



DHL SEMICONDUCTOR LOGISTICS

LEADING INDUSTRY SOLUTIONS AND SERVICES FOR YOUR END-TO-END SUPPLY CHAIN

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SEMICONDUCTOR INDUSTRY – MANAGING COMPLEXITY

It is difficult to imagine a more complex sequence of production and distribution processes than in the semiconductor supply chain. There are multiple supply chain steps, from materials sourcing to silicon wafer fabrication, and then from chip and processor assembly and testing to worldwide transportation. From this point onward, the supply chain must also support warehousing, distribution and last-mile delivery to end customers.

Adding to this complexity, the semiconductor industry features highly capital-intensive manufacturing processes, hazardous inbound materials management, and high-value sensitive goods handling. All of this requires specialized and tightly integrated logistics services to support each element of the semiconductor value chain.

HIGHLY DYNAMIC AND FAST-PACED MARKET

Companies in this industry operate in a highly dynamic, fast-paced market environment driven by digitalization and the Internet of Things. Typically this requires a substantial R&D budget and high capital expenditure – long-term investment decisions to secure sufficient capacity along with access to next-level technologies.

In addition, these companies must be prepared for highly volatile and cyclical demand, including shifts in customer segments. As a consequence, in recent years there has been a significant increase in M&A activities as organizations seek to secure the latest technologies, expand capacity, and gain access to attractive market segments.



Semiconductor supply chains have to respond to the needs of an increasingly dynamic market.

SUPPLY CHAIN PRIORITIES

A COMPLEX SUPPLY CHAIN AS THE SEMICONDUCTOR ONE HAS DISTINCT CHARACTERISTICS AND REQUIREMENTS. THEY ARE ESSENTIAL FOR PROVIDING ANY LOGISTICS SERVICES AND SOLUTIONS.

Reliable infrastructure – Companies operating in the semiconductor industry seek proven, dependable systems and processes for capital equipment and inbound goods transportation, manufacturing logistics, assembly and test transportation, warehousing, and distribution solutions.

Global reach – the semiconductor industry is global in nature, requiring logistics and transportation capabilities that span every continent and country, sometimes from inaccessible and remote locations and to all major population centers.

Integrated logistics – collaboration must be simplified between suppliers, manufacturers, distributors and customers, and enhanced by digitalization and new developments, particularly the Internet of Things.

Specialty expertise – to support this industry, it's not enough for logistics professionals to know about logistics; they

must also have a deep understanding of the semiconductor world and its specific supply chain requirements.

Safe handling – for many valuable and sensitive materials and devices in the semiconductor supply chain, there is a need for environmental protection including end-to-end temperature, humidity and shock control, delivering zero-defect quality levels.

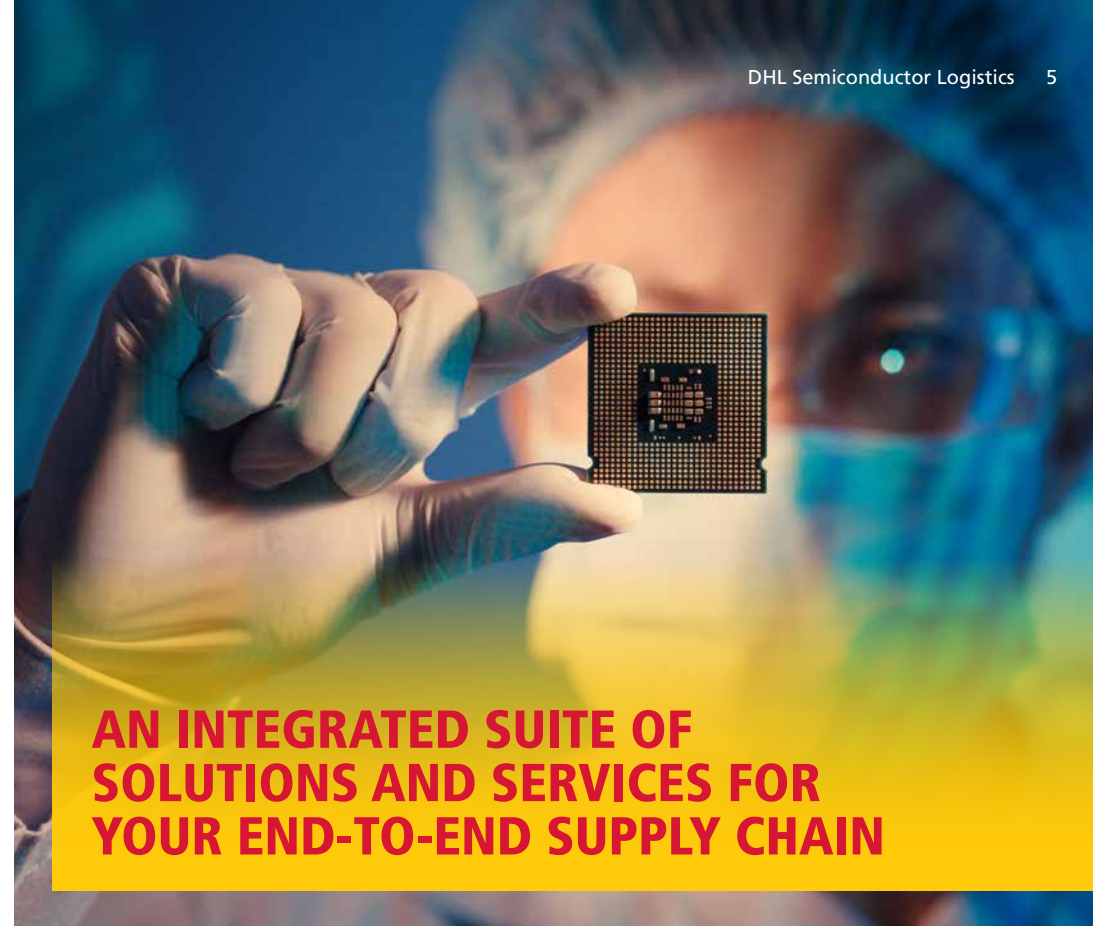
Security solutions – cargo theft comes at a high cost when moving high-value semiconductor items around the world, so you need to select a logistics partner with proven expertise and with relevant logistics certification.

