

Guidelines taken from IPC-7351

Library Expert Footprint Naming Convention

PCB Libraries, Inc.

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Surface Mount Land Pattern Naming Convention

Ball Grid Array's	BGA + Pin Qty. + C or N + P Pitch _ Ball Columns X Ball Rows _ Body Length X Width X Height + B Ball Diameter
BGA w/Dual Pitch.....	BGA + Pin Qty. + C or N + P Col Pitch X Row Pitch _ Ball Columns X Ball Rows _ Body Length X Width X Height + B Ball Diameter
BGA w/Staggered Pins.....	BGAS + Pin Qty. + C or N + P Pitch _ Ball Columns X Ball Rows _ Body Length X Width X Height + B Ball Diameter
Capacitors, Chip, Array, Concave.....	CAPCAV + Pin Qty. + P Pitch _ + Body Length X Width X Height + L Lead Length X Width
Capacitors, Chip, Array, Flat.....	CAPCAF + Pin Qty. + P Pitch _ + Body Length X Width X Height + L Lead Length X Width
Capacitors, Chip.....	CAPC + Body Length X Width X Height + L Lead Length
Capacitors, Polarized, Chip.....	CAPPC + Body Length X Width X Height + L Lead Length
Capacitors, Dual Flat No-lead.....	CAPDFN + Body Length X Width X Height + L Lead Length X Width
Capacitors, Polarized, Dual Flat No-lead.....	CAPPDFN + Body Length X Width X Height + L Lead Length X Width
Capacitors, Molded.....	CAPM + Lead Span X Body Width X Height + L Lead Length X Width
Capacitors, Polarized, Molded.....	CAPPM + Lead Span X Body Width X Height + L Lead Length X Width
Capacitors, Aluminum Electrolytic.....	CAPAE + Base Body Size X Height + L Lead Length X Width
Ceramic Flat Packages.....	CFP + Pin Qty. + P Pitch _ Body Length X Lead Span X Height + L Lead Length X Width
Column Grid Array, Circular Lead.....	CGA + Pin Qty. P Pitch _ Pin Columns X Pin Rows _ Body Length X Width X Height + L Diameter
Pillar Column Grid Array.....	PCGA + Pin Qty. P Pitch _ Pin Columns X Pin Rows _ Body Length X Width X Height + L Diameter
Crystals (2 leads).....	XTAL + Body Length X Width X Height + L Lead Length X Width
Crystals, Dual Flat No-lead.....	XTALDFN + Body Length X Width X Height + L Lead Length X Width
Crystals, Side Concave.....	XTALSC + Body Length X Width X Height + L Lead Length
Diodes, Chip.....	DIODC + Body Length X Width X Height + L Lead Length
Diodes, Dual Flat No-lead.....	DIODFN + Pin Qty. _ Body Length X Width X Height + L Lead Length X Width
Diodes, Molded.....	DIOM + Lead Span X Body Width X Height + L Lead Length X Width
Diodes, Non-polarized, Chip.....	DIONC + Lead Span X Body Width X Height + L Lead Length
Diodes, Non-polarized, Dual Flat No-lead.....	DIONDFN + Pin Qty. _ Body Length X Width X Height + L Lead Length X Width
Diodes, Non-polarized, Molded.....	DIONM + Lead Span X Body Width X Height + L Lead Length X Width
Diodes, MELF.....	DIOMELF + Body Length + Diameter + L Lead Length
Diodes, Side Concave.....	DIOSC _ Body Length X Width X Height + L Lead Length
Diodes, Side Concave, 4 Pin.....	DIOSC4 + P Pitch _ Body Length X Width X Height + L Lead Length
Diodes, Small Outline Flat Lead, 2 Pin.....	SODFL + Lead Span X Body Width X Height + L Lead Length X Width
Diodes, Small Outline Flat Lead, 3 - 6 Pin.....	DIOSOFL + Pin Qty. + P Pitch _ + Lead Span X Body Height + L Lead Length X Width
DPAK.....	DPAK + Pin Qty. + P Pitch _ Lead Span X Height + L Lead Length X Width + T Thermal Tab Pad Length X Width
Ferrite Bead, Chip.....	BEADC + Body Length X Width X Height + L Lead Length
Fuses, Chip.....	FUSC + Body Length X Width X Height + L Lead Length
Fuses, Dual Flat No-Lead.....	FUSDFN + Body Length X Width X Height + L Lead Length X Lead Width
Fuses, Molded.....	FUSM + Lead Span X Body Width X Height + L Lead Length X Lead Width
Fuses, Side Concave.....	FUSSC + Body Length X Width X Height + L Lead Length
IC, Small Outline Package, Flat Lead.....	SOPFL + Pin Qty. + P Pitch _ + Lead Span X Body Height + L Lead Length X Width
Inductors, Chip.....	INDC + Body Length X Width X Height + L Lead Length
Inductors, Chip, Array, Concave.....	INDCAV + Pin Qty. + P Pitch _ Body Length X Width X Height + L Lead Length X Width
Inductors, Chip, Array, Flat.....	INDCAF + Pin Qty. + P Pitch _ Body Length X Width X Height + L Lead Length X Width
Inductors, Dual Flat No-lead.....	INDDFN + Body Length X Width X Height + L Lead Length X Width
Inductors, Molded.....	INDM + Lead Span X Body Width X Height + L Lead Length X Width
Inductors, Precision, Molded.....	INDPM + Lead Span X Body Width X Height + L Lead Length X Width
Inductors, Side Concave.....	INDSC + Body Length X Width X Height + L Lead Length
Integrated Circuit, Small Outline, Flat Lead, 3 - 6 pin.....	ICSOFL + Pin Qty. + P Pitch _ + Lead Span X Body Height + L Lead Length X Width
Land Grid Array, Circular Lead.....	LGA + Pin Qty. + C + P Pitch _ Pin Columns X Pin Rows _ Body Length X Width X Height + L Lead Diameter
Land Grid Array, Square Lead.....	LGA + Pin Qty. + S + P Pitch _ Pin Columns X Pin Rows _ Body Length X Width X Height + L Lead Size
