



Creation Technologies

BEST TOTAL SOLUTIONS. LIFETIME PARTNERSHIPS.

Market Conditions Q3 2021

creation
TECHNOLOGIES

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Q3 & Q4 2021 Market Outlook



“Let’s all remember
to continue to be
careful. This is far
from over worldwide”

Lindsley Ruth

Chief Executive Officer of Electrocomponents

July 19, 2021

EMCO - Malaysian government has announced an enhanced movement control order July 2021

Infineon July, 2021

As reaction to the continuous high number of new infections our Backend site in Melaka was ordered by the Ministry of Health to extend the shutdown at those production blocks where higher infection rates occur until 13 July. Currently this is the case in our production blocks 3 & 4. All other production blocks are allowed to operate with full workforce, subject to continued lower infection rate. As a consequence of these latest developments, we expect a significant lower output in these production blocks for additional 10 days, based on the latest lockdown extension from 7 to 13 July. We are putting all efforts to minimize the impact on our customer side and will inform affected customers individually.

ON Semiconductor July, 2021

As previously communicated to you, the Malaysian government has been working to limit the spread of COVID-19 through several measures. Due to a surge in COVID-19 cases, the Malaysian government and its agencies have now increased restrictive measures for the public and businesses in most districts of Selangor and Kuala Lumpur to contain the virus. Above all, our company prioritizes the safety of our employees under all circumstances. We are doing everything in our power to mitigate the impact of the limitations for our customers, working to ensure the on-time delivery of products.

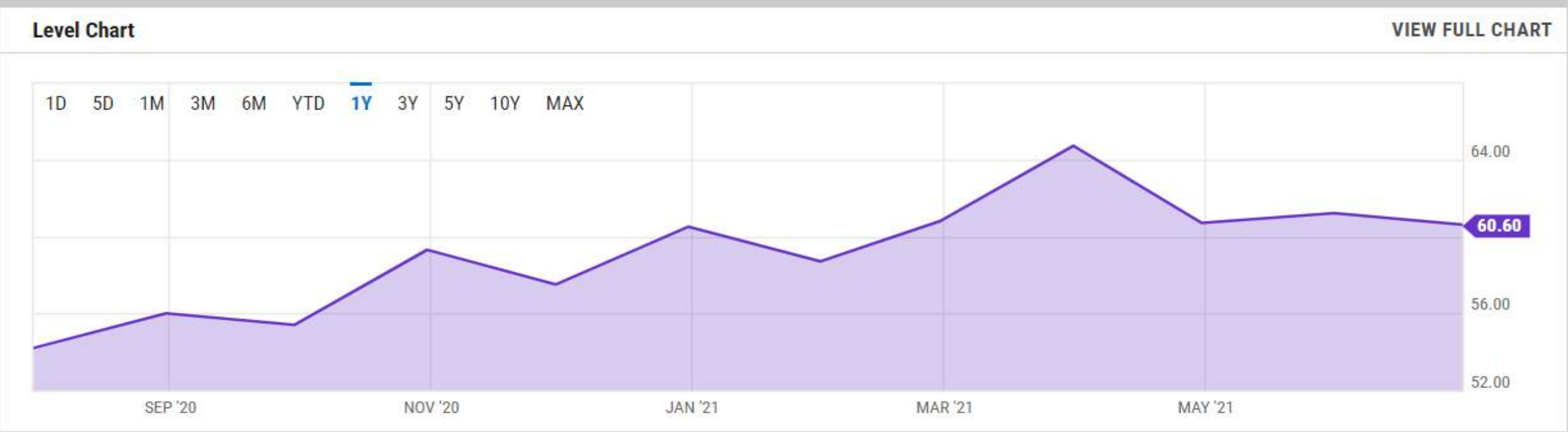
Nexperia July, 2021

Multiple COVID-19 variants are circulating globally, and the number of the COVID-19 cases globally is still high. Local governments continue to take measures as needed. As a result, the Malaysian government has announced today an enhanced MCO (EMCO) in a number of localities in Selangor and Kuala Lumpur for two weeks due to the spike in cases there.

Potential MFRs Impacted	
Advanced MCRO Devices	Mcrochip
Altera	Mcron
Amphenol	Molex
Analog Devices	Murata Manufacturing Co.
Artesyn Embedded Technologies	Nexperia USA Inc.
AVAGO	NXP
Avnet	Omron
AVX	ON Semiconductor
Bel Fuse Inc.	OSRAM Opto Semiconductors
Boums	Panasonic
CTS	Power Integrations
Dialight	Renesas Electronics
Diodes Incorporated	ROHM
Finisar	Samtec Inc.
Fox Electronics	Semtech
Foxconn	SITIME
IDT	SMART
Infineon	STMicroelectronics
Intel	Taiyo Yuden
Intersil	TE Connectivity
Kemet	Texas Instruments
Laird Connectivity Inc.	Toshiba
Maxim Integrated	Triad Semiconductor Inc.
Mcrochip	Vishay
Mcron	Xilinx

The Purchasing Managers Index is a diffusion index summarizing economic activity in the manufacturing sector in the US. The index is based on a survey of manufacturing supply executives conducted by the Institute of Supply Management. Participants are asked to gauge activity in a number of categories like new orders, inventories, and production and these sub-indices are then combined to create the PMI. A PMI above 50 would designate an overall expansion of the manufacturing economy whereas a PMI below 50 signifies a shrinking of the manufacturing economy.

US ISM Manufacturing PMI is at a current level of 60.60, down from 61.20 last month and up from 52.60 one year ago. This is a change of -0.98% from last month and 15.21% from one year ago



Global Component Shortage Continues

Fluctuating Demand

The global pandemic played a huge part in the current shortages. When the initial lockdowns triggered a collapse in car sales, automakers immediately slashed orders for parts. This including semiconductor chips—a typical new car can contain more than a thousand.

At the same time there was a huge surge in demand for consumer electronics. At the Howells household, with 3 people working full time from home, we were getting regular deliveries of laptops, screens, webcams, microphones, back lights and more. Within weeks, our on-line sales expanded to a new TV, a washing machine and other household devices.

So, like any good business would, chip manufacturers saw the change in demand from consumers like me and shifted their output to serve that demand. But when car sales rebounded in late 2020, and the automotive industry started placing new orders, they couldn't get enough chips to meet the demand. While news reports on the semiconductor shortage has focused on the automotive industry, most consumer electronics and hi-tech companies will be feeling the exact same pressures.

The Pandemic Exposed Risks

For cost-reduction purposes, over the past decade or more, the production of semiconductors and microelectronics has moved offshore, and supply chains have become more global. In 1990, 37% of chips were made in American factories. By 2020 that number had declined to just 12% with manufacturing now concentrated in Taiwan, South Korea and China.

Again, during the pandemic the risks associated with these global supply chains has been exposed due to plant shutdowns, port and border closures and long lead times.

No short term fix

Restoring the supply and demand balance will take time because semiconductor manufacturing is not suited to rapid and large shifts in demand. And as the overall demand for chips increases, the manufacturers simply don't have the capacity to meet the demand in the time required. Making a semiconductor is one of the most complex manufacturing processes. Lead times of up to 26 weeks are the norm to produce a finished chip. And as manufacturing has consolidated to a small collection of big chip makers, predominantly in Asia, demand far exceeds the available supply.

Mitigation Strategies

- Speed and clarity for AML & costing support is crucial as available inventory is time sensitive
- Be aware that material availability and allocation is being tied to cost acceptance
- Define and communicate UPPV and PPV approval policies in advance and review monthly
- Review and lean out BOM/AML modifications and independent distributor policies
- Forecast horizons of 12 to 18 months drive visibility and validity at manufacturers
- Utilize Creation's Value Add Value Engineering BOM Risk Assessments
- Leverage MFR relationships through access to design activity and development
- Drive robust AML diversity along with attention to BOM accuracy
- Review over engineered sockets by limiting extended temp, industrial and automotive grade materials
- Identify and communicate MFR representatives assigned to your organization
- Identify and communicate direct manufacturer sales contacts assigned to your organization
- Identify and communicate preferred independent distributor partners
- Review and refresh and communicate counterfeit policies and procedures on a monthly basis



Q3 & Q4 New Concerns

Q3 & Q4 Concerns

COST INCREASES
Beyond
Semiconductors

Logistics
Peak Season
Expected to start in
August

COUNTERFEIT
COMPONENTS

COST INCREASES Beyond Semiconductors

“..., some electronics manufacturing services providers seem to be very aggressive in trying to secure an inventory position for passives. “A materials manager does not want a build to be held because some lower-cost passive component” was not in stock, he said.

AVX’s business is also being impacted by tight supply and rising prices for raw materials. Pratt noted that the price of copper has tripled over the last year and the price of palladium has doubled. Prices for rubidium, silver and resins also have increased. “Resins have gone up significantly because of the petroleum industry. With the price of oil increasing that has a direct impact on the price of resin,” said Pratt.

- Eric Pratt , SVP , AVX

“...supply is tight and lead times are stretching for many capacitors, resistors, and other passive components, connectors, electromechanical devices and power supplies. Prices are also increasing for many electronic components , ranging from the mid-single digits to 30 per cent.

“with lead times stretching to 35 weeks for some passives. For instance, in March multilayer ceramic capacitor (MLCC) lead times were about 16 to 20 weeks. In early May they moved out to 30 to 35 weeks, he said.

