

# Die Herausforderungen der IPC-7351 Bauteilsuche

---



Präsentiert

von Karl-Heinz Kluwetasch

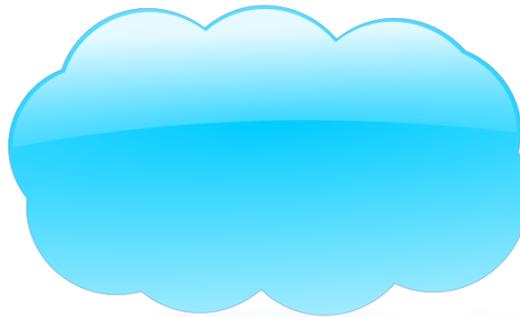
## ... für die Bibliotheks-Automatisierung:

- Firmen nutzen verschiedene CAD-Programme in unterschiedlichen Versionen. Aufgrund neuer Programmfunktionen sind die PCB-Bibliotheken nicht rückwärts kompatibel. Häufig werden veraltete oder sogar eingestellte CAD-Programme verwendet.
- CAD-Hersteller erweitern kontinuierlich ihre Programmpalette und somit ändern sich auch die Formate laufend. Die Entwicklung von neuen Konvertern für jedes CAD-Programm ist eine große Herausforderung.
- CAD-Anbieter unterstützen den Import eines neutralen PCB-Bibliotheken-Formats nicht, sondern schützen Ihre Daten über Binär-Codes oder verschlüsseln die Daten.
- Die Bauteilhersteller können nicht verantwortlich dafür sein PCB-Bibliotheken herzustellen, die über 30 verschiedene CAD-Programm-Versionen unterstützen.
- Die Bauteilhersteller entwickeln einzigartige Bauteileinheiten, die einen komplexen Footprint (Land Patterns) erfordern.
- Es gibt zahlreiche Möglichkeiten Footprints zu erstellen.

## Online Beschaffung und Einsatz von IPC-7351 konformen Bauteilen für CADSTAR:

Über spezielle Bauteil Suchmaschinen haben Entwickler heute die Möglichkeit, Bauteile zeitsparend zu suchen, zu finden und herunterzuladen.

In welchem Umfang die Bauteildaten kompatibel mit dem eigenen CAD-System sind, stellt sich allerdings erst bei der Verwendung der Bauteile in CADSTAR heraus. Die allgemeine Anbieterangabe „IPC-konform“ ist allerdings kein Freibrief, das Bauteil direkt zu verwenden. Neben den einfachen Dingen wie Lagenzuordnung oder die verwendete Maßeinheit mm oder Inch, sind die produktionsrelevanten Landeflächen-Abmessungen relevant.

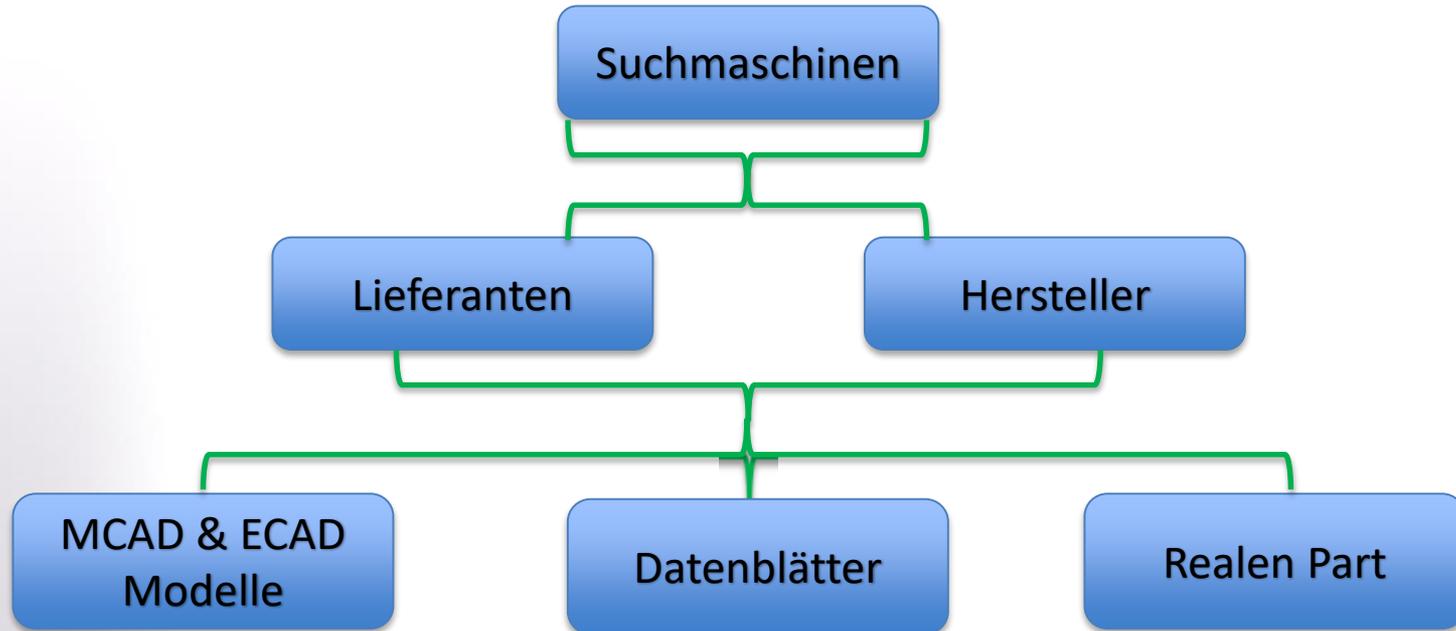


SamacSys  
SOFTWARE FROM OUTSIDE THE BOX



CADSTAR





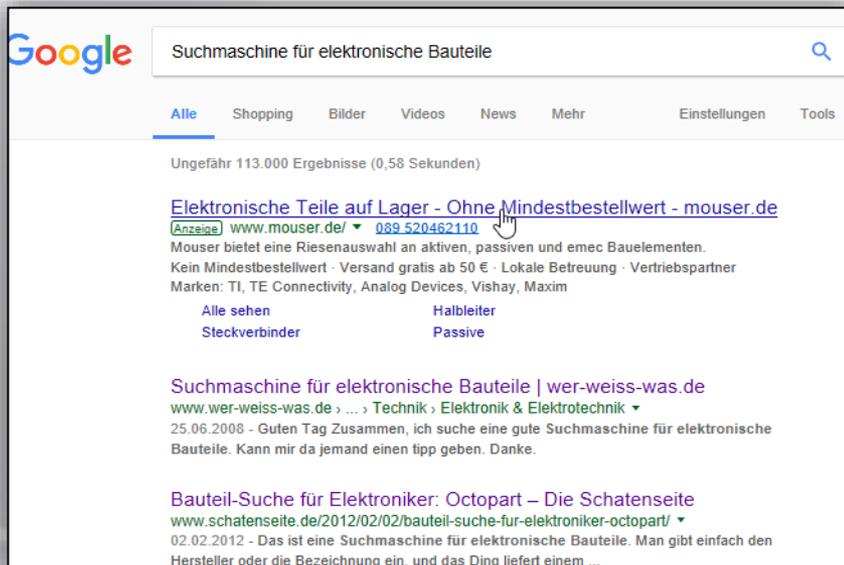
- 2 D Landpatteren
- Simulations-Modelle
- 3 D Model

- Übersicht
- Elektrische Funktionen
- Mechanische Daten

- Preis
- Verfügbarkeit
- Ort

# Auswahl der Part-Suchmaschinen im Web

Die ersten Hinweise auf mögliche Suchmaschinen für Parts werden durch eine simple Suchabfrage erreicht.



Links zu anderen Halbleiterseiten	
<b>The Semiconductor Resource page</b>	<a href="http://www.semiresources.com">http://www.semiresources.com</a> vormals: start.at/semipage bzw. www.mindspring.com/~the1/semi.html von Roger Sligar (Mitarbeiter von Unique Technologies, vormals EBV). Links, Adressen, Tel- und Fax-Nummern von Halbleiterherstellern. Eine HTML-Seite pro Anfangsbuchstabe, nach <b>eigenen Angaben</b> die umfangreichste Liste im WWW Stand: 2.7.2011
<b>ECA Manufacturer list</b>	<a href="http://www.ecadata.de/herst/eca-hersteller.html">http://www.ecadata.de/herst/eca-hersteller.html</a> Stand: 26.9.2012 Hersteller Liste des Fachverlages ECA von Manfred Bergler
<b>Chip Directory</b>	<a href="http://www.chipdir.nl">http://www.chipdir.nl</a> <a href="#">Direkter Link zur Hersteller-Übersicht</a> Mirror: <a href="http://www.xs4all.nl/~ganswijk/chipdir">http://www.xs4all.nl/~ganswijk/chipdir</a> Stand: 25.8.2008 von Jaap van Ganswijk, Die Niederlande
<b>Octopart</b>	<a href="http://octopart.com/">http://octopart.com/</a> Bauteile-Suchmaschine mit Angabe von Preisen und Verfügbarkeit von verschiedenen Distributoren
<b>Elneec</b>	<a href="http://www.elnec.com/support/ic-logos/?method=name">http://www.elnec.com/support/ic-logos/?method=name</a> Sammlung von Logos, Herstellernamen und Weblinks
<b>The Antique Chip Collector's Page</b>	<a href="http://www.antiquetech.com">http://www.antiquetech.com</a> Info-Seite für Chip-Sammler über: erste ICs (hauptsächlich Mikroprozessoren und Speicher) und deren Hersteller und Vorläuferfirmen der heutigen Hersteller (z.B. Signetics, Ates, Commodore, ...) Stand: 28.9.2004
<b>Chips Etc.</b>	<a href="http://www.chipsetc.com">http://www.chipsetc.com</a> Seite für Chip-Sammler: Computer-Chip-Klassiker, Halbleiter- und Transistor-Erinnerungsstücke (Memorabilien), etc.
<b>Smithsonian - The Chip Collection</b>	<a href="http://smithsonianchips.si.edu">http://smithsonianchips.si.edu</a> Historische Infos zu Halbleiterherstellern in USA, Insider-Infos, alte Fachzeitschriften, ...

# Suchmaschine: **Octopart**

Octopart ist ein Anbieter von Datenbeständen und speziellen Suchfunktionen für elektronische Bauelemente.

**Octopart**

Search by part number or keyword

Or try an example search: [PIC18F4550](#)

Octopart is the **fastest** search engine for electronic parts. Search across hundreds of **distributors** and thousands of **manufacturers**.

### Browse parts by category

- Integrated Circuits
- Discrete Semiconductors
- Passive Components
- Electromechanical
- Connectors
- Sensors
- Optoelectronics
- Circuit Protection
- Power Products
- Cables and Wire

**BOM Tool**  
**Common Parts Library**  
**Octopart API**  
**Blog**

**Distributors**  
Abacus Technologies  
Allied Electronics  
Arrow  
Avnet  
Digi-Key  
element14 APAC  
Farnell

**Manufacturers**  
Future Electronics  
Grainger  
Hellind Electronics  
Onlinecomponents  
Mouser  
Newark  
PEI Genesis

SLF6025T-100M1R0-PF

Category: Inductors

Manufacturer: TDK

Distributor: Mouser

TDK SLF6025T-100M1R0-PF - Buy Now at Digi-Key from \$0.504

Prices Specs Currency: EUR Sort: Relevance Results 1 - 1 of 1

TDK SLF6025T-100M1R0-PF \$0.400 + Add to BOM Datasheet 3

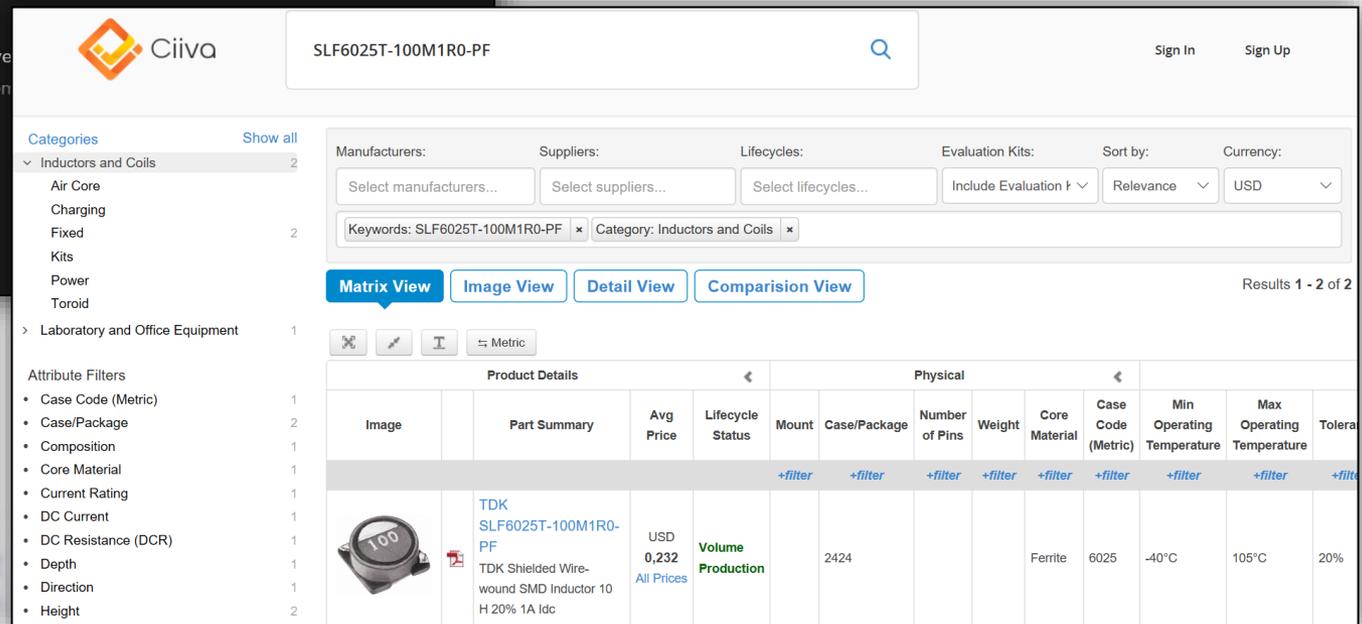
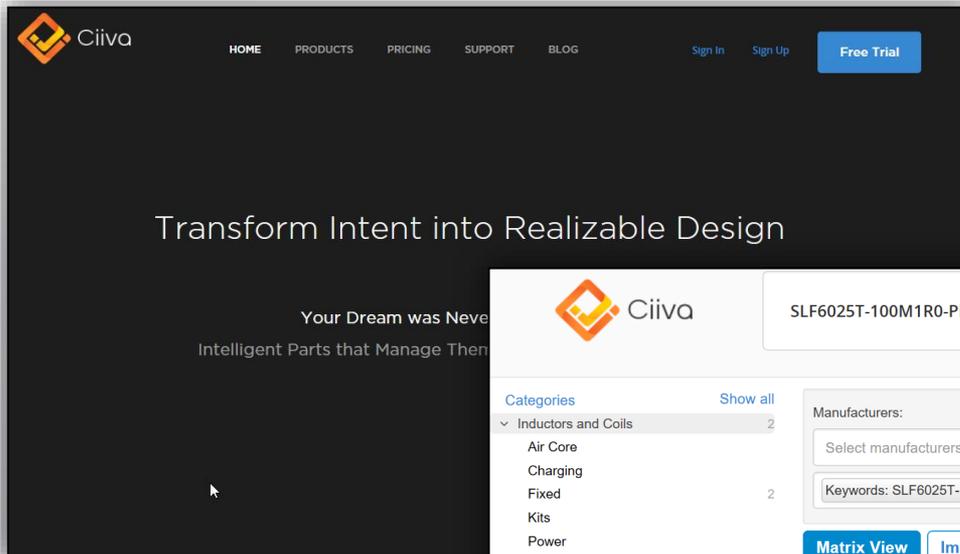
Inductor Power Shielded Wirewound 10uH 20% 100KHz Ferrite 1.3A 57.3mOhm DCR 2424 T/R

Distributor	SKU	Stock	MOQ	Pkg	1	10	100	1,000	10,000	
Digi-Key	<a href="#">445-174416-1-ND</a>	1,031	1	Cut Tape	EUR*	0.900	0.835	0.604	0.463	0.463
Verical	<a href="#">SLF6025T-100M1R0-PF</a>	2,039	31		EUR*		0.501	0.406	0.406	
RS Components	<a href="#">6044438</a>	5,760								
Chip One Stop Japan	<a href="#">C15741000198846</a>	2,039	10	Cut Tape	EUR*	0.688	0.423	0.345	0.345	
Mouser	<a href="#">810-SLF6025T-100M</a>	2,708			EUR*	0.918	0.688	0.654	0.367	0.332

More filters: Inductance, Lead-Free Status, Mounting Type, RoHS, Shielding

\* SLF6025T-100M1R0-PF - TDK  
<https://octopart.com/>

Ciiva ist ein Anbieter von Datenbeständen und speziellen Suchfunktionen für elektronische Bauelemente.



SLF6025T-100M1R0-PF

Manufacturers: Suppliers: Lifecycles: Evaluation Kits: Sort by: Currency:

Select manufacturers... Select suppliers... Select lifecycles... Include Evaluation Kits Relevance USD

Keywords: SLF6025T-100M1R0-PF Category: Inductors and Coils

Matrix View Image View Detail View Comparison View Results 1 - 2 of 2

Product Details				Physical								
Image	Part Summary	Avg Price	Lifecycle Status	Mount	Case/Package	Number of Pins	Weight	Core Material	Case Code (Metric)	Min Operating Temperature	Max Operating Temperature	Tolerance
	TDK SLF6025T-100M1R0-PF TDK Shielded Wire-wound SMD Inductor 10 H 20% 1A Idc	USD 0,232 All Prices	Volume Production		2424			Ferrite	6025	-40°C	105°C	20%

\* SLF6025T-100M1R0-PF - TDK  
<https://ciiva.com> und <https://ciiva.com/part>

Parts.io ist ein Anbieter von Datenbeständen und speziellen Suchfunktionen für elektronische Bauelemente.

BASE NUMBER	MANUFACTURER PART NUMBER	COMPOSITE PRICE	STOCK	DESCRIPTION
SCD	SCD0504T-101K-N	\$0.2050	785	1 ELEMENT, 10 GENERAL PURP, SMD, ROHS CO
MLF	MLF2012DR82K			General Purpos, 1 Element, Ferr, CHIP, 805, H, ROHS COMPLI
P1170	P1170-502NLF			General Purpos, Element, Ferrite, ROHS COMPLI
LP5314	LP5314-100MLB			General Purpos, Element, Ferrite, ROHS COMPLI
DO5010H	DO5010H-103MLB	\$1.5471	2,969	General Purpos, Element, Ferrite, ROHS COMPLI
LQP15M	LQP15MZH7800D	\$0.0957	54,186	General Purpos, Element, SMD, (
36581J	36581J16AJTJG	\$0.2370	4,511	1 ELEMENT, 0.0 PURPOSE INCL, 0603
LK	LK1205R7K-T	\$0.1193	24,000	General Purpos, 1 Element, Ferr, CHIP, 805, RO
CS	CS0903-12HJ-H			General Purpos, 1 Element, Ferr, CHIP, 805, RO
HK	HK1608R2N1-T	\$0.0638	50,588	General Purpos, 1 Element, Ferr, CHIP, 805, RO

\* SLF6025T-100M1R0-PF - TDK  
<http://parts.io>

Je nach Suchmaschine können mehr oder weniger umfangreiche Informationen angezeigt bzw. Suchkriterien festgelegt werden.

parts.io SLF6025T-100M1R0-PF

You have 30 days left on your free trial. Please update your account details for future billings. Update Account Details →

SLF6025T-100M1R0-PF

Inductors

1 Results Filter Results Analytics

Filter your results

Manufacturer Part Number: SLF6025-100M1R0-PF

Did your search return too few results? Expand your search!

BASE NUMBER	COMPOSITE PRICE	INDUCTANCE (NOM.)	PART LIFE CYCLE CODE
SLF	\$0.5012	10 µH	ACTIVE

CONSTRUCTION: MAGNETICALLY SHIELDED

RISK RANK

SLF6025T-100M1R0-PF Download Datasheet

INDUCTORS

TDK July 2013

[Kein Titel]

Inductors for Power Circuits

Wound Ferrite

SLF series

SLF6025T-100M1R0-PF

Inductors

1,034,508 Results Filter Results Analytics

Filter your results

BASE NUMBER Show All

AL IM IR CIH MPC120000

IMC-1812 CI NL PIC HL9

KQ SDWL-C HL7 IRF

ISC-1812 AL0307 ISC-1210 ER

COMPOSITE PRICE SHOW OUTLIERS

18501 14372 10029 5310 9832 0

INDUCTANCE (NOM.)

0.047 0.047 µH 1000.0 µH

PART LIFE CYCLE CODE

ACTIVE

OBSOLETE CONTACT MANUFACTURER UNKNOWN

CONSTRUCTION Show All

- CHIP 119,470
- SHIELDED 42,967
- CYLINDRICAL 23,263
- UNSHIELDED 19,869
- EPOXY MOLDED 17,077
- MAGNETICALLY SHIELDED 14,342
- MOLDED CHIP 13,364
- MULTILAYER CHIP 13,361

RISK RANK

2.21 2.21 - 9.66 9.66

STANDARD SELECTIONS

PBFREE CODE YES NO

MILITARY SPEC TRUE FALSE

SURFACE MOUNT YES NO

HAS STOCK TRUE FALSE

CORE MATERIAL Show All

- FERRITE 175,352
- CERAMIC 105,288
- FERRITE 77,332
- IRON 54,288
- CERAMIC 30,950
- IRON 18,999
- PHENOLIC 12,377
- NON-MAGNETIC 10,909

Show All Filters

# Lieferanten Unterstützung:



Digi-Key verwendet Software von Ultra Librarian, um die gewählten Parts an unterschiedliche E-CAD Systeme ausgeben zu können.



