

A P P N O T E S SM

IPC-7351B Naming Convention for Standard SMT Land Patterns Surface Mount Land Patterns

Component, Category

Land Pattern Name

Ball Grid Array's	BGA + Pin Qty + C or N + Pitch P + Ball Columns X Ball Rows _ Body Length X Body Width X Height
BGA w/Dual Pitch	BGA + Pin Qty + C or N + Col Pitch X Row Pitch P + Ball Columns X Ball Rows _ Body Length X Body Width X Height
BGA w/Staggered Pins	BGAS + Pin Qty + C or N + Pitch P + Ball Columns X Ball Rows _ Body Length X Body Width X Height
BGA Note: The C or N = Collapsing or Non-collapsing Balls	
Capacitors, Chip, Array, Concave	CAPCAV + Pitch P + Body Length X Body Width X Height - Pin Qty
Capacitors, Chip, Array, Flat	CAPCAF + Pitch P + Body Length X Body Width X Height - Pin Qty
Capacitors, Chip, Non-polarized	CAPC + Body Length + Body Width X Height
Capacitors, Chip, Polarized	CAPCP + Body Length + Body Width X Height
Capacitors, Chip, Wire Rectangle	CAPCWR + Body Length + Body Width X Height
Capacitors, Molded, Non-polarized	CAPM + Body Length + Body Width X Height
Capacitors, Molded, Polarized	CAPMP + Body Length + Body Width X Height
Capacitors, Aluminum Electrolytic	CAPAE + Base Body Size X Height
Ceramic Flat Packages	CFP127P + Lead Span Nominal X Height - Pin Qty
Column Grid Array, Circular Lead	CGA + Pin Qty + C + Pitch P + Pin Columns X Pin Rows _ Body Length X Body Width X Height
Column Grid Array, Square Lead	CGA + Pin Qty + S + Pitch P + Pin Columns X Pin Rows _ Body Length X Body Width X Height
Crystals (2 leads)	XTAL + Body Length X Body Width X Height
Dual-in-Line Packages (Butt Mount)	DIP + Pitch P + Lead Span Nominal X Height - Pin Qty
Dual Flat No-lead	DFN + Body Length X Body Width X Height - Pin Qty
Diodes, Chip	DIOC + Body Length + Body Width X Height
Diodes, Molded	DIOM + Body Length + Body Width X Height
Diodes, MELF	DIOMELF + Body Length + Body Diameter
Diodes, Side Concave, 2 Pin	DIOSC + Body Length X Body Width X Height - Pin Qty
Fuses, Molded	FUSM + Body Length + Body Width X Height
Inductors, Chip	INDC + Body Length + Body Width X Height
Inductors, Molded	INDM + Body Length + Body Width X Height
Inductors, Precision Wire Wound	INDP + Body Length + Body Width X Height
Inductors, Chip, Array, Concave	INDCAV + Pitch P + Body Length X Body Width X Height - Pin Qty
Inductors, Chip, Array, Flat	INDCAF + Pitch P + Body Length X Body Width X Height - Pin Qty
Land Grid Array, Circular Lead	LGA + Pin Qty + C + Pitch P + Pin Columns X Pin Rows _ Body Length X Body Width X Height
Land Grid Array, Square Lead	LGA + Pin Qty + S + Pitch P + Pin Columns X Pin Rows _ Body Length X Body Width X Height
Land Grid Array, Rectangle Lead	LGA + Pin Qty + R + Pitch P + Pin Columns X Pin Rows _ Body Length X Body Width X Height
LED's, Molded	LEDM + Body Length + Body Width X Height
LED's, Side Concave, 2 Pin	LEDSC + Body Length X Body Width X Height - Pin Qty
