TopLine™

Part Numbering System

Series	Page	Pcode	Description
SC	4-5	XD1	Chips Passives
SD	6-7		
SE	8-9		
SR	10-11		
SRM	12-13		
SI	14-15		
SOT	16-17	XD1	Discrete Semi
DPAK	18-19		
MELF DIODE	20-21		
RECTANGULAR DIODE	22-23		
PLCC	24-25	XP1	IC
LCC	26-27	XL1	
SOIC	28-29	XS1	
SOJ	30-31	XS1	
FP	32-33	XF1	
MSOP	34-35	XS1	
SSOP	36-37	XS1	
TSSOP	38-39	XS1	
TSOP(I)	40-41	XO1	
TSOP(II)	42-43	XO1	
TQFP	44-45	XQ1	Quad Flat Pack
LQFP	46-47		
QFP	48-49		
CERQUAD	50-51	XC1	Ceramic Quad Flat Pack
CLCC	52-53		
FC Flip Chips	54-55	XI1	Flip Chip
FCW Flip Chip Wafers	56-57		
Wafers	58-59	XE1	Wafers & Die
Die	60-61		
BGA - CSP	62-63	XJ1	Grid Array
CBGA	64-65		
CLGA - LGA	66-67		
SLP, MLF, QFN	68-69	XU1	Leadless
DIP	70-71	XN1	Throughhole
TO	72	XT1	
DO	73	XA1	

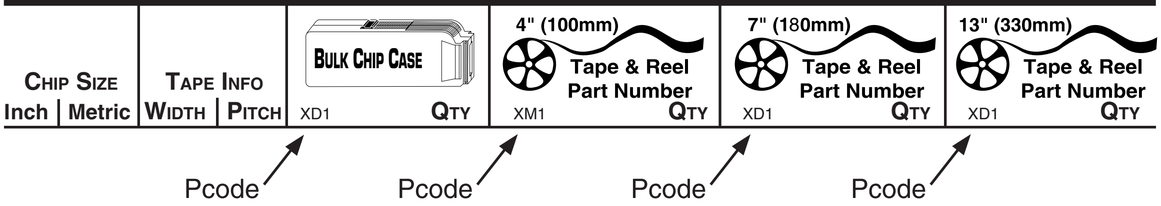
TopLine™ **Part Numbering System**

Quick Guide to Product Codes - “Pcode”

Pcode	Description	Part Number Series (example)
XA1	Axial Lead Component	CF, CS, EA, DO (leaded only)
XB1	Books, Catalog & Reference	
XC1	Ceramic CERQUAD	CERQUAD and CLCC
XD1	Chips, Passives & Discrete Semi	SC, SD, SE, SI, SR, SRM, SOD, SOT, DPAK
XE1	Wafers & Die	WE, WED, WM, WMD and ED, MD
XF1	Flat Packs	FP
XG1	Pin Grid Array	PGA, PPGA, CPGA
XH1	Ceramic DIP	CERDIP
XI1	Flip Chip	FC, FCN, FCW, FCWN
XJ1	Ball Grid Array & Land Grid Array	BGA, CBGA, SBGA, LBGA, eBGA, fBGA, CSP, LGA, CLGA
XK1	Kits, PC Boards, Gerber	900000 to 999999 series
XL1	Ceramic Leadless Chip Carrier	LCC
XM0	Small Quantity Bulk Pack	100000 to 102999 series
XM1	Small Reels of Components	227000 to 230000 series
XN1	Plastic Dual Inline (DIP)	DIP, SDIP
XP1	Plastic Leadless Chip Carrier	PLCC
XQ1	Quad Flat Pack	QFP, BQFP, LQFP, TQFP
XR1	Radial Lead Components	CK, DD, EH, RS, Connector
XS1	SOIC - Small Outline IC	SO, SOL, SOM, SOP, SOX, SOY, SOZ, SOLJ, SOXJ, MSOP, SSOP, TSSOP
XT1	Leaded Transistor	TO
XU1	Leadless Lead Frame Components	SLP, MLF, QFN, MLP, MCC
XV1	-to be defined-	-to be defined-
XW1	-work in progress-	-not for sale-
XX1	-miscellaneous-	-not for sale-
XY1	Tools	HRS, VAMPIRE
XZ1	Packaging Items	TRAY, REEL, TUBE

Look for the Pcode in the TopLine Catalog

DUMMY COMPONENT ORDERING INFORMATION



TopLine™ **Part Numbering System**

Quick Guide - Reference Info

Lead Pitch

mm	Mils known in Industry as:	Inch
0.4mm	15 mils	.0157”
0.5mm	20 mils	.0197”
0.635mm	25 mils	.0250”
0.65mm	25 mils	.0256”
0.8mm	30 mils	.030”
1.0mm	40 mils	.040”
1.27mm	50 mils	.050”
2.54mm	100 mils	.100”

Caustion: 25mils is not accurate description.
Suggest using metric (mm) for clarity.

Packaging Codes

Code	Description
B	Bulk
M	Tube
T	Tray
C	Carrier
F	Bulk Cassette Box
E	Plastic Tape (no reel)
E4A	Plastic Tape, 4” Reel
E7A	Plastic Tape, 7” Reel
E13A	Plastic Tape, 13” Reel
P	Paper Tape (no reel)
P4A	Paper Tape, 4” Reel
P7A	Paper Tape, 7” Reel
P13A	Paper Tape, 13” Reel

Industry Jargon

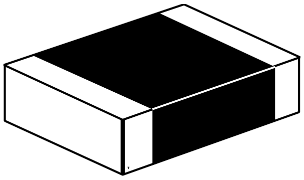
Jargon	Definition
CSP	Chip Scale Package usually refers to small or fine pitch BGA. Often misused term.
Fine-Pitch	Usually means 0.5mm pitch or less
Eutectic	Solder melts and solidifies at the same temperature. Misunderstood term. Often used to mean Sn63/Pb37 solder.
JEDEC	Industry Standard
EIA	USA Industry Association
EIAJ	Japan Industry Association
CAD	Misused term. Often means pick and place coordinates.
Gerber	Software instructions used to make a stencil or a PC board.
Lead Free	Alloy with no Pb material

“Lead Free” Codes (No Pb)

Code	Lead Alloy Material
BGA, CSP & Flip Chip	
C	Sn/Ag/Cu
F	Sn96.5/Au3.5
G	Au Gold
Lead Frame Devices	
B	Sn/97/Bi3.0
C	Sn98/Cu2.0
F	Ni-Pd
T	Sn100
TIN	Sn100

Note: Not all alloys available for every device

Ceramic Chip Capacitor



SC 0805 P 7 A

SERIES
SC = Ceramic Chip Capacitor

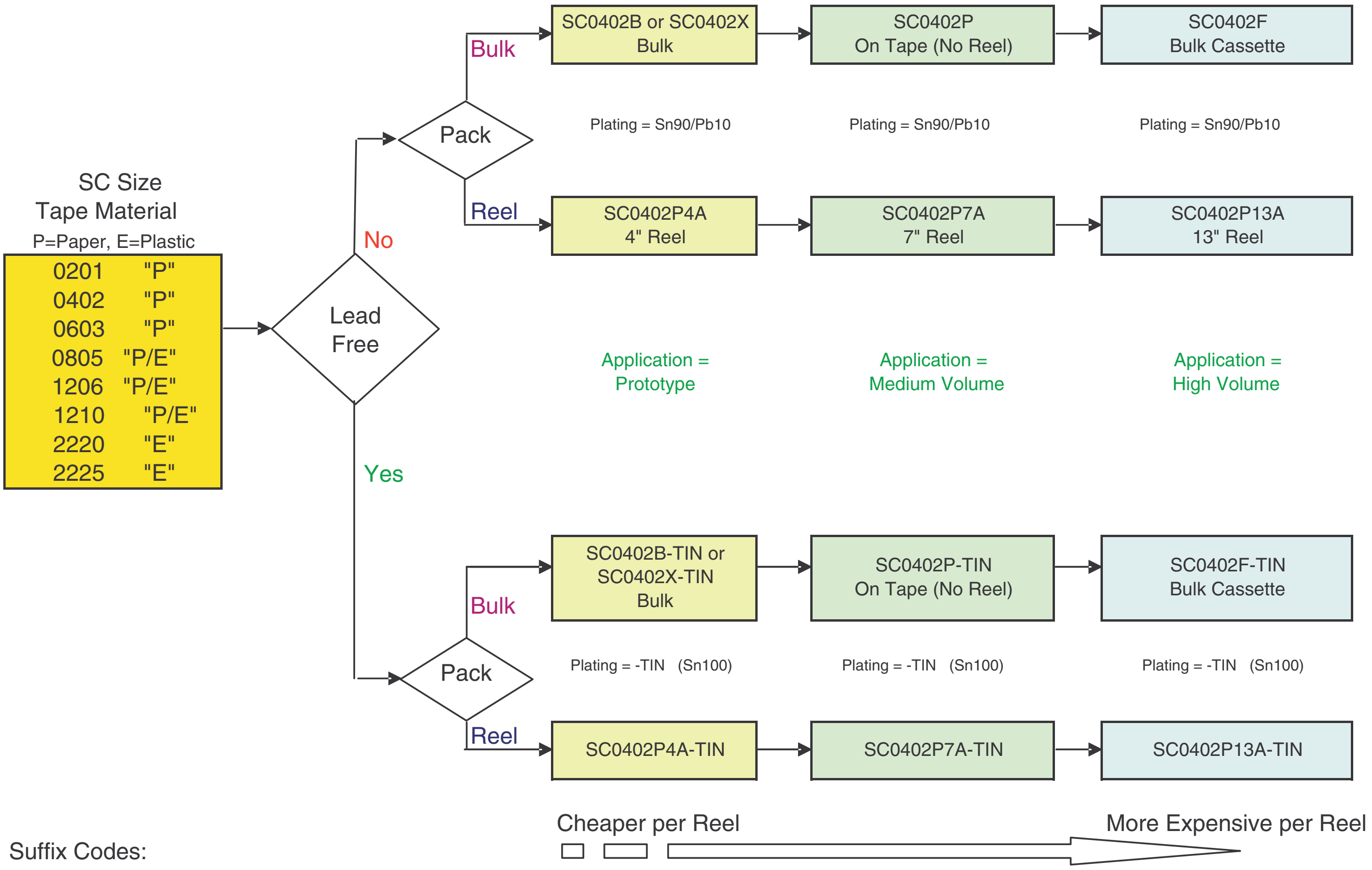
SIZE CODE
INCH DIMENSIONS
0805 = .08” x .05”

REEL SIZE
4 = 4” (100mm)
7 = 7” (180mm)
13 = 13” (330mm)

REEL MATERIAL
A = Plastic
P = Paper

PACKAGING
P = Paper Tape
E = Plastic Tape
F = Bulk Cassette Box
B = Bulk Bag
X = Small Qty. Pack

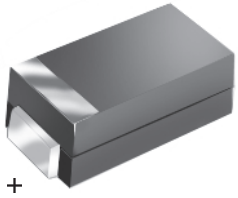
Substituting Chip Capacitors “SC” Series



SC Size	Tape Material
0201	"P"
0402	"P"
0603	"P"
0805	"P/E"
1206	"P/E"
1210	"P/E"
2220	"E"
2225	"E"

Suffix Codes:
Lead Free Plating: "TIN" = Sn100
Pack: "B" = Bulk (unspecified pack), "X" = mini Pack Bags, "F" = Bulk Cassette
Paper Tape: P4A = 4" Mini Reel(special), P7A = 7" Reel, P13A = 13" Reels
Plastic Tape: E4A = 4" Mini Reel (special), E7A = 7" Reel, E13A = 13" Reels
On Tape (No Reel) "E" = Plastic Tape or "P" = Paper Tape

Tantalum Capacitor



SD 3216 E 7 A

SERIES

SD = Tantalum Capacitor

SIZE CODE

METRIC DIMENSIONS

A = 3216 = 3.2mm x 1.6mm
B = 3528 = 3.5mm x 2.8mm
C = 6032 = 6.0mm x 3.2mm
D = 7343 = 7.3mm x 4.3mm

PACKAGING

E = Plastic Tape
B = Bulk Bag
X = Small Qty. Pack

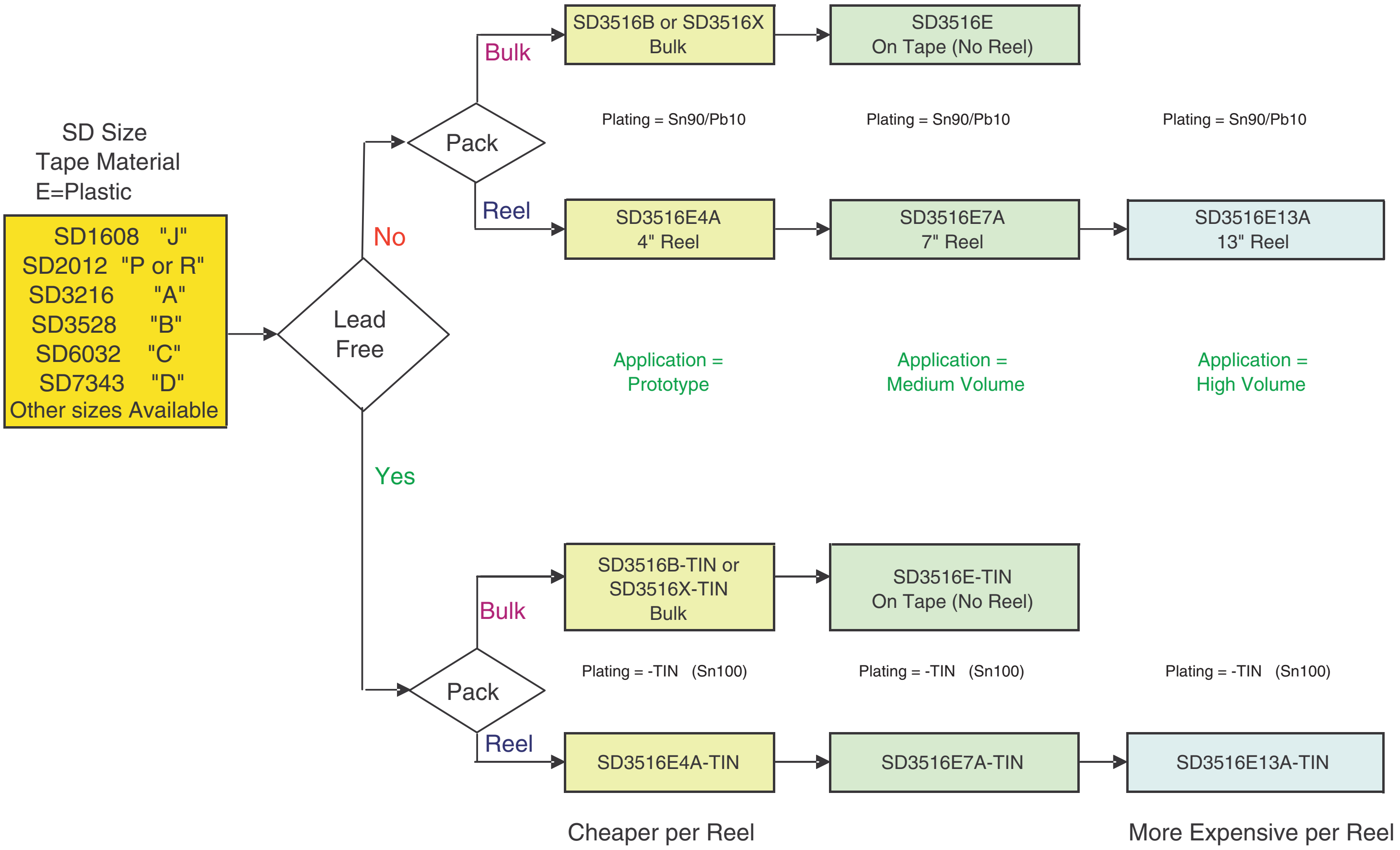
REEL SIZE

4 = 4” (100mm)
7 = 7” (180mm)
13 = 13” (330mm)

REEL MATERIAL

A = Plastic

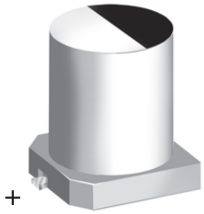
Substituting Tantalum Capacitors "SD Series"



Suffix Codes:
Lead Free Plating: "TIN" = Sn100
Pack: "B" = Bulk (unspecified pack), "X" = mini Pack Bags

Plastic Tape: E4A = 4" Mini Reel (special), E7A = 7" Reel, E13A = 13" Reels
On Tape (No Reel) "E" = Plastic Tape

Aluminum Capacitor



SE 6 E 13 A

Passives

SE = Ceramic Capacitor

Size Code

Metric Dimensions (diameter)

6 = 6.3mm

Reel Size

7 = 7” (180mm)
13 = 13” (330mm)
15 = 15” (380mm)

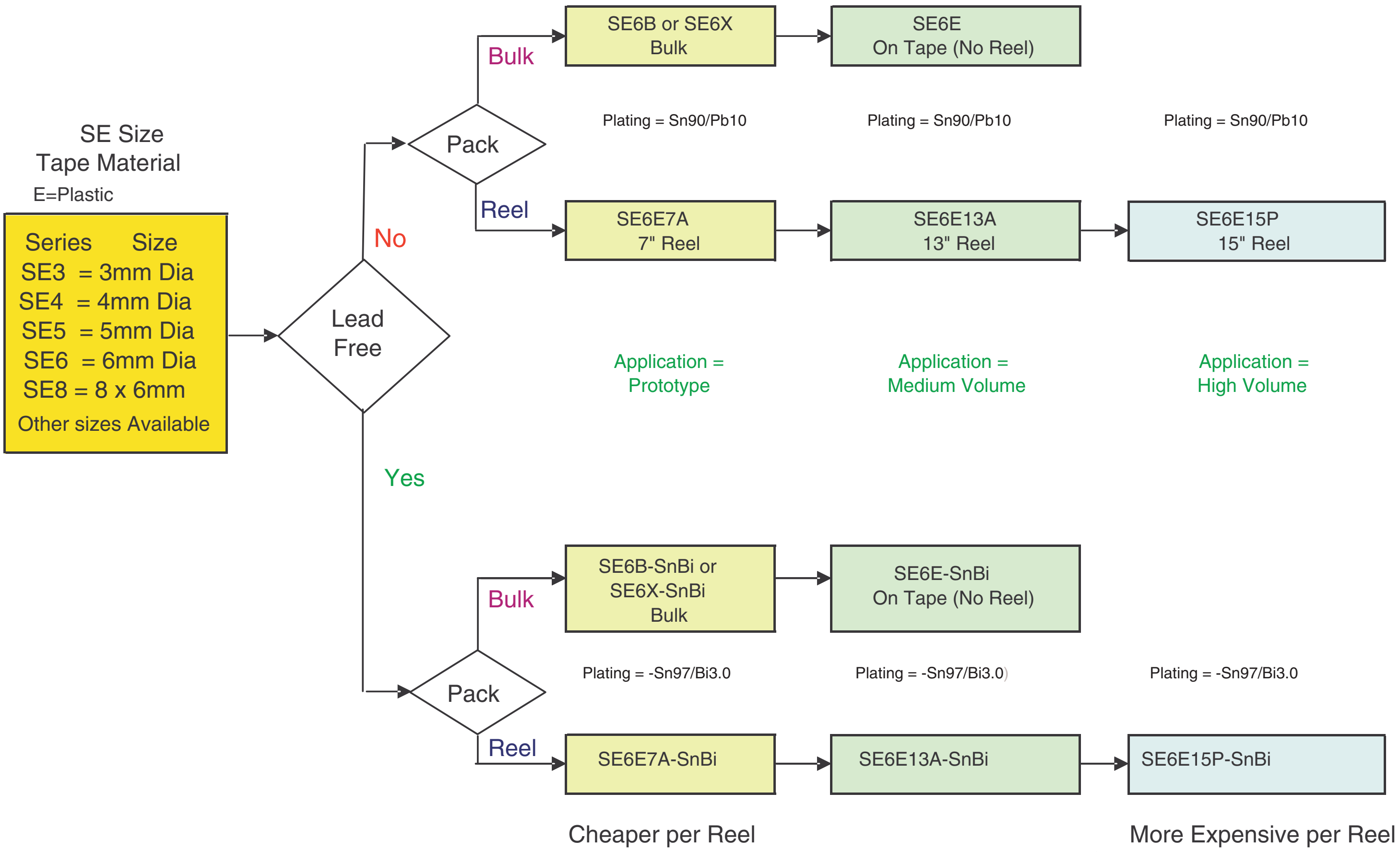
Reel Material

A = Plastic
P = Paper

Packaging

E = Plastic Tape
B = Bulk Bag
X = Small Qty. Pack

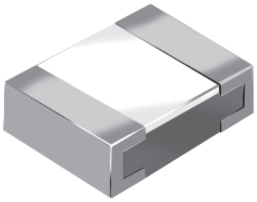
Substituting Aluminum Capacitors “SE” Series



Suffix Codes:
Lead Free Plating: "SnBi" = Sn97/Bi3.0
Pack: "B" = Bulk (unspecified pack), "X" = mini Pack Bags