Artikel vergleichen	Abbildung	Digi-Key Teilenummer	Hersteller-Teilenummer	Hersteller	Beschreibung	Verfügbare Menge	Einheitspreis EUR	Mindestbestellmenge ist	Verpackung	Serie	Status der Komponente	Typ	Material Kern	Induktivität	Toleranz	Strom
<input type="checkbox"/>		445-174418-2-ND	SLF6025T-100M1R0-PF	TDK Corporation	FIXED IND 10UH 1A 88.76 MOHM SMD	0 Standardlieferzeit: 14 Wochen	0,38718	1.000	Band und Spule (Tape and Reel - TR)	SLF	Aktiv	Drahtgewickelt	Ferit	10 µH	±20%	1,3 A
<input type="checkbox"/>		445-174418-1-ND	SLF6025T-100M1R0-PF	TDK Corporation	FIXED IND 10UH 1A 88.76 MOHM SMD	981 - Sofort	0,60000	1	Am Band (Cut Tape - CT)	SLF	Aktiv	Drahtgewickelt	Ferit	10 µH	±20%	1,3 A
<input type="checkbox"/>		445-174418-8-ND	SLF6025T-100M1R0-PF	TDK Corporation	FIXED IND 10UH 1A 88.76 MOHM SMD	981 - Sofort		1	Digi-Reel®	SLF	Aktiv	Drahtgewickelt	Ferit	10 µH	±20%	1,3 A

# Lieferanten Unterstützung:



Es werden alle erforderlichen Daten für eine komplette Parts Beschreibung ausgegeben.

The screenshot shows the 'Ultra Librarian for Digi-Key' web interface. It is divided into several sections:

- Header:** 'Ultra Librarian for Digi-Key' with the Digi-Key logo and the text 'Access millions of parts in your desired CAD format. Powered by Ultra Librarian and made available for free by Digi-Key.'
- Progress Bar:** A horizontal line with three steps: 'Review Part Selection', 'Select CAD Formats', and 'Start Your Download'. The first two steps are completed, and the third is active.
- Part Selection:** A section with a 'Digi-Key Part Number' field containing '296-6501-2-ND' and 'Manufacturer: Texas Instruments' with 'Manufacturer PN: NE555DR'. Below this are 'CAD Model Types Available' with 'Symbol' and 'Footprint' options, each with a 'Preview' button and a small diagram.
- Choose CAD Format(s):** A list of CAD formats with expandable arrows: '3D STEP Model', 'Altium', 'Cadence', 'Eagle', 'Mentor', 'Pulsnix', 'Zuken', 'CADSTAR v3+', and 'CR-5000/CR-8000'.
- Downloading:** A section with the 'Digi-Key Part Number' '296-6501-2-ND' and 'Manufacturer: Texas Instruments' with 'Manufacturer PN: NE555DR'. It includes a 'Getting started with your new parts:' section with instructions on downloading a zip file and adding the selected model to the CAD environment.
- Need more parts?:** A section with the text 'Purchase part packs and always have access to the parts you need when you need them.' and three 'Buy Now >' buttons for '50 Part Pack' (50 parts for \$50, \$1/per part), '100 Part Pack' (100 parts for \$75, \$0.75/per part), and '1000 Part Pack' (1000 parts for \$500, \$0.50/per part).
- Download:** A section with a checkbox 'I have read the License Agreement and agree to the Terms and Conditions'.

The screenshot shows the contents of an 'exports.zip' file. It lists four files with their respective file paths:

- CadStar.cpa** Pfad: ZukenCADSTAR\ZukenCADSTAR\
- CadStar.csa** Pfad: ZukenCADSTAR\ZukenCADSTAR\
- CadStar.lib** Pfad: ZukenCADSTAR\ZukenCADSTAR\
- readme.txt** Pfad: ZukenCADSTAR\ZukenCADSTAR\

# Lieferanten Unterstützung:



Zusätzliche Lagen werden den Projekten hinzugefügt. Die Ausgaben der Bauteilbeschreibungen erfolgen in thousands of an inch.

Name	Type	Thickness (mm)	Embedding	Description	Sub Type	Physical L
Top Elec	Electrical		None		(None)	1
Top Assembly	Non-Electrical		None		(None)	1
Top Glue Spot	Non-Electrical		None		(None)	1
Top Paste	Non-Electrical		None		(None)	1
Top Placement	Non-Electrical		None		(None)	1
Top silk	Non-Electrical		None		(None)	1
Top Solder Resi	Non-Electrical		None		(None)	1
No tracks	Non-Electrical		None		(None)	1
No vias	Non-Electrical		None		(None)	1
Universal ARD	Non-Electrical		None		(None)	1
GND	Powerplane		None		(None)	2
Sig 2	Electrical		None		(None)	3
Sig 3	Electrical		None		(None)	4
Sig 4	Electrical		None		(None)	5
Sig 5	Electrical		None		(None)	6
Sig 6	Electrical		None		(None)	7
Sig 7	Electrical		None		(None)	8
Sig 8	Electrical		None		(None)	9
Sig 9	Electrical		None		(None)	10
Sig 10	Electrical		None		(None)	11
Sig 11	Electrical		None		(None)	12
Sig 12	Electrical		None		(None)	13
Sig 13	Electrical		None		(None)	14
VCC	Powerplane		None		(None)	15
Bottom Elec	Electrical		None		(None)	16
Bottom Assembl	Non-Electrical		None		(None)	16
Bottom Glue Spo	Non-Electrical		None		(None)	16
Bottom Paste	Non-Electrical		None		(None)	16
Bottom Placeme	Non-Electrical		None		(None)	16
Bottom silk	Non-Electrical		None		(None)	16
Bottom Solder R	Non-Electrical		None		(None)	16
Doc 1	Documentatio		None		(None)	

Colours - Layers

Layer Name:	Visible:
Top Elec	Yes
Top Assembly	Yes
Top Glue Spot	No
Top Paste	Yes
Top Placement	Yes
Top silk	Yes
Top Solder Resist	Yes
No tracks	No
No vias	No
Universal ARD	No
GND	No
Sig 2	No
Sig 3	No
Sig 4	No
Sig 5	No

NE555\_D\_8

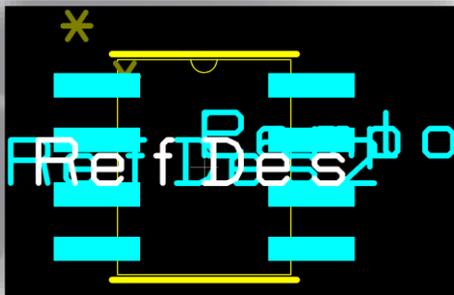
User Attributes

RefDes	Type	Value
C		

Description: Value of attached item.

Attribute Of: [All]

Buttons: Add..., Delete, Rename..., Change..., Used , Close, Help



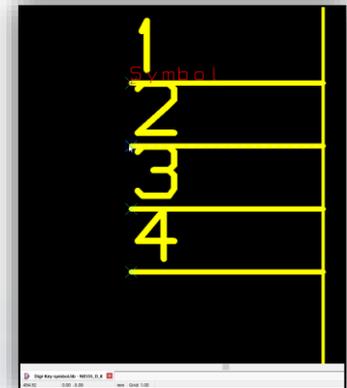
Assignments

Lines | Text | Pads | Hatchings | Copper | Design Rules

Pads

Used	Pad Code	Layer	Shape	Size (Thou)	Orient Angle	Left Length	Right Length	Internal Feature
<input type="checkbox"/>	RX66Y200T	(Default)	Rectangle	20	0.0	23	23	23
<input checked="" type="checkbox"/>	RX78Y220T	(Default)	Rectangle	22	0.0	28	28	28
<input type="checkbox"/>	RX90Y240T	(Default)	Rectangle	24	0.0	33	33	33

Buttons: Add Assignment, Add Reassignment, Duplicate Assignment



# Lieferanten Unterstützung:



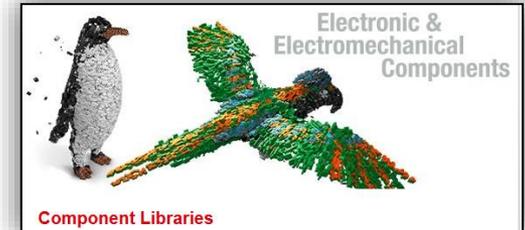
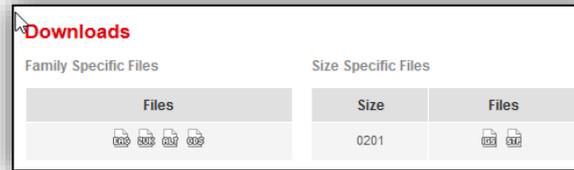
Aktuell wird noch das Format CADSTAR 3.01 ausgegeben.

The screenshot displays the Ultra Librarian software interface. On the left, a browser window shows the website <http://www.accelerated-designs.com>. The main interface is divided into several panels:

- PatternView: SOP127P150X2**: Shows a PCB layout with dimensions and a component footprint. Dimensions include 2.2x5 88mm, 12.2x2 84mm, 95.1x1 27mm, and 138.1x5 87mm. Component identifiers include (2x) Sco1=1, 26, 24, 14, 50, 14.
- Ultra Librarian Binary Reader Version 5.3.320**: Shows the "Step 1. Select a File to Load" and "Step 2. Select Tools" sections. The "Component: CLC007AJE loaded." message is visible. The "Export to Selected Tools" button is highlighted.
- License Status**: Shows user data (User Name: Frank Frank, User Company: Accelerated Designs, Licensing Number: ACFB0F1AC, Protected Thru: Permanent License) and a list of supported tools and features. The "Import" and "Export" sections are checked, including Accel 14.0 PCB, Allegro 14, Cadstar 3.0.1, DDE Supermax ECAD, Mentor Boardstation, and OrCAD 9.0. The "Features" section includes UL Gold, UL Lite, UL, Silver, Template Editor, Binary XLR Out, and XML Library Out.

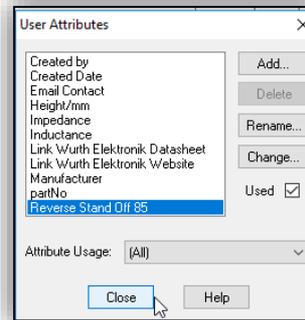
# Lieferanten Unterstützung:

Es werden gesamte Part-Familien ausgegeben.

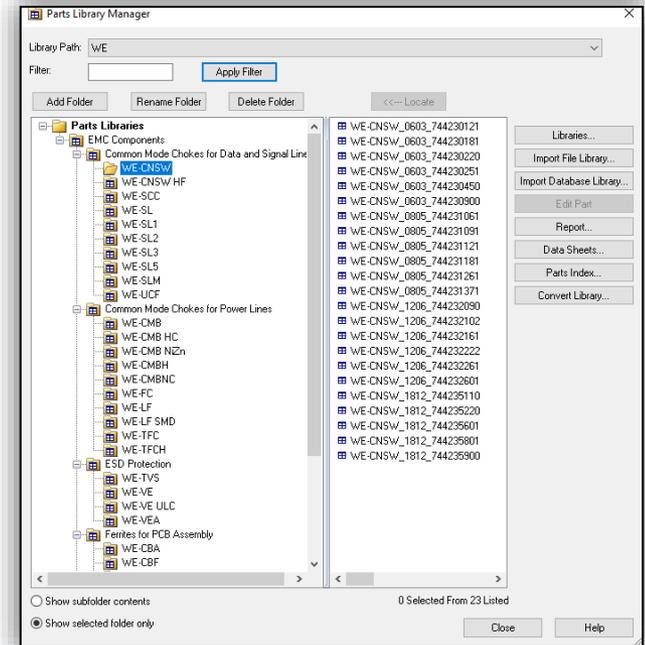


**CADSTAR-EMC\_COMPONENTS-rev1.zip**

- EMC Components.LIB  
Pfad:
- WE-CADSTAR-PCB.lib  
Pfad:
- WE-CADSTAR-SYMBOL.lib  
Pfad:



Part Name	Number	Description	Version	Definition
WE-CBA_0603_782633620	782633620	WE-CBA SMD EMI Suppression Ferrite Bead	1	WE-CBA_0603_782633620
WE-CBA_0603_782633601	782633601	WE-CBA SMD EMI Suppression Ferrite Bead	1	WE-CBA_0603_782633601
WE-CBA_0603_782632620	782632620	WE-CBA SMD EMI Suppression Ferrite Bead	1	WE-CBA_0603_782632620
WE-CBA_0603_782632511	782632511	WE-CBA SMD EMI Suppression Ferrite Bead	1	WE-CBA_0603_782632511



partNo	Impedance	Link Würth Elektronik Website	Created by	Created Date	Link Würth Elektronik Datasheet	Manufacturer	Email Contact	Height/mm
782633620	62 Ohm@100MHz	<a href="http://www.we-online.de">http://www.we-online.de</a>	Baojun Chen	May 2016	<a href="http://katalog.we-online.de/pbs/datasheet/78">http://katalog.we-online.de/pbs/datasheet/78</a>	Würth Elektronik	<a href="mailto:libraries@we-online.com">libraries@we-online.com</a>	0.8
782633601	600 Ohm@100MHz	<a href="http://www.we-online.de">http://www.we-online.de</a>	Baojun Chen	May 2016	<a href="http://katalog.we-online.de/pbs/datasheet/78">http://katalog.we-online.de/pbs/datasheet/78</a>	Würth Elektronik	<a href="mailto:libraries@we-online.com">libraries@we-online.com</a>	0.8
782632620	62 Ohm@100MHz	<a href="http://www.we-online.de">http://www.we-online.de</a>	Baojun Chen	May 2016	<a href="http://katalog.we-online.de/pbs/datasheet/78">http://katalog.we-online.de/pbs/datasheet/78</a>	Würth Elektronik	<a href="mailto:libraries@we-online.com">libraries@we-online.com</a>	0.8
782632511	510 Ohm@100MHz	<a href="http://www.we-online.de">http://www.we-online.de</a>	Baojun Chen	May 2016	<a href="http://katalog.we-online.de/pbs/datasheet/78">http://katalog.we-online.de/pbs/datasheet/78</a>	Würth Elektronik	<a href="mailto:libraries@we-online.com">libraries@we-online.com</a>	0.8

[http://www.we-online.com/web/en/electronic\\_components/produkte\\_pb/bauteilebibliotheken/libraries.php](http://www.we-online.com/web/en/electronic_components/produkte_pb/bauteilebibliotheken/libraries.php)

# Lieferanten Unterstützung:



Zusätzliche Lagen werden den Projekten hinzugefügt. Die Ausgaben erfolgen in thousands of an inch für SCM und mm für PCB.

Layers				
Name	Description	Type	Sub Type	Physical Layer
Top Placement		Non-Electrical	Placement	1
Top Assembly		Non-Electrical	Assembly	1
Top Paste		Non-Electrical	Paste	1
Top Silk		Non-Electrical	Silkscreen	1
Top Solder Resi		Non-Electrical	Solder Resi	1
Top Glue Spot		Non-Electrical	(None)	1
No vias		Non-Electrical	(None)	1
Top Elec		Electrical	(None)	1
Bottom Glue Spo		Non-Electrical	(None)	2
Inner1		Electrical	(None)	2
Inner2		Electrical	(None)	3
Bottom Elec		Electrical	(None)	4
Bottom Solder R		Non-Electrical	Type Resi	4
Bottom Silk		Non-Electrical	Silkscreen	4
Bottom Paste		Non-Electrical	Paste	4
Bottom Assembl		Non-Electrical	Assembly	4
Bottom Placeme		Non-Electrical	Placement	4
Board		Documentatio	(None)	

Attribute	Text	Read Only	Type
partNo	782633620	<input type="checkbox"/>	Part Definition
Impedance	62 Ohm@100MHz	<input type="checkbox"/>	Part Definition
Link Würth Elektronik Website	http://www.we-online.de	<input type="checkbox"/>	Part Definition
Created by	Beojin Chen	<input type="checkbox"/>	Part Definition
Created Date	May 2016	<input type="checkbox"/>	Part Definition
Link Würth Elektronik Datasheet	http://catalog.we-online.de/pbs/datasheet/7826336	<input type="checkbox"/>	Part Definition
Manufacturer	Würth Elektronik	<input type="checkbox"/>	Part Definition
Email Contact	libraries@we-online.com	<input type="checkbox"/>	Part Definition
Height/mm	0.8	<input type="checkbox"/>	Part Definition
Reverse Stand Off 85		<input type="checkbox"/>	Part Definition
Inductance		<input type="checkbox"/>	Part Definition

Gate

WE-CBA\_0603

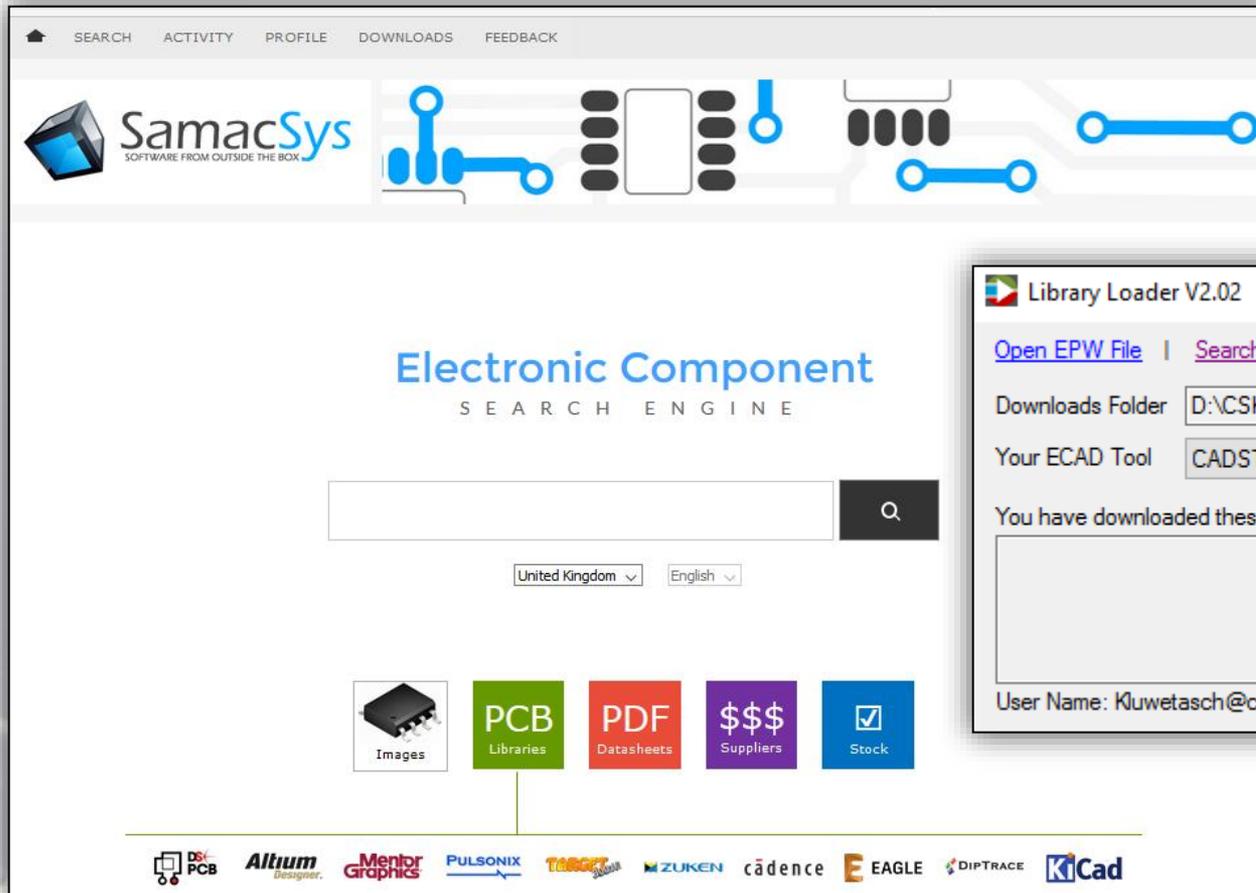
### Pads

Used	Pad Code	Layer	Shape	Size (mm)	Orient Angle	Left Length	Right Length	Internal Feature
<input type="checkbox"/>	SMD 0.85x2.30 Rectangle	(Default)	Rectangle	0.850	90.0	0.725	0.725	0.725
<input checked="" type="checkbox"/>	SMD 0.95x0.70 Rectangle	(Default)	Rectangle	0.700	0.0	0.125	0.125	0.125
<input checked="" type="checkbox"/>	SMD 0.95x0.70 Rectangle	Top Paste	Rectangle	0.802	0.0	0.125	0.125	0.125
<input checked="" type="checkbox"/>	SMD 0.95x0.70 Rectangle	Top Solder Res	Rectangle	0.802	0.0	0.125	0.125	0.125
<input type="checkbox"/>	SMD 0.98x3.70 Rectangle	(Default)	Rectangle	0.980	90.0	1.360	1.360	1.360
<input type="checkbox"/>	SMD 1.0x1.6 Rectangle	(Default)	Rectangle	1.000	90.0	0.300	0.300	0.300

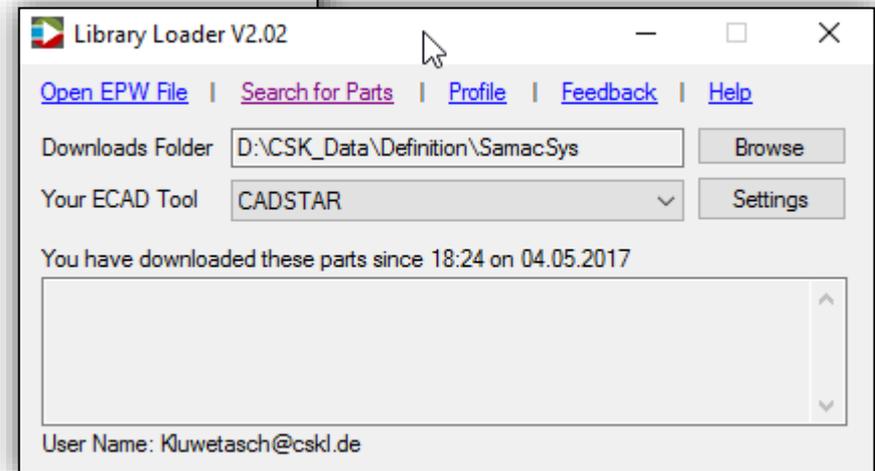
### Pads

Used	Pad Code	Layer	Shape	Size (Thou)	Orient Angle	Left Length	Right Length	Internal Feature
<input type="checkbox"/>	SMD 0.85x2.30 Rectangle	(Default)	Rectangle	33.5	90.0	28.5	28.5	28.5
<input checked="" type="checkbox"/>	SMD 0.95x0.70 Rectangle	(Default)	Rectangle	27.6	0.0	4.9	4.9	4.9
<input checked="" type="checkbox"/>	SMD 0.95x0.70 Rectangle	Top Paste	Rectangle	31.6	0.0	4.9	4.9	4.9
<input checked="" type="checkbox"/>	SMD 0.95x0.70 Rectangle	Top Solder Res	Rectangle	31.6	0.0	4.9	4.9	4.9
<input type="checkbox"/>	SMD 0.98x3.70 Rectangle	(Default)	Rectangle	38.6	90.0	53.5	53.5	53.5
<input type="checkbox"/>	SMD 1.0x1.6 Rectangle	(Default)	Rectangle	39.4	90.0	11.8	11.8	11.8

Die bewährteste Verbindung zwischen Zuken CADSTAR und einer Suchmaschine wird zur Zeit durch SamacSys gewährleistet. Unterstützt durch eine „Add Part“-Funktion.

