IPC-7351 Naming Convention for Standard SMT Land Patterns

Surface Mount Land Patterns

Component, Category	Land Pattern Name
Ball Grid Array's, Inch Based (1.27mm / 0.05" Pitch)	**BGA127P** + Number of Pin Columns **X** Number of Pin Rows **-** Pin Qty
Ball Grid Array's, Metric Based (1.50mm Pitch)	**BGA150P** + Number of Pin Columns **X** Number of Pin Rows **-** Pin Qty
Ball Grid Array's, Metric Based (1.00mm Pitch)	**BGA100P** + Number of Pin Columns **X** Number of Pin Rows **-** Pin Qty
Ball Grid Array's, Metric Based (0.80mm Pitch)	**BGA80P** + Number of Pin Columns **X** Number of Pin Rows **-** Pin Qty
Ball Grid Array's, Metric Based (0.75mm Pitch)	**BGA75P** + Number of Pin Columns **X** Number of Pin Rows **-** Pin Qty
Ball Grid Array's, Metric Based (0.65mm Pitch)	**BGA65P** + Number of Pin Columns **X** Number of Pin Rows **-** Pin Qty
Ball Grid Array's, Metric Based (0.50mm Pitch)	**BGA50P** + Number of Pin Columns **X** Number of Pin Rows **-** Pin Qty
Ball Grid Array's w/Staggered Pins (1.27mm Pitch)	**SBGA127P** + Number of Pin Columns **X** Number of Pin Rows **-** Pin Qty
Capacitors, Chip, Non-polarized	**CAPC** + Body Size in Metric
Capacitors, Chip, Array, Concave (Pins on 2 or 4 sides)	**CAPCAV** + Body Size in Metric
Capacitors, Chip, Array, Convex, E-Version (Equal Pin Sizes)	**CAPCAXE** + Body Size in Metric
Capacitors, Chip, Array, Convex, S-Version (End Pins Larger)	**CAPCAXS** + Body Size in Metric
Capacitors, Chip, Array, Flat (Pins on 2 sides)	**CAPCAF** + Body Size in Metric
Capacitors, Chip, Polarized	**CAPCP** + Body Size in Metric
Capacitors, Chip, Wire Rectangle	**CAPCWR** + Body Size in Metric
Capacitors, Molded, Non-polarized	**CAPM** + Body Size in Metric
Capacitors, Molded, Polarized	**CAPMP** + Body Size in Metric
Capacitors, Aluminum Electrolytic	**CAPAE** + Base Body Width (**W**) + Height (**H**)
Ceramic Flat Packages	**CFP127P** + Lead Span Nominal **-** Pin Qty
Column Grid Array's	**CGA** + Number of Pin Columns **X** Number of Pin Rows **-** Pin Qty
Diodes, Molded (JEDEC Standard Package)	**DIOM** + Body Size in Metric
Diodes, MELF	**DIOMELF** + Body Size in Metric
Inductors, Chip	**INDC** + Body Size in Metric
Inductors, Chip, Array, Concave (Pins on 2 or 4 sides)	**INDCAV** + Body Size in Metric
Inductors, Chip, Array, Convex, E-Version (Equal Pin Sizes)	**INDCAXE** + Body Size in Metric
Inductors, Chip, Array, Convex, S-Version (End Pins Larger)	**INDCAXS** + Body Size in Metric
Inductors, Chip, Array, Flat (Pins on 2 sides)	**INDCAF** + Body Size in Metric
Inductors, Molded	**INDM** + Body Size in Metric
Inductors, Precision Wire Wound	**INDP** + Body Size in Metric
Plastic Leaded Chip Carriers Square (JEDEC Standard Package)	**PLCC-** Pin Qty
Plastic Leaded Chip Carriers Rectangular (JEDEC Standard Package)	**PLCCR-** Pin Qty