- David Stein VP Digi-Key

Strong demand is also occurring with connectors. Don Hnatyshin, senior vice president supply chain for connector manufacturer Molex, said connector demand is rising for a range of reasons including cloud and data center expansions, Industry 4.0 requirements, electric vehicle growth, greater adoption of factory automation, and advancements in technology such as artificial intelligence..

Strong demand combined with “force majeure” in the resin supply chain have contributed to long lead times for connectors. Production of resin, which is used in many components, connectors and printed circuit boards, slowed or shut down earlier in the year after a major storm knocked out power in Texas where a lot of resin is produced.

- Don Hnatyshin, SVP Molex

Financial Markets July 2021

Oil Price In \$¹



Copper Price In \$²



Nasdaq (Index Value)³



Philadelphia Semiconductor Index⁴



¹ Source: www.nasdaq.com

² Source: www.oil-price.net

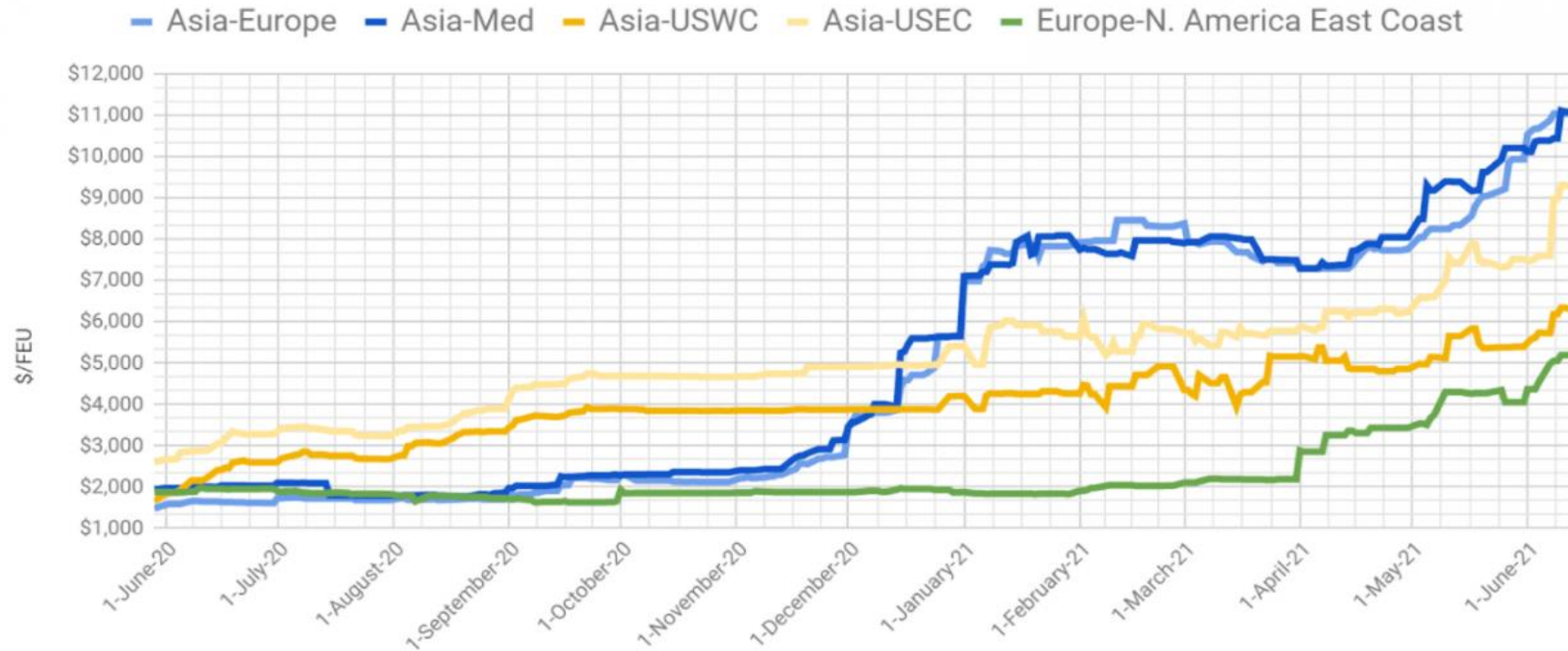
³ Source: www.nasdaq.com

⁴ The PHLX Semiconductor Sector (SOX) is a price-weighted stock market index composed of 19 companies primarily involved in the design, distribution, manufacture, and sale of semiconductors. Source: Market Watch

Logistics
Peak Season starts
in August

Shipping & Freight Cost Increases, Freight Capacity, and Shipping Container Shortage [2021]

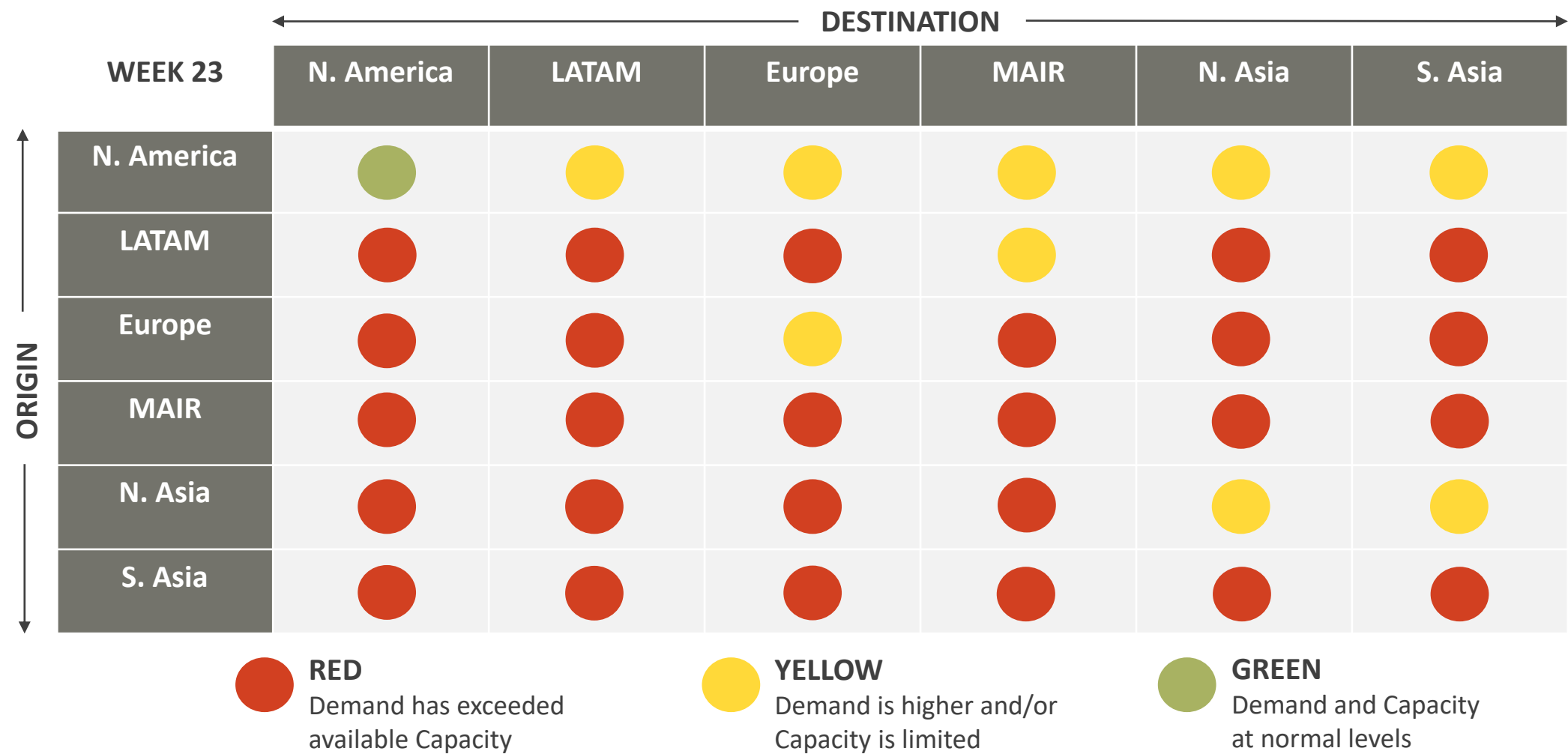
FBX - Ocean Container Spot Rates During the Pandemic



