



dizain-sync

Challenges in Component Management

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High tech electronics

+

D&E
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Hardware



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Test & Measurement



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innovatieve elektronica

Woensdag 19 april 2023
1931 Congrescentrum 's-Hertogenbosch



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Challenges in component availability

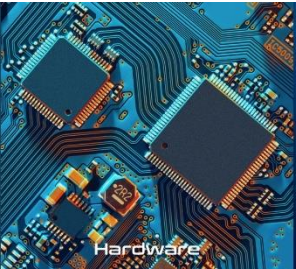
- ✦ Challenges
- ✦ Component Database
- ✦ Getting data from Providers



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Challenges

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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.



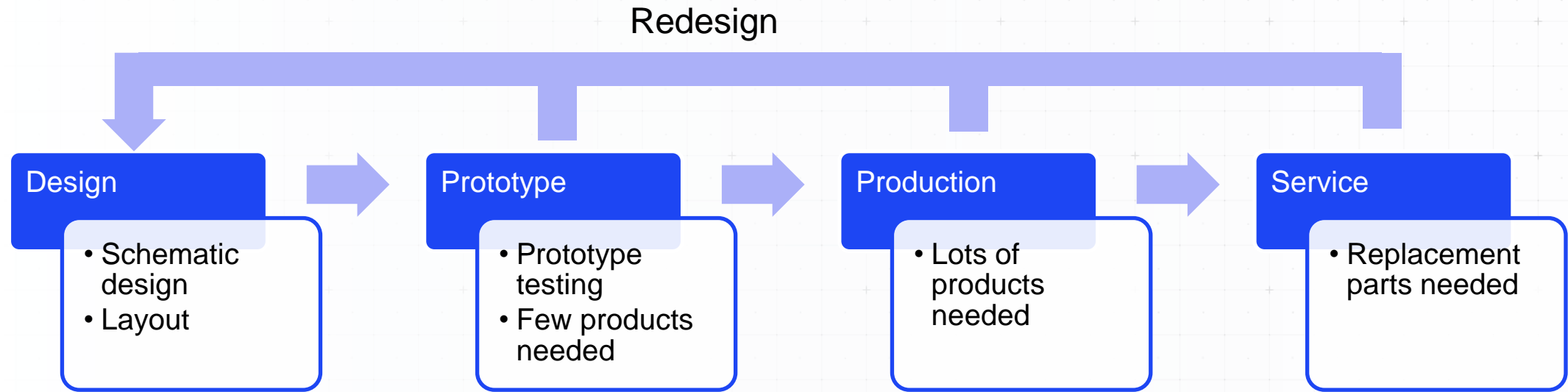
Rules and Regulations

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

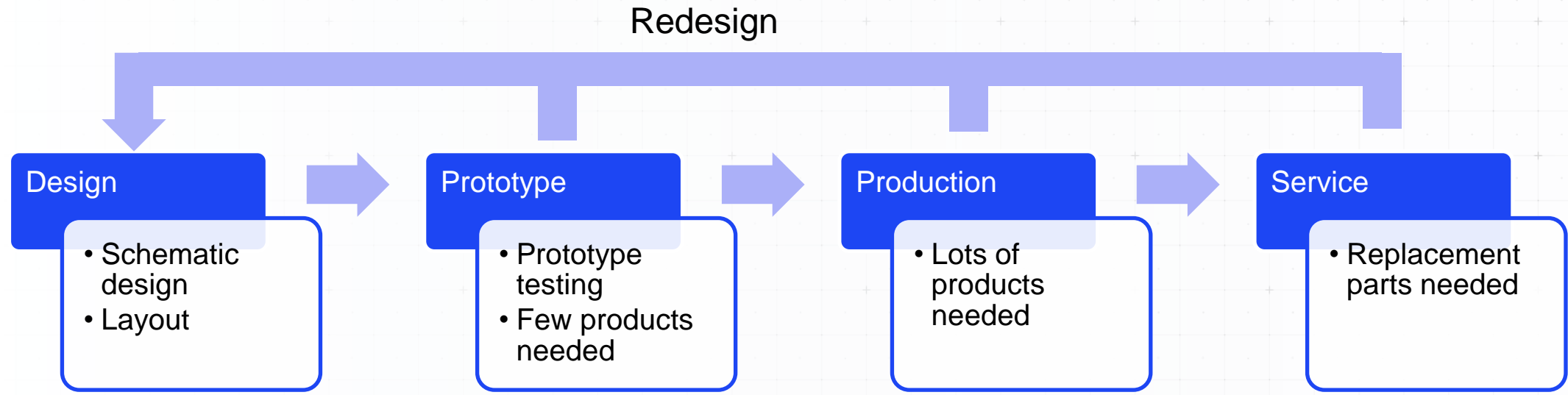
More components needed



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.

