

# IPC-7351 Naming Convention for Standard SMT Land Patterns

## Surface Mount Land Patterns

<u>Component, Category</u>	<u>Land Pattern Name</u>
Ball Grid Array's, Inch Based (1.27mm / 0.05" Pitch).....	<b>BGA127P</b> + Number of Pin Columns <b>X</b> Number of Pin Rows - Pin Qty
Ball Grid Array's, Metric Based (1.50mm Pitch).....	<b>BGA150P</b> + Number of Pin Columns <b>X</b> Number of Pin Rows - Pin Qty
Ball Grid Array's, Metric Based (1.00mm Pitch).....	<b>BGA100P</b> + Number of Pin Columns <b>X</b> Number of Pin Rows - Pin Qty
Ball Grid Array's, Metric Based (0.80mm Pitch).....	<b>BGA80P</b> + Number of Pin Columns <b>X</b> Number of Pin Rows - Pin Qty
Ball Grid Array's, Metric Based (0.75mm Pitch).....	<b>BGA75P</b> + Number of Pin Columns <b>X</b> Number of Pin Rows - Pin Qty
Ball Grid Array's, Metric Based (0.65mm Pitch).....	<b>BGA65P</b> + Number of Pin Columns <b>X</b> Number of Pin Rows - Pin Qty
Ball Grid Array's, Metric Based (0.50mm Pitch).....	<b>BGA50P</b> + Number of Pin Columns <b>X</b> Number of Pin Rows - Pin Qty
Ball Grid Array's w/Staggered Pins (1.27mm Pitch).....	<b>SBGA127P</b> + Number of Pin Columns <b>X</b> Number of Pin Rows - Pin Qty
Capacitors, Chip, Non-polarized.....	<b>CAPC</b> + Body Length + Body Width
Capacitors, Chip, Polarized.....	<b>CAPCP</b> + Body Length + Body Width
Capacitors, Chip, Wire Rectangle.....	<b>CAPCWR</b> + Body Length + Body Width
Capacitors, Molded, Non-polarized.....	<b>CAPM</b> + Body Length + Body Width
Capacitors, Molded, Polarized.....	<b>CAPMP</b> + Body Length + Body Width
Capacitors, Aluminum Electrolytic.....	<b>CAPAE</b> + Base Body Width ( <b>W</b> ) + Height ( <b>H</b> )
Ceramic Flat Packages.....	<b>CFP127P</b> + Lead Span Nominal - Pin Qty
Column Grid Array's.....	<b>CGA</b> + Number of Pin Columns <b>X</b> Number of Pin Rows - Pin Qty
Diodes, Molded (JEDEC Standard Package).....	<b>DIOM</b> + Body Length + Body Width
Diodes, MELF.....	<b>DIOMELF</b> + Body Length + Body Width
Inductors, Chip.....	<b>INDC</b> + Body Length + Body Width
Inductors, Molded.....	<b>INDM</b> + Body Length + Body Width
Inductors, Precision Wire Wound.....	<b>INDP</b> + Body Length + Body Width
Plastic Leaded Chip Carriers Square (JEDEC Standard Package).....	<b>PLCC</b> - Pin Qty
Plastic Leaded Chip Carriers Rectangular (JEDEC Standard Package).....	<b>PLCCR</b> - Pin Qty
Plastic Leaded Chip Carrier Sockets Square.....	<b>PLCCS</b> - Pin Qty
Plastic Leaded Chip Carrier Sockets Rectangular.....	<b>PLCCRS</b> - Pin Qty
Plastic Leaded Chip Carriers (w/Non-JEDEC Standard).....	<b>PLCC</b> + Pitch <b>P</b> + Lead Span L1 <b>X</b> Lead Span L2 Nominal - Pin Qty
Plastic Quad Flat Packages, 0.635mm Pitch, Pin 1 Side.....	<b>PQFPS</b> - Pin Qty
Plastic Quad Flat Packages, 0.635mm Pitch, Pin 1 Center.....	<b>PQFPC</b> - Pin Qty
