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Layout Library

August 2005

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145MILXP

145 MIL X-PACK

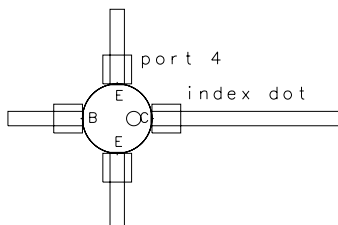
4 ports

package and hole 145 mil diameter

3 leads 30×155.5 mil, 1 lead 30×391.5 mil

pads 60 mil square

BJT



145ML4PK

145 MIL FOUR-PACK

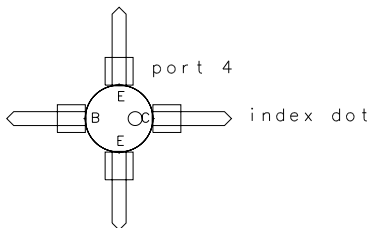
4 ports

package and hole 145 mil diameter

4 leads 30×168.7 mil

pads 60 mil square

BJT



1D2J1A

1-2J1A

2 ports

package 59×110.2 mil

2 leads 23.6×255.9 mil

2 pads 43.6 mil square

Diode



NOTE: text size for a and c has been enlarged

2D3H1A

2-3H1A

3 ports

flange 98.4×338.6 mil

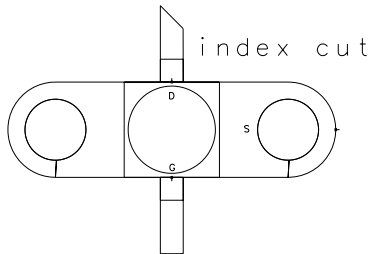
package 98.4 mil square and circle 90 mil diameter

holes 63 mil diameter 240.2 mil center-to-center

2 leads 23.6×78.8 mil

2 pads 23.6 mil square

FET



2D3J1C

2-3J1C

4 ports

SMT

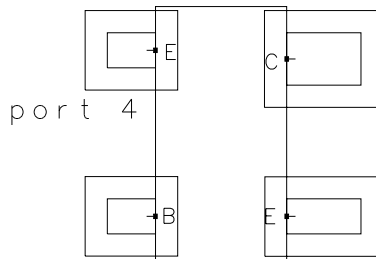
package 114.4×59 mil

2 short leads 15.8×21.8 mil, 1 long lead 15.8×33.6 mil

collector lead 23.6×53.6 mil

pads are lead size plus 10 mil

BJT



2D7C1A

2-7C1A

3 ports

flange 236.2×728.4 mil

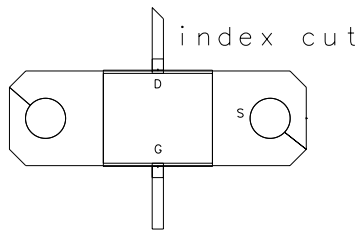
package 236.2×267.8 mil and 220.4×267.8 mil

holes 98.4 mil diameter spaced 551.2 mil center-to-center

2 leads 27.6×157.5 mil

2 pads 27.6 mil square

FET



AFLANGE

(no name given by vendor)

3 ports

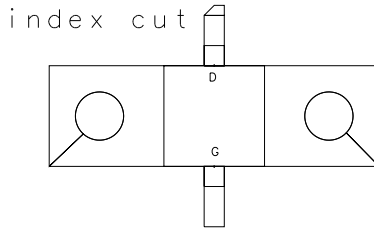
flange 820×250 mil

holes 120 mil diameter spaced 570 mil center-to-center

leads 50×150 mil

pads 50 mil square

FET



AK

AK

5 ports

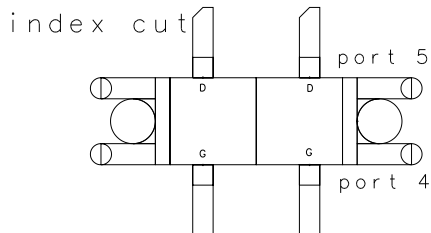
open flange 976×256 mil

holes 130 mil diameter spaced 726 mil center-to-center

leads 60×205 mil

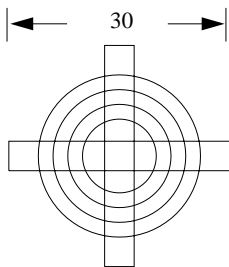
pads 60 mil square

FET



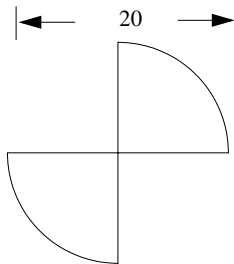
ALMK

Alignment marker
conductor diameter 30 mil
no ports



ALMK2

Alignment marker
conductor diameter 20 mil
no ports



AP

AP

3 ports

flange 750×250 mil

holes 125 mil diameter 560 mil center-to-center

leads 60×200 mil

pads 60 mil square

FET



AQ

AQ

5 ports

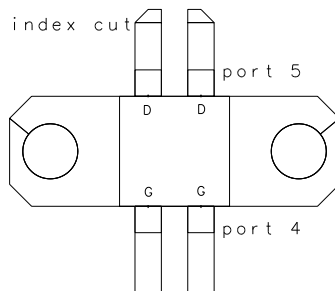
flange 750×250 mil

holes 130 mil diameter 560 mil center-to-center

leads 60×197.5 mil

pads 60 mil square

FET



ATF36

Avantek 36

4 ports

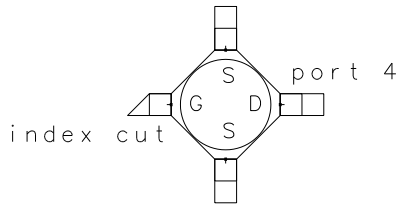
SMT

package 100 mil octagon and 83 mil diameter circle

leads 20×40 mil

pads 20 mil square

FET



ATF70

Avantek 70

4 port

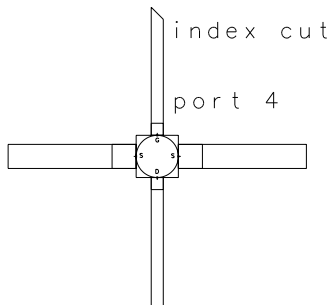
SMT

package 70 mil square and circle

2 leads 40×212.5 mil, 2 leads 20×212.5 mil

2 pads 40 mil square, 2 pads 20 mil square

FET



ATF76

Avantek 76

4 ports

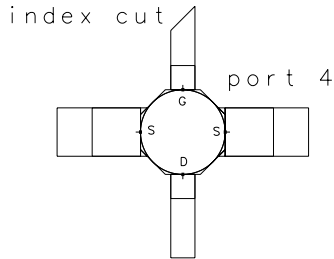
SMT

package 70 mil octagon and circle

2 leads 40 × 69 mil, 2 leads 20 × 69 mil

2 pads 40 mil square, 2 pads 20 mil square

FET



ATF84

Avantek 84

4 ports

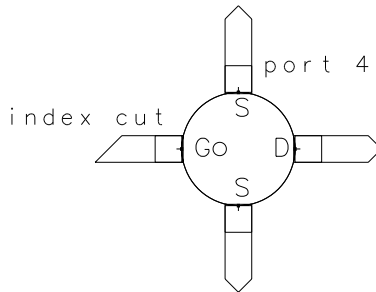
package 85 mil diameter

hole 85 mil diameter

leads 20 × 65 mil

pads 20 × 20 mil

FET



ATF86

Avantek 86

4 ports

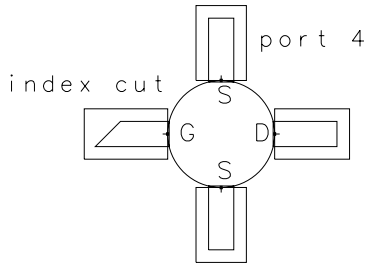
SMT

package 85 mil diameter

leads 20×57.5 mil

pads 40×66.3 mil

FET



ATCCAP

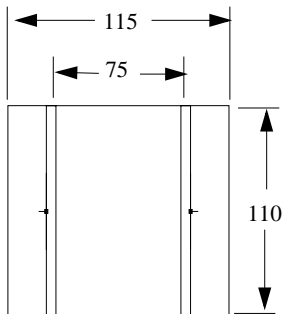
Chip capacitor outline

2 ports

75 mil port-to-port

leads 110×25 mil

packages 110×75



AVNK35

Avantek 35

4 ports

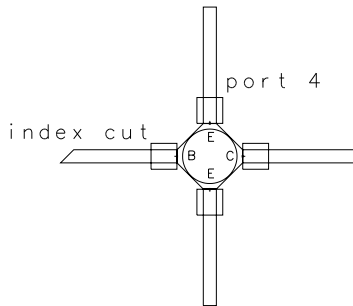
SMT

package 100 mil square

leads 20×175 mil

pads 40 mil square

BJT



AVNK70

Avantek 70

4 ports

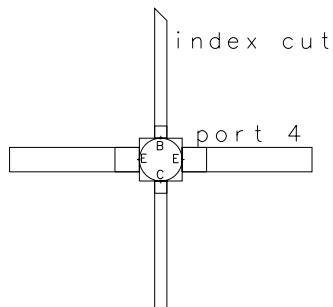
SMT

package 70 mil square and circle

leads 40×212.5 mil and leads 20×212.5 mil

pads 40 mil square and pads 20 mil square

BJT



AVNK85

Avantek 85

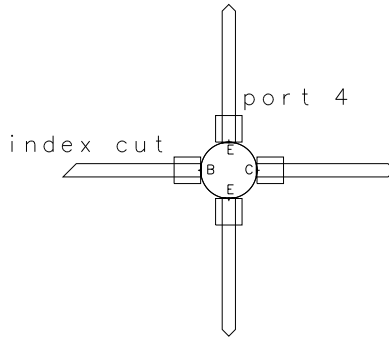
4 ports

package and hole 85 mil diameter

leads 20×207.5 mil

pads 40 mil square

BJT



AVNK86

Avantek 86

4 ports

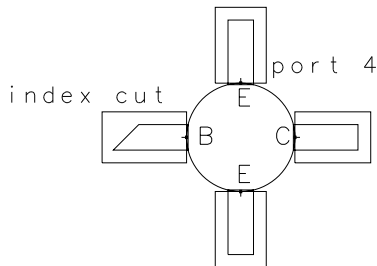
SMT

package 85 mil diameter

leads 20×57.5 mil

pads 40×66.3 mil

BJT



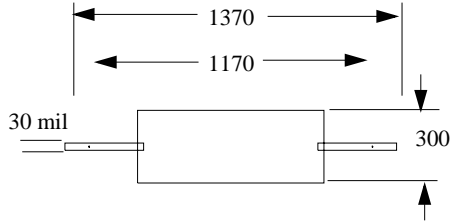
AXIAL_L

Axial leaded components (large)

2 ports

leads 30×325

packages 300×770



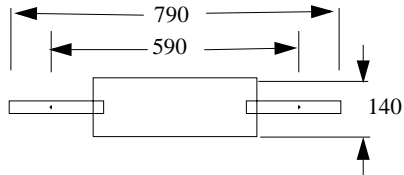
AXIAL_M

Axial leaded components (medium)

2 ports

leads 30×270

packages 140×390



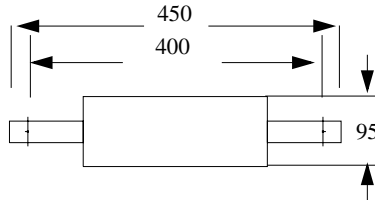
AXRES

Axial leaded components (small)

2 ports

leads 29×100 mil

resistor 95×249



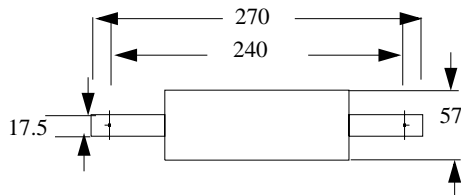
AXRES2

Axial leaded components

2 ports

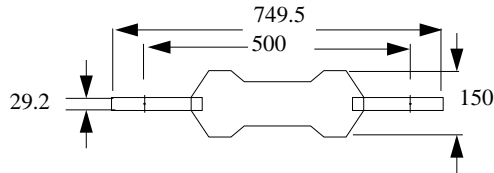
leads 17.5×60 mil

resistor 57×150



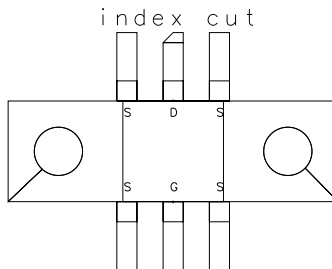
AXRES3

Axial leaded components
2 ports, 500 mil port-to-port
leads 29.2×205 mil
resistor



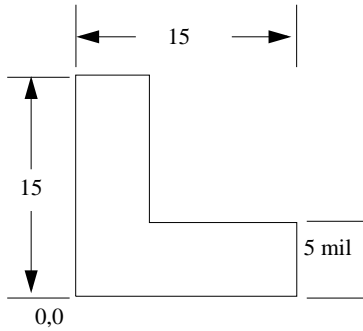
BFLANGE

no name given by vendor
3 ports
flange 820×250 mil
holes 120 mil diameter 570 mil center-to-center
leads 50×170 mil
pads 50 mil square
FET