LED's, Chip.....	LEDC + Body Length + Width X Height + L Lead Length
LED's, Dual Flat No-lead.....	LEDDFN + Body Length X Width X Height + L Lead Length X Width
LED's, Molded.....	LEDM + Lead Span X Body Width X Height + L Lead Length X Width
LED's, Side Concave.....	LEDSC + Body Length X Width X Height + L Lead Length
LED's, Side Concave, 4 Pin.....	LEDSC4 + P Pitch _ Body Length X Width X Height + L Lead Length
Oscillators, Dual Flat No-Lead (4-pin).....	OSCDFN4 _ Body Length X Width X Height + L Lead Length X Width
Oscillators, Side Concave.....	OSCS + Pin Qty. + P Pitch _ Body Length X Width X Height + L Lead Length X Width
Oscillators, Side Flat.....	OSCSF + Pin Qty. + P Pitch _ Body Length X Width X Height + L Lead Length X Width
Oscillators, J-Lead.....	OSCSJ + Pin Qty. + P Pitch _ Body Length X Lead Span X Height + L Lead Width
Oscillators, L-Bend Lead.....	OSCL + Pin Qty. + P Pitch _ Body Length X Lead Span X Height + L Lead Length X Width
Oscillators, Corner Concave.....	OSCCC + Body Length X Width X Height + L Lead Length X Width
Plastic Leaded Chip Carriers.....	PLCC + Pin Qty. + P Pitch _ Lead Span L1 X Lead Span L2 Nominal X Height + L Lead Width
Plastic Leaded Chip Carrier Sockets Square.....	PLCCS + Pin Qty. + P Pitch _ Lead Span L1 X Lead Span L2 Nominal X Height + L Lead Width
Pull-back Small Outline No-lead.....	PSON + Pin Qty. + P Pitch _ Body Length X Width X Height + L Lead Length X Width + T Thermal Pad Length X Width
Pull-back Quad Flat No-lead.....	QFN + Pin Qty. + P Pitch _ Body Length X Width X Height + L Lead Length X Width + T Thermal Pad Length X Width
Quad Flat Packages.....	QFP + Pin Qty. + P Pitch _ Lead Span L1 X Lead Span L2 Nominal X Height + L Lead Length X Width + T Thermal Pad Length X Width
Ceramic Quad Flat Packages.....	CQFP + Pin Qty. + P Pitch _ Lead Span L1 X Lead Span L2 Nominal X Height + L Lead Length X Width
Quad Flat No-lead.....	QFN + Pin Qty. + P Pitch _ Body Length X Width X Height + L Lead Length X Width + T Thermal Pad Length X Width
Quad Leadless Ceramic Chip Carriers.....	LCC + Pin Qty. + P Pitch _ Body Length X Width X Height + L Lead Length X Width
Quad Leadless Ceramic Chip Carriers (Pin 1 on Side).....	LCCS + Pin Qty. + P Pitch _ Body Length X Width X Height + L Lead Length X Width
Resistors, Chip.....	RESC + Body Length X Width X Height + L Lead Width
Resistors, Chip, Array, Concave.....	RESCAV + Pin Qty. + P Pitch _ Body Length X Width X Height + L Lead Length X Width
Resistors, Chip, Array, Convex, E-Version (Even Pin Size).....	RESCAXE + Pin Qty. + P Pitch _ Body Length X Width X Height + L Lead Length X Width
Resistors, Chip, Array, Convex, S-Version (Side Pins Diff).....	RESCAXS + Pin Qty. + P Pitch _ Body Length X Width X Height + L Lead Length X Width
Resistors, Chip, Array, Flat.....	RESCAF + Pin Qty. + P Pitch _ Body Length X Width X Height + L Lead Length X Width
Resistors, Dual Flat No-lead.....	RESDFN + Pin Qty. _ Body Length X Width X Height + L Lead Length X Width
Resistors, MELF.....	RESMELF + Body Length + Diameter + L Lead Width
Resistors, Molded.....	RESM + Lead Span X Body Width X Height + L Lead Length X Width
Resistors, Side Concave.....	RESSC + Body Length X Width X Height + L Lead Length X Width
Small Outline IC, J-Leaded.....	SOJ + Pin Qty. + P Pitch _ Body Length X Lead Span X Height + L Lead Width
Small Outline IC, L-Leaded.....	SOL + Pin Qty. + P Pitch _ Body Length X Lead Span X Height + L Lead Width
Small Outline Integrated Circuit, (50 mil Pitch SOIC).....	SOIC + Pin Qty. + P Pitch _ Body Length X Lead Span X Height + L Lead Length X Width
Small Outline Packages.....	SOP + Pin Qty. + P Pitch _ Body Length X Lead Span X Body Height + L Lead Length X Width + T Thermal Pad Length X Width
Small Outline No-lead.....	SON + Pin Qty. + P Pitch _ Body Length X Width X Height + L Lead Length X Width + T Thermal Pad Length X Width
Small Outline Diode.....	SOD + Lead Span X Body Width X Height + L Lead Length X Width
SOT143.....	SOT143 + Pin Qty. + P Pitch _ Lead Span X Body Height + L Lead Length
SOT343.....	SOT343 + Pin Qty. + P Pitch _ Lead Span X Body Height + L Lead Length
SOT23.....	SOT23 + Pin Qty. + P Pitch _ Lead Span X Body Height + L Lead Length
SOT223.....	SOT223 + Pin Qty. + P Pitch _ Lead Span X Body Height + L Lead Length
Thermistors, Chip.....	THRMC + Body Length + Width X Height + L Lead Width
Transistors, Small Outline, Flat Lead, 3 - 6 pin.....	TRXSOFL + Pin Qty. + P Pitch _ + Lead Span X Body Height + L Lead Length X Width
Transistors, Dual Flat No-lead.....	TRXDFN + Pin Qty. _ Body Length X Body Width X Height + L Lead Length X Width
Varistors, Chip.....	VARC + Body Length X Width X Height + L Lead Width

Library Expert Naming Convention for Through-Hole Land Patterns

The land pattern naming convention uses component dimensions to derive the land pattern name.

