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Challenges in Component Management

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High tech electronics

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- Getting data from Providers

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Challenges

Challenges

Component Scarcity increased due to Covid, the war on Ukraine, trade restrictions, etc.

- Shifting demands in products
- Transportation Challenges
- Lack of raw materials

This makes it hard to keep designs in production.

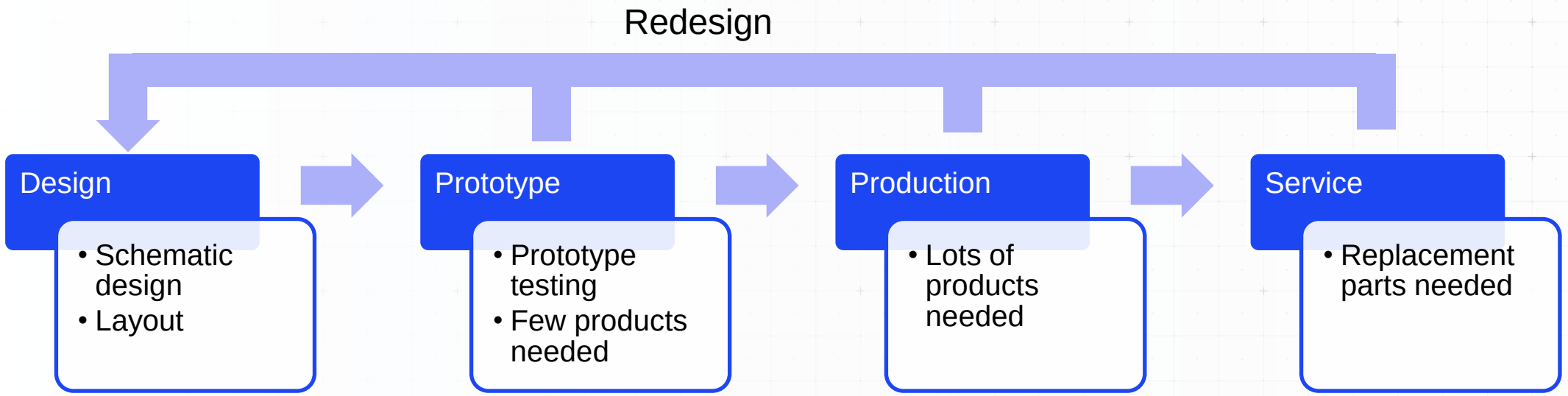
Rules and Regulations

More and more regulations will come in to play, due to environmental impact, labor conditions, etc.

- RoHS
- REACH
- Conflict Materials
- …

This has impact on what parts you can choose.

Component use in Design Lifecycle



Designer chooses parts based on current situation

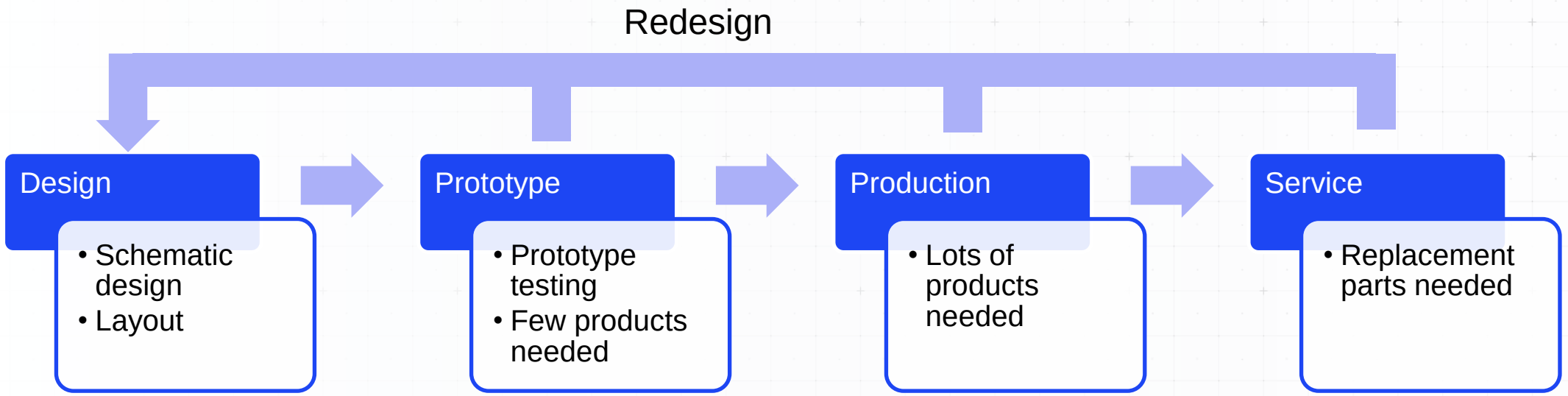
Few boards, leadtime is important

More components needed

Problem

Although the design decisions determine a lot, you design now, but the production/service can be much later, with hugely different circumstances.