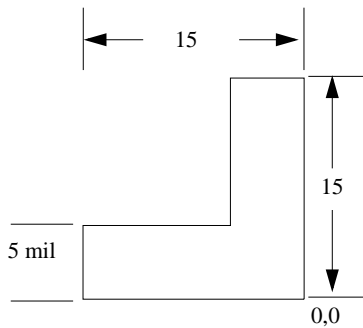
C-LL

Alignment corner marks
no ports
conductor 5 mil wide



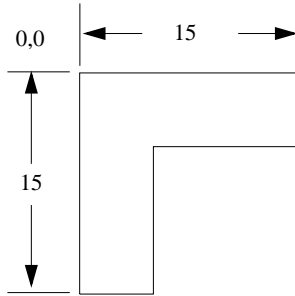
C-LR

Alignment corner marks
no ports
conductor 5 mil wide



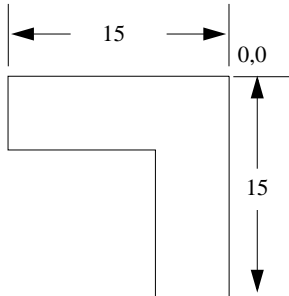
C-UL

Alignment corner marks
no ports
conductor 5 mil wide



C-UR

Alignment corner marks
no ports
conductor 5 mil wide



C145D01

Motorola Case 145-01

4 ports

stud mount

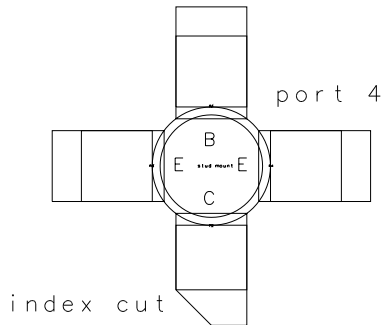
package 375 mil diameter

hole 325 mil diameter

4 leads 225 × 317.5 mil

3 pads 225 mil square. 1 pad 225 × 205 mil

BJT



C18202

Motorola Case 182-02

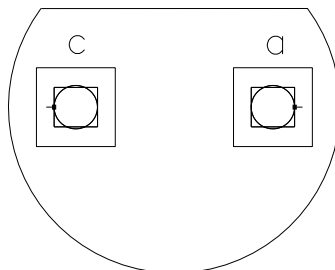
2 ports

package 170 mil diameter cut × 130 mil chord

holes 22 mil diameter and 22 × 20 mil

pads 40 mil square

Diode



C2003

Motorola Case 20-03

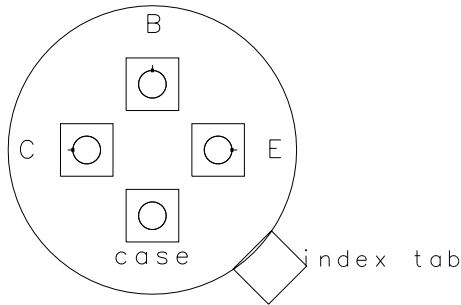
3 ports

case 219.5 mil diameter

holes 21 mil diameter 50 mil from case center

pads 40 mil square

BJT



C211D07

Motorola Case 211-07

4 ports

flange 975 × 250 mil

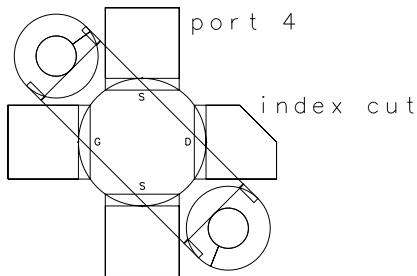
package 380 mil diameter

holes 120 mil diameter 725 mil center-to-center

leads 220 × 210 mil at 45°

pads 220 × 210 mil

FET



C211D07V2

Motorola Case 211-07

4 ports

flange 975×250 mil

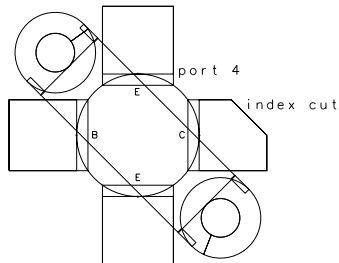
package 380 mil diameter

holes 120 mil diameter 725 mil center-to-center

leads 220×210 mil at 45°

pads 220×210 mil

BJT



C221CD02

Motorola Case 221C-02

3 ports

drawn as if flange

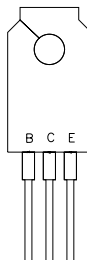
package 398×698 mil

hole 145 mil diameter

3 leads 132×33 mil and 58 mil

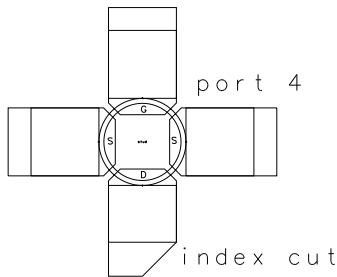
3 pads 58×132 mil

BJT



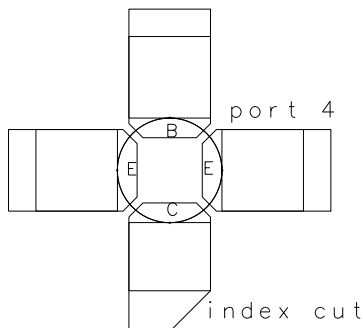
C244D04

Motorola Case 244-04
4 ports
stud mount
package 282 mil diameter
hole 250 mil diameter
leads 220×294 mil
pads 220×220 mil
FET



C249D05

Motorola Case 249-05
4 ports
package and hole 282 mil diameter
4 leads 220×294 mil
4 pads 220 mil square
BJT



C2904

Motorola Case 29-04

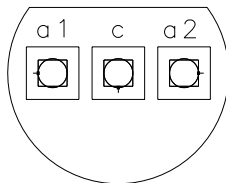
3 ports

package 170 mil diameter cut \times 135 mil chord

holes 22 mil diameter and 22×20 mil

pads 40 mil square

Diode



C30301

Motorola Case 303-01

4 ports

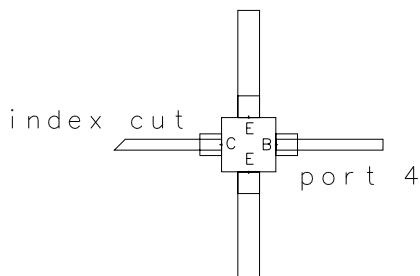
SMT

100 mil square package

2 leads 40×197.5 mil, 2 leads 20×197.5 mil

pads 40 mil square

BJT



C305D01

Motorola Case 305-01

4 ports

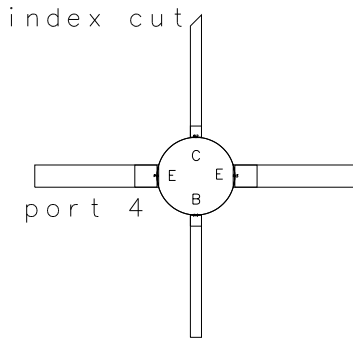
stud mount

package and hole 210 mil diameter

2 leads 60×330 mil, 2 leads 30×330 mil

2 pads 60 mil square, 2 pads 30 mil square

BJT



C317D02

Motorola Case 317-02

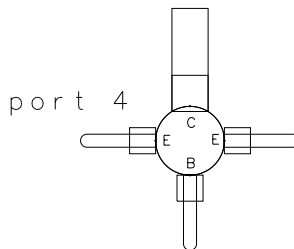
4 ports

190 mil diameter package and hole

1 lead 100×270.5 mil, 3 leads 36×207.5 mil

1 pad 100 mil square, 3 pads 72 mil square

BJT



C319BD01

Motorola Case 319B-01

5 ports

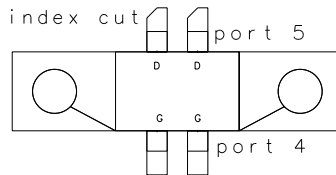
flange 975×233 mil

holes 130 mil diameter 725 mil center-to-center

leads 60×130 mil

pads 60 mil square

FET



C319D06

Motorola Case 319-06

3 ports

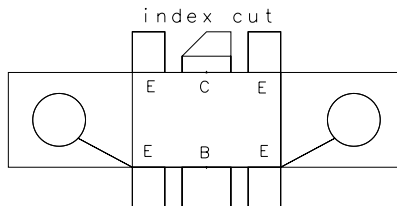
flange 975×233 mil

holes 130 mil diameter 725 mil center-to-center

4 leads 60×100 mil, 2 leads 120×100 mil (one notch)

4 pads 80×100 mil, 1 pad 40×120 mil

BJT



C369D03

Motorola Case 369-03

3 ports

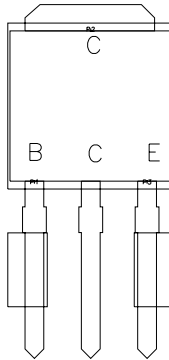
drawn as for flange mount

package 240×258 mil

3 leads 30×365 mil

2 pads 63×118 mil, 1 pad 265 mil square

BJT



C5102

Motorola Case 51-02

2 ports

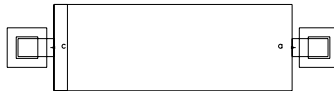
package 96×265 mil

2 leads 20×40 mil (bent)

2 holes 22 mil square

2 pads 44 mil square

Diode



C744AD01

Motorola Case 744A-01

8 ports

flange 385 × 900 mil

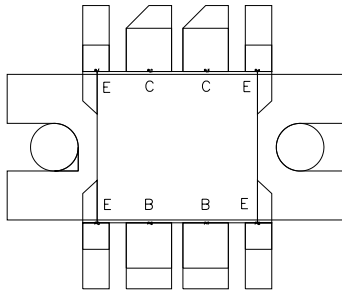
package 424 × 400 mil

holes 126 mil diameter 650 mil center-to-center

4 leads 182 × 70 mil, 4 leads 182 × 120 mil

4 pads 70 mil square, 4 pads 120 mil square

BJT



C751D03

Motorola Case 751-03

8 ports

SMT

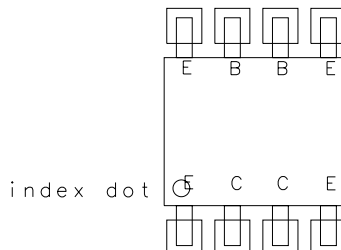
single device inside

package 192 × 154 mil

8 leads 16.5 × 41.5 mil

8 pads 36.5 mil square

BJT



C7904

Motorola Case 79-04

3 ports

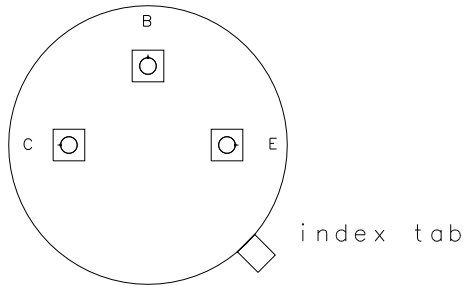
package 352.5 mil diameter

holes 21 mil diameter

100 mil from package center

pads 40 mil square

BJT



CD

CD

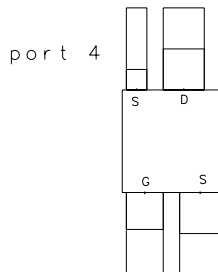
4 ports

package 250 mil square

2 leads 100 × 200 mil, 1 lead 90 × 200 mil, 1 lead 50 × 200 mil

2 pads 100 mil square, 1 pad 90 mil square, 1 pad 50 mil square

FET



CERECX

CEREC-X

4 ports

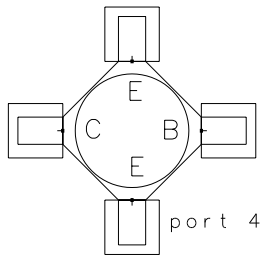
SMT

package 100.4 mil octagon and 86.6 mil diameter circle

leads 19.7×32.5 mil

pads 39.5 mil square

BJT



CERECXF

CEREC-XF

4 ports

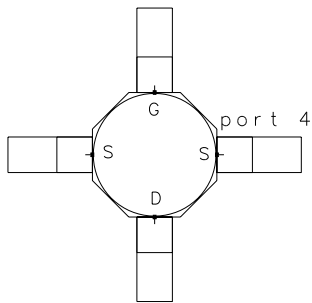
SMT

package 70 mil octagon

leads 20×47.5 mil

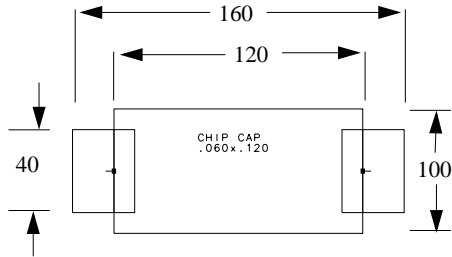
pads 20 mil square

FET



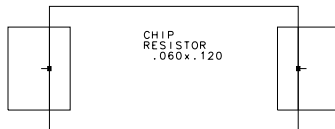
CHPCAP

Surface mount components
conductor 40×30 mil
packages 60×120 mil
2 ports



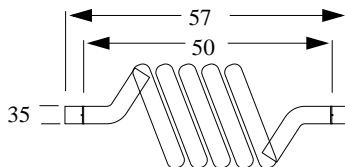
CHPRES

2 ports
packages 60×120 mil
leads 40×30 mil



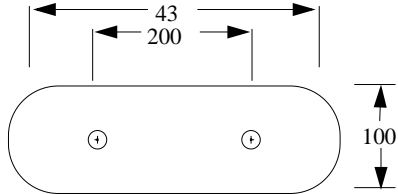
COIL1

General inductor outline
hand wound coil inductor
2 ports
dia.35 mil



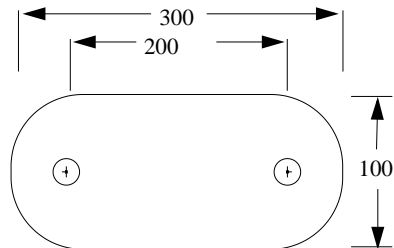
DISK_L

Ceramic disk capacitors (large)
2 ports 200 mil port-to-port
packages 140×432 mil
leads 24 mil diameter



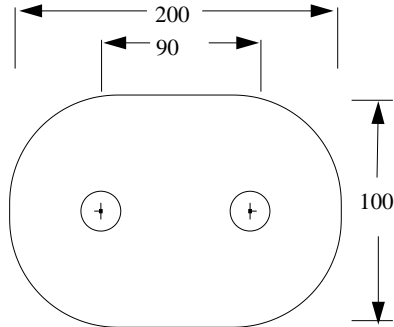
DISK_M

Ceramic disk capacitors (medium)
2 ports 200 mil port-to-port
packages 140×300 mil
leads 24 mil diameter



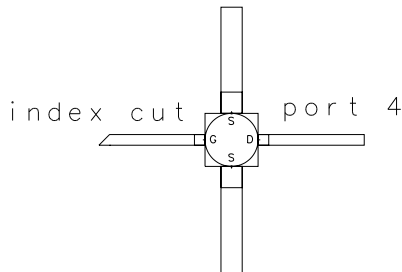
DISK_S

Ceramic disk capacitors (small)
2 ports 90 mil port-to-port
packages 140×200 mil
leads 24 mil diameter



GD11

GD11
4 ports
SMT
package 98.4 mil square and circle
2 leads 39.4×196.9 mil, 2 leads 19.7×196.9 mil
2 pads 39.4 mil square, 2 pads 19.7 mil square
FET



GD16

GD16

4 ports

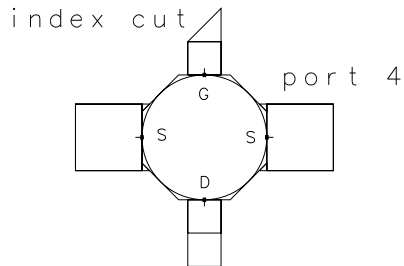
SMT

package 75 mil octagon

2 leads 40×40 mil, 2 leads 20×40 mil

2 pads 40 mil square, 2 pads 20 mil square

FET



GD4

GD4

4 ports

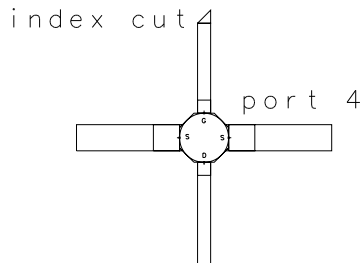
SMT

package 75 mil octagon

2 leads 40×157.5 mil, 2 leads 20×157.5 mil

2 pads 40 mil square, 2 pads 20 mil square

FET



GD7

GD7

4 ports

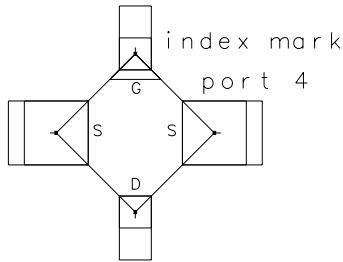
SMT

package 70 mil square (package is octagonal underneath)