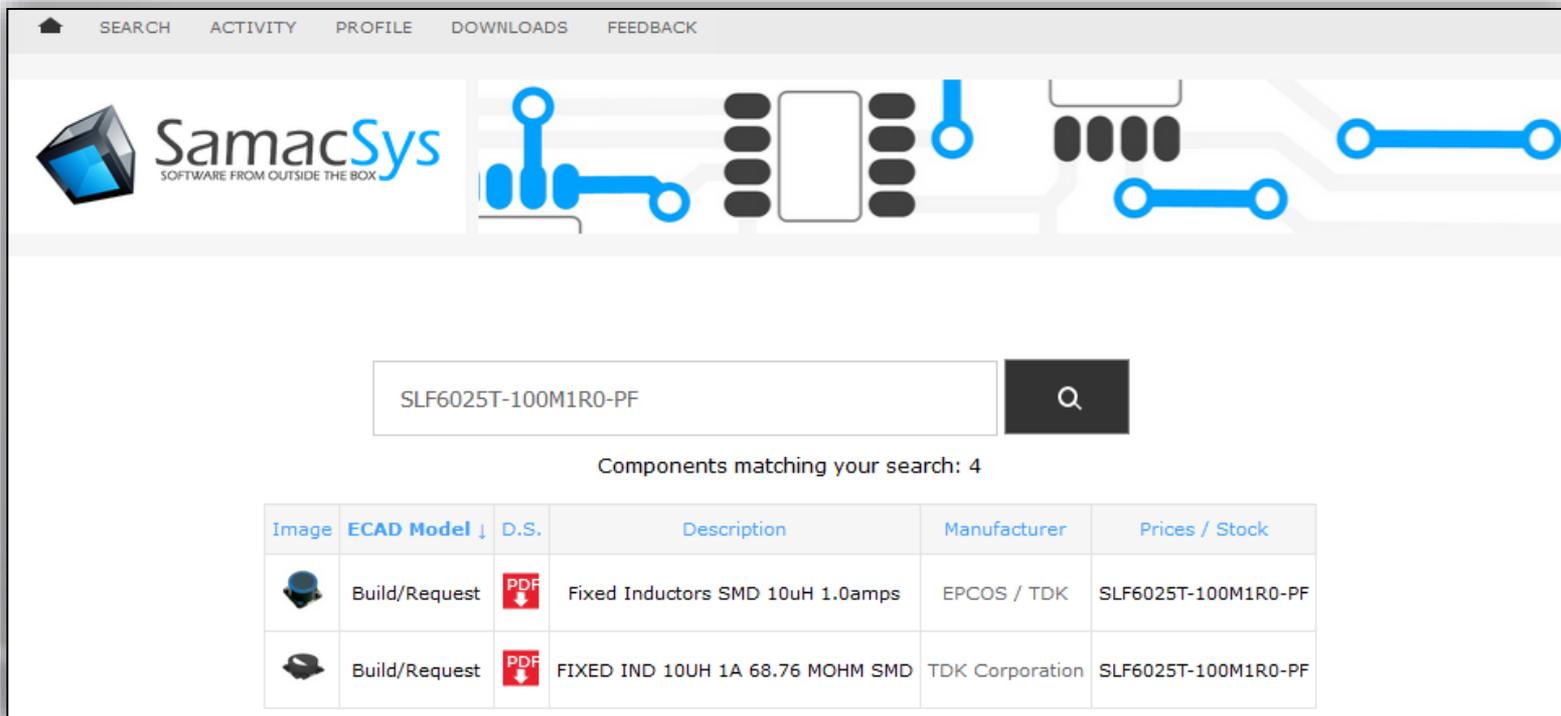


The screenshot shows the SamacSys website interface. At the top, there is a navigation bar with links for SEARCH, ACTIVITY, PROFILE, DOWNLOADS, and FEEDBACK. Below this is the SamacSys logo and a decorative graphic of electronic components. The main heading reads "Electronic Component SEARCH ENGINE". A search input field is present, along with dropdown menus for "United Kingdom" and "English". Below the search area are five colored buttons: "Images" (with a chip icon), "PCB Libraries" (green), "PDF Datasheets" (red), "\$\$\$ Suppliers" (purple), and "Stock" (blue with a checkmark). At the bottom, a row of partner logos includes DSX PCB, Altium Designer, Mentor Graphics, PULSONIX, TIGER, ZUKEN, cadence, EAGLE, DIPTRACE, and KiCad.



The screenshot shows a "Library Loader V2.02" dialog box. It features a title bar with standard window controls. Below the title bar are links for "Open EPW File", "Search for Parts", "Profile", "Feedback", and "Help". There are two main configuration sections: "Downloads Folder" with a text box containing "D:\CSK\_Data\Definition\SamacSys" and a "Browse" button; and "Your ECAD Tool" with a dropdown menu set to "CADSTAR" and a "Settings" button. Below these is a message: "You have downloaded these parts since 18:24 on 04.05.2017" followed by an empty list area with scroll arrows. At the bottom, it displays "User Name: Kluwetach@cskl.de".

Die Verfügbarkeit eines Datenblattes ist nicht gleichbedeutend mit der Verfügbarkeit des Parts.



The screenshot shows the SamacSys search interface. At the top, there is a navigation bar with links for SEARCH, ACTIVITY, PROFILE, DOWNLOADS, and FEEDBACK. Below this is the SamacSys logo and a decorative header with circuit board icons. A search bar contains the text 'SLF6025T-100M1R0-PF' and a search button. Below the search bar, it says 'Components matching your search: 4'. A table displays the search results.

Image	ECAD Model ↓	D.S.	Description	Manufacturer	Prices / Stock
	Build/Request		Fixed Inductors SMD 10uH 1.0amps	EPCOS / TDK	SLF6025T-100M1R0-PF
	Build/Request		FIXED IND 10UH 1A 68.76 MOHM SMD	TDK Corporation	SLF6025T-100M1R0-PF

Statt den SamacSys Wizard zunutzen, kann ein registrierter User auch online eine Anfrage nach dem gewünschten Part stellen.



Build / Request MPN - SLF6025T-100M1R0-PF

Package Category

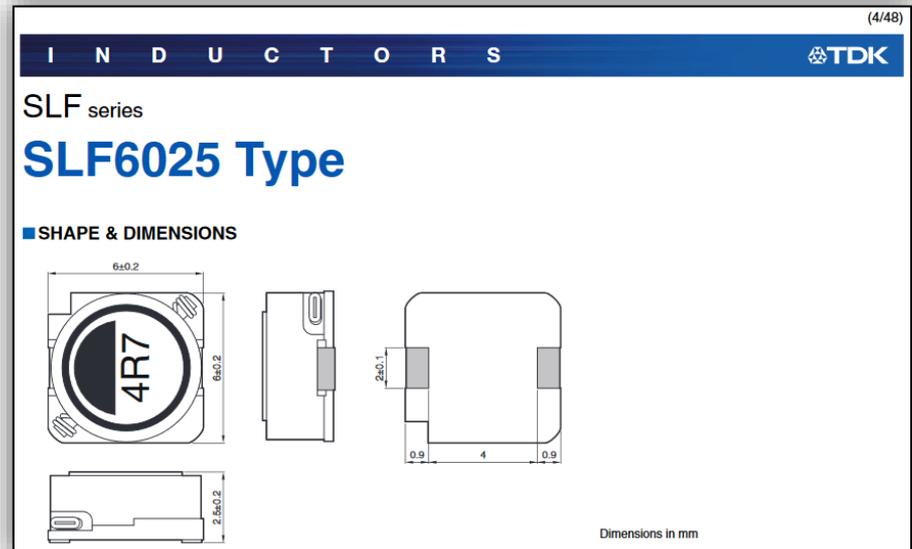


**BUILD**  
LAUNCH WIZARD

**REQUEST**  
SUBMIT REQUEST

**Note:**  
This part is not of a package type for which we have a high degree of automation. We are continually working to extend our automation to additional package types, but to build and check this part right now will take significant human involvement.

If sufficient engineers request the same part we will build it manually.

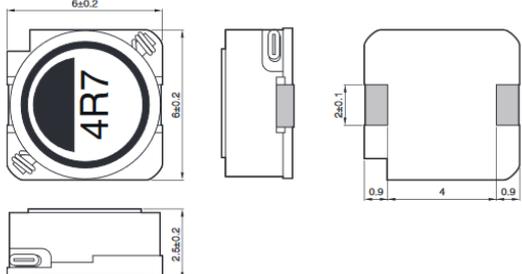


INDUCTORS (4/48)



SLF series  
**SLF6025 Type**

■ SHAPE & DIMENSIONS



Dimensions in mm

Alternatively after you have submitted your request you may move the part directly into our 24 hour turnaround queue by making a £5 PayPal donation to the team. We will let you know how to do that after the request is in.



**REQUEST**

**SUBMIT REQUEST**

Manufacturer	TDK Corporation
Part Number	SLF6025T-100M1R0-PF

## SamacSys Part Request Processing

Thank you for your part creation request.

A confirmation link has been sent to 'kluwetash@cskl.de' along with an offer to have the part built manually.

Es werden alle erforderlichen Daten zum Download für CADSTAR zur Verfügung gestellt.

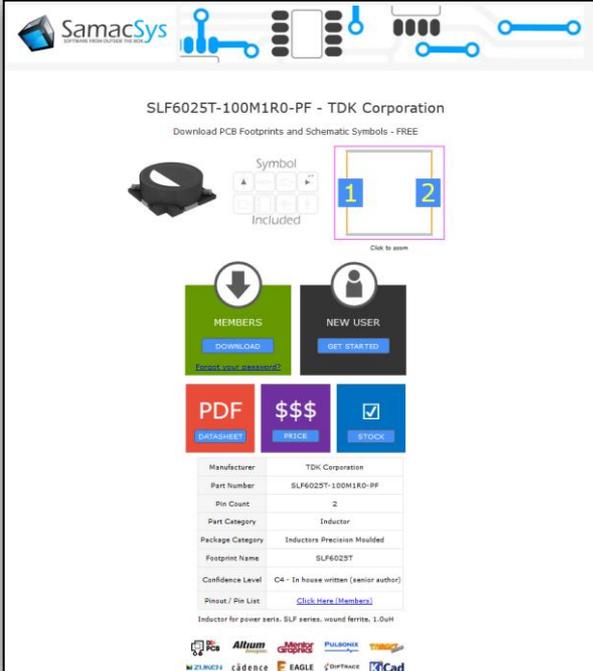
SamacSys <samacsys@componentsearchengine.com>  
Part Status Update  
An Kluwetesch

### Part Status Update on SLF6025T-100M1R0-PF

You received this email because you requested a PCB library part be created for part number SLF6025T-100M1R0-PF from TDK Corporation. Your parts current status in the part creation process is shown in green below.

Requested	The creation of the part has just been requested. We have a data sheet and a part number.
Incomplete	The part number is confirmed and the part is in the data entry queue.
Partial	Pin names and locations are available.
Allocated	An engineer has been allocated to check the pinout information and determine the mechanical data for the package.
NeedsChecking	Electrical and Mechanical data for the part is complete and is waiting for an independant review.
CheckingAllocated	A second engineer has been allocated to review the work of the first.
Verified	The electrical and mechanical data entry is complete and has been reviewed. The next step is footprint generation which is automatic and instant in many cases. If the flow of these emails pauses here your part is of a type we have yet to automate.
<b>Released</b>	<b>All checks have been completed. The part is released and available for use. You can now download your part by clicking the "find part" button in EPW or from our website <a href="#">here</a>.</b>

Unless you disable emails from us in the application you used to request this part, you will be informed each time your part advances through the creation process.



SLF6025T-100M1R0-PF - TDK Corporation  
Download PCB Footprints and Schematic Symbols - FREE

Symbol Included

MEMBERS  
NEW USER

PDF \$\$\$\$

Manufacturer	TDK Corporation
Part Number	SLF6025T-100M1R0-PF
Pin Count	2
Part Category	Inductor
Package Category	Inductors Precision Moulded
Footprint Name	SLF6025T
Confidence Level	C4 - In house written (senior author)
Pinout / Pin List	<a href="#">Click Here (Members)</a>

Inductor for power series: SLF series, wound ferrite, 1.0µH

CSK\_Data > Definition > SamacSys > components > LIB\_SLF6025T-100M1R0-PF >

<input type="checkbox"/> Name	Änderungsdatum	Typ
INDPM6060X270N.cpa	04.05.2017 18:40	CPA-Datei
SLF6025T-100M1R0-PF.csa	04.05.2017 18:40	CSA-Datei
SLF6025T-100M1R0-PF.lib	04.05.2017 18:40	LIB-Datei

Der Wizard stellt umfangreiche Daten zur Erstellung des gesuchten Parts zu Verfügung.

### Mechanical Information (step 2 of 3)

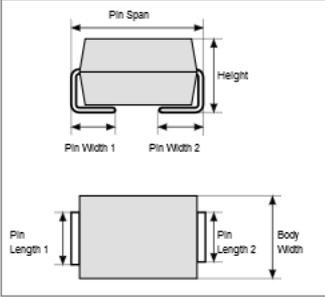
Consider loading package data from an existing package:

Dimensions for SLF6025T-100M1R0-PF

Units:

Method:

Dimension	Minimum	Maximum
Body Width	5,8	6,2
Height		2,7
Pin Length 1	1,9	2,1
Pin Length 2	1,9	2,1
Pin Span	5,8	6,2
Pin Width 1	0,9	0,9
Pin Width 2	0,9	0,9

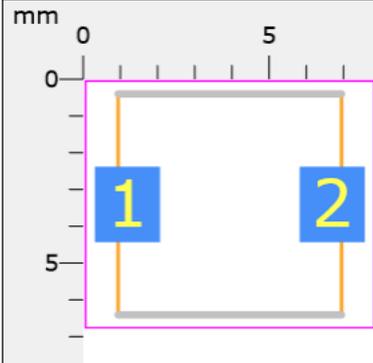


Pins and Pads

Pad Shape:

Package Name:

#### Footprint Preview



Layers:

- Assembly Drawing Top
- Silkscreen Top
- Courtyard
- Top
- Pin Numbers

### SamacSys PCB Library Wizard

Read Only View

#### General Properties (step 1 of 3)

Manufacturer:

Part Number:

Pin Count:  - *Include thermal pads and transistor tabs*

Package Category:

Part Category:

Datasheet URL:

Package Details URL:

Description:



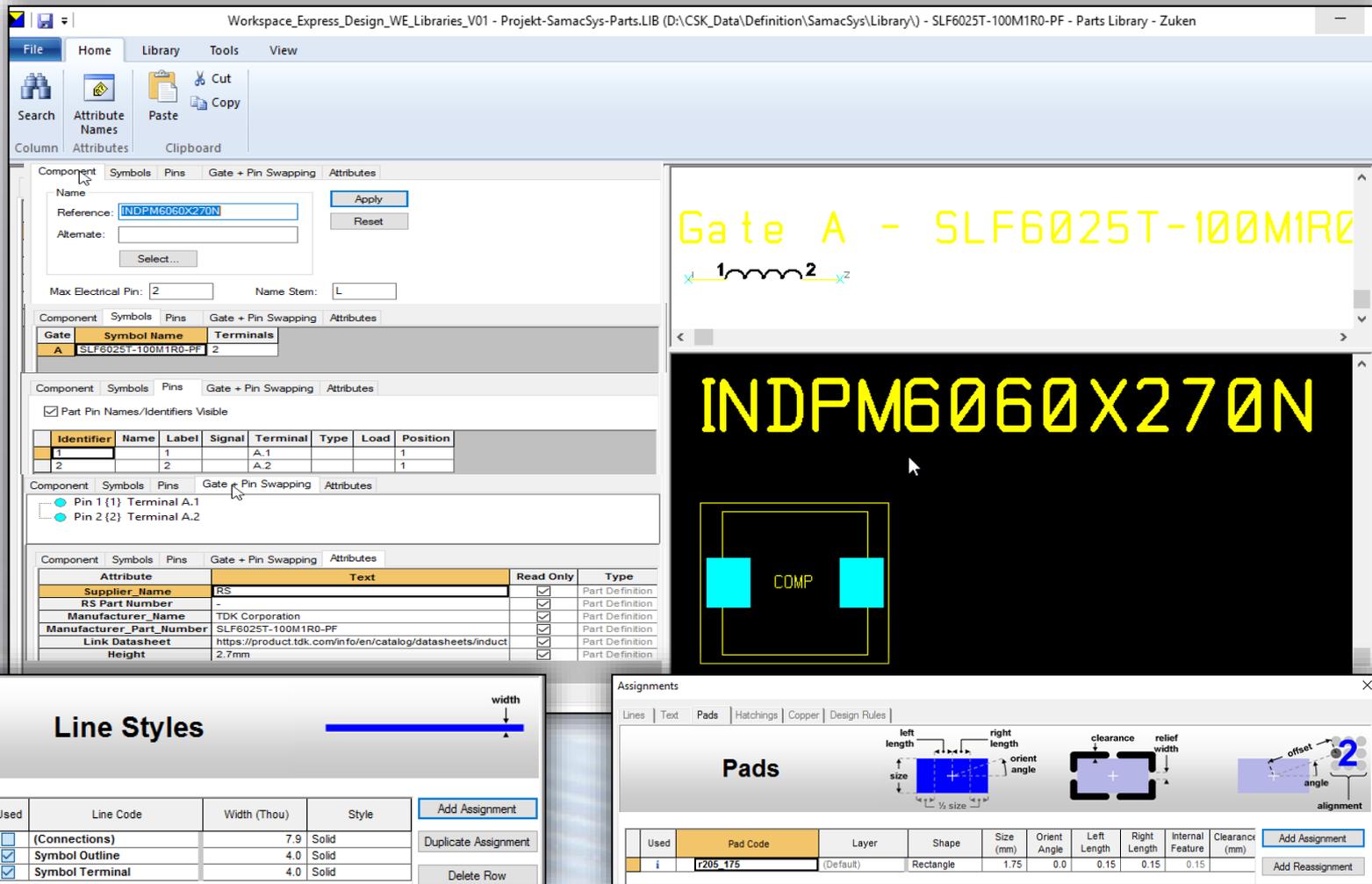
Released

### Electrical Pin Information (step 3 of 3)

The pinout in this part category is always as below and cannot be changed.

Number	Name	Type
1	1	<input type="text" value="Undefined"/>
2	2	<input type="text" value="Undefined"/>

Die Symbol Ausgaben erfolgen in thousands of an inch.  
Die Component Ausgaben erfolgen in mm.



The screenshot displays the SamacSys software interface for configuring a component. The main window shows the 'Component' configuration for 'INDPM6060X270N'. The 'Reference' field is set to 'INDPM6060X270N'. The 'Max Electrical Pin' is set to 2, and the 'Name Stem' is 'L'. The 'Gate + Pin Swapping' tab is active, showing a table of gate assignments:

Gate	Symbol Name	Terminals
A	SLF6025T-100M1R0-PF	2

Below this, the 'Part Pin Names/Identifiers Visible' table is shown:

Identifier	Name	Label	Signal	Terminal	Type	Load	Position
1		1	A.1	A.1			1
2		2	A.2	A.2			1

The 'Attributes' table is also visible:

Attribute	Text	Read Only	Type
Supplier_Name	RS	<input checked="" type="checkbox"/>	Part Definition
RS Part Number	-	<input checked="" type="checkbox"/>	Part Definition
Manufacturer_Name	TDK Corporation	<input checked="" type="checkbox"/>	Part Definition
Manufacturer_Part_Number	SLF6025T-100M1R0-PF	<input checked="" type="checkbox"/>	Part Definition
Link Datasheet	<a href="https://product.tdk.com/info/en/catalog/datasheets/induct">https://product.tdk.com/info/en/catalog/datasheets/induct</a>	<input checked="" type="checkbox"/>	Part Definition
Height	2.7mm	<input checked="" type="checkbox"/>	Part Definition

Overlaid on the main window are three smaller windows:

- Gate A - SLF6025T-100M1R0**: Shows a schematic symbol for a gate with two terminals labeled 1 and 2.
- INDPM6060X270N**: Shows the component symbol on a black background with a yellow border.
- Line Styles**: A table defining line styles for connections, symbol outlines, and symbol terminals.
- Assignments - Pads**: A window for defining pad parameters for a specific component instance (i, P205 175).

**Line Styles Table:**

Used	Line Code	Width (Thou)	Style
<input type="checkbox"/>	(Connections)	7.9	Solid
<input checked="" type="checkbox"/>	Symbol Outline	4.0	Solid
<input checked="" type="checkbox"/>	Symbol Terminal	4.0	Solid

**Assignments - Pads Table:**

Used	Pad Code	Layer	Shape	Size (mm)	Orient Angle	Left Length	Right Length	Internal Feature	Clearance (mm)
<input checked="" type="checkbox"/>	i P205 175	(Default)	Rectangle	1.75	0.0	0.15	0.15	0.15	

Die Layer entsprechen den Vorgaben der IPC Richtlinien und sind direkt verwendungsfähig.  
Die Parts Informationen sind ebenfalls direkt einsetzbar.