LED's, Side Concave, 4 Pin	LEDSC + Pitch P + Body Length X Body Width X Height - Pin Qty
Oscillators, Side Concave	OSCSC + Pitch P + Body Length X Body Width X Height - Pin Qty
Oscillators, J-Lead	OSCJ + Pitch P + Body Length X Body Width X Height - Pin Qty
Oscillators, L-Bend Lead	OSCL + Pitch P + Body Length X Body Width X Height - Pin Qty
Oscillators, Corner Concave	OSCC + Body Length X Body Width X Height
Plastic Leaded Chip Carriers	PLCC + Pitch P + Lead Span L1 X Lead Span L2 Nominal X Height - Pin Qty
Plastic Leaded Chip Carrier Sockets Square	PLCCS + Pitch P + Lead Span L1 X Lead Span L2 Nominal X Height - Pin Qty
Quad Flat Packages	QFP + Pitch P + Lead Span L1 X Lead Span L2 Nominal X Height - Pin Qty
Ceramic Quad Flat Packages	CQFP + Pitch P + Lead Span L1 X Lead Span L2 Nominal X Height - Pin Qty
Quad Flat No-lead	QFN + Pitch P + Body Width X Body Length X Height - Pin Qty + Thermal Pad
Pull-back Quad Flat No-lead	PQFN + Pitch P + Body Width X Body Length X Height - Pin Qty + Thermal Pad
Quad Leadless Ceramic Chip Carriers	LCC + Pitch P + Body Width X Body Length X Height - Pin Qty
Quad Leadless Ceramic Chip Carriers (Pin 1 on Side)	LCCS + Pitch P + Body Width X Body Length X Height - Pin Qty
Resistors, Chip	RESC + Body Length + Body Width X Height
Resistors, Molded	RESM + Body Length + Body Width X Height
Resistors, MELF	RESMELF + Body Length + Body Diameter
Resistors, Chip, Array, Concave	RESCAV + Pitch P + Body Length X Body Width X Height - Pin Qty
Resistors, Chip, Array, Convex, E-Version (Even Pin Size)	RESCAXE + Pitch P + Body Length X Body Width X Height - Pin Qty
Resistors, Chip, Array, Convex, S-Version (Side Pins Diff)	RESCAXS + Pitch P + Body Length X Body Width X Height - Pin Qty
Resistors, Chip, Array, Flat	RESCAF + Pitch P + Body Length X Body Width X Height - Pin Qty
Small Outline Diodes, Flat Lead	SODFL + Lead Span Nominal + Body Width X Height
Small Outline IC, J-Leaded	SOJ + Pitch P + Lead Span Nominal X Height - Pin Qty
Small Outline Integrated Circuit, (50 mil Pitch SOIC)	SOIC127P + Lead Span Nominal X Height - Pin Qty
Small Outline Packages	SOP + Pitch P + Lead Span Nominal X Height - Pin Qty
Small Outline No-lead	SON + Pitch P + Body Width X Body Length X Height - Pin Qty + Thermal Pad
Pull-back Small Outline No-lead	PSON + Pitch P + Body Width X Body Length X Height - Pin Qty + Thermal Pad
Small Outline Transistors, Flat Lead	SOTFL + Pitch P + Lead Span Nominal X Height - Pin Qty
SOD (Example: SOD3717X135 = JEDEC SOD123)	SOD + Lead Span Nominal + Body Width X Height
SOT89 (JEDEC Standard Package)	SOT89
SOT143 & SOT343 (JEDEC Standard Package)	SOT143 & SOT343
SOT143 & SOT343 Reverse (JEDEC Standard Package)	SOT143R & SOT343R
SOT23 & SOT223 Packages (Example: SOT230P700X180-4)	SOT + Pitch P + Lead Span Nominal X Height - Pin Qty
TO (Generic DPAK - Example: TO228P970X238-3)	TO + Pitch P + Lead Span X Height - Pin Qty

