



Agilent Technologies

ADS 2008
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Layout Library

Advanced Design System 2008

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Contents

- Fixed Artwork
- - 145MILXP
 - 2D3H1A
 - 2D3J1C
 - 2D7C1A
 - AFLANGE
 - ATCCAP
 - AVNK35
 - AVNK70
 - AVNK85
 - AVNK86
 - AXIAL_L
 - AXIAL_M
 - AXRES
 - AXRES2
 - AXRES3
 - BFLANGE
 - C-LL
 - C319BD01
 - C319D06
 - C369D03
 - C5102
 - C744AD01
 - C751D03
 - C7904
 - CD
 - CERECX
 - CERECXF
 - CHPCAP
 - CHPRES
 - COIL1
 - DISK_L
 - DISK_M
 - DISK_S
 - GD11
 - GF7
 - HP70GT
 - HP85PLAS
 - HPAC100
 - HPAC100X
 - HPAC200
 - HPAC200V2
 - LG
 - LLD
 - M205
 - MOP

- MW4
- MWT70
- MWT71
- MWT73
- NEC01
- NEC34
- NEC35
- NEC37
- NEC38
- NEC39
- NEC53E
- NEC75
- NEC83
- NEC84
- NEC84A
- NEC87
- NEC89
- NEC89A
- OKI_1
- RADIAL_M
- RADIAL_S
- RESA
- SFLANGE
- SOT223
- SOT223V2
- SOT23
- SOT23V2
- SOT23V3
- SOT23V4
- SOT23V5
- SOT23V6
- SOT23V7
- SOT23V8
- SOT323
- SOT37
- SOT89
- SOT89V2
- SRP
- TO117
- TPLAST
- TUNCAP
- UMD
- UPRIGHT
- URP
- WIRE0
- WIRE1
- SMT Package Layout Artwork Library
 - Using SMT Package Artwork as Artwork Replacement
 - - SMT Artwork Replacement Examples
 - Ceramic Flat Pack (CFP) Packages

- - Ceramic Flat Pack (CFP) Layout Artwork
- Chip and MELF Components
- - Chip Component Layout Artwork
- SOT, DPAK, D2PAK Packages
- - SOT-23 Layout Artwork
- Plastic Flat Pack (PFP) Packages
- - Plastic Flat Pack (PFP) Layout Artwork
- Quad Flat Pack (QFP) Packages
- - Quad Flat Pack (QFP) Layout Artwork
- Plastic Leaded Chip Carrier (PLCC)
- - Plastic Leaded Chip Carrier (PLCC) Layout Artwork
- Small Outline IC (SOIC)
- - Small Outline IC (SOIC) Package Layout Artwork
- Writing Customized SMT PAL Artwork
- - Structure of a SMT PAL artwork
- - Examples of SMT PAL Artwork Using the Generic Function
 - - SOIC Artwork
 - - PLCC Artwork
 - - Ceramic Flat Packages (CFP) and Plastic Flat Packages (PFP)
 - - Quad Flat Package (QFP)
- Font Definitions
 - din17
 - iso3098
 - roman
 - smooth
 - italic
 - standard
 - gothic
 - math
 - sans
 - sansbold
 - filled
 - filledbold
 - straight
 - straightfilled

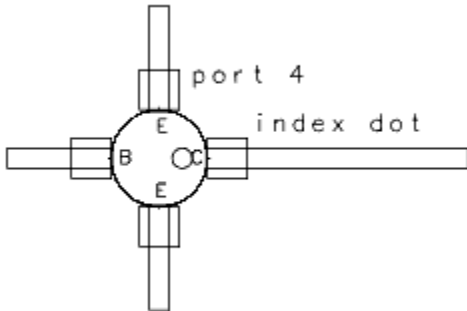
Fixed Artwork

145MILXP

145 MIL X-PACK

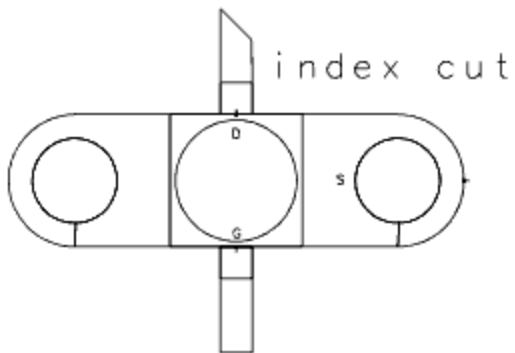
4 ports

package and hole 145 mil diameter
3 leads 30 × 155.5 mil, 1 lead 30 × 391.5 mil
pads 60 mil square
BJT