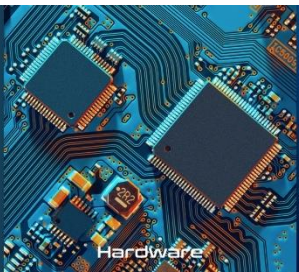
Have second sources



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Component Database

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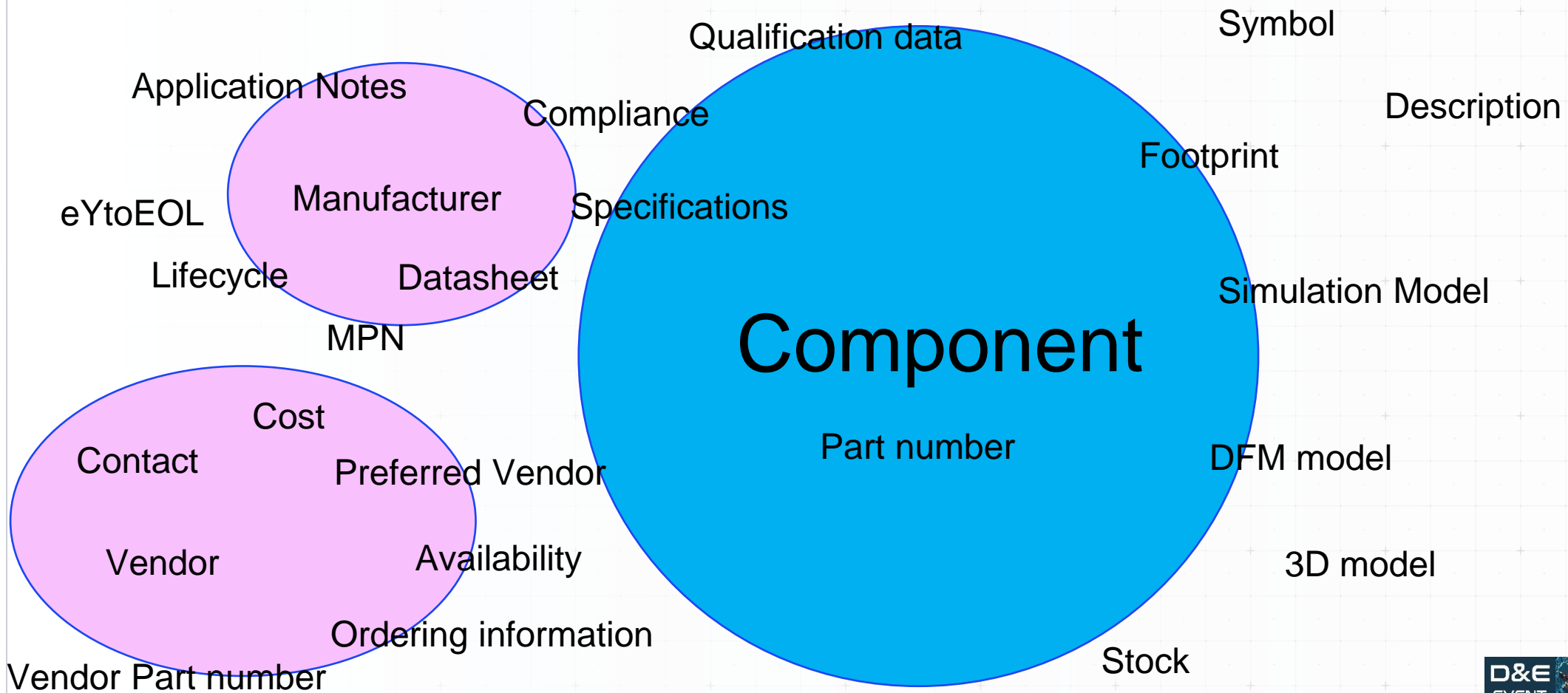
Component Database

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 loooooong 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.