IPC-7351B 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

Naming Convention Special Character Use for Land Patterns

The _ (underscore) is the separator between pin Qty in Hidden & Deleted pin components

The – (dash) is used to separate the pin qty.

The X (capital letter X) is used instead of the word “by” to separate two numbers such as height X width like “Quad Packages”.

IPC-7351B Suffix Naming Convention for Land Patterns

Common SMT Land Pattern to Describe Environment Use (This is the last character in every name)

Note: This excludes the BGA component family as they only come in the Nominal Environment Condition

- **M**..... Most Material Condition (Level A)
- **N**..... Nominal Material Condition (Level B)
- **L**..... Least Material Condition (Level C)

Alternate Components that do not follow the JEDEC, EIA or IEC Standard

- **A**..... Alternate Component (used primarily for SOP & QFP when Component Tolerance or Height is different)
- **B**..... Second Alternate Component

Reverse Pin Order

- **-20RN**..... 20 pin part, Reverse Pin Order, Nominal Environment

Hidden Pins

- **-20_24N** 20 pin part in a 24 pin package. The pins are numbered 1 – 24 the hidden pins are skipped. The schematic symbol displays up to 24 pins.

Deleted Pins

- **-24_20N** 20 pin part in a 24 pin package. The pins are numbered 1 – 20. The schematic symbol displays 20 pins.

JEDEC and EIA Standard parts that have several alternate packages

- **AA, AB, AC**. JEDEC or EIA Component Identifier

GENERAL SUFFIXES

_HS.....**HS = Land Pattern with Heat Sink attachment requiring additional holes or pads**

Example: TO254P1055X160_HS-6N

_BEC**BEC = Base, Emitter and Collector (Pin assignments used for three pin Transistors)**

Example: SOT95P280X160_BEC-3N

_SGD**SGD = Source, Gate and Drain (Pin assignments used for three pin Transistors)**

Example: SOT95P280X160_SGD-3N

_213.....**213 = Alternate pin assignments used for three pin Transistors**

Example: SOT95P280X160_213-3N

PCB Matrix Naming Convention for Non-Standard SMT Land Patterns

Surface Mount Land Patterns

Component, Category

Land Pattern Name

Amplifiers.....	AMP _Mfr.'s Part Number
Batteries.....	BAT _Mfr.'s Part Number
Capacitors, Variable.....	CAPV _Mfr.'s Part Number
Capacitors, Chip, Array, Concave (Pins on 2 or 4 sides).....	CAPCAV _Mfr Series No. - Pin Qty
Capacitors, Chip, Array, Flat (Pins on 2 sides).....	CAPCAF _Mfr Series No. - Pin Qty
Capacitors, Miscellaneous.....	CAP _Mfr.'s Part Number
Crystals.....	XTAL _Mfr.'s Part Number
Diodes, Miscellaneous.....	DIO _Mfr.'s Part Number
Diodes, Bridge Rectifiers.....	DIOB _Mfr.'s Part Number
Ferrite Beads.....	FB _Mfr.'s Part Number
Fiducials.....	FID + Pad Size X Solder Mask Size
Filters.....	FIL _Mfr.'s Part Number
Fuses.....	FUSE _Mfr.'s Part Number
Fuse, Resettable.....	FUSER _Mfr.'s Part Number
Inductors, Miscellaneous.....	IND _Mfr.'s Part Number
Inductors, Chip, Array, Concave (Pins on 2 or 4 sides).....	INDCAV _Mfr Series No. - Pin Qty
Inductors, Chip, Array, Flat (Pins on 2 sides).....	INDCAF _Mfr Series No. - Pin Qty
Keypad.....	KEYPAD _Mfr.'s Part Number
LEDS.....	LED _Mfr.'s Part Number
LEDS, Chip.....	LED _Mfr.'s Part Number
Liquid Crystal Display.....	LCD _Mfr.'s Part Number
Microphones.....	MIC _Mfr.'s Part Number
Opto Isolators.....	OPTO _Mfr.'s Part Number
Oscillators.....	OSC _Mfr.'s Part Number - Pin Qty
Quad Flat Packages w/Bumper Corners, Pin 1 Side.....	BQFP + Pitch P + Lead Span L1 X Lead Span L2 Nominal X Height - Pin Qty
Quad Flat Packages w/Bumper Corners, 1 Center.....	BQFPC + Pitch P + Lead Span L1 X Lead Span L2 Nominal X Height - Pin Qty
Resistors, Chip, Array, Concave (Pins on 2 or 4 sides).....	RESCAV _Mfr Series No. - Pin Qty
Resistors, Chip, Array, Convex Type E (Pins on 2 sides).....	RESCAXE _Mfr Series No. - Pin Qty
Resistors, Chip, Array, Convex Type S (Pins on 2 sides).....	RESCAXS _Mfr Series No. - Pin Qty
Resistors, Chip, Array, Flat (Pins on 2 sides).....	RESCAF _Mfr Series No. - Pin Qty
Relays.....	RELAY _Mfr.'s Part Number
Speakers.....	SPKR _Mfr.'s Part Number
Switches.....	SW _Mfr.'s Part Number
Test Points, Round.....	TP + Pad Size (1 place left of decimal and 2 places right of decimal, Example TP100 = 1.00mm)
Test Points, Square.....	TPS + Pad Size (1 place left of decimal and 2 places right of decimal)
Test Points, Rectangle.....	TP + Pad Length X Pad Width (1 place left of decimal and 2 places right of decimal)
Thermistors.....	THERM _Mfr.'s Part Number
Transceivers.....	XCVR _Mfr.'s Part Number
Transducers (IRDA's).....	XDCR _Mfr.'s Part Number
Transient Voltage Suppressors.....	TVS _Mfr.'s Part Number
Transient Voltage Suppressors, Polarized.....	TVSP _Mfr.'s Part Number
Transistor Outlines, Custom.....	TRANS _Mfr.'s Part Number
Transformers.....	XFMR _Mfr.'s Part Number
Trimmers & Potentiometers.....	TRIM _Mfr.'s Part Number
Tuners.....	TUNER _Mfr.'s Part Number
Varistors.....	VAR _Mfr.'s Part Number
Voltage Controlled Oscillators.....	VCO _Mfr.'s Part Number
Voltage Regulators, Custom.....	VREG _Mfr.'s Part Number