2D3H1A

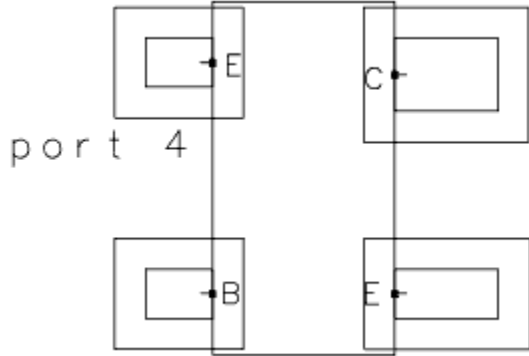
2-3H1A
3 ports
flange 98.4 × 338.6 mil
package 98.4 mil square and circle 90 mil diameter
holes 63 mil diameter 240.2 mil center-to-center
2 leads 23.6 × 78.8 mil
2 pads 23.6 mil square
FET



2D3J1C

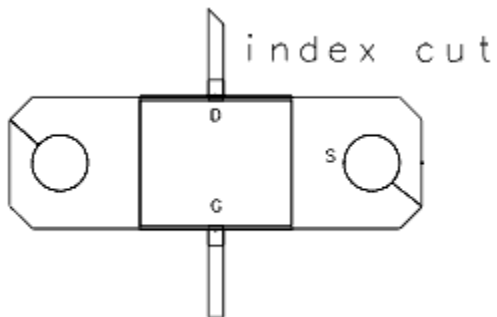
2-3J1C
4 ports
SMT

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

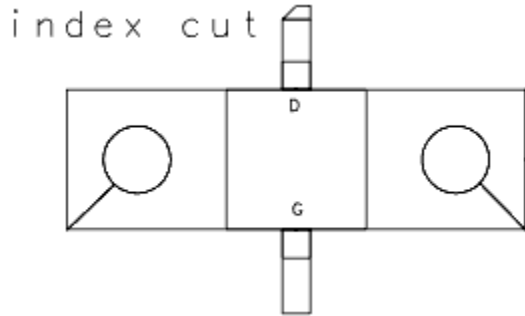
2-7C1A
3 ports
flange 236.2×728.4 mil
package 236.2×267.8 mil and 220.4×267.8 mil
holes 98.4 mil diameter spaced 551.2 mil center-to-center
2 leads 27.6×157.5 mil
2 pads 27.6 mil square
FET



AFLANGE

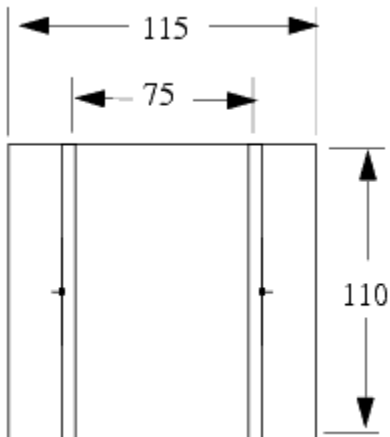
(no name given by vendor)
3 ports

flange 820 × 250 mil
holes 120 mil diameter spaced 570 mil center-to-center
leads 50 × 150 mil
pads 50 mil square
FET



ATCCAP

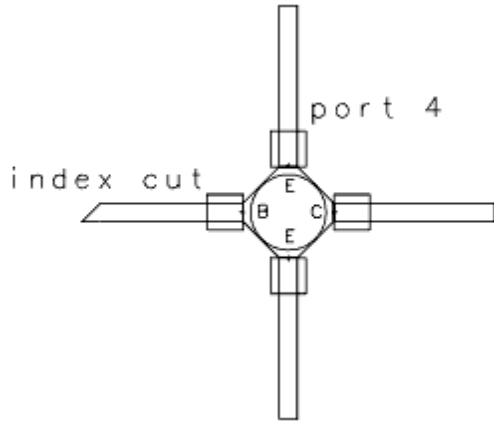
Chip capacitor outline
2 ports
75 mil port-to-port
leads 110 × 25 mil
packages 110 × 75