Name	Type	Thickness (mm)	Embedding	Description	Sub Type	Phy
Construction	Documentatio		None		(None)	
Drill Drawing	Documentatio		None		(None)	
Top Placement	Non-Electrical		None		Placement	1
Top Assembly	Non-Electrical		None		Assembly	1
Top Paste	Non-Electrical		None		Paste	1
Top silk	Non-Electrical		None		Silkscreen	1
Top Solder Resi	Non-Electrical		None		Solder Resi	1
Top Elec	Electrical		None		(None)	1
Bottom Elec	Electrical		None		(None)	2
Bottom Solder R	Non-Electrical		None		Solder Resi	2
Bottom silk	Non-Electrical		None		Silkscreen	2
Bottom Paste	Non-Electrical		None		Paste	2
Bottom Assembl	Non-Electrical		None		Assembly	2
Bottom Placeme	Non-Electrical		None		Placement	2

Name	Type	Thickness (mm)	Embedding	Description	Sub Type	Physical Layer
Top 3D Model O	Non-Electrical		None		(None)	1
Top Placement	Non-Electrical		None		Placement	1
Top Assembly	Non-Electrical		None		Assembly	1
Top Paste	Non-Electrical		None		Paste	1
Top Silk	Non-Electrical		None		Silkscreen	1
Top Solder Resi	Non-Electrical		None		Solder Resi	1
Top Elec	Electrical		None	Componentside	(None)	1
Bottom Elec	Electrical		None	Solderside	(None)	2
Bottom Solder R	Non-Electrical		None		Solder Resi	2
Bottom Silk	Non-Electrical		None		Silkscreen	2
Bottom Paste	Non-Electrical		None		Paste	2
Bottom Assembl	Non-Electrical		None		Assembly	2
Bottom Placeme	Non-Electrical		None		Placement	2
Bottom 3D Model	Non-Electrical		None		(None)	2

```

Projekt-SamacSys-Parts.LIB - Editor
Datei Bearbeiten Format Ansicht ?
# FORMAT 32

+N0 'root'
|

.END
    
```

```

Projekt-SamacSys-Parts.LIB - Editor
Datei Bearbeiten Format Ansicht ?
# FORMAT 32

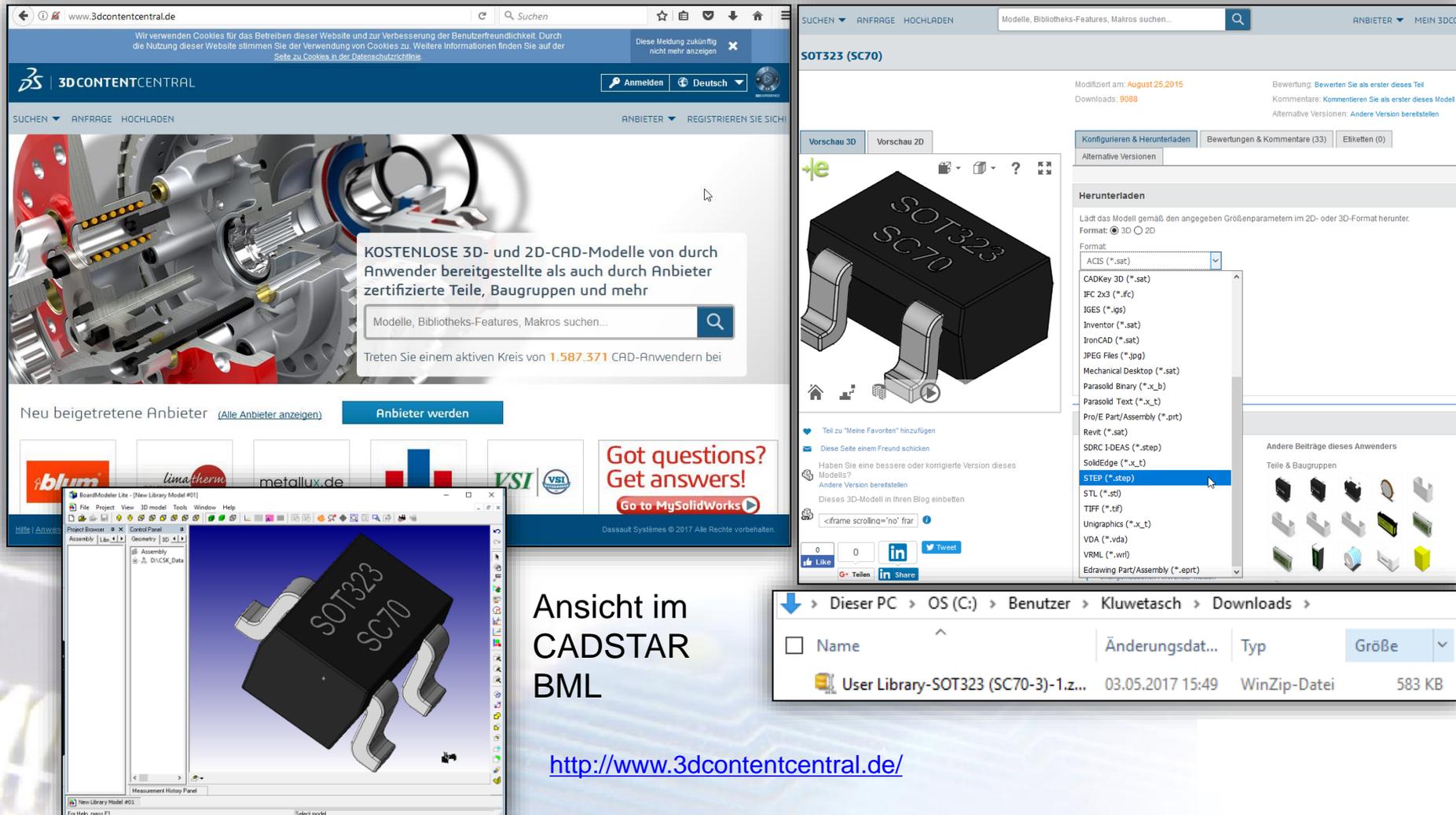
+N0 'root'

.SLF6025T-100M1R0-PF :1 ;Inductor for power seris, SLF series, wound ferrite, 1.0uH
INDPM6060X270N
*STM L
*NGS
*PLB 1="1" 2="2"
*MXP 2
*DFN SLF6025T-100M1R0-PF
~!Supplier_Name (RS)
~!RS Part Number (-)
~!Manufacturer_Name (TDK Corporation)
~!Manufacturer_Part_Number (SLF6025T-100M1R0-PF)
~!Link Datasheet (https://product.tdk.com/info/en/catalog/datasheets/inductor_commercial_power_slf6025_en.pdf)
~!Height (2.7mm)
SLF6025T-100M1R0-PF
1.11U 2.11U

.END
    
```

Part Name	Number	Description	Version	Definition	SPICE	Part Acceptance
SLF6025T-100M1R0-PF		Inductor for power seris, SLF series, wound ferrite, 1.0uH	1	SLF6025T-100M1R0-PF		

Eine der möglichen Webseiten zum Download von 3D STEP Modellen.



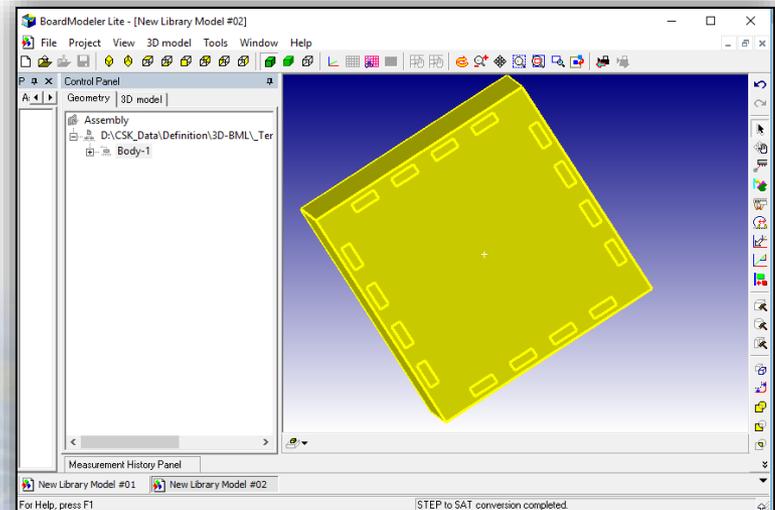
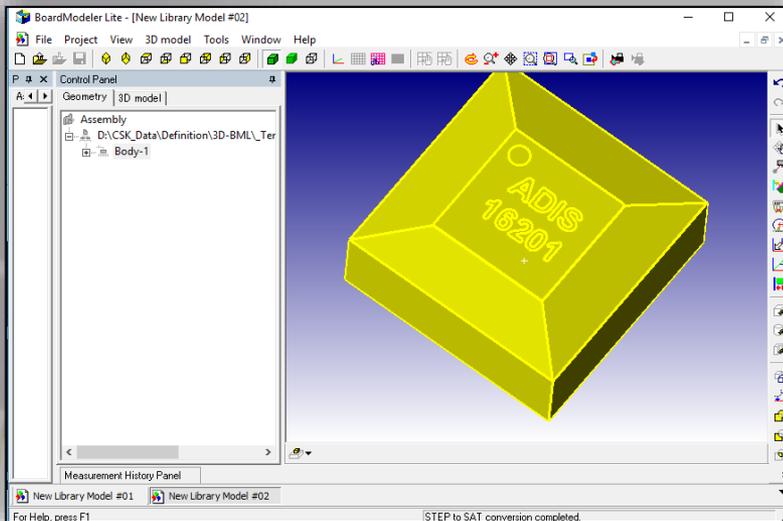
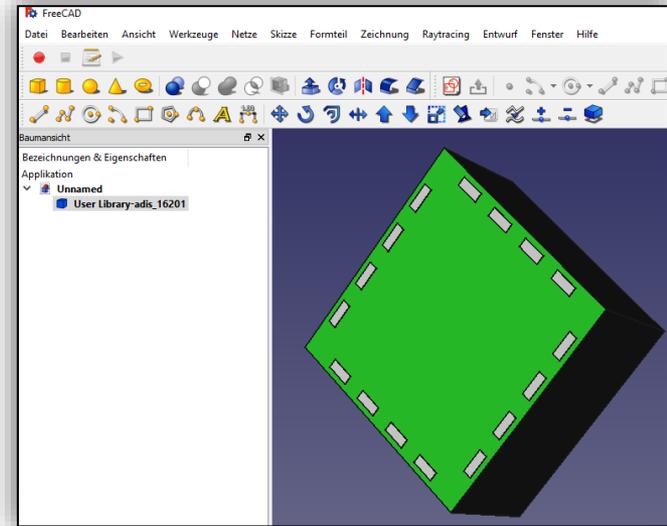
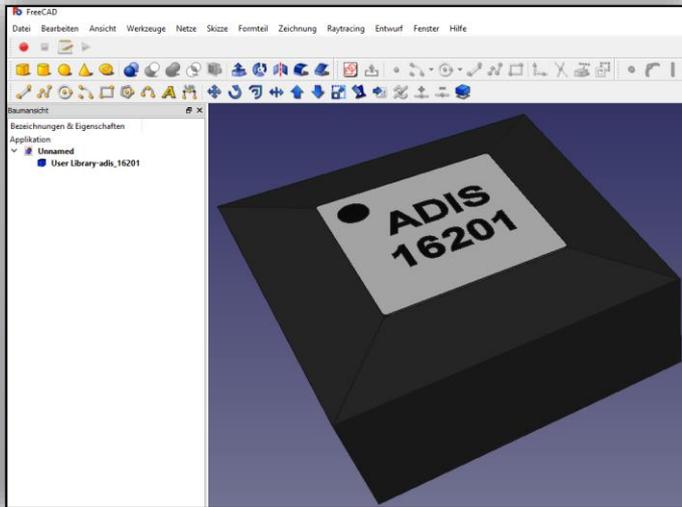
The image shows a composite of three screenshots related to downloading 3D STEP models from 3D Content Central.

- Top Left:** The homepage of [www.3dcontentcentral.de](http://www.3dcontentcentral.de). It features a search bar, navigation tabs (SUCHEN, ANFRAGE, HOCHLADEN), and a main banner for "KOSTENLOSE 3D- und 2D-CAD-Modelle". A search for "SOT323 SC70" is shown in the search bar.
- Top Right:** A detailed view of the search results for "SOT323 (SC70)". It shows a 3D model of the component, download statistics (9088 downloads), and a list of available file formats for download. The "STEP (\*.step)" format is highlighted.
- Bottom Left:** A screenshot of the CADSTAR BML software interface showing the downloaded 3D model of the SOT323 SC70 component.
- Bottom Right:** A screenshot of a Windows File Explorer window showing the downloaded file: "User Library-SOT323 (SC70-3)-1.z...", dated 03.05.2017 15:49, with a size of 583 KB.

Ansicht im  
CADSTAR  
BML

<http://www.3dcontentcentral.de/>

# 3D STEP Modelle: FreeCAD und CADSTAR BML



# PCB Library Expert für IPC-7351 Land Pattern



Software-interne Suchmöglichkeit via Octopart API: Verfügbarkeit, Artikelnummer & Datenblatt

The screenshot shows the PCB Library Expert Pro (2017.12) interface. The main window displays a footprint library with columns for Footprint Name and Physical Description. A context menu is open over the selected footprint 'QFN33P50\_500X500', with the 'Search Octopart' option highlighted. A 'Search Octopart' dialog box is open, showing the part number 'SLF6025T-100M1R0-PF' and a search result from TDK. A table of search results is also visible, listing various suppliers and their prices for the part.

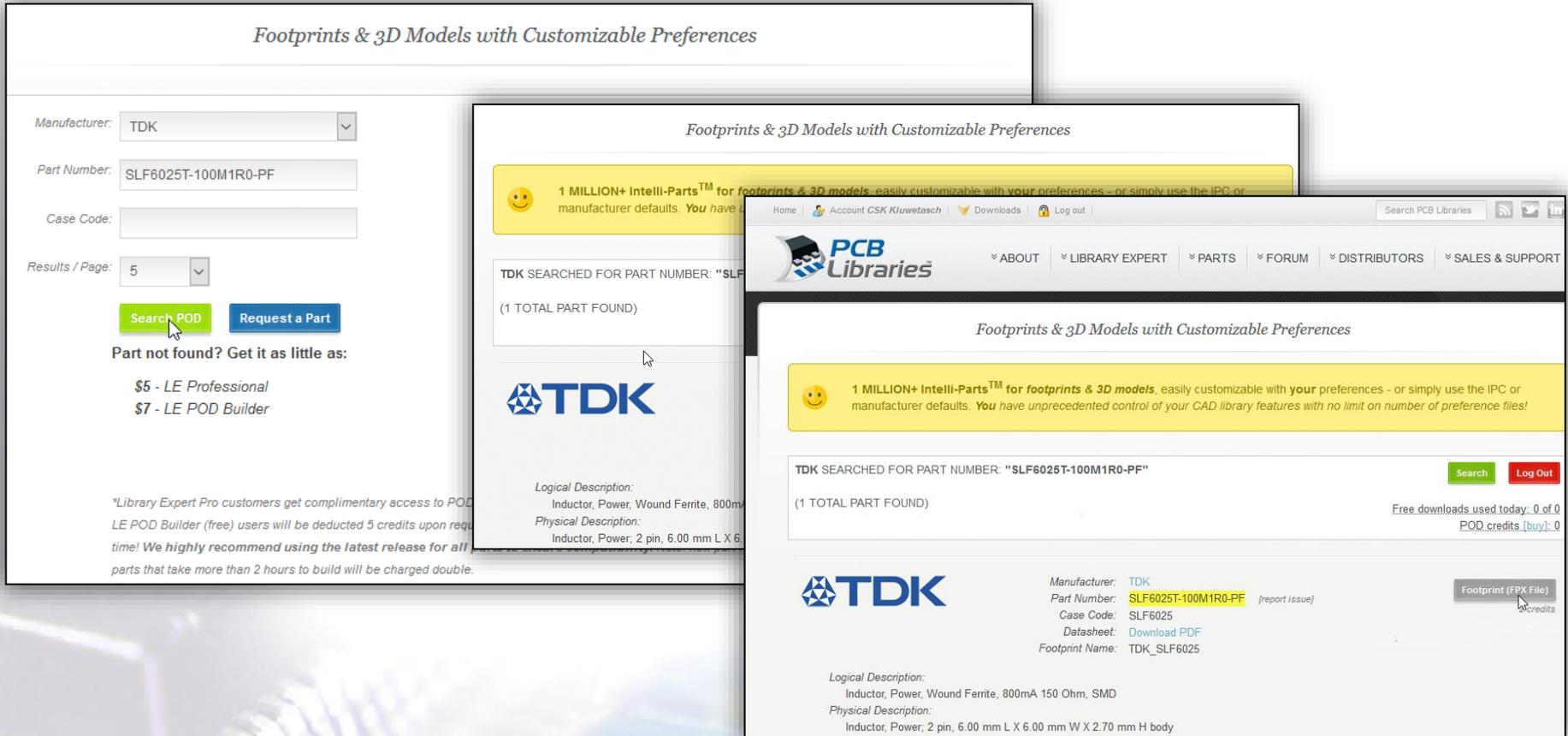
Portal	SKU	Quantity	Packaging	MOQ	Price Range
Digi-Key*	<a href="#">445-174416-2-ND</a>	1000	Tape & Reel	1000	0.38 - 0.40
Verical*	<a href="#">SLF6025T-100M1R0-PF</a>	2039		31	0.38 - 0.44
Chip One Stop Japan*	<a href="#">C1S711000198846</a>	2039	Cut Tape	10	0.38 - 0.33
Mouser*	<a href="#">810-SLF6025T-100M</a>	2708			0.38 - 0.40
Arrow*	<a href="#">SLF6025T-100M1R0-PF</a>	22		1	0.38 - 0.40
TTI*	<a href="#">SLF6025T-100M1R0-PF</a>	0			0.38 - 0.39
Newark*	<a href="#">90R0663</a>	0	Tape & Reel	1000	0.36 - 0.40
Avnet*	<a href="#">SLF6025T-100M1R0-PF</a>	0		1000	0.36 - 0.36
RS Components*	<a href="#">6044438</a>	5760			0.36 - 0.36
Avnet Europe*	<a href="#">SLF6025T-100M1R0-PF</a>	0		1000	0.36 - 0.36
Rutronik*	<a href="#">IND15881</a>	0		1000	0.36 - 0.33
LTL Group	<a href="#">SLF6025T-100M1R0-PF</a>	6898			0.36 - 0.33
Abacus Technologies	<a href="#">SLF6025T-100M1R0-PF</a>	3700			0.36 - 0.33

\* SLF6025T-100M1R0-PF - TDK

<http://www.pcblibraries.com/POD/>

# Suchmaschine:

Die PCB Library Expert Software vereinigt eine software-interne Suchfunktion mit der Online POD Datenbank, um die Beschaffung IPC-7351 konformer Landflächen zu gewährleisten.



The screenshot displays the PCB Libraries search interface. The top navigation bar includes the PCB Libraries logo and a search bar. The main content area is titled "Footprints & 3D Models with Customizable Preferences".

**Search Interface (Left Panel):**

- Manufacturer: TDK
- Part Number: SLF6025T-100M1R0-PF
- Case Code: (empty)
- Results / Page: 5
- Buttons: Search POD, Request a Part
- Text: Part not found? Get it as little as:
  - \$5 - LE Professional
  - \$7 - LE POD Builder
- Footnote: \*Library Expert Pro customers get complimentary access to POD. LE POD Builder (free) users will be deducted 5 credits upon request! We highly recommend using the latest release for all parts that take more than 2 hours to build will be charged double.

**Search Results (Middle Panel):**

- Header: Footprints & 3D Models with Customizable Preferences
- Message: 1 MILLION+ Intelli-Parts™ for footprints & 3D models, easily customizable with your preferences - or simply use the IPC or manufacturer defaults. You have...
- Search Criteria: TDK SEARCHED FOR PART NUMBER: "SLF6025T-100M1R0-PF"
- Results: (1 TOTAL PART FOUND)
- Image: TDK logo
- Logical Description: Inductor, Power, Wound Ferrite, 800mA
- Physical Description: Inductor, Power, 2 pin, 6.00 mm L X 6.00 mm W X 2.70 mm H body

**Product Detail (Right Panel):**

- Header: Footprints & 3D Models with Customizable Preferences
- Message: 1 MILLION+ Intelli-Parts™ for footprints & 3D models, easily customizable with your preferences - or simply use the IPC or manufacturer defaults. You have unprecedented control of your CAD library features with no limit on number of preference files!
- Search Criteria: TDK SEARCHED FOR PART NUMBER: "SLF6025T-100M1R0-PF"
- Buttons: Search, Log Out
- Stats: Free downloads used today: 0 of 0, POD credits [buy]: 0
- Image: TDK logo
- Manufacturer: TDK
- Part Number: SLF6025T-100M1R0-PF [report issue]
- Case Code: SLF6025
- Datasheet: Download PDF
- Footprint Name: TDK\_SLF6025
- Footprint (FPX File) button
- Logical Description: Inductor, Power, Wound Ferrite, 800mA 150 Ohm, SMD
- Physical Description: Inductor, Power, 2 pin, 6.00 mm L X 6.00 mm W X 2.70 mm H body

# Part Building Service:



Ergänzt wird die Bauteil-Suche durch den Part Building Service von PCB Libraries.

**FREE BOM BUILDER SERVICE**  
**"Sounds too good to be true" is now REALITY**

- Send us your BOM
- We extract all parts from Parts on Demand database
- We build all standard parts for FREE
- You can choose if you want to pay \$5 per part for remaining parts
- Guaranteed to save you time and money
- Available to Library Expert Pro customers on latest version

[read more...](#)

*The completely redesigned PCB Library Expert*

We offer tools to automate building of MILLIONS of footprints and 3D models. In addition, we also offer an intelligent PCB library that gets you footprints (23 CAD formats) and 3D models with *your own user preferences*: line widths, pad shapes, colors, rotation, and dozens more.

Look throughout the industry for the highest quality PCB libraries at the lowest cost and you end up at our PCB Library Expert. Our PCB Library Expert lets you effortlessly calculate and generate high-quality footprints in a fraction of the time it would take you to create them using a CAD tool.