The first 3 – 6 characters in the land pattern name describe the component family.

The first number in the land pattern name refers to the Lead Spacing or hole to hole location to insert the component lead.

All numbers that follow the Lead Spacing are component dimensions.

These characters are used as component body identifiers that precede the value and this is the priority order of the component body identifiers –

P = Pitch for components with more than two leads

W = Maximum Lead Width (or Component Lead Diameter)

L = Body Length for horizontal mounting

D = Body Diameter for round component body

T = Body Thickness for rectangular component body

H = Height for vertically mounted components

Q = Pin Quantity for components with more than two leads

R = Number of Rows for connectors

A, B & C = the fabrication complexity level as defined in the IPC-2221 and IPC-2222

Notes:

All component body values are in millimeters and go two places to the right of the decimal point and no leading zeros.

All Complexity Levels used in the examples are “**B**”.

Component, Category

Land Pattern Name

Capacitors, Non Polarized Axial Diameter Horizontal Mounting..... **CAPAD** + Lead Spacing + **W** Lead Width + **L** Body Length + **D** Body Diameter

Example: **CAPAD800W52L600D150B**

Capacitors, Non Polarized Axial Diameter; Lead Spacing 8.00; Lead Width 0.52; Body Length 6.00; Body Diameter 1.50

Capacitors, Non Polarized Axial Rectangular**CAPAR** + Lead Spacing + **W** Lead Width + **L** Body Length + **T** Body thickness + **H** Body Height

Example: **CAPAR800W52L600T50H70B**

Capacitors, Non Polarized Axial; Lead Spacing 8.00; Lead Width 0.52; Body Length 6.00; Body Thickness 0.50; Body Height 0.70

Capacitors, Non Polarized Axial Diameter Vertical Mounting**CAPADV** + Lead Spacing + **W** Lead Width + **L** Body Length + **D** Body Diameter

Example: **CAPADV300W52L600D150B**

Capacitors, Non Polarized Axial; Lead Spacing 3.00; Lead Width 0.52; Body Length 6.00; Body Diameter 1.50mm

Capacitors, Non Polarized Axial Rect. Vert. Mtg. **CAPARV** + Lead Spacing + **W** Lead Width + **L** Body Length + **T** Body Thickness + **H** Body Height

Example: **CAPARV300W52L600T50H70B**

Capacitors, Non Polarized Axial Rect. Vertical; Lead Spacing 8.00; Lead Width 0.52; Body Length 6.00; Body Thickness 0.50; Body Height 0.70

Capacitors, Non Polarized Radial Diameter.....**CAPRD** + Lead Spacing + **W** Lead Width + **D** Body Diameter + **H** Body Height

Example: **CAPRD200W52D300H550B**

Capacitors, Non Polarized Radial Diameter; lead spacing 2.00; lead width 0.52; Body Diameter 3.00; Height 5.50

Capacitors, Non Polarized Radial Rectangular**CAPRR** + Lead Spacing + **W** Lead Width + **L** Body Length + **T** Body thickness + **H** Body Height

Example: **CAPRR200W52L50T70H550B**

Capacitors, Non Polarized Radial Rectangular; lead spacing 2.00; lead width 0.52; Body Length 0.50; Body thickness 0.70; Height 5.50

Capacitors, Non Polarized Radial Disk Button**CAPRB** + Lead Spacing + **W** Lead Width + **L** Body Length + **T** Body thickness + **H** Body Height

Example: **CAPRB200W52L50T70H550B**

Capacitors, Non Polarized Radial Rectangular; lead spacing 2.00; lead width 0.52; Body Length 0.50; Body thickness 0.70; Height 5.50

Capacitors, Polarized Axial Diameter Horizontal Mounting**CAPPAD** + Lead Spacing + **W** Lead Width + **L** Body Length + **D** Body Diameter

Example: **CAPPAD800W52L600D150B**

Capacitors, Polarized Axial Diameter; Lead Spacing 8.00; Lead Width 0.52; Body Length 6.00; Body Diameter 1.50

Capacitor, Polarized Radial Diameter.....**CAPPRD** + Lead Spacing + **W** Lead Width + **D** Body Diameter + **H** Body Height

Example: **CAPPRD200W52D300H550B**

Capacitors, Polarized Radial Diameter; lead spacing 2.00; lead width 0.52; Body Diameter 3.00; Height 5.50

Diodes, Axial Diameter Horizontal Mounting.....**DIOAD** + Lead Spacing + **W** Lead Width + **L** Body Length + **D** Body Diameter

Example: **DIOAD800W52L600D150B**

Diodes, Non Polarized Axial Diameter; Lead Spacing 8.00; Lead Width 0.52; Body Length 6.00; Body Diameter 1.50

Diodes, Axial Diameter Vertical Mounting**DIOADV** + Lead Spacing + **W** Lead Width + **L** Body Length + **D** Body Diameter

Example: **DIOADV300W52L600D150B**

Diodes, Non Polarized Axial; Lead Spacing 8.00; Lead Width 0.52; Body Length 6.00; Body Diameter 1.50

Dual-In-Line Packages**DIP** + Lead Span + **W** Lead Width + **P** Pin Pitch + **L** Body Length + **H** Component Height + **Q** Pin Qty