Freightos July 15, 2021

Ocean Market Trade Lane Capacity

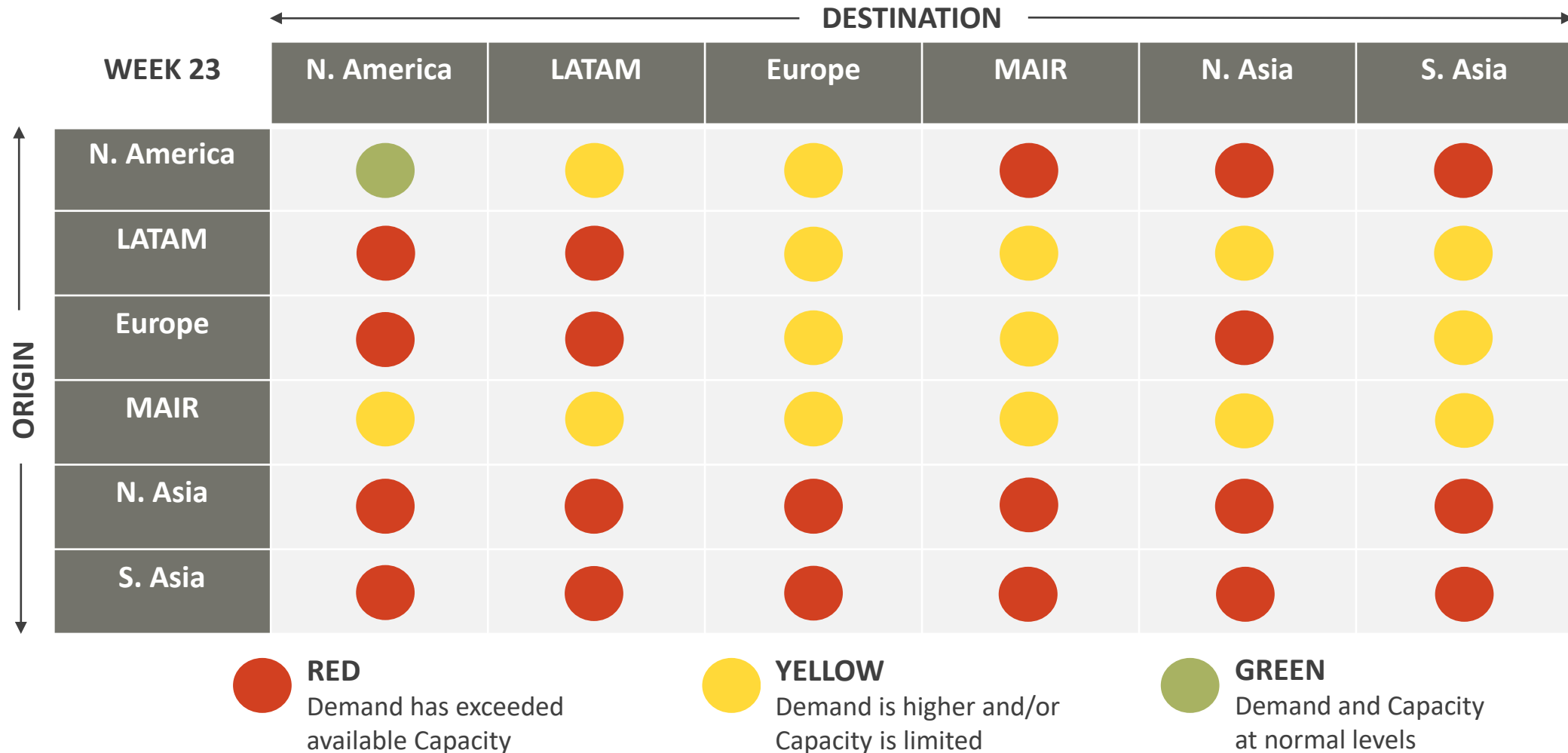
OCEAN MARKET DEMAND & CAPACITY INDEX



Air Market Trade Lane Capacity

- The transportation of Covid-19 vaccines and the increased need for PPE are adding further pressure on the market.
- The shortage of ocean freight containers is causing constraints in global air freight capacity while passenger aircraft belly-space remains off the market.

AIR MARKET DEMAND & CAPACITY INDEX



Typhoon *In-Fa*

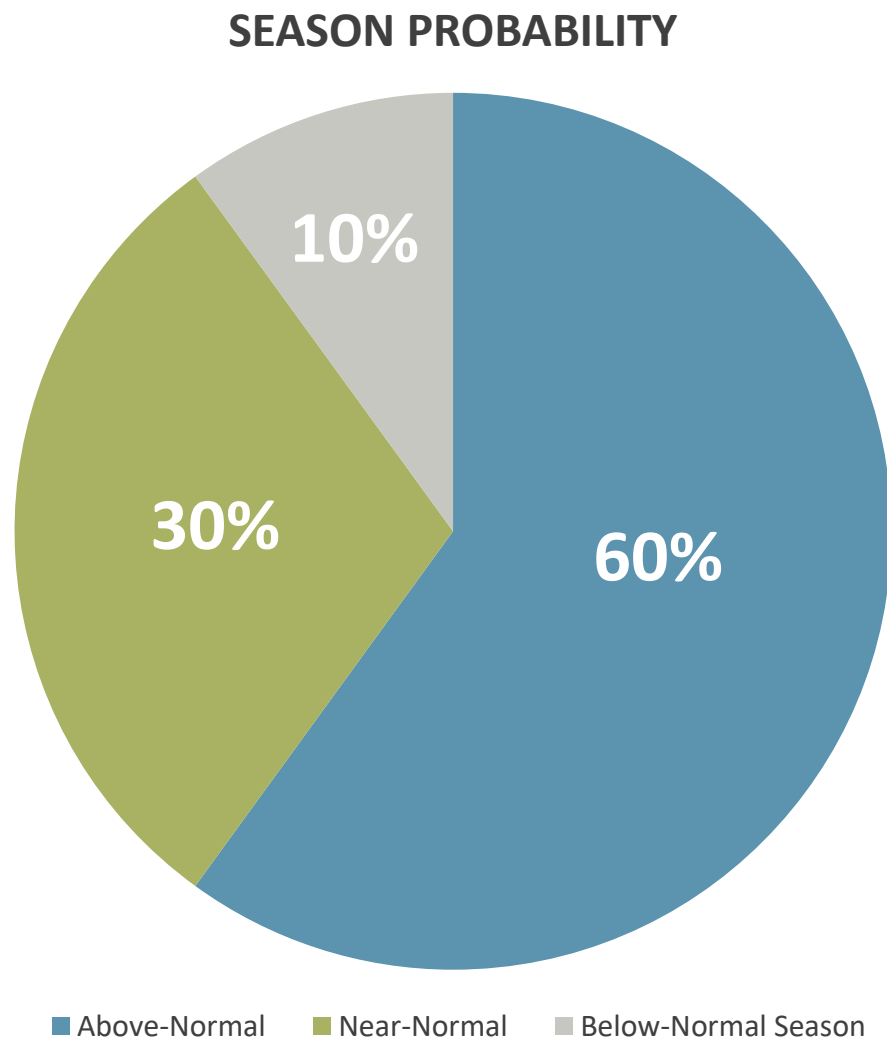
- According to CH Robinson, warehouses have also stopped container loading and deliveries to terminals.
- The forwarder said: “Shanghai has been closed since Friday and port operations are expected to reopen tonight around 10pm. Ningbo port was also closed on Friday, but terminals and depots are resuming this afternoon. We expect to see vessel berthing delays of four-to-six days at each port.”
- Hundreds of flights from Shanghai and Ningbo have been cancelled. CH Robinson said Ningbo International, Shanghai Pudong and Shanghai Hongqiao were all closed yesterday.
- “Charter flights for today have been cancelled, while some freighters are resuming later today,” the company added.

[The Load Star :: Typhoon brings more supply chain chaos in China, closing air, sea and rail hubs](#)





2021 Atlantic Hurricane Season Outlook



NAMED STORMS

13-20

HURRICANES

6-10

MAJOR HURRICANES

3-5

Market Updates : General Outlook & Recommendations

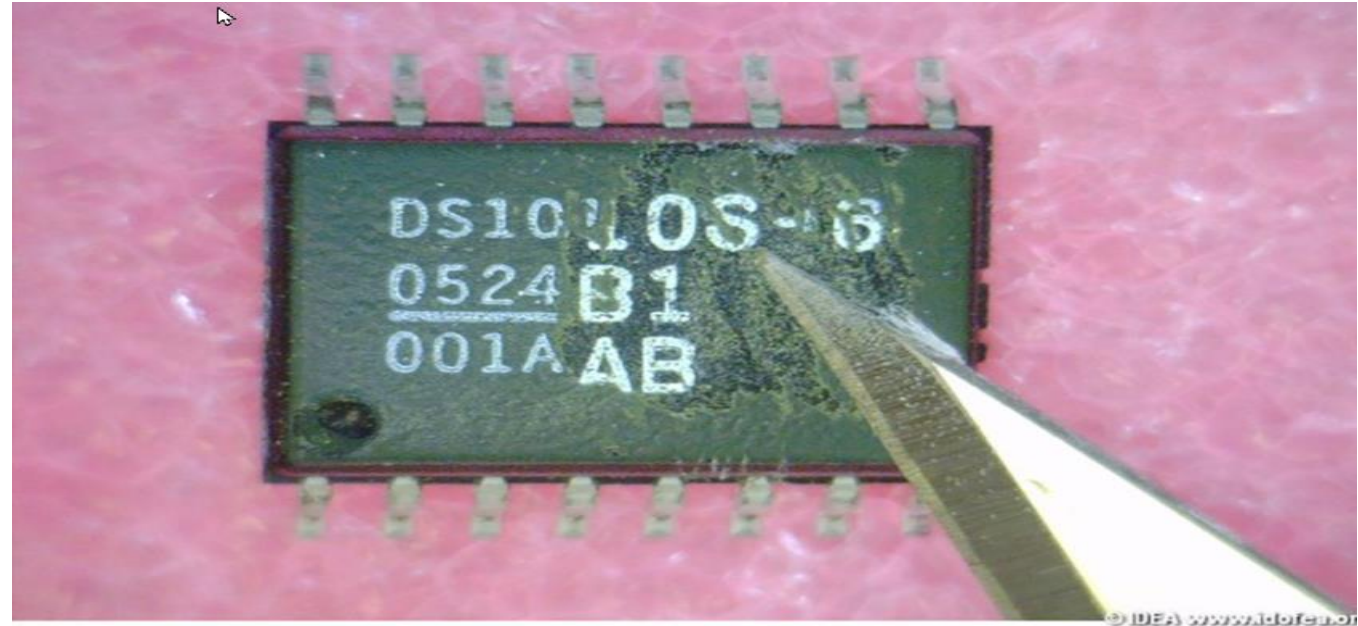
OUTLOOK

- Expect that the situation will remain challenging through the balance of the year
- Increase in Blank Sailings through Q3
- High Backlogs to clear
- Increase in demand due to peak season
- **Peak Season Expected to start in August (Fall Fashion, Holiday Season, CNY)**