2 leads 40 × 30 mil, 2 leads 20 × 30 mil

2 pads 40 mil square, 2 pads 20 mil square

FET



GD9

GD9

4 ports

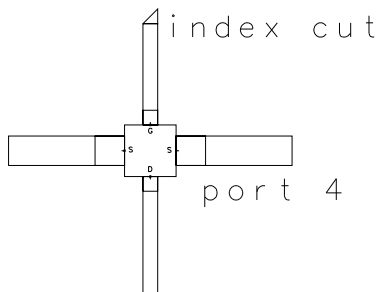
SMT

package 70 mil square

2 leads 40 × 157.5 mil, 2 leads 20 × 157.5 mil

2 pads 40 mil square, 2 pads 20 mil square

FET



GF1

GF1

3 ports

flange 327×98 mil 10 mil rad corners

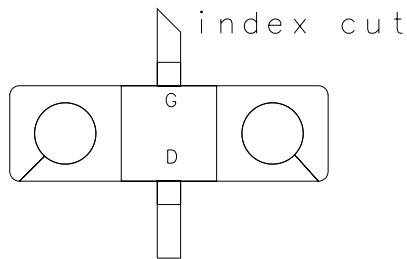
package 98 mil square

2 holes 63 mil diameter 213 mil center-to-center

2 leads 24×79 mil

2 pads 24 mil square

FET



GF11

GF11

3 ports

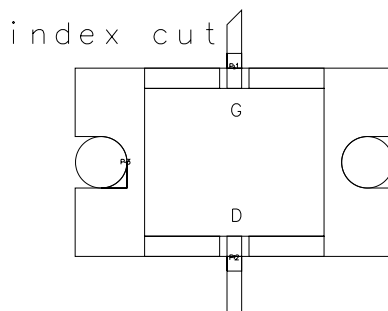
open flange 433×256 mil

holes 70 mil diameter 362 mil center-to-center

2 leads 20×79 mil

2 pads 20 mil square

FET



GF21

GF21

3 ports

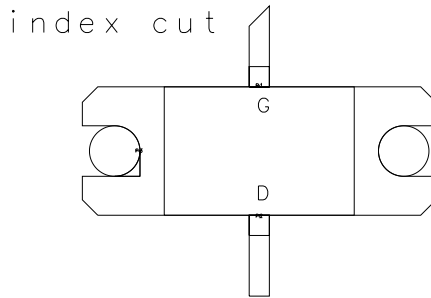
open flange 689 × 250 mil 30 mil corners

holes 98.4 mil diameter 563 mil center-to-center

2 leads 39.4 × 157.5 mil

2 pads 39.4 × 39.4 mil

FET



GF4

GF4

3 ports

flange 417 × 138 mil 12 mil corners

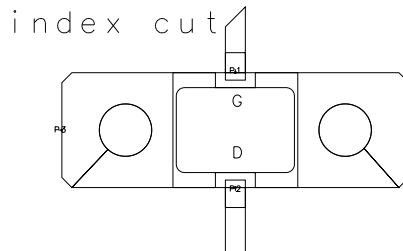
package 150 × 98 mil minus indentations

holes 63 mil diameter 264 mil center-to-center

2 leads 24 × 79 mil

2 pads 24 mil square

FET



GF7

GF7

3 ports

flange 551 × 173 mil

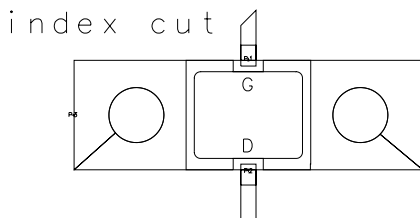
package 197 × 173 mil minus indentations

holes 87 mil diameter 354 mil center-to-center

2 leads 24 × 79 mil

2 pads 24 mil square

FET



HP70GT

HPAC-70GT

4 ports

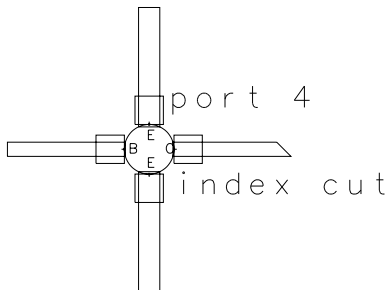
SMT

package 70 mil diameter

2 leads 30 × 165 mil, 2 leads 20 × 165 mil

pads 40 mil square

BJT



HP85PLAS

HP85 Plastic

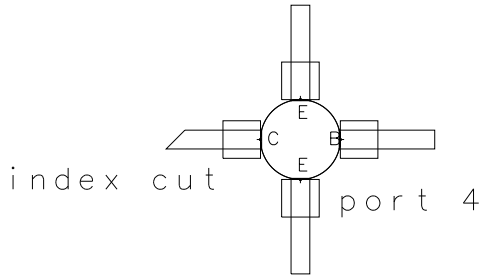
4 ports

package and hole 85 mil diameter

leads 20×100.5 mil

pads 40 mil square

BJT



HPAC100

HPAC100

4 ports

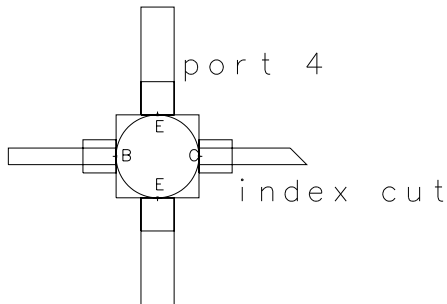
SMT

package 100 mil square and diameter

2 leads 40×130 mil, 2 leads 20×130 mil

pads 40 mil square

BJT



HPAC100X

HPAC100X

4 ports

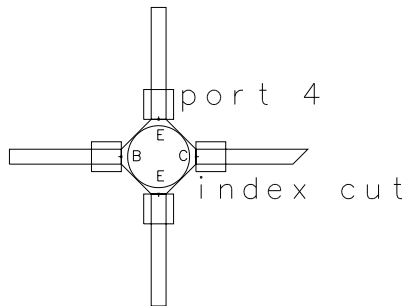
SMT

package 100 mil octagon and 83 mil diameter circle

4 leads 20×150 mil

pads 40 mil square

BJT



HPAC200

HPAC200

4 ports

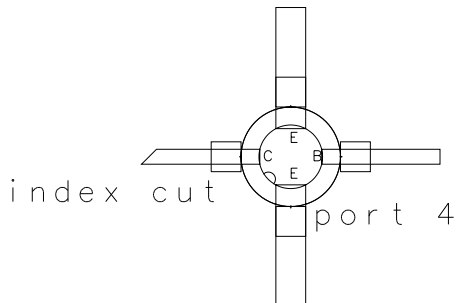
package and hole 200 mil diameter

leads enter package at 128 mil diameter

2 leads 60×200 mil, 2 leads 30×200 mil

pads 60 mil square

BJT



HPAC200V2

HPAC200

4 ports

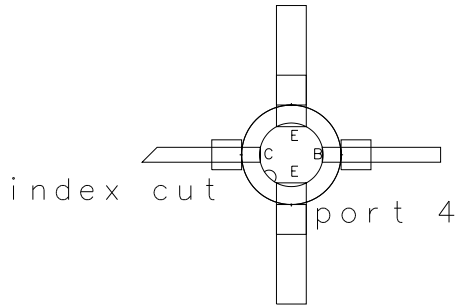
package and hole 200 mil diameter

leads enter package at 128 mil diameter

2 leads 60×200 mil, 2 leads 30×200 mil

pads 60 mil square

BJT



LG

LG

4 ports

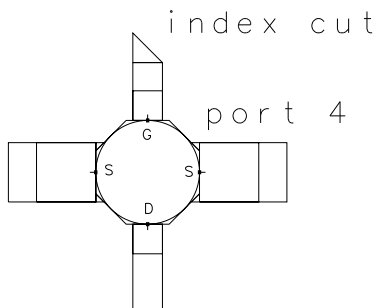
SMT

package 70 mil octagon

2 leads 40×59 mil, 2 leads 20×59 mil

2 pads 40 mil square, 2 pads 20 mil square

FET



LLD

LLD

2 ports

SMT

package 114.2×53.2 mil

2 leads 11.8×53.2 mil

2 pads 31.8×73.2 mil

Diode



M205

M205

2 ports

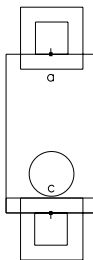
SMT

package 60×106.3 mil

2 leads 21.7×21.5 mil

2 pads 41.7×41.5 mil

Diode



M253

M253

4 ports

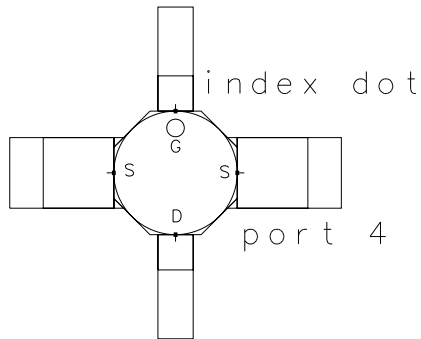
SMT

package 70 mil octagon

2 leads 40×59 mil, 2 leads 20×59 mil

2 pads 40 mil square, 2 pads 20 mil square

FET



MACROT

MACRO-T

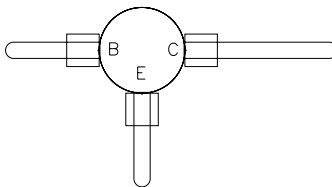
3 ports

package and hole 190 mil diameter

2 pins 36×207.5 mil, 1 pin 36×337.5 mil

pads 72 mil square

BJT



MACROX

MACRO-X

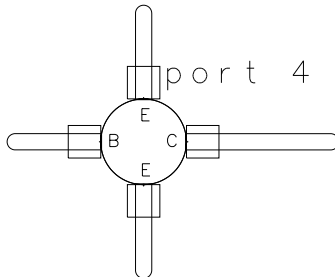
4 ports

package and hole 190 mil diameter

3 pins 36×207.5 mil, 1 pin 36×337.5 mil

pads 72 mil square

BJT



ME

ME

3 ports

flange 630×197 mil

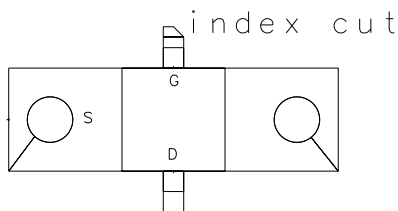
package 197 mil square

holes 87 mil diameter 472 mil center-to-center

2 leads 39×79 mil

2 pads 39 mil square

FET



MICROX

MICRO-X

4 ports

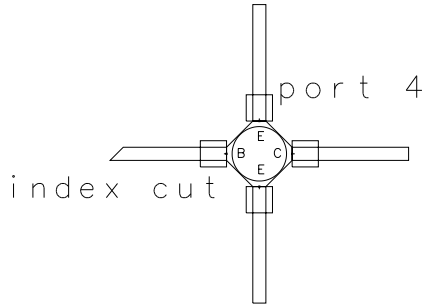
SMT

package 100 mil octagon and 83 mil diameter circle

leads 20×177.5 mil

pads 40 mil square

BJT



MOP

Mini Octal Package

8 ports

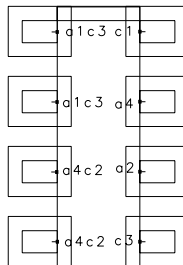
SMT

package 185.4×59 mil

8 leads 25×15.8 mil

8 pads 45×35.8 mil

Diode



MW4

MW4

4 ports

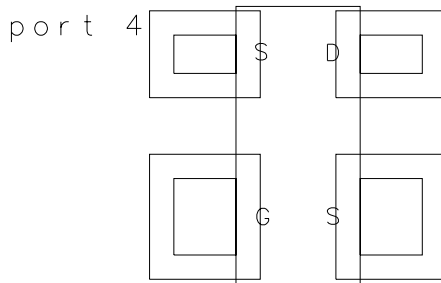
SMT

package 51.2×114.2 mil

2 leads 31.5×25.6 mil, 2 leads 15.8×25.6 mil

2 pads 51.5×45.6 mil, 2 pads 35.8×45.6 mil

FET



MWT70

MWT70

4 ports

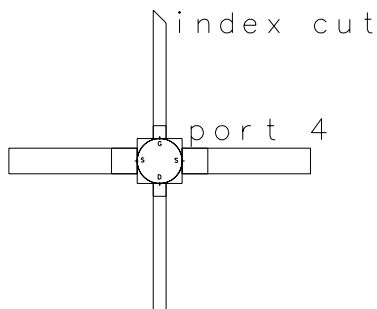
SMT

package 70 mil square and circle

2 leads 40×200 mil, 2 leads 20×200 mil

2 pads 40 mil square, 2 pads 20 mil square

FET



MWT71

MWT71

3 ports

flange 335 × 98 mil

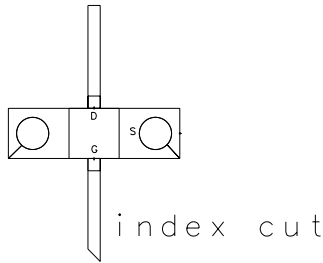
package 98 mil square

holes 63 mil diameter 240 mil center-to-center

2 leads 24 × 201 mil

2 pads 24 mil square

FET



MWT73

MWT73

4 ports

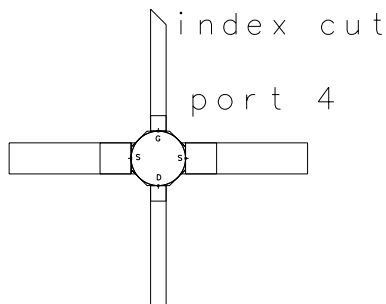
SMT

package 70 mil octagon and circle

2 leads 40 × 157 mil, 2 leads 20 × 157 mil

2 pads 40 mil square, 2 pads 20 mil square

FET



NEC01

NEC01

3 ports

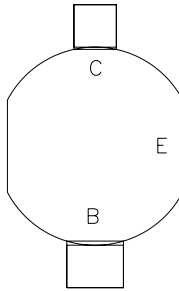
package 275.6 mil diameter circle cut to 244 mil width