Example: **DIP762W52P254L1905H508Q14B**

Dual-In-Line Package: Lead Span 7.62; Lead Width 0.52; Pin Pitch 2.54; Body Length 19.05; Body Height 5.08; Pin Qty 14

Dual-In-Line Sockets**DIPS** + Lead Span + **W** Lead Width + **P** Pin Pitch + **L** Body Length + **H** Component Height + **Q** Pin Qty

Example: **DIPS762W52P254L1905H508Q14B**

Dual-In-Line Package Socket: Lead Span 7.62; Lead Width 0.52; Pin Pitch 2.54; Body Length 19.05; Body Height 5.08; Pin Qty 14

Headers, Vertical..... **HDRV** + Lead Span + **W** Lead Width + **P** Pin Pitch + **R** Pins per Row + **L** Body Length + **T** Body Thickness + **H** Component Height

Example: **HDRV200W52P200R2L4400T400H900B**

Header, Vertical: Lead Span 2.00; Lead Width 0.52; Pin Pitch 2.00; 2 Rows; Body Length 44.00; Body Thickness 4.00; Body Height 9.00

Headers, Right Angle **HDRRA** + Lead Span + **W** Lead Width + **P** Pin Pitch + **R** Pins per Row + **L** Body Length + **T** Body Thickness + **H** Component Height

Example: **HDRRA200W52P200R2L4400T400H900B**

Header, Vertical: Lead Span 2.00; Lead Width 0.52; Pin Pitch 2.00; 2 Rows; Body Length 44.00; Body Thickness 4.00; Body Height 9.00

Inductors, Axial Diameter Horizontal Mounting **INDAD** + Lead Spacing + **W** Lead Width + **L** Body Length + **D** Body Diameter

Example: **INDAD800W52L600D150B**

Inductors, Axial Diameter; Lead Spacing 8.00; Lead Width 0.52; Body Length 6.00; Body Diameter 1.50

Inductors, Axial Diameter Vertical Mounting **INDADV** + Lead Spacing + **W** Lead Width + **L** Body Length + **D** Body Diameter

Example: **INDADV300W52L600D150B**

Inductors, Axial Diameter Vertical Mounting; Lead Spacing 3.00; Lead Width 0.52; Body Length 6.00; Body Diameter 1.50

Jumpers, Wire **JUMP** + Lead Spacing + **W** Lead Width

Example: **JUMP500W52B**

Jumper; Lead Spacing 5.00; Lead Width 0.52

Mounting Holes Plated With Support Pad **MTGP** + Pad Size + **H** Hole Size + **Z** Inner Layer Pad Size

Example: **MTGP700H400Z520**

This is a Mounting hole for a #6-32 screw using a circular 7.00 land on the primary and secondary side of the board, a 4.00 diameter hole with the internal lands are smaller than the external and are also circular 5.20 in diameter.

Mounting Holes Non-Plated With Support Pad **MTGNP** + Pad Size + **H** Hole Size + **Z** Inner Layer Pad Size

Example: **MTGNP700H400Z520**

This is a Mounting hole for a #6-32 screw using a circular 7.00 land on the primary and secondary side of the board, a 4.00 diameter hole with the internal lands are smaller than the external and are also circular 5.20 in diameter.

Mounting Holes Non-Plated Without Support Pad **MTGNP** + Pad Size + **H** Hole Size + **Z** Inner Layer Pad Size + **K** Keep-out Diameter

Example: **MTGNP100H400Z520K700**

This is a Mounting hole for a #6-32 screw using a circular 1mm land on the primary and secondary side of the board, a 4.00 diameter hole with the internal lands are smaller than the external and are also circular 5.20 in diameter and a 7.00 diameter keep-out.

Mounting Holes Plated with 8 Vias **MTGP** + Pad Size + **H** Hole Size + **Z** Inner Layer Pad Size + 8 Vias

Example: **MTGP700H400Z520V8**

This is a Mounting hole for a #6-32 screw using a circular 7mm land on the primary and secondary side of the board, a 4mm diameter hole with the internal lands are smaller than the external and are also circular 5.2mm in diameter, with 8 vias.

Pin Grid Array's **PGA** + Pin Qty + **P** Pitch + **C** Pin Columns + **R** Pin Rows + **L** Body Length **X** Body Width + **H** Component Height

Example: **PGA84P254C10R10L2500X2500H300B**

Pin Grid Array: Pin Qty 84; Pin Pitch 2.54; Columns 10; Rows 10; Body Length 25.00 X 25.00; Component Height 3.00

Resistors, Axial Diameter Horizontal Mounting **RESAD** + Lead Spacing + **W** Lead Width + **L** Body Length + **D** Body Diameter

Example: **RESAD800W52L600D150B**

Resistors, Axial Diameter; Lead Spacing 8.00; Lead Width 0.52; Body Length 6.00; Body Diameter 1.50

Resistors, Axial Diameter Vertical Mounting **RESADV** + Lead Spacing + **W** Lead Width + **L** Body Length + **D** Body Diameter

Example: **RESADV300W52L600D150B**

Resistors, Axial Diameter Vertical Mounting; Lead Spacing 3.00; Lead Width 0.52; Body Length 6.00; Body Diameter 1.50

Resistors, Axial Rectangular Horizontal Mounting .. **RESAR** + Lead Spacing + **W** Lead Width + **L** Body Length + **T** Body thickness + **H** Body Height

Example: **RESAR800W52L600T50H70B**

Resistors, Axial Rectangular; Lead Spacing 8.00; Lead Width 0.52; Body Length 6.00; Body Thickness 0.50; Body Height 0.70

Single-In-Line Packages **SIP** + Body Width + **W** Lead Width + **P** Pin Pitch + **L** Body Length + **H** Component Height + **Q** Pin Qty