RECOMMENDATIONS

- Long-term planning – provide accurate forecasts to secure equipment and space in time - the more reliable the volume is, the higher chance it has to get on board
- Place booking well in advance 6-8 weeks
- Advise Logistics teams about priority shipments for alternative solutions 2 weeks prior to port arrival
- Consider shipping LCL (more consistent for shipping smaller volumes than FCL)
- Consider flexibility for equipment, consider substitutions ie: two 20ft vs a 40ft
- Reserve space on air freight services for shipments that cannot be delayed, the rates are higher, but this measure will keep your supply chain running

COUNTERFEIT CONCERNS



Instances of chip fraud have historically been underreported, industry participants and experts say, because victims are reluctant to publicly admit that they have been duped. Pursuing criminal charges is difficult, particularly across borders.

For counterfeiters and shady distributors, the possibility of getting caught isn't great enough to alter behavior, said Diganta Das, a researcher at the University of Maryland who studies counterfeit electronics. There are so few convictions, Mr. Das said he could recite them all if he tried.

What's Worse Than a Chip Shortage? Buying Fake Ones,, WSJ 07-15-21

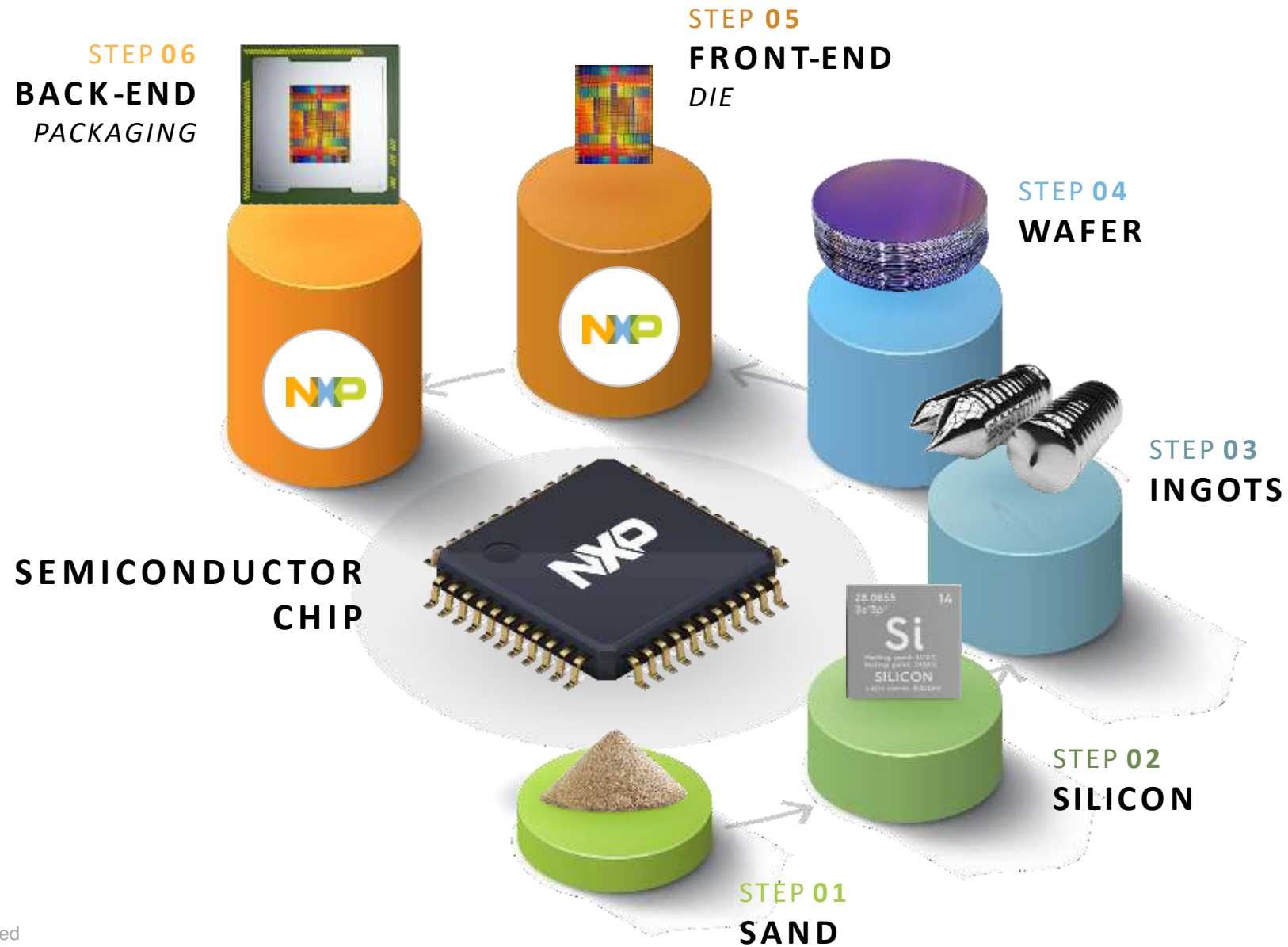
Common Counterfeit Mitigation Testing Specifications

DLA QTSL	HONEYWELL SPOC 419 LEVEL TESTING	NGC CONF010 LEVEL TESTING	LEVEL 4
External Visual Inspection	External Visual Inspection	External Visual Inspection	Resistance to Solvents Test (up to 35 samples)
X-Ray Inspection	Solvents Testing		
X-Ray Fluorescence	X-Ray Inspection	Solvents Testing	Visual Verification Test (up to 100 samples)
Decapsulation	X-Ray Fluorescence		
Full Functional Electrical Testing	Heated Chemical Testing	X-Ray Inspection	Label Verification – On all external/internal packaging after test and prior to shipping
	Decapsulation		
	Electrical Testing	Heated Chemical Testing	Re-Labeling/Re-Packaging Devices – to be completed after test and prior to shipping
AS6081 LEVEL TESTING	RAYTHEON QNOTE TESTING LEVEL		
External Visual Inspection	External Visual Inspection	Decapsulation	Coplanarity Test (up to 100 samples)
Heated Chemical Testing	Solvents Testing		
X-Ray Inspection	X-Ray Inspection	Electrical Testing	Electrical/Full Function Test (up to 250 samples)
X-Ray Fluorescence	X-Ray Fluorescence		X-Ray Test Validation (up to 250 samples)
Decapsulation	Solderability		Decapsulation Test Validation (1 Sample)
	Heated Chemical Testing		
	Decapsulation		Solderability Testing – required on all devices outside of 2-year date code
	Lead Cross-Section		
	Full Functional Electrical Testing		

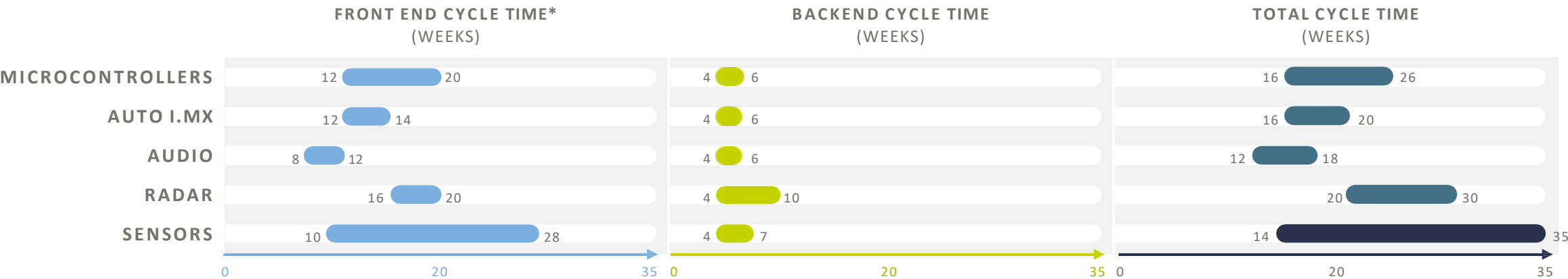
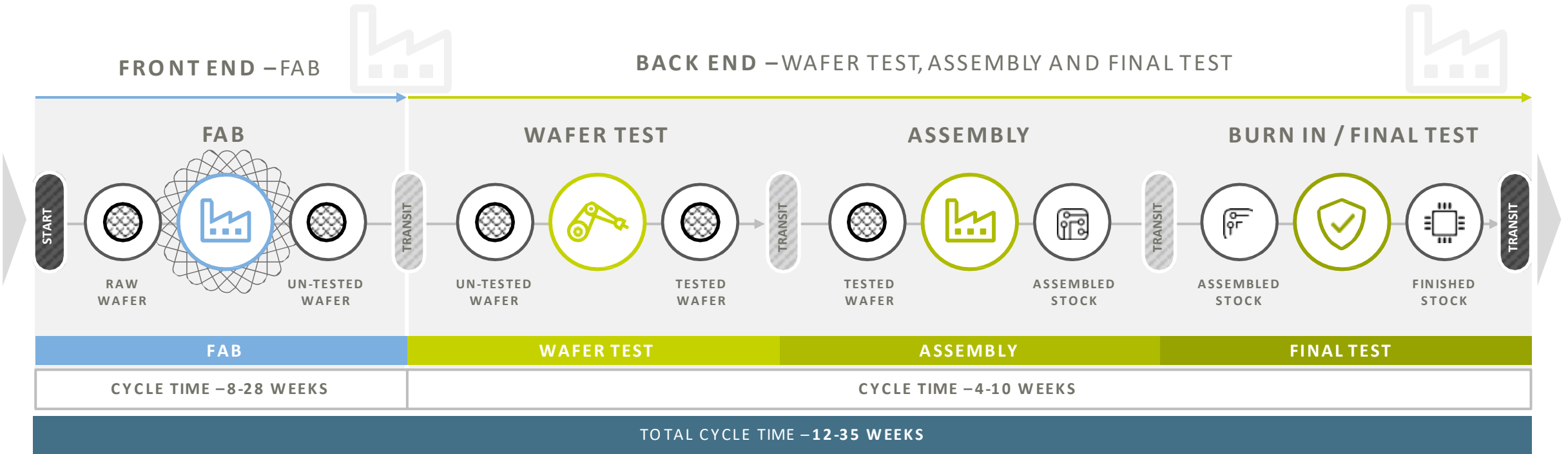