1 lead 59×78.8 mil, 1 lead 59 mil square

1 pad 59 mil square, 1 pad 59×78.8 mil

emitter on bottom

BJT



NEC03

NEC03

4 ports

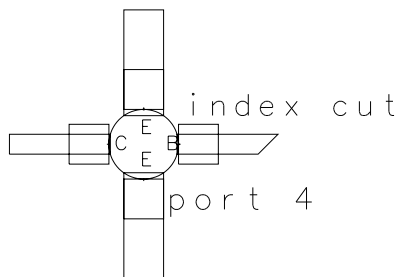
SMT

package 137.8 mil diameter

2 leads 78.7×196.9 mil, 2 leads 39.4×196.9 mil

pads 78.7 mil square

BJT



NEC07

NEC07

4 ports

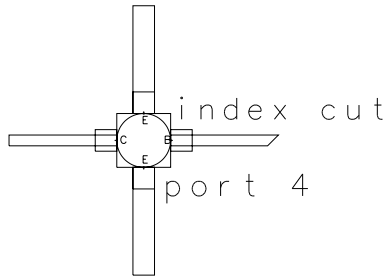
SMT

package 98.4 mil square and circle

2 leads 39.4×196.9 mil, 2 leads 19.7×196.9 mil

pads 39.4 mil square

BJT



NEC08

NEC08

4 ports

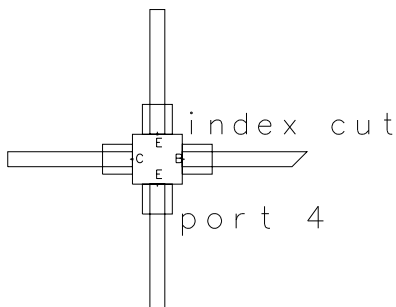
SMT

package 78.7 mil square

leads 23.6×196.9 mil

pads 47.2 mil square

BJT



NEC12

NEC12

3 ports

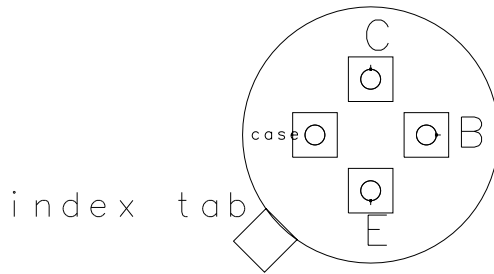
package 229.9 mil diameter

holes 17.8 mil diameter

50 mil from package center

pads 40 mil square

BJT



NEC13

NEC13

3 ports

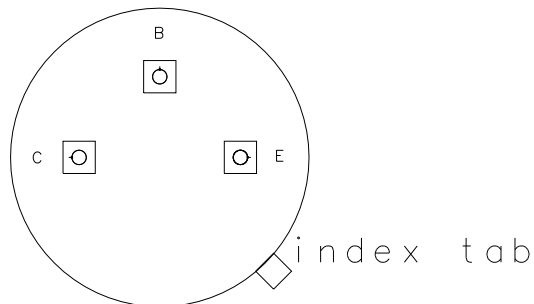
package 370.1 mil diameter

holes 17.8 mil diameter

100 mil from package center

pads 40 mil square

BJT



NEC14

NEC14

3 ports

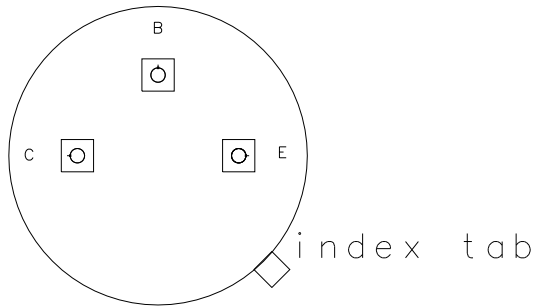
package 370.1 mil diameter

holes 17.8 mil diameter

100 mil from package center

pads 40 mil square

BJT



NEC15

NEC15

3 ports

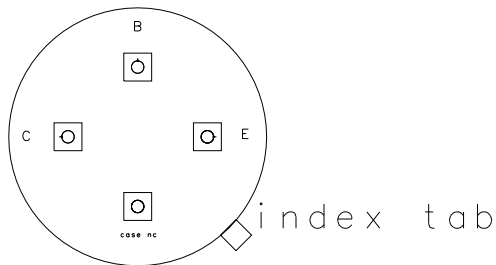
package 370.1 mil diameter

holes 17.8 mil diameter

100 mil from package center

pads 40 mil square

BJT



NEC18

NEC18

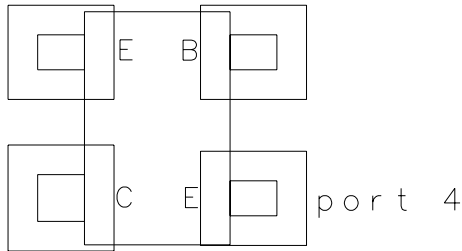
4 ports

SMT

package 49.2×78.7 mil

3 leads 11.8×15.8 mil, 1 lead 15.8 mil square

3 pads 31.8 mil square



NEC19

NEC19

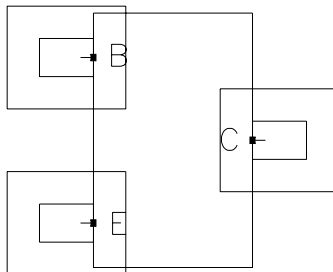
3 ports

SMT

package 31.5×63 mil

2 leads 7.9×15.8 mil, 1 lead 11.8×15.8 mil

BJT



NEC20

NEC20

4 ports

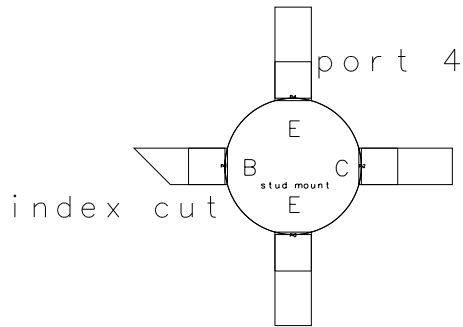
stud mount

package and hole 295.3 mil diameter

4 leads 78.8 × 196.9 mil

4 pads 78.8 mil square

BJT



NEC30

NEC30

3 ports

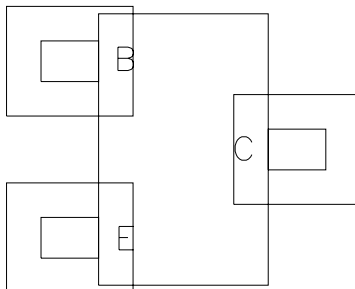
SMT

package 49.3 × 78.8 mil

leads 11.8 × 16.7 mil

pads 31.9 × 36.8 mil

BJT



NEC32

NEC32

3 ports

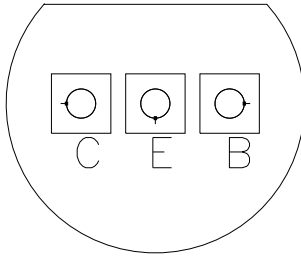
package 204.7 mil diameter circle cut \times 149.9 mil chord

total y-axis height 165.4 mil

holes 19.7 mil diameter 69.7 mil down from chord spaced 50 mil center-to-center

pads 40 mil square

BJT



NEC33

NEC33

3 ports

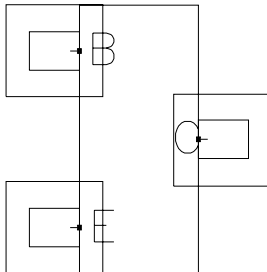
SMT

package 115 \times 51 mil

leads 16.5 \times 21.5 mil

pads 41.5 \times 39.4 mil

BJT



NEC34

NEC34

3 ports

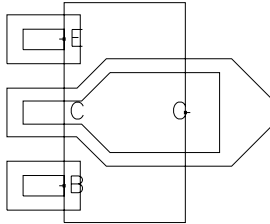
SMT

package 177.2×97.7 mil

2 leads 16.5×33.1 mil and 27.6×64.4 mil

2 pads 39.4×59.1 mil

BJT



NEC35

NEC35

4 ports

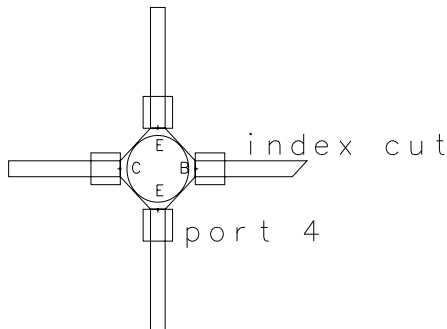
SMT

package 100.4 mil octagon and 82.7 mil diameter circle

leads 19.7×149.6 mil

pads 39.4 mil square

BJT



NEC37

NEC37

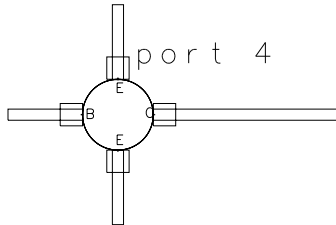
4 ports

package and hole 149.6 mil diameter

3 leads 23.6×157.5 mil, 1 lead 23.6×393.7 mil

pads 47.2 mil square

BJT



NEC38

NEC38

4 ports

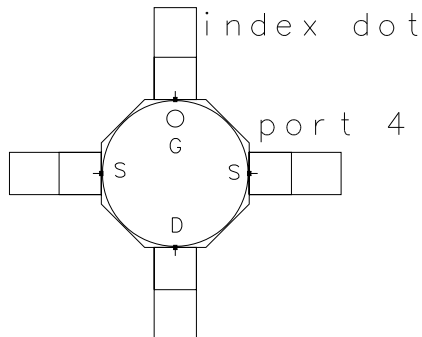
SMT

package 70 mil octagon

leads 20×43.5 mil

pads 20 mil square

FET



NEC39

NEC39

4 ports

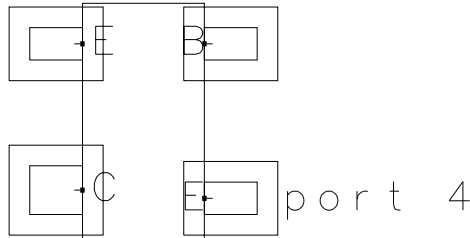
SMT

package 59.1×114.2 mil

3 leads 15.7×25.6 mil, 1 lead 23.6×25.6 mil

pads are leads 10 mil xy

BJT



NEC53E

NEC53E

3 ports

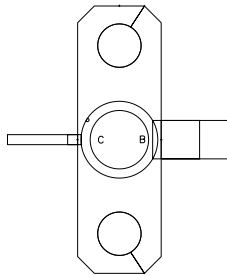
flange 800×250 mil

holes 130 mil diameter 563 mil center-to-center

1 lead 30×210 mil, 1 lead 115×210 mil

1 pad 30 mil square, 1 pad 115 mil square

BJT



NEC75

NEC75

3 ports

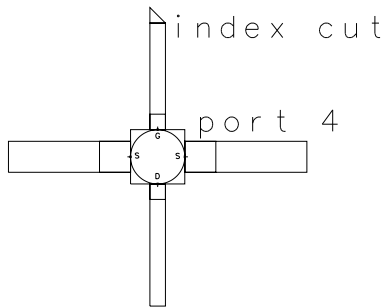
flange 385.8×90.6 mil

holes 70.8 mil diameter 275.6 mil center-to-center

2 leads 19.6×118.1 mil

2 pads 19.6 mil square

FET



NEC83

NEC83

4 ports

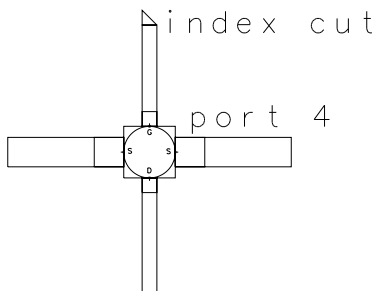
SMT

package 70 mil square

2 leads 40×157.5 mil, 2 leads 20×157.5 mil

2 pads 40 mil square, 2 pads 20 mil square

FET



NEC84

NEC84

4 ports

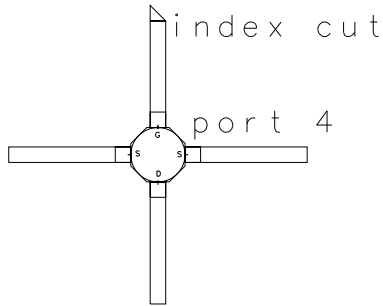
SMT

package 70 mil octagon

leads 20×157.5 mil

pads 20 mil square

FET



NEC84A

NEC84A

4 ports

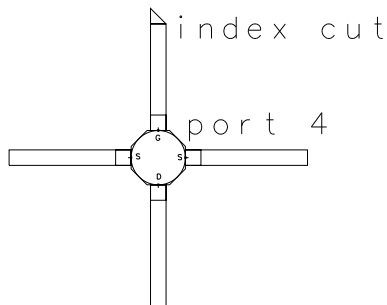
SMT

package 70 mil octagon

leads 20×157.5 mil

pads 20 mil square

FET



NEC87

NEC87

3 ports

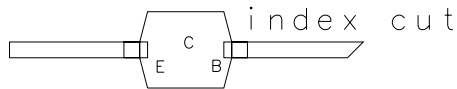
package 114.2×137.8 mil octagon

2 leads 23.6×196.9 mil

2 pads 23.6 mil square

collector on bottom

BJT



NEC89

NEC89

4 ports

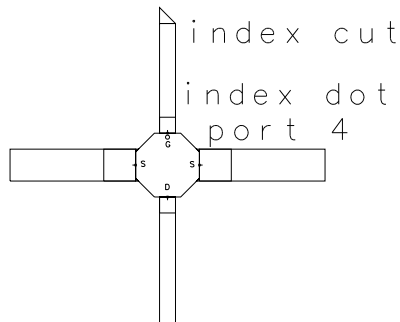
SMT

package 80 mil octagon

2 leads 80×157.5 mil, 2 leads 20×157.5 mil

2 pads 20 mil square, 2 pads 80 mil square

FET



NEC89A

NEC89A

4 ports

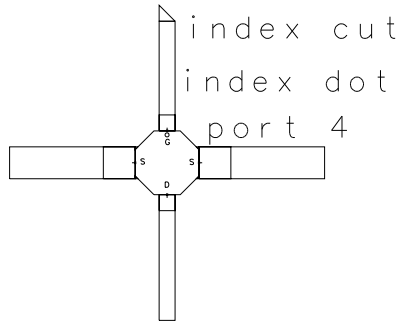
SMT

package 80 mil octagon

2 leads 80×157.5 mil, 2 leads 20×157.5 mil

2 pads 20 mil square, 2 pads 80 mil square

FET



OKI_1

(no name given by vendor)

3 ports

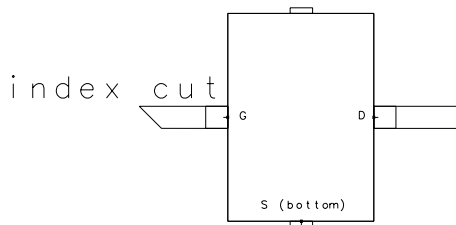
package and hole 130×185 mil

2 leads 19.7×78.8 mil

2 pads 19.7 mil square

2 support bars 5×20 mil

FET



PFLANGE

(no name given by vendor)

5 ports

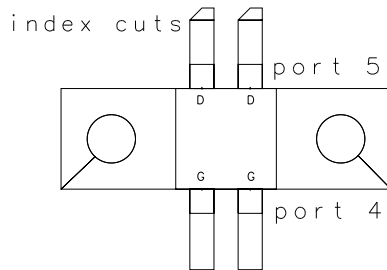
flange 820×250 mil

holes 120 mil diameter 570 mil center-to-center

leads 60×200 mil

pads 60 mil square

FET



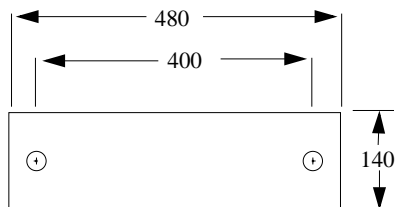
RADIAL_L

Radial leaded components

2 ports 400 mil port-to-port

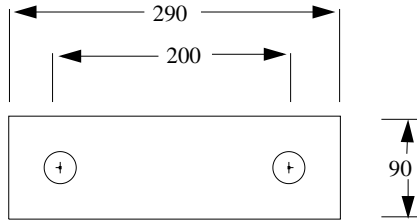
packages 140×480 mil

leads 28 mil diameter



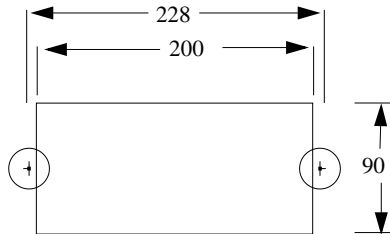
RADIAL_M

Radial leaded components
2 ports 200 mil port-to-port
packages 90×290 mil
leads 28 mil diameter



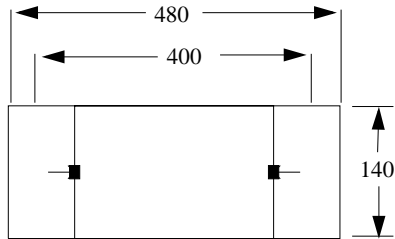
RADIAL_S

Radial leaded components
2 ports 200 mil port-to-port
packages 90×190 mil
leads 28 mil diameter



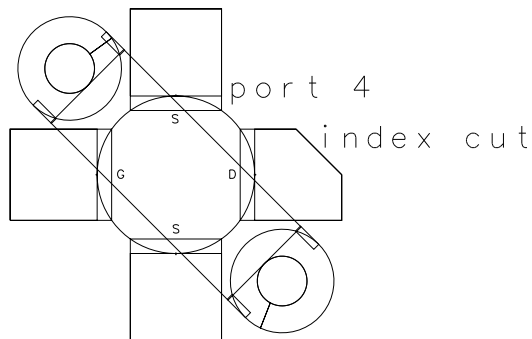
RESA

Chip resistor
2 ports 30 mil port-to-port
packages 20×30 mil
resi 20×50 mil



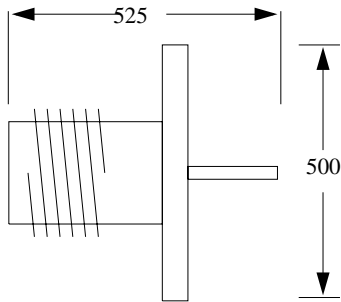
SFLANGE

(no name given by vendor)
4 ports
flange 975×250 mil
package 380 mil diameter
holes 120 mil diameter 725 mil center-to-center
leads 220×210 mil at 45°
pads 220×210 mil
FET



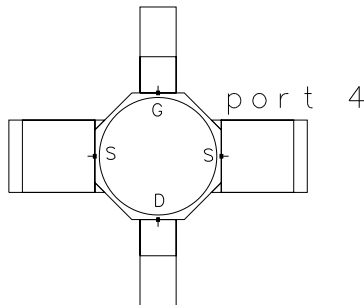
SMA_FEM

SMA connector outline female
no ports
conductor
cond2
leads



SMSMICROX

Siemens MICRO-X
4 ports
SMT
package 70 mil octagon
2 leads 20×47.5 mil, 2 leads 40×47.5 mil
2 pads 20 mil square, 2 pads 40 mil square
FET
WARNING: NOT identical to MICROX