Databook

Library: opamp

Query Builder Criteria Slot 4,3,1

nc	lifecycle	part_name	part_family	device	description	parts	comment	component_height	manufacturer_class	symbol	fun
4022.438.20012	MATURE	AD8614ART	OPAMP	PART43820012AA	SOT23-5 HIGH CUR...	1		1.45	WAVE,REFLOW	opamp	PAR
4022.438.20012	MATURE	AD8614ART	OPAMP	PART43820012AA	SOT23-5 HIGH CUR...	1		1.45	WAVE,REFLOW	1p1n	PAR
4022.438.20016	MATURE	OPA364	OPAMP	PART43820016AA	SOT23 R2R SINGLE ...	1		1.45	WAVE,REFLOW	opamp	PAR
4022.438.20016	MATURE	OPA364	OPAMP	PART43820016AA	SOT23 R2R SINGLE ...	1		1.45	WAVE,REFLOW	1p1n	PAR
4022.438.20018	MATURE	OPA335AIDB	OPAMP	PART43820018AA	SOT23 ZERO DRIFT ...	1		1.49	WAVE,REFLOW	opamp	PAR
4022.438.20018	MATURE	OPA335AIDB	OPAMP	PART43820018AA	SOT23 ZERO DRIFT ...	1		1.49	WAVE,REFLOW	1p1n	PAR
4022.438.20019	MATURE	LT1800CS5	OPAMP	PART43820019AA	SOT23-5 R2R LOW ...	1		1.0	WAVE,REFLOW	opamp	PAR
4022.438.20019	MATURE	LT1800CS5	OPAMP	PART43820019AA	SOT23-5 R2R LOW ...	1		1.0	WAVE,REFLOW	1p1n	PAR
4022.438.20022	MATURE	INA133U	OPAMP	PART43820022AA	SO8 HI SPEED PREC...	1		1.75	WAVE,REFLOW	opamp03	PAR
4022.438.20022	MATURE	INA133U	OPAMP	PART43820022AA	SO8 HI SPEED PREC...	1		1.75	WAVE,REFLOW	1p1n1nc	PAR
4022.438.20023	MATURE	OPA380AIDGKT	OPAMP	PART43820023AA	MSOP8 HIGH SPEE...	1		1.1	WAVE,REFLOW	opamp	PAR

Configuration: MySQL_vx2_v08.dbc Filter: validfilter,lifecyclefilter Matches: 485

CL View Search: opamp

Symbol: ee79_analog:opamp.1

Fixed

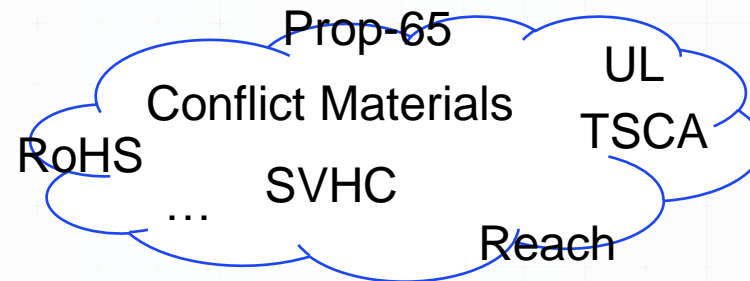
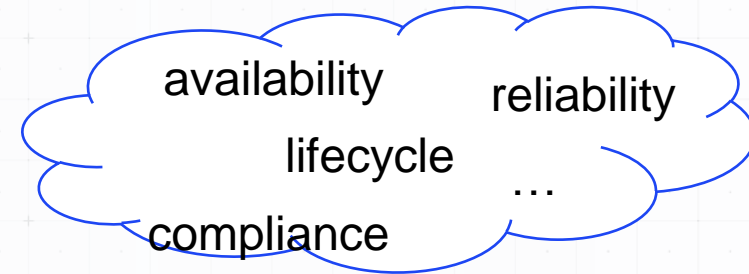
(Siemens DxDesigner)



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 at 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	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.



Getting data from providers

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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

Warning: Multiple records found for **Diodes Incorporated - BZT52C12** from your Preferred Supplier list. Please select 1 entry below and click 'OK'. Pricing shown reflects the cost of a single part.