Plastic Tape: E7A = 7" Small Reel (special), E13A = 13" Reel, E15P = 15" Reels
On Tape (No Reel) "E" = Plastic Tape

Chip Resistor



SR 0805 P 7 A

PASSIVES
SR = Chip Resistors

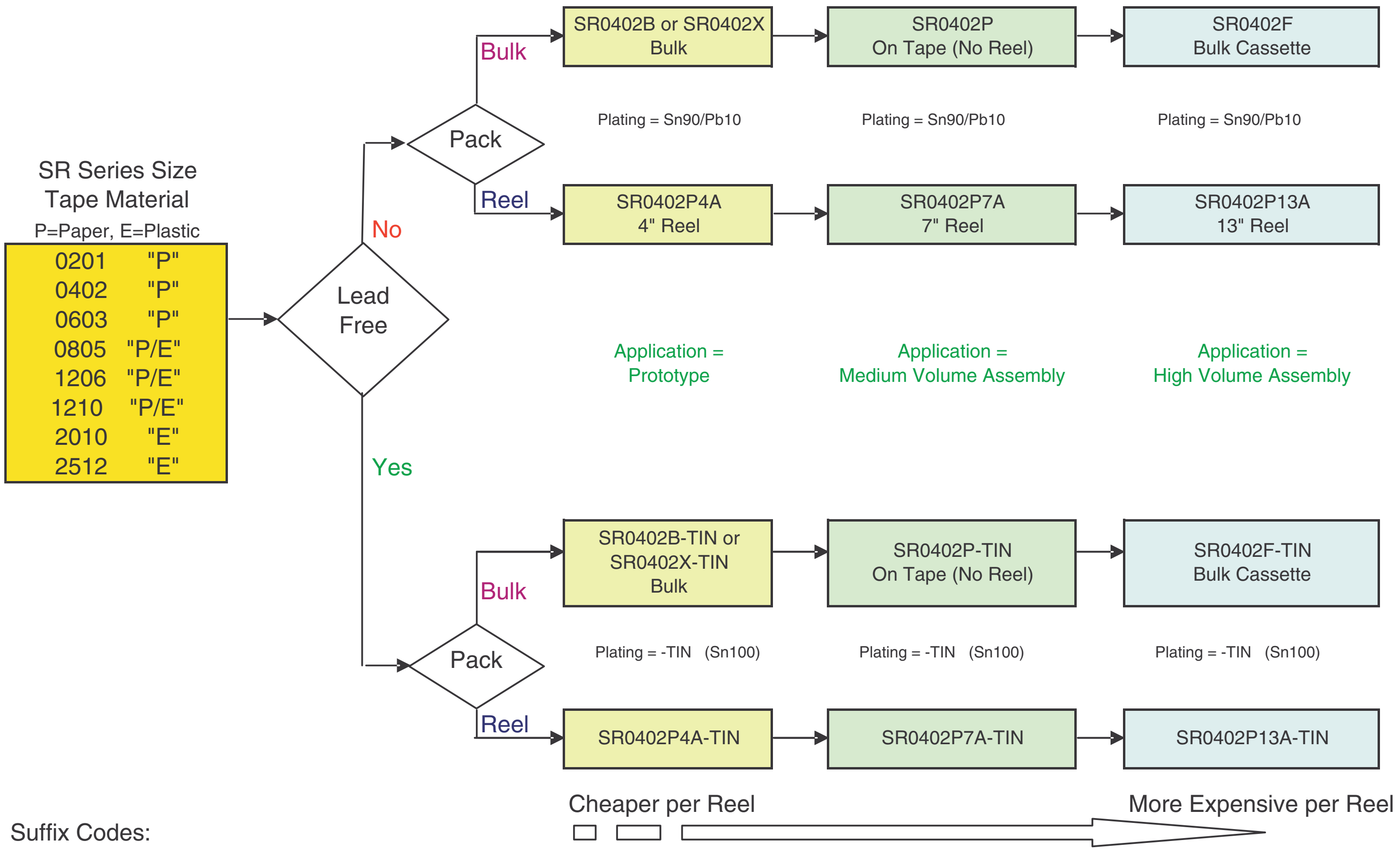
SIZE CODE
INCH DIMENSIONS
0805 = .08" x .05"

REEL SIZE
4 = 4" (100mm)
7 = 7" (180mm)
13 = 13" (330mm)

REEL MATERIAL
A = Plastic
P = Paper

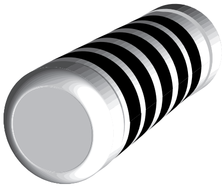
PACKAGING
P = Paper Tape
E = Plastic Tape
F = Bulk Cassette Box
B = Bulk Bag
X = Small Qty. Pack

Substituting Chip Resistors "SR" Series



Suffix Codes:
Lead Free Plating: "TIN" = Sn100
Pack: "B" = Bulk (unspecified pack), "X" = mini Pack Bags, "F" = Bulk Cassette
Paper Tape: P4A = 4" Mini Reel (special), P7A = 7" Reel, P13A = 13" Reels
Plastic Tape: E4A = 4" Mini Reel (special), E7A = 7" Reel, E13A = 13" Reels,
On Tape (No Reel) "E" = Plastic Tape or "P" = Paper Tape
-ZERO = Zero Ohm Resistors

MELF Resistor



SRM 0805 E 7 A

Passives
SRM = Melf Resistors

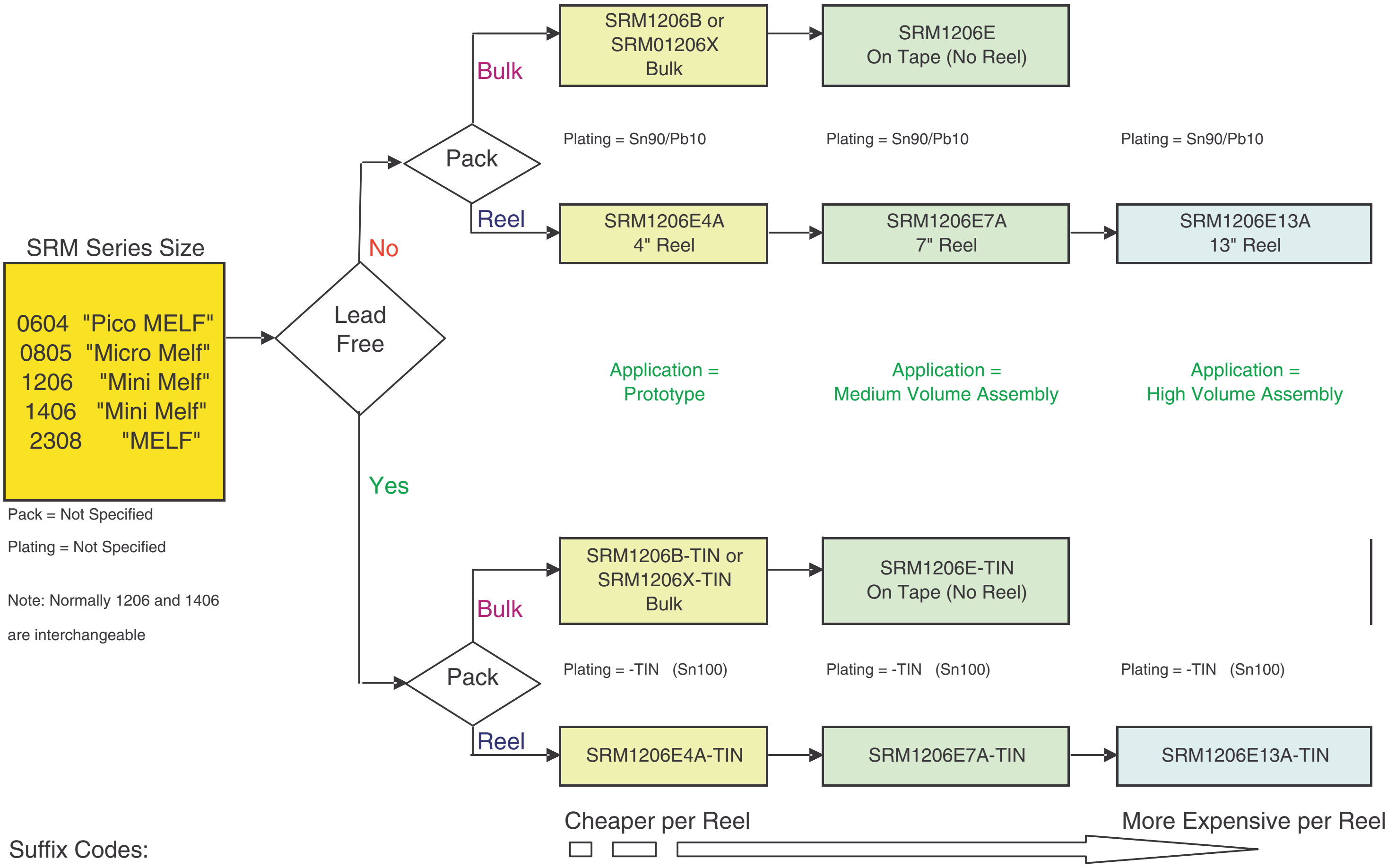
Size Code
Inch Dimensions
0805 = .08” x .05”

Reel Size
4 = 4” (100mm)
7 = 7” (180mm)
13 = 13” (330mm)

Reel Material
A = Plastic
P = Paper

Packaging
E = Plastic Tape
B = Bulk Bag
X = Small Qty. Pack

Substituting Melf Resistors “SRM” Series



Pack = Not Specified

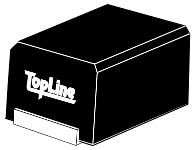
Plating = Not Specified

Note: Normally 1206 and 1406 are interchangeable

Suffix Codes:
Lead Free Plating: "TIN" = Sn100
Pack: "B" = Bulk (unspecified pack), "X" = mini Pack Bags
Plastic Tape: E13A = 13" Reels, E7A = 7" Reel, E4A = 4" Mini Reel (special)
"E" = On Plastic Tape. No Reel
-ZERO = Zero Ohm Resistors

Part Numbering System

Chip Inductor


Molded Case


Multilayer Inductor

SI 1812 E 7 A

Passives
SI = Inductor

Size Code
Inch Dimensions
1812 = .18” x .12”

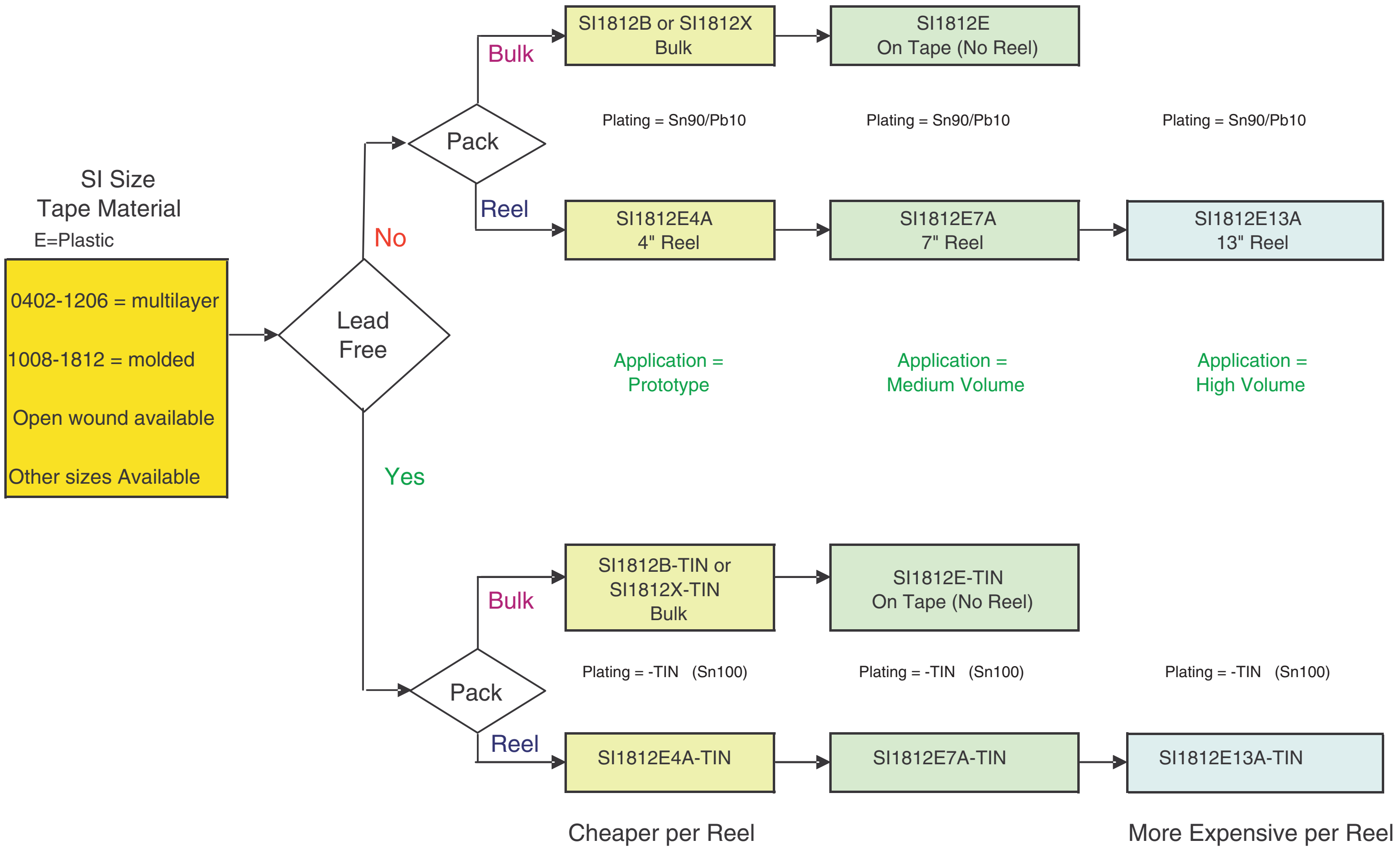
Packaging
E = Plastic Tape
B = Bulk Bag
X = Small Qty. Pack

Reel Size
4 = 4” (100mm)
7 = 7” (180mm)
13 = 13” (330mm)

Reel Material
A = Plastic

TopLine™ **Part Numbering System**

Substituting Inductors “SI” Series

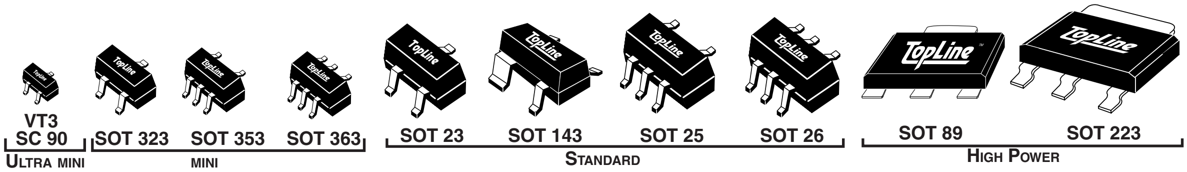


Suffix Codes:
Lead Free Plating: "TIN" = Sn100
Pack: "B" = Bulk (unspecified pack), "X" = mini Pack Bags

Plastic Tape: E4A = 4" Mini Reel (special), E7A = 7" Reel, E13A = 13" Reels
On Tape (No Reel) "E" = Plastic Tape

TopLine™ **Part Numbering System**

SOT Transistor



SOT 23 E 7 A

DISCRETE DEVICE
SOT=Small Outline Transistor
SC = Japan Series

BODY CODE
Refer to drawings
for outline dimensions

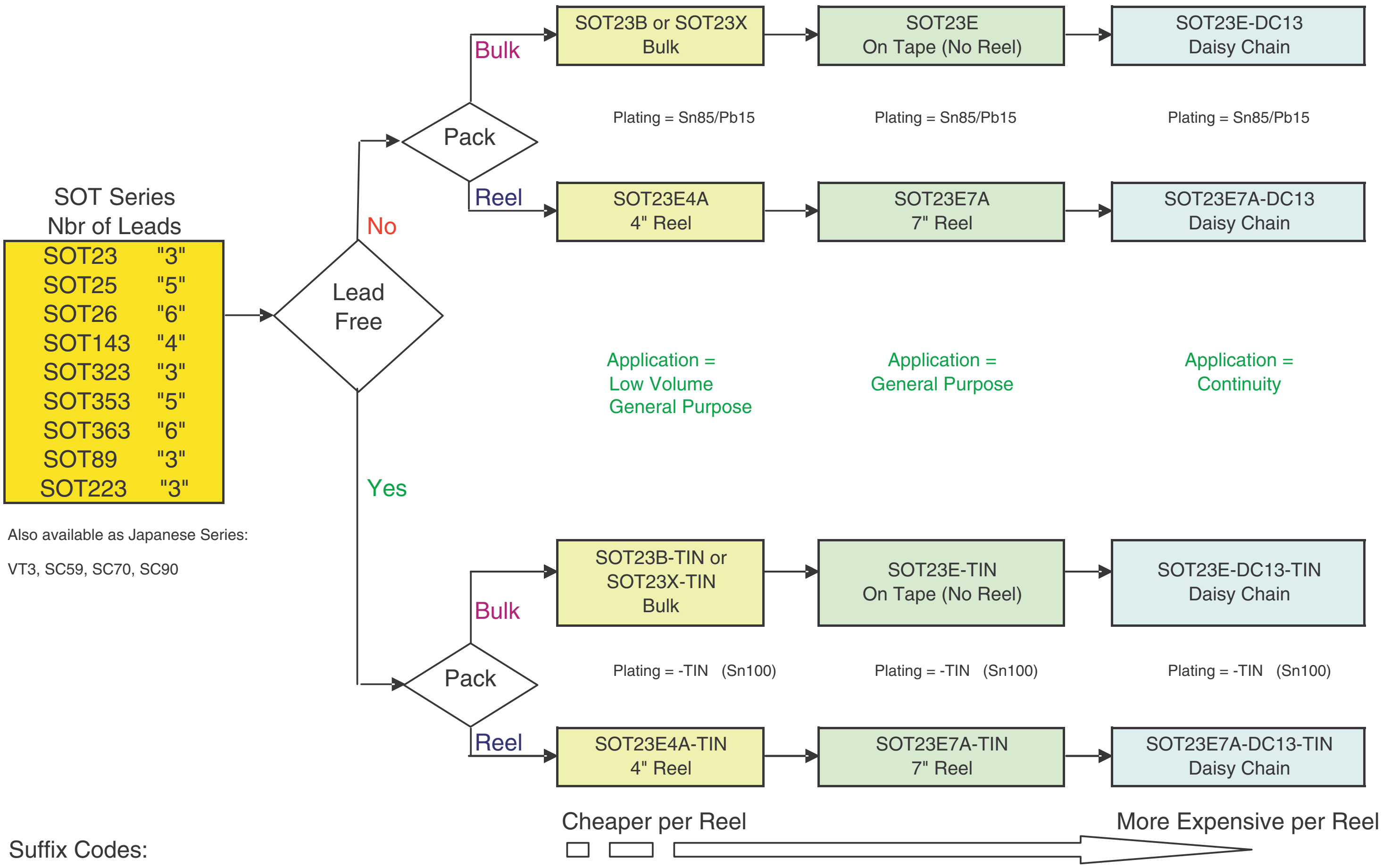
REEL SIZE
4 = 4” (100mm)
7 = 7” (180mm)
13 = 13” (330mm)

REEL MATERIAL
A = Plastic

PACKAGING
E = Plastic Tape
B = Bulk Bag
X = Small Qty. Pack

TopLine™ **Part Numbering System**

Substituting “SOT Series

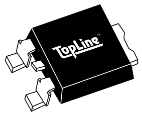


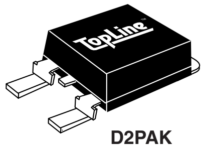
Also available as Japanese Series:

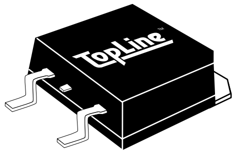
VT3, SC59, SC70, SC90

Suffix Codes:
Lead Free Plating: "TIN" = Sn100
Pack: "B" = Bulk (unspecified pack), "X" = mini Pack Bags
Plastic Tape: E4A = 4" Mini Reel (special), E7A = 7" Reel, E13A = 13" Reels
"E" = On Plastic Tape. No Reel
Daisy Chain: DC13, DC23, etc. See drawing for details