Semiconductor Manufacturing Complexity

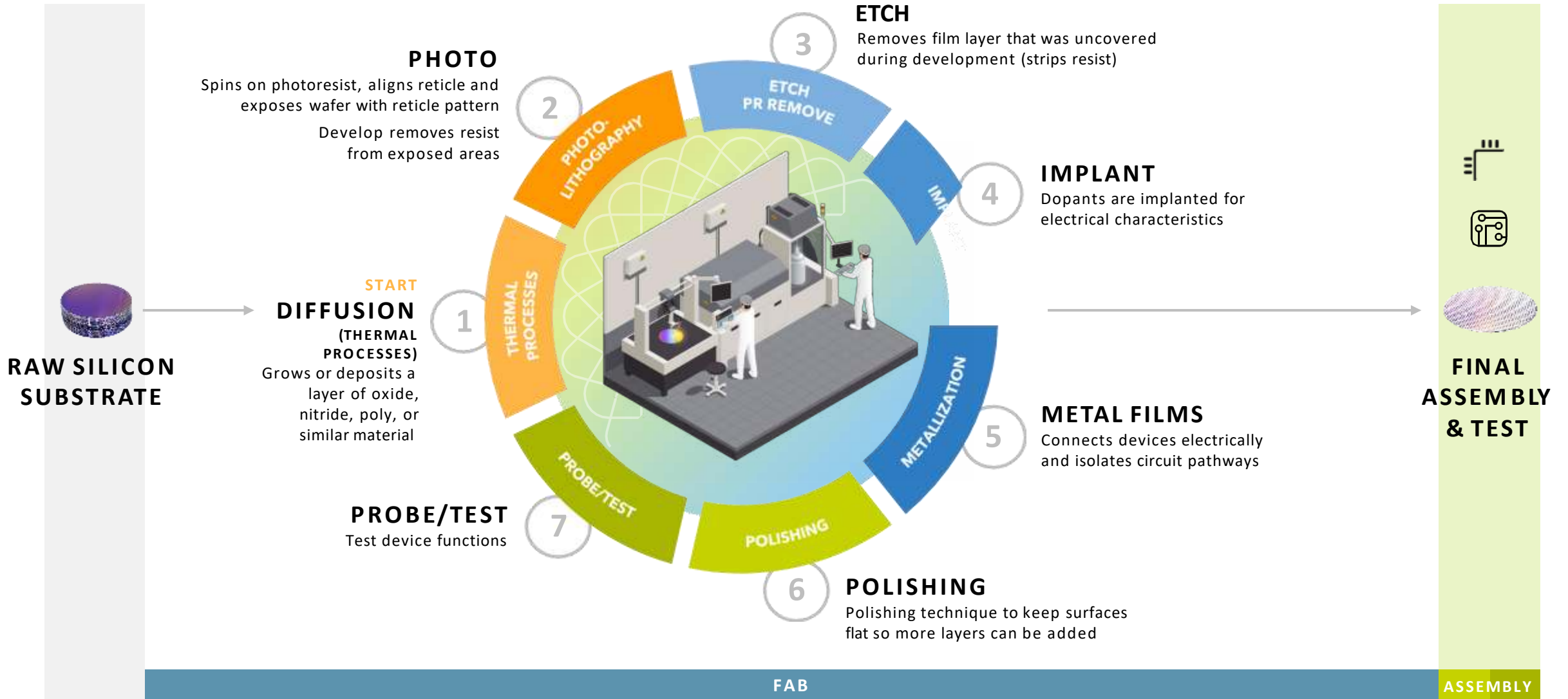
HOW IS A SEMICONDUCTOR MADE?



SEMICONDUCTOR MANUFACTURING PHASES –TYPICAL FLOW



SEMICONDUCTOR MANUFACTURING FUNDAMENTAL PROCESSES

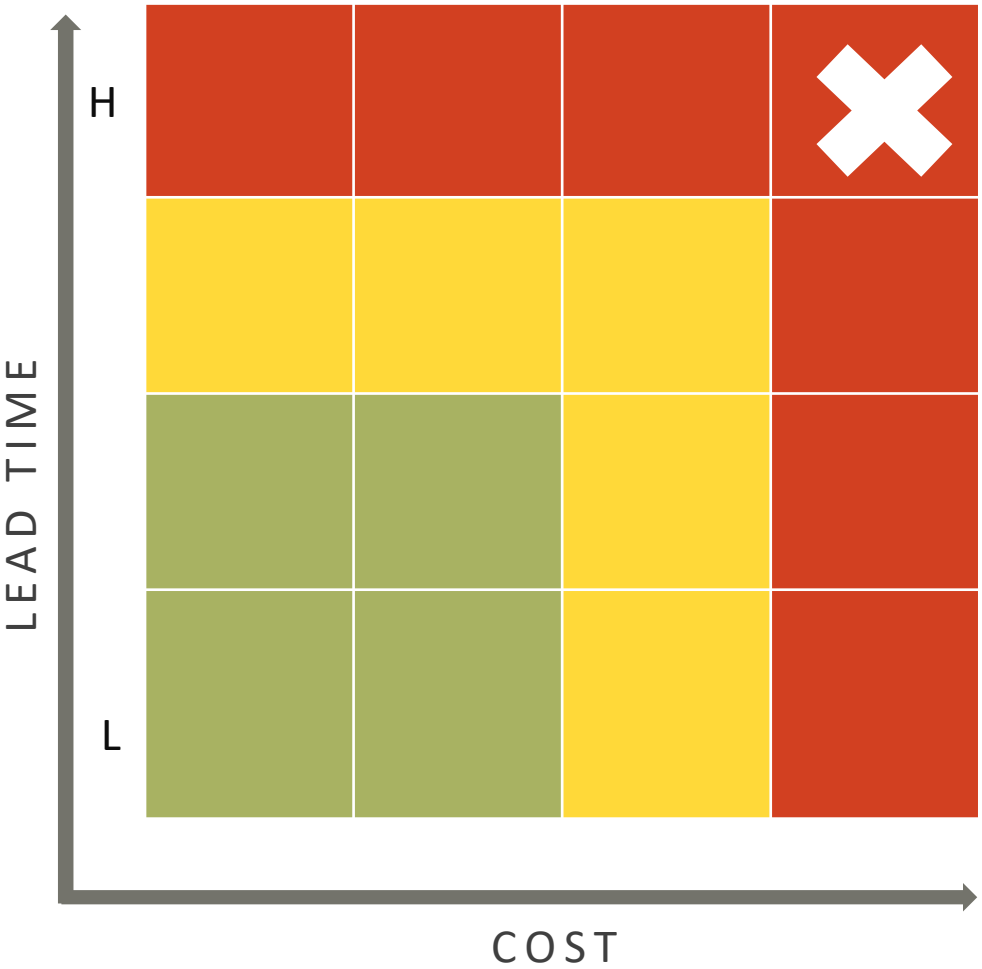
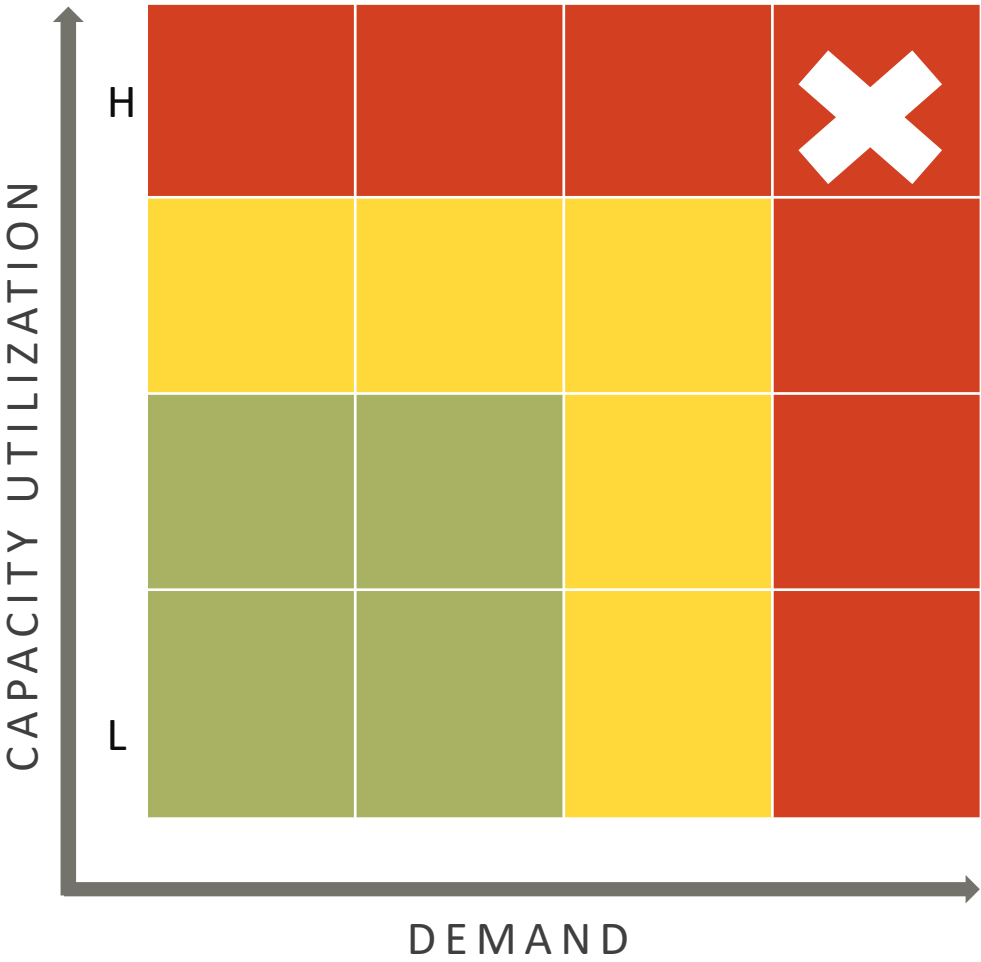