Example: **DIP150W52P254L1905H508Q14B**

Single-In-Line Package: Body Width 1.5; Lead Width 0.52; Pin Pitch 2.54; Body Length 19.05; Body Height 5.08; Pin Qty 14

Test Points, Round Land **TP** + Lead Width

Example: **TP52**

Test Points, Square Land **TPS** + Lead Width

Example: **TPS52**

Test Points, Top Land Round & Bottom Land Square **TPRS** + Lead Width

Example: **TPRS52**

Wire **PAD** + Wire Width

Example: **PAD52**

Library Expert Land Pattern Naming Convention Notes

- All dimensions are in Metric Units
- All Lead Span and Height numbers go two places past the decimal point and “include” trailing Zeros
- All Lead Span and Body Sizes go two place before the decimal point and “remove” leading Zeros
- All Chip Component Body Sizes are one place to each side of the decimal point
- Pitch Values are two places to the right & left of decimal point with no leading Zeros but include trailing zeros

Land Pattern Naming Convention: Each land pattern in IPC-7351 is specified by a unique name that must convey the package family type, pin quantity, pin pitch, body length and width dimensions, terminal lead span, terminal lead length and width and thermal pad dimensions whenever applicable. Other fields in a land pattern name are optional and are discussed below.

Table 1 specifies the naming convention for each package type. The following notes provide the user with guidance on using the table.

Specific characters are reserved for use in the naming convention to denote or separate certain fields:

- **P** : Prefixes pin pitch. For example, P80 specifies a 0.80 mm pitch between terminations.
- **L** : Prefixes nominal lead dimensions
- **T** : Prefixes thermal tab dimensions
- **X** : Dimension separator. For example, 0.80 mm by 1.50 mm is denoted 80X150
- **C, N** : Denote Collapsing and Non-collapsing balls respectively when specifying a BGA land pattern
- **_** : Underscore is a field separator between pin quantity and/or pin pitch and the package body dimensions
- **-** : Dash is a field separator between pin quantity in hidden and deleted pin components
- **+** : Plus denotes "in addition to". The plus "+" symbol does not actually appear in the land pattern name but is only used to assist the user in reading Table 1.

Additional notes for using Table 1:

- All dimensions are metric units
- All dimensions are nominal except height is maximum
- All numeric values are two places before and after the decimal point and “remove” leading Zeros
- If there is no pin quantity in the Land Pattern Name it is assumed that the pin quantity is 2
- Thermal Tabs are included in the Pin Quantity

Additional and Optional Fields:

The suffix letters “L”, “M”, and “N” are used to signify when the land protrusion is at their minimum (least), maximum (most), or median (nominal) protrusion and appear as the last character. The 3 Density Levels are defined as follows:

M = Maximum (Most) Material Condition (Density Level A)

N = Median (Nominal) Material Condition (Density Level B)

L = Minimum (Least) Material Condition (Density Level C)

If no Density Level suffix is provided, then the land pattern either follows the component manufacturer's recommended pattern or a custom land pattern for use with multiple component manufacturer's packages in the same component family.

Additional suffices for JEDEC Standard parts that have several alternate packages are as follows:

AA, AB, AC JEDEC Component Identifier (used primarily on Semiconductor packages).

Additional suffices for alternate components that do not follow the JEDEC standard are as follows (these are located before the Density Level suffix):

“A” – Alternate Component letter is used when component package nominal dimensions are the same for two packages but the package tolerances are different enough to create a unique land pattern to avoid land pattern name duplication.

Ball Grid Array (BGA) packages may require land pattern names that indicate a difference in pitch between balls in the rows vs. balls in the columns. These are often referred to as a “dual pitch BGA”. For example, the BGA land pattern name of BGA48C**80X100**P6X8_900X1200X120 conveys that the pitch 0.80 mm between columns and 0.100 mm between rows.

Note: In this example, Pin A1 is assumed to be located in the Lower left when viewing the package from the top view. A 90° rotation of the BGA swaps the definition of Rows and Columns.

A pin order or pin quantity modifier shall be added to the component package type specification to convey reverse pin ordering, hidden pins, or deleted pins.

SOP20R: 20 pin part, Reverse Pin Order

SOT143R: Reverse Pin Order

SOP20-24: 20 pin part in a 24 pin package. The pins are numbered 1 – 24 the hidden pins are skipped over. The schematic symbol displays up to 24 pins.

SOP24-20: 20 pin part in a 24 pin package. The pins are numbered 1 – 20 the deleted pins are removed. The schematic symbol displays 20 pins.

Land Pattern Naming for Non-conforming Packages: A large number of component packages are unique, non-standard packages or unique connectors. These component packages do not fit into a standard land pattern name due to their unique features. Therefore, in order to have a single land pattern naming convention that covers every component package in the electronics industry, the land pattern name must be associated with the component manufacturer and their part number or case code as shown below:

ManufacturerNameAbbreviation_ManufacturerPartNumber or
ManufacturerNameAbbreviation_ManufacturerCaseCode

- All special characters used in the part number will be replaced with a hyphen "-" except periods "." will be replaced with an underscore "_".
- If the component package or connector is unique and has a single manufacturer part number, then **Part Number** would be used to generate the Land Pattern Name
- The component is a standard package and is associated with multiple manufacturer part numbers then manufacturer **Case Code** would be used to generate the Land Pattern Name

Examples:

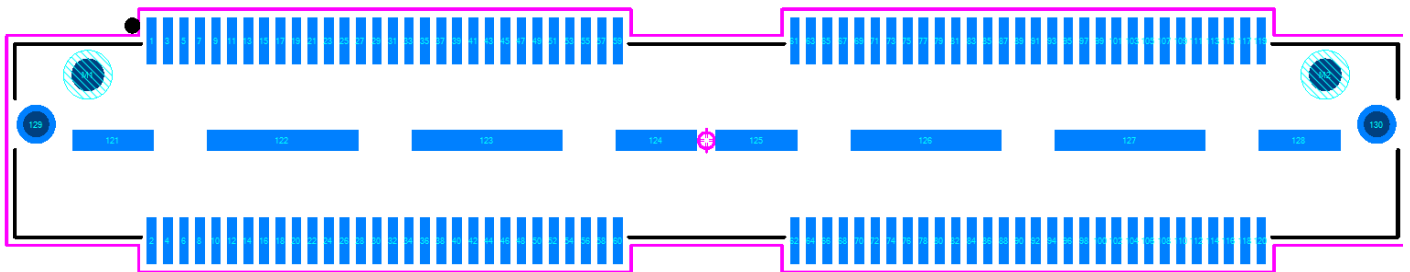
FOXCONN_JFM38U1A-2PVT-4F
MOLEX_67503-1020
SAMTEC_QTH-060-01-L-D-A

TI_RKG41
MAXIM_L1053-H2
CUI_SJ-3566AN

CK_CRD16CM0SB
ABRACON_ABM11
AMPHENOL_101-00565-64

For reference, various unique footprints are shown below that are non-conforming with Table 1.

SAMTEC_QTH-060-01-L-D-A – SMT Connector with plated mounting and non-plated alignment holes



Appendix I - Library Expert Manufacturer Names

for updates, visit www.PCBLibraries.com/downloads

3M	3M	Caddock	CADDOCK
4D	4D	Cal-Chip	CALCHIP
Aavid Thermalloy	AAVID	California Eastern Laboratories	CEL
Abrakon	ABRACON	Cambion	CAMBION
Active-Semi	ACTIVESEMI	Cambridge Silicon Radio	CSR
Adam Technologies	ADAMTECH	Camden Boss	CAMDEN
Adesto Technologies	ADESTO	Cantherm	CANTHERM
Advanced	ADVANCED	Cardinal	CARDINAL
Advanced Acoustic Technology	AAT	Carling Technologies	CARLING
Advanced Linear Devices	ALD	Central	CENTRAL
AEL Crystals	AEL	Challenge Electronics	CHALLENGE
Aeroflex	AEROFLEX	Cinch	CINCH
AirBorn	AIRBORN	Cirrus Logic	CIRRUS
AKM Semiconductor	AKMSEMI	Citizen Finedevice	CITIZEN
Akros Silicon	AKROS	Cliff Electronic Components	CLIFF
Allegro Micro	ALLEGRO	CnC Tech	CNCTECH
Alliance Memory	ALLIANCE	COEV Magnetics	COEVMAG
Allwinner Technology	ALLWINNER	CogniMem Technologies	COGNIMEM
Alpha & Omega	ALPHA	Coilcraft	COILCRAFT
Alpha Novatech	ALPHANOVA	Comchip	COMCHIP
Alps	ALPS	CONEC	CONEC
Altech	ALTECH	Conexant	CONEXANT
Altera	ALTERA	Contact Technology	CONTACT
Ambiq Micro	AMBIQ	Copal	COPAL
American Electrical	AMELECTRICAL	Cornell Dubilier Electronics	CDE
American Technical Ceramics	AMTECHCER	Cosel	COSEL
Ametherm	AMETHERM	Coto	COTO
Amgis Toroids	AMGIS	Cree	CREE
Amotech	AMOTECH	Crystek	CRYSTEK
Amphenol	AMPHENOL	CS Bright	CSBRIGHT
Amphenol Advanced Sensors	AMPHENOLAS	CTS	CTS
Amphenol Aerospace Operations	AMPHENOLAE	CUI	CUI
Amphenol Canada	AMPHENOLCA	Custom MMIC	CUSTOMMMIC
Amphenol Connex	AMPHENOLCX	Cyntec	CYNTEC
ams AG	AMSAG	Cypress Semiconductor	CYPRESS
Analog Devices	ANALOG	Cyrod	CYROD
Anaren	ANAREN	Data Delay Devices	DATADelay
Andon	ANDON	Defense Supply Center, Columbus	DSC
Anglia	ANGLIA	Delta Electronics	DELTA
Apem	APEM	Deltron	DELTRON
Apex Microtechnology	APEXMICRO	Device Engineering	DEVICEENG
API Delevan	APIDEV	Dialight	DIALIGHT
API Technologies	APITECH	Dialog	DIALOG
Arch Electronics	ARCHELEC	Dielectric	DIELECTRIC
Aries	ARIES	Digilent	DIGILENT
Artesyn Embedded Technologies	ARTESYN	Digitron Semiconductors	DIGITRON
ASJ	ASJ	Diodes	DIODES
Assmann	ASSMANN	Dionics	DIONICS
Atmel	ATMEL	Diotec Semiconductor	DIOTEC
AUK Contractors Co., Ltd	AUK	DIPTRONICS	DIPTRONICS
Avago Technologies	AVAGO	DORJI Applied Technologies	DORJI
AVX	AVX	DYNAMAX	DYNAMAX
AzureWave	AZUREWAVE	EastRising Technology	EASTRISING
Battery Space	BATTERYSPACE	Eaton Bussmann	EATON
Bel Power Solutions	BELPS	Ecliptek	ECLIPTEK
BelFUSE	BELFUSE	ECS International	ECS
Bellwether	BELLWETHER	EECO	EECO
Bivar	BIVAR	Efficient Power Conversion	EPC
BLOCK	BLOCK	Electrocube	ELECTROCUBE
Blockmaster Electronics	BLOCKMASTER	Electronic Assembly	EA
Bluegiga Technologies	BLUEGIGA	Elmo Motion Control	ELMO
Bosch-Sensortec	BOSCH	Elna	ELNA
Bourns	BOURNS	EMC Technology	EMCTECH
Buddies Technology	BUDDIES	EnOcean	ENOCEAN
Bulgin	BULGIN	EPCOS	EPCOS
C&K	CK	Epitex	EPITEX
C3Semi	C3	Epson	EPSON