Design Lifecycle – Solutions?



Designer chooses parts based on current situation

Provide good lifecycle data.
Check often during design.

Few boards, leadtime is important

Involve board manufacturer as early as possible e.g. through a preliminary BOM.

More components needed

Regularly check part availability.
Use a bigger stock.
Do not wait until leadtimes increase.

Have second sources

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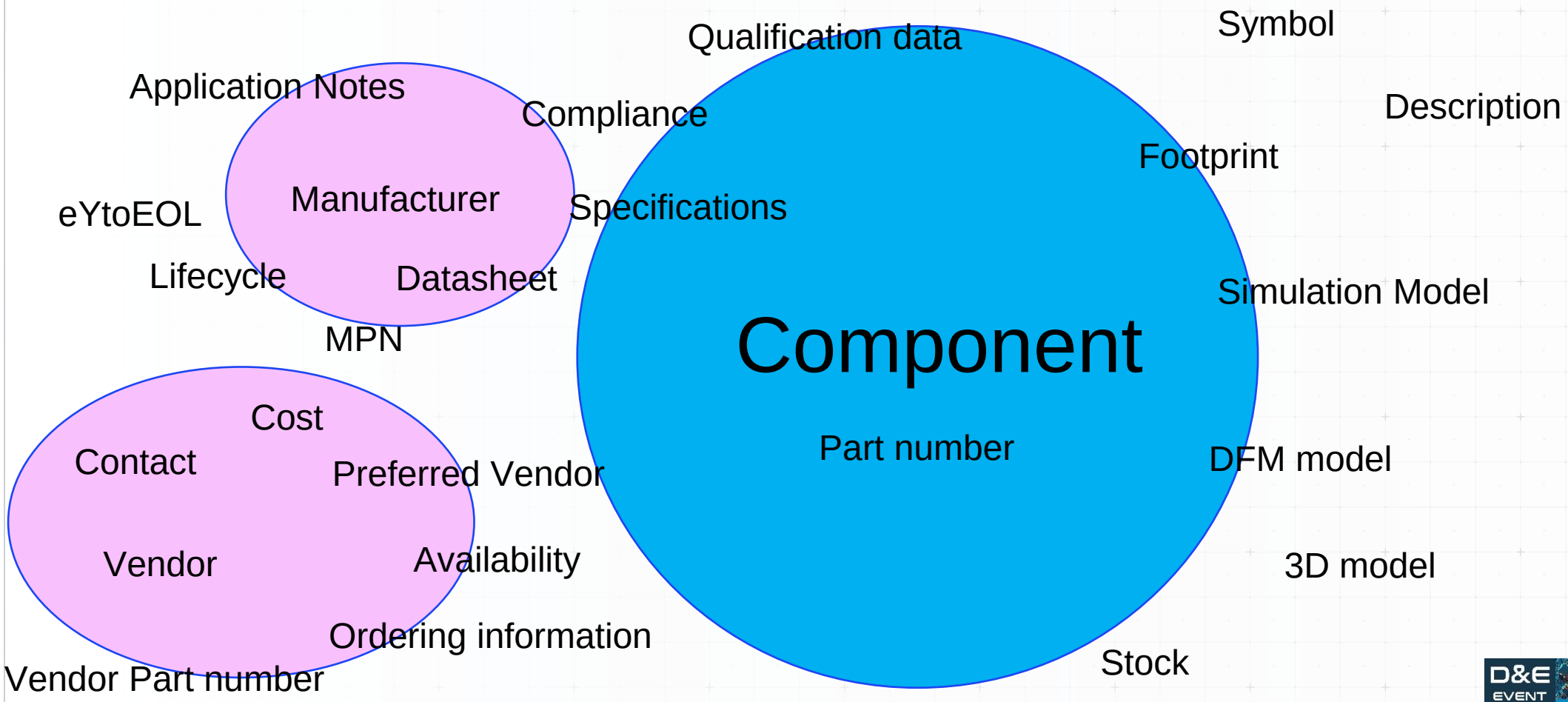
Component Database

Component Database

Key part in this is the component database used for electronic design contains all parts that are used by your organization for electronic design.