DPAK Power Transistor


DPAK


D2PAK


D3PAK

D2PAK 5 E 13 A

DISCRETE DEVICE
DPAK (small)
D2PAK (medium)
D3PAK (large)
SC = Japan Series

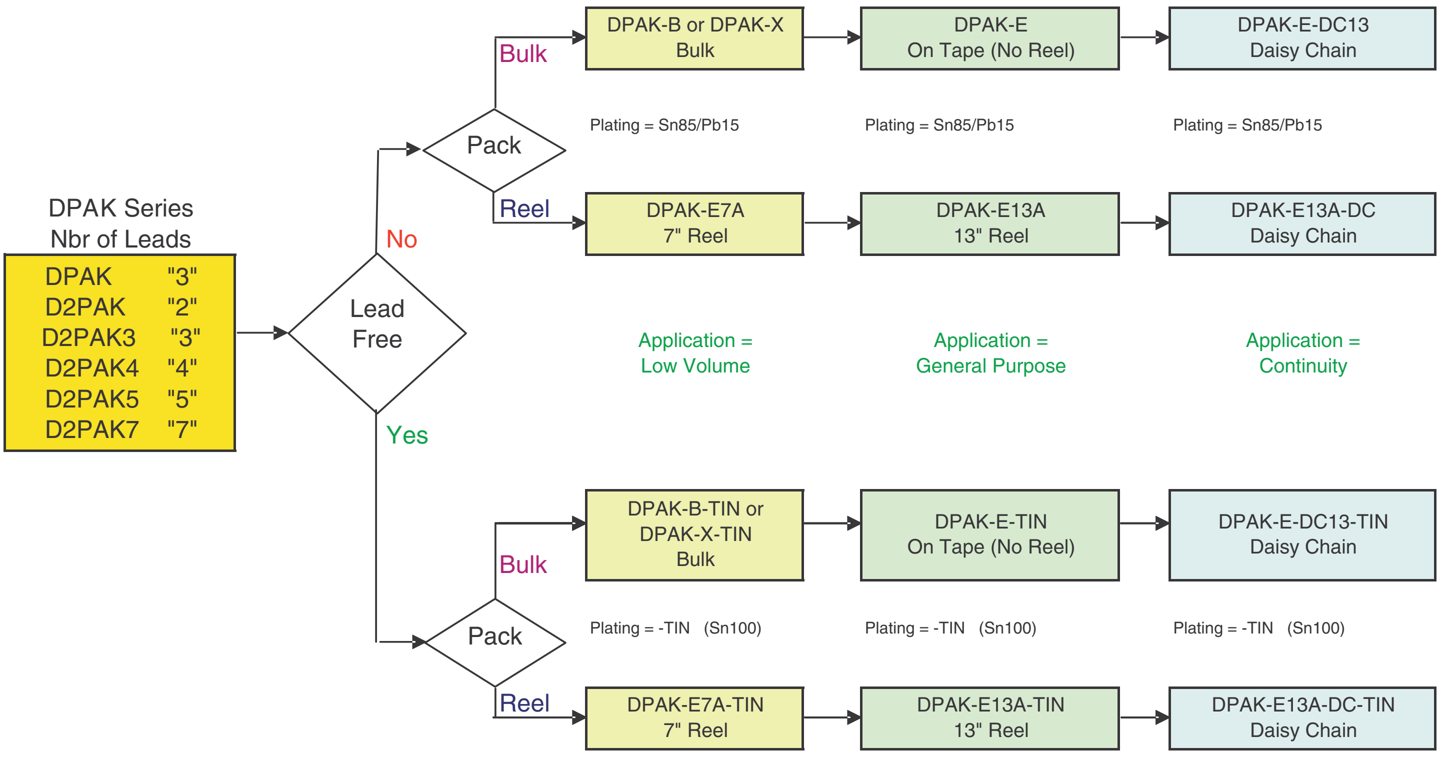
NUMBER OF LEADS

REEL SIZE
4 = 4” (100mm)
7 = 7” (180mm)
13 = 13” (330mm)

REEL MATERIAL
A = Plastic

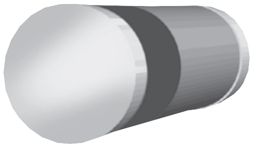
PACKAGING
E = Plastic Tape
B = Bulk Bag
X = Small Qty. Pack

Substituting "DPAK" Series



Suffix Codes:
Lead Free Plating: "TIN" = Sn100
Pack: "B" = Bulk (unspecified pack), "X" = mini Pack Bags
Plastic Tape: E4A = 4" Mini Reel (special), E7A = 7" Reel (Special), E13A = 13" Reels
"E" = On Plastic Tape. No Reel
DC = Daisy Chain: See drawing for details

MELF Diode



SOD 80 E 7 A

DISCRETE DEVICE
SOD = Small Outline Diode
SM = Standard Melf

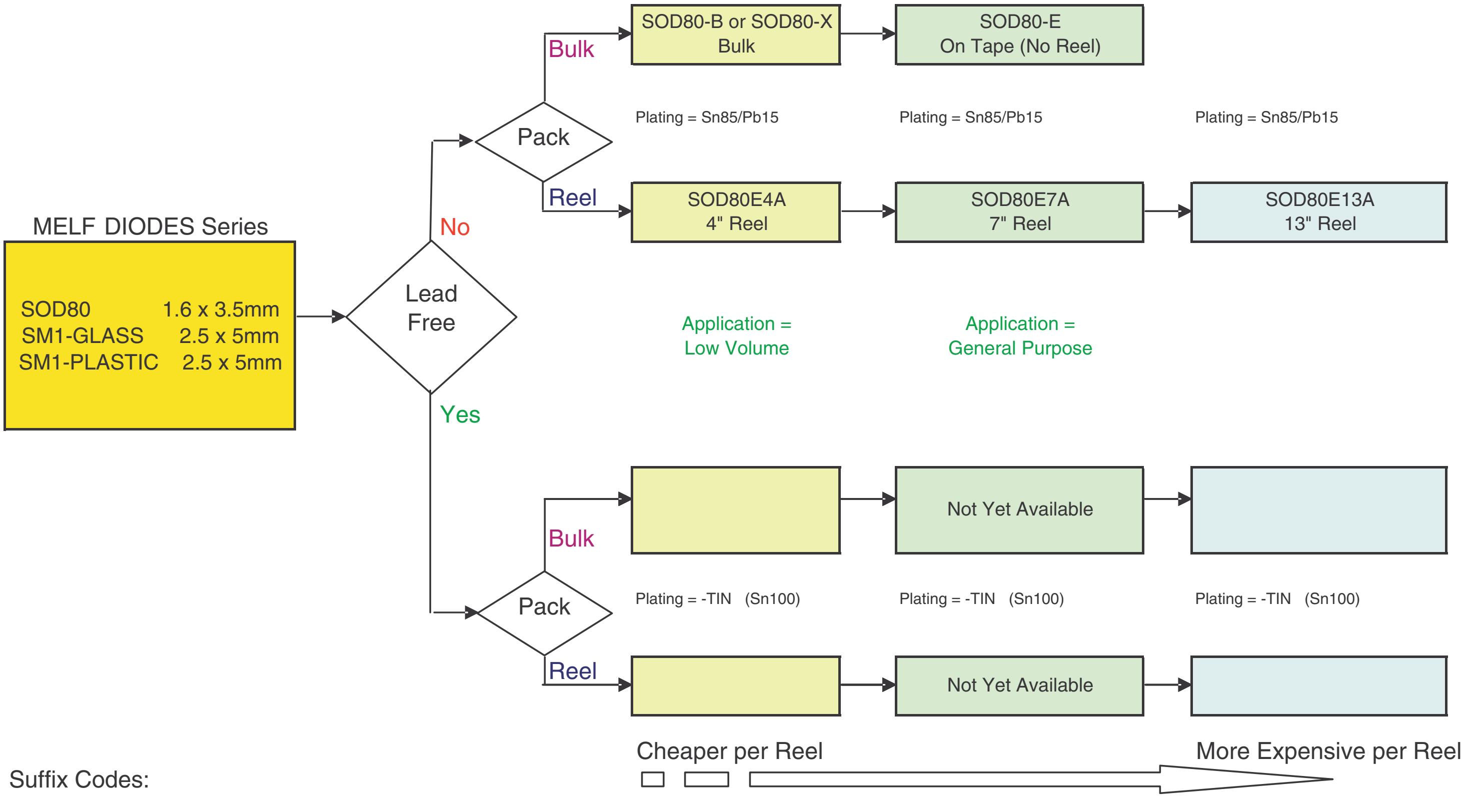
BODY CODE
Refer to drawings for dimensions

REEL SIZE
4 = 4” (100mm)
7 = 7” (180mm)
13 = 13” (330mm)

REEL MATERIAL
A = Plastic

PACKAGING
E = Plastic Tape
B = Bulk Bag
X = Small Qty. Pack

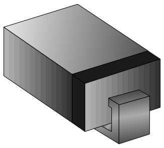
Substituting “MELF” Diodes



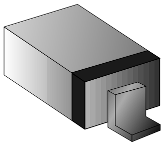
Suffix Codes:
Lead Free Plating: "TIN" = Sn100
Pack: "B" = Bulk (unspecified pack), "X" = mini Pack Bags
Plastic Tape: E4A = 4" Mini Reel (special), E7A = 7" Reel, E13A = 13" Reels
"E" = On Plastic Tape. No Reel

Note: SM1-GLASS = Glass Body SM1-PLASTIC = Epoxy Molded Body
Normally, Glass or Plastic bodies can be substituted for one another.

Rectangular Diode (Rectifier)



C-Bend
Lead



Gull-Wing
Lead

SOD 123 E 7 A

Discrete Device
SOD = Small Outline Diode
SC = Japan Series
SMAJ = J-lead
SMAG = Gull Wing
FM1 = SMAJ

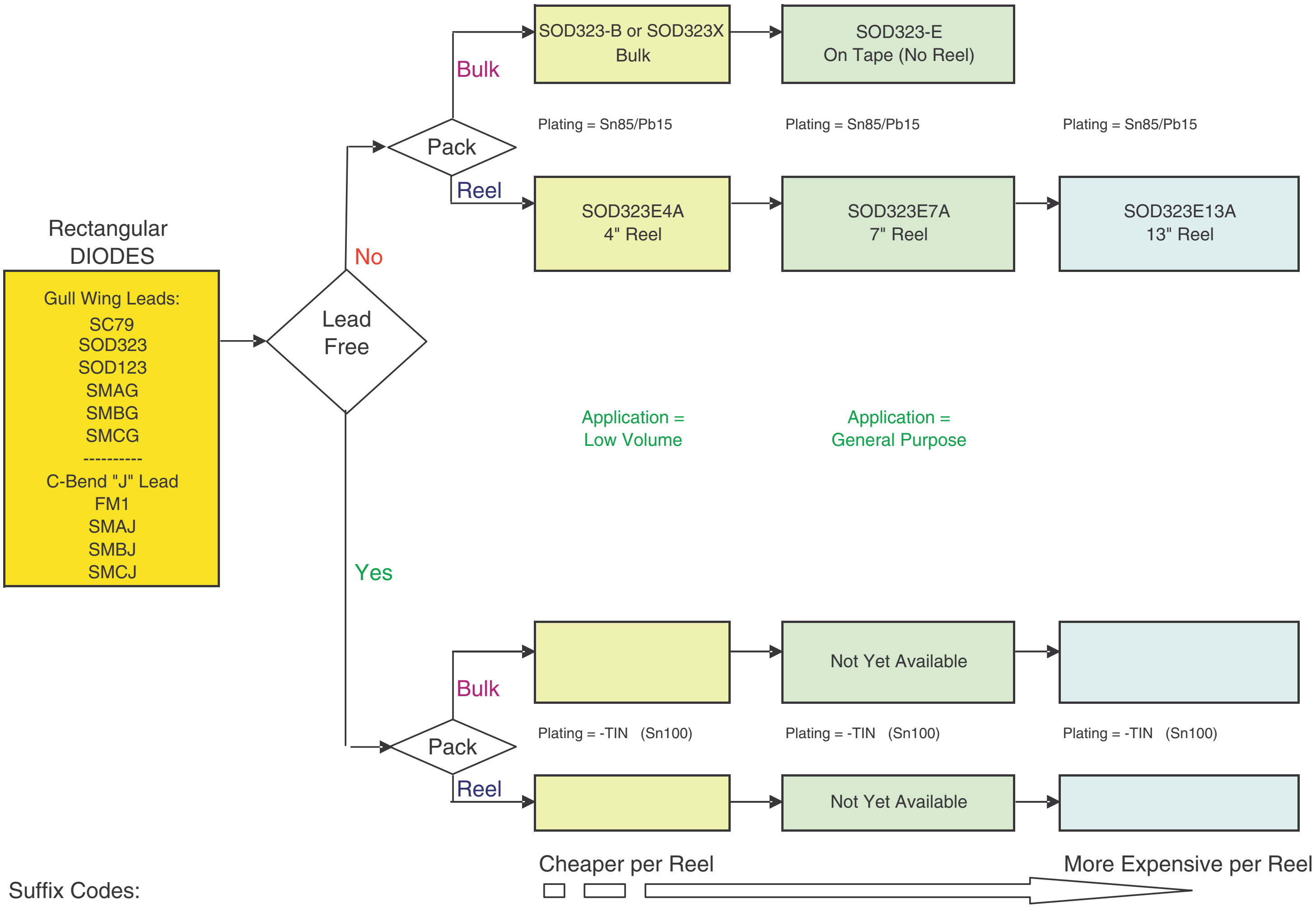
Body Code
Refer to drawings
for dimensions

Reel Size
4 = 4” (100mm)
7 = 7” (180mm)
13 = 13” (330mm)

Reel Material
A = Plastic

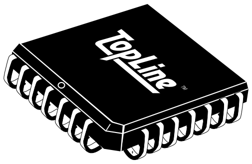
Packaging
E = Plastic Tape
B = Bulk Bag
X = Small Qty. Pack

Substituting “Rectangular” Diodes



Suffix Codes:
"E" = On Plastic Tape. No Reel
Pack: "B" = Bulk (unspecified pack), "X" = mini Pack Bags
Plastic Tape: E4A = 4" Mini Reel (special), E7A = 7" Reel, E13A = 13" Reels

PLCC



PLCC 68 M Lead Plating - Option

DEVICE

NUMBER LEADS

PACKAGING

M = Tubes
E7A = 7” Tape & Reel
E13A = 13” Tape & Reel
X = Single Pack

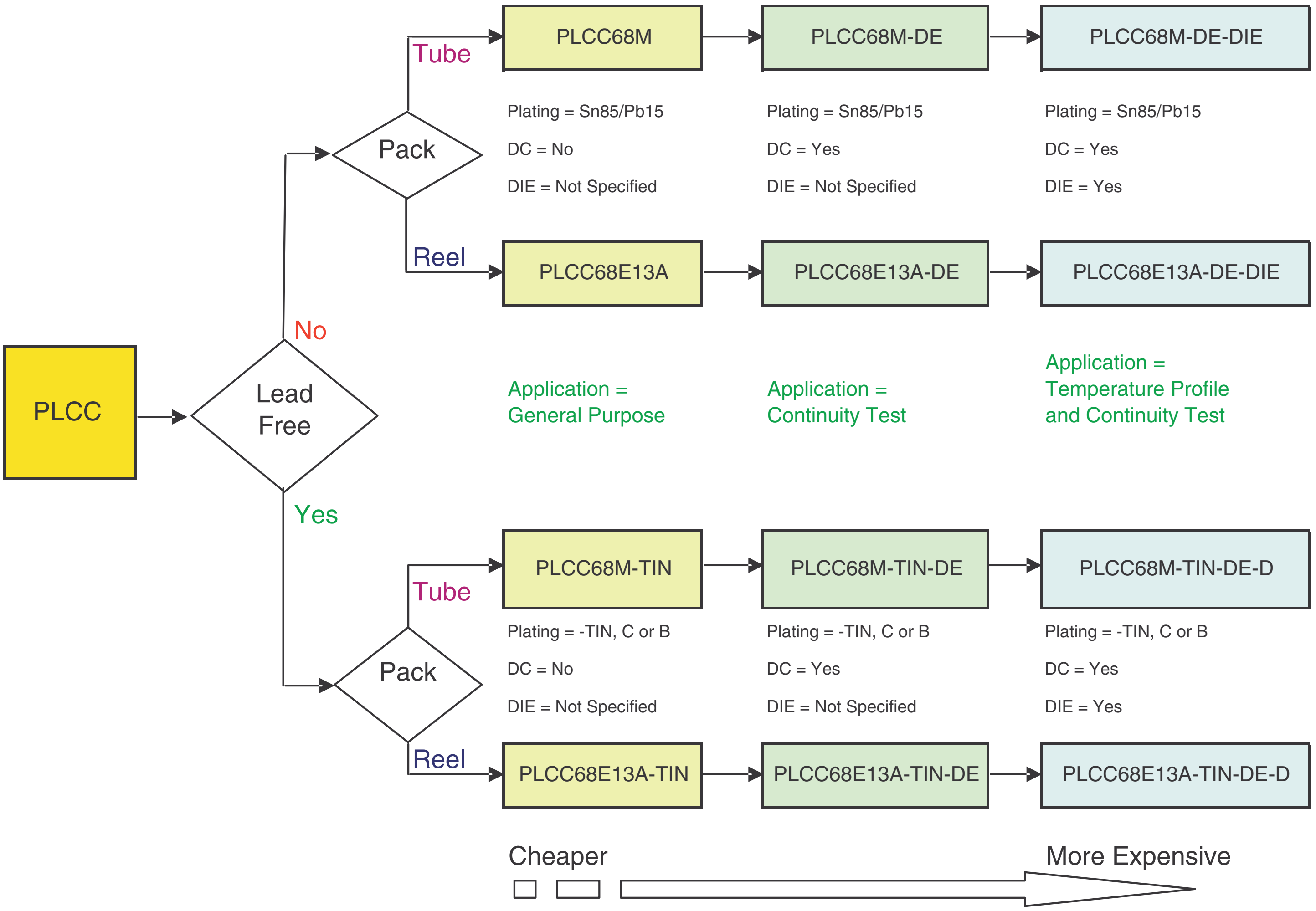
LEAD PLATING

Blank = Sn85/Pb15
TIN = Sn100
B = Sn97/Bi3.0
C = Sn98/Cu2.0

OPTION

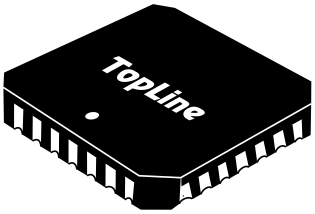
Blank = unspecified
DE = Daisy Chain Even
ISO =Isolated
Die or D = Die

Substituting PLCC



Suffix Codes:
"DIE" is sometimes abbreviated to "D".
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc)
"ISO" = Isolated internal connections. "BUS" = All Leads Internally Connected
Lead Free Plating: "TIN" = Sn100, B = Sn97/Bi3.0 C = Sn98/Cu2.0
Pack: "M" = Tubes, E13A = 13" Reels, E7A = 7" Reel, "X" = mini Pack Bags

LCC
Ceramic Leadless Chip Carrier



LCC 44 B 50 R .28 x .35 - Options

SERIES
LCC = Leadless Chip Carrier

NUMBER LEADS

PACKAGING
B = Bulk
M = Tubes
T = Trays

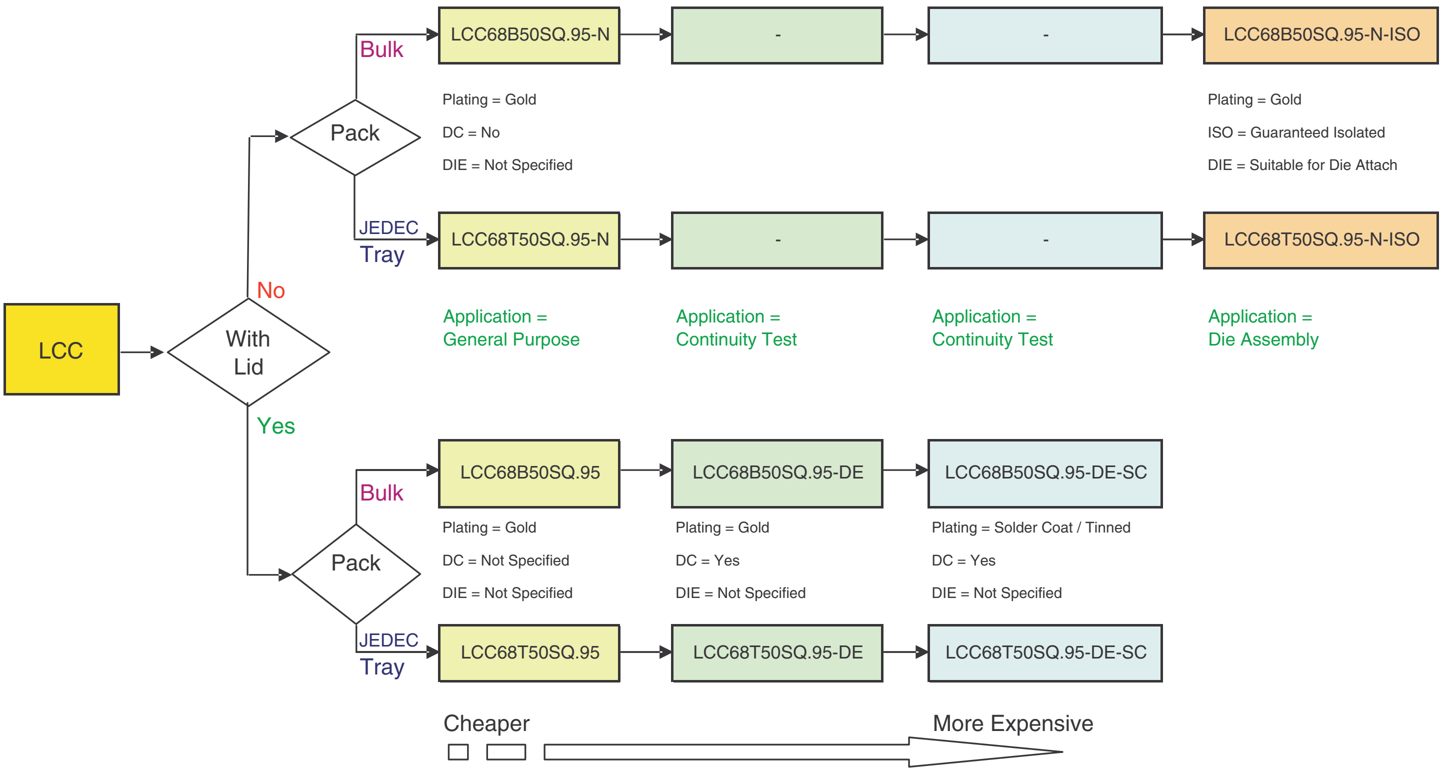
LEAD PITCH
50 = 50 MILS

CASE SHAPE
SQ = Square
R = Rectangular

CASE SIZE
In Inches

OPTIONS
Blank = Gold Leads with Lid
N = No Lid
SC = Soldered Castellations
DE = Daisy Chain Even
ISO = Isolated pins

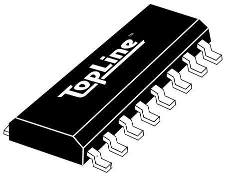
Substituting LCC



Suffix Codes:
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc) "ISO"= Isolated connections
Plating: Blank = Gold SC = Solder Coated
Pack: "M" = Tubes, B = Bulk or Vacuum formed Trays T = JEDEC MatrixTrays

SOIC

Small Outline Circuit - Gull Wing Leads



SOL 16 M Lead Plating - Option

DEVICE

SERIES	BODY WIDTH MILS	 MM
SO	150	3.9mm
SOL	300	7.5mm
SOM	220	5.6mm
SOP	208	5.3mm
SOW	330~350	8.4~8.9mm
SOX	400	10.0mm
SOY	450	11.4mm
SOZ	525	13.3mm

Pitch = 50 mil (1.27mm) Standard

NUMBER LEADS

PACKAGING

M = Tubes
E4A = 4" Tape & Reel
E7A = 7" Tape & Reel
E13A = 13" Tape & Reel
X = Small Qty.