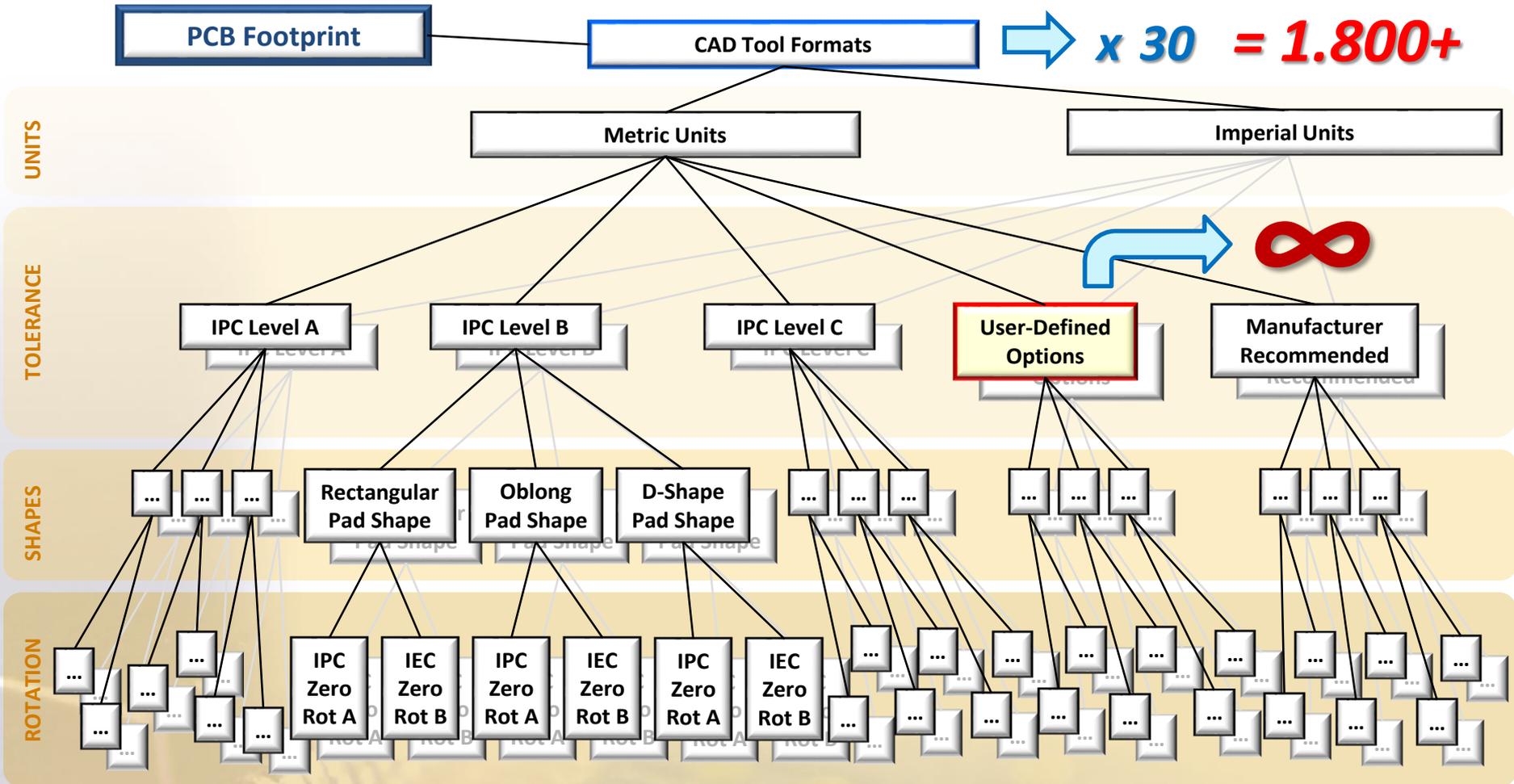
Footprint Name
XTALDFN2_200X120X60L50X100
ALTERA_EP4CGX15BN11C7N
AMPHENOL_LMJ2018811100DL1T4
AMPHENOL_101-00565-64
CAPC100X50X56L25
AMPHENOL_10-507143-85E
QFN25P50_400X400X80L40X24T260

Physical Description	Case Code
Crystal, Dual Flat No-Lead (DFN 2 Pin); 2 pin, 2.00 mm L X 1.20 mm W X 0.60 mm H body	ABS06
Pullback Quad Flat No-Lead (PQFN with Tab); 148 pin, 11.00 mm L X 11.00 mm W X 0.80 mm H body	148-QFN
Connector, Right Angle RJ45 w/Transformer; 14 pin, 16.51 mm L X 25.40 mm W X 13.76 mm H body	LMJ201881X100DL1T4
Connector, Right Angle Receptacle; 15 pin, 26.60 mm L X 25.00 mm W X 3.45 mm H body	101-00565-64
Capacitor, Chip; 1.00 mm L X 0.50 mm W X 0.56 mm H body	X5R 0402
Connector, Vertical Receptacle; 472 pin, 138.176 mm L X 13.767 mm W X 12.598 mm H body	L-2081-2
Quad Flat No-Lead (QFN with Tab), 0.50 mm pitch; square, 6 pin X 6 pin, 4.00 mm L X 4.00 mm W X 0.80 mm H body	CP-247

Manufacturer	Part Number	Logical Description
Abracon	ABS06-107-32.768KHZ-T	Crystal, 4pF 32.768 kHz
Altera	EP4CGX15BN11C7N	IC, Cyclone IV GX
Amphenol	LMJ201881X100DL1T4	Modular Jack, 8 Position, RJ45, with LED's and Transformer
Amphenol	101-00565-64	Connector, 15 Position, SD Card
AVX	0402ZD104KAT2A	Capacitor, Chip, Ceramic 0.1uF 10% 10V X5R
Amphenol Aerospace Operations	10-507143-85E	Connector, 472 Position, High Density Interconnect System with MIL-C-55302 Type Bristle Brush Contacts
Analog Devices	ADL5201	IC, Wide Dynamic Range, High Speed, Digital Controlled VGA

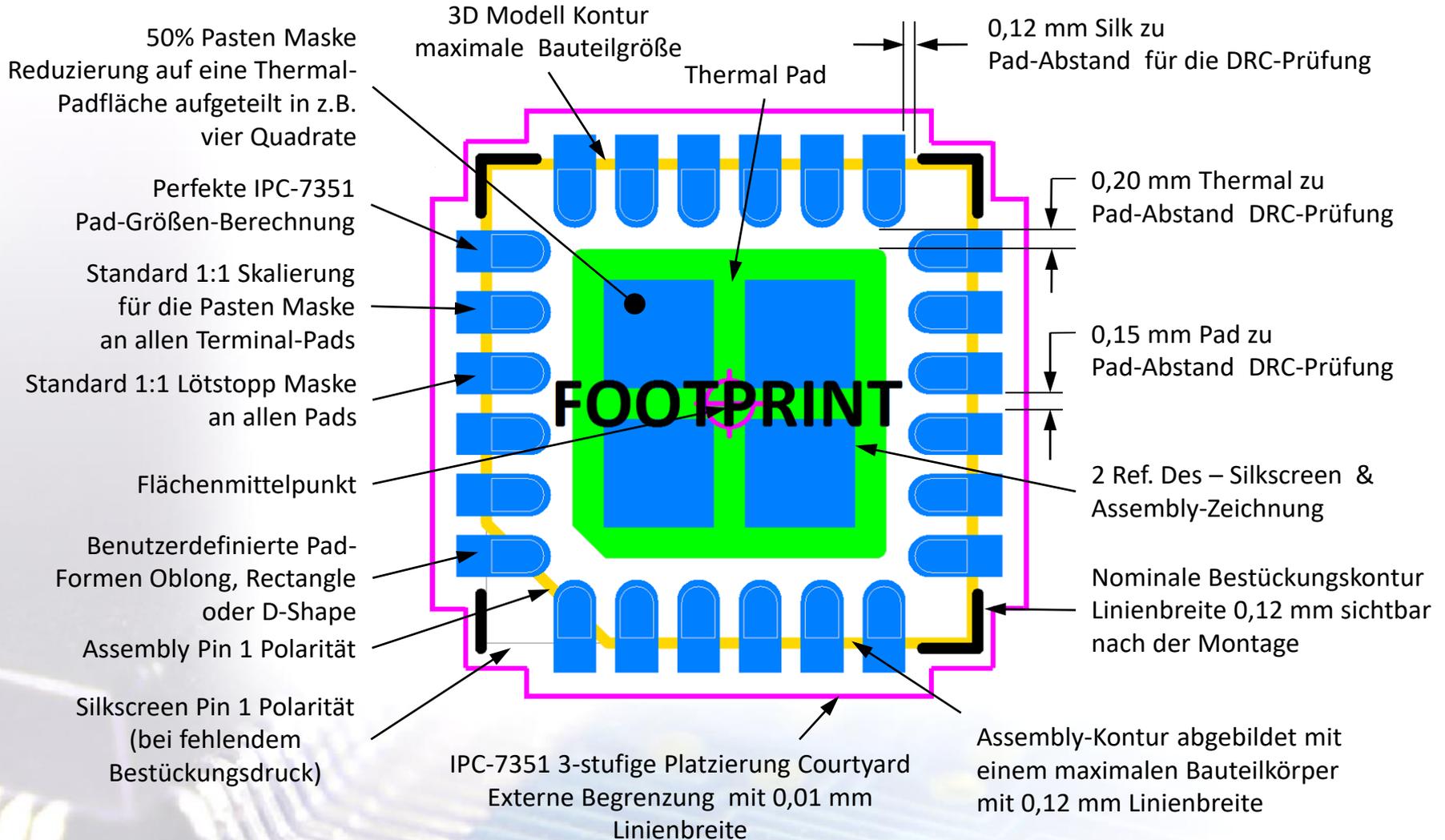
<http://www.pcblibraries.com/LibraryExpert/BOM/>

# IPC-7351 – Richtlinien für Land Pattern

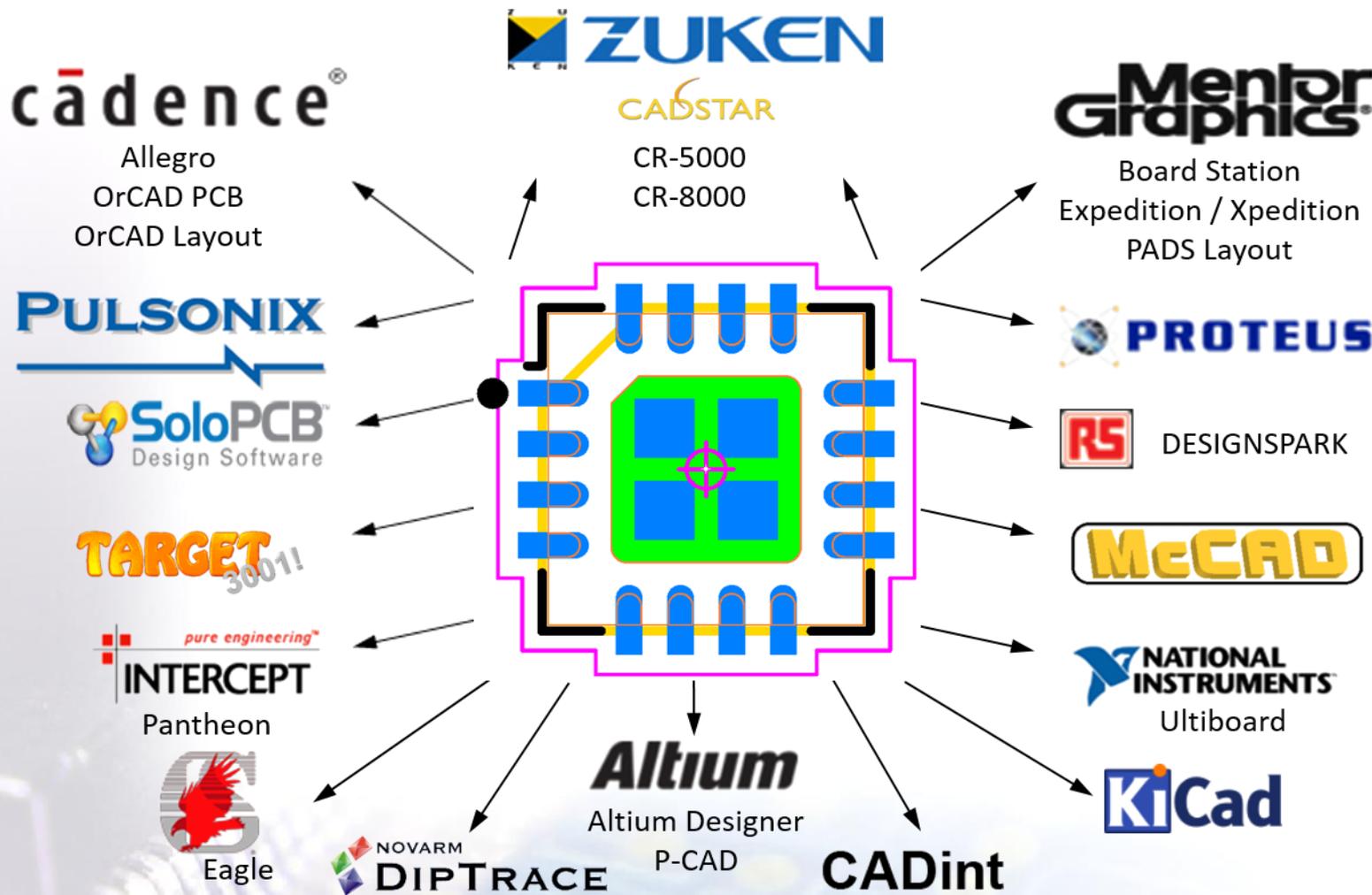


**30 CAD Programme X 2 Einheiten = 60 X 5 Stufen = 300 X 3 Pad Formen = 900 X 2 Rotationen = 1.800+ Variationen**

# IPC-7351 – Richtlinien für Land Pattern



# IPC-7351 – Richtlinien für Land Pattern



# IPC-7351B (& C) Berechnungsgrundlagen

**IPC-7351B DE**  
2010 - Juni

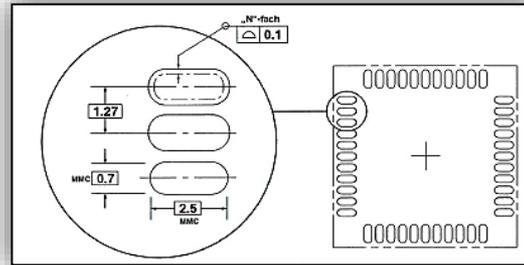
**Basisanforderungen an das SMT-Design und SMD-Anschlussflächen-Richtlinie**

Ersatz für IPC-7351A  
Februar 2007

Eine vom IPC entwickelte Richtlinie

Association Connecting Electronics Industries

FED  
Für Verfahren im Design, Entwicklung und Fertigung



**Abmessungsangaben der Hersteller für ein SOIC**

Die Abmessungen und Toleranzen der Herstellerangaben werden in das System der Profil-Bemaßung umgewandelt, [S] entspricht dabei dem „Maximal-Materialzustand“.

Hinweis: Falls [S] nicht vom Bauteil-Hersteller angegeben wird, kann es dadurch ermittelt werden, dass die Maße [T] von der Länge subtrahiert werden.

$$[S] = [L] - 2[T]$$

Die Fertigungstoleranz beträgt 0,1 mm

**Abmessungen und Toleranzen des Herstellers (maximale Länge des Bauelements beträgt 3,4 mm).**

Das Bauelement ist dargestellt im „Mindest-Materialzustand“ (LMC) mit zusätzlicher Profiloleranz, um den maximalen Längenbereich des Bauelements von 3,4 mm zu zeigen.

Anschlussflächen-Bild mit der Abmessung „Z“ im „Maximal-Materialzustand“. Bei der Bestimmung der richtigen Abmessung für „Z“ werden die Profiloleranz des Bauelements (0,2 X Z), zusätzlich der Toleranz des Anschlussflächen-Bildes (0,05X2) zusätzlich der Bestückungs-genauigkeit (0,1 Abweichung von der Sollposition) zusätzlich des gewünschten Spitzenhohlkehle berücksichtigt.

0.63 Anschluss-raster

0.3 - 0.2

Anschlussraster

Anschlussraster

Anschlüsse (W)

Anschluss-flächen (X)

$$[M] = \frac{W_{max}}{2} \cdot \sqrt{C^2 + F^2 + P^2}$$

$$[N] = E - \left[ \frac{W_{max}}{2} \right] \cdot \sqrt{C^2 + F^2 + P^2}$$

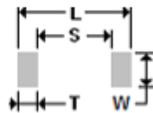
Hinweis: Die Positionstoleranz berücksichtigt den Verschiebungswinkel

# PCBL – SMD Excel Reference Calculator



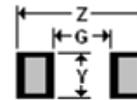
Es ist möglich, die wesentlichen Footprintgrößen direkt zu berechnen.

- Dieses Excel Formblatt steht kostenlos zur Verfügung.

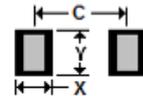


Enter Data:			
Lmin	5,85	Fab Tol +/-	0,050
Lmax	6,20	Place Tol +/-	0,025
Lrange	0,35		
Tmin	0,40	Toe Goal	0,35
Tmax	1,27	Heel Goal	0,35
Trange	0,87	Side Goal	0,03
Wmin	0,31		
Wmax	0,51	Place Rnd	0,02
Wrangle	0,20	Size Rnd	0,01

Calculation:			
Stol	2,09	Toe Tol	0,36742
Stol(RMS)	1,28	Zmax	6,91742
Sdiff	0,81	Heel Tol	1,28406
Smax	5,40	Gmin	3,01053
Smin	3,31	Side Tol	0,22913
New Smax	4,99	Yref	0,59913
New Smin	3,72		
		Place Rnd Factor	50
		Size Rnd Factor	100



Result:			
C	4,96	Toe Max	0,53
X	1,95	Toe Min	0,35
Y	0,60	Toe Goal	0,35
		Heel Max	0,99
		Heel Min	0,35
		Heel Goal	0,35
		Side Max	0,15
		Side Min	0,03
		Side Goal	0,03



Questions? Visit our online forum  
[www.PCBLibraries.com/Forum](http://www.PCBLibraries.com/Forum)

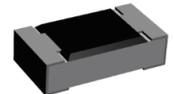
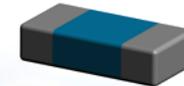
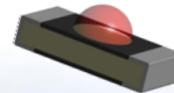


FREE PCB Library Expert  
[www.PCBLibraries.com/Downloads](http://www.PCBLibraries.com/Downloads)



Free USB-Stick

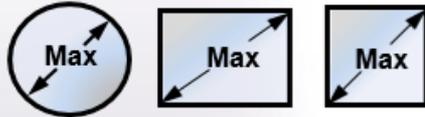
Inhalt: Ressourcen von CSK und PCB Libraries  
 zum Thema IPC-7351 und der Software: PCB Library Expert



# PCBL – PTH Excel Reference Calculator

Es ist möglich, die wesentlichen Footprintgrößen direkt zu berechnen.

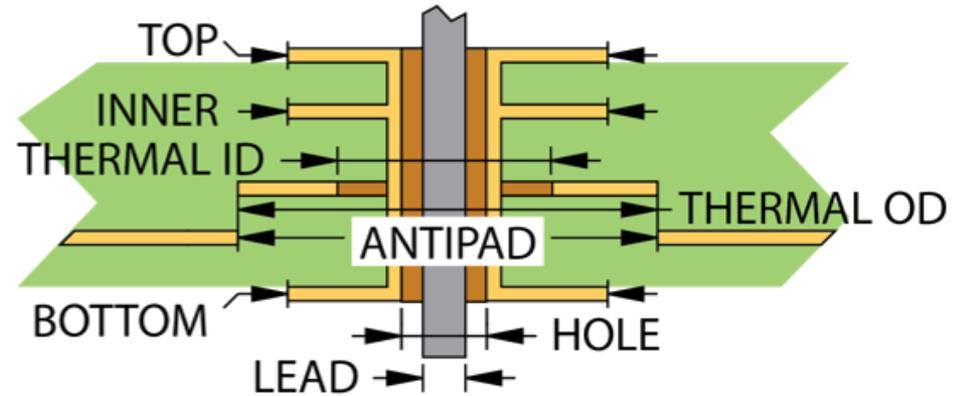
- Dieses Excel Formblatt steht kostenlos zur Verfügung.



Enter Data	
Maximum Lead (see above)	0,50
Hole over Lead	0,20
Pad to Hole Ratio	1,50
Minimum Annular Ring	0,20
Thermal ID over Hole	0,40
Minimum Thermal OD over ID	0,30
Thermal OD to Hole Ratio	1,10
Spoke Width (% of OD ÷ 4)	75
Round Off	0,01
Round Factor =	100

Restore Defaults

Pad Stack Results	
Hole =	0,70
Calculated Pad =	1,05
Minimum Pad =	1,10
Top, Inner, Bottom Pad =	1,10
Plane Thermal ID =	1,10
Plane Thermal OD =	1,47
Plane Anti-Pad =	1,47
Thermal Spoke Width =	0,28



FREE PCB Library Expert  
[www.PCBLibraries.com/Downloads](http://www.PCBLibraries.com/Downloads)

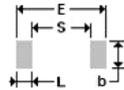


Questions? Visit our online forum  
[www.PCBLibraries.com/Forum](http://www.PCBLibraries.com/Forum)

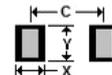
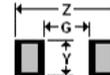


# Vergleich: IPC-7351C Richtlinie & Proportional

Current Sample  
10603 - M1608  
Vishay CRCW0603100KFKEA



## Incremental SMD Reference Calculator



Samples	
Rectangular End Cap	
C0201	R0201
C0402	R0402
C0603	R0603
Gull Wing Examples	
SO-14 Pitch 1.27	
SOT-23 Pitch 0.95	
TQFP-44 Pitch 0.80	
TSSOP-16 Pitch 0.65	
MSOP-10 Pitch 0.50	
TVSOP-24 Pitch 0.40	
Inward L	
3216-18A	7343-31D
Cylindrical	
MiniMelf	Melf
Flat Protruded	
SOT-563	
Castellated	
TC-164	

Enter Data:	
Emin	3,00
Emax	3,25
Etol =	0,25
Lmin	0,30
Lmax	0,70
Ltol =	0,40
bmin	1,45
bmax	1,65
btol =	0,20

Toe Goal	0,35
Heel Goal	0,00
Side Goal	0,00
Place Rnd	0,02
Size Rnd	0,01
Fab Tol +/-	0,050
Place Tol +/-	0,025

Calculation:	
Stol =	1,05
Stol (RMS) =	0,62
Sdiff =	0,43
Smax =	2,65
Smin =	1,60
New Smax =	2,43
New Smin =	1,82
Place Round Factor =	50
Size Round Factor =	100

Toe Tol =	0,27386
Zmax =	3,97386
Heel Tol =	0,62849
Gmin =	1,80574
Side Tol =	0,22913
Yref =	1,67913

Result:	
C =	2,88
X =	1,08
Y =	1,68

Toe Max =	0,48
Toe Min =	0,34
Toe Goal	0,35
Heel Max =	0,31
Heel Min =	0,00
Heel Goal	0,00
Side Max =	0,12
Side Min =	0,00
Side Goal	0,00

## F E D Proportional SMD Reference Calculator

Enter Data:	
Enom =	3,13
Lnom =	0,50
bnom =	1,55
cnom =	0,70
e (pitch) =	0

cnom = Terminal Thickness or Height

Goal Determination	
Toe Goal (%)	40
Heel Goal (%)	10
Side Goal (%)	10

Goals are a percentage of cnom

Calculation:	
Z =	3,56000
G =	1,86000
Y =	1,69000

Result:	
C =	2,84
C/2 =	1,42
X =	0,85
Y =	1,69

Risk observation	
Toe Max =	0,345
Toe Min =	0,208
Toe Goal =	0,280
Heel Max =	0,287
Heel Min =	-0,027
Heel Goal =	0,070
Side Max =	0,120
Side Min =	0,005
Side Goal =	0,070

Toe Min + Toe Tol/2  
C+X -Lmax/2  
max. 0.5mm

For Evaluation Purposes Only



# Excel Sheet: IPC-7351B Löttempfehlungen



## IPC-7351B Solder Joint Goal Tables

This documentation specifies the solder joint goals used by the PCB Library Expert, the EDA industry's leading library automation solution.