It contains information about the component, and all ‘artwork’ to use the component in the design tool, like symbol, footprint.

Component Information



Demands to component database - Designer point of view

Designer wants to:

- Easily find the component.
  - See as much information as possible.
  - Searchable on all specifications.
  - Information readily available
- Use all possible parts in the world
- Does not want to be bothered with compliance, logistics etc.

Demands to component database - Component Engineer point of view

Component engineer wants to:

- Have up-to-date information on lifecycle, availability, etc.
- Have as little parts as possible
- Have as little work as possible

Demands to component database - Purchasing/Logistics point of view

Purchasing wants to:

- As little parts as possible
- As cheaply as possible
- All parts must have second sources
- Parts are quickly available, at every possible production site.
- Parts stay available for a looooong time.

Demands to component database - Other requirements

Part cost as low as possible

Database cost as low as possible

High quality parts, high reliability

Compliant to all regulations

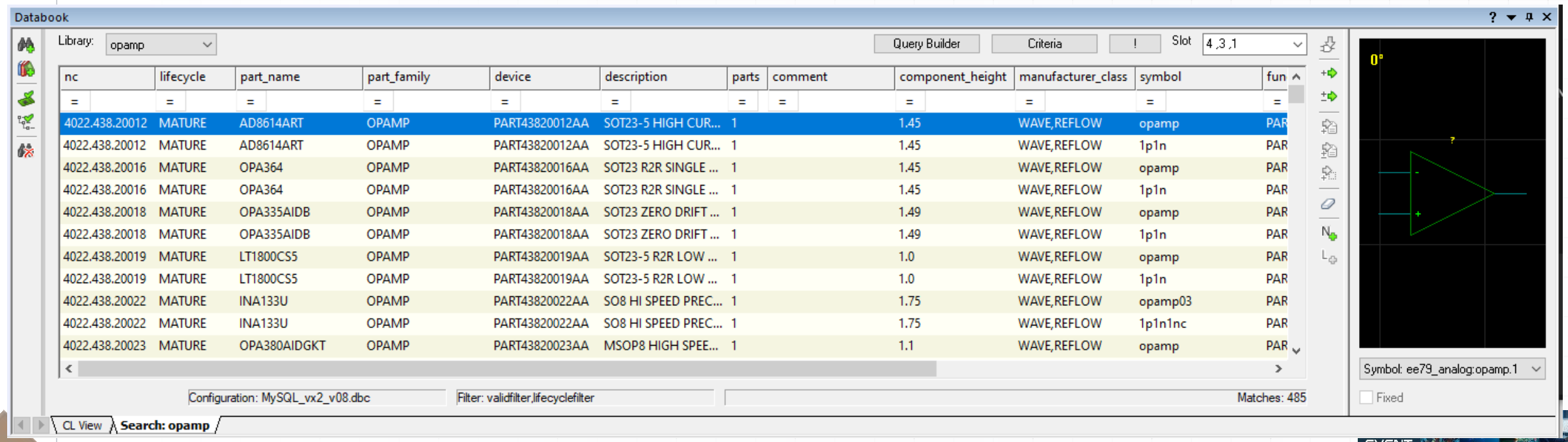
Component Database

Trade off between parties. General rules:

- Generally, a small database is better
  - Standardize on series (e.g. choose 0603, a precision series and high power series)
  - Standardize on connectors (and cables)
- Qualify manufacturers/vendors

Part Placement

Design tools can let you search on parameters of the part, before placing it on the schematic.