SOD123

SOD123

2 ports

SMT

package 61×106.3 mil

2 leads 19.7×23.6 mil

2 pads 39.7×43.6 mil

Diode



SOD323

SOD323

2 ports

SMT

package 49.2×98.6 mil

2 leads 11.8×15.8 mil

2 pads 31.8×35.8 mil

Diode



SOD80

SOD80

2 ports

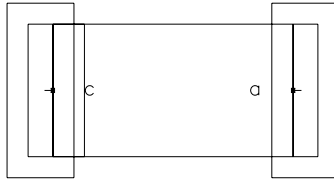
SMT

package 63×137.8 mil

2 leads 11.8×63 mil

2 pads 31.8×83 mil

Diode



SOT103

SOT103

4 ports

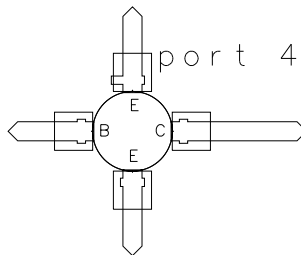
package and hole 189 mil diameter

3 leads 45.3×200.8 mil

1 lead 45.3×318.9 mil

pads 90.6 mil square

BJT



SOT143

SOT143

4 ports

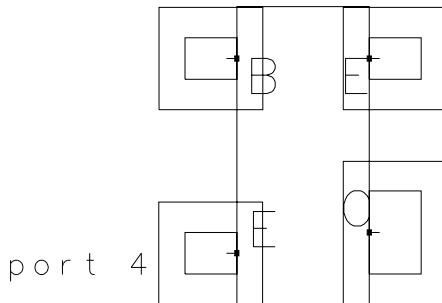
SMT

package 51×115 mil

3 leads 16×20 mil, 1 lead 32×20 mil

3 pads 40×39.4 mil, 1 pad 55.2×40 mil

BJT



SOT143R

SOT143R

4 ports

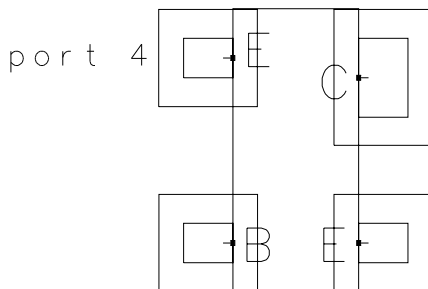
SMT

package 51×115 mil

3 leads 16×20 mil, 1 lead 32×20 mil

3 pads 40×39.4 mil, 1 pad 55.2×40 mil

BJT



SOT143RV2

SOT143

4 ports

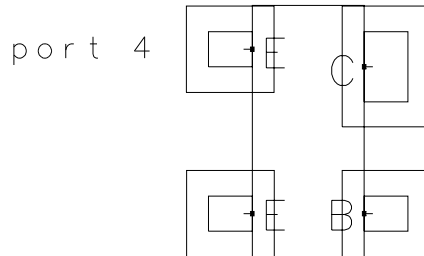
SMT

package 51×115 mil

3 leads 16×20 mil, 1 lead 32×20 mil

3 pads 40×39.4 mil, 1 pad 55.2×40 mil

BJT



SOT143V2

SOT143

4 ports

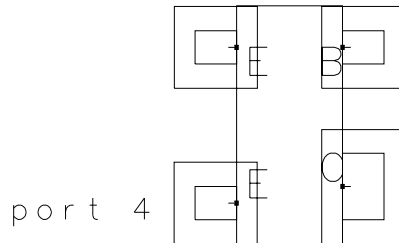
SMT

package 51×115 mil

3 leads 16×20 mil, 1 lead 32×20 mil

3 pads 40×39.4 mil, 1 pad 55.2×40 mil

BJT



SOT143V3

SOT143

4 ports

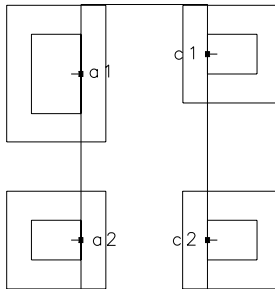
SMT

package 51×115 mil

3 leads 16×20 mil, 1 lead 32×20 mil

3 pads 40×39.4 mil, 1 pad 55.2×40 mil

Diode



SOT143V4

SOT143

4 ports

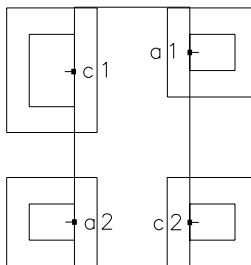
SMT

package 51×115 mil

3 leads 16×20 mil, 1 lead 32×20 mil

3 pads 40×39.4 mil, 1 pad 55.2×40 mil

Diode



SOT143V5

SOT143

4 ports

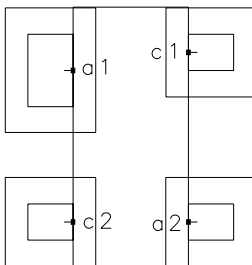
SMT

package 51×115 mil

3 leads 16×20 mil, 1 lead 32×20 mil

3 pads 40×39.4 mil, 1 pad 55.2×40 mil

Diode



SOT143V6

SOT143

4 ports

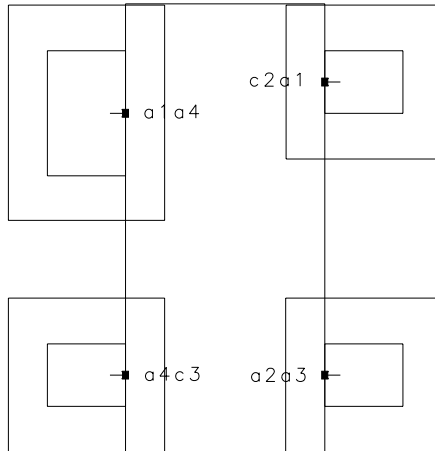
SMT

package 51×115 mil

3 leads 16×20 mil, 1 lead 32×20 mil

3 pads 40×39.4 mil, 1 pad 55.2×40 mil

Diode



SOT143V7

SOT143

4 ports

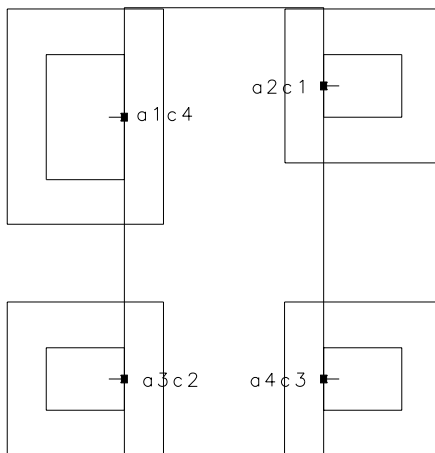
SMT

package 51×115 mil

3 leads 16×20 mil, 1 lead 32×20 mil

3 pads 40×39.4 mil, 1 pad 55.2×40 mil

Diode



SOT223

SOT223

4 ports

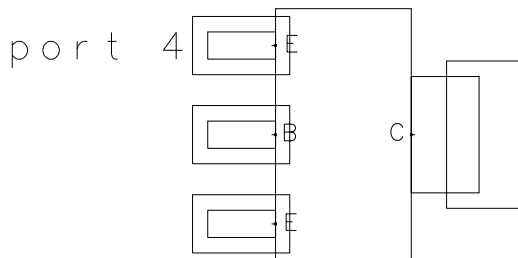
SMT

package 255.9×137.8 mil

3 leads 27.6×68.9 mil, 1 lead 118.1×68.9 mil

3 pads 98.5×59.2 mil, 1 pad 78.9×149.6 mil

BJT



SOT223V2

SOT223

3 ports

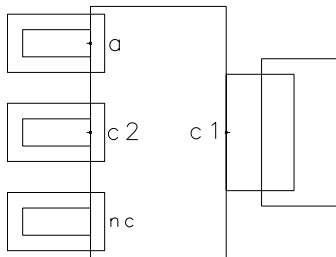
SMT

package 255.9×137.8 mil

3 leads 27.6×68.9 mil, 1 lead 118.1×68.9 mil

3 pads 98.5×59.2 mil, 1 pad 78.9×149.6 mil

Diode



SOT23

SOT23

3 ports

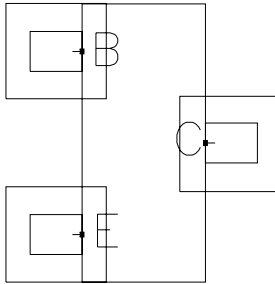
SMT

package 115×51 mil

leads 16.5×21.5 mil

pads 41.5×39.4 mil

BJT



SOT23V2

SOT23

2 ports

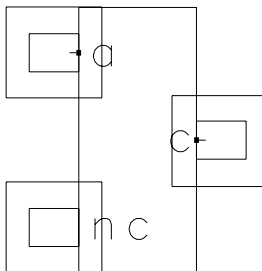
SMT

package 115×51 mil

leads 16.5×21.5 mil

pads 41.5×39.4 mil

Diode



SOT23V3

SOT23

2 ports

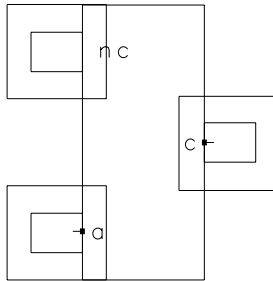
SMT

package 115×51 mil

leads 16.5×21.5 mil

pads 41.5×39.4 mil

Diode



SOT23V4

SOT23

2 ports

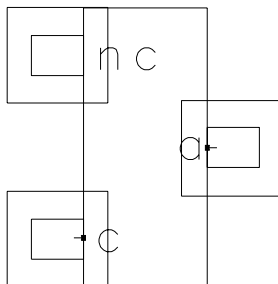
SMT

package 115×51 mil

leads 16.5×21.5 mil

pads 41.5×39.4 mil

Diode



SOT23V5

SOT23

3 ports

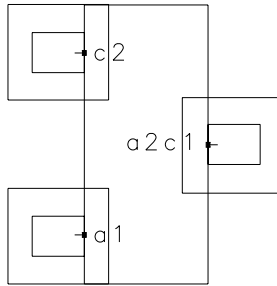
SMT

package 115×51 mil

leads 16.5×21.5 mil

pads 41.5×39.4 mil

Diode



SOT23V6

SOT23

3 ports

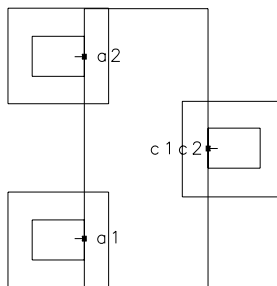
SMT

package 115×51 mil

leads 16.5×21.5 mil

pads 41.5×39.4 mil

Diode



SOT23V7

SOT23

3 ports

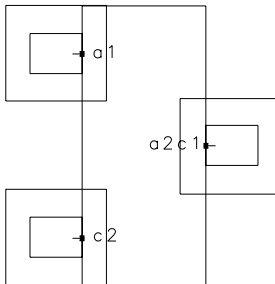
SMT

package 115×51 mil

leads 16.5×21.5 mil

pads 41.5×39.4 mil

Diode



SOT23V8

SOT23

3 ports

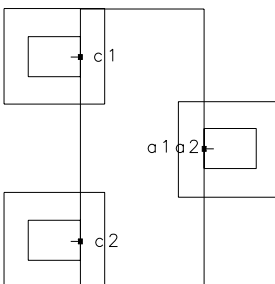
SMT

package 115×51 mil

leads 16.5×21.5 mil

pads 41.5×39.4 mil

Diode



SOT323

SOT323

3 ports

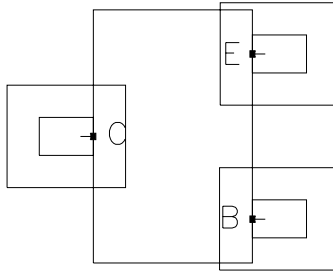
SMT

package 78.6×49.4 mil

leads 11.8×16.8 mil

pads 31.8×36.8 mil

BJT



SOT37

SOT37

3 ports

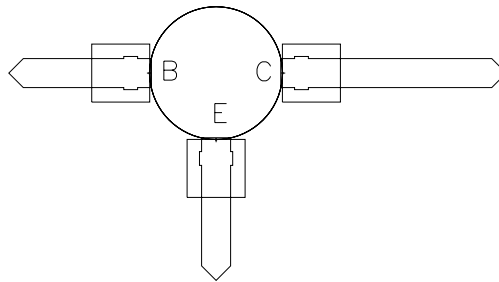
package and hole 189 mil diameter

2 leads 41.3×200.8 mil

1 lead 41.3×318.9 mil

pads 82.6 mil square

BJT



SOT89

SOT89

3 ports

SMT

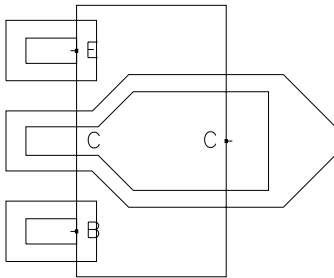
package 177.2×97.7 mil

2 leads 16.5×33.1 mil

collector lead 18.6×33.1 mil and 27.6×64.64 mil

2 pads 59.1×39.4 mil

BJT



SOT89V2

SOT89

3 ports

SMT

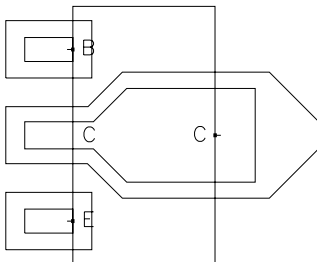
package 177.2×97.7 mil

2 leads 16.5×33.1 mil

collector lead 18.6×33.1 mil and 27.6×64.64 mil

2 pads 59.1×39.4 mil

BJT



SRP

SRP

2 ports

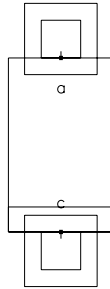
SMT

package 63×104.3 mil

2 leads 22.6×23.6 mil

2 pads 42.6×43.6 mil

Diode



TO117

TO117

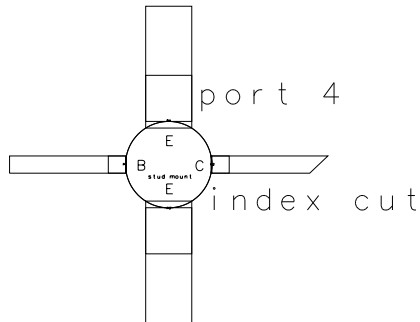
4 ports

stud mount package and hole 295.3 diameter

2 leads 157.5×393.7 mil, 2 leads 59.1×393.7 mil

2 pads 59.1 mil square, 2 pads 157.5 mil square

BJT



TO206AA

TO206AA

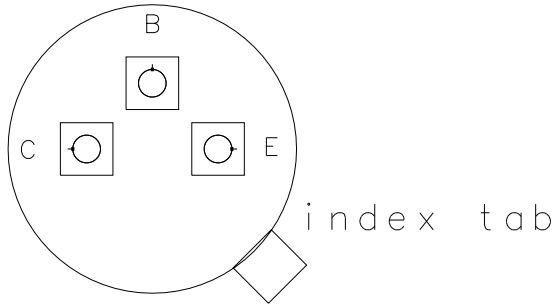
3 ports

package 219.5 mil diameter

holes 21 mil diameter 50 mil from package center

pads 40 mil square

BJT



TO206AF

TO206AF

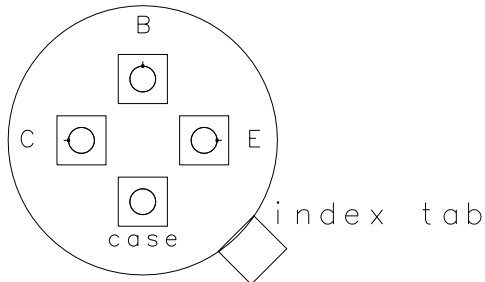
3 ports

package 219.5 mil diameter

holes 21 mil diameter 50 mil from package center

pads 40 mil square

BJT



TO226AA

TO226AA

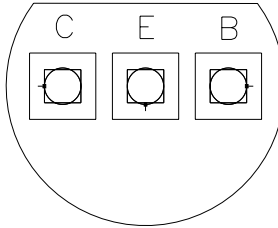
3 ports

package 170 mil diameter cut \times 135 mil chord

holes 22 mil diameter and 22×20 mil

pads 40 mil square

BJT



TO39

TO39

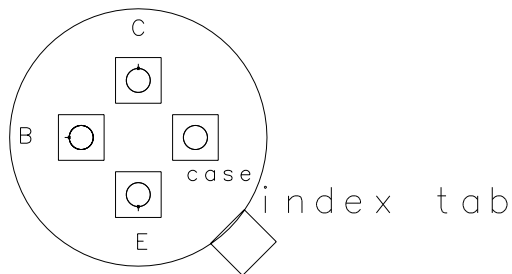
3 ports

package 352.5 mil diameter

holes 21 mil diameter 100 mil from package center

pads 40 mil square

BJT



TO72

TO72

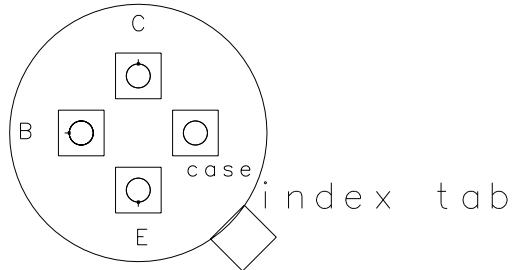
3 ports

package 225.4 mil diameter

holes 21 mil diameter 50 mil from center

pads 40 mil square

BJT



TO72V2

TO72V2

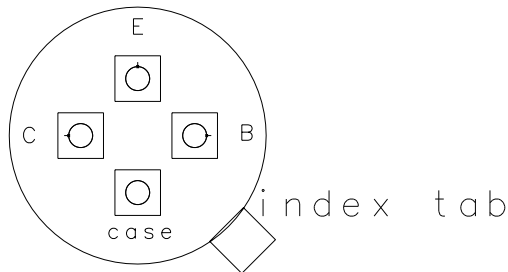
3 ports

package 225.4 mil diameter

holes 21 mil diameter 50 mil from center

pads 40 mil square

BJT



TO92

TO92

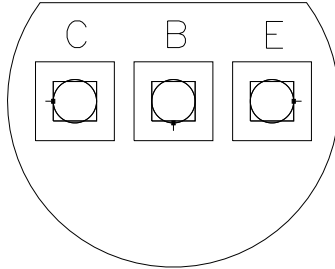
3 ports

package 170 mil diameter cut \times 135 mil chord

holes 22 mil diameter and 22×20 mil

pads 40 mil square

BJT



TPLAST

TPLAST

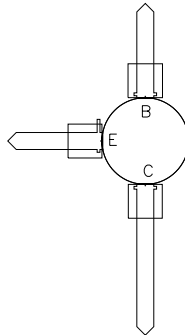
3 ports

package and hole 181.1 mil diameter

2 leads 35.4×196.85 mil, 1 lead 35.4×315 mil

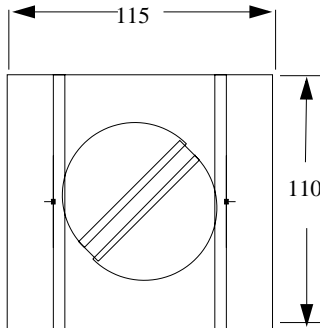
pads 70.8 mil square

BJT



TUNCAP

Tunable chip capacitor
2 ports 75 mil port-to-port
leads 110 × 25 mil
packages 12 × 62
dielectric 110 × 115



UMD

UMD
2 ports
package 63 × 102.4 mil
2 leads 15.8 × 31.6 mil (bent)
2 pads 40 mil square
2 holes 20 mil square
Diode



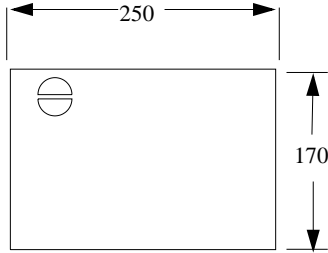
UPRIGHT