Flexibility and agility – change is the new normal, so logistics solutions must be compatible with shrinking innovation cycles, sudden shifts in demand, faster time-to-market, dynamic mode transportation, proactive risk management, and end-to-end supply chain visibility.



COMPETITIVE ADVANTAGE

Companies seeking market leadership, M&A advantage, or expansion into new growth segments require end-to-end optimized, secure logistics and transportation services to achieve valuable differentiation.



AN INTEGRATED SUITE OF SOLUTIONS AND SERVICES FOR YOUR END-TO-END SUPPLY CHAIN

With our commitment to providing specialized solutions for growth markets and industries, DHL offers an end-to-end suite of solutions and services for the entire semiconductor supply chain. We have more than 3,000 dedicated personnel and over 50 facilities worldwide. For specialized movement of capital equipment, DHL operates a Global Capital Support Center in Dublin, Ireland, with satellite offices across Asia Pacific, North America, and Europe.

Along with end-to-end product visibility, compliance with international regulations, and maximum security for your high-value, sensitive goods, we ensure collaboration in the semiconductor ecosystem, supporting and partnering with suppliers, manufacturers, foundries, assembly and test organizations, OEMs, and distributors.

We have more than
3,000
dedicated personnel

50
facilities worldwide

OUR UNIQUE VALUE PROPOSITION:

An integrated end-to-end suite of solutions and services from a single source that drives enhancement and innovation along the semiconductor supply chain

SEMICONDUCTOR DHL SOLUTION COVERAGE



DHL

- Capital Equipment Logistics**
 - Global Capital Support Center (GCSC)
 - Scheduling FAB installations
 - Service Logistics
- Inbound Logistics**
 - Hazardous Inbound to FAB
 - Stockroom at FAB
 - FAB shipping departments
- Assembly & Test**
 - Onsite people A&T to prepare shipments
 - Bulk inventory moves to DC
 - Finished goods direct shipment
- Wafer shipping**
 - Packaging and distribution
- Value Added Services**
 - Testing, kitting, packaging, cleanroom
 - Foil vacuum packing
 - Single unit picks
 - ESD compliance
 - Sourcing packaging
 - Scrapping
- Automation**
 - Full/Semi automated storage, pick & pack solutions
- Distribution, Final Mile & Reverse**
 - Multimodal finished goods/dynamic routing
 - Airfreight, Express, Hybrid
 - Bulk direct ship/distributors
 - Trucking
 - X-dock operations
 - Charters, hand carries, NFO
 - Consignment stocking locations
 - Sample/Prototype distribution
 - Reverse Logistics
- End-to-End Supply Chain**
 - Zero defects/8D standardization
 - Risk Management/Resilience360
 - Industry Quality standards
 - Customs, Security solutions/Escorts
 - Piece level visibility
 - Network optimization (e.g. Multi-use facilities)
 - Collaborative supply chains/continuous improvement



CAPITAL EQUIPMENT LOGISTICS

MANAGING YOUR HIGH-VALUE CAPITAL EQUIPMENT MOVES

DHL offers operational expertise in all aspects of capital equipment handling, particularly full compliance with specific handling requirements to ensure the safety and integrity of your high-value items throughout the shipment journey. We understand and answer your need for shipment visibility on a global scale, and provide you with 24/7 monitoring which includes direct real-time reporting at all transit points. From initial dispatch to on-time delivery, we also provide you with a single point of contact.