Corner Concave		Gull Wing	
Cylindrical End Cap		Inward Flat Ribbon L	
Flat Lead		J-Lead	
Flat Lug		Outward L Lead	
Flat No-Lead Side		Rectangular End Cap	
Flat No-Lead Bottom		Side Lead (Concave, Convex)	
Inward L Lead		Under Body Outward L	
Ball Grid Array		Column Grid Array	



# Excel Sheet: IPC-7351C Löttempfehlungen



**PROPOSED**  
**IPC-7351C Solder Joint Goal Tables**

This documentation specifies the solder joint goals used by the PCB Library Expert, the EDA industry's leading library automation solution. These are the calculations in the proposed IPC-7351C



Corner Concave	
Cylindrical End Cap	
Flat Lead	
Flat Lug	
Flat No-Lead Side	
Flat No-Lead Bottom	
Inward L Lead	
Ball Grid Array	

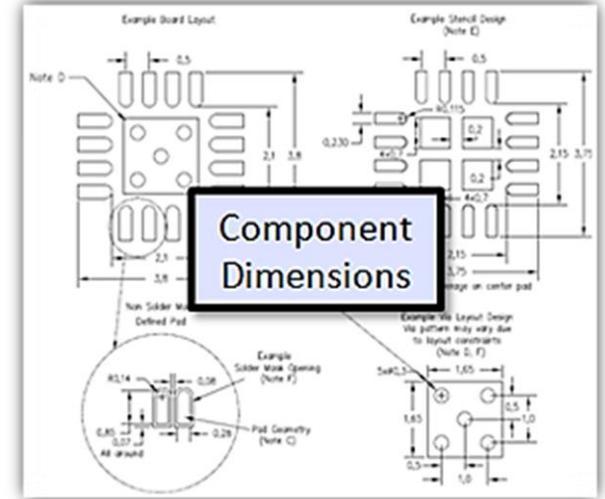
Gull Wing	
Inward Flat Ribbon L	
J-Lead	
Outward L Lead	
Rectangular End Cap	
Side Lead (Concave, Convex)	
Under Body Outward L	
Column Grid Array	



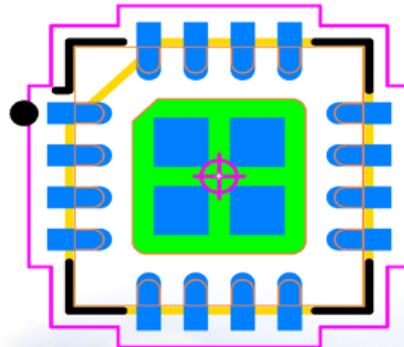
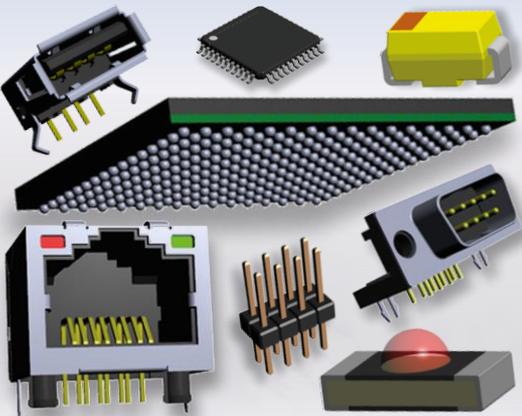
# PCB Library Expert Software

## Benutzer- und firmenspezifische Einstellungen und Regeln:

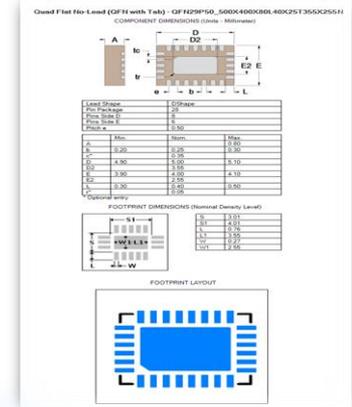
- ✓ Imperial oder Metrisch
- ✓ Pad Formen
- ✓ Bauteil Rotationen
- ✓ Löttempfehlungen
- ✓ Linienbreiten
- ✓ DRC Regeln
- ✓ und viele mehr ...



## Automatisch: 3D STEP Modelle

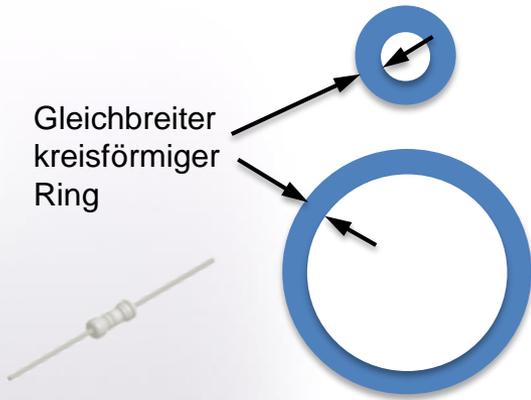


23 CAD Outputs



Dokumentation

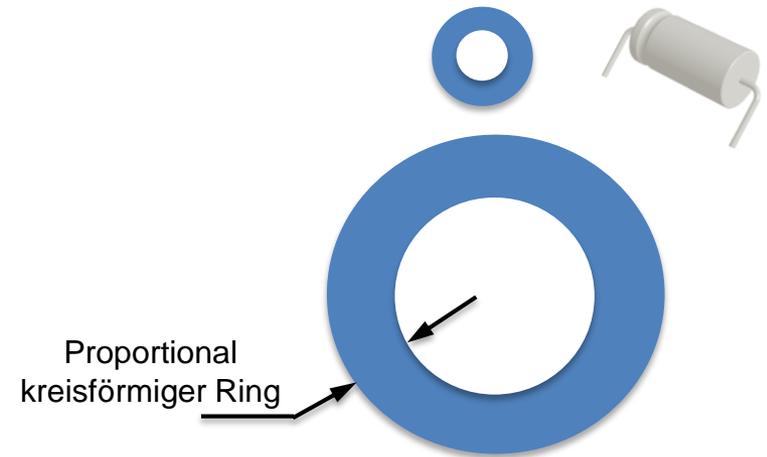
## 3-stufiges Pad Stack



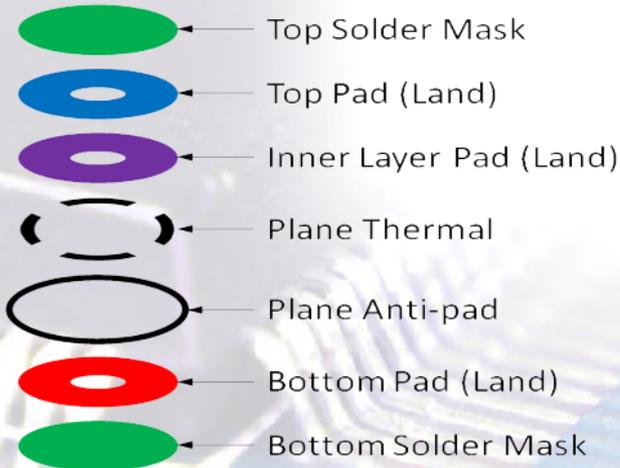
## Proportional Pad Stack

kleines Loch

großes Loch

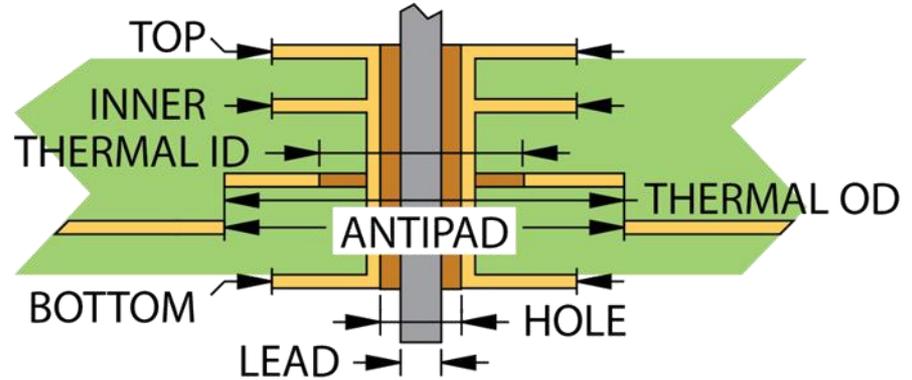
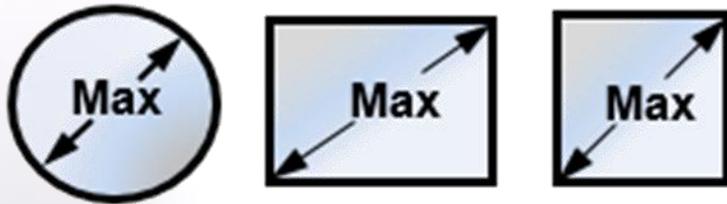


## Aufbau THT PAD Stack



	Maximum (Most)	Median (Nominal)	Minimum (Least)
Gleichartige Eigenschaften			
Loch-Durchmesser Faktor (über den gesamten Draht)	0.25	0.20	0.15
Int. & ext. Pad Vergrößerung (zum Lochdurchmesser hinzugefügt)	0.50 mm	0.35 mm	0.30 mm
Anti-Pad Vergrößerung (zum Lochdurchmesser hinzugefügt)	1.00 mm	0.70 mm	0.50 mm
Courtyard Aufweitung vom Bauteilkörper und/oder Pads (je nach größerem Wert)	0.50 mm	0.25 mm	0.12 mm
Courtyard Rundungstoleranz	Aufrundung auf die nächsten zwei Nachkommastellen: 1.00, 1.01, 1.02, 1.03, ...		

# IPC-7351C: Proportional Pad Stack



Enter Data	
Maximum Lead (see above)	0.50
Hole over Lead	0.20
Pad to Hole Ratio	1.50
Minimum Annular Ring	0.20
Thermal ID over Hole	0.40
Minimum Thermal OD over ID	0.30
Thermal OD to Hole Ratio	1.10
Spoke Width (% of OD ÷ 4)	75
Round Off	0.01
Round Factor =	100

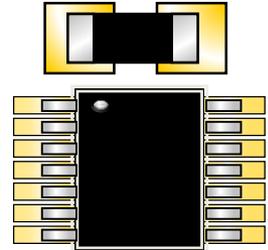
Pad Stack Results	
Hole =	0.70
Calculated Pad =	1.05
Minimum Pad =	1.10
Top, Inner, Bottom Pad =	1.10
Plane Thermal ID =	1.10
Plane Thermal OD =	1.47
Plane Anti-Pad =	1.47
Thermal Spoke Width =	0.28

- Hinweis - Hole over Lead:**
- Runder Draht: 0.20 mm
  - Recheckiger Draht: 0.15 mm

# 5-stufige Toleranzeinstellung der IPC-7351

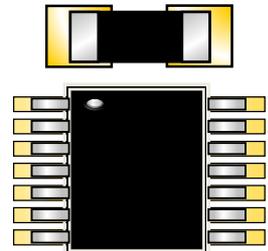
## Level A = Most: Maximaler Überstand der Anschlussflächen

Für Designs mit niedriger Bauteildichte ist diese Art von Landflächen entwickelt worden. Diese als "Maximum" bezeichneten Footprints sind in ihrer Größe für das optimale Wellenlöten oder Schwalllöten für Bauteile ohne Anschlüsse oder mit abgewinkelten Anschlüssen definiert worden. Das beinhaltet auch die Bauteilfamilien mit nach innen liegenden "J" geformten Anschlüssen, womit ein breiteres Prozessfenster für das Reflow-Lötverfahren zur Verfügung steht.



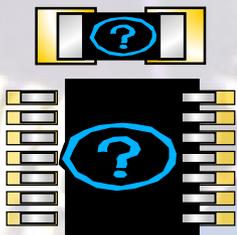
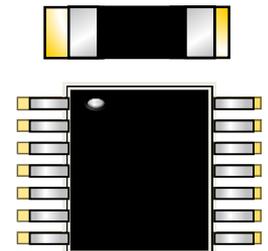
## Level B = Nominal: Mittlerer Überstand der Anschlussflächen

Für Designs mit einer mittleren Packungsdichte kann geprüft werden, ob eine mittlere Größe an Footprints verwendet werden kann. Diese Footprint-Größe ist so bemessen, dass für alle Bauteilfamilien eine robuste Lötverbindung für einen Reflow-Prozess vorgesehen ist und stellt geeignete Footprint-Größen für Wellenlöten oder Reflow-Löten für Bauteile ohne Anschlüsse oder mit abgewinkelten Anschlüssen dar.



## Level C = Least: Minimaler Überstand der Anschlussflächen

Hohe Packungsdichten sind typisch für tragbare und mobile Geräte. Diese Anwendungen benutzen die "Mindest" Footprint-Größen im Design. Im Regelfall kommt es zu Variationen von Footprint-Größen.



- ✓ **Herstellerempfehlung:** Vom Hersteller empfohlene Bauteil-Footprints
- ✓ **Benutzerdefiniert:** Verwendet benutzerdefinierte Regeln für Bauteil-Footprints

Diese Faktoren werden benutzt, um die optimalen Footprint-Größen zu berechnen:

1. Bauteilkörpertoleranz:  $\pm 0.1 \text{ mm bis } \pm 0.3 \text{ mm (T)}$
2. Bauteilanschlusstoleranz:  $\pm 0.2 \text{ mm bis } \pm 0.5 \text{ mm (T)}$
3. Fertigungstoleranz:  $\pm 0.05 \text{ mm (F)}$
4. Platzierungstoleranz:  $\pm 0.025 \text{ mm (P)}$
5. Footprint-Rundungsfehler:  $\pm 0.01 \text{ mm}$
6. Footprint-Abstands-Rundungsfehler:  $\pm 0.01 \text{ mm}$
7. Lötstellenempfehlungen für Zeh (*Toe*), Ferse (*Heel*) und Seite (*Side*):

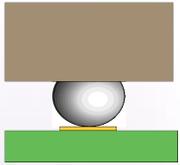
$$\sqrt{T^2 + F^2 + P^2}$$



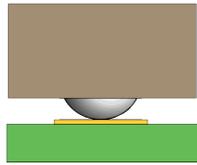
	Maximum (Most) Density Level A	Median (Nominal) Density Level B	Minimum (Least) Density Level C
Toe ( $J_T$ )	0.55	0.35	0.15
Heel ( $J_H$ ) <sup>1</sup>	0.45	0.35	0.25
Side ( $J_S$ )	0.05	0.03	0.01
Aufrunden	Rundung auf den nächsten Wert mit 2 Nachkommastellen, z.B.: 1.00, 1.01, 1.02, 1.03		
Courtyard excess	0.50	0.25	0.10

# SMD Terminaltypen

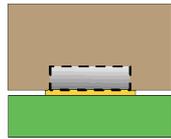
Ball Grid Array



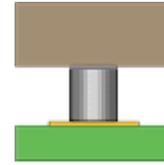
Bump Grid Array



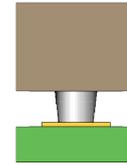
Land Grid Array



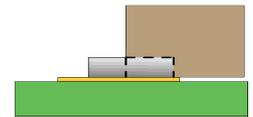
Column Grid Array



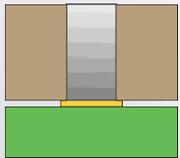
Pillar Grid Array



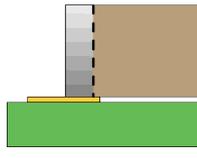
Flat Lug



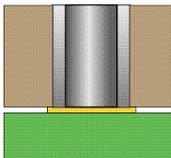
Flat Side



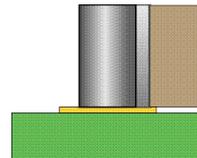
Convex Side



Concave Side



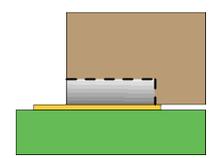
Corner Concave



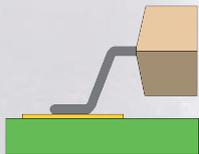
Inward L



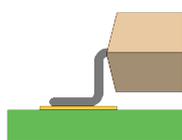
Flat Bottom



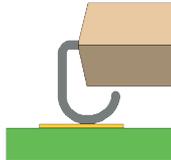
Gull Wing



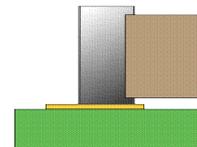
Outward L



J-Lead



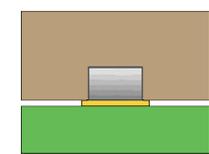
End Cap



Under Body L

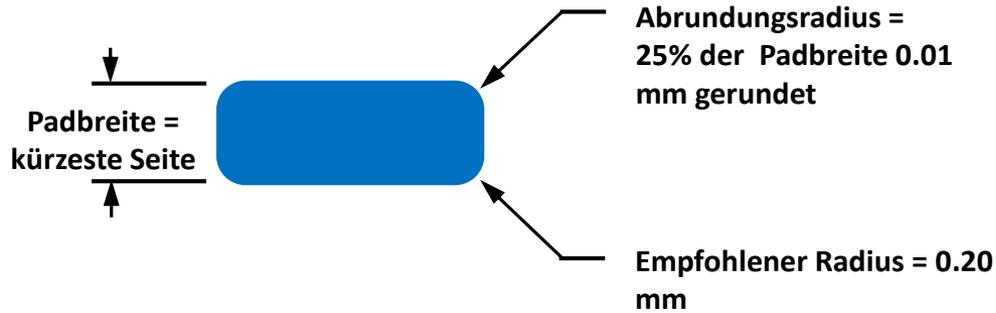


No-Lead



# Padform Empfehlungen - Rounded Rectangle

- ❌ Viele Bauteilhersteller empfehlen ein Rechteck:
- ❌ IPC-SM-782 und IPC-7351B empfehlen ein Oblong:
- ✅ IPC-7351C empfiehlt ein Rechteck mit abgerundeten Ecken:



## Lead Formen & Rounded Rectangles:

Under Body "L"



End Cap



Gull Wing



PQFN D-Shape

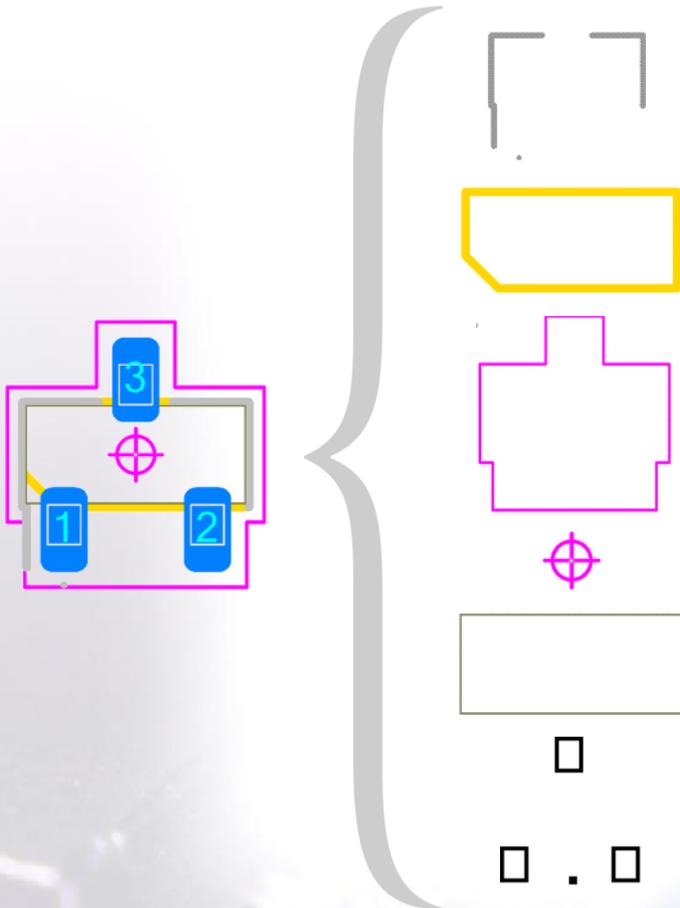


Corner Concave



QFN D-Shape

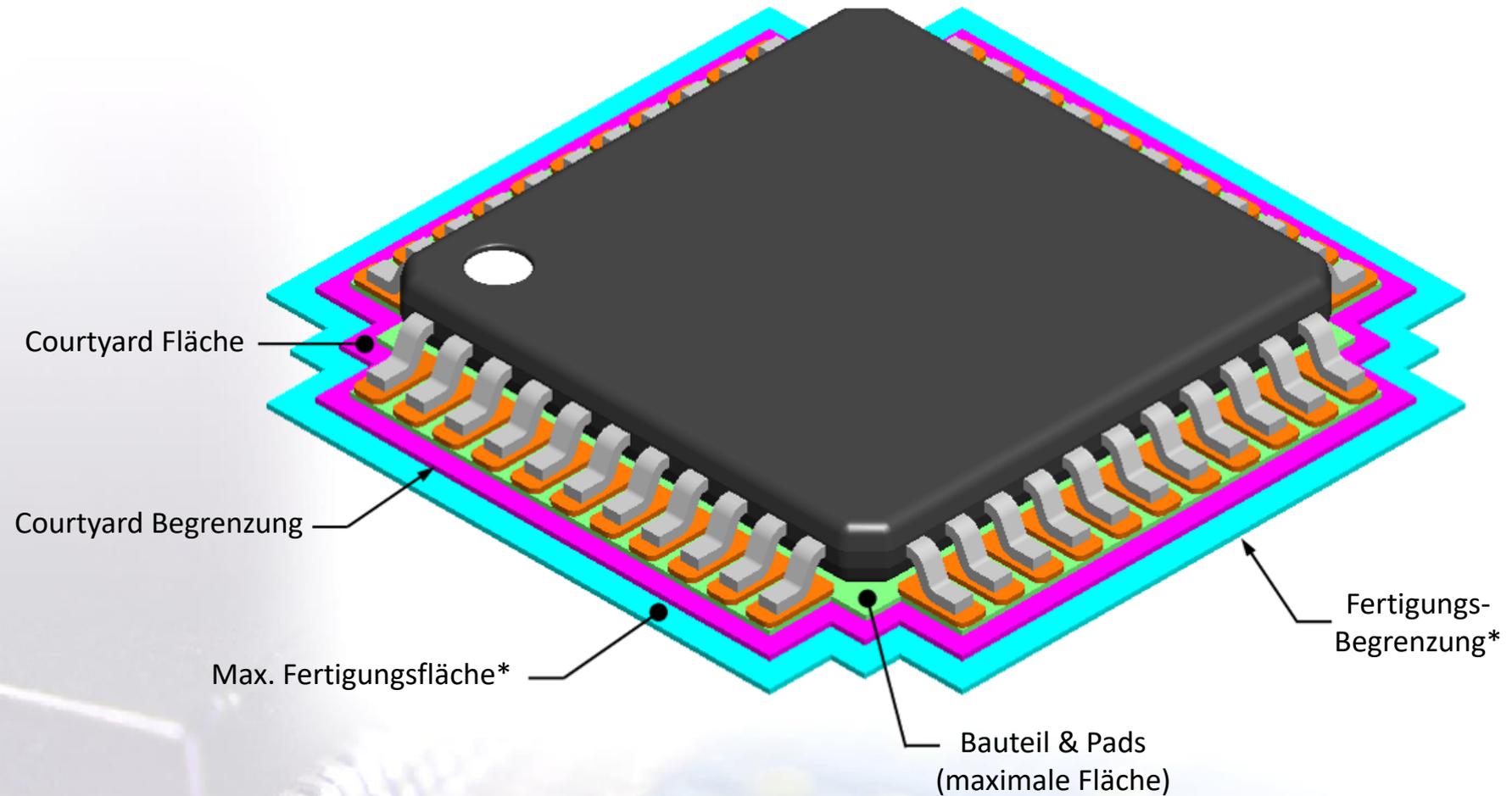




- Legend\* Kontur und Polaritätsmarkierung
- Assembly Kontur und Polaritätsmarkierung
- Courtyard Kontur
- Land Pattern Nullpunktkennzeichnung
- Bauteil Kontur
- Anschlusspunkt Kontur

\* Legend = Silkscreen  
IPC-T-50J Terms and Definitions

# IPC-7351C Courtyard Contour Following



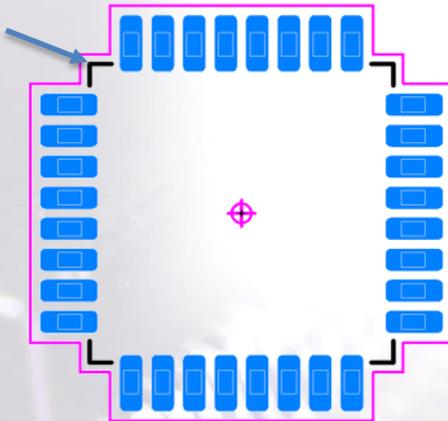
**\*Design Regel im CAD-Tool:**  
Abstand von Bauteil zu Bauteil

# Legend Linienunterbrechungen

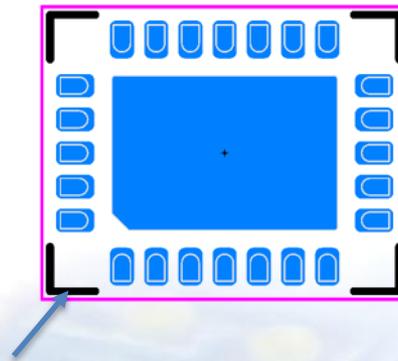
Die maximale Bauteilkörper Umrandung ist der Ausgangspunkt für die Zuordnung der Legend Umriss Innenkante.