Note: All dimensions are in Metric Units and all numbers go two places past the decimal point

IPC-7251 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 **CAPPA** + Lead Spacing + **W** Lead Width + **L** Body Length + **D** Body Diameter

Example: **CAPPA800W52L600D150B**

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

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

Example: **CAPPR200W52D300H550B**

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

Transistor Outline, Flange Mount, Horizontal **TO** + Pin Pitch **P** + Body Length **X** Body Width **X** Height Max – Pin Qty

Example: **TO170P2207X1028X470-5A**

Transistor Outline, Flange Mount: 1.70 Pin Pitch; 22.07 Body Length; 10.28 Body Width; 4.70 Height; 5 pins; Fabrication Level A

Transistor Outline, Flange Mount, Vertical..... **TO** + Pin Pitch **P** + Body Length **X** Body Width **X** Height Max – Pin Qty

Example: **TO127P817X1028X2084-5A**

Transistor Outline, Flange Mount: 1.27 Pin Pitch; 8.17 Body Length; 10.28 Body Width; 20.84 Height; 5 pins; Fabrication Level A

Transistor Outline, Cylindrical..... **TO** + Pin Pitch **P** + Body Diameter **X** Height Max – Pin Qty

Example: **TO508R895X660-4A**

Transistor Outline, Cylindrical: 5.08 Pin Radius; 8.95 Body Diameter; 6.60 Height; 5 pins; Fabrication Level A

Header, vertical, 2.54mm pitch; 0.635mm lead width, 20 pins, 2 rows, 10 pins per row, 25.40mm L X 2.54mm W X 8.38mm H body

HDRV20W64P254_2X10_2540X254X838P – Example: vertical header, 2 rows by 20 pins:

Headers, Right Angle... **HDRV** + total Pins + **W** Lead Width + **P** Row Pitch (+ **X** Column Pitch [if different]) + **_** Row s + **X** Pins per Row + **_** Body Length + **X** Body Thickness + **X** Component Height + Fabrication Level

Header, right angle, 2.54mm pitch; 0.635mm lead width, 20 pins, 2 rows, 10 pins per row, 25.40mm L X 2.54mm W X 5.08mm H body

HDRRA20W64P254_2X10_2540X254X508P – Example: right angle header, 2 rows by 20 pins:

Headers, Right Angle... **HDRRA** + total Pins + **W** Lead Width + **P** Row Pitch (+ **X** Column Pitch [if different]) + **_** Row s + **X** Pins per Row + **_** Body Length + **X** Body Thickness + **X** Component Height + Fabrication Level

Header, vertical, 2.54mm pitch; 0.635mm lead width, 50 pins, 3 rows, 25 pins per row, 63.50mm L X 2.54mm W X 8.38mm H body

HDRV50W64P254_3X25_6350X254X838P – Example: vertical header, 3 rows by 25 pins with 25 missing pins:

Headers, Vertical **HDRV** + Total Pins + **W** Lead Width + **P** Row Pitch (+ **X** Column Pitch [if different]) + **_** Row s + **X** Pins per Row + **_** Body Length + **X** Body Thickness + **X** Component Height + Fabrication Level