In addition, DHL provide services on fab equipment installations, inventory management and service parts logistics for capital equipment.



INBOUND LOGISTICS

STREAMLINING YOUR LOGISTICS TO YOUR FACILITIES

Specialized services are required to manage inbound logistics for raw materials and stockroom operations. In addition, DHL supports shipping departments to organize outbound flows. You can select our full suite of foundry logistics services or cherry-pick specific elements to complement your in-house capabilities: appointment deliveries to the foundry, manufacturing site, or assembly & test facility with multiple transit time options, stockroom-to-factory floor management, critical inventory management, shipping functions for outbound flows, including document preparation and customer service, and inbound dangerous goods management.



ASSEMBLY & TEST

HANDLING ALL KINDS OF SHIPPING NEED WITH ON-SITE SUPPORT

DHL is able to take control of onsite management and release of inventory to the factory floor. Our personnel can also be deployed directly in your assembly and test facilities to manage bulk inventory moves to your warehouses and distribution centers. Alternatively, with the necessary invoicing solutions in place, we can provide options to send your finished goods to distributors or end customers, bypassing your warehouses. You can select as required from a range of additional services including customer service support, traffic planning and routing support, proactive shipment monitoring, risk assessments, and contingency planning.



WAFER SHIPPING

SETTING PARAMETERS FOR DEPENDABLE SHIPPING... AND YOUR PEACE OF MIND

Understanding that product integrity is critical, we provide a range of packaging materials and solutions to suit every need. We share your priority of securely handling and transporting each wafer item so that it arrives at destination in perfect condition. DHL can utilize multiple shipment options to achieve the right balance of speed and cost for every shipment – for example,

same-day or express courier services as well as freight forwarding via air, road, rail or ocean. We transport your sensitive goods on predictable and tested international routes, and our control tower services enable dynamic routing when plans need to change at the last minute.



WAREHOUSING

LEVERAGING INDUSTRY-SPECIFIC VALUE-ADDED SERVICES

Our semiconductor value-added warehousing services include testing goods for compliance or replacement as well as kitting right down to unit level and preparing and packaging your products.

We fulfil ESD compliance standards and we are able to meet specific service requirements such as sourcing specialist packaging, providing foil vacuum packing, and enabling single unit picks. To ensure semiconductor item integrity, our personnel are trained and experienced in specialist cleanroom activities. We offer a total inventory management service using our system or your own systems, and provide proactive reporting according to your specific needs. We can handle materials scrapping as per SOP requirements.

In addition, DHL operates service parts warehouses globally to ensure time-definite delivery of critical manufacturing items to the factory floor.



AUTOMATION

BENEFITING FROM HIGHLY AUTOMATED OPERATIONS

We have deployed fully- and semiautomated storage and pick & pack solutions, and we are investing in additional robotics capabilities. We invite you to visit one of our DHL Innovation Centers to see for yourself our showcase of the very latest and near-future applications of automation in logistics. Automation benefits include lower cost and high quality levels.

DISTRIBUTION & FINAL MILE

UTILIZING A BROAD AND FLEXIBLE RANGE OF DISTRIBUTION OPTIONS

With DHL, you can adapt the supply chain to achieve the required levels of speed, flexibility, and cost – our secure transportation solutions include airfreight, ocean freight, express, hybrid, trucking, and bulk direct distribution, along with charter, hand-carry options and NFO for exceptional shipment requirements.

Our consignment stocking locations include VMI hubs for time-tested efficient distribution. We also offer multiple transit options for sample and prototype distribution, and all shipments can include real-time monitoring. For your reverse logistics needs, we provide a full suite of semiconductor solutions including testing, warranty returns, authorization systems, and daily reporting, all with global visibility.

END-TO-END SUPPLY CHAIN

STRENGTHENING THE SUPPLY CHAIN

The supply chain is only as strong as its weakest link, so end-to-end management and understanding of your specific requirements are essential. DHL is your assurance of a reliable and resilient supply chain supported by zero defects/8D standardization, risk management tools such as DHL Resilience360, and compliance with semiconductor quality standards. Our personnel offer expertise in customs handling and specific security solutions for high-value goods, even providing escorts when required, and all services are delivered with item-level visibility. We also work to streamline and optimize networks, and provide options for direct shipping and formulti-use facilities. DHL seeks a collaborative partnership with each semiconductor customer, aligning our objectives and regularly reviewing joint progress to ensure continuous improvement.

FIND OUT MORE ABOUT DHL SEMICONDUCTOR LOGISTICS

Contact us as for more information at info.semiconductor@dhl.com and visit our website dhl.com/dhlsemiconductorlogistics. We invite you to visit one of our DHL Innovation Centers to see for yourself our showcase of the very latest and near-future applications of automation in logistics.