Die Legend sollte bei Plastikbauteilen nur an den Seiten gezeichnet werden. Bei größeren Bauteilen, z.B. BGA, CGA und LGA jedoch, nur in den Ecken und nicht an den Seiten. Es wird empfohlen, dass die Legends sich nicht auf die Bauteil Pads beziehen.

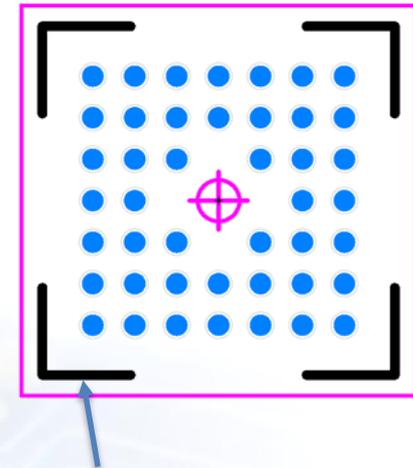
Quad Flat Package  
**QFP**



Pull-back Quad Flat No-lead  
**PQFN**

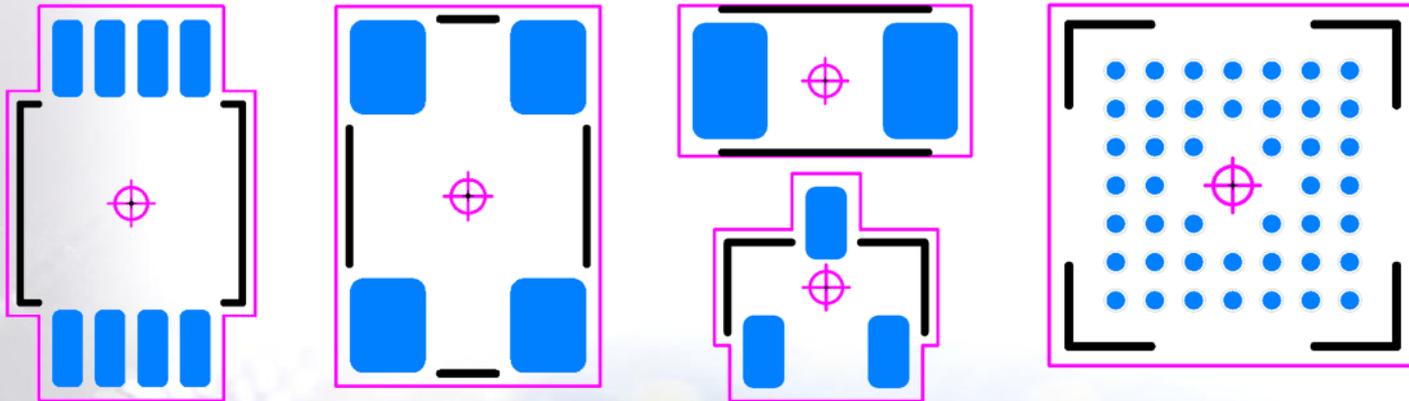


Ball Grid Array  
**BGA**



Die Nullpunkte des Land Patterns sind normalerweise im Flächenmittelpunkt. Jedoch ist es gelegentlich schwierig, diesen Punkt bei unregelmäßigen Konturen zu bestimmen.

- In diesen Fällen wird der Pin 1 verwendet. Das gilt auch für viele Verbinder mit Durchgangsbohrungen.
- Die zentrierten Nullpunkte der Land Pattern werden, wie in den Bildern gezeigt, mit einem runden, nichtgefüllten 0.50 mm großen Kreis, mit einer 0.05 mm Linienbreite und einem 0.70 mm großen Kreuz gekennzeichnet.



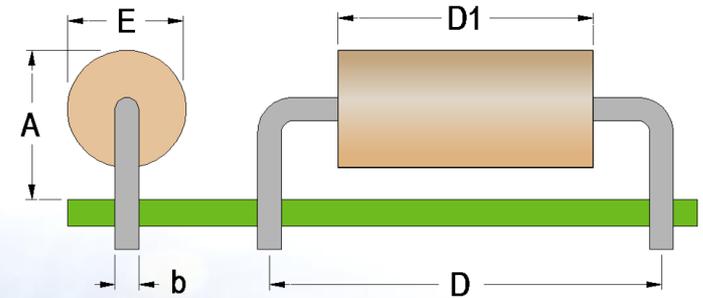
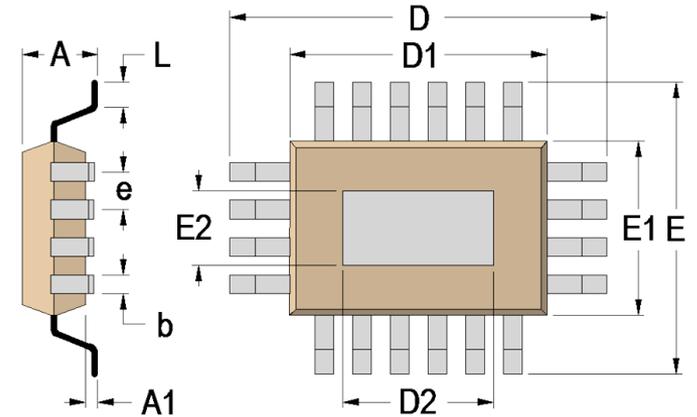
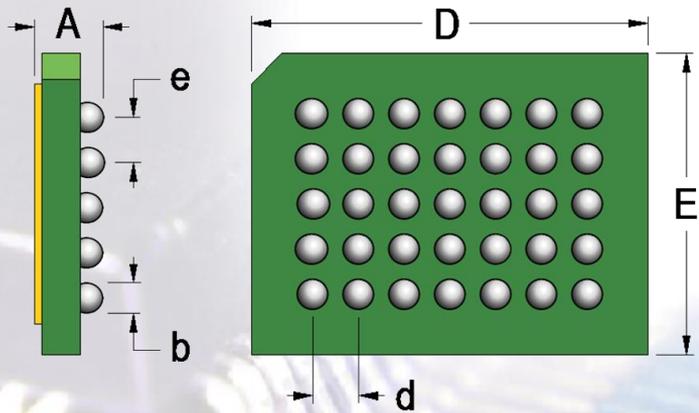
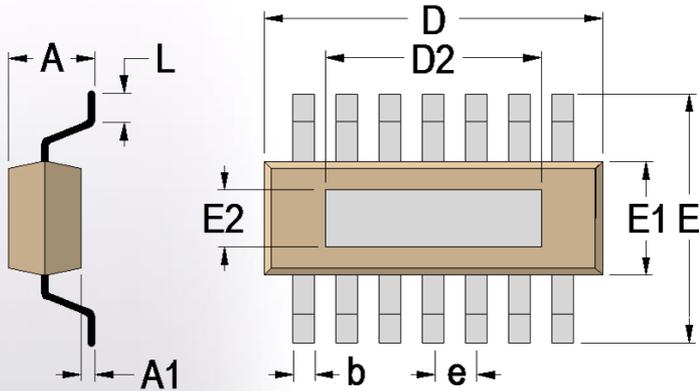


# EIA vs JEDEC Bauteilbemaßung

## EIA Bauteilbemaßungen

VS

## JEDAC Bauteilbemaßungen



# Pad Stack Naming Convention

IPC-7351  
Pad Stack  
Naming  
Convention

PCB Libraries, Inc.

August 18, 2016

Der erste Buchstabe im Pad Stack Namen beschreibt die Form von dem Pad auf den Außenlagen der Leiterplatte. Standardgemäß werden kleine Buchstaben verwendet.

- **Hinweis:** „b“ = Oblongs, weil der Buchstabe „O“ leicht mit der Zahl „0“ verwechselt werden könnte.

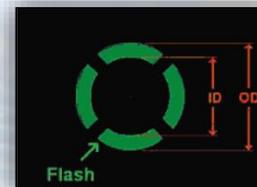
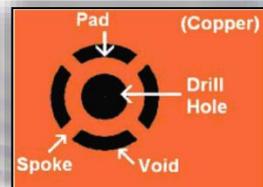
## Den Grundformen werden sechs Buchstaben zugewiesen:

c	Circular	(= Kreis)
s	Square	(= Quadrat)
r	Rectangle	(= Rechteck)
b	Oblong	(= Länglich)
d	D-Shape	(= ein Ende quadratisch & das andere Ende rund)
u	User defined contour	(= Unregelmäßige Form)



# Pad Stack Standard Definition

- Die **Lötstopmmaske** ist im Maßstab 1:1 der Pad-Größe
- Die **Pastenmaske** ist im Maßstab 1:1 der Pad-Größe
- Auf den Innenlagen ist die **gleiche Pad-Form**, wie auf den Außenlagen
- Die primären und sekundären Pads haben die **gleiche Größe**
- Auf den **Innenlagen** sind die Pad-Formen **rund**
- **Vias** (*Durchkontaktierungen*) sind **rund**
- **Montagebohrungen** sind **rund**
- **Unzulässige Zeichen:** „“, ; : / \ [ ] ( ) . { } \* & % \$ # ! @ ^ =
- **Wärmefallen** haben **4 Anschlussstege**
- **Wärmefallen:** Gleiche Größe beim Außendurchmesser (*OD*) und der Plane-Freistellung
- **Proportionales Verhältnis:** Pad-Freistellung (*Anti-Pad*) in einer Plane zum Pad
- **Proportionales Verhältnis:** Wärmefallen-Innendurchmesser (*ID*), Außendurchmesser (*OD*) und Stege



# Kennzeichner für Pad Stack Namen

<u>Einzel-Kennzeichner</u>	
<b>n</b>	nicht-durchkontaktiertes Loch
<b>z</b>	die Pads der Innenlage sind anders dimensioniert als auf den Außenlagen
<b>x</b>	Kennbuchstabe, der alleine oder mit anderen Kennbuchstaben für Pads auf der gegenüberliegende Seite von der primären Layer diese Pads in der Abmessung dimensioniert
<b>t</b>	Wärmefallenwerte, falls unterschiedlich zum Standard-Padstack
<b>m</b>	Lötstoppmaske, falls sie sich vom voreingestellten 1:1 Größenverhältnis zum Pad unterscheidet
<b>p</b>	Lötpaste, falls sie sich vom voreingestellten 1:1 Größenverhältnis zum Pad unterscheidet
<b>y</b>	Pad-Freistellung ( <i>Anti-Pad</i> ), wenn sich der Wert vom Außendurchmesser (OD) der Wärmefalle unterscheidet
<b>o</b>	Verschiebung vom Pad-Nullpunkt
<b>k</b>	Freizuhaltender Bereich ( <i>Keep-out</i> )
<b>r</b>	Radius für gerundete rechteckige Pads
<b>c</b>	Abschrägung der Fase bei rechteckigen Pads

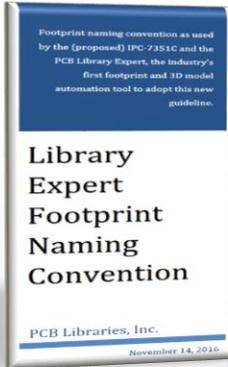
<u>Doppel-Kennzeichner</u>	
<b>ts</b>	Quadratische Wärmefallengröße, falls unterschiedlich zur Oberseite in Form und Abmessung
<b>sw</b>	Breite des Steges zur Wärmefalle
<b>zs</b>	Innenlagenform ist ein Quadrat ( <i>Hinweis: Der Standardwert ist kreisförmig</i> )
<b>m0</b>	Kein Lötstoppmasken-Abstand
<b>mx0</b>	Gegenüberliegende Lötstoppmaske ist kreisförmig
<b>mx0</b>	Kein Lötstoppmasken-Abstand auf der gegenüberliegenden Seite
<b>xc</b>	Gegenüberliegende Seite ist kreisförmig
<b>vs</b>	Via mit quadratischem Pad
<b>hn</b>	nicht metallisiertes Loch

# Beispiele für Pad Stack Namen

<u>Metric units</u>	
<b>c150h90</b>	Standard Pad Stack mit rundem Pad 1.50 mm Durchmesser und einem 0.90 mm Loch <i>(ohne zusätzlichen Kennbuchstaben)</i>
<b>c150h90z140</b>	Auf der Innenlage ist ein Durchmesser von 1.40 mm oder 0.10 mm kleiner als auf den Außenlagen.
<b>c150h90z140x170</b>	Auf der gegenüberliegenden Seite ist der Durchmesser 1.7 mm oder 0.3 mm größer.
<b>c150h90z140x170m165mx185</b>	Der Durchmesser der Lötstoppmasken-Öffnung ist um 0.15 mm größer als das Pad der Außenlagen.
<b>c150h90z140x170m165mx185y300</b>	Der Durchmesser der Pad-Freistellung ( <i>Anti-Pad</i> ) = 0.3 mm
<b>c150h90z140x170m165mx185y300t150_180_40</b>	Wärmefalle ID = 1.50 mm, OD = 1.80 mm, Stegbreite = 0.40 mm, Pad-Freistellung ( <i>Anti-Pad</i> ) = 1.80 mm

<u>Imperial units</u>	
<b>c60h39</b>	Standard Pad Stack mit rundem Pad, 60 Mil Durchmesser und einem 39 Mil Loch <i>(ohne zusätzlichen Kennbuchstaben)</i>
<b>c60h39z55</b>	Auf der Innenlage ist der Durchmesser 55 Mil oder 5 Mil kleiner als auf den Außenlagen.
<b>c60h39z55x68</b>	Auf der gegenüberliegenden Seite ist der Durchmesser 68 Mil oder 8 Mil größer.
<b>c60h39z55x68m66mx72</b>	Der Durchmesser der Lötstoppmasken-Öffnung ist um 8 Mil größer als auf der oberen Lage und um 12 Mil größer als auf der gegenüberliegenden Seite.
<b>c60h39z55x68m66mx72y120</b>	Der Durchmesser der Pad-Freistellung ( <i>Anti-Pad</i> ) = 120 Mil
<b>c60h39z55x68m66mx72y120t60_70_16</b>	Wärmefallen-ID = 60 Mil, OD 70 Mil, Stegbreite 16 Mil, Pad-Freistellung ( <i>Anti-Pad</i> ) 120 Mil

# Land Pattern Naming Convention



- ✓ Bei der Naming Convention gilt für alle Funktionen:  
Der Längenwert steht vor dem Breitenwert, wie z.B.: Bauteilkörper, Thermal Pad und Anschlussfläche

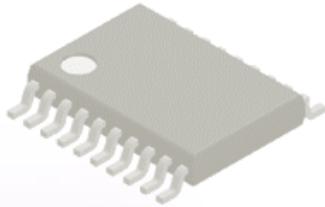
## Die Pinanzahl folgt nun der Bauteilfamilienabkürzung:

- Beispiel für ein SOP: **SOP16P65\_500X640X120L60X24T340X500**
- Beispiel für ein QFP: **QFP64P50\_1200X1200X100L60X22T800**
- Gull Wing Lead Anschlusslängentoleranz: **SOP50P710X120-14NL60**
- Ballgrid-Größe: **BGA121C50P11X11\_600X600X100NB23**
- Chip Terminal Leadbreite: **CAP320X160x140L50**

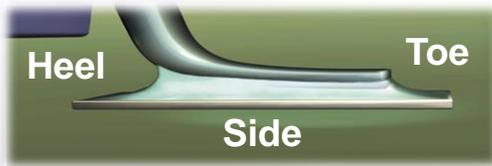
Ball Grid Array's.....	<b>BGA</b> + Pin Qty. + <b>C</b> or <b>N</b> + <b>P</b> Pitch _ Ball Columns X Ball Rows _ Body Length X Width X Height + <b>B</b> Ball Diameter
BGA w/Dual Pitch.....	<b>BGA</b> + Pin Qty. + <b>C</b> or <b>N</b> + <b>P</b> Col Pitch X Row Pitch _ Ball Columns X Ball Rows _ Body Length X Width X Height + <b>B</b> Ball Diameter
BGA w/Staggered Pins.....	<b>BGAS</b> + Pin Qty. + <b>C</b> or <b>N</b> + <b>P</b> Pitch _ Ball Columns X Ball Rows _ Body Length X Width X Height + <b>B</b> Ball Diameter
Capacitors, Chip, Array, Concave.....	<b>CAPCAV</b> + Pin Qty. + <b>P</b> Pitch _ + Body Length X Width X Height + <b>L</b> Lead Length X Width
Capacitors, Chip, Array, Concave.....	<b>CAPCAF</b> + Pin Qty. + <b>P</b> Pitch _ + Body Length X Body X Height + <b>L</b> Lead Length X Width
Capacitors, Chip.....	<b>CAPC</b> + Body Length X Width X Height + <b>L</b> Lead Length
Capacitors, Polarized, Chip.....	<b>CAPPC</b> + Body Length X Width X Height + <b>L</b> Lead Length
Capacitors, Dual Flat No-lead.....	<b>CAPDFN</b> + Body Length X Width X Height + <b>L</b> Lead Length X Width
Capacitors, Polarized, Dual Flat No-lead.....	<b>CAPPDFN</b> + Body Length X Width X Height + <b>L</b> Lead Length X Width
Capacitors, Molded.....	<b>CAPM</b> + Body Length X Width X Height + <b>L</b> Lead Length X Width
Capacitors, Polarized, Molded.....	<b>CAPPM</b> + Body Length X Width X Height + <b>L</b> Lead Length X Width
Capacitors, Aluminum Electrolytic.....	<b>CAPAE</b> + Base Body Size X Height + <b>L</b> Lead Length X Width
Ceramic Flat Packages.....	<b>CFP</b> + Pin Qty. + <b>P</b> Pitch _ Body Length X Lead Span X Height + <b>L</b> Lead Length X Width
Column Grid Array, Circular Lead.....	<b>CGA</b> + Pin Qty. <b>P</b> Pitch _ Pin Columns X Pin Rows _ Body Length X Width X Height + <b>L</b> Diameter
Pillar Column Grid Array.....	<b>PCGA</b> + Pin Qty. <b>P</b> Pitch _ Pin Columns X Pin Rows _ Body Length X Width X Height + <b>L</b> Diameter
Crystals (2 leads).....	<b>XTAL</b> + Body Length X Width X Height + <b>L</b> Lead Length X Width
Crystals, Dual Flat No-lead.....	<b>XTALDFN</b> + Body Length X Width X Height + <b>L</b> Lead Length X Width
Crystals, Side Concave.....	<b>XTALSC</b> + Body Length X Width X Height + <b>L</b> Lead Length
Diodes, Chip.....	<b>DIOC</b> + Body Length X Width X Height + <b>L</b> Lead Length
Diodes, Dual Flat No-lead.....	<b>DIODFN</b> + Pin Qty. _ Body Length X Width X Height + <b>L</b> Lead Length X Width
Diodes, Molded.....	<b>DIOM</b> + Body Length X Width X Height + <b>L</b> Lead Length X Width
Diodes, Non-polarized Chip.....	<b>DIONC</b> + Body Length X Width X Height + <b>L</b> Lead Length
Diodes, Non-polarized Molded.....	<b>DIONM</b> + Body Length X Width X Height + <b>L</b> Lead Length X Width
Diodes, MELF.....	<b>DIOMELF</b> + Body Length + Diameter + <b>L</b> Lead Length
Diodes, Side Concave.....	<b>DIOSC</b> _ Body Length X Width X Height + <b>L</b> Lead Length
Diodes, Side Concave, 4 Pin.....	<b>DIOSC4</b> + <b>P</b> Pitch _ Body Length X Width X Height + <b>L</b> Lead Length
DPAK.....	<b>DPAK</b> + Pin Qty. + <b>P</b> Pitch _ Lead Span X Height + <b>L</b> Lead Length X Width