Plastic Leaded Chip Carrier Sockets Square	**PLCCS-** Pin Qty
Plastic Leaded Chip Carrier Sockets Rectangular	**PLCCRS-** Pin Qty
Plastic Quad Flat Packages, 0.635mm Pitch, Pin 1 Side	**PQFPS-** Pin Qty
Plastic Quad Flat Packages, 0.635mm Pitch, Pin 1 Center	**PQFPC-** Pin Qty
Bumper Quad Flat Packages, 0.635mm Pitch, Pin 1 Side	**BQFPS-** Pin Qty
Bumper Quad Flat Packages, 0.635mm Pitch, Pin 1 Center	**BQFPC-** Pin Qty
Quad Flat Packages, 1.00mm Pitch	**QFP100P** + Lead Span L1 **X** Lead Span L2 Nominal **-** Pin Qty
Quad Flat Packages, 0.80mm Pitch	**QFP80P** + Lead Span L1 **X** Lead Span L2 Nominal **-** Pin Qty
Quad Flat Packages, 0.65mm Pitch	**QFP65P** + Lead Span L1 **X** Lead Span L2 Nominal **-** Pin Qty
Shrink Quad Flat Packages, 0.50mm Pitch	**SQFP50P** + Lead Span L1 **X** Lead Span L2 Nominal **-** Pin Qty
Shrink Quad Flat Packages, 0.40mm Pitch	**SQFP40P** + Lead Span L1 **X** Lead Span L2 Nominal **-** Pin Qty
Shrink Quad Flat Packages, 0.30mm Pitch	**SQFP30P** + Lead Span L1 **X** Lead Span L2 Nominal **-** Pin Qty
Thin Quad Flat Packages, 0.80mm Pitch, Height ≤ 1.60mm	**TQFP80P** + Lead Span L1 **X** Lead Span L2 Nominal **-** Pin Qty
Thin Quad Flat Packages, 0.65mm Pitch, Height ≤ 1.60mm	**TQFP65P** + Lead Span L1 **X** Lead Span L2 Nominal **-** Pin Qty
Thin Quad Flat Packages, 0.50mm Pitch, Height ≤ 1.60mm	**TSQFP50P** + Lead Span L1 **X** Lead Span L2 Nominal **-** Pin Qty
Thin Quad Flat Packages, 0.40mm Pitch, Height ≤ 1.60mm	**TSQFP40P** + Lead Span L1 **X** Lead Span L2 Nominal **-** Pin Qty
Thin Quad Flat Packages, 0.30mm Pitch, Height ≤ 1.60mm	**TSQFP30P** + Lead Span L1 **X** Lead Span L2 Nominal **-** Pin Qty
Ceramic Quad Flat Packages, 1.27mm Pitch	**CQFP127P** + Lead Span L1 **X** Lead Span L2 Nominal **-** Pin Qty
Ceramic Quad Flat Packages, 0.80mm Pitch	**CQFP80P** + Lead Span L1 **X** Lead Span L2 Nominal **-** Pin Qty
Ceramic Quad Flat Packages, 0.635mm Pitch	**CQFP63P** + Lead Span L1 **X** Lead Span L2 Nominal **-** Pin Qty
Quad Flat No Lead Packages 0.80mm Pitch	**QFN80P** + Body Width **X** Body Length in Metric **-** Pin Qty + Thermal Pad
Quad Flat No Lead Packages 0.65mm Pitch	**QFN65P** + Body Width **X** Body Length in Metric **-** Pin Qty + Thermal Pad
Quad Flat No Lead Packages 0.50mm Pitch	**QFN50P** + Body Width **X** Body Length in Metric **-** Pin Qty + Thermal Pad
Quad Flat No Lead Packages 0.40mm Pitch	**QFN40P** + Body Width **X** Body Length in Metric **-** Pin Qty + Thermal Pad
Quad Leadless Ceramic Chip Carriers (JEDEC Standard Package)	**LCC** + Body Width **X** Body Length in Metric **-** Pin Qty
Quad Leadless Ceramic Chip Carriers (Pin 1 on Side)	**LCCS** + Body Width **X** Body Length in Metric **-** Pin Qty
Quad Bottom Chip Carrier (JEDEC MO-217B)	**QBCC** + Body Width **X** Body Length in Metric **-** Pin Qty