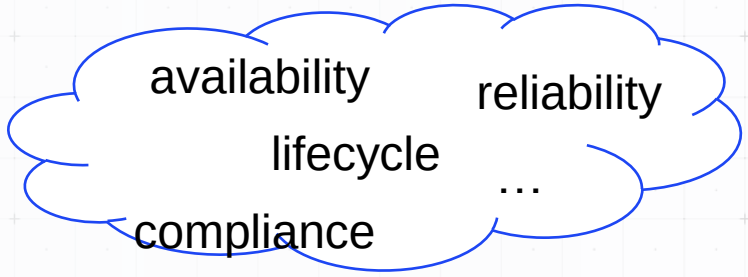
(Siemens DxDesigner)

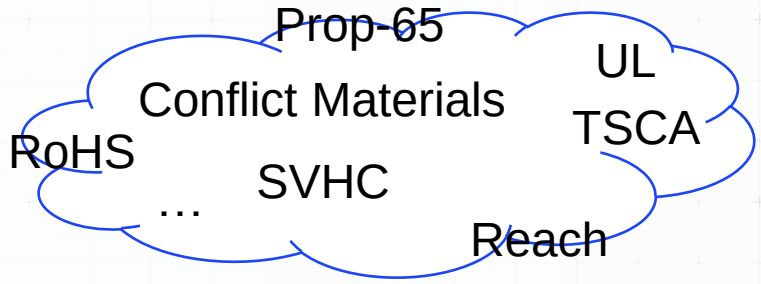
Part Placement – condense information

Condense status, lifecycle, compliance and logistical information into one or just a few status values.

e.g. Preferred Yes/No

Compliance Ok Yes/No





Part Placement - Direct Searchable Data

- Classify parts in a structure (e.g. IEC-61360)
- Provide searchable data for top-x specification parameters per class.
  This should bring the selection down quickly to a few parts.
- Standardize on descriptions.
  “Zener Array Diode, Dual, 4.7 V, Dual Common Anode, 300 mW, 150 °C, SOT-23, 3 Pin”

This is a trade-off between ease of access and maintenance effort.

Some parameters are difficult to determine as they are e.g. temperature dependent. So they are easily misinterpreted or not useful a all.

Example Parameters

Artikelnr. fabrikant	Ordercode	Beschrijving / Fabrikant	Beschikbaarheid	Prijs voor	Prijs	Hoeveelheid	Zener Voltage Nom	Diode Configuration	Power Dissipation	Operating Temperature Max	Diode Case Style	No. of Pins	Diode Mounting	Qualification	Product Range
AZ23C4 V7-7-F 	1773570 Data Sheet RoHS Date/Lot Code	Zener Array Diode, Dual, 4.7 V, Dual Common Anode, 300 mW, 150 °C, SOT-23, 3 Pin DIODES INC. Bestsellers	12 Op voorraad	TAPE EN REEL, AFGESNEDEN Afgesneden tape Verpakkingsopties	5+ € 0,494 10+ € 0,374 100+ € 0,211 500+ € 0,141	5 Toevoegen Min: 5 Mult: 5	4.7V	Dual Common Anode	300mW	150°C	SOT-23	3 Pin	Surface Mount	-	AZ23C

Product Range	Device Core	Data Bus Width	No. of Bits	Data Bus Width	MCU Core Size	Operating Frequency Max	CPU Speed	Program Memory Size	RAM Memory Size	IC Case / Package	No. of Pins	MCU Case Style	No. of I/O's	Interfaces	Embedded Interface Type	ADC Channels	MCU Applications	Supply Voltage Min	ADC Resolution
Kinetis L Family KL2x Series Microcontrollers	ARM Cortex-M0+	32 bit	-	32bit	-	48MHz	-	128KB	16KB	LQFP	80Pins	LQFP	66I/O's	I2C, SPI, UART, USB	I2C, SPI, UART, USB	18Channels	USB Microcontroller	1.71V	16Bit

Part Placement – Direct access

- Provide links to datasheets, and other data at manufacturer.

  Do you copy? Which do you copy? Do you keep history?

- Provide search link for the part to manufacturer for additional information (needs to be maintained).

Logistics information

- Provide lifecycle information (e.g. estimated years to EOL, or ‘New, Mature, Phase-out, Obsolete’).
- Provide cost indication (and keep updating this with your main supplier).
- Lead-times are useful but change often. Link with preferred vendor is better.
- If ordering parts yourself MOQ, Preferred vendor etc are important as well.

Note: Most logistical information that was available during design is outdated once you start producing.

Regulatory Compliance

We all need to comply to the regulations like RoHS, REACH, Prop-65 etc.

Often compliance is required by design, but also for every product made. This means that up to date information needs to be available when producing as well.

These regulations are in flux. New specifications come out, exemptions expire, etc.

This makes it hard to track.

