SEMICON®

EMS PCBA

PCB Advanced Testing and Inspection Solutions

- 3D AOI-SPI with AI
- X-Ray Inspection
- Ionic Contamination Testing
- Flying Probe Testing (FPT)
- In-Circuit (ICT) Adapters
- Functional Testers (FCT)
- JTAG Boundary Scan Testing

SEMICON®
EMS PCBA

Who we are, what we do

over 35
years of experience

135+
employees

4
localizations

4000 sqm
production area

IPC® Member

Semicon Sp. z o.o. is a family-owned, innovative company operating in electronics, photonics, aerospace, defence and other high-tech industries.

Semicon has been operating on the electronics market for more than three decades. Our team consists of 135 professionals, working in four locations, with a total area of about 4000 square meters, offers you a number of services and a rich portfolio of products from globally renowned manufacturers.

We specialise in providing the highest quality assembly services for complex electronic systems in all business and industrial sectors. With an extensive range, including materials and components for electronics, services for electronics and testing products, we can turn your ideas and requirements into highly advanced electronics solutions that are custom-made to your specifications.

In addition to our core automatic optical control of PCBA, we offer a wide range of complementary testing services to ensure that your electronic products meet the highest quality standards. We leave nothing to chance.

We are a member of the IPC organization and our production team is certified as trainers, experts and specialists of IPC standards.

Our comprehensive approach to testing and inspection ensures a seamless and efficient production process from start to finish.

Each of advance testing services and inspection solution is also offered separately.

Certificates

Semicon has implemented and maintain the Integrated Quality Management System, confirmed by the following certificates:

ISO 9001:2015
Quality Management System

AS 9120:2018
Quality Management System
Requirements for Aviation, Space and Defence Distributors

ISO 13485:2016
Quality Assurance of Medical Devices

ISO14001:2015
Environmental Management System

AQAP 2110:2016
Quality Assurance of Defence Products

The highest quality and long-term reliability

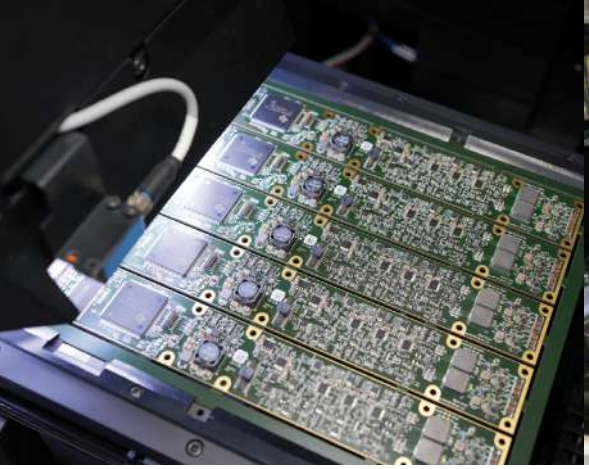
Comprehensive PCBA inspection and electrical testing ensures the highest quality and long-term reliability of the final product

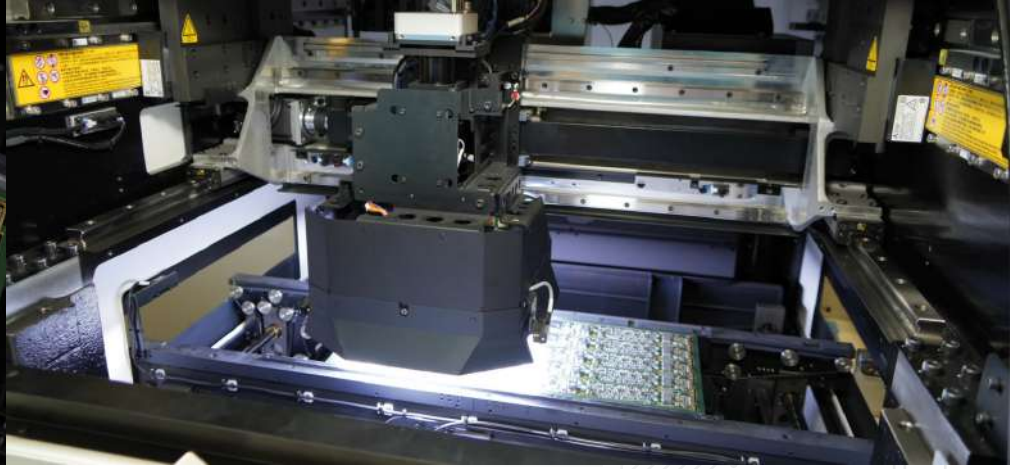
Increased fault detection

PCBA testing helps to identify problems in the projects, whether they are functionality or manufacturability issues