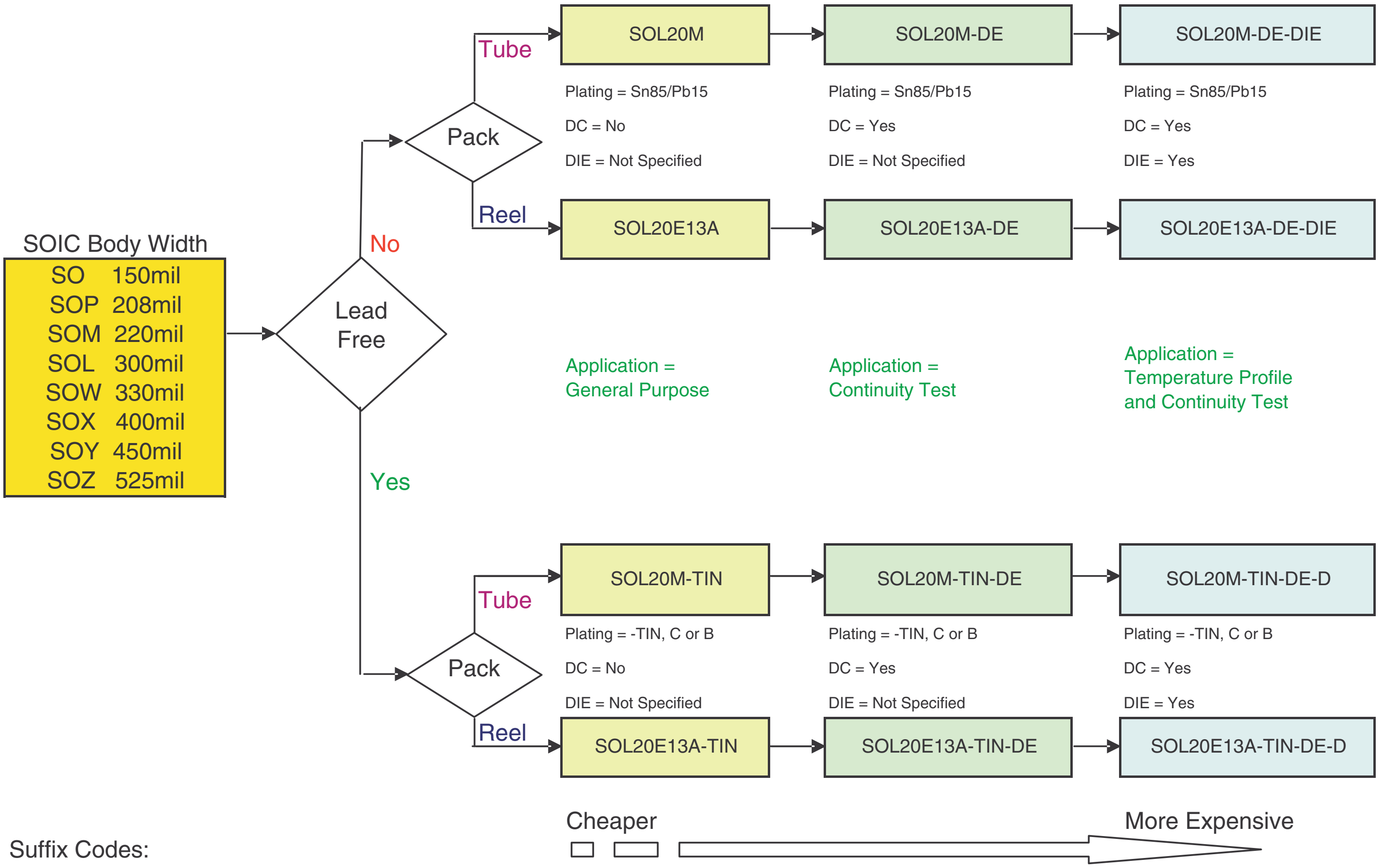
LEAD PLATING

Blank = Sn85/Pb 15
TIN = Sn100
B = Sn97/Bi3.0
C = Sn98/Cu2.0

OPTION

Blank = unspecified
DE = Daisy Chain Even
ISO = Isolated

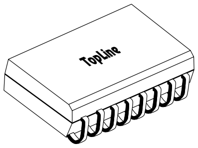
Substituting SOIC



Suffix Codes:
"DIE" is sometimes abbreviated to "D".
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc) "ISO"= Isoloated connections "BUS" = All Leads Connected.
Lead Free Plating: "TIN" = Sn100, B = Sn97/Bi3.0 C = Sn98/Cu2.0
Pack: "M" = Tubes, E13A = 13" Reels, E7A = 7" Reel (special), "X" = mini Pack Bags
Pitch in mils: Always 50mils (1.27mm). No code necessary.

SOJ

Small Outline J-Lead



SOLJ 28 M Lead Plating - Option

DEVICE

NUMBER LEADS

	BODY WIDTH	
SERIES	**MILS**	**MM**
SOLJ	300	7.5mm
SOXJ	400	10mm

Pitch = 50 mil (1.27mm) Standard

PACKAGING

M = Tubes
E4A = 4” Tape & Reel
E7A = 7” Tape & Reel
E13A = 13” Tape & Reel
X = Single Pack

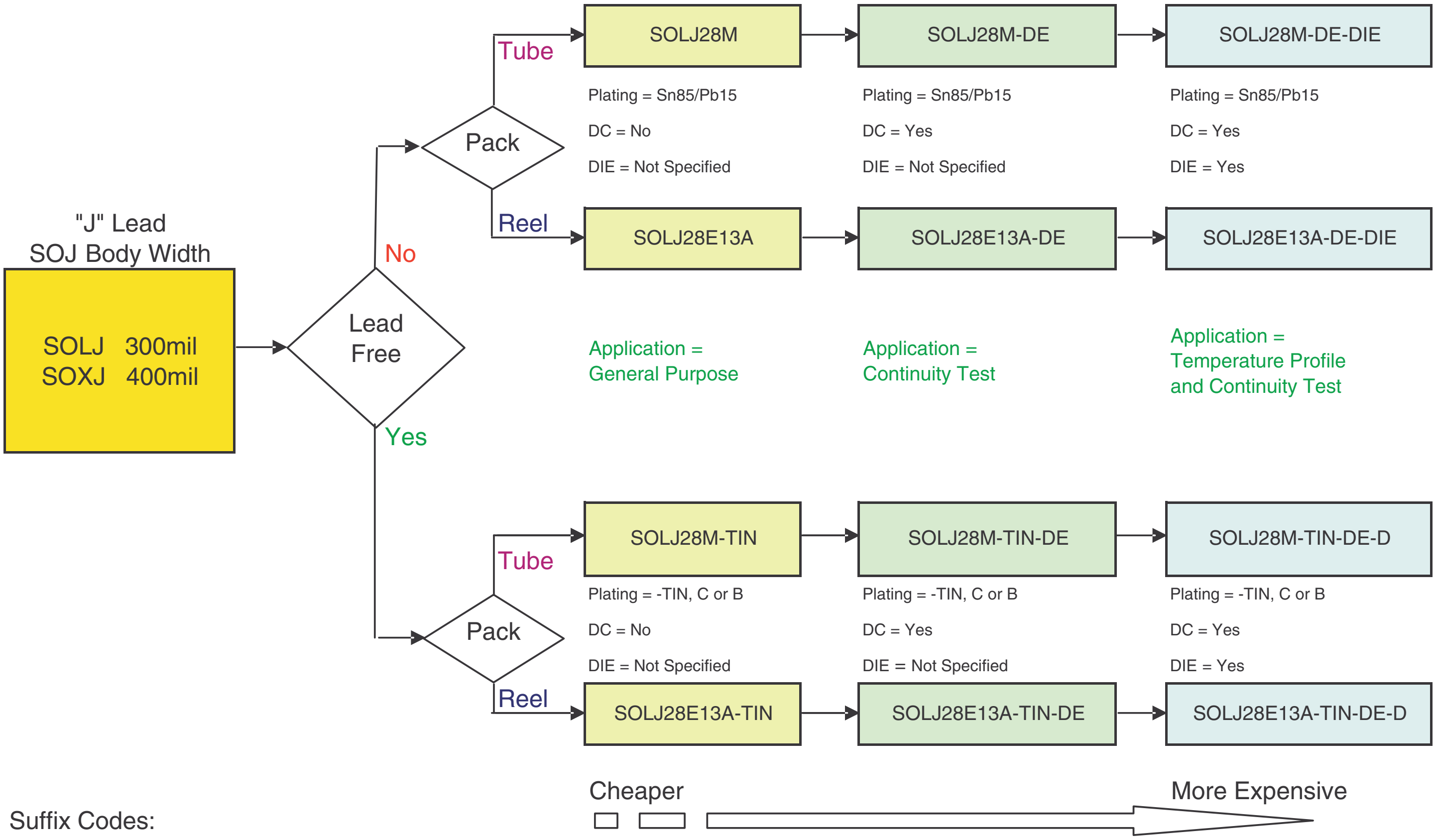
LEAD PLATING

Blank = Sn85/Pb 15
TIN = Sn100
B = Sn97/Bi3.0
C = Sn98/Cu2.0

OPTION

Blank = unspecified
DE = Daisy Chain Even
ISO = Isolated
D = Die

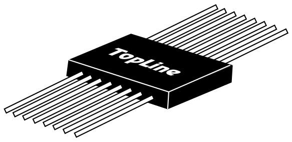
Substituting SOJ



Suffix Codes:
"DIE" is sometimes abbreviated to "D".
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc) "ISO"= Isoloated connections "BUS" = All Leads Connected.
Lead Free Plating: "TIN" = Sn100, B = Sn97/Bi3.0 C = Sn98/Cu2.0
Pack: "M" = Tubes, E13A = 13" Reels, E7A = 7" Reel (special), "X" = mini Pack Bags
Pitch in mils: Always 50mils (1.27mm). No code necessary.

Part Numbering System

Flat Packs



FP 16 C 50 R .27 x .40 B - Options

SERIES
FP = Flat Pack

NUMBER LEADS

PACKAGING
T = Tray
C = Carrier
F = Tie Bar

LEAD PITCH
50 = 50 MILS

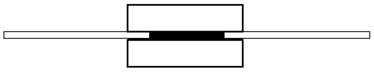
CASE SHAPE
SQ = Square
R = Rectangular

CASE SIZE
In Inches

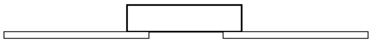
LEAD LOCATIONS
T = Top Braze
S = Sandwitch
B = Bottom Braze

LID OPTIONS
Blank = With Lid, Gold Lead
N = No Lid, Gold Lead
SC = Solder Coated Leads
DE = Daisy Chain, Gold Lead

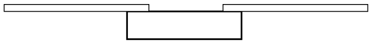
LEAD LOCATIONS



Side/Sandwich
Code S

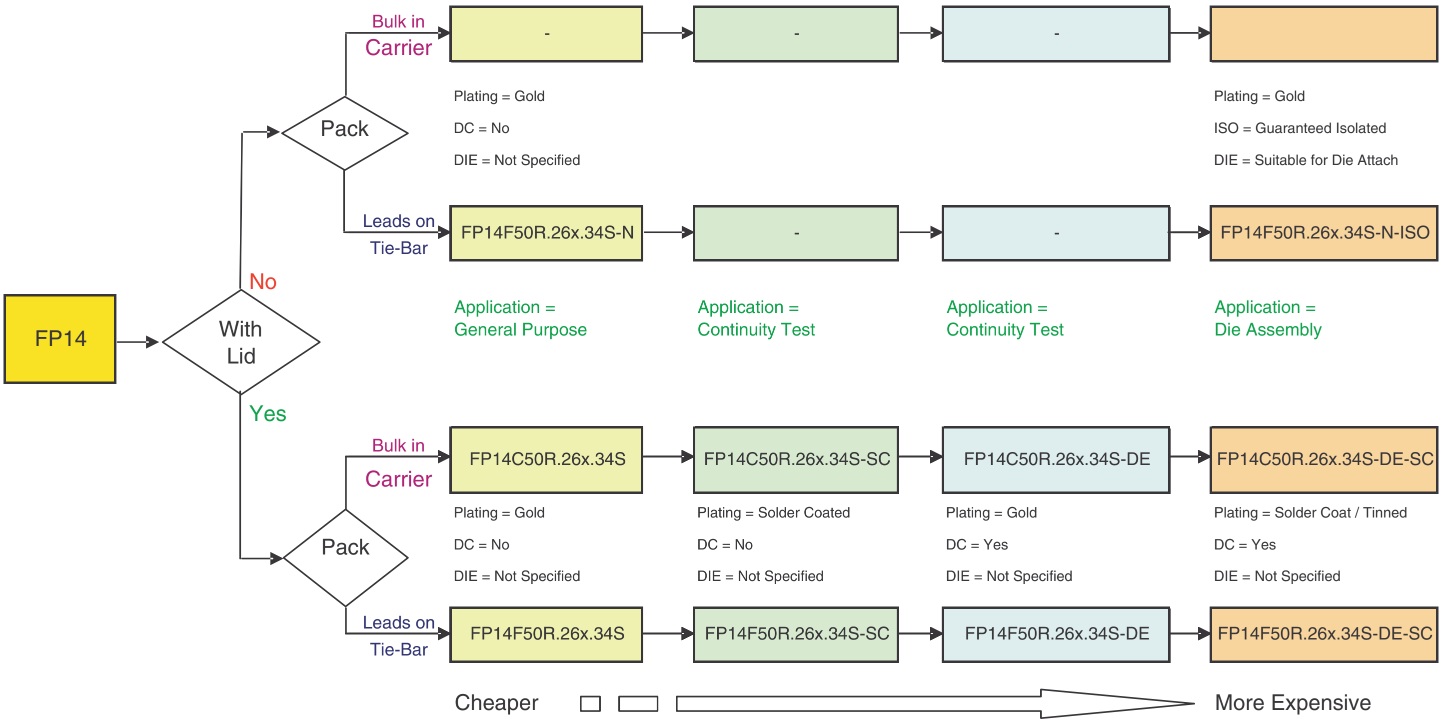


Bottom Brazed
Code B



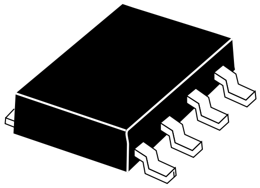
Top Brazed
Code T

Substituting “FP” Flat Pack



Suffix Codes:
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc) "ISO"= Isolated connections
Plating: Blank = Gold SC = Solder Coated or Tinned Sn63 Solder
Pack: "C" = Trimmed Leads in Plastic Carrier "F" = Leads on Tie-Bar. Must be trimmed and formed prior to assembly.
Lead Location: "S"= Side Brazed / Sandwich "T"= Top Brazed "B" = Bottom Brazed

MSOP



MSOP 8 M Lead Plating - Option

DEVICE

LEADS	**PITCH**
8 lead	0.65mm
10 lead	0.5mm

NUMBER LEADS

PACKAGING

M = Tubes
E4A = 4” Reel
E7A = 7” Reel
X = Small Pack
E = Carrier (No Reel)

LEAD PLATING

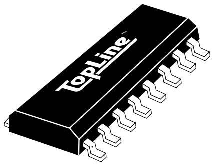
Blank = Sn85/Pb15
TIN = Sn100

OPTION

Blank = unspecified
DE = Daisy Chain Even
ISO = Isolated
D = Die

(Temporary Blank Page)

SSOP



SSOP 16 M Pitch Lead Plating - Option

DEVICE

NUMBER LEADS

	BODY WIDTH	
SERIES	MILS	MM
QSOP	150	4.0mm
SSOP	208	5.3mm
SSOP	300	7.5mm

PACKAGING

M = Tubes
E4A = 4” Tape & Reel
E7A = 7” Tape & Reel
E13A = 13” Tape & Reel
X = Small Pack
E = Carrier (No Reel)

LEAD PLATING

Blank = Sn85/Pb15
TIN = Sn100
B = Sn97/Bi3.0

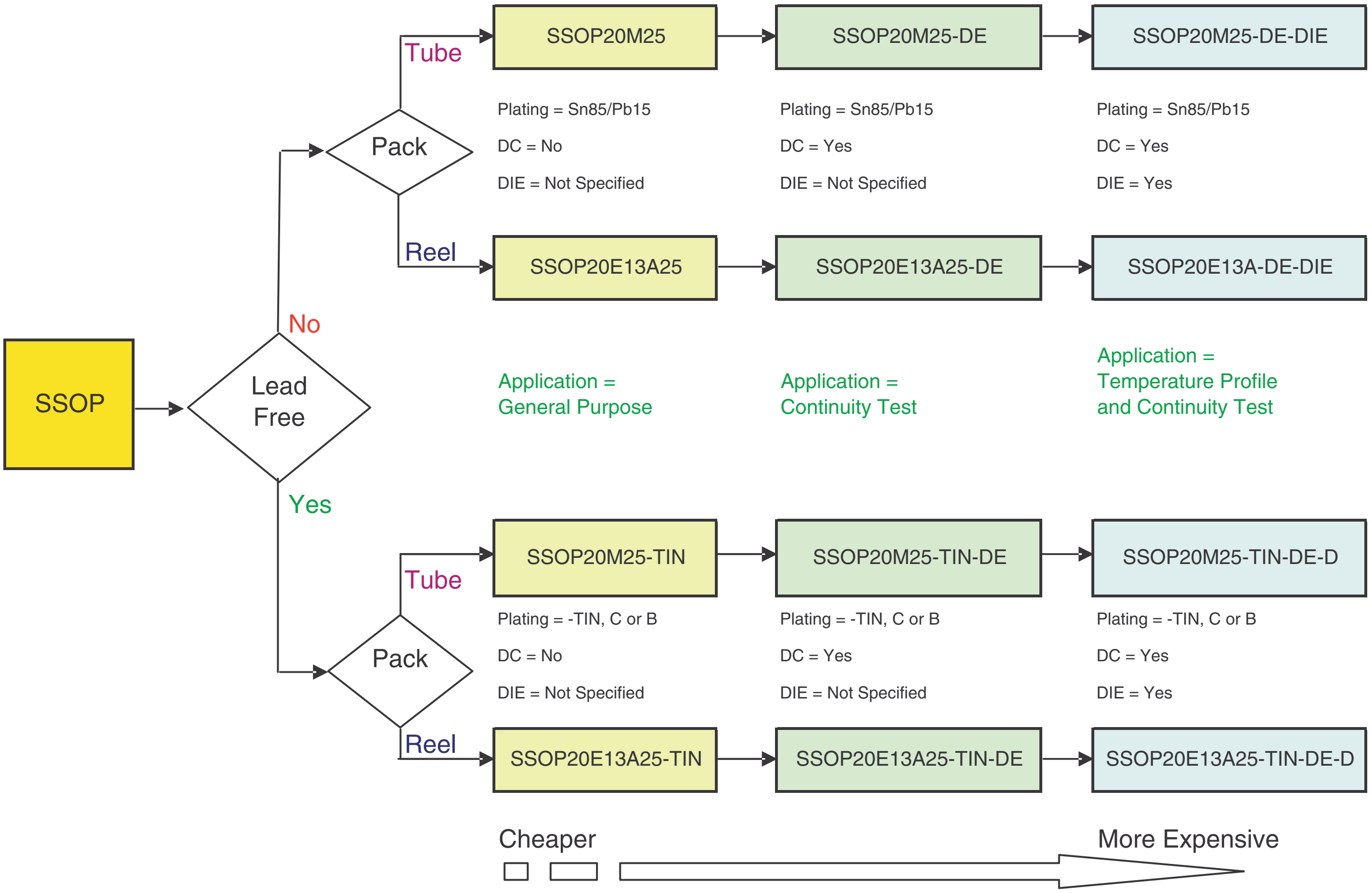
PITCH (MILS)