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 hole for ANSI size 6 with flat washer, tight fitting, non-plated; 3.85mm dia. hole, 8.7mm land, with 6 vias

Example: **MTGNP870H385V6P**

Mounting hole, **MTG** + **NP** (non-plated) + Land Size + **H** + Hole Size + **V** + No. of vias + Fab Level

Mounting hole for Metric size M3.5 pan head, tight fitting, plated; 3.85mm dia. hole, 7.35mm land

Example: **MTGP735H385Z735P**

Mounting hole, **MTG** + **P** (plated) + Land Size + **H** + Hole Size + **Z** + Anti-pad size + Fab Level

Mounting hole for size 2.75 mm, loose fitting, plated; 2.9mm dia. hole, 4mm land

Example: **MTGP400H290Z400P**

Mounting hole, **MTG** + **NP** (plated) + Land Size + **H** + Hole Size + **Z** + Anti-pad size + Fab Level

Example – clearance hole:

Mounting hole for size 2.25 mm, tight fitting, non-plated; 2.6mm dia. hole, 1.3mm land

Example: **MTGNP130H260Z130P**

Mounting hole, **MTG** + **NP** (non-plated) + Land Size + **H** + Hole Size + **Z** + Anti-pad size + Fab Level

Oscillators **OSC** + Lead Span + **W** Lead Diameter + **P** Pin Pitch + **L** Body Length + **H** Component Height + **Q** Pin Qty

Example for 8 pin Oscillator: **OSC762W46P762L1320H600Q8B**

Oscillator: Lead Span 7.62; Lead Diameter 0.46; Pin Pitch 762; Body Length 13.20; Body Height 6.00; Pin Qty 8

Example for 14 pin Oscillator: **OSC762W53P1524L2080H508Q14B**

Oscillator: Lead Span 7.62; Lead Diameter 0.53; Pin Pitch 762; Body Length 20.80; Body Height 508; Pin Qty 14

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: **SIP150W52P254L1905H508Q8B**

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 8

Test Point; 0.635mm lead width, round, 2.54mm Diameter X 5.84mm H body height.

TPCW64D254H584P – Example: round test point with round or square lead:

Test Points, **TP** + **C** + **W** + Lead Width + **D** + Body Diameter + **H** + Height + Fab Level

Test Point; 0.635mm lead width, square, 2.54mm W X 5.84mm H body.

TPRW64L254H584P – Example: square test point with round or square lead:

Test Points, **TP** + **R** + **W** + Lead Width + **L** + Body Size + **H** + Height + Fab Level

Test Point; 1.57mm W X 0.635mmT lead width, rectangular, 2.54mm L X 0.635mm W X 3.30mm H body

TPRW157X64L254T64H330P – Example: rectangular test point with rectangular lead

Test Points, **TP** + **R** + **W** + Lead Length + **X** + Lead Width + **L** + Body Length + **T** + Body Width + **H** + Height + Fab Level

Wire..... **PAD** + Wire Width

Example: **PAD52**

Note: All dimensions are in Metric Units and all numbers go two places past the decimal point