Time and cost savings

PCBA testing prevents the production of defective boards and reduces the time and costs associated with replacing and repairing them





3D AOI-SPI with AI

JUKI's 3D AOI-SPI device enhances the quality control capabilities of manufactured electronics. It enables automatic optical assembly inspection (AOI) as well as solder paste printing parameters (SPI). The applied analysis method based on artificial intelligence (AI) eliminates discrepancies in error qualification, saving time needed for assessment and significantly increasing inspection efficiency.

A high-speed computer camera scans for:

- missing components
- positional divergence
- wrong parts
- lead defects reverses
- solder integrity
- height variations
- defects: polarity, lead missing, bent leads, tombstone, bridging, etc.

PCB Ionic Contamination Testing

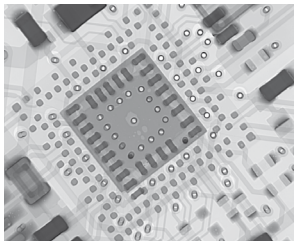
The test is performed using the CM33+ device from Gen3 Systems. Measurements are performed in accordance with IPC TM-650 or MIL-STD-2000 standards in the range of 0.01–30 µg NaCl/cm2. The test is particularly important when starting new assembly lines, changing materials or suppliers, as well as in the case of signs of corrosion, dendrite growth, electrochemical migration, or as a cyclic check that allows you to assess the correctness of production processes.

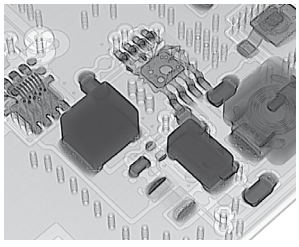
X-Ray Inspection

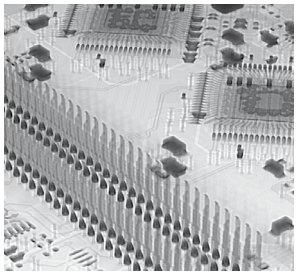
X-Ray inspection is performed in real time using the latest generation of GE equipment. The system has been designed and configured for high-resolution inspection. The smallest detected objects can be as small as 0.5 µm.

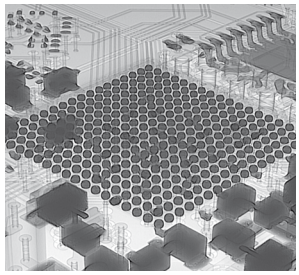
The X-ray device allows for:

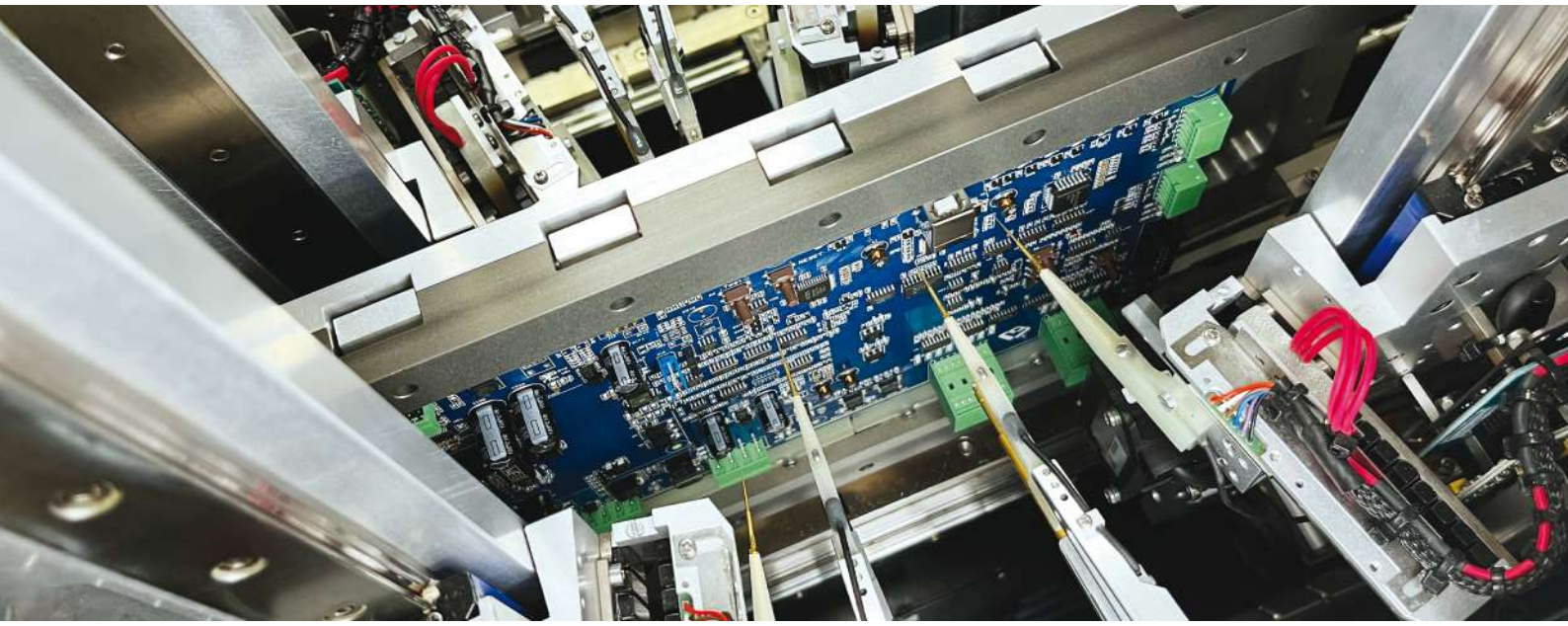
- inspection of soldered joints and components
- analysis of solder voids
- analysis of unwetted solder balls in BGAs
- detection of solder spatter
- detection of PCB delamination
- measurement of hole filling in through-hole connections
- inspection of soldered and crimped connections in cable connectors
- determination of the primary causes of a given defect: insufficient amount of solder paste, incorrect reflow soldering profile
- detection of internal cracks
- detection of voids after encapsulation processes
- verification of the quality of electrode welding in terms of the occurrence of various internal defects.







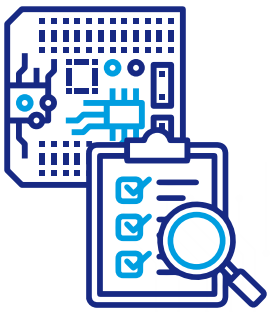




Flying Probe Testing (FPT)

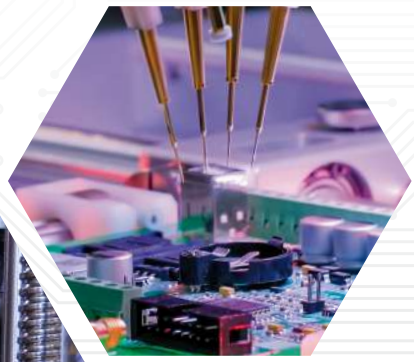
Flying Probe PCB testing provides high fault coverage with repeatability - there's no need for a test fixture.

The Flying Probe tester combines the following functions: ICT, FCT, FlyScan, On Board Programming (OBP), thermal tests, LED tests (brightness, colour, saturation, spectrum), AOI control.



Features and advantages:

- Checking resistance, capacitance, inductance, short circuits, open circuits, polarity
- Verification of PCBA functionality
- Ability to test components as small as 0.3 x 0.15 mm
- High testing speed thanks to the use of 8 precise testing probes
  Short implementation time and programming flexibility
- Eliminates the cost of additional testing equipment
- Making changes to the design without having to modify the test device. Full traceability
- Testing even in the absence of test points



In-Circuit (ICT) Adapters and Functional Testers (FCT)

We design and manufacture high-quality ICT and FCT testing solutions for electronics and cable harnesses. We work closely with our clients to understand their specific requirements and goals. We provide full technical support, starting from concept, through design, construction, to tester validation. We are a long-time distributor of **TECON, PTR, QA**, and **LEENO** test needles, **SENSATA, 3M**, and **POMONA** test clips and sockets, as well as parts for test adapters from renowned manufacturers.