Actual Manufacturer	SupplierPN	Supplier	Description	Part Count	Supplier Price	Min order QTY	Unit Stock	Lifecy...	RO
Actual ManufacturerPN: BZT52C12									
Diodes Incorporated	62T1034	Newark	Zener Single Diode, 12 V, ...	8	0.12400 USD	5	1500	Obs...	Compla
Actual ManufacturerPN: BZT52C12-7-F									
Diodes Incorporated	Digi-Key	Digi-Key	DIODE ZENER 12V 500...	8	0.21000 USD	1	178282	Active	Compla
Diodes Incorporated	Digi-Key	Digi-Key	DIODE ZENER 12V 500...	8	0.03784 USD	3000	177000	Active	Compla
Diodes Incorporated	Avnet Americas	Avnet Americas	Diode Zener Single 12V 5...	8	0.03088 USD	3000	68000	Active	Compla
Diodes Incorporated	Avnet Americas	Avnet Americas	Diode Zener Single 12V 5...	8	0.12400 USD	5	0	Active	Compla
Diodes Incorporated	Allied Electronic...	Allied Electronic...	Zener Diode 12V 5.3% 50...	8	0.05100 USD	1	0	Active	Compla
Diodes Incorporated	Newark	Newark	ZENER DIODE, 12V, 0.5...	8	0.18000 USD	5	0	Active	Compla
Diodes Incorporated	Newark	Newark	ZENER DIODE, 12V, 0.5...	8	0.03900 USD	3000	6000	Active	Compla
Diodes Incorporated	Newark	Newark	ZENER DIODE S00123 ...	8	0.03100 USD	3000	9000	Active	Compla
Actual ManufacturerPN: BZT52C12-13-F									
Diodes Incorporated	Digi-Key	Digi-Key	DIODE ZENER 12V 500...	8	0.21000 USD	1	62175	Active	Compla
Diodes Incorporated	Digi-Key	Digi-Key	DIODE ZENER 12V 500...	8	0.21000 USD	1	62175	Active	Compla
Diodes Incorporated	Digi-Key	Digi-Key	DIODE ZENER 12V 500...	8	0.02703 USD	10000	60000	Active	Compla
Diodes Incorporated	Avnet Americas	Avnet Americas	Diode Zener Single 12V 5...	8	0.02447 USD	10000	0	Active	Compla
Diodes Incorporated	Allied Electronic...	Allied Electronic...	Diode Zener Single 12V 5...	8	0.04200 USD	1250	0	Active	Compla
Diodes Incorporated	Newark	Newark	ZENER DIODE, 12V, 0.5...	8	0.19000 USD	5	0	Active	Compla
Diodes Incorporated	Newark	Newark	ZENER DIODE, 12V, 0.5...	8	Error finding ...	10000	0	Active	Compla
Diodes Incorporated	Newark	Newark	ZENER DIODE S00123 ...	8	Error finding ...	10000	0	Active	Compla
Actual ManufacturerPN: BZT52C12LP-7									
Diodes Incorporated	Digi-Key	Digi-Key	DIODE ZENER 11.4V 25...	8	0.43000 USD	1	11215	N/A	Compla
Diodes Incorporated	Digi-Key	Digi-Key	DIODE ZENER 11.4 250...	8	0.43000 USD	1	11215	N/A	Compla
Diodes Incorporated	Digi-Key	Digi-Key	DIODE ZENER 12V 250...	8	0.08080 USD	3000	9000	N/A	Compla
Diodes Incorporated	Avnet Americas	Avnet Americas	Diode Zener Single 12V 5...	8	0.05860 USD	3000	51000	Active	Compla

Found: 34
Part Suppliers

Supply Chain info - Altium – Global Part Catalog / OctoPart

Components


Clock&Timing

Name	Description
MCP7940M-I/SN	Low-Cost I2C(TM) Real-Time Clock/Calendar with SRA...
DS1307ZN+	I2C Real-Time Clock, 4.5 to 5.5 V, -40 to 85 degC, 8-Pin...
LM555CM	Highly Stable 555 Timer for Generating Accurate Time...

Need more components?
Try [Manufacturer Part Search](#)
or [Create component](#)

Details


CMP-00023-00001-2 144 €4.14 (each)

 **DS1307ZN+**
I2C Real-Time Clock, 4.5 to 5.5 V, -40 to 85 degC, 8-Pin SOIC, RoHS, Tube

References Place

Case/Package SOIC

Part Choices

 **Maxim DS1307ZN+**
Real Time Clock, Volatile, 1 Timer(s), CMOS, PDSO8

[Datasheet](#) 18 SPN(s) ▲

RSComponents		RSComponents		RSComponents		Digi-Key	
1898602P	DE	1898602	DE	1897215	DE	DS1307ZN+-ND	US
Stock: 48	Unit: €3.73	Stock: 48	Unit: €4.14	Stock: 48	Unit: €3.04	Stock: 0	Unit: \$4.72
10 @ €3.73	26 @ €3.51	2 @ €4.14	10 @ €3.73	100 @ €3.04	300 @ €2.89	1 @ \$4.72	10 @ \$4.24
100 @ €3.04	250 @ €2.89	26 @ €3.51	Show more	500 @ €2.59	Show more	25 @ \$4.00	Show more

Where Used

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.



Other subjects around the component database

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Other subjects

Part Request systems and qualification process

Alternates

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

(Vishay xxx)

Approved Vendor Lists



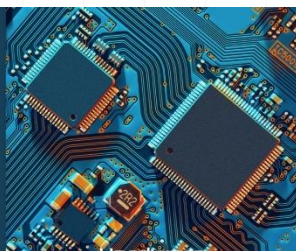
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Dizain-Sync

Connecting your Design Flow

www.dizain-sync.com

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