PCB Matrix Naming Convention for Non-standard PTH Land Patterns

Library Name

Land Pattern Name

Amplifiers.....	AMP _Mfr.'s Part Number
Batteries	BAT _Mfr.'s Part Number
Bridge Rectifiers	DIOB _Mfr.'s Part Number
Converters	CONV _Mfr.'s Part Number
Crystals	XTAL _Mfr.'s Part Number
Ferrite Beads	FB _Mfr.'s Part Number
Filters.....	FIL _Mfr.'s Part Number
Fuses.....	FUSE _Mfr.'s Part Number
Fuses, Resettable.....	FUSER _Mfr.'s Part Number
Heat Sinks	HSINK _Mfr.'s Part Number
Inductors.....	IND _Mfr.'s Part Number
LED's	LED _Mfr.'s Part Number
Liquid Crystal Display	LCD _Mfr.'s Part Number
Microphones	MIC _Mfr.'s Part Number
MOV	MOV _Mfr.'s Part Number
Opto Isolators	OPTO _Mfr.'s Part Number
Oscillators.....	OSC _Mfr.'s Part Number
PAD	PAD + Pad Size X Hole Size + H
Photo Detectors.....	PHODET _Mfr.'s Part Number
Regulators	REG _Mfr.'s Part Number
Relays	RELAY _Mfr.'s Part Number
Shield, off the shelf	SHIELD _Mfr.'s Part Number
Shield, Custom	SHIELD + Body Length X Body Width
Speakers	SPKR _Mfr.'s Part Number
Stiffners	STIF _Mfr.'s Part Number
Switches	SW _Mfr.'s Part Number
Thermistors.....	THERM _Mfr.'s Part Number
Transducers (IRDA's).....	XDCR _Mfr.'s Part Number
Transient Voltage Suppressors	TVS + Mfr.'s Part Number
Transient Voltage Suppressors, Polarized	TVSP + Mfr.'s Part Number
Transistor Outlines (JEDEC Standard Package).....	TO - JEDEC Number
Transistor Outlines, Custom	TRANS _Mfr.'s Part Number
Transformers	XFMR _Mfr.'s Part Number
Trimmers & Potentiometers	TRIM _Mfr.'s Part Number
Tuners	TUNER _Mfr.'s Part Number
Varistors	VAR _Mfr.'s Part Number
Voltage Controlled Oscillator	VCO _Mfr.'s Part Number
Voltage Regulators (JEDEC Standard Package).....	TO - JEDEC Number

IPC-7x51 Naming Convention for Connector Land Patterns

Library Name

Land Pattern Name

CONNECTORS (Miscellaneous Connector Libraries)

3M™	3M_Part Number
AGILENT™	AGILENT_Part Number
AIRBORNE™	AIRBORNE_Part Number
AMPHENOL™	AMPHENOL_Part Number
AVX™	AVX_Part Number
BERG™	BERG_Part Number
BLOCKMASTER ELECTRONICS™	BLOCKMASTER_Part Number
CUI-STACK™	CUI-STACK_Part Number
E.F. JOHNSON™	JOHNSON_Part Number
ERNI	ERNI_Part Number
FCI ELECTRONICS™	FCI_Part Number
FUJITSU™	FUJITSU_Part Number
HIROSE™	HIROSE_Part Number
ITT CANNON™	ITT_Part Number
JALCO™	JALCO_Part Number
JWT™	JWT_Part Number
JST™	JST_Part Number
KEYSTONE™	KEYSTONE_Part Number
KYCON™	KYCON_Part Number
LEMO™	LEMO_Part Number
MILL-MAX™	MILL-MAX_Part Number
MOLEX™	MOLEX_Part Number
NEUTRIK™	NEUTRIK_Part Number
PHOENIX™	PHOENIX_Part Number
PULSE™	PULSE_Part Number
RIA™	RIA_Part Number
SAMTEC™	SAMTEC_Part Number
SIEMENS™	SIEMENS_Part Number
SPEEDTECH™	SPEEDTECH_Part Number
STEWART™	STEWART_Part Number
SULLINS™	SULLINS_Part Number
SWITCHCRAFT™	SWITCHCRAFT_Part Number
TYCO™	TYCO_Part Number
YAMAICHI™	YAMAICHI_Part Number

IPC-7351 Surface Mount Land Patterns Sectional Breakdown

IPC-735* Component Family Breakdown:

- IPC-7351** = IEC 61188-5-1, Generic requirements - Attachment (land/joint) considerations – **General Description**
IPC-7352 = IEC 61188-5-2, Sectional requirements - Attachment (land/joint) considerations – **Discrete Components**
IPC-7353 = IEC 61188-5-3, Sectional requirements - Attachment (land/joint) considerations – **Gull-Wing leads, two sides (SOP)**
IPC-7354 = IEC 61188-5-4, Sectional requirements - Attachment (land/joint) considerations – **J leads, two sides (SOJ)**
IPC-7355 = IEC 61188-5-5, Sectional requirements - Attachment (land/joint) considerations – **Gull-Wing leads, four sides (QFP)**
IPC-7356 = IEC 61188-5-6, Sectional requirements - Attachment (land/joint) considerations – **J leads, four sides (PLCC)**
IPC-7357 = IEC 61188-5-7, Sectional requirements - Attachment (land/joint) considerations – **Post leads, two sides (DIP)**
IPC-7358 = IEC 61188-5-8, Sectional requirements - Attachment (land/joint) considerations – **Area Array Components (BGA)**
IPC-7359 = NO IEC Document, Sectional requirements - Attachment (land/joint) considerations – **No Lead Components (LCC)**