25 = 0.65mm (0.635mm QSOP)
30 = 0.8mm
40 = 1.0mm

OPTION

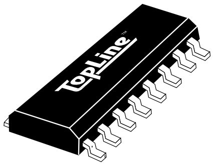
Blank = unspecified
DE = Daisy Chain Even
ISO = Isolated
D = Die

Substituting SSOP



Suffix Codes:
"DIE" is sometimes abbreviated to "D".
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc) "ISO"= Isoloated connections "BUS" = All Leads Connected.
Lead Free Plating: "TIN" = Sn100, B = Sn97/Bi3.0 C = Sn98/Cu2.0
Pack: "M" = Tubes, E13A = 13" Reels, E7A = 7" Reel (special), "X" = mini Pack Bags
Pitch in mils: 15.7 = 0.4mm, 19.7 = 0.5mm, 25 = 0.65mm, 31.5 = 0.8mm, 40 = 1.0mm

TSSOP



TSSOP 24 M 25 Lead Plating - Option

DEVICE

SERIES	**BODY WIDTH**	
	MILS	**MM**
TSSOP	173	4.4mm
TSSOP	240	6.1mm

NUMBER LEADS

PACKAGING

M = Tubes
E4A = 4" Reel
E7A = 4" Reel
E13A = 13" Reel
X = Small Pack
E = Carrier (No Reel)

PITCH (MILS)

15.7 = 0.4mm
19.7 = 0.5mm
25 = 0.65mm

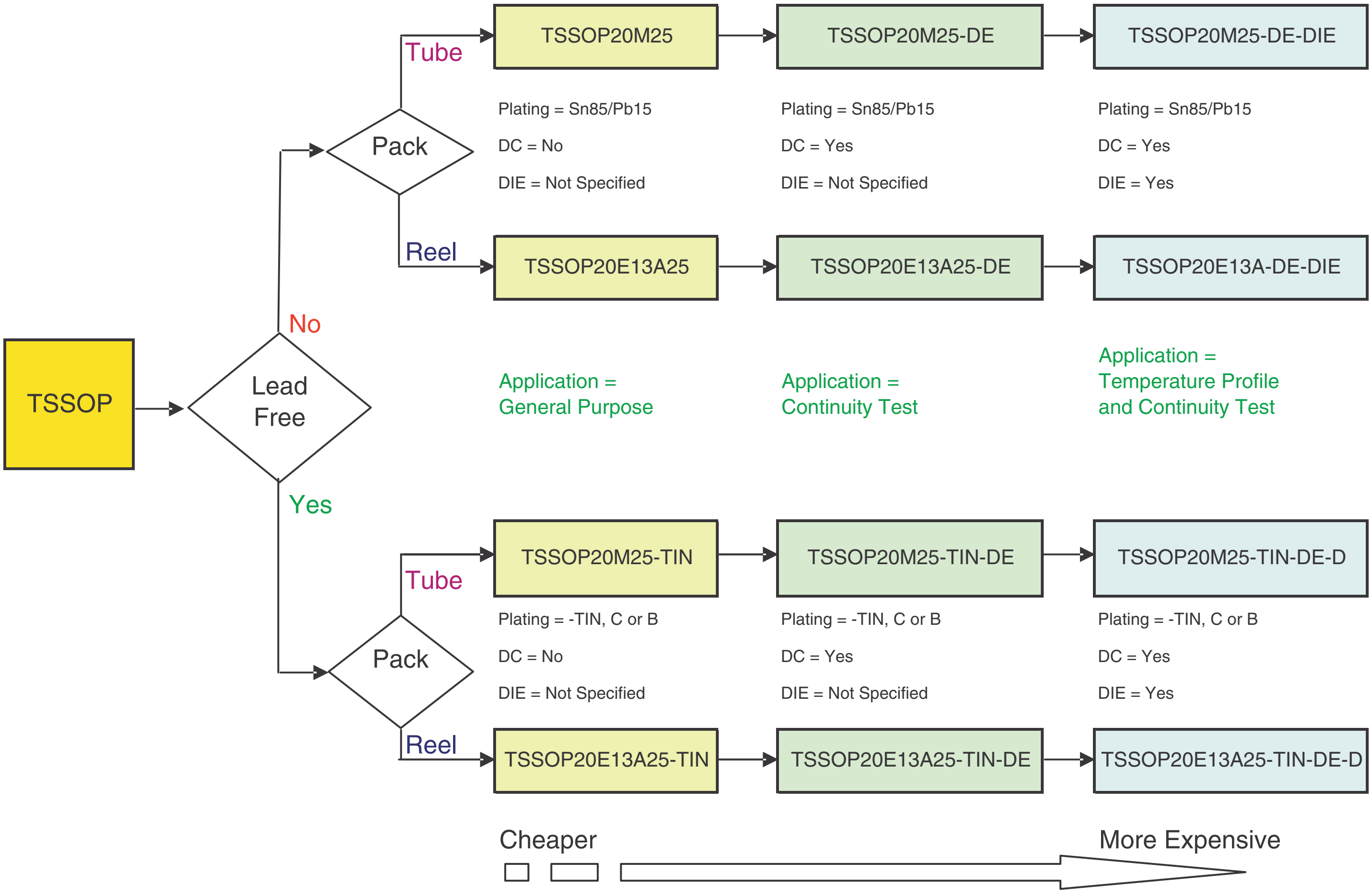
LEAD PLATING

Blank = Sn85/Pb15
TIN = Sn100
B = Sn97/Bi3.0

OPTION

Blank = unspecified
DE = Daisy Chain Even
ISO = Isolated
D = Die

Substituting TSSOP



Suffix Codes:
"DIE" is sometimes abbreviated to "D".
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc) "ISO"= Isoloated connections "BUS" = All Leads Connected.
Lead Free Plating: "TIN" = Sn100, B = Sn97/Bi3.0 C = Sn98/Cu2.0
Pack: "M" = Tubes, E13A = 13" Reels, E7A = 7" Reel (special), "X" = mini Pack Bags

TSOP (Type 1)

TSOP 32 S T 19.7 - T1 Lead Plating - Option

DEVICE
TSOP

NUMBER LEADS
32 = 32 leads
28/32 = 28 leads on 32 lead body (4 leads missing)

BODY LENTH
Blank = Standard
S = Short (stunt)

PACKAGING
T = Tray
E7A = 7” Reel
E13A = 13” Reel
X = Single Pack
E = Carrier (No Reel)

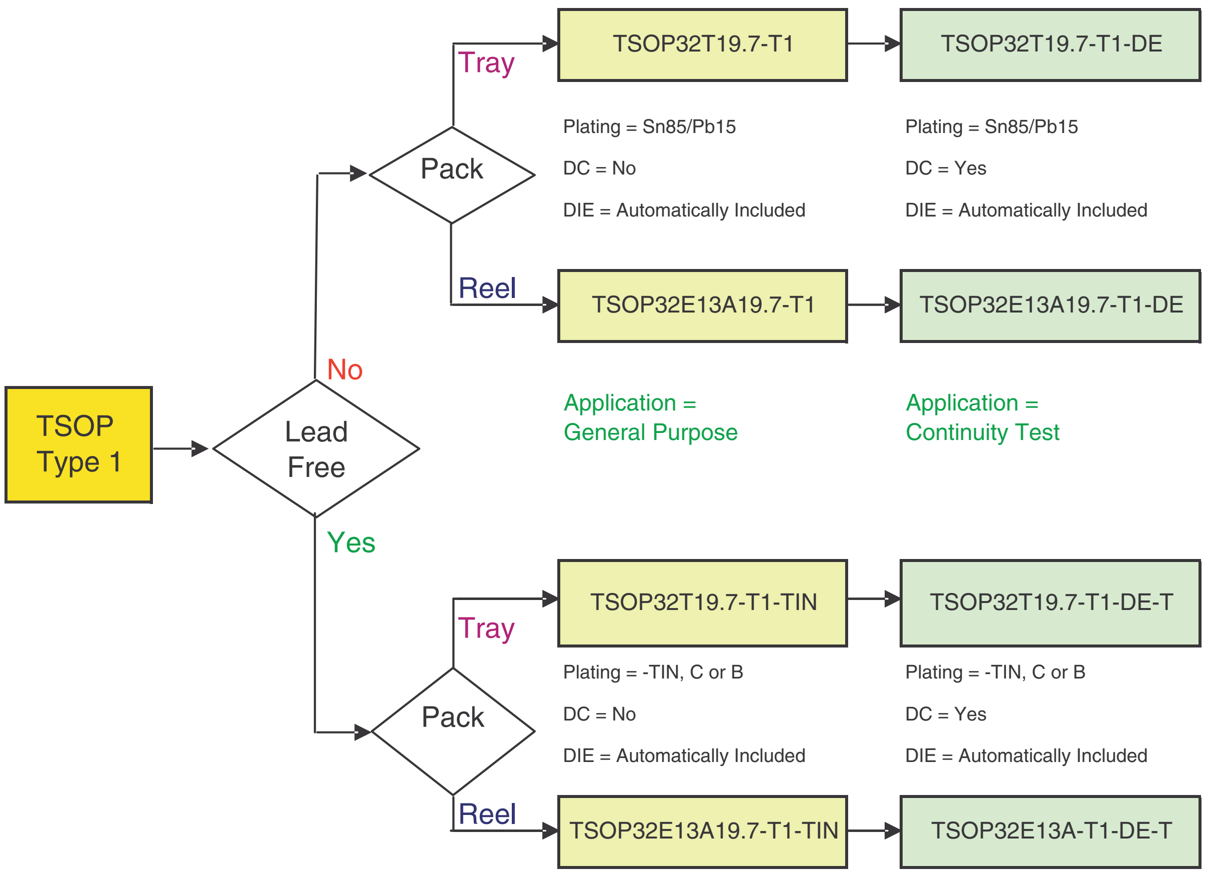
PITCH (MILS)
19.7 = 0.5mm
21.6 = 0.55mm

TYPE
T1 = Leads on narrow ends

LEAD PLATING
Blank = Sn85/Pb15
TIN = Sn100
B = Sn97/Bi3.0

OPTION
Blank = unspecified
DE = Daisy Chain Even
ISO = Isolated

Substituting TSOP (Type 1)



Suffix Codes:
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc) "ISO"= Isoloated connections "BUS" = All Leads Connected.
Lead Free Plating: "TIN" = "T" = Sn100, B = Sn97/Bi3.0 C = Sn98/Cu2.0
Pack: "T" = Tray, E13A = 13" Reel, E7A = 7" Reel, "E" = Carrier Tape without Reel, "X" = mini Pack Bags
Silicon Dummy DIE is automatically included. No need to add Suffix -DIE
Pitch: 19.7mils (21.6 = 0.55mm, 19.7 = 0.5mm)

Part Numbering System

TSOP (Type II)

TSOP 32 T 19.7 - T2 - Lead Plating Option

Device
TSOP

Nbr. Leads
32 = 32 leads
40/44 = 40 leads on 44 lead body (4 leads missing)

Packaging
T = Tray
E7A = 7" Reel
E13A = 13" Reel
X = Small Pack
E = Carrier (No Reel)

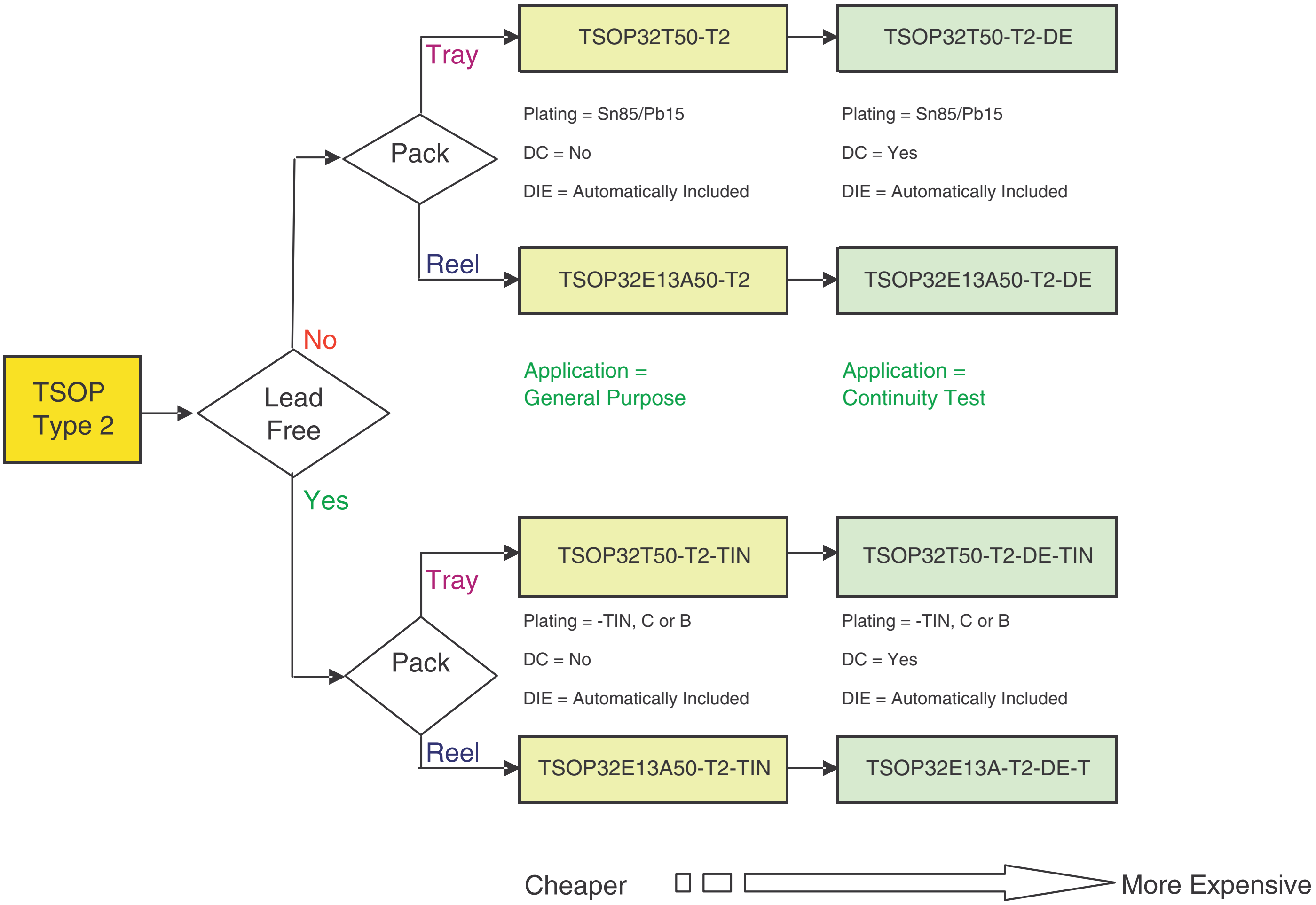
Pitch (mils)
25 = 0.65mm
30 = 0.8mm
50 = 1.27mm

Type
T2 = Leads on wide side

Lead Plating
Blank = Sn85/Pb15
TIN = Sn100
B = Sn97/Bi3.0

Option
Blank = unspecified
DE = Daisy Chain Even

Substituting TSOP (Type II)

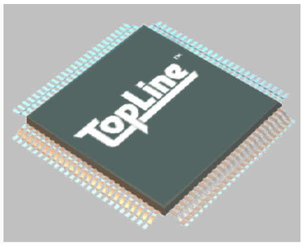


Suffix Codes:
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc)   "ISO"= Isoloated connections   "BUS" = All Leads Connected.
Lead Free Plating: "TIN" = "T" = Sn100,   B = Sn97/Bi3.0   C = Sn98/Cu2.0
Pack: "T" = Tray,   E13A = 13" Reel,   E7A = 7" Reel,   "E" = Carrier Tape without Reel,   "X" = mini Pack Bags
Silicon Dummy DIE is automatically included. No need to add Suffix -DIE
Pitch in mils: (50 = 1.27mm, 30 = 0.8mm)

TopLine™ **Part Numbering System**

TQFP

Thin Quad Flat Pack



TQFP 100 T 25 - Lead Plating - Option

DEVICE

TQFP = Thin Quad Flat Pack
1.0mm Thick

LEAD PITCH (MIL)

MIL	MM
40	1.0mm
30	0.8mm
25	0.65mm
19.7	0.5mm
15.7	0.4mm

NUMBER LEADS

LEAD PLATING

Blank = Sn85/Pb15
T = Sn100 Tin
B = Sn97/Bi3.0
C = Sn98/Cu2.0

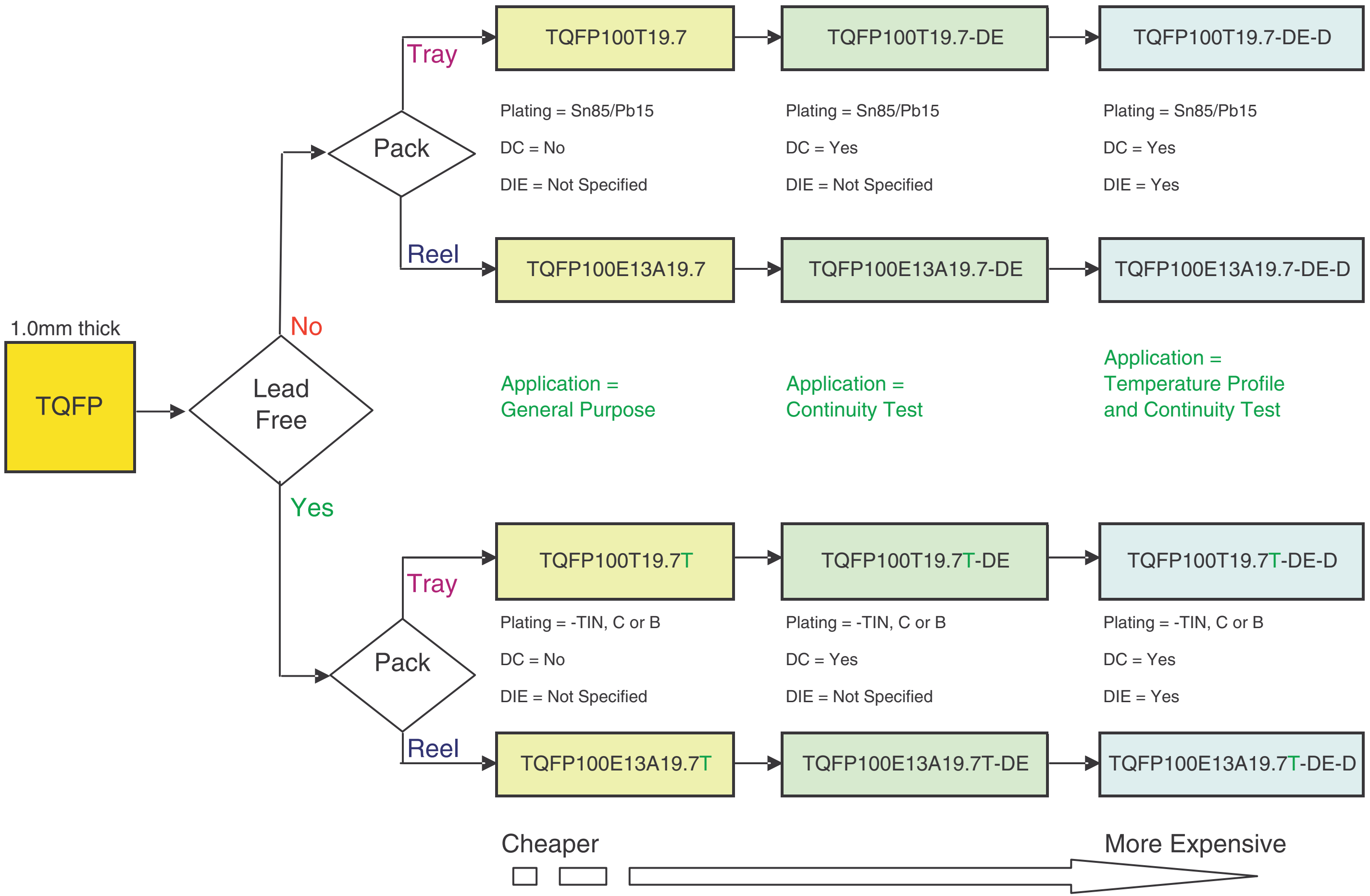
PACKAGING

T = Tray
E7A = 7” Reel (special)
E13A = 13” Reel
X = Small Pack
E = Carrier (No Reel)