IC MANUFACTURING USES A RECURSIVE DEPOSITION AND MASKING PROCESS TO DEFINE PATTERNS OF, DOPED AREAS, ISOLATION FILMS, AND METAL CONDUCTORS TO CREATE SOLID STATE DEVICES



Semiconductor Outlook

Semiconductor Market Conditions Outlook



Actives LT & Cost Outlook

ANALOG			
	LEAD TIME	LT TREND	COST TREND
TI	18-35	N	I
ADI	24-26	N	I
MICROCHIP	16-22	A	I
NXP	20-26	A	I
MAXIM	15-18	N	I
ON-SEMI	20-26	I	I
ST-MICRO	24-32	A	I
ROHM	18-24	A	I
RENESAS	18-26	A	I
MICRO CONTROLLERS			
	LEAD TIME	LT TREND	COST TREND
ST-MICRO	52++	A	A
INFINEON/CYPRESS	34-45	I	I
LATTICE	34-36	I	I
MICROCHIP	30-52	A	I
MICROSEMI	30-52	I	I
NXP	24-52	A	I
RENESAS	26-30	I	I
PLD			
	LEAD TIME	LT TREND	COST TREND
XYLINX	24-32	N	N
INTEL	18-48	I	I
MICROCHIP	18-36	I	I

MEMORY			
	LEAD TIME	LT TREND	COST TREND
MICRON	24-28	I	I
SAMSUNG	52-54	A	I
ST-MICRO	28-26	A	I
RENASAS	20-24	I	N
ISSI	16-24	I	I
INFINEON	26-36	I	I
ALLIANCE	25-30	I	I
KINGSTON	13-24	I	I
MICROCHIP	28-52	A	I
DISCRETE			
	LEAD TIME	LT TREND	COST TREND
VISHAY	32-40	A	I
DIODES	26-52	I	I
ON-SEMI	24-52	I	I
INFINEON	24-52	A	I
IXYS	20-24	I	N
LITTLEFUSE	20-24	I	I
MCC	32-52	I	I
NEXPERIA	26-52	A	I
ROHM	32-52	I	I
ST-MICRO	32-52	A	I

N is Neutral, I is Increasing , D is Decreasing, A is Allocation

Opto, RF, & EM LT & Cost Outlook

OPTO			
	LEAD TIME	LT TREND	COST TREND
BROADCOM	18-30	N	I
EVERLIGHT	18-24	I	I
OSRAM	18-36	A	I
RENESAS	13-30	I	I
SAMSUNG	18-24	I	N
TOSHIBA	32-52	A	I
VISHAY	18-32	I	I
RF & COMMUNICATION			
	LEAD TIME	LT TREND	COST TREND
INFINEON/CYPRESS	26-30	I	I
CEL	17-26	N	N
LAIRD	22-26	I	I
MICROCHIP	24-26	I	I
MURATA	32-52	I	I
NXP	48-52	A	I
PANASONIC	24-26	I	I
SIERRA WIRELESS	18-26	I	N
UBLOX	32-52	A	I
ST-MICRO	40-52	I	I

INTERCONNECT			
	LEAD TIME	LT TREND	COST TREND
TYCO/TE	26-30	I	I
MOLEX	24-32	I	I
AMPHENOL	22-26	I	I
JST	32-52	I	I
SAMTEC	18-32	N	I
ELECTROMECH			
	LEAD TIME	LT TREND	COST TREND
CRYSTALS/OSC	52++	A	A
ABRACON	52++	A	A
C&K	24-32	I	N
ESPON	18-32	I	I
FOX	18-32	I	I
IXYS	20-24	I	I
KEYSTONE	13-16	N	I
NKK	13-18	N	I

N is Neutral, I is Increasing , D is Decreasing, A is Allocation

C&R and Inductor LT & Cost Outlook

CAPS			
	LEAD TIME	LT TREND	COST TREND
AVX	24-32	I	I
MURATA	24-32	I	I
NICHICON	18-24	I	I
PANASONIC	22-26	I	I
SAMSUNG	22-26	I	I
SURGE	22-24	I	I
TAIYOYUDEN	24-32	I	I
TDK	24-36	I	I

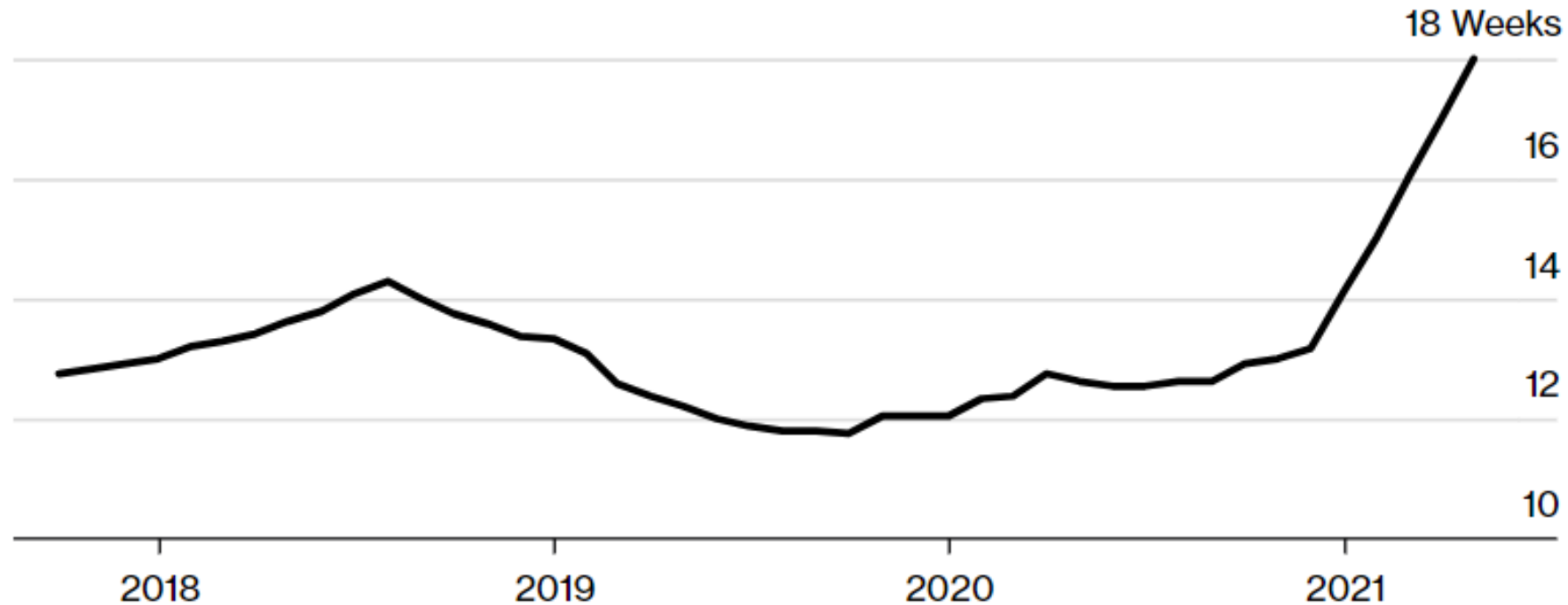
N is Neutral, I is Increasing , D is Decreasing, A is Allocation