IPC-7351 Surface Mount Land Pattern Zero Orientation

- 1) Chip Capacitors, Resistors and Inductors (RES, CAP and IND) – **Pin 1 (Positive) on Left**
- 2) Molded Inductors (INDM), Resistors (RESM), Molded Polarized Capacitors (CAPMP) – **Pin 1 (Positive) on Left**
- 3) Precision Wire-wound Inductors – **Pin 1 (Positive) on Left**
- 4) MELF Diode – **Pin 1 (Cathode) on Left**
- 5) SOD Diodes – **Pin 1 (Cathode) on Left**
- 6) Aluminum Electrolytic Capacitors – **Pin 1 (Positive) on Left**
- 7) SOT Devices (SOT23, SOT23-5, SOT223, SOT89, SOT143, etc.) – **Pin 1 Upper Left**
- 8) TO252 & TO263 (DPAK Type) Devices – **Pin 1 Upper Left**
- 9) Small Outline Gullwing ICs (SOIC, SOP, TSOP, SSOP, TSSOP) – **Pin 1 Upper Left**
- 10) Ceramic Flat Packs (CFP) – **Pin 1 Upper Left**
- 11) Small Outline J Lead ICs (SOJ) – **Pin 1 Upper Left**
- 12) Quad Flat Pack ICs (PQFP, SQFP) – **Pin 1 Upper Left**
- 13) Ceramic Quad Flat Packs (CQFP) – **Pin 1 Upper Left**
- 14) Bumper and Plastic Quad Flat Pack ICs (BQFPC, PQFPC Pin 1 Center) – **Pin 1 Top Center**
- 15) Plastic Leadless Chip Carriers (PLCC) – **Pin 1 Top Center**
- 16) Leadless Chip Carriers (LCC) – **Pin 1 Top Center**
- 17) Leadless Chip Carriers (LCCS Pin 1 on Side) – **Pin 1 Upper Left**
- 18) Quad Flat No-Lead ICs (QFN) QFNS & QFN RV, QFN RH – **Pin 1 Upper Left**
- 19) Ball Grid Arrays (BGA) – **Pin A1 Upper Left**

IPC-7251 Through-hole Land Patterns Sectional Breakdown

IPC-725* Component Family Breakdown:

IPC-7251 = Generic requirements – Attachment (land/joint) considerations – **General Description**

IPC-7252 = Sectional requirements – Attachment (land/joint) considerations – **Discrete Components (Axial & Radial)**

IPC-7253 = Sectional requirements – Attachment (land/joint) considerations – **Dual-In-Line Package (DIP)**

IPC-7254 = Sectional requirements – Attachment (land/joint) considerations – **Three Leaded Semiconductor**

IPC-7255 = Sectional requirements – Attachment (land/joint) considerations – **Pin Grid Array**

IPC-7256 = Sectional requirements – Attachment (land/joint) considerations – **Unique Multiple function Parts**

IPC-7257 = Sectional requirements – Attachment (land/joint) considerations – **Connectors & Headers**

IPC-7258 = Sectional requirements – Attachment (land/joint) considerations – **Single-In-line Package (SIP) Resistor Networks**

IPC-7259 = Sectional requirements – Attachment (land/joint) considerations – **Mounting Hardware**

IPC-7251 Through-hole Land Pattern Zero Orientation

- 1) Axial Lead Capacitors, Resistors, Diodes and Inductors (RES, CAP, DIO and IND) – **Pin 1 (Positive or Cathode) on Left**
- 2) Radial Lead Capacitors (CAP) – **Pin 1 (Positive) on Left**
- 3) Dual-in-line Packages (DIP) – **Pin 1 Left – Upper**
- 4) Three Leaded Semiconductor – **Pin 1 Left – Upper**
- 5) Pin Grid Array (PGA) – **Pin 1 Left – Upper**
- 6) Unique Multiple function Parts – **Pin 1 Left – Upper**
- 7) Connectors & Headers (HDR) – **Pin 1 Left – Upper**
- 8) Single-In-line Package (SIP) Resistor Networks – **Pin 1 Left – Upper**