OPTIONS

Blank = Unspecified
DE = Daisy Chain Even
ISO = Isolated
D = Die

Substituting TQFP

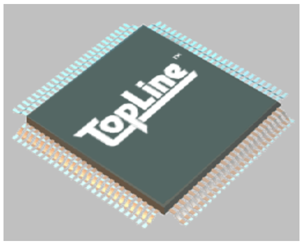


Suffix Codes:
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc) "ISO"= Isoloated connections "BUS" = All Leads Connected.
Lead Free Plating: "TIN" = "T" = Sn100, B = Sn97/Bi3.0 C = Sn98/Cu2.0
Pack: "T" = Tray, E13A = 13" Reel, E7A = 7" Reel, "E" = Carrier Tape without Reel, "X" = mini Pack Bags
"D" = Silicon Dummy DIE
Footprint Adder assumed 2.0mm.
Pitch in mils: 15.7 = 0.4mm, 19.7 = 0.5mm, 25 = 0.65mm, 30 = 0.8mm, 40 = 1.0mm

Part Numbering System

LQFP

Low Quad Flat Pack



LQFP 100 T 25 - Lead Plating - Option

DEVICE

LQFP = Low Quad Flat Pack
1.4mm Thick

LEAD PITCH (MIL)

MIL	MM
40	1.0mm
30	0.8mm
25	0.65mm
19.7	0.5mm
15.7	0.4mm
11.8	0.3mm

NUMBER LEADS

LEAD PLATING

Blank = Sn85/Pb15
T = Sn100 Tin
B = Sn97/Bi3.0
C = Sn98/Cu2.0

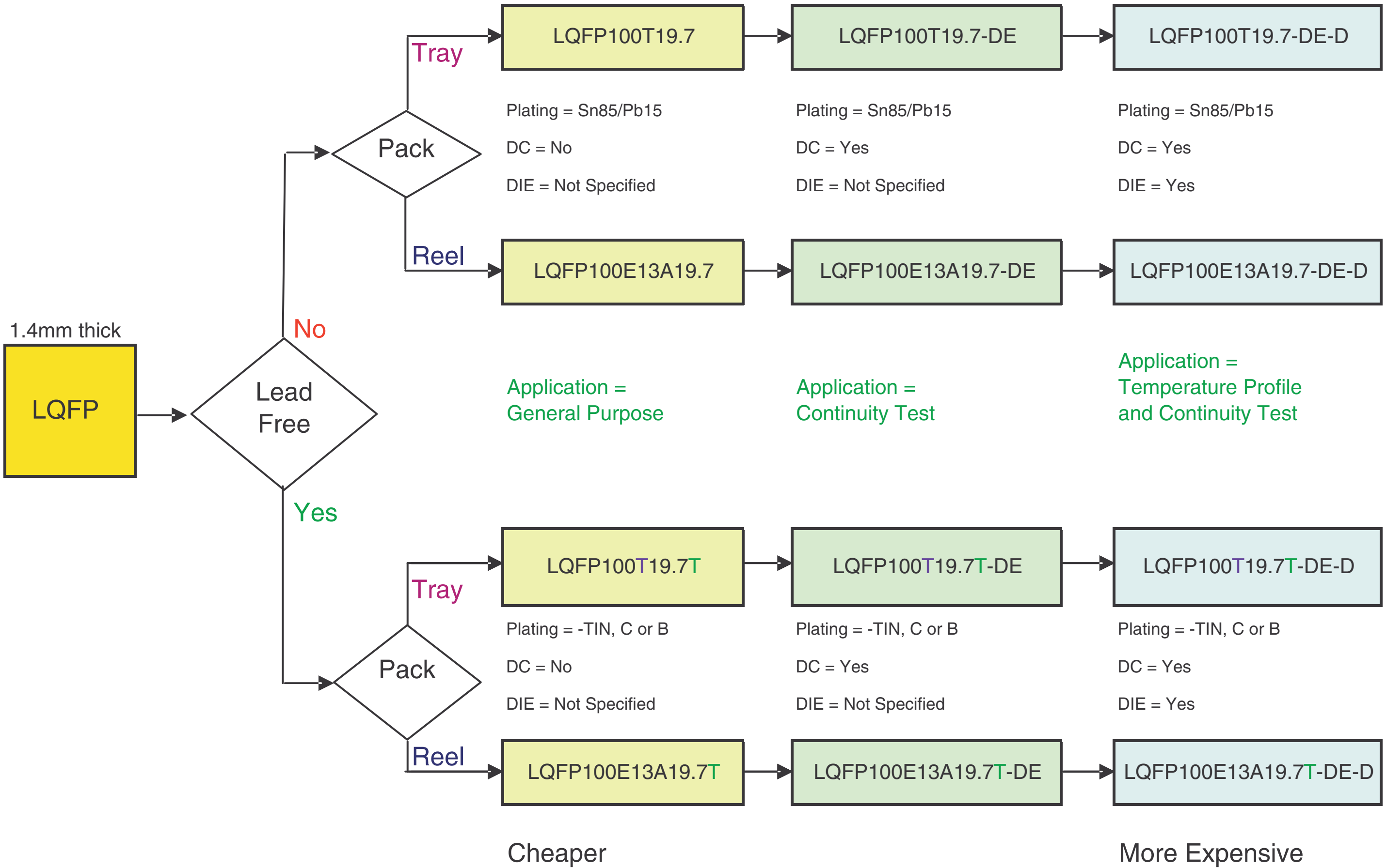
PACKAGING

T = Tray
E7A = 7” Reel
E13A = 13” Reel
X = Small Pack
E = Carrier (No Reel)

OPTIONS

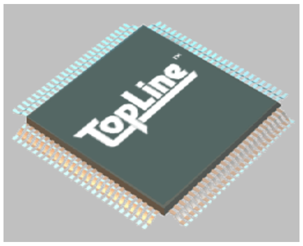
Blank = Unspecified
DE = Daisy Chain Even
ISO = Isolated
D = Die

Substituting LQFP



Suffix Codes:
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc) "ISO"= Isoloated connections "BUS" = All Leads Connected.
Lead Free Plating: "TIN" = "T" = Sn100, B = Sn97/Bi3.0 C = Sn98/Cu2.0
Pack: "T" = Tray, E13A = 13" Reel, E7A = 7" Reel, "E" = Carrier Tape without Reel, "X" = mini Pack Bags
"D" = Silicon Dummy DIE
Footprint Adder assumed 2.0mm.
Pitch in mils: 15.7 = 0.4mm, 19.7 = 0.5mm, 25 = 0.65mm, 30 = 0.8mm, 40 = 1.0mm

QFP
Quad Flat Pack



QFP 100 T 25 - 3.9 - Options

DEVICE

QFP = Quad Flat Pack

also known as
PQFP and MQFP

NUMBER LEADS

PACKAGING

T = Tray
E7A = 7” Tape & Reel
E13A = 13” Tape & Reel
X = Single Pack

LEAD PITCH (MIL)

MIL	MM
40	1.0mm
30	0.8mm
25	0.65mm
19.7	0.5mm
15.7	0.4mm

FOOTPRINT

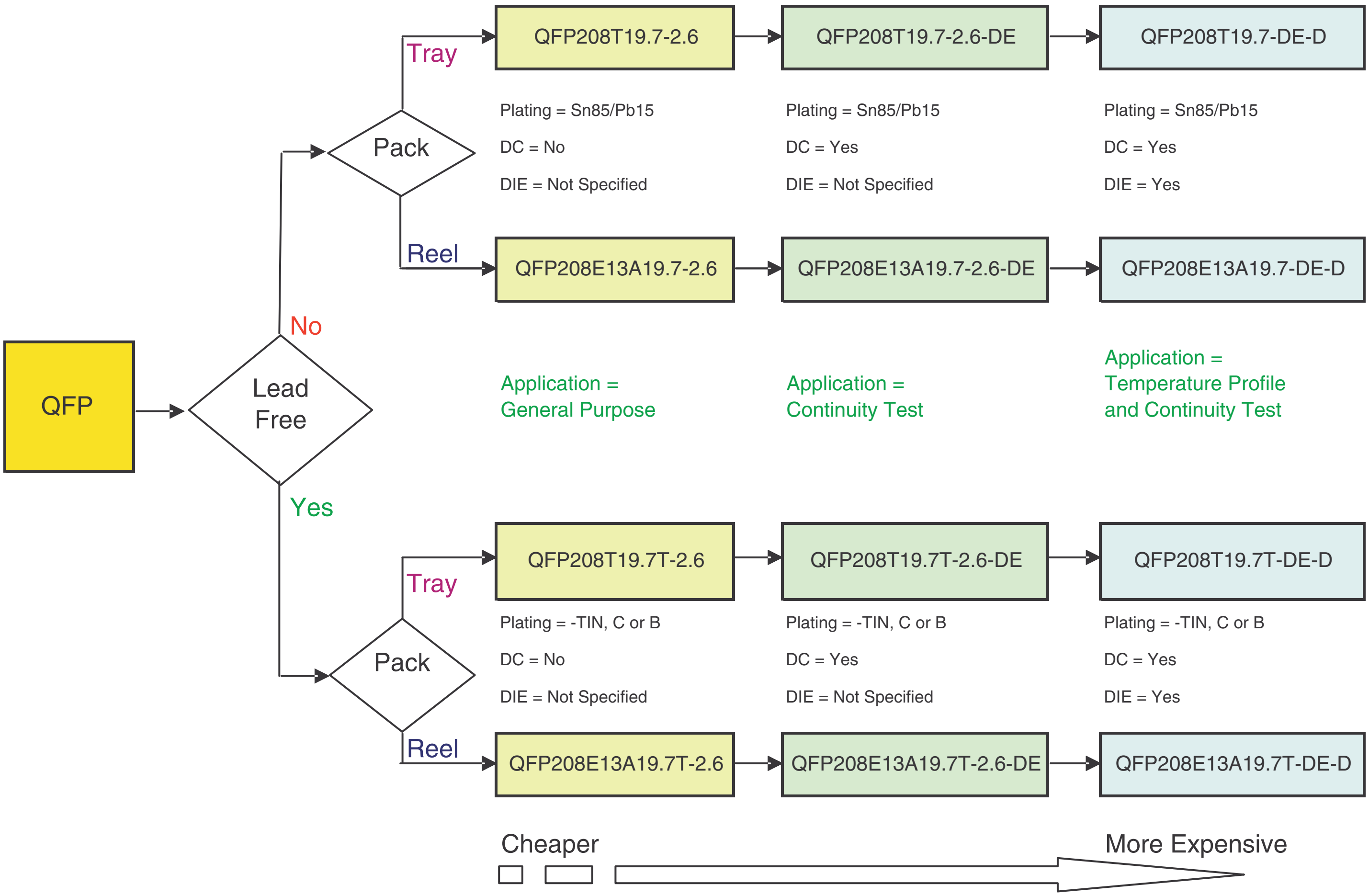
Add to body for total tip to tip dimensions.

2.6 = 2.6mm
3.2 = 3.2mm
3.9 = 3.9mm

OPTIONS

Blank = Unspecified
DE = Daisy Chain Even
ISO = Isolated
D = Die

Substituting QFP

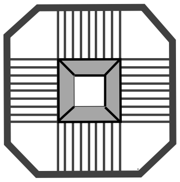


Suffix Codes:
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc) "ISO"= Isoloated connections "BUS" = All Leads Connected.
Lead Free Plating: "TIN" = "T" = Sn100, B = Sn97/Bi3.0 C = Sn98/Cu2.0
Pack: "T" = Tray, E13A = 13" Reel, E7A = 7" Reel, "E" = Carrier Tape without Reel, "X" = mini Pack Bags
"D" = Silicon Dummy DIE
"2.6" = Footprint Adder (mm) (Typically: 2.6, 3.2 or 3.9 depending on lead count & body size)
Pitch in mils: 15.7 = 0.4mm, 19.7 = 0.5mm, 25 = 0.65mm, 30 = 0.8mm, 40 = 1.0mm

TopLine™ **Part Numbering System**

CERQUAD

Ceramic Quad Flat Pack



CERQUAD 68 F 50 - Options

BODY

CERAMIC = Ceramic Quad Flat Pack

NUMBER LEADS

LEAD PITCH (MIL)

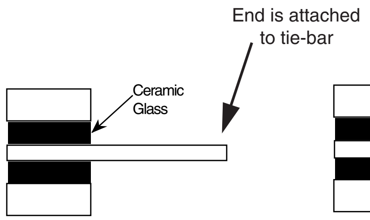
MIL	MM
50	1.27mm
30	0.8mm
25	0.635 or 0.65

OPTIONS

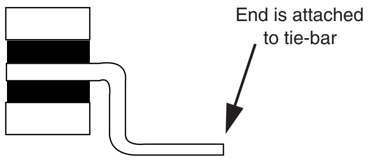
Blank = With Lid, Gold Leads
N = Without Lid
DE = Daisy Chain Even
ISO = Isolated
SC = Solder Coat leads

LEAD STYLE

F = Flat Leads with Tie Bars (Standard)
G = Gull Wing

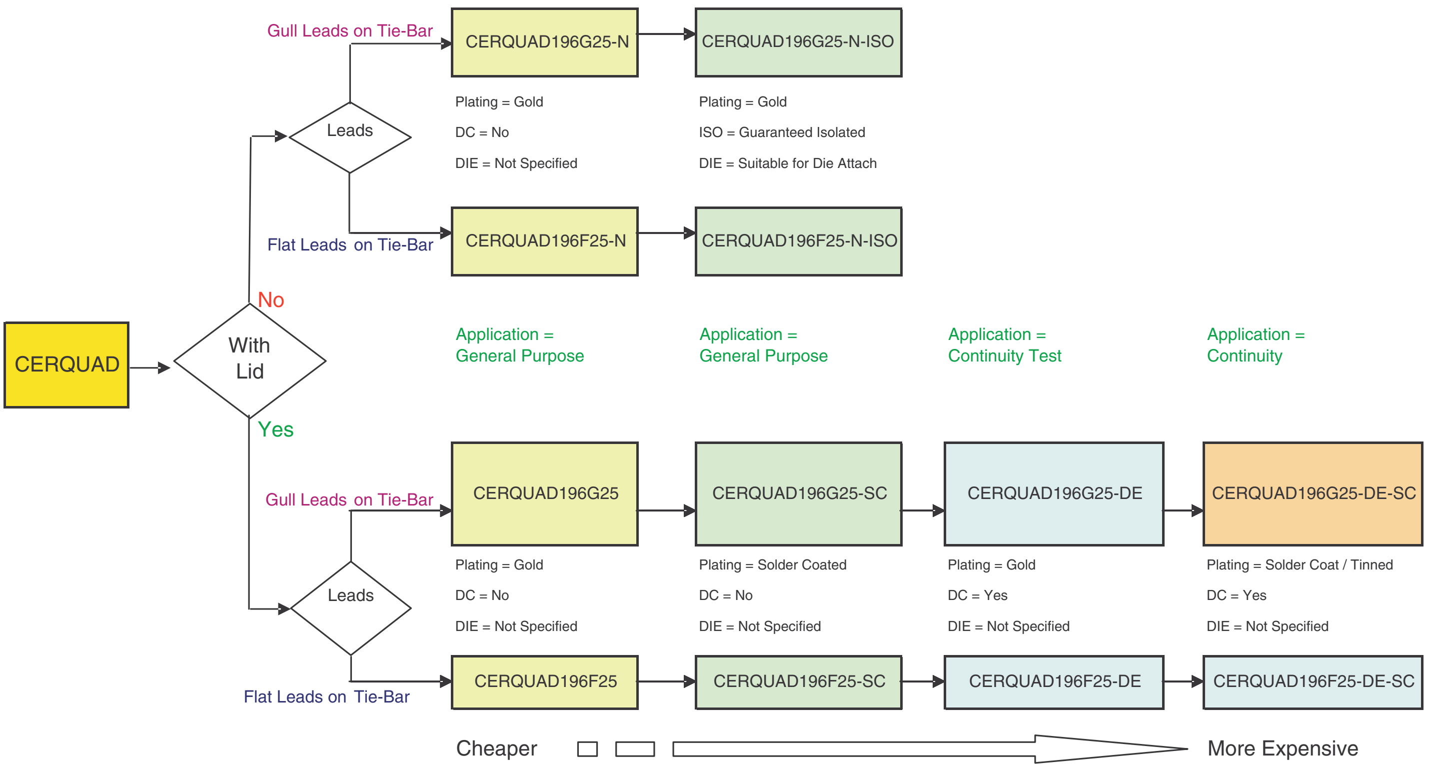


Flat Lead on lead frame



Gull-Wing with tie-bar

Substituting “CERQUAD”

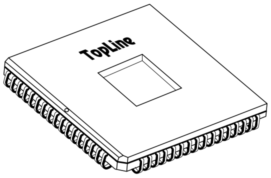


Suffix Codes:
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc) "ISO"= Isolated connections
Plating: Blank = Gold SC = Solder Coated with Tinned Sn63 Solder
Pack: "G" = Gull Wing Leads on Tie Bar "F" = Flat Leads on Tie-Bar.
Note: "F" and "G" Leads must be trimmed and formed by customer prior to assembly.

TopLine™ **Part Numbering System**

CLCC

“J” Lead Carrier



CLCC 68 J 50 - Options

BODY

CERAMIC = Ceramic Quad Flat Pack

NUMBER LEADS

LEAD STYLE

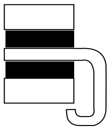
J = J-Bend Leads (Standard)

LEAD PITCH (MIL)

MIL	MM
50	1.27mm

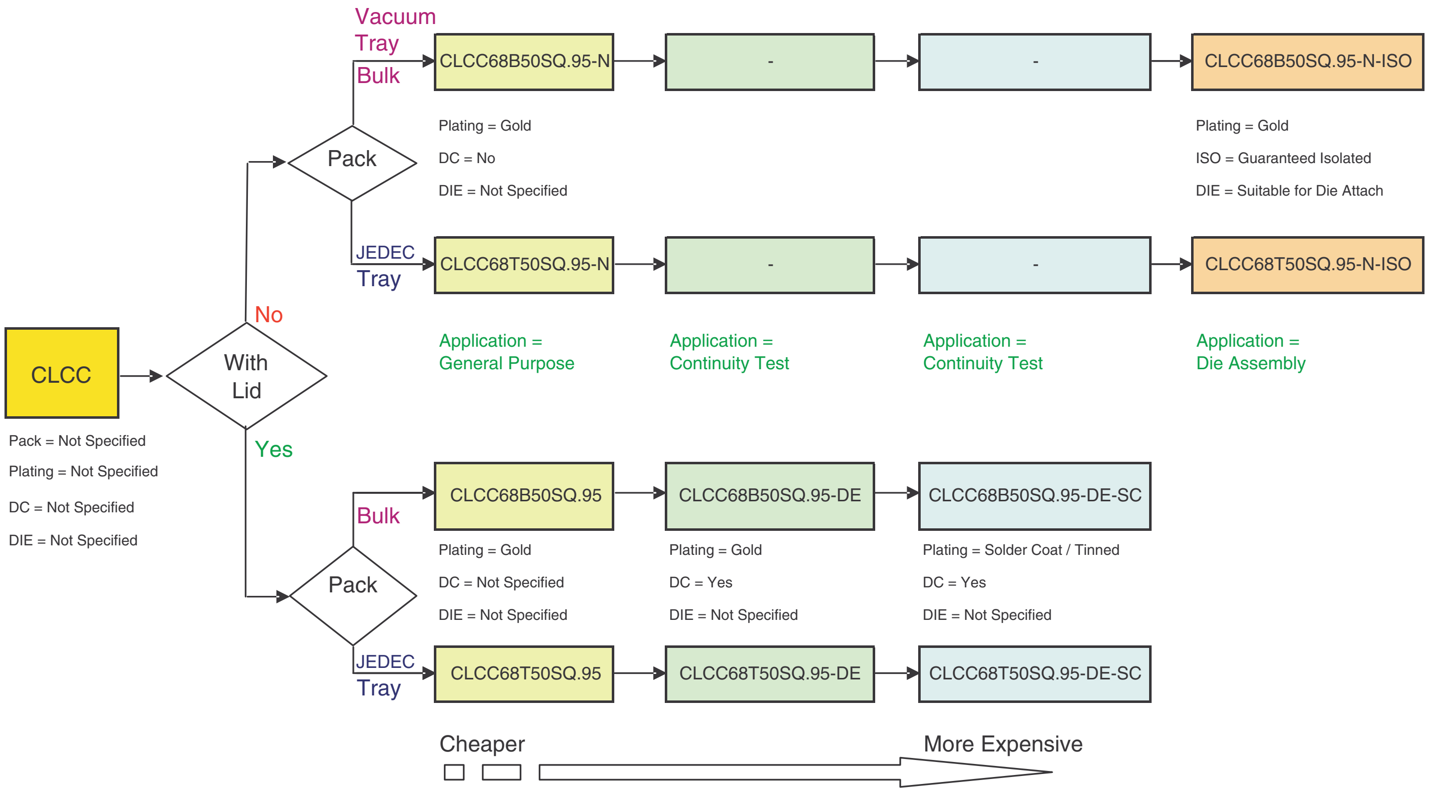
OPTIONS

Blank = With Lid, Gold Leads (Standard)
N = Without Lid
DE = Daisy Chain Even
ISO = Isolated
SC = Solder Coat Leads



