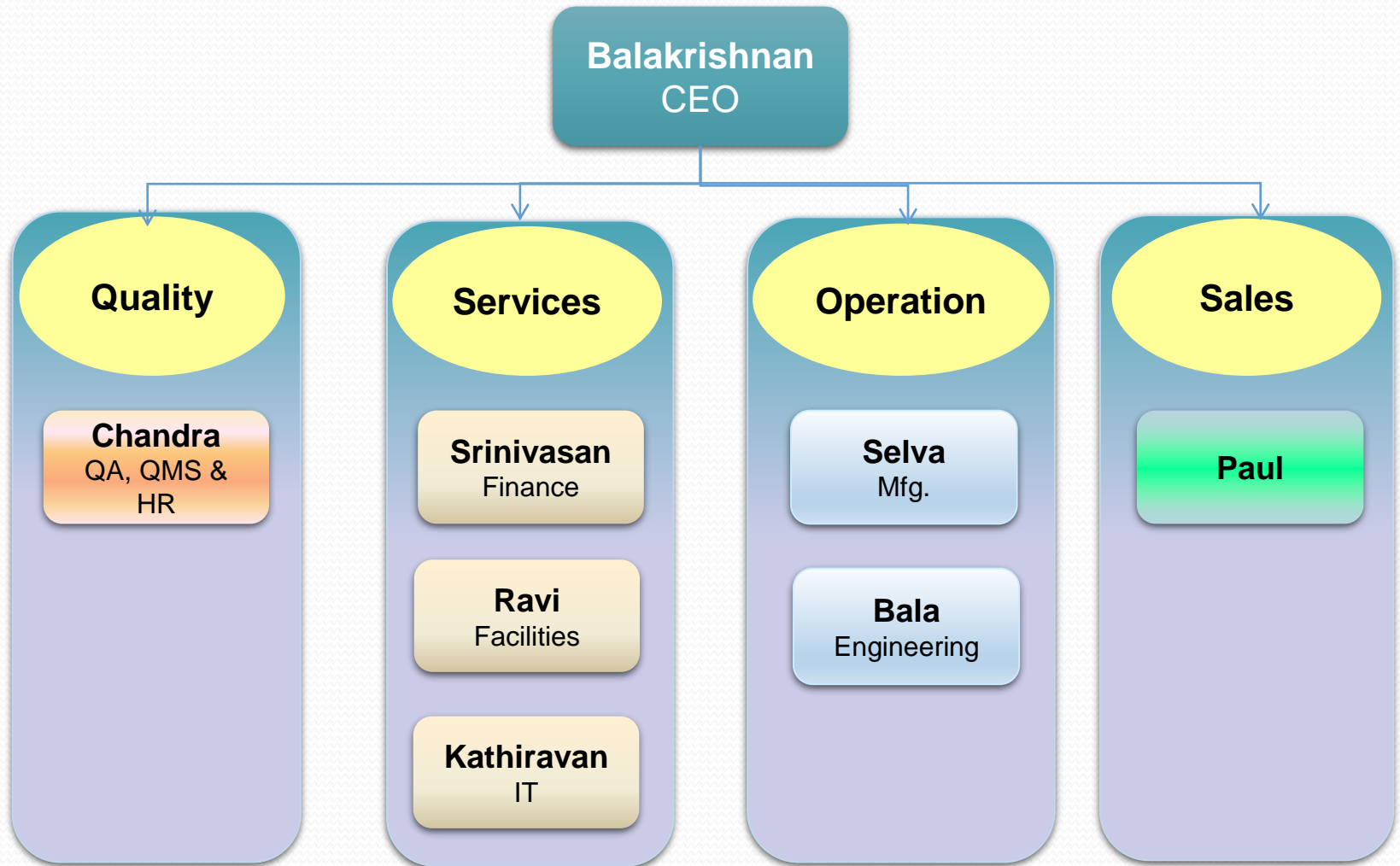


- Technically qualified operators & technicians
- Skilled engineers & experienced Management
- Low attrition rate (< 6%). Developed second-in-line in all functions starting from Supervisor level
- Strong engineering database ensures that any attrition will not affect any process
- Over 40% of the employees have over 15 years of service with SPEL
- Low direct labor cost & management provides various Employee welfare schemes as a motivational activity through Employee Welfare Committee
- Training cell providing comprehensive training (including soft skill & Customer focus) to all level at regular interval & conducts test to ensure the capability
- Talent pool available from Local universities with electronics/semiconductor background

- One Stop Turnkey Destination :
  - Probe → B/G → Assembly → Test → T&R → Drop shipment*
- Turnaround time
  - Assembly 5 days with Linear Loading
  - Testing : 2 days
  - Fast Track Assembly in 2 days with Premium Charge
- Factory Schedule : 24 x 7
- Drop Ship to End-Customers
- Daily Direct Flights to US, Europe & Asia Pacific :
  - 2days Transit (Inbound / Outbound)
- STAR eWIP - an online Semiconductor Tracking And Resourcing Software for regular Customer WIP update



- SPEL is awarded AEO (Authorized Economic Operator) Certificate by Central Board of Excise & Customs
  - ✓ Green Channel Status for Imports & Exports
  - ✓ Zero Customs Duty & No Open Inspection
- Our Own Custom clearance office in Airport premises
- Clearance within 6 Working hrs.
- Easy Equipment Consignment In & Out of factory
- Certified as Star Export house by Ministry of Commerce & Industry, Govt. of India
- Accredited Client Programme (ACP) status from Board of Excise & Customs enables faster clearance





- Adding few more QFN packages with minimum sizes
- Qualified for Silver bonding
- Packaged die to die bonding & PCB bonding for domestic Customers
- Working on Ceramic packages (Open cavity) for our Customers
- Pursuing to acquire assembly houses for BGA & WLCSP packages
- Increasing Cu volume to 32% and plan to improve further

- Excellent Value proposition
- Low cost Turnkey services
  - ✓ Provides one stop solution for all QFN & Leaded packages
- Excellent Customer service
  - ✓ Dedicated Customer account engineers. Interacting on daily basis with Customers in real time basis. No need of any resident engineer for any of the Customer
- Package Portfolio covering major application segments
  - ✓ Has test platforms for all products
- New package development and prototype assembly
  - ✓ Has talented team to provide solutions
- Test engineering support
  - ✓ Developing test programs for all needs
- On-Time delivery
- Potential market growth in India
  - ✓ Govt's policy initiations, Incentive schemes, Encouraging indigenous manufacturing, Consumer consumptions growth etc.

	Singapore	USA	Germany	India
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	069533	CA 95054	D-85551	603209
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Thank  
You