=> Get your information from someone else (e.g. Silicon Expert, IHS, BomCheck, etc.), and regularly update it in your systems.

Check information - BOMs

Provide an easy way to generate BOMs with logistical and compliance information.

- Preliminary BOM
- During production as well.

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Getting data from providers

Getting data

How do you get this data?

- Standard databases, OctoPart, PartMiner, etc can deliver a lot of information already.
- Parties like Silicon Expert, or IHS can deliver lifecycle and compliance information.
- Parties like OctoPart and SupplyFrame deliver supply information

Supply chain information

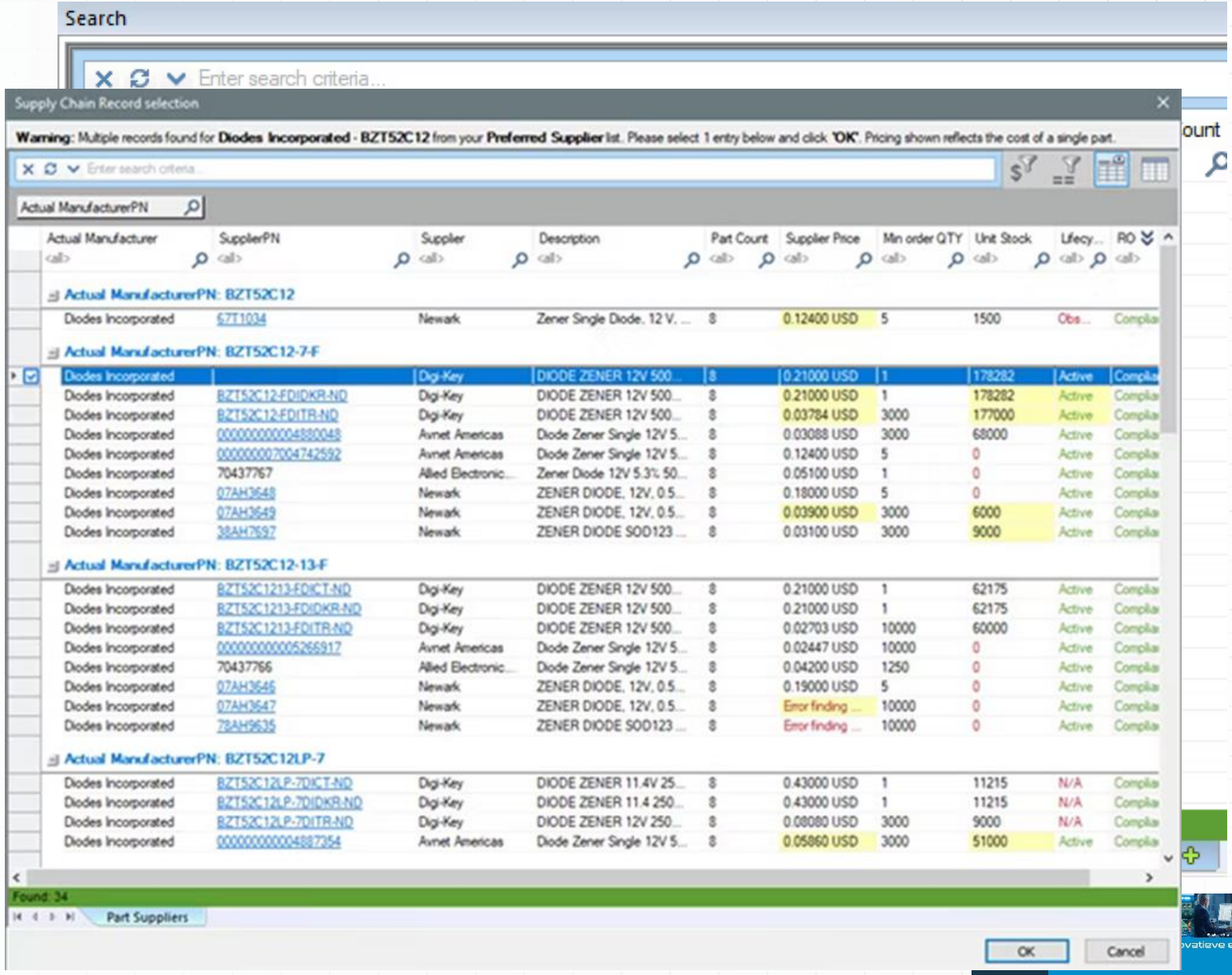
Several providers now provide live checks into the supply chain into your design tool.