L = Lead Terminal Toleranz; T = Termal Tab size; X = instead of word „by“

# IPC-7351B Löttempfehlungen Gull Wing Leads



➤ Keine Differenzierung zwischen Toe & Heel



	Maximum (Most) Density Level A	Median (Nominal) Density Level B	Minimum (Least) Density Level C
Toe ( $J_T$ )	0.55	<b>0.35</b>	0.15
Heel ( $J_H$ ) <sup>1</sup>	0.45	<b>0.35</b>	0.25
Side ( $J_S$ )	0.05	0.03	0.01
Aufrunden	Rundung auf den nächsten Wert mit 2 Nachkommastellen, z.B.: 1.00, 1.01, 1.02, 1.03		
Courtyard excess	0.50	0.25	0.10

# IPC-7351C Löttempfehlungen Gull Wing Leads



## Incremental Pin Pitch

SOP / QFP
Terminal Lead Spacing
Pitch > 1.00 mm
Pitch > 0.80 and <= 1.00 mm
Pitch > 0.65 and <= 0.80 mm
Pitch > 0.50 and <= 0.65 mm
Pitch > 0.40 and <= 0.50 mm
Pitch <= 0.40 mm

Least Density Level			
Toe	Heel	Side	Courtyard
0.30	0.40	0.05	0.10
0.25	0.35	0.04	0.10
0.20	0.30	0.03	0.10
0.15	0.25	0.01	0.10
0.10	0.20	-0.02	0.10
0.10	0.20	-0.03	0.10

Nominal Density Level			
Toe	Heel	Side	Courtyard
0.35	0.45	0.06	0.20
0.30	0.40	0.05	0.20
0.25	0.35	0.04	0.20
0.20	0.30	0.02	0.20
0.15	0.25	-0.01	0.20
0.15	0.25	-0.02	0.20

Most Density Level			
Toe	Heel	Side	Courtyard
0.40	0.50	0.07	0.40
0.35	0.45	0.06	0.40
0.30	0.40	0.05	0.40
0.25	0.35	0.03	0.40
0.20	0.30	0.00	0.40
0.20	0.30	-0.01	0.40

SOT
Terminal Lead Spacing
Pitch > 1.92 mm
Pitch > 0.95 and <= 1.92 mm
Pitch > 0.65 and <= 0.95 mm
Pitch > 0.50 and <= 0.65 mm
Pitch > 0.40 and <= 0.50 mm
Pitch <= 0.40 mm

Least Density Level			
Toe	Heel	Side	Courtyard
0.20	0.30	0.05	0.10
0.15	0.20	0.04	0.10
0.15	0.20	0.03	0.10
0.10	0.15	0.01	0.10
0.10	0.15	-0.02	0.10
0.10	0.15	-0.03	0.10

Nominal Density Level			
Toe	Heel	Side	Courtyard
0.25	0.35	0.06	0.20
0.20	0.25	0.05	0.20
0.20	0.25	0.04	0.20
0.15	0.20	0.02	0.20
0.15	0.20	-0.01	0.20
0.15	0.20	-0.02	0.20

Most Density Level			
Toe	Heel	Side	Courtyard
0.30	0.40	0.07	0.40
0.25	0.30	0.06	0.40
0.25	0.30	0.05	0.40
0.20	0.25	0.03	0.40
0.20	0.25	0.00	0.40
0.20	0.25	-0.01	0.40

DPAK
Terminal Lead Spacing
Pitch > 2.54 mm
Pitch > 2.29 and <= 2.54 mm
Pitch > 1.70 and <= 2.29 mm
Pitch > 1.27 and <= 1.70 mm
Pitch <= 1.27 mm

Least Density Level			
Toe	Heel	Side	Courtyard
0.35	0.40	0.15	0.10
0.35	0.40	0.10	0.10
0.25	0.40	0.05	0.10
0.20	0.35	0.00	0.10
0.15	0.30	0.00	0.10

Nominal Density Level			
Toe	Heel	Side	Courtyard
0.45	0.50	0.20	0.20
0.45	0.50	0.15	0.20
0.35	0.50	0.10	0.20
0.30	0.45	0.05	0.20
0.25	0.40	0.05	0.20

Most Density Level			
Toe	Heel	Side	Courtyard
0.55	0.60	0.30	0.40
0.55	0.60	0.25	0.40
0.45	0.60	0.20	0.40
0.40	0.55	0.10	0.40
0.35	0.50	0.10	0.40

SOD
Terminal Lead Spacing
Pitch = None

Least Density Level			
Toe	Heel	Side	Courtyard
0.20	0.30	0.05	0.10

Nominal Density Level			
Toe	Heel	Side	Courtyard
0.25	0.35	0.06	0.20

Most Density Level			
Toe	Heel	Side	Courtyard
0.30	0.40	0.07	0.40

# IPC-7351C Löttempfehlungen Gull Wing Leads

SOP / QFP
Terminal Lead Spacing
Pitch > 1.00 mm
Pitch > 0.80 and <= 1.00 mm
Pitch > 0.65 and <= 0.80 mm
Pitch > 0.50 and <= 0.65 mm
Pitch > 0.40 and <= 0.50 mm
Pitch <= 0.40 mm

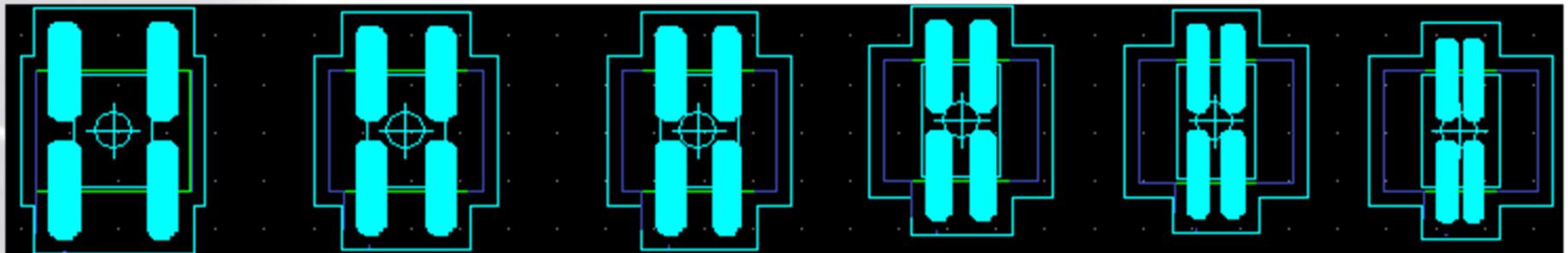
Least Density Level			
Toe	Heel	Side	Courtyard
0.30	0.40	0.05	0.10
0.25	0.35	0.04	0.10
0.20	0.30	0.03	0.10
0.15	0.25	0.01	0.10
0.10	0.20	-0.02	0.10
0.10	0.20	-0.03	0.10

Nominal Density Level			
Toe	Heel	Side	Courtyard
0.35	0.45	0.06	0.20
0.30	0.40	0.05	0.20
0.25	0.35	0.04	0.20
0.20	0.30	0.02	0.20
0.15	0.25	-0.01	0.20
0.15	0.25	-0.02	0.20

Most Density Level			
Toe	Heel	Side	Courtyard
0.40	0.50	0.07	0.40
0.35	0.45	0.06	0.40
0.30	0.40	0.05	0.40
0.25	0.35	0.03	0.40
0.20	0.30	0.00	0.40
0.20	0.30	-0.01	0.40



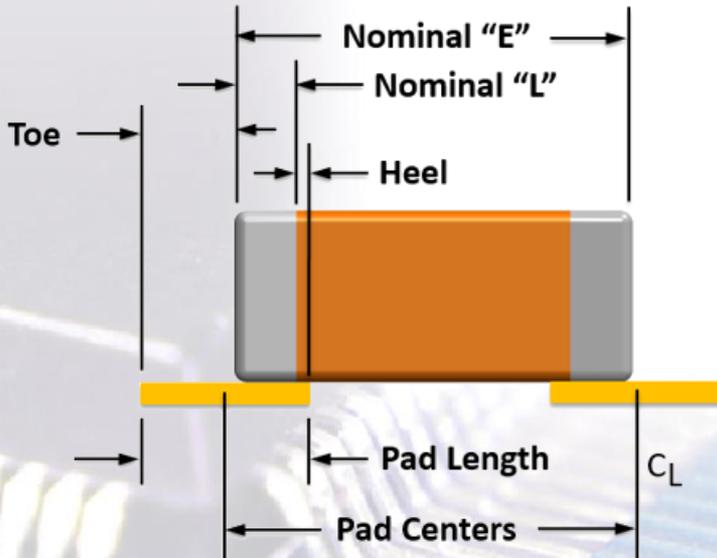
➤ Je kleiner der Pin Pitch, desto kleiner die Land Pattern.



# IPC-7351B Löttempfehlungen für Chip Bauteile



	Maximum (Most) Density Level A	Median (Nominal) Density Level B	Minimum (Least) Density Level C
Toe ( $J_T$ )	0.55	0.35	0.15
Heel ( $J_H$ )	0.00	0.00	0.00
Side ( $J_S$ )	0.05	0.00	-0.05
Aufrunden	Rundung auf den nächsten Wert mit 2 Nachkommastellen, z.B.: 1.00, 1.01, 1.02, 1.03		
Courtyard excess	0.50	0.25	0.10

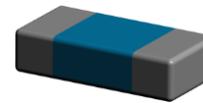


## Rechteckige END CAP "CHIP" Bauteile:

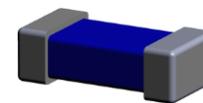
Chip Non-polarized Diode



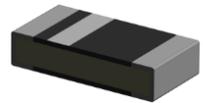
Chip Thermistor



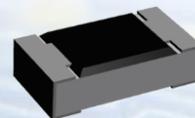
Chip Inductor



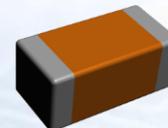
Chip Diode



Chip Resistor



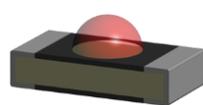
Chip Capacitor



Polarized Chip Capacitor



Chip LED



## Incremental Pin Pitch

Chip Package Sizes	Rectangular End Cap
	Nominal Package Length
2010 & Greater	Length > 4.75 mm
1812 & 1825	Length > 3.85 and <= 4.75 mm
1206, 1210 & 0612	Length > 2.85 and <= 3.85 mm
0603, 0705 & 0805	Length > 1.30 and <= 2.85 mm
0402, 0306 & 0502	Length > 0.75 and <= 1.30 mm
0201 & 0102	Length > 0.50 and <= 0.75 mm
01005 & Less	Length <= 0.50 mm



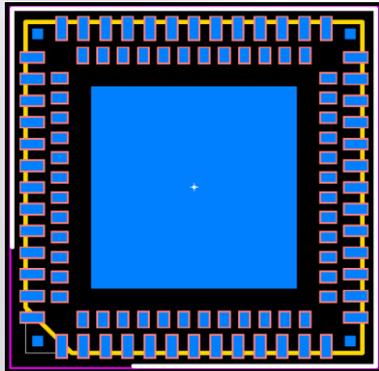
Least Density Level			
Toe	Heel	Side	Courtyard
0.40	0.00	-0.05	0.10
0.30	0.00	-0.05	0.10
0.25	0.00	-0.05	0.10
0.20	0.00	-0.05	0.10
0.15	-0.02	-0.02	0.10
0.08	-0.03	-0.03	0.10
0.04	-0.04	-0.04	0.10

Nominal Density Level			
Toe	Heel	Side	Courtyard
0.50	0.00	0.00	0.20
0.40	0.00	0.00	0.20
0.35	0.00	0.00	0.20
0.30	0.00	0.00	0.20
0.20	-0.01	-0.01	0.15
0.10	-0.02	-0.02	0.15
0.05	-0.03	-0.03	0.15

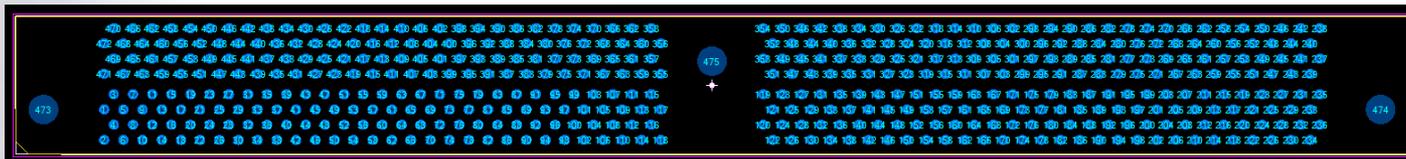
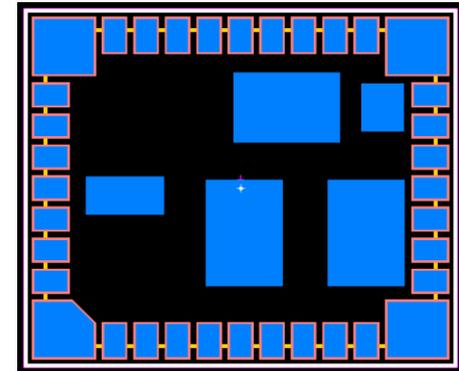
Most Density Level			
Toe	Heel	Side	Courtyard
0.60	0.00	0.05	0.40
0.50	0.00	0.05	0.40
0.45	0.00	0.05	0.40
0.40	0.00	0.05	0.40
0.25	0.00	0.00	0.20
0.12	-0.01	-0.01	0.20
0.06	-0.02	-0.02	0.20

Software Programme berechnen für Land Pattern traditionell nur die Standard-Bauteile. Damit werden nur ca. 50% aller verfügbaren Bauteile abgedeckt. Die herausragende Aufgabe ist es, flexible und dynamische Regeln und Definitionen zu erstellen, um Millionen von unterschiedlichen Bauteilen gemäß der Herstellerempfehlungen zu erstellen.

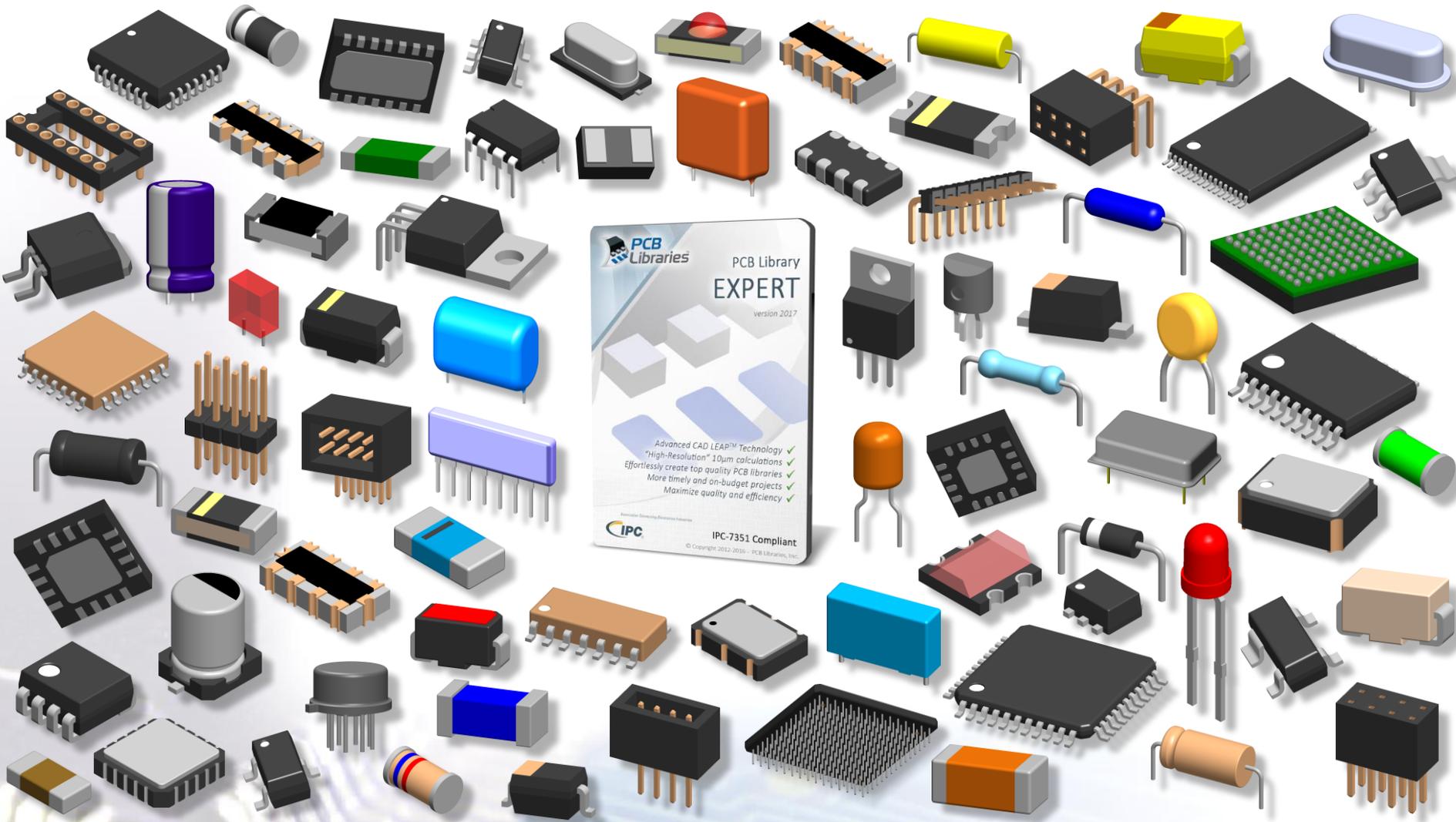
**PCB Library Expert** erstellt sowohl diese Mengen an Bauteilen als auch Land Pattern gemäß Hersteller Empfehlungen und/oder IPC-Richtlinien, z.B. nach PAD Form Eigenschaften:



- ✓ Asymmetrische
- ✓ Unterschiedliche Größen
- ✓ Verschiedene Formen
- ✓ ...



# PCB Library Expert Pro Erweiterung - 3D STEP



PDF



## Library Expert Surface Mount Families

- IPC-7351C (Proposed) Solder Joint Goals
- Hinweis: Land Pattern = Nominal Density Level
- Non-polarized Rectangular chip Components

PDF



## Library Expert Through-hole Families

- Flange Mount Vertical (TO-220)
- Cylindrical (JEDEC TO)
- Single In-line Packages (SIP)

<p>Chip Capacitor</p>	<p>Chip Resistor</p>	<p>Chip Inductor</p>
<p>Chip Fuse</p>	<p>Chip Thermistor</p>	<p>Chip Varistor</p>
<p>Chip Non-polarized Diode</p>		
<p>Chip Land Pattern Zero Rotation</p>		

<p>Flange Mount Vertical (TO-220)</p>	<p>Flange Mount Vertical (TO-220) Land Pattern Zero Rotation</p>
<p>Cylindrical (JEDEC TO)</p>	<p>Cylindrical (TO-99) Land Pattern Zero Rotation</p>
<p>Single In-line Package (SIP)</p>	<p>Single In-line Package (SIP) Land Pattern Zero Rotation</p>

# PCB Library Expert – Vergleich der Versionen



**Note:**

All Library Expert Professional outputs (CAD formats and 3D STEP) are licensed separately.



Calc



Viewer



POD



Lite



Pro

**Features**

<b>Parts on Demand</b> 1 million parts - Build parts purchased/downloaded - Output parts purchased/downloaded to CAD and/or 3D STEP	preview -	preview -	~ \$1-\$2 / Part ~ \$1-\$2 / Part	- -	✓ ✓
<b>IPC-7351 Compliant</b> - <a href="http://confirm.at IPC.org">confirm at IPC.org</a>	✓	✓	✓	✓	✓
<b>Rotate or Mirror component &amp; Footprints</b>	✓	✓	✓	✓	✓
<b>Query Pad Stack and Drafting features</b>	✓	✓	✓	✓	✓
<b>Toggle Layers and change colors</b>	✓	✓	✓	✓	✓
<b>Calculate Surface Mount or Through-hole Footprints</b>	✓	✓	✓	✓	✓
<b>Print datasheet</b>	preview	preview	✓	✓	✓
<b>Automation of Footprints for 23 CAD formats</b>	-	-	✓	✓	✓
<b>Automation of 3D STEP Models**</b>	-	-	✓	-	✓
<b>CAD LEAP Technology</b> (Libraries Enhanced with Automated Preferences) - dozens of preferences to auto-rebuild entire libraries	✓	✓	✓	-	✓
<b>Open unlimited selective Preference files</b>	✓	✓	✓	-	✓
<b>Browse FPX Files to View component and footprint dimensions</b> (allow co-workers and customers to browse your personal library)	✓	✓	✓	-	✓
<b>Multiple users can share same Global Preference files</b>	✓	✓	✓	-	✓
<b>Starter Library of 5,000 unique component packages</b> (for use with hundreds of thousands of parts)	-	✓	-	-	✓
<b>Create non-standard parts</b> (asymmetrical, different size/shape pads)	-	-	✓	-	✓
<b>BOM Builder Service</b>	-	-	-	-	✓
<b>Build parts without limit on pin quantity</b>	-	-	-	-	✓
<b>Utilities</b> (unit, hole/pad size, & axial lead form calculators)	limited	limited	limited	limited	✓
<b>Browse, edit, update FPX library files</b>	limited	limited	limited	-	✓
<b>Batch-build and mass-edit entire CAD libraries in seconds</b>	-	-	limited	-	✓
<b>Network License, company-wide library solutions for team collaboration</b>	limited	limited	-	-	✓
<b>Calculate, create and modify all IPC-compliant footprints you need!</b>	-	-	-	-	✓
<b>Create customized footprints for unique needs</b> (modify preferences)	-	-	-	-	✓

# Software Solution for the IPC-7351

---

***Kluwetasch@cskl.de***

*Official German Distributor & CSK Inhaber*

Für Rückfragen und weitere Informationen  
steht Ihnen das CSK Team gerne zur Verfügung.

CSK - CAD Systeme Kluwetasch e.K.

Struckbrook 49

D - 24161 Altenholz

Tel.: +49 (0)431 32917-0

Fax: +49 (0)431 32917-26

E-Mail: [Kluwetasch@cskl.de](mailto:Kluwetasch@cskl.de)

Internet: <https://www.cskl.de>