ERNI	ERNI	IQD Frequency Products	IQD
Espressif	ESPRESSIF	Ironwood Electronics	IRONWOOD
E-Switch	ESWITCH	ITT Cannon	ITT
E-tec Interconnect	ETEC	IXYS	IXYS
Etron Technology	ETRON	JALCO Co., Ltd	JALCO
Eurohm	EUROHM	Japan Aviation Electronics	JAE
Euroquartz Ltd	EUROQUARTZ	Jauch Quartz GmbH	JAUCH
Everlight	EVERLIGHT	Johanson	JOHANSON
Everspin Technologies	EVERSPIN	JRC	JRC
Exar Corporation	EXAR	JST	JST
Excelitas	EXCELITAS	KDS	KDS
Fairchild Imaging	FAIRCHILDIMG	Kemet	KEMET
Fairchild Semiconductor	FAIRCHILD	Kemight Technologies	KEYSIGHT
Fair-Rite	FAIRRITE	Keystone Electronics	KEYSTONE
Fairview Microwave	FAIRVIEW	King Core Electronics	KINGCORE
Faratronic	FARATRONIC	Kingbright	KINGBRIGHT
Fastron	FASTRON	Kionix	KIONIX
FCI Electronics	FCI	KitaGawa	KGS
Ferroxcube	FERROXCUBE	Knitter-Switch	KNITTER
Finisar	FINISAR	Knowles Electronics	KNOWLES
Fischer Elektronik	FISCHER	KOA Speer Electronics	KOA
Fox Electronics	FOX	Kobiconn	KOBICONN
Foxconn Electronics	FOXCONN	KYCON	KYCON
Freescale	FREESCALE	Kyocera	KYOCERA
Fremont Micro Devices	FMD	Laird	LAIRD
Fresco Logic	FRESCO	Lantronix	LANTRONIX
Frontier	FRONTIER	Lattice Semiconductor	LATTICE
FTDI Chip	FTDI	Leach	LEACH
Fuji	FUJI	Ledtronics	LEDTRONICS
Fujitsu	FUJITSU	Legacy Technologies	LEGACYTECH
Fuzetec	FUZETEC	Lelon	LELON
GaN Systems	GAN	LEM	LEM
General Electric	GE	LEMO	LEMO
GeneSiC	GENESIC	Lime Microsystems	LIME
Global Connector Technology	GCT	Linear Technology	LINEAR
Gowanda	GOWANDA	Linx	LINX
Grayhill	GRAYHILL	Lite-On Optoelectronics	LITEON
Greenliant	GREENLIANT	Littelfuse	LITTELFUSE
GSI Technology	GSI	LSR	LSR
Haiwai Electronics	HAIWAI	Lumex	LMX
HALO Electronics	HALO	Lumileds	LUMILEDS
Hamamatsu	HAMAMATSU	Lyn-Tron	LYNTRON
HanRun	HANRUN	MAC8	MAC8
Harting	HARTING	MACOM	MACOM
Harvatek	HARVATEK	Macronix	MACRONIX
Harwin	HARWIN	Mallory Sonalert Products	MALLORY
Hewlett Packard	HP	Marki Microwave	MARKI
Hirose	HIROSE	Marktech	MARKTECH
Hittite	HITTITE	Marvell	MARVELL
HMICRO	HMICRO	Maxim Integrated	MAXIM
Holt	HOLT	Meder	MEDER
Holtek Semiconductor	HOLTEK	MegaChips	MEGACHIPS
Honda Tsushin Kogyo	HTK	Memory Protection Devices	MPD
Honeywell	HONEYWELL	METZ Connect	METZ
IC Plus	ICPLUS	Micrel	MICREL
ICE Components	ICE	Micro Commercial	MICRO
Illinois Capacitor	ILLINOIS	Microchip	MICROCHIP
ILSI America	ILSI	MicroCrystal	MICROCRYSTAL
Imo Precision Controls	IMOPC	Micron	MICRON
Infineon	INFINEON	Micronas	MICRONAS
Infinite Power Solutions	INFINITE	Micropac	MICROPAC
Infomart	INFOMART	MicroPower Direct	MPDIRECT
Innovasic	INNOVASIC	Microsemi	MICROSEMI
Integrated Device Technology	IDT	MILL-MAX	MILLMAX
Integrated Silicon	ISSI	Mini-Circuits	MINICIRCUITS
Intel	INTEL	Mitsubishi Electric	MITSUBISHI
International Rectifier	IRF	MMD	MMD
Intersil	INTERSIL	Molex	MOLEX
Invac	INVAC	Monolithic Power Systems	MONOLITHIC
InvenSense	INVENSENSE	MORNSUN	MORNSUN
I-PEX	IPEX	Most Well Technology	MOSTWELL