J-lead CLCC

Substituting CLCC



Suffix Codes:
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc) "ISO"= Isolated connections
Plating: Blank = Gold SC = Solder Coated
Pack: "M" = Tubes, B = Bulk or Vacuum formed Trays T = JEDEC MatrixTrays

Flip Chip

FC 48 D 5.08 E 457 - DC

SERIES
FC = Flip Chip (standard
FCN = Bumpless
FCW = Bump Wafer
FCWN = Bumpless Wafer

BUMPS

BUMP SIZE
C = 165µm
D = 190µm
G = 135µm
H = 105µm

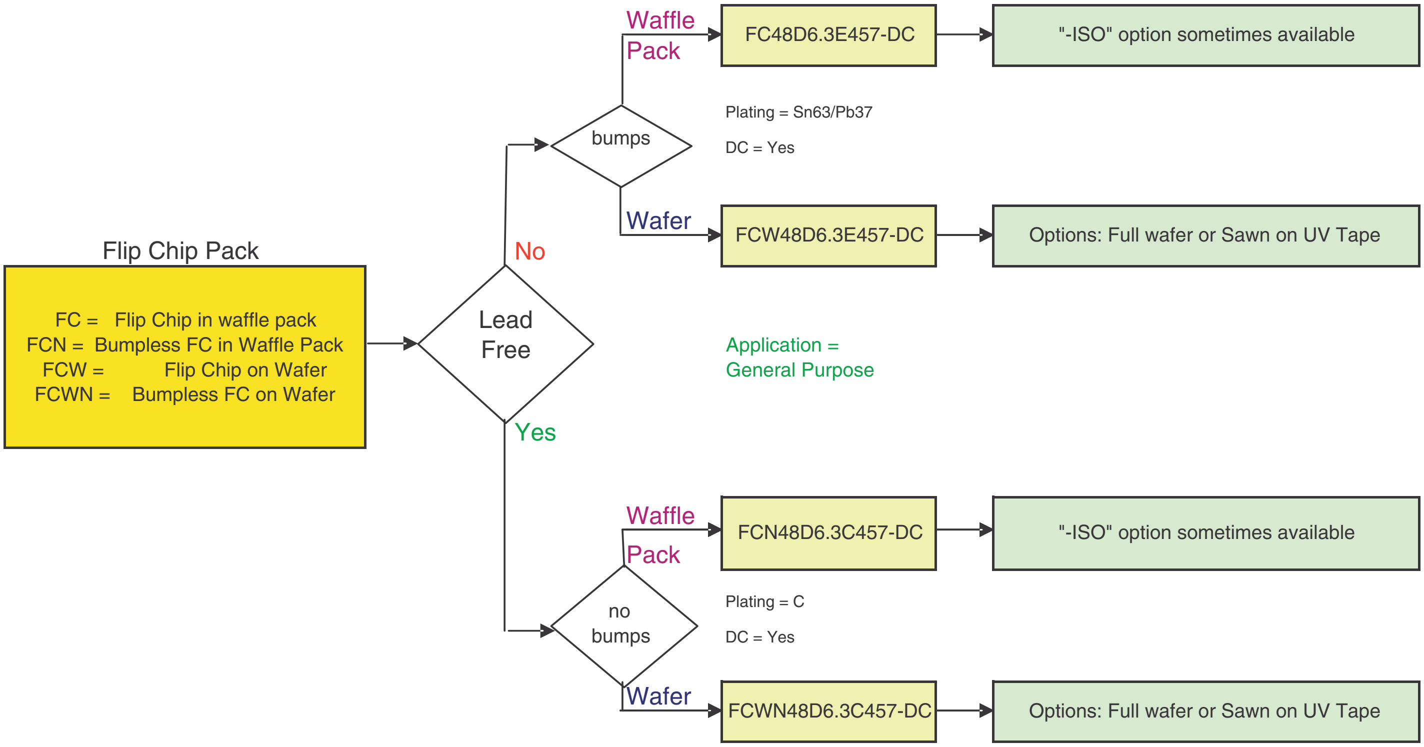
DIE SIZE
millimeter (mm)

BUMP COMPOSITION
E = Eutectic 63/37
N = Nickel
G = Gold
C = Sn/Ag/Cu

BUMP PITCH
micron (µm)

OPTION
DC = Daisy Chain
UVR = Sawn on UV Tape with ring
UV = Sawn on UV Tape
E7A = Tape & Reel

Substituting FC



Suffix Codes:
"DC" = Daisy Chain (See Drawing for Details) "ISO"= Isoloated connections
Plating: "E" = Sn63/Pb37, G = Gold C = 95.5Sn/3.5Ag/1.0Cu
Pack: Normally in 2" Square Waffle Packs

Flip Chip Wafers

FCW 88 G 5 E 204

SERIES
FCW = Bump Wafer
FCWN = Bumpless Wafer

NUMBER BUMPS

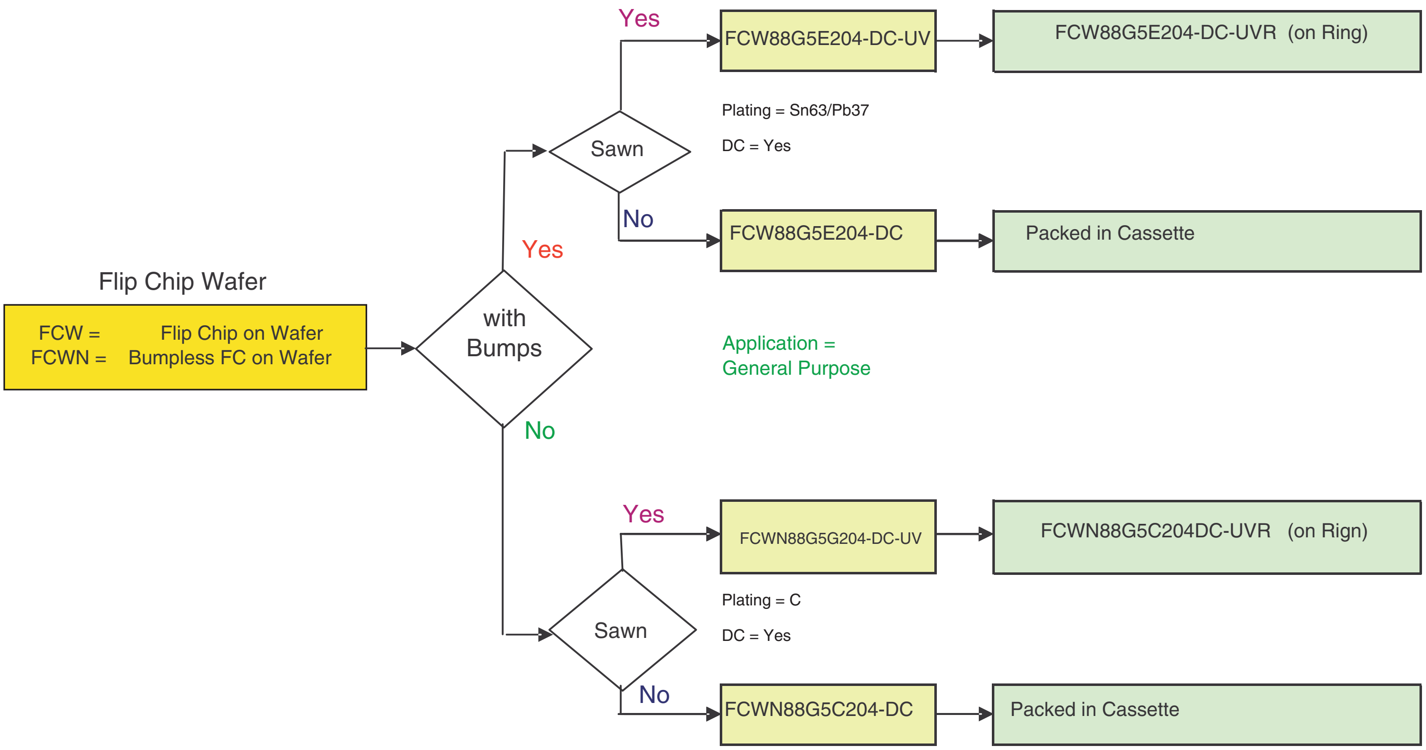
BUMP SIZE
C = 165µm
D = 190µm
G = 135µm
H = 105µm

DIE SIZE
millimeter (mm)

BUMP COMPOSITION
E = Eutectic 63/37
C = Sn/Ag/Cu
G = Gold

BUMP PITCH
millimeter (mm)

Substituting Flip Chip Wafers



Suffix Codes:
"DC" = Daisy Chain (See Drawing for Details) "ISO"= Isoloated connections
Plating: "E" = Sn63/Pb37, G = Gold C = 95.5Sn/3.5Ag/1.0Cu
Pack: Normally in 2" Square Waffle Packs

Silicon Wafer

WM 8 - C Option

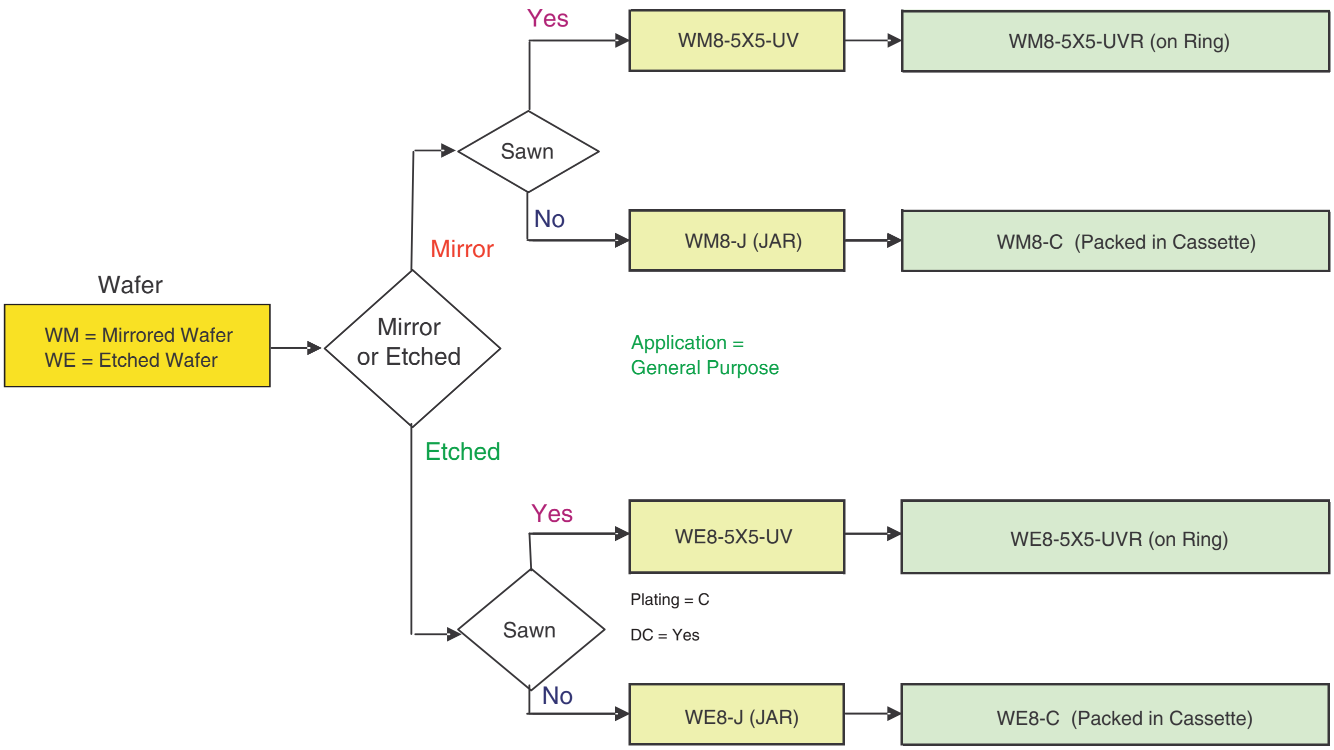
SERIES
WM = Mirror Wafer
WE = Etched Wafer

WAFER DIAMETER
8 = 8” = 200mm
6 = 6” = 150mm

PACKAGING
C = Cassette
J = Jar
B = Box

OPTION
UV = UV Tape
UVR = UV Tape & Ring

Substituting Silicon Wafers



Suffix Codes:
"DC" = Daisy Chain (See Drawing for Details) "ISO"= Isoloated connections
Plating: "E" = Sn63/Pb37, G = Gold C = 95.5Sn/3.5Ag/1.0Cu
Pack: Normally in 2" Square Waffle Packs

Silicon Die

MD 6 x 6 WP2 BG

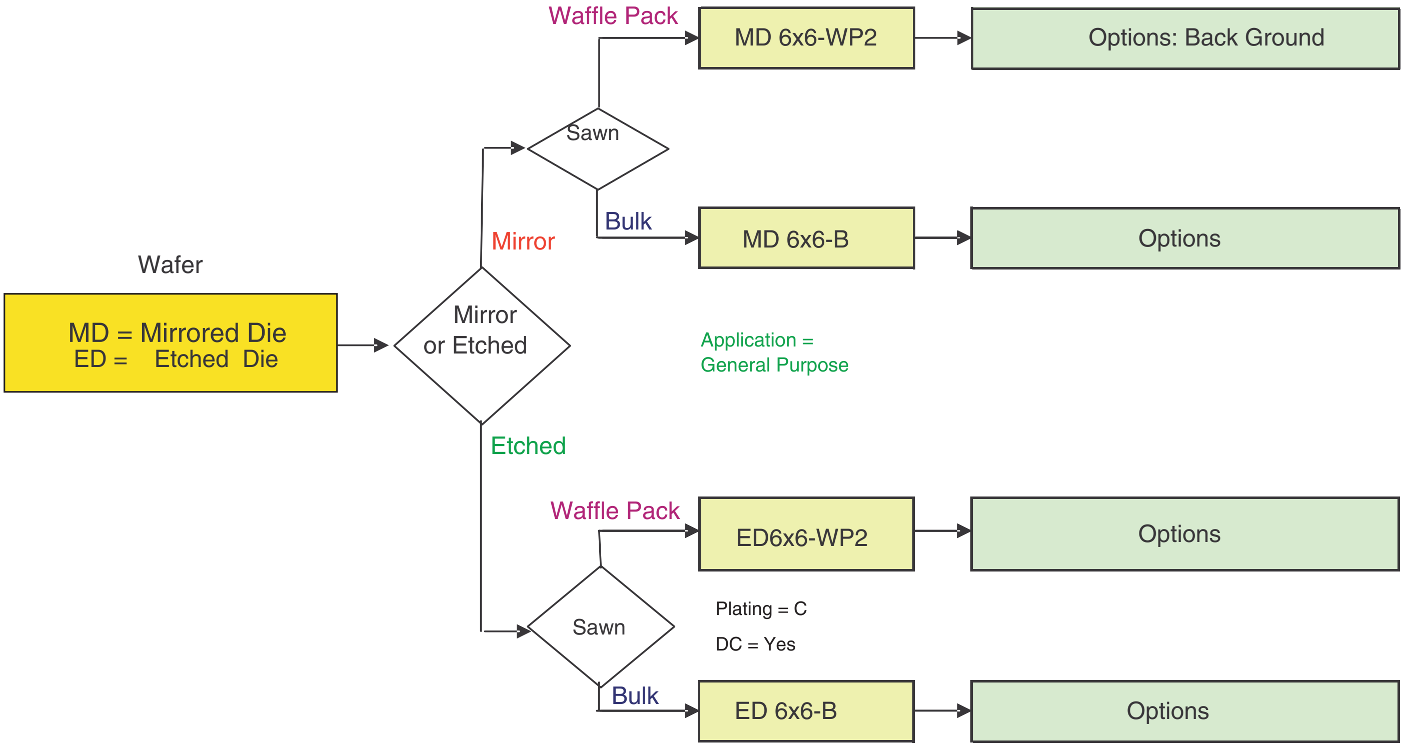
Series
MD = Mirror Die
ED = Etched Die

Die Size
millimeter (mm)

Packaging
WP2 = Waffle Pack 2”
B = Bulk

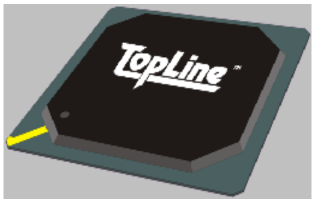
Option
BG = Back Ground

Substituting Silicon Die



Suffix Codes:
Pack: Normally in 2" Square Waffle Packs

BGA
Ball Grid Array



BGA 225 T 1.5 Ball Option - DC15 - D

Device
BGA = Plastic
CBGA = Ceramic
SBGA = Heat Spreader
CSP = Chip Scale

Nbr. Balls

Packaging
T = Trays
E7A = 7” Tape & Reel
E13A = 13” Tape & Reel
X = Single Pack

Pitch (mm)
1.5
1.27
1.00
.8
.75
.5

Daisy Chain
Refers to a
drawing number

Code

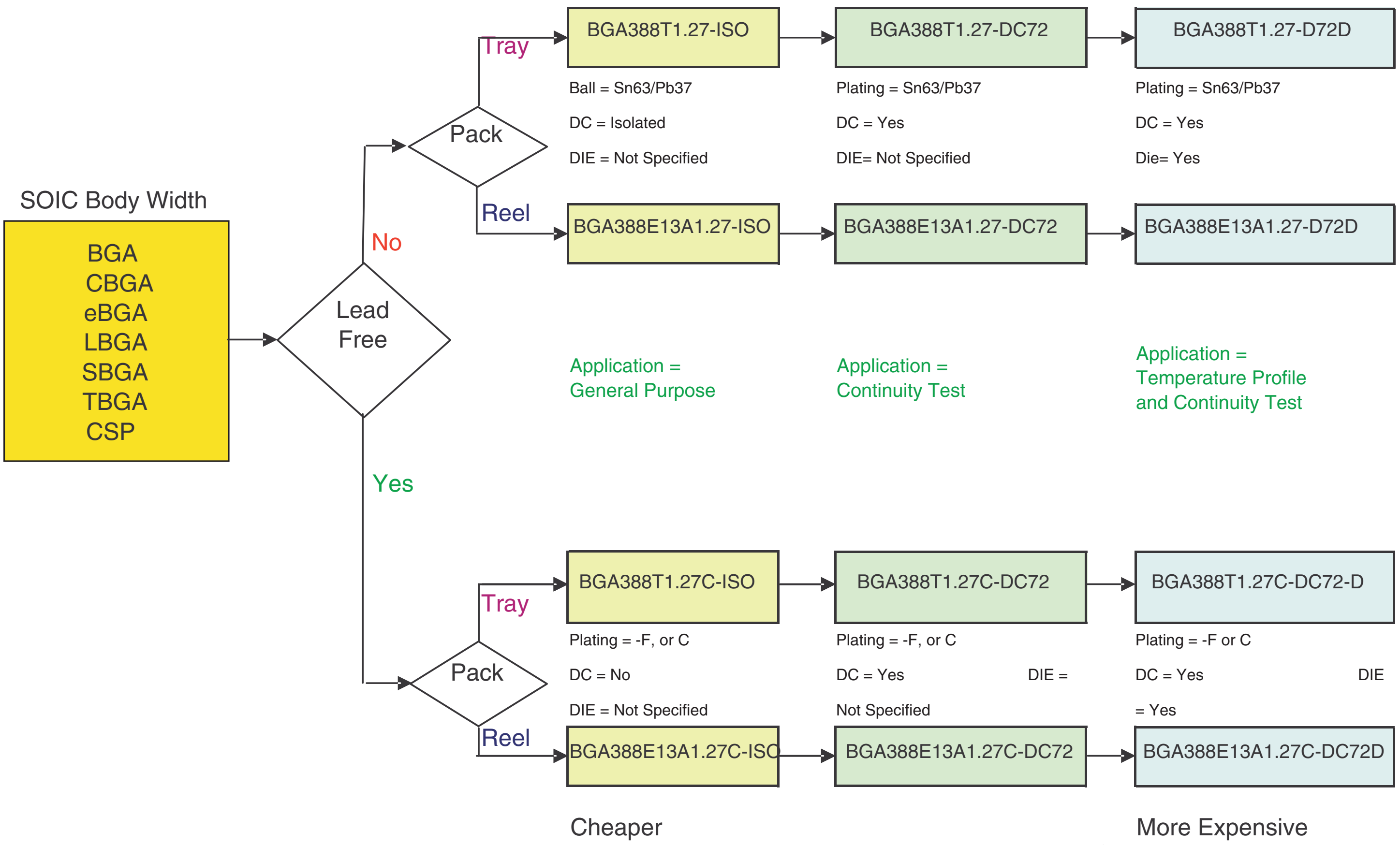
CBGA
Blank = Sn10/Pb90 Standard
High Temperature
L = Sn62/Pb34/Ag2
Low Temperature Option

LEAD FREE (NO Pb)
F = Sn96.5/Ag3.5
C = Sn96.3/Ag3.2/Cu0.5
or Sn95.5/Ag4.0/Cu0.5

BGA, SBGA, eBGA, LBGA
Blank = Sn63 Standard

Solder Ball
Blank = Unspecified
D = Die

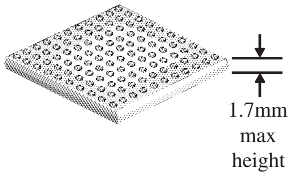
Substituting BGA



Suffix Codes:
"DIE" is sometimes abbreviated to "D".
"DC" = Daisy Chain (SEE DRAWING) "ISO"= Isoloated connections "BUS" = All Leads Connected.
Lead Free Plating: F = Sn96.5/Ag3.5 C = Sn95.6/Ag4.0/Cu0.5
Pack: "T" = TRAYS, E13A = 13" Reels, E7A = 7" Reel (special), "X" = mini Pack Bags
For CBGA Only: Add letter "L" for low temperature ball.