- Mapping needed. When using generic components this is hard
- Which supplier is important? Local supplier may not be in there. What if you have multiple locations?
- Local stock is not in there.
- Some tools work on BOM

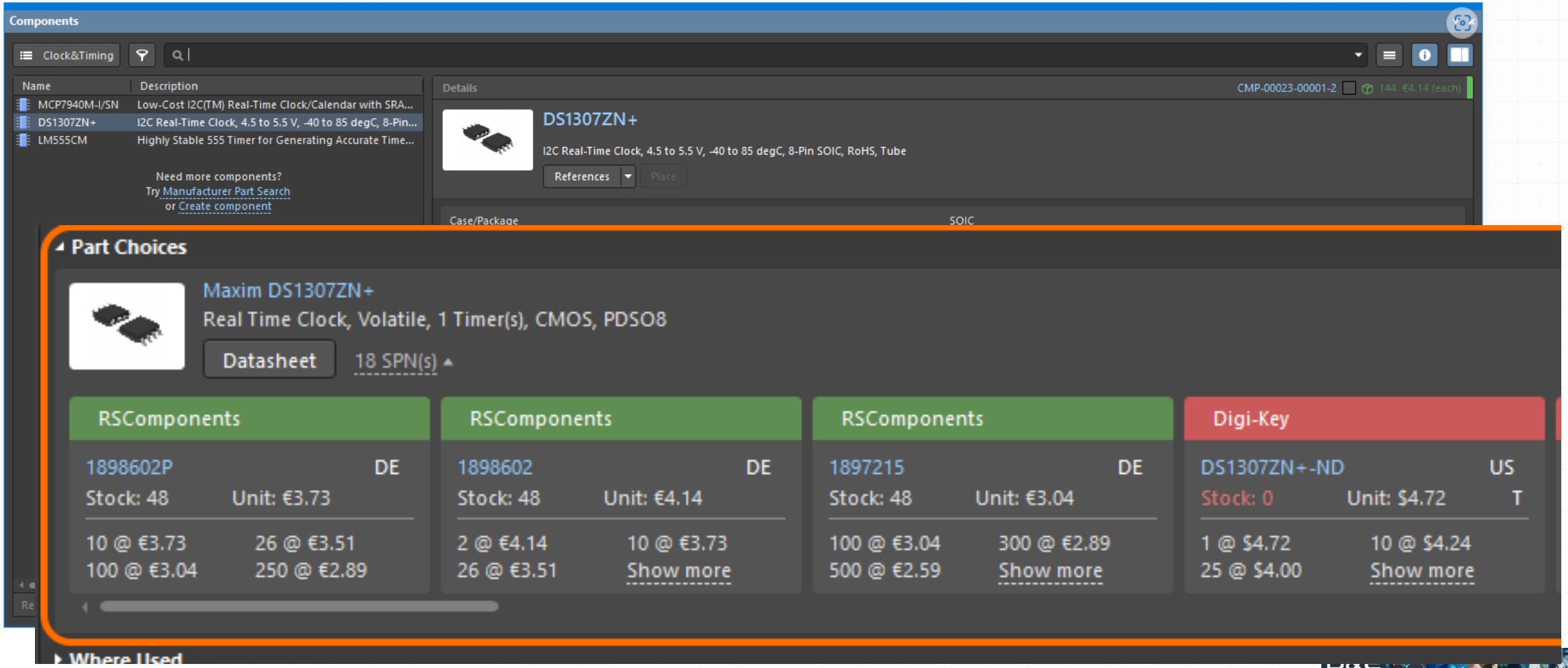
Supply Chain info - Siemens DxDesigner

Status indicators alert users to risk

Source: Siemens



Supply Chain info - Altium – Global Part Catalog / OctoPart



Source: Altium

Symbols/footprints

Quality — Correctness is key.

Uniformity — Or it does not look good.

- US/European drawing style?
- Where to put inputs and outputs.
- Fractured symbols

For footprints a lot of IPC generators are available.

Available databases are usually a mess. Low consistency in drawing guidelines.

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Other subjects around the component database

Other subjects

Part Request systems and qualification process

Alternates

General components (resistor 10k 5%) or specific components (Vishay xxx)

Approved Vendor Lists

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