Quad Flat Packages w/Bumper Corners, 0.635mm Pitch, Pin 1 Side.....	<b>BQFPS</b> - Pin Qty
Quad Flat Packages w/Bumper Corners, 0.635mm Pitch, Pin 1 Center.....	<b>BQFPC</b> - Pin Qty
Quad Flat Packages, 1.00mm Pitch.....	<b>QFP100P</b> + Lead Span L1 <b>X</b> Lead Span L2 Nominal - Pin Qty
Quad Flat Packages, 0.80mm Pitch.....	<b>QFP80P</b> + Lead Span L1 <b>X</b> Lead Span L2 Nominal - Pin Qty
Quad Flat Packages, 0.65mm Pitch.....	<b>QFP65P</b> + Lead Span L1 <b>X</b> Lead Span L2 Nominal - Pin Qty
Shrink Quad Flat Packages, 0.50mm Pitch.....	<b>SQFP50P</b> + Lead Span L1 <b>X</b> Lead Span L2 Nominal - Pin Qty
Shrink Quad Flat Packages, 0.40mm Pitch.....	<b>SQFP40P</b> + Lead Span L1 <b>X</b> Lead Span L2 Nominal - Pin Qty
Shrink Quad Flat Packages, 0.30mm Pitch.....	<b>SQFP30P</b> + Lead Span L1 <b>X</b> Lead Span L2 Nominal - Pin Qty
Thin Quad Flat Packages, 0.80mm Pitch, Height ≤ 1.60mm.....	<b>TQFP80P</b> + Lead Span L1 <b>X</b> Lead Span L2 Nominal - Pin Qty
Thin Quad Flat Packages, 0.65mm Pitch, Height ≤ 1.60mm.....	<b>TQFP65P</b> + Lead Span L1 <b>X</b> Lead Span L2 Nominal - Pin Qty
Thin Quad Flat Packages, 0.50mm Pitch, Height ≤ 1.60mm.....	<b>TSQFP50P</b> + Lead Span L1 <b>X</b> Lead Span L2 Nominal - Pin Qty
Thin Quad Flat Packages, 0.40mm Pitch, Height ≤ 1.60mm.....	<b>TSQFP40P</b> + Lead Span L1 <b>X</b> Lead Span L2 Nominal - Pin Qty
Thin Quad Flat Packages, 0.30mm Pitch, Height ≤ 1.60mm.....	<b>TSQFP30P</b> + Lead Span L1 <b>X</b> Lead Span L2 Nominal - Pin Qty
Ceramic Quad Flat Packages, 1.27mm Pitch.....	<b>CQFP127P</b> + Lead Span L1 <b>X</b> Lead Span L2 Nominal - Pin Qty
Ceramic Quad Flat Packages, 0.80mm Pitch.....	<b>CQFP80P</b> + Lead Span L1 <b>X</b> Lead Span L2 Nominal - Pin Qty
Ceramic Quad Flat Packages, 0.635mm Pitch.....	<b>CQFP63P</b> + Lead Span L1 <b>X</b> Lead Span L2 Nominal - Pin Qty
Quad Flat No-lead, 0.80mm Pitch.....	<b>QFN80P</b> + Body Width <b>X</b> Body Length - Pin Qty + Thermal Pad
Quad Flat No-lead, 0.65mm Pitch.....	<b>QFN65P</b> + Body Width <b>X</b> Body Length - Pin Qty + Thermal Pad
Quad Flat No-lead, 0.50mm Pitch.....	<b>QFN50P</b> + Body Width <b>X</b> Body Length - Pin Qty + Thermal Pad
Quad Flat No-lead, 0.40mm Pitch.....	<b>QFN40P</b> + Body Width <b>X</b> Body Length - Pin Qty + Thermal Pad
Pull-back Quad Flat No-lead.....	<b>PQFN</b> + Pitch <b>P</b> + Body Width <b>X</b> Body Length - Pin Qty + Thermal Pad
Quad Leadless Ceramic Chip Carriers.....	<b>LCC</b> + Pitch <b>P</b> + Body Width <b>X</b> Body Length - Pin Qty
Quad Leadless Ceramic Chip Carriers (Pin 1 on Side).....	<b>LCCS</b> + Pitch <b>P</b> + Body Width <b>X</b> Body Length - Pin Qty
Resistors, Chip.....	<b>RESC</b> + Body Length + Body Width
Resistors, Molded.....	<b>RESM</b> + Body Length + Body Width
Resistor, MELF.....	<b>RESMELF</b> + Body Length + Body Width