Upright mounted variable resistor

no ports

packages 170×250 mil

Text



URP

URP

2 ports

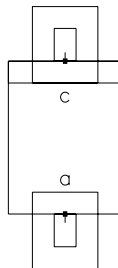
SMT

package 52×70 mil

2 leads 10×15 mil

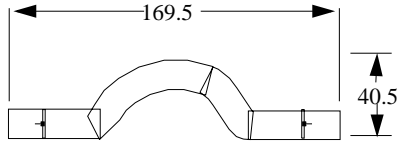
2 pads 30×35 mil

Diode



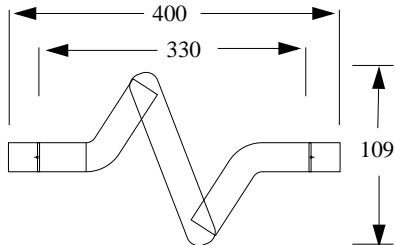
WIRE0

Wire loop outline
2 ports 133.5 mil port-to-port
conductor 15 mil wide \times 47 mil
dielectric



WIRE1

one turn coil outline
2 ports 330 mil port-to-port
dielectric 35 mil wide



Chapter 2: SMT Package Layout Artwork Library

The SMT Package Layout Artwork Library (SMT PAL) defines the SMT package artwork for some of the most commonly-used packages. The SMT PAL consists of 131 artwork packages of 7 different types:

- Ceramic Flat Pack (CFP)
- Chip and MELF components
- SOT, DPAK and D2PAK
- Plastic Flat Pack (PFP)
- Quad Flat Pack (QFP)
- Plastic Leaded Chip Carrier (PLCC)
- Small Outline IC (SOIC)

This chapter describes the library, including the package type and name, the AEL interface function name (AEL macro name), and the dimensions of the package. A diagram is shown for each package type.

This chapter also describes how you can use the SMT PAL to define the SMT package artwork in a custom *create_item* and how you can use the AEL macro name defining the package artwork as an artwork replacement for sub-circuits or sub-systems.

Using SMT Package Artwork as Artwork Replacement

The procedure for using the SMT package artwork as an artwork replacement is similar to using the standard artwork replacements. In the Design Parameters dialog box, change the artwork type to AEL macro and define the two parameters, SMTPAD and OFFSET. Set the SMTPAD parameter type to *string*.

Figure 2-1 shows an example for using the SMT package layout artwork library AEL function as an artwork replacement, through the Parametric Subnetwork (PSN). Underlying the network *3PortSubNet* is the element S3P, that can be viewed by pushing into the component. In the Design Parameters dialog for the subnetwork, *3PortSubNet*, the Artwork Type is set to AEL *macro* and Name is set to *smtart_SOT23*. Two parameters, SMTPAD and OFFSET, are defined in the Design Parameters dialog. Set the SMTPAD parameter value to *String*, with “*Pad1*” as its default value. Set the OFFSET parameter type to *real*, with *0* as its default value.

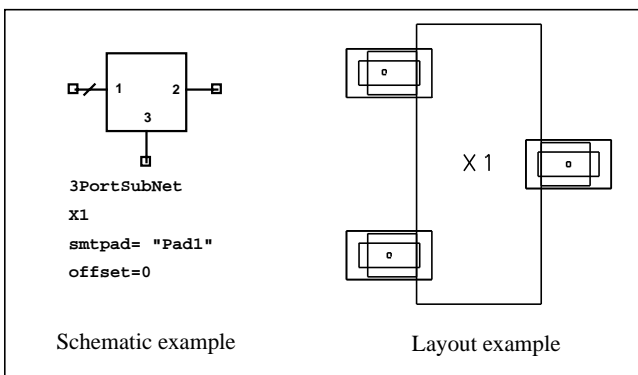


Figure 2-1. SMT Artwork Replacement Examples

Ceramic Flat Pack (CFP) Packages

Table 2-1 lists 17 CFP packages and the associated layout artwork AEL macro name and dimensions for each package. Figure 2-2 shows the layout artwork for a typical CFP with the marked dimensions given in the table.

Table 2-1. Ceramic Flat Pack (CFP) Packages

| Part Name | AEL Macro Name | Package | | Lead | | Lead-lead Spacing (mm) |
|-----------|-----------------|------------|-------------|------------|-------------|------------------------|
| | | Width (mm) | Length (mm) | Width (mm) | Length (mm) | |
| CFP24 | smtart_CFP24 | 15.36 | 9.65 | 0.43 | 7.87 | 1.27 |
| CFP28 | smtart_CFP28 | 18.78 | 9.14 | 0.43 | 7.87 | 1.27 |
| CFP42 | smtart_CFP42 | 27.16 | 16.24 | 0.43 | 7.61 | 1.27 |
| CFP10-03 | smtart_CFP10_03 | 7.36 | 3.81 | 0.305 | 2.74 | 1.27 |
| CFP14-03 | smtart_CFP14_03 | 9.9 | 3.81 | 0.305 | 2.74 | 1.27 |
| CFP10-04 | smtart_CFP10_04 | 7.36 | 6.35 | 0.431 | 2.47 | 1.27 |
| CFP14-04 | smtart_CFP14_04 | 9.9 | 6.35 | 0.431 | 2.47 | 1.27 |
| CFP16-04 | smtart_CFP16_04 | 11.17 | 6.35 | 0.431 | 2.47 | 1.27 |
| CFP16-21 | smtart_CFP16_21 | 11.17 | 13.96 | 0.431 | 3.16 | 1.27 |
| CFP20-22 | smtart_CFP20_22 | 13.71 | 16.5 | 0.431 | 2.89 | 1.27 |
| CFP24-19 | smtart_CFP24_19 | 16.25 | 8.88 | 0.431 | 3.20 | 1.27 |
| CFP24-21 | smtart_CFP24_21 | 16.25 | 13.96 | 0.431 | 3.16 | 1.27 |
| CFP28-19 | smtart_CFP28_19 | 18.79 | 8.88 | 0.508 | 3.20 | 1.27 |
| CFP36-20 | smtart_CFP36_20 | 23.87 | 11.42 | 0.431 | 2.93 | 1.27 |
| CFP36-21 | smtart_CFP36_21 | 23.87 | 13.96 | 0.431 | 3.16 | 1.27 |
| CFP36-23 | smtart_CFP36_23 | 23.87 | 21.57 | 0.431 | 2.86 | 1.27 |
| CFP40-20 | smtart_CFP40_20 | 26.41 | 11.42 | 0.431 | 2.93 | 1.27 |

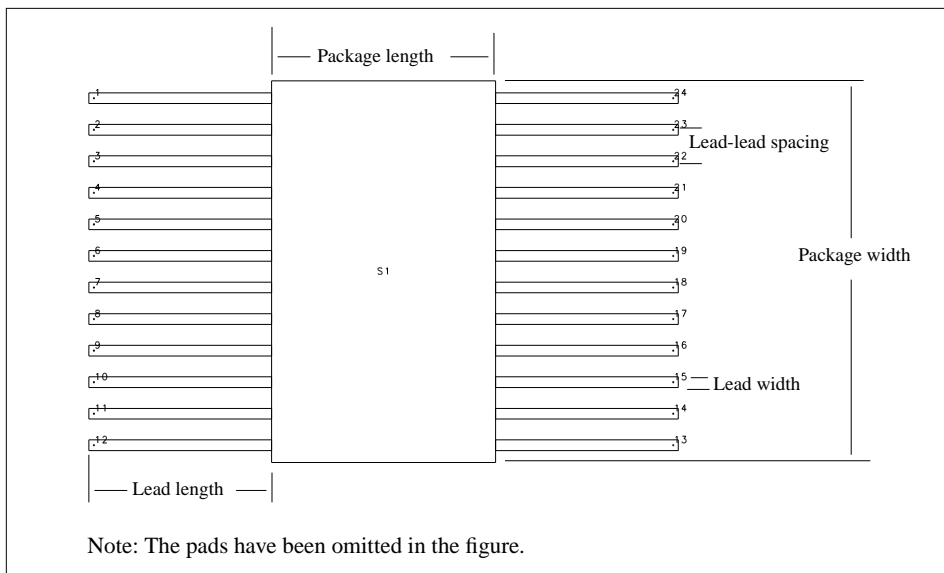


Figure 2-2. Ceramic Flat Pack (CFP) Layout Artwork

Chip and MELF Components

Table 2-2 lists 15 chip component packages and 4 MELF components, and the associated layout artwork AEL macro name and dimensions for each package. Figure 2-3 shows the layout artwork for a typical chip component, 0402, with the marked dimensions given in the table.

Table 2-2. Chip and MELF Component Packages

| Part Name | AEL Macro Name | Package | | End-cap Termination Length (mm) | Description |
|-----------|----------------|------------|-------------|---------------------------------|-----------------------|
| | | Width (mm) | Length (mm) | | |
| 0402 | smtart_0402 | 0.508 | 1.00 | 0.127 | Resistor |
| 0603-Res | smtart_0603R | 0.787 | 1.55 | 0.305 | Resistor |
| 0603-Cap | smtart_0603C | 0.787 | 1.55 | 0.203 | Capacitor |
| 0805 | smtart_0805 | 1.22 | 2.01 | 0.457 | Resistor or capacitor |
| 1005 | smtart_1005 | 1.27 | 2.54 | 0.254 | Capacitor |

Table 2-2. Chip and MELF Component Packages (continued)

| Part Name | AEL Macro Name | Package | | End-cap Termination Length (mm) | Description |
|-----------|----------------|------------|-------------|---------------------------------|-----------------------|
| | | Width (mm) | Length (mm) | | |
| 1206 | smtart_1206 | 1.57 | 3.20 | 0.558 | Resistor or capacitor |
| 1210 | smtart_1210 | 2.49 | 3.20 | 0.558 | Resistor or capacitor |
| 1805 | smtart_1805 | 1.27 | 4.57 | 0.305 | Capacitor |
| 1808 | smtart_1808 | 2.03 | 4.57 | 0.305 | Capacitor |
| 1812 | smtart_1812 | 3.17 | 4.57 | 0.305 | Capacitor |
| 1825 | smtart_1825 | 6.35 | 4.57 | 0.305 | Capacitor |
| 2010 | smtart_2010 | 2.54 | 5.1 | 0.40 | Capacitor |
| 2220 | smtart_2220 | 5.08 | 5.58 | 1.27 | Capacitor |
| 2225 | smtart_2225 | 6.35 | 5.58 | 1.27 | Capacitor |
| 2512 | smtart_2512 | 3.2 | 6.3 | 0.40 | Capacitor |
| 2309 | smtart_2309 | 2.3 | 5.9 | 1.0 | MELF |
| 1406 | smtart_1406 | 1.55 | 3.5 | 0.80 | MELF |
| SOD-80 | smtart_SOD80 | 1.60 | 3.5 | 0.431 | MELF |
| SOD-87 | smtart_SOD87 | 1.6 | 3.5 | 0.30 | MELF |

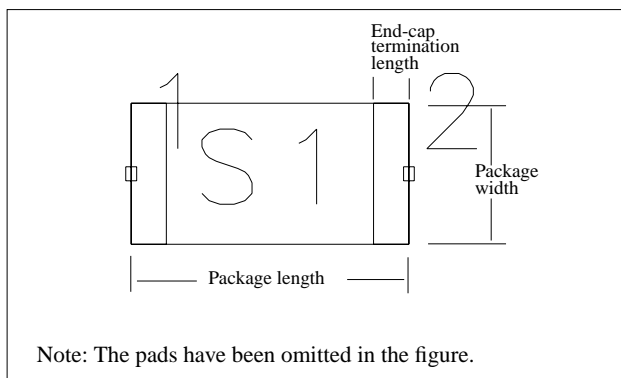


Figure 2-3. Chip Component Layout Artwork

SOT, DPAK, D2PAK Packages

Table 2-3 lists 20 SOT, DPAK, and D2PAK packages and the associated layout artwork AEL macro name and dimensions for each package.