RESISTORS			
	LEAD TIME	LT TREND	COST TREND
PANASONIC	18-24	I	I
SEI	18-24	I	I
VISHAY	32-52	A	I
YAGEO	24-26	I	I
INDUCTORS/TRANSFORMERS			
	LEAD TIME	LT TREND	COST TREND
MURATA	18-20	I	I
PANASONIC	22-26	N	N
WURTH	16-32	I	I

2021 Average Lead Times Have Surpassed the 2018 High Water Mark

Lead Times Blow Past Previous Peak

The gap between ordering a chip and delivery is still growing



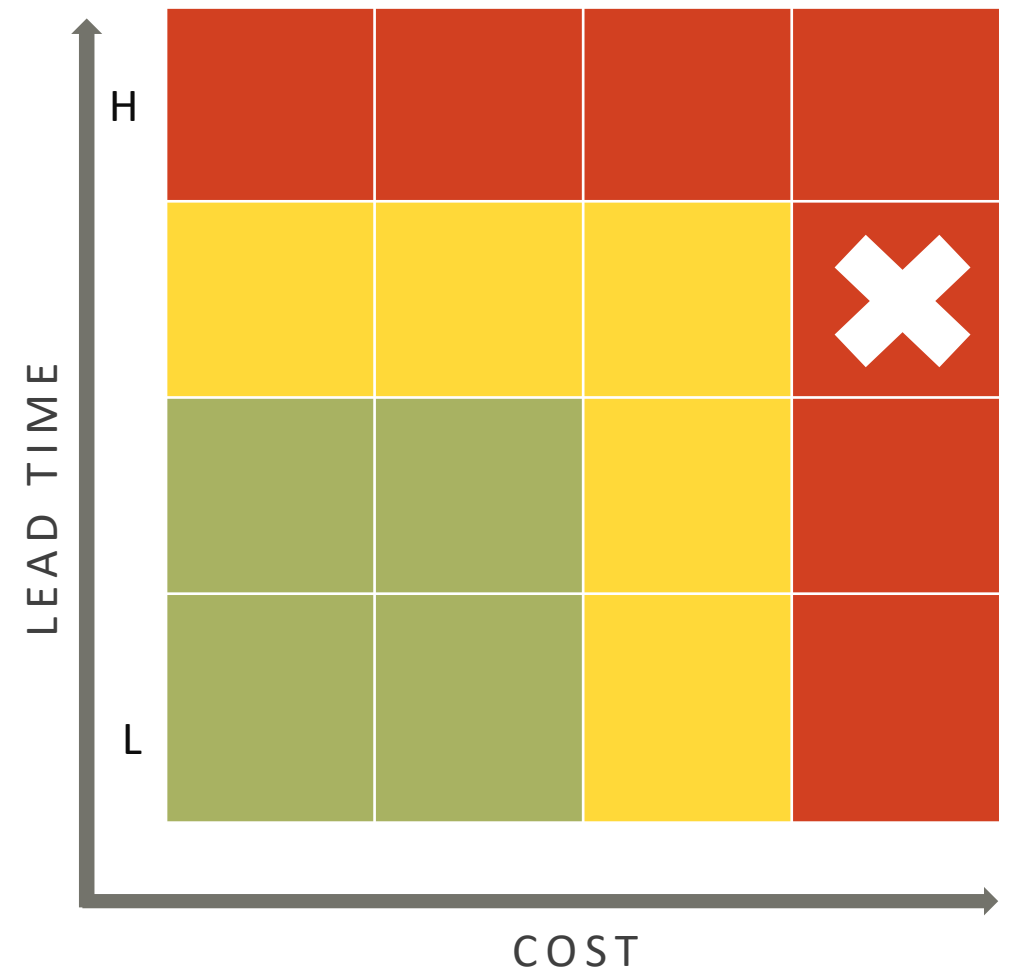
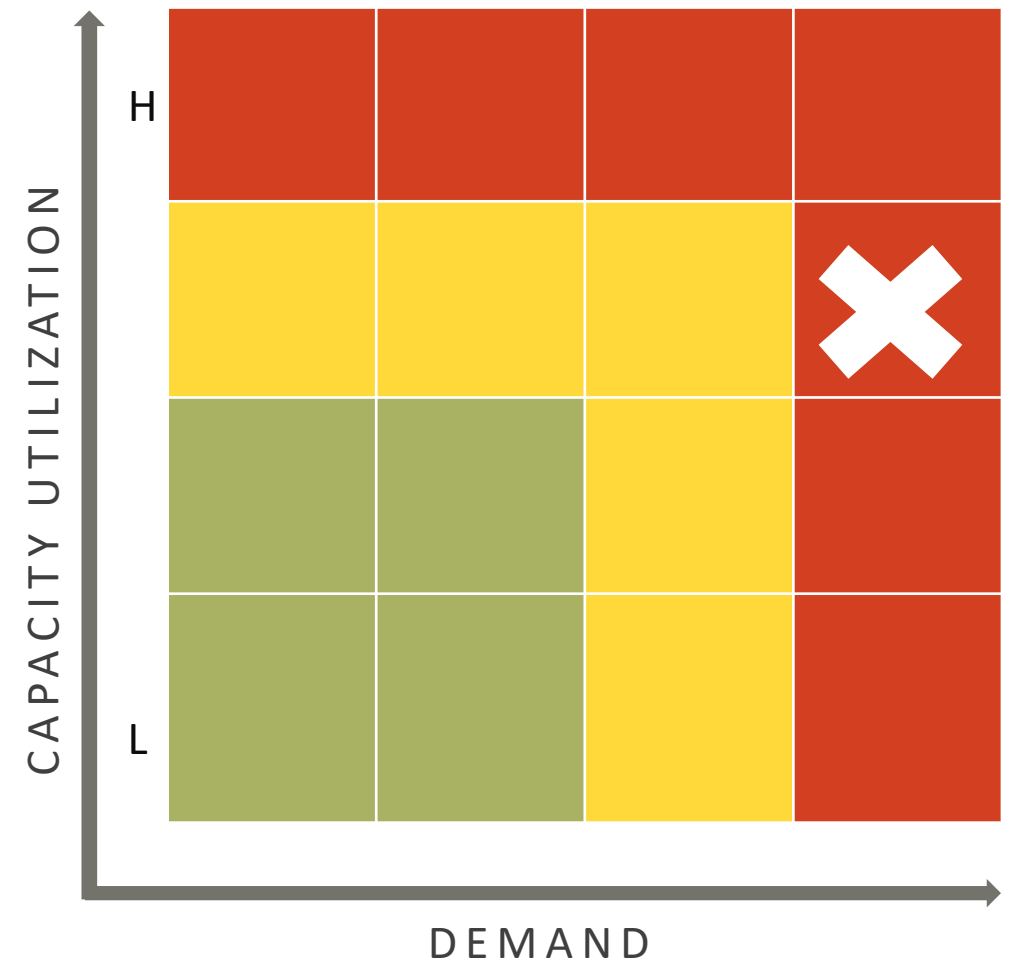
Source: Susquehanna Financial Group

Wait Times for Chips Hit Record 18 Weeks as Shortage Deepens, Bloom Berg June 22 , 2021



Electromechanical Q2&Q3 Outlook

Electromechanical Market Conditions Outlook



Connector Industry Sales Zoom Through May 2021

May 2021 was an exceptional month. Sales were up +41.5%, resulting in \$6,339 million in sales worldwide. Year-to-date 2021 connector industry sales are \$31,308 million, up +30.7%. The following table breaks this down by month compared to 2020 results.

World Connector Sales

Month	Actual		% Change
	2020	2021	
Jan	\$4,942	\$5,881	19.0%
Feb	\$5,235	\$6,633	26.7%
March	\$5,220	\$6,547	25.4%
April	\$4,120	\$5,908	43.4%
May	\$4,480	\$6,339	41.5%
YTD	\$23,997	\$31,308	30.7%