CBGA

Ceramic Ball Grid Array



CBGA 625 T 1.27 Ball Option - DC61

DEVICE
CBGA = Ceramic

NBR. BALLS

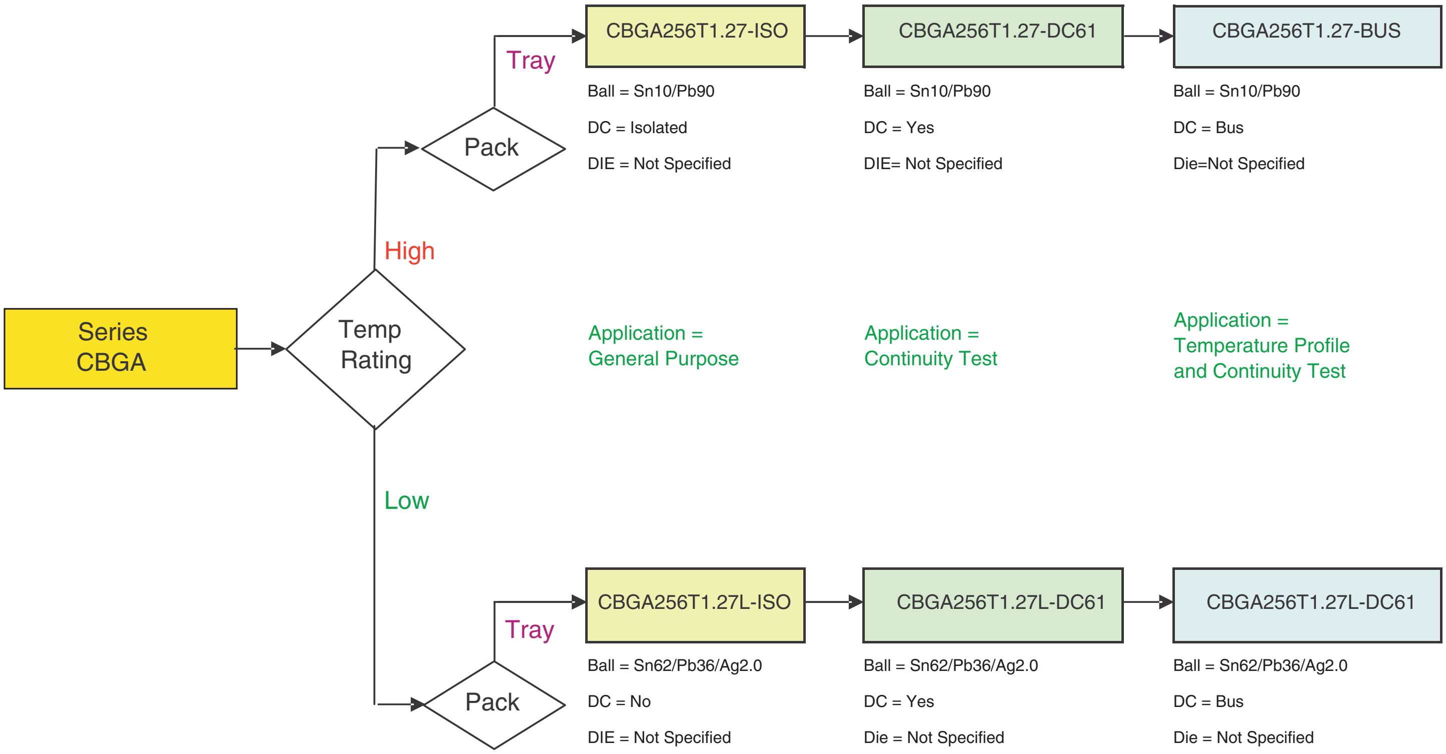
PACKAGING
T = Trays
X = Single Pack

PITCH (MM)
1.27

CODE
Blank = Sn10/Pb90 Standard High Temperature
L = Sn62/Pb36/Ag2 Low Temperature

DAISY CHAIN
Refers to a drawing number

Substituting CBGA



Suffix Codes:

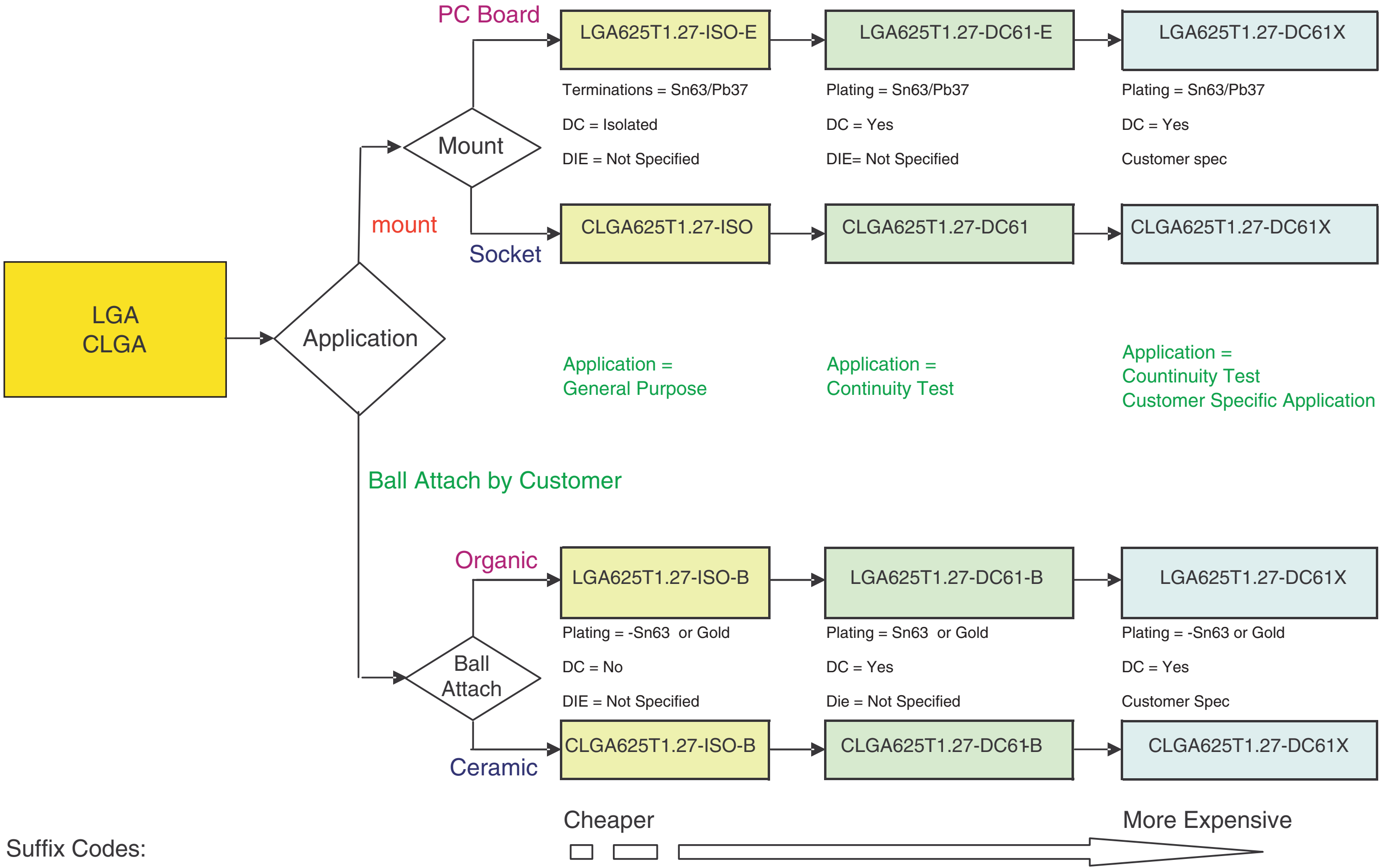
"DC" = Daisy Chain (SEE DRAWING) "ISO"= Isoloated connections "BUS" = All Leads Connected.
Lead Free Plating: Blank = Sn10/Pb90 (standard High Temp) L = Sn62/Pb36/Ag2.0 (Low Temp)
Pack: "T" = TRAYS "X" = mini Pack Bags

LGA

Land Grid Array

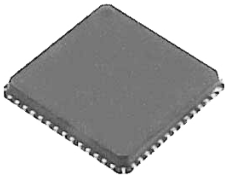
CLGA	625	T	1.27	- DC61	A	3
Substrate	**I/O**	**Packaging**	**Pitch**	**Circuit**	**Options**	**Substrate**
Ceramic		T = Trays	mm	DC = Daisy Chain Pads BUS = All Pads Shorted ISO = All Pads Isolated	Blank = Standard for Socket E = Raised Pad 5mil B = Ball Attach by Customer X = Customer Spec	Blank = 1.0mm thick (Standard) 2 = 1.5mm thick 3 = 3mm thick

Substituting LGA



Suffix Codes:
Organic = FR5 Subsrate, Ceramic= Alumina
"DC" = Daisy Chain (SEE DRAWING) "ISO"= Isoloated connections "BUS" = All Leads Connected.
Lead Free Plating: F = Sn96.5/Ag3.5 G = Gold Other plating available
Pack: "T" = TRAYS
.

SLP, MLF, QFN, MCC



SLP 16 M .5 Lead Plating - Option

DEVICE
SLP
MLF
QFN

NUMBER LEADS

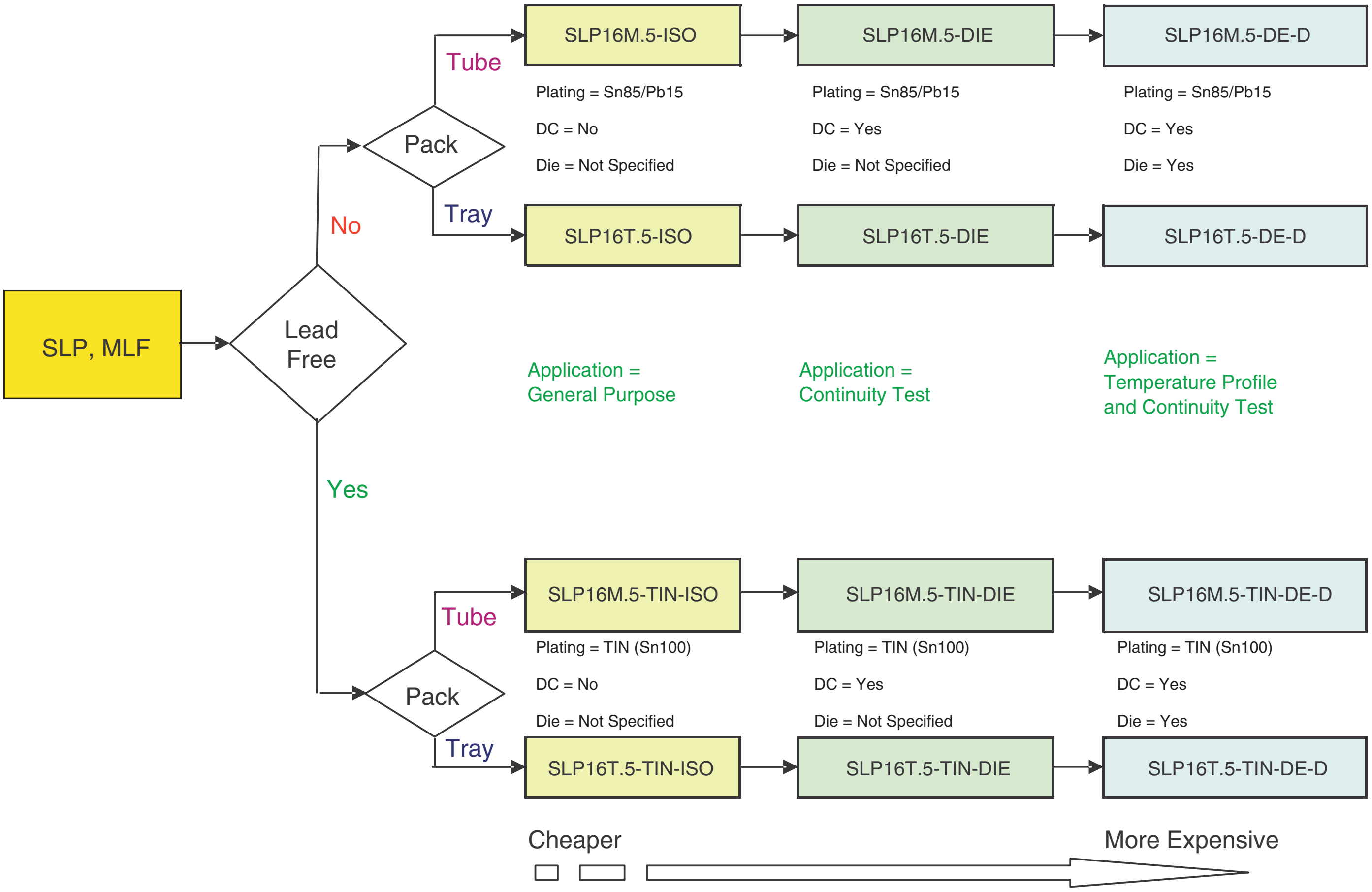
PACKAGING
M = Tubes
T = Trays
E7A = 7” Tape & Reel
X = Small Pack

LEAD PLATING
Blank = Sn85/Pb15
TIN = Sn100
F = Ni-Pd

PITCH (MILS)
.5 = 0.5mm
.65 = 0.65mm
.8 = 0.8mm

OPTION
Blank = unspecified
DE = Daisy Chain Even
ISO = Isolated

Substituting SLP, MLF, QFN

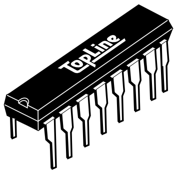


Suffix Codes:
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc) "ISO" = Isolated connections "BUS" = All Leads Connected.
Lead Free Plating: "TIN" = "T"
Pack: "T" = Tray, "M" = Tube, "E7A" = 7" Reel, "E" = Carrier Tape without Reel, "X" = mini Pack Bags, "D" = Silicon Dummy Die

Pitch in mils: .5 = 0.5mm, .65 = 0.65mm, .8 = 0.8mm

TopLine™ **Part Numbering System**

DIP & CERDIP



DIP 16 M 3 - Option

DEVICE

DIP = Plastic (.1” pitch)
SDIP = Skinney Dip (0.07” pitch
CERDIP = Ceramic

NUMBER LEADS

PACKAGING

M = Tubes
X = Single Pack

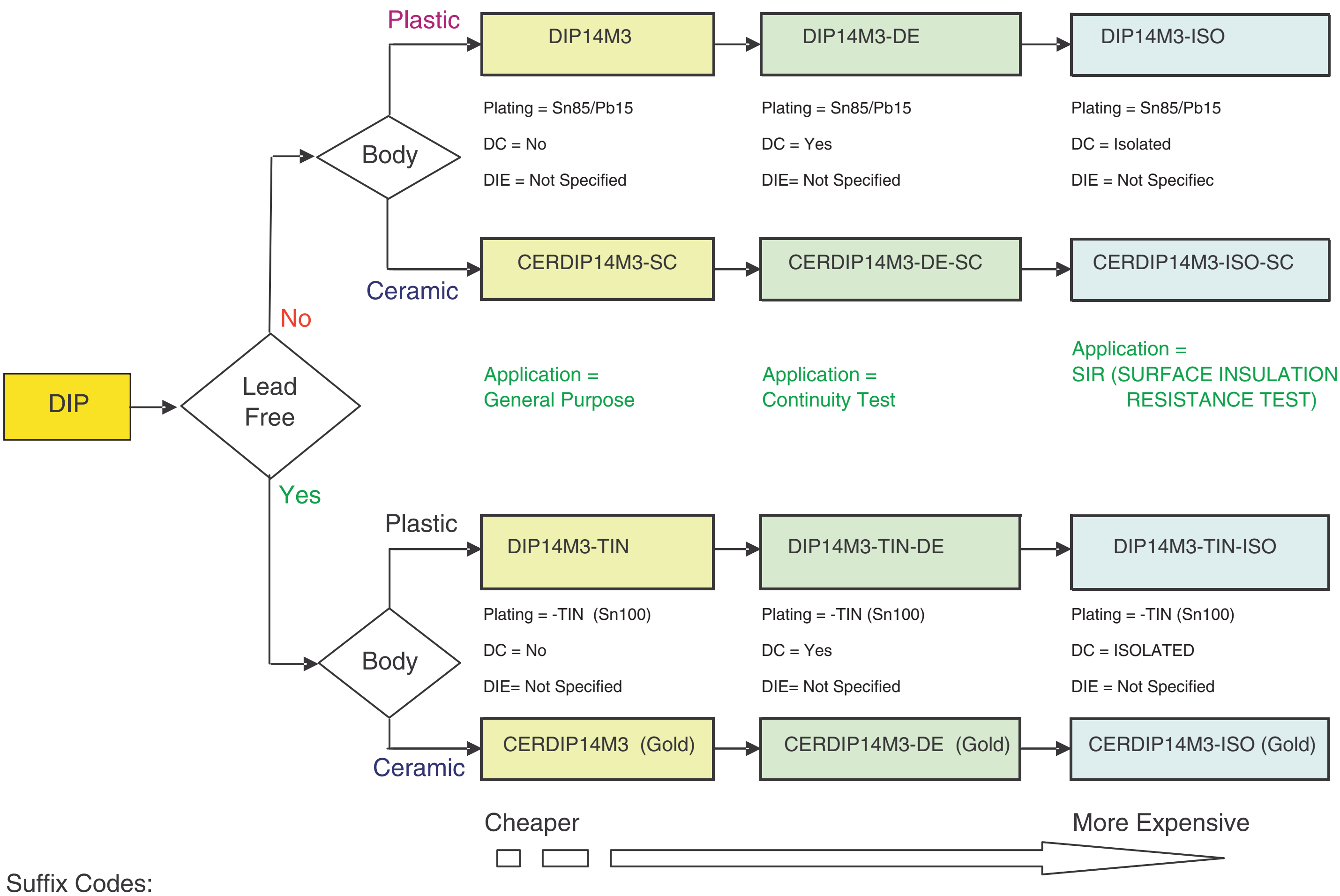
PITCH (MILS)

3 = 300mil
6 = 600mil
9 = 900mil

OPTION

Blank = unspecified
DE = Daisy Chain Even
ISO = isolated

Substituting DIP & CERDIP

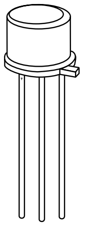


Suffix Codes:
"DE" = Daisy Chain "Even" (1-2, 3-4, 5-6, 7-8, etc) "ISO"= Isoloated connections "BUS" = All Leads Connected.
Lead Free Plating: "TIN" = "T"
Pack: "F" = Leads on tie bars, M = Tube, "X" = mini Pack Bags
"D" = Silicon Dummy DIE

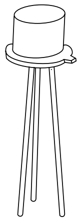
Pitch in mils: .5 = 0.5mm, .65 = 0.65mm, .8 = 0.8mm

TO - Throughhole Transistor

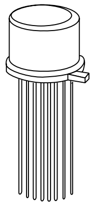
TO5 (1.25" lead length)
TO39 (.75" lead length)

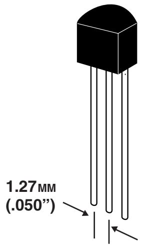


TO18

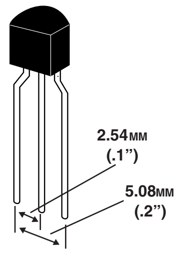


TO75 6 Lead
TO99 8 Lead

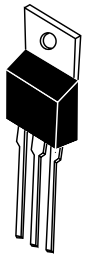




TO92



TO92T-.2



TO220

TO 220 M 3 - Option

Device

TO = Transistor Outline

JEDEC Registration Number

Packaging

M = Tubes
T = Tape & Reel
C = Carrier
A = Ammo Tape
Blank = Bulk

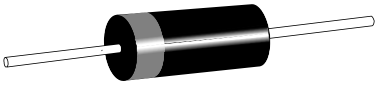
Option

3 = 3 Leads
Blank = Standard

Option

Blank = unspecified
G = Gold
X = special description

DO - Throughhole Diodes



DO 35 T - Option

DEVICE
DO = Diode Outline

JEDEC REGISTRATION NUMBER

PACKAGING
Blank = Bulk
T = Tape & Reel

OPTION
Blank = unspecified
G = Gold
X = special description

Notes

Notes

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Part Numbering System

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