Most packages require two parameters, SMTPAD and OFFSET. Packages that require two SMTPAD parameters are indicated by an asterisk (*). If lead 1 (e.g., SOT143) is of a different dimension than the other leads, the first SMTPAD identifies lead 1. If a lead other than lead 1 (e.g., DPAK1) is of a different dimension, then the second SMTPAD identifies the lead of a different dimension.

Figure 2-4 shows the layout artwork for a typical SOT-23 package with the marked dimensions given in the table.

Table 2-3. SOT, DPAK, D2PAK Packages

| Part Name | AEL Macro Name | Package | | Lead 1 | | Other Leads | | Lead-lead Spacing | |
|----------------|----------------|------------|-------------|------------|-------------|-------------|-------------|-------------------|-------------|
| | | Width (mm) | Length (mm) | Width (mm) | Length (mm) | Width (mm) | Length (mm) | Side 1 (mm) | Side 2 (mm) |
| SOT-23 | smtart_SOT23 | 2.92 | 1.30 | 0.45 | 0.51 | 0.45 | 0.51 | 1.90 | N/A |
| SOT-23, Metric | smtart_SOT23M1 | 2.92 | 1.50 | 0.45 | 0.50 | 0.45 | 0.50 | 1.90 | N/A |
| SOT-23, Metric | smtart_SOT23M2 | 2.92 | 1.50 | 0.45 | 0.65 | 0.45 | 0.65 | 1.90 | N/A |
| SOT-23, Metric | smtart_SOT23M3 | 1.60 | 0.80 | 0.30 | 0.40 | 0.30 | 0.40 | 1.00 | N/A |
| SOT-23, Metric | smtart_SOT23M4 | 2.00 | 1.25 | 0.30 | 0.43 | 0.30 | 0.43 | 1.30 | N/A |
| SOT-23, Metric | smtart_SOT23M5 | 2.90 | 1.30 | 0.40 | 0.55 | 0.40 | 0.55 | 1.90 | N/A |
| SOT-25 | smtart_SOT25A | 2.92 | 1.50 | 0.30 | 0.65 | 0.30 | 0.54 | 1.90 | 0.95 |
| SOT-25 | smtart_SOT25B | 2.00 | 0.90 | 0.20 | 0.60 | 0.20 | 0.60 | 1.30 | 0.65 |
| SOT-25 | smtart_SOT25C | 2.00 | 1.25 | 0.20 | 0.43 | 0.20 | 0.43 | 0.65 | 0.65 |
| SOT-25 | smtart_SOT2 5D | 2.90 | 1.60 | 0.30 | 0.60 | 0.30 | 0.60 | 0.95 | 0.95 |
| SOT-36 | smtart_SOT36 | 2.90 | 1.60 | 0.30 | 0.60 | 0.30 | 0.60 | 0.95 | 0.95 |
| SOT-143* | smtart_SOT143A | 2.90 | 1.30 | 0.88 | 0.75 | 0.48 | 0.75 | 1.70 | 1.90 |
| SOT-143* | smtart_SOT143B | 2.90 | 1.30 | 0.88 | 0.60 | 0.48 | 0.60 | 1.70 | 1.90 |

Note: An asterisk (*) denotes that the artwork requires 2 SMTPAD components.

Table 2-3. SOT, DPAK, D2PAK Packages (continued)

| Part Name | AEL Macro Name | Package | | Lead 1 | | Other Leads | | Lead-lead Spacing | |
|-----------|----------------|------------|-------------|------------|-------------|-------------|-------------|-------------------|-------------|
| | | Width (mm) | Length (mm) | Width (mm) | Length (mm) | Width (mm) | Length (mm) | Side 1 (mm) | Side 2 (mm) |
| SOT-223* | smtart_SOT223 | 6.50 | 3.50 | 3.00 | 1.75 | 0.74 | 1.75 | 2.30 | N/A |
| DPAK* | smtart_DPAK1 | 5.50 | 5.50 | 5.20 | 2.79 | 0.51 | 2.00 | 4.60 | N/A |
| DPAK* | smtart_DPAK2 | 5.50 | 5.50 | 5.20 | 12.0 | 0.51 | 2.00 | 2.30 | N/A |
| DPAK* | smtart_DPAK3 | 6.09 | 6.09 | 5.20 | 2.74 | 0.79 | 1.07 | 4.60 | N/A |
| DPAK* | smtart_DPAK4 | 5.87 | 6.10 | 4.83 | 2.74 | 0.79 | 1.07 | 4.57 | N/A |
| DPAK* | smtart_DPAK5 | 8.15 | 5.82 | 5.38 | 4.45 | 1.14 | 1.55 | 4.57 | N/A |
| D2PAK* | smtart_D2PAK | 10.41 | 9.96 | 0.71 | 4.83 | 9.96 | 1.27 | 2.54 | N/A |

Note: An asterisk (*) denotes that the artwork requires 2 SMTPAD components.

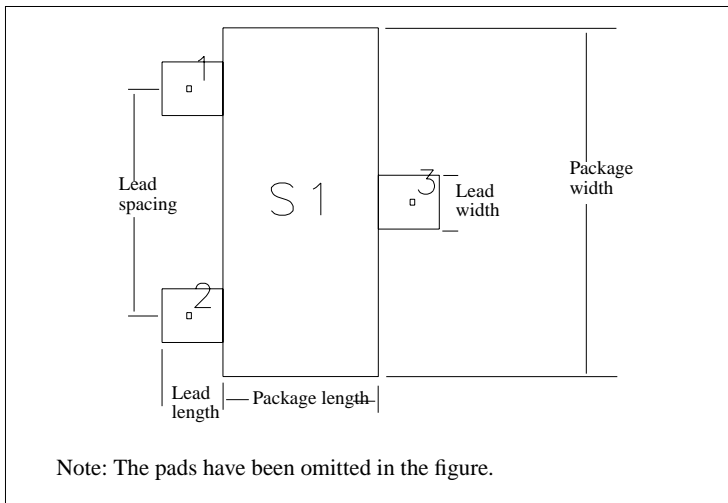


Figure 2-4. SOT-23 Layout Artwork

Plastic Flat Pack (PFP) Packages

Table 2-4 lists 3 Plastic Flat Pack (PFP) packages and the associated layout artwork AEL macro name and dimensions for each package. Figure 2-5 shows the layout artwork for a PFP with the marked dimensions given in the table.

Table 2-4. Plastic Flat Pack (PFP) Packages

| Part Name | AEL Macro Name | Package | | Lead | | Lead-lead Spacing (mm) |
|-----------|----------------|------------|-------------|------------|-------------|------------------------|
| | | Width (mm) | Length (mm) | Width (mm) | Length (mm) | |
| PFP-16 | smtart_PFP16 | 10.18 | 6.85 | 0.43 | 8.88 | 1.27 |
| PFP-18 | smtart_PFP18 | 11.04 | 7.79 | 0.43 | 7.87 | 1.27 |
| PFP-20 | smtart_PFP20 | 15.49 | 9.27 | 0.43 | 7.72 | 1.27 |

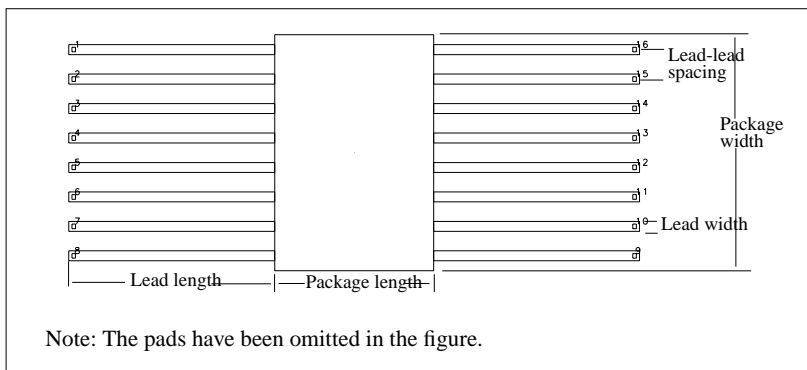


Figure 2-5. Plastic Flat Pack (PFP) Layout Artwork

Quad Flat Pack (QFP) Packages

Table 2-5 lists 48 Quad Flat Pack (QFP) and the associated layout artwork AEL macro name and dimensions for each package. Figure 2-6 shows the layout artwork for a typical QFP package with the marked dimensions given in the table.

Table 2-5. Quad Flat Pack (QFP) Packages

| Part Name | AEL Macro Name | Package | | Lead | | Lead-lead Spacing (mm) | Description |
|-----------|----------------|------------|-------------|------------|-------------|------------------------|---------------|
| | | Width (mm) | Length (mm) | Width (mm) | Length (mm) | | |
| QFP32A | smtart_QFP32A | 7.0 | 7.0 | 0.3 | 1.0 | 0.8 | 8 leads/side |
| QFP32B | smtart_QFP32B | 5.0 | 5.0 | 0.2 | 1.0 | 0.5 | 8 leads/side |
| QFP40A | smtart_QFP40A | 6.0 | 6.0 | 0.2 | 1.0 | 0.5 | 10 leads/side |
| QFP40B | smtart_QFP40B | 5.0 | 5.0 | 0.15 | 1.0 | 0.4 | 10 leads/side |
| QFP40C | smtart_QFP40C | 7.0 | 5.0 | 0.2 | 1.0 | 0.5 | 12 × 8 leads |
| QFP44A | smtart_QFP44A | 10.5 | 11.5 | 0.3 | 1.5 | 0.8 | 11 leads/side |
| QFP44B | smtart_QFP44B | 10.1 | 10.1 | 0.3 | 1.1 | 0.8 | 11 leads/side |
| QFP44C | smtart_QFP44C | 10.6 | 10.6 | 0.3 | 1.9 | 0.8 | 11 leads/side |
| QFP44D | smtart_QFP44D | 10.0 | 10.0 | 0.3 | 1.61 | 0.8 | 11 leads/side |
| QFP44E | smtart_QFP44E | 10.0 | 10.0 | 0.41 | 1.99 | 0.8 | 11 leads/side |
| QFP44F | smtart_QFP44F | 14.0 | 14.0 | 0.35 | 1.61 | 1.0 | 11 leads/side |
| QFP48A | smtart_QFP48A | 12.7 | 12.7 | 0.3 | 2.3 | 0.8 | 12 leads/side |
| QFP48B | smtart_QFP48B | 12.0 | 12.0 | 0.3 | 1.65 | 0.8 | 12 leads/side |
| QFP48C | smtart_QFP48C | 7.0 | 7.0 | 0.2 | 1.0 | 0.5 | 12 leads/side |
| QFP48D | smtart_QFP48D | 6.0 | 6.0 | 0.15 | 1.0 | 0.4 | 12 leads/side |
| QFP52A | smtart_QFP52A | 16.7 | 16.7 | 0.3 | 2.3 | 1.0 | 13 leads/side |
| QFP52B | smtart_QFP52B | 10.0 | 10.0 | 0.3 | 1.61 | 0.65 | 13 leads/side |
| QFP52C | smtart_QFP52C | 10.0 | 10.0 | 0.3 | 2.05 | 0.65 | 13 leads/side |
| QFP52D | smtart_QFP52D | 7.0 | 5.0 | 0.15 | 1.0 | 0.40 | 16 × 10 leads |
| QFP54 | smtart_QFP5 | 11.2 | 11.2 | 0.3 | 1.6 | 0.65 | 14 × 13 leads |
| QFP56 | smtart_QFP56 | 11.5 | 12.5 | 0.3 | 1.5 | 0.65 | 14 leads/side |
| QFP60A | smtart_QFP60A | 14.0 | 14.0 | 0.4 | 2.1 | 0.8 | 15 leads/side |
| QFP60B | smtart_QFP60B | 10.0 | 7.0 | 0.2 | 1.0 | 0.5 | 12 × 18 leads |
| QFP64A | smtart_QFP64A | 15 | 15 | 0.35 | 1.3 | 0.8 | 16 leads/side |
| QFP64B | smtart_QFP64B | 19.4 | 15 | 0.4 | 1.3 | 1.0 | 13 × 19 leads |
| QFP64C | smtart_QFP64C | 15.3 | 15.3 | 0.35 | 1.5 | 0.8 | 16 leads/side |
| QFP64D | smtart_QFP64D | 21.3 | 15.3 | 0.41 | 1.7 | 1.0 | 13 × 19 leads |

Table 2-5. Quad Flat Pack (QFP) Packages (continued)

| Part Name | AEL Macro Name | Package | | Lead | | Lead-lead Spacing (mm) | Description |
|-----------|----------------|------------|-------------|------------|-------------|------------------------|-------------------------|
| | | Width (mm) | Length (mm) | Width (mm) | Length (mm) | | |
| QFP64E | smtart_QFP64E | 22.8 | 22.8 | 0.457 | 10.15 | 1.27 | 16 leads/side |
| QFP64F | smtart_QFP64F | 14.0 | 14.0 | 0.381 | 1.61 | 0.8 | 13 × 19 leads |
| QFP64G | smtart_QFP64G | 14.0 | 14.0 | 0.356 | 1.18 | 0.8 | 16 leads/side |
| QFP64H | smtart_QFP64H | 20.0 | 14.0 | 0.432 | 1.61 | 1.0 | 13 × 19 leads |
| QFP64I | smtart_QFP64I | 7.0 | 7.0 | 0.15 | 1.0 | 0.4 | 16 leads/side |
| QFP70 | smtart_QFP70 | 23.6 | 10.4 | 0.3 | 2.5 | 0.8 | 11 × 24 leads |
| QFP72 | smtart_QFP72 | 10.0 | 10.0 | 0.2 | 1.0 | 0.5 | 18 leads/side |
| QFP74 | smtart_QFP74 | 20.6 | 20.6 | 0.4 | 1.3 | 1.0 | 18 × 19 leads |
| QFP76 | smtart_QFP76 | 10.0 | 7.0 | 0.15 | 1.0 | 0.4 | 15 × 23 leads |
| QFP80A | smtart_QFP80A | 14.0 | 14.0 | 0.3 | 1.6 | 0.65 | 20 leads/side |
| QFP80B | smtart_QFP80C | 20.0 | 14.0 | 0.35 | 1.8 | 0.8 | 16 × 24 leads |
| QFP80C | smtart_QFP80C | 20.0 | 14.0 | 0.35 | 2.35 | 0.8 | 16 × 24 leads |
| QFP80D | smtart_QFP80D | 14.0 | 14.0 | 0.3 | 1.18 | 0.65 | 20 × 20 leads/side |
| QFP80E | smtart_QFP80E | 20.0 | 14.0 | 0.36 | 2.1 | 0.8 | 16 × 24 leads |
| QFP80F | smtart_QFP80F | 20.0 | 14.0 | 0.36 | 1.6 | 0.8 | 16 × 24 leads |
| QFP80G | smtart_QFP80G | 12.0 | 12.0 | 0.203 | 1.0 | 0.5 | 20 × 20 leads/side |
| QFP88A | smtart_QFP88A | 20.0 | 14.0 | 0.3 | 2.5 | 0.65 | 18 × 26 leads |
| QFP88B | smtart_QFP88B | 12.0 | 12.0 | 0.2 | 1.0 | 0.5 | 22 leads/side |
| QFP88C | smtart_QFP88C | 10.0 | 10.0 | 0.15 | 1.0 | 0.4 | 22 leads/side |
| QFP88D | smtart_QFP88D | 14.0 | 10.0 | 0.2 | 1.0 | 0.5 | 18 × 26 leads |
| QFP94 | smtart_QFP94 | 20.6 | 20.6 | 0.35 | 1.3 | 0.8 | 23 × 24 × 23 × 24 leads |

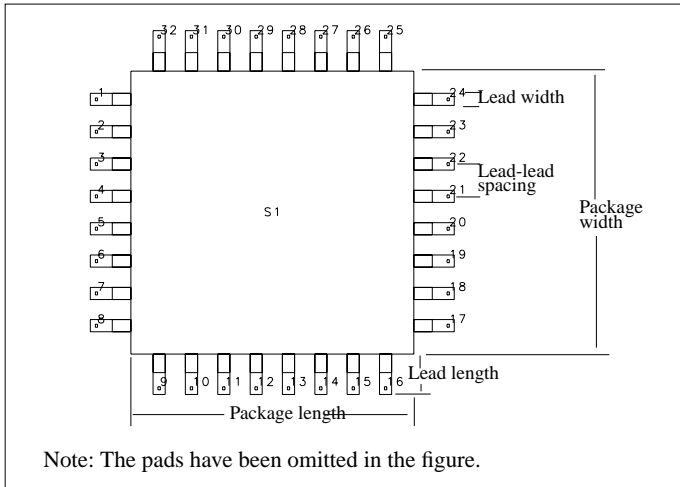


Figure 2-6. Quad Flat Pack (QFP) Layout Artwork

Plastic Leaded Chip Carrier (PLCC)

Table 2-6 lists 11 Plastic Leaded Chip Carrier (PLCC) packages and the associated layout artwork AEL macro name and dimensions for each package. Figure 2-7 shows the layout artwork for a typical PLCC package with the marked dimensions given in the table.