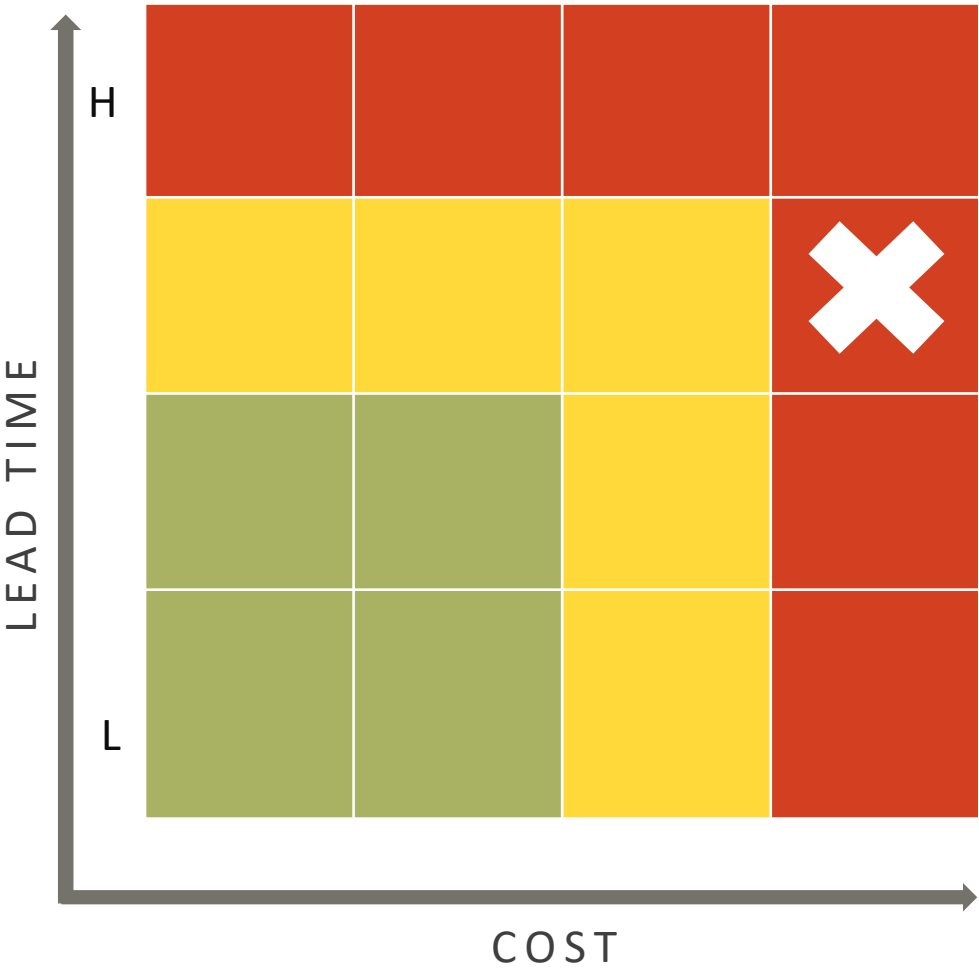
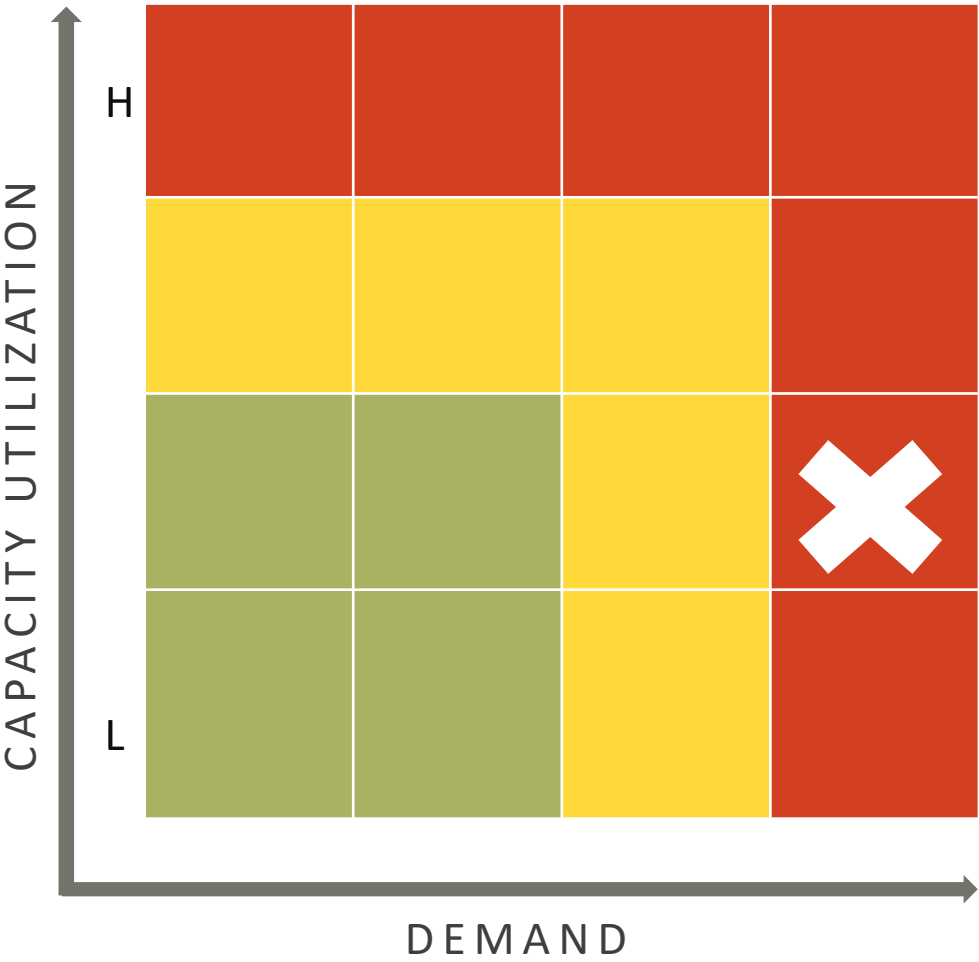
\$ Millions

Connector Industry Sales Outlook – June 2021 Update, July 13 [Connector Supplier.com](http://ConnectorSupplier.com)



PCB Q2&Q3 Outlook

PCB Market Conditions Outlook



North American PCB Industry Sales Up 6.3% in June

Published: 22 July 2021

By Mike Buetow

BANNOCKBURN, IL – North American printed circuit board fabricators reported the 90-day moving average shipments in June rose 6.3% from a year ago.

Shipments grew 17.3% sequentially, IPC announced.

Bookings for the month rose 19.4% year-over-year and 28.9% from the revised May figures.

“We saw strong PCB orders in June, outstripping any month since early 2006. The electronics supply remains constrained and companies continue to look for any available capacity,” said Shawn DuBravac, Chief Economist, IPC. “Shipments also picked up strongly during the month, suggesting some disruptions are starting to improve and companies are increasingly able to fulfill incoming orders.”

The book-to-bill ratio was 1.15, up 40 basis points from last month. It was the eighth straight month the ratio was in positive territory.

The ratio is calculated by dividing the value of orders booked over the past three months by the value of sales billed during the same period from companies in IPC’s survey sample. A ratio of more than 1.0 suggests current demand is ahead of supply, which is a positive indicator for sales growth over the next three to 12 months.

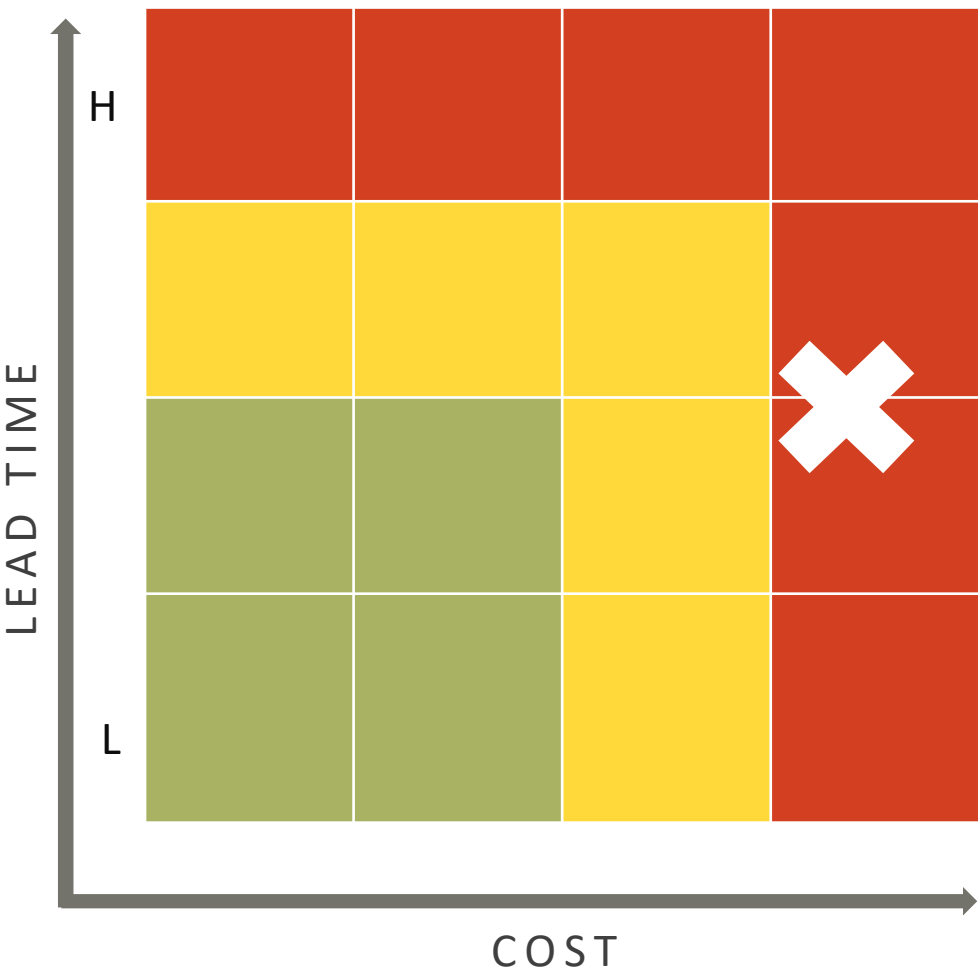
Printed Circuit Design & Fab, July 22, 2001

Bookings for the month rose 19.4% year-over-year and 28.9% from the revised May figures.



Metals Q2&Q3 Outlook

Metals Market Conditions Outlook



1 Year Copper Price

4.21 USD/lb



USD Pounds 1 year

1 Year Tin Price

15.70 USD/lb



USD Pounds 1 year

1 Year Silver Price

25.36 USD/ozt



USD Troy Ounce 1 year

1 Year Platinum Price

1,091.98 USD/ozt



USD Troy Ounce 1 year

Tin-silver-copper (Sn-Ag-Cu, also known as SAC), is a lead-free (Pb-free) alloy commonly used for electronic solder.

Mining.com, July 22, 2021



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Thank You