Motocraft	MOTOCRAFT	ROHM Semiconductor	ROHM
MS Kennedy	MSK	RS	RS
Multicomp	MULTICOMP	Rubycon	RUBYCON
Murata	MURATA	Samsung Electro-Mechanics	SAMSUNGEM
NDK	NDK	Samsung Semiconductor	SAMSGEM
Neutrik USA	NEUTRIK	Samtec	SAMTEC
Newhaven Display	NEWHAVEN	SanDisk	SANDISK
NIC Components	NIC	Sangshin	SANGSHIN
Nichia Corporation	NICHIA	Sanken Electric	SANKEN
Nichicon	NICHICON	Sanyo	SANYO
Nippon Chemi-Con	NIPPON	Schaffner	SCHAFFNER
NKK Switches	NKK	Schurter	SCHURTER
NorComp	NORCOMP	SEGGER	SEGGER
Nordic	NORDIC	Seiko Instruments	SEIKO
Nover	NOVER	Semitec	SEMITEC
Nuvoton	NUVOTON	Semtech	SEMTECH
NXP Semiconductors	NXP	Sensata Technologies/Airpax	SENSATA
ODU	ODU	Sensata WELLS-CTI	SENSATAWELLSCTI
Ohmite	OHMITE	Sensirion	SENSIRION
Omnetics	OMNETICS	Sensitron	SENSITRON
OMRON	OMRON	Sensor Electronic Technology	SETI
ON Semiconductor	ONSEMI	Seoul Semiconductor	SEOULSEMI
On Shore Technology	OST	Sharp Microelectronics	SHARP
Opto Diode	OPTODIO	SIBA Fuses	SIBA
Osram	OSRAM	Sigma Designs	SIGMA
PAN JIT International	PANJIT	Signal Transformer	SIGNAL
Panasonic	PANASONIC	Silex Technology	SILEX
PANCON	PANCON	Silicon Labs	SILICONLABS
Parallax	PARALLAX	Singatron Enterprises	SINGATRON
PCI Express	PCIEX	SiTIME	SITIME
Peregrine Semiconductor	PEREGRINE	Siward	SIWARD
Pericom Semiconductor	PERICOM	Skyworks Solutions	SKYWORKS
Phoenix Contact	PHOENIX	SMEC	SMEC
Pickering	PICKERING	SMP Technology	SMPTECH
Pico Electronics	PICO	Soberton	SOBERTON
Piconics	PICONICS	Sonix Technology	SONIX
Plessey	PLESSEY	Souriau Connection Technology	SOURIAU
Pletronics	PLETRONICS	Southwest Microwave	SOUTHWEST
Power Integrations	POWERINT	Spansion	SPANSION
Preci-Dip	PRECIDIP	Sprague-Goodman	SPRAGUE
P-TEC	PTEC	ST Microelectronics	ST
PTR Messtechnik	PTRM	Stackpole Electronics	STACKPOLE
PUI Audio	PUIAUDIO	Standex-Meder Electronics	STANDEX
Pulse Electronics	PULSE	Stanley Electric	STANLEY
Purdy	PURDY	STAR MICRONICS	STAR
QT Brightek	QTBRIGHTTEK	STARCONN	STARCONN
Q-TECH	QTECH	State of the Art	SA
Qualcomm	QUALCOMM	Stewart Connector	STEWART
Qualtek Electronics	QUALTEK	Sullins Connector Solutions	SULLINS
Quickfilter Technologies	QUICKFILTER	Sumida	SUMIDA
QuickLogic	QUICKLOGIC	Sunex Digital Imaging Optics	SUNEX
Raltron	RALTRON	Suotek	SUOTEK
Ramtron	RAMTRON	Susumu	SUSUMU
RCD Components	RCDCOMP	Switchcraft	SWITCHCRAFT
RDI	RDI	SYFER	SYFER
RECOM Electronic	RECOM	SynQor	SYNQOR
Rectron	RECTRON	Tag Connect	TAG
Redpine Signals	REDPINE	Taicom	TAICOM
Renata Batteries	RENATA	Taimag	TAIMAG
Renco Electronics	RENCO	TAITRON	TAITRON
Renesas Electronics	RENESAS	Taiwan Semiconductor	TAIWANSEMI
RF Solutions	RFSOL	Taiyo Yuden	TAIYO
RFHIC	RFHIC	Talema Group	TALEMA
RFMD	RFMD	Tamura	TAMURA
Rhopoint Components	RHOPOINT	Taoglas	TAOGLAS
Richtek Technology	RICHTEK	TDK	TDK
Ricoh Electronic Devices	RICOH	TE Connectivity	TE
Riedon	RIEDON	Telit	TELIT
Rigado	RIGADO	Tensility International	TENSILITY
RLC Electronics	RLCELEC	Texas Instruments	TI
RLS	RLS	Titan Opto	TITANOPTO

Toko America	TOKOAM
Torex Semiconductor	TOREX
Toshiba.....	TOSHIBA
Traco	TRACO
Triad Magnetics.....	TRIADMAGNETICS
Triad Semiconductor	TRIADSEMI
Trinamic Motion Control GmbH	TRINAMIC
TriQuint.....	TRIQUINT
TRP Connector.....	TRPCONN
TT Electronics.....	TT
Tusonix.....	TUSONIX
TXC Corporation.....	TXC
U-Blox.....	UBLOX
United Chemi-Con.....	UNITEDCC
VectorNav Technologies	VECTORNAV
Vectron	VECTRON
venkel.....	VENKEL
VIA Labs.....	VIALABS
Vicor	VICOR
Vishay.....	VISHAY
Visual Communications	VCC
VLSI Solutions	VLSI
Volgen/Kaga Electronics	VOLGEN
Voltronics.....	VOLTRONICS
VTI.....	VTI
WAGO	WAGO
Walsin Technology	WALSIN
Wamco	WAMCO
Weco	WECO
Weidmuller.....	WEIDMULLER
WIMA.....	WIMA
Winbond Electronics	WINBOND
WIZnet.....	WIZNET
Wolfson	WOLFSON
WP Products.....	WPPRO
Wurth	WURTH
XFMRs.....	XFMRs
XICON	XICON
Xilinx.....	XILINX
XMOS	XMOS
XP EMCO	XPEMCO
XP Power.....	XPPOWER
Yageo.....	YAGEO
Yamaichi Electronics	YAMAICHI
YDS	YDS
Yoldal	YOLDAL
Zentri	ZENTRI
Zilog.....	ZILOG