Table 2-6. Plastic Leaded Chip Carrier (PLCC) Packages

| Part Name | AEL Macro Name | Package | | Lead | Lead-lead Spacing (mm) |
|-----------|------------------|------------|-------------|------------|------------------------|
| | | Width (mm) | Length (mm) | Width (mm) | |
| PLCC18AA | smtart_PLCC18A A | 10.85 | 7.32 | 0.431 | 1.27 |
| PLCC18AB | smtart_PLCC18 AB | 12.52 | 7.42 | 0.431 | 1.27 |
| PLCC20SQ | smtart_PLCC20 SQ | 8.13 | 8.13 | 0.431 | 1.27 |
| PLCC22RT | smtart_PLCC22 RT | 11.62 | 6.54 | 0.431 | 1.27 |
| PLCC28RT | smtart_PLCC28 RT | 12.94 | 7.87 | 0.431 | 1.27 |
| PLCC28SQ | smtart_PLCC28 SQ | 10.67 | 10.67 | 0.431 | 1.27 |
| PLCC32RT | smtart_PLCC32 RT | 12.95 | 10.67 | 0.431 | 1.27 |
| PLCC44SQ | smtart_PLCC44 SQ | 15.48 | 15.48 | 0.431 | 1.27 |

Table 2-6. Plastic Leaded Chip Carrier (PLCC) Packages (continued)

| Part Name | AEL Macro Name | Package | | Lead | Lead-lead Spacing (mm) |
|-----------|------------------|------------|-------------|------------|------------------------|
| | | Width (mm) | Length (mm) | Width (mm) | |
| PLCC52SQ | smtart_PLCC52 SQ | 18.02 | 18.02 | 0.431 | 1.27 |
| PLCC68SQ | smtart_PLCC68 SQ | 23.10 | 23.10 | 0.431 | 1.27 |
| PLCC84SQ | smtart_PLCC84 SQ | 28.17 | 28.17 | 0.431 | 1.27 |

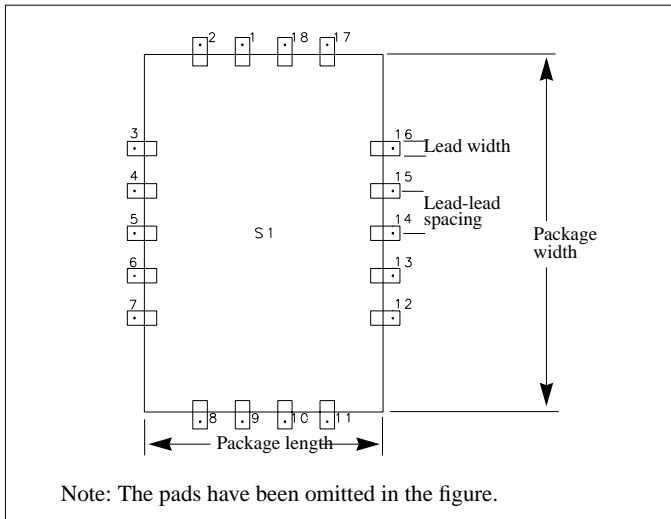


Figure 2-7. Plastic Leaded Chip Carrier (PLCC) Layout Artwork

Small Outline IC (SOIC)

Table 2-7 lists 13 Small Outline IC (SOIC) packages and the associated layout artwork AEL macro name and dimensions for each package. Figure 2-8 shows the layout artwork for a typical SOIC package with the marked dimensions given in the table.

Table 2-7. Small Outline IC (SOIC) Packages

| Part Name | AEL Macro Name | Package | | Lead | | Lead-lead Spacing (mm) |
|-----------|----------------|------------|-------------|------------|-------------|------------------------|
| | | Width (mm) | Length (mm) | Width (mm) | Length (mm) | |
| SO8N | smtart_SO8N | 3.90 | 4.87 | 0.432 | 1.05 | 1.27 |
| SO14N | smtart_SO14N | 3.90 | 8.63 | 0.432 | 1.05 | 1.27 |
| SO16N | smtart_SO16N | 3.90 | 9.90 | 0.432 | 1.05 | 1.27 |
| SO14M | smtart_SO14M | 5.59 | 9.910 | 0.432 | 1.01 | 1.27 |
| SO16M | smtart_SO16M | 5.59 | 11.20 | 0.457 | 1.01 | 1.27 |
| SO8L | smtart_SO8L | 7.50 | 5.20 | 0.432 | 1.40 | 1.27 |
| SO14L | smtart_SO14L | 57.50 | 9.010 | 0.432 | 1.40 | 1.27 |
| SO16L | smtart_SO16L | 7.50 | 10.30 | 0.432 | 1.40 | 1.27 |
| SO18L | smtart_SO18L | 7.50 | 11.55 | 0.432 | 1.40 | 1.27 |
| SO20L | smtart_SO20L | 7.50 | 12.80 | 0.432 | 1.40 | 1.27 |
| SO24L | smtart_SO24L | 7.50 | 15.37 | 0.432 | 1.40 | 1.27 |
| SO28L | smtart_SO28L | 7.50 | 17.92 | 0.432 | 1.40 | 1.27 |
| SO32L | smtart_SO32L | 7.50 | 20.50 | 0.432 | 1.70 | 1.27 |

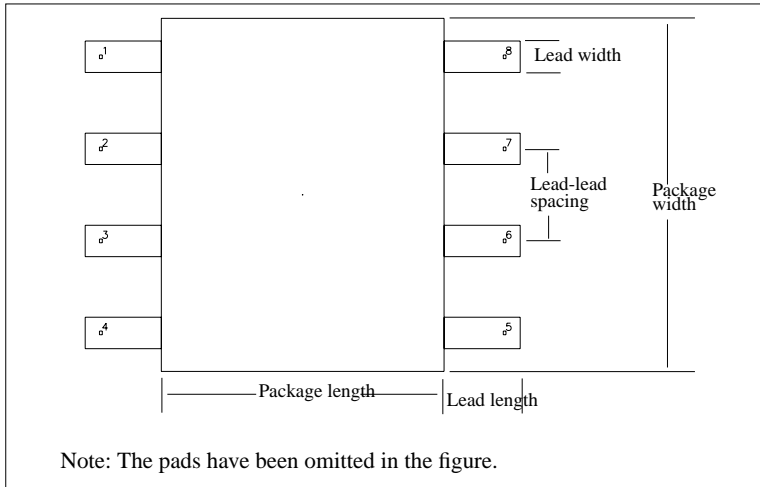


Figure 2-8. Small Outline IC (SOIC) Package Layout Artwork

Writing Customized SMT PAL Artwork

This section describes how to customize the SMT PAL artwork AEL functions to use in a custom component. Most times, the SMT artwork types in the SMT PAL can be used without any modifications, assuming the dimensions of the artwork match the requirements. However, sometimes the artwork in the PAL may not match the dimensions required. In this case, the existing AEL code in the SMT PAL could be used to write a customized artwork.

Structure of a SMT PAL artwork

All SMT PAL artwork use an AEL function to describe the artwork. For example, the SOT143A package uses the AEL function `smtart_SOT143A(smtpad1, smtpad2, offset)`. The code for this function is shown below:

```
defun smtart_SOT143A (smtpad1, smtpad2, offset)
{
// Lead 1 and 2 are interchanged in the leadDim_list on Purpose
smtart_draw_SMT(
    list(smtpad1, smtpad2), //list of SMT PAD instance name
    offset,                //pad offset from connecting pin
    0.0013,                //width of package in Units (1.3 mm)
    0.0029,                //Length of package in Units (2.9 mm)
    0,                     //not used
    0,                     //not used
    list(0.0017,0.0,0.0019,0.0), //Lead-to-lead spacing on sides 1,2,3 and 4
                                //of the package in Units

    list(0.00026,0,0.00026,0), //LeadOffset
    list(2,0,2,0),             //Number of leads list
    list(0.00048,0.00075, 0.00088,0.00075, NULL, 0.00048,0.00075,
0.00048,0.00075, NULL, "side1"),
    list(0,0,-90, 0,-0.0017,-90, 0.00232,-0.0017,90, 0.00232,0.0002,90),
//Pins list
    0,                        //Not Used
    "mts",                    //Units
    "portOpt6",              //Package style option
    0,                        //Lead Extension
    NULL
); //smtart_draw_SMT
}
```

The code above calls another function called, `smtart_draw_SMT()`. This is a generic function that is used by all the SMT PAL artworks. An explanation of the arguments used in the generic function `smtart_draw_SMT()` is given in [Table 2-8](#) below:

Table 2-8. Arguments for the Generic Function `smtart_draw_SMT()`

| Argument Name | Description |
|---------------|---|
| SMT_PAD_list | List of SMT PAD instance name. For example, the SOT143A has 2 pads, one for leads 1, and another one for leads 2, 3, and 4. |
| Offset | Pad offset from connecting pin. |
| Width | Width of package (vertical dimension) in Units e.g. 0.0013 for SOT143A |
| Length | Length of package (horizontal dimension) in Units e.g. 0.0029 for SOT143A |
| Width1 | Not used |
| Length1 | Not used |
| Spacing | List of 4 lead-to-lead spacing (in Units) on sides 1, 2, 3, and 4. |
| LeadOffset | List of lead edge offset (in Units) from edge of package for all 4 sides. |
| NumLeads | List of number of leads on each side of the package. |
| LeadsDim | List of leads dimensions on all sides (width1, length1, width2, length2, etc.) |
| PinsList | List of pin parameters on all sides. list(X1,Y1,Angle1,X2,Y2,Angle2,...) where X1, X2 are x-axis location of pin 1, 2, ... Y1, Y2 are y-axis location of pin 1, 2, ... Angle1, Angle2 are angles of pin 1, 2, ... |
| DelX | Not used |
| Units | Dimension units - "um", "mm", "mts", "mil", "in" |
| PackageStyle | Package style option. Choices are: - portOpt1 -- SOT23,SOT25,SOT36 - portOpt2 -- SOIC, CFP, PFP - portOpt3 -- PLCC - portOpt4 -- components, MELF - portOpt5 -- QFP - portOpt6 -- SOT143, SOT223 - portOpt7 -- D2PAK - portOpt8 -- - portOpt9 -- DPAK2 |
| LeadExt | Lead extension |
| PortTransList | Not used |

Side 1 is the left hand side, 2 to the top, 3 to the right and 4 to the bottom. Pin 1 is always on the left hand side of the package and is drawn at the origin (0,0).

Examples of SMT PAL Artwork Using the Generic Function

Some more examples of SMT PAL artwork using the generic function is given below.

SOIC Artwork

```
defun smtstart_SO8N (smtpad, offset)
{
  decl initialDist;
  // all dimensions in mts.
  //initialDist = 0.5 * [Body_length - Lead_width - ((No_leads/2) - 1) *
lead-lead spacing]
  initialDist = 0.5 * (0.00487 - 0.000432 - 3 * 0.00127);
  smtstart_draw_SMT(smtpad,offset,0.0039,0.00487,0,0,
    list(0.00127,0,0.00127,0), list(initialDist,0,initialDist,0),
    list(4,0,4,0),list(0.000432,0.00105,0,0,0.000432,0.00105,0,0),
    list(-90.0,1,NULL,NULL,90.0,5,NULL,NULL),0,"mts", "portOpt2",
0,NULL);
}
```

PLCC Artwork

```
defun smtstart_PLCC18AA (smtpad, offset)
{
  decl initialDistL, initialDistW, packLength, packWidth, leadExt;
  leadExt = 0.000508;
  packLength = 0.01173 - 2 * leadExt;
  packWidth = 0.00817 - 2 * leadExt;

  // all dimensions in mts.
  initialDistL = 0.5 * (packLength - 0.000432 - 4 * 0.00127);
  initialDistW = 0.5 * (packWidth - 0.000432 - 3 * 0.00127);
  smtstart_draw_SMT(smtpad,offset,packWidth,packLength,0,0,
    list(0.00127,0.00127,0.00127,0.00127),
list(initialDistL,initialDistW,initialDistL,initialDistW),

list(5,4,5,4),list(0.000432,0.00088,0.000432,0.00085,0.000432,0.00088,0.0004
32,0.00085),
    list(-90.0,3,7, 180,2,18, 90.0,12,16, 0,8,11, 2),0,"mts", "portOpt3",
leadExt, NULL);
  //elPorts_list =
list(ang1,nodeStart,nodeStop,ang2,nodeStart,nodeStop,...,node1Position)
}
```

Ceramic Flat Packages (CFP) and Plastic Flat Packages (PFP)

```
defun smtstart_CFP24 (smtpad, offset)
{
  decl initialD;
  initialD = 0.5*(0.01536-11*0.00127-0.00043);
  //initialD = {packLength - (#Leads-1)*spacing - leadWidth}/2
  smtstart_draw_SMT(smtpad,offset,0.00965,0.01536,0,0,
    list(0.00127,0,0.00127,0), list(initialD,0,initialD,0),
    list(12,0,12,0),list(0.00043,0.00787,0,0,0.00043,0.00787,0,0),
    list(-90.0,1, NULL,NULL, 90.0,13, NULL,NULL),0,"mts", "portOpt2", 0,
  NULL);
}
```

Quad Flat Package (QFP)

```
defun smtstart_QFP32A (smtpad, offset)
{
  decl initialD;
  initialD = 0.5*(0.007-7*0.0008-0.0003);
  smtstart_draw_SMT(smtpad,offset,0.007,0.007,0,0,
    list(0.0008,0.0008,0.0008,0.0008),
  list(initialD,initialD,initialD,initialD),

  list(8,8,8,8),list(0.0003,0.001,0.0003,0.001,0.0003,0.001,0.0003,0.001,0.000
  46),
    list(-90.0,1, 180,32, 90.0,17, 0,9),0,"mts", "portOpt5", 0, NULL);
}
```

Chapter 3: Font Definitions

din17

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
' 1234567890 - = |
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iso3098

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roman

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smooth

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italic

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standard

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gothic

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 M N O P Q R S T U V W X Y Z
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math

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straightfilled

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