We offer:

- Designing test adapters based on solutions from well-known manufacturers: INGUN, GPS, ATX, and others on request
- Designing adapters for non-standard solutions
- ICT and FCT test adapters with interchangeable cassettes and adapters dedicated to each test system, e.g. Inline TRI, Inline 6TL, SPEA
- Cabling systems for adapters for each test system, e.g. Keysight/Agilent, Teradyne/Genrad Mechanics and pneumatics for adapters
- Providing auxiliary testing equipment: cameras, security measures, devices for specialised measurements
- Engineering support from the concept to the validation phase
- Manufacturing of components based on the provided documentation and drawings
- LED analysers and sensors:
  - www.feasa.ie
  - www.optomisticproducts.com
- Providing additional equipment used with test fixtures like ISP programmers and JTAG/Boundary-Scan (Including test sequences):
  - ALGOCRAFT WriteNow!
  - SMH FlashRunner 2.0
  - JTAG Technologies

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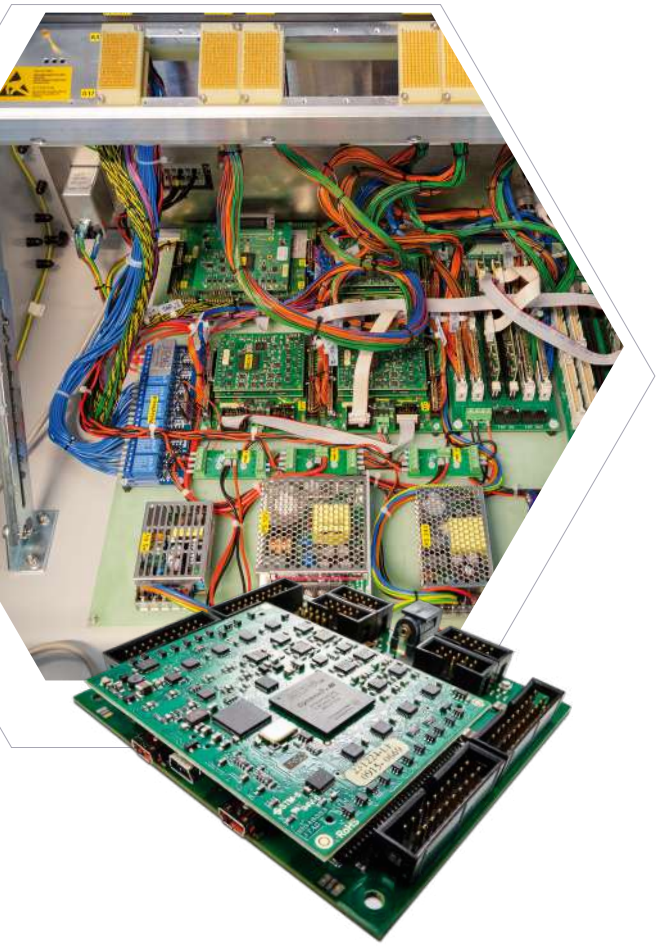
JTAG Boundary Scan Testing

provided by

JTAG TECHNOLOGIES®

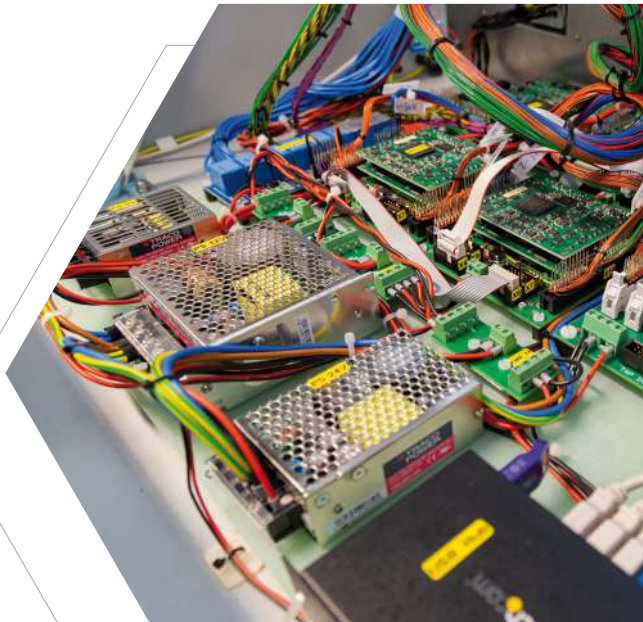
JTAG Live®

We provide a number of different Boundary Scan tester services and our experienced consultants can advise you on the testing process for your product. The tests are specially designed to maximise test coverage. We can provide a solution for your existing products, or work with you from the early stages of product design so that your PCBs are optimised for manufacturing test.