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

# IPC-7351 Naming Convention for Standard SMT Land Patterns

## Surface Mount Land Patterns (continued)

<u>Component, Category</u>	<u>Land Pattern Name</u>
Small Outline IC, J-Leaded 300, 350, 400, 450 mil Body Width (Pitch 1.27mm)	<b>SOJ127P</b> + Lead Span Nominal - Pin Qty
Small Outline IC, J-Leaded (Pitch 0.65mm)	<b>SOJ65P</b> + Lead Span Nominal - Pin Qty
Small Outline Integrated Circuit, 1.27mm Pitch (Standard 50 mil Pitch SOIC)	<b>SOIC127P</b> + Lead Span Nominal - Pin Qty
Small Outline Packages, 1.27mm Pitch (Non-Standard 50 mil Pitch SOIC)	<b>SOP127P</b> + Lead Span Nominal - Pin Qty
Small Outline Packages, 1.00mm Pitch	<b>SOP100P</b> + Lead Span Nominal - Pin Qty
Small Outline Packages, 0.80mm Pitch	<b>SOP80P</b> + Lead Span Nominal - Pin Qty
Small Outline Packages, 0.65mm Pitch	<b>SOP65P</b> + Lead Span Nominal - Pin Qty
Small Outline Packages, 0.635mm Pitch	<b>SOP63P</b> + Lead Span Nominal - Pin Qty
Shrink Small Outline Packages, 0.50mm Pitch	<b>SSOP50P</b> + Lead Span Nominal - Pin Qty
Shrink Small Outline Packages, 0.40mm Pitch	<b>SSOP40P</b> + Lead Span Nominal - Pin Qty
Shrink Small Outline Packages, 0.30mm Pitch	<b>SSOP30P</b> + Lead Span Nominal - Pin Qty
Thin Small Outline Packages, Height is ≤ 1.60mm, 1.27mm Pitch	<b>TSOP127P</b> + Lead Span Nominal - Pin Qty
Thin Small Outline Packages, Height is ≤ 1.60mm, 1.00mm Pitch	<b>TSOP100P</b> + Lead Span Nominal - Pin Qty
Thin Small Outline Packages, Height is ≤ 1.60mm, 0.80mm Pitch	<b>TSOP80P</b> + Lead Span Nominal - Pin Qty
Thin Small Outline Packages, Height is ≤ 1.60mm, 0.65mm Pitch	<b>TSOP65P</b> + Lead Span Nominal - Pin Qty
Thin Shrink Small Outline Packages, Height is ≤ 1.60mm, 0.55mm Pitch	<b>TSSOP55P</b> + Lead Span Nominal - Pin Qty
Thin Shrink Small Outline Packages, Height is ≤ 1.60mm, 0.50mm Pitch	<b>TSSOP50P</b> + Lead Span Nominal - Pin Qty
Thin Shrink Small Outline Packages, Height is ≤ 1.60mm, 0.40mm Pitch	<b>TSSOP40P</b> + Lead Span Nominal - Pin Qty
Thin Shrink Small Outline Packages, Thin (Height is ≤ 1.60mm) 0.30mm Pitch	<b>TSSOP30P</b> + Lead Span Nominal - Pin Qty
Very Small Outline Packages, 0.762mm Pitch (0.30" Pitch)	<b>VSOP762P</b> + Lead Span Nominal - Pin Qty
Small Outline No-lead (0.3 - 0.8mm Pitch)	<b>SON</b> + Pitch <b>P</b> + Body Width <b>X</b> Body Length - Pin Qty + Thermal Pad
Pull-back Small Outline No-lead	<b>PSON</b> + Pitch <b>P</b> + Body Width <b>X</b> Body Length - Pin Qty + Thermal Pad
SOD (Example: <b>SOD3705</b> = <b>SOD123</b> )	<b>SOD</b> + Lead Span Nominal + Body Width
SOT89 (JEDEC Standard Package)	<b>SOT89</b>
SOT143 (JEDEC Standard Package)	<b>SOT143</b>
SOT343 (JEDEC Standard Package)	<b>SOT343</b>
SOT143 Reverse (JEDEC Standard Package)	<b>SOT143R</b>
SOT343 Reverse (JEDEC Standard Package)	<b>SOT343R</b>
SOT223 (JEDEC Standard Package) (Example: SOT230P700-4N)	<b>SOT</b> + Pitch <b>P</b> + Lead Span Nominal - Pin Qty
SOT Generic Package 0.65mm Pitch	<b>SOT65P</b> + Lead Span Nominal - Pin Qty
SOT Generic Package 0.95mm Pitch	<b>SOT95P</b> + Lead Span Nominal - Pin Qty
TO (Generic DPAK - Example: TO228P970-3N)	<b>TO</b> + Pitch <b>P</b> + Lead Span - Pin Qty

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

# IPC-7351 Naming Convention for Standard SMT Land Patterns

## SYNTAX EXPLANATIONS:

The + (plus sign) stands for "in addition to" (no space between the prefix and the body size)

The \_ (under score) is the separator between the Prefix and the Mfr Part Number.

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".

## SUFFIXES For Every 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)

Example: **RESC3216L**, **RESC3216N**, **RESC3216M**

## SUFFIXES for 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

Example: **SQFP50P900X1200-52AN**

## SUFFIXES for JEDEC and EIA Standard parts that have several alternate packages

- **AA, AB, AC**. JEDEC or EIA Component Identifier (Used primarily on Quad Flat No-lead Packages)

## GENERAL SUFFIXES

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

Example: **TO254P1055\_HS-6N**

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

Example: **SOT95P280\_BEC-3N**

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

Example: **SOT95P280\_SGD-3N**

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

Example: **SOT95P280\_213-3N**

# IPC-7351 Surface Mount Land Patterns

## 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)**

## Component Zero Orientations Pin 1 Location for CAD Library Construction:

- 1) Chip Capacitors, Resistors and Inductors (RES, CAP and IND) – **Pin 1 (Positive) on Left**
- 2) Molded Inductors (INDM), Resistors (RESM), Tantalum Capacitors (CAPT) – **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 Quad Flat Pack ICs (BQFP Pin 1 Center) – **Pin 1 Top Center**
- 15) Plastic Leaded Chip Carriers (PLCC) – **Pin 1 Top Center**
- 16) Leadless Chip Carriers (LCC) – **Pin 1 Top Center**
- 17) Quad Flat No-Lead ICs (QFN) QFNS & QFN RV, QFN RH – **Pin 1 Upper Left**
- 18) Ball Grid Arrays (BGA) – **Pin A1 Upper Left**