IPC-7351 Naming Convention for Standard SMT Land Patterns

Surface Mount Land Patterns (continued)

Component, Category	Land Pattern Name
Resistors, Chip	**RESC** + Body Size in Metric
Resistors, Chip, Array, Concave (Pins on 2 or 4 sides)	**RESCAV** + Body Size in Metric
Resistors, Chip, Array, Convex, E-Version (Equal Pin Sizes)	**RESCAXE** + Body Size in Metric
Resistors, Chip, Array, Convex, S-Version (End Pins Larger)	**RESCAXS** + Body Size in Metric
Resistors, Chip, Array, Flat (Pins on 2 sides)	**RESCAF** + Body Size in Metric
Resistors, Molded	**RESM** + Body Size in Metric
Resistor, MELF	**RESMELF** + Body Size in Metric
Small Outline IC, J-Leaded 300, 350, 400, 450 mil Body Width (Pitch 1.27mm)	**SOJ127P** + Lead Span Nominal **-** Pin Qty
Small Outline IC, J-Leaded (Pitch 0.65mm)	**SOJ65P** + Lead Span Nominal **-** Pin Qty
Small Outline Integrated Circuit, 1.27mm Pitch (Standard 50 mil Pitch SOIC)	**SOIC127P** + Lead Span Nominal **-** Pin Qty
Small Outline Packages, 1.27mm Pitch (Non-Standard 50 mil Pitch SOIC)	**SOP127P** + Lead Span Nominal **-** Pin Qty
Small Outline Packages, 1.00mm Pitch	**SOP100P** + Lead Span Nominal **-** Pin Qty
Small Outline Packages, 0.80mm Pitch	**SOP80P** + Lead Span Nominal **-** Pin Qty
Small Outline Packages, 0.65mm Pitch	**SOP65P** + Lead Span Nominal **-** Pin Qty
Small Outline Packages, 0.635mm Pitch	**SOP63P** + Lead Span Nominal **-** Pin Qty
Shrink Small Outline Packages, 0.50mm Pitch	**SSOP50P** + Lead Span Nominal **-** Pin Qty
Shrink Small Outline Packages, 0.40mm Pitch	**SSOP40P** + Lead Span Nominal **-** Pin Qty
Shrink Small Outline Packages, 0.30mm Pitch	**SSOP30P** + Lead Span Nominal **-** Pin Qty
Thin Small Outline Packages, Height is ≤ 1.60mm, 1.27mm Pitch	**TSOP127P** + Lead Span Nominal **-** Pin Qty
Thin Small Outline Packages, Height is ≤ 1.60mm, 1.00mm Pitch	**TSOP100P** + Lead Span Nominal **-** Pin Qty
Thin Small Outline Packages, Height is ≤ 1.60mm, 0.80mm Pitch	**TSOP80P** + Lead Span Nominal **-** Pin Qty
Thin Small Outline Packages, Height is ≤ 1.60mm, 0.65mm Pitch	**TSOP65P** + Lead Span Nominal **-** Pin Qty
Thin Shrink Small Outline Packages, Height is ≤ 1.60mm, 0.55mm Pitch	**TSSOP55P** + Lead Span Nominal **-** Pin Qty
Thin Shrink Small Outline Packages, Height is ≤ 1.60mm, 0.50mm Pitch	**TSSOP50P** + Lead Span Nominal **-** Pin Qty
Thin Shrink Small Outline Packages, Height is ≤ 1.60mm, 0.40mm Pitch	**TSSOP40P** + Lead Span Nominal **-** Pin Qty
Thin Shrink Small Outline Packages, Thin (Height is ≤ 1.60mm) 0.30mm Pitch	**TSSOP30P** + Lead Span Nominal **-** Pin Qty
Very Small Outline Packages, 0.762mm Pitch (0.30” Pitch)	**VSOP762P** + Lead Span Nominal **-** Pin Qty
SOD (Example: **SOD3705** = **SOD123**)	**SOD** + Lead Span Nominal + Body Width
SON - Dual No Lead Packages 0.3 - 0.8mm Pitch	**SON** + Pitch **P** + Body Width **X** Body Length **-** Pin Qty + Thermal Pad
SOT89 (JEDEC Standard Package)	**SOT89**
SOT143 (JEDEC Standard Package)	**SOT143**
SOT343 (JEDEC Standard Package)	**SOT343**
SOT143 Reverse (JEDEC Standard Package)	**SOT143R**
SOT343 Reverse (JEDEC Standard Package)	**SOT343R**
SOT223 (JEDEC Standard Package) (Example: SOT230P700-4N)	**SOT** + Pitch **P** + Lead Span Nominal **-** Pin Qty
SOT Generic Package 0.65mm Pitch	**SOT65P** + Lead Span Nominal **-** Pin Qty
SOT Generic Package 0.95mm Pitch	**SOT95P** + Lead Span Nominal **-** Pin Qty
TO (Generic DPAK - Example: TO228P970-3N)	**TO +** Pitch **P** + Lead Span **-** Pin Qty

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”.
Connector Series Number:

In these libraries such as AMP & MOLEX the “Series Number” is used and the pin qty. Molex Example: **90663-60**
The other connector libraries will just contain the manufacturer’s part number. We did a study and could not find any overlapping manufacture part numbers for 20 different connector manufacturers, so it’s safe to use it.

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)

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

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

- **AA, AB, AC**. JEDEC or EIA Component Identifier (Used primarily on Chip Resistors, Inductors and Capacitors)

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)

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

_213 ..... 213 = Alternate pin assignments used for three pin Transistors
Example: SOT95P280_BEC-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 & QFNRV, QFNRH – **Pin 1 Upper Left**

18) Ball Grid Arrays (BGA) – **Pin A1 Upper Left**