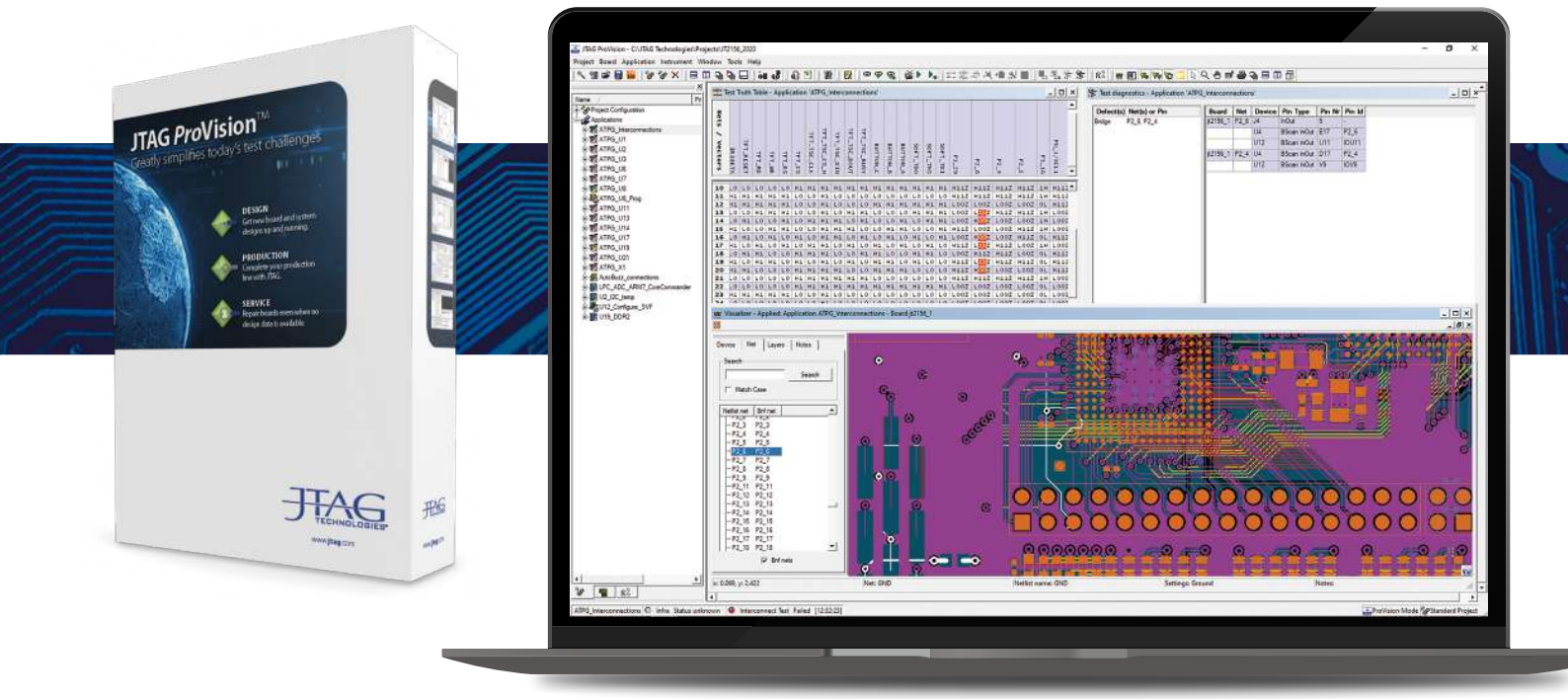
The benefits offered by Boundary Scan testing:

- unique signal path verification from device silicon to device silicon for finding net bridges, opens, stucks to GND / VCC
- functional testing of single device and user defined clusters
- precise resolution of failure discovery narrowed to single net or even device pin
- significant reduction in the required number of physical test points on the board allowing increased board component density
- corresponding reduction in costs associated with test fixtures
- shorten repair times even if no, or only limited, design data is available and can be used to re-program parts for system upgrades
- shorter time-to-market by faster debugging of prototypes
- on-board testing and programming capabilities
- reduced in-circuit testing time
- higher production efficiency
- easy adaptation in many scenarios, from “JTAG only” access to deep integration with ICT or FP testers from leading manufacturers, maximizing overall test coverage



We offer:

- Development of a Boundary Scan test procedure including test fault coverage analysis
- Interconnect, memories, peripheral digital buses and clusters testing
- Device programming
- Python based scripting for functional testing
- Turn key solution including test fixtures
- Integration of tests with your other test tools e.g. ICT, FPT



Increased test coverage by combination of:

- Boundary Scan and Flying Probe - High flexibility without bed of-nails for high-mix
- Boundary Scan and Functional Test - High fault coverage also in dynamic domain
- Boundary Scan and In-Circuit Test - High throughput with best diagnostic quality for high-volume
- Boundary Scan and AOI - High throughput with best diagnosis for high-volume

Overview of advanced testing and inspection solutions

	Defect Type	3D AOI-SPI	X-Ray	In-Circuit Tests	Flying Probe Tests	Functional Tests	JTAG Boundary Scan Tests
Soldering defects	Visible shorts	Yes	Yes, but not reasonable	Yes	Yes	Yes	Yes
	Hidden shorts	-	Yes	Yes	Yes	Yes	Yes
	Visible opens	Yes	Yes, but not reasonable	partially	partially	Yes	Yes
	Hidden opens	-	difficult	partially	partially	Yes	Yes
	Solder quality	Yes	Yes	-	-	-	-
	Cracks	-	Yes	Yes	Yes	-	-
	Voids	-	Yes	-	-	-	-
Placement errors	Missing component	Yes	Yes	Yes	Yes	Yes	partially
	Wrong component	partially	-	Yes	Yes	Yes	partially
	Orientation	Yes	-	Yes	Yes	Yes	Yes
	Misplaced/ Alignment	Yes	Yes	-	-	-	-
Electrical defects	Defective component	-	-	Yes	Yes	Yes	Yes
	Defective PCB	-	-	Yes	Yes	Yes	Yes
	ESD / EMI	-	-	partially	partially	Yes	partially
	Design Problems	-	-	-	-	Yes	partially
	Software defects	-	-	-	-	Yes	partially
Benefits		Early in process, fast, solder paste control	Structural changes, built-in components	Fast	No fixture, NPI, quick project changes	Functional, On-speed	Versatility, In-System Programming
Disadvantages		No electrical test	Expensive, difficult analysis	Require fixture, large q-ty,	Slow, BGA partially	Expensive	Mainly Digital Limited Analog

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Contact us

EMS - Electronic Manufacturing Services
Inquiries: EMSinquiry@semicon.com.pl
Orders: EMSorder@semicon.com.pl
General information: EMSinfo@semicon.com.pl
PL 04-805 Warsaw,
Ezopa 71a Street
+48 22 612 67 92
+48 22 825 24 64

Headquarters and R&D department
info@semicon.com.pl
zamowienia@semicon.com.pl
PL 04-761 Warsaw,
Zwoleńska 43/43a Street
+48 22 615 73 71
+48 22 615 64 31

Laser modules design and production
lasery@semicon.com.pl
PL 04-761 Warsaw,
Zwolenska 43/43a Street
+48 22 615 73 71

SMT Laser cut stencils manufacturing
szablony@semicon.com.pl
PL 05-077 Warsaw,
Zakretowa 4 Street
+48 22 615 27 05

Tapes converting
tasmy@semicon.com.pl
PL 05-077 Warsaw,
Zakretowa 4 Street
+48 22 102 22 52

Aero, Defence and Space department
mro@semicon.com.pl
orders@semicon.com.pl
PL 04-761 Warsaw,
Zwoleńska 43/43a Street
+48 22 615 73 71
+48 22 615 64 31

Main warehouse
(open Mo-Fr, 8:00-16:00 CET)
radomszczanska@semicon.com.pl
PL 04-764 Warsaw,
Radomszczanska 19 Street
+48 22 615 83 40