AVNK35

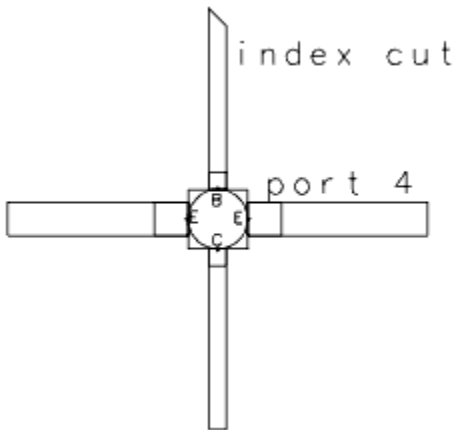
Avantek 35
4 ports

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

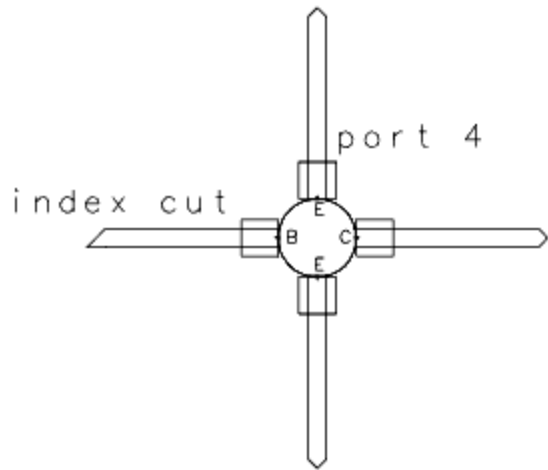
4 ports

package and hole 85 mil diameter

leads 20 × 207.5 mil

pads 40 mil square

BJT



AVNK86

Avantek 86

4 ports

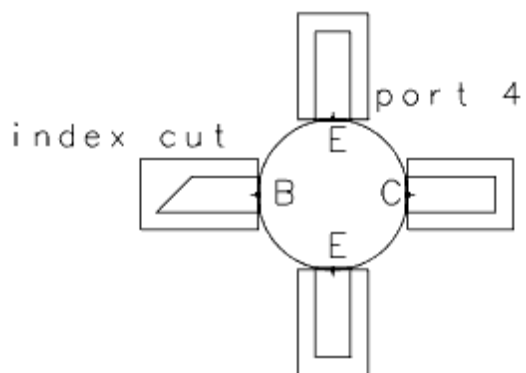
SMT

package 85 mil diameter

leads 20 × 57.5 mil

pads 40 × 66.3 mil

BJT



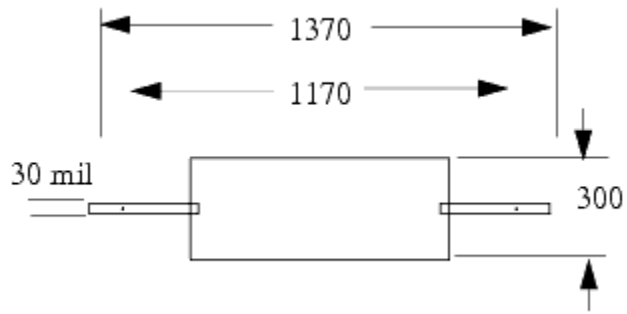
AXIAL_L

Axial leaded components (large)

2 ports

leads 30 × 325

packages 300 × 770



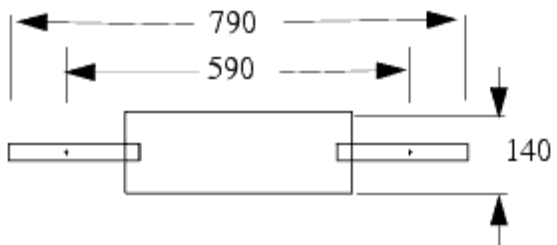
AXIAL_M

Axial leaded components (medium)

2 ports

leads 30 × 270

packages 140 × 390



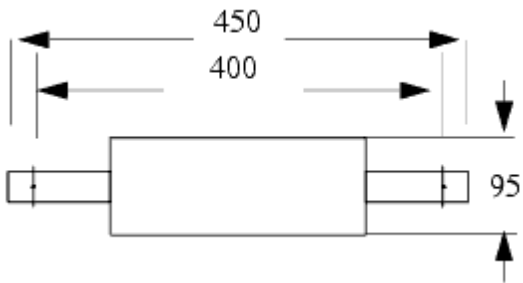
AXRES

Axial leaded components (small)

2 ports

leads 29 × 100 mil

resistor 95 × 249



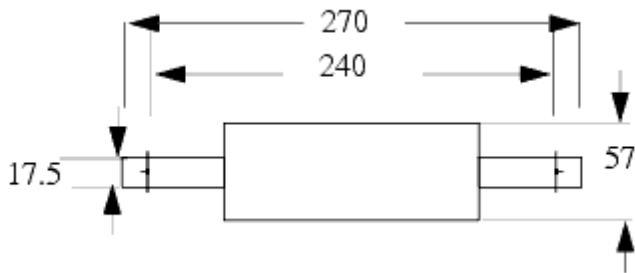
AXRES2

Axial leaded components

2 ports

leads 17.5×60 mil

resistor 57×150



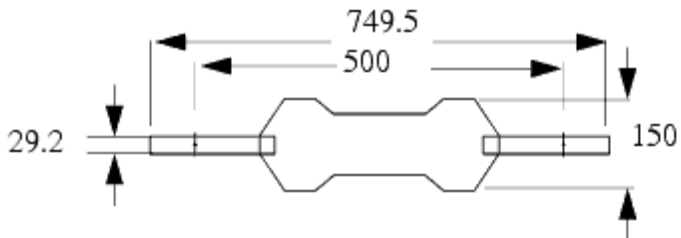
AXRES3

Axial leaded components

2 ports, 500 mil port-to-port

leads 29.2×205 mil

resistor



BFLANGE

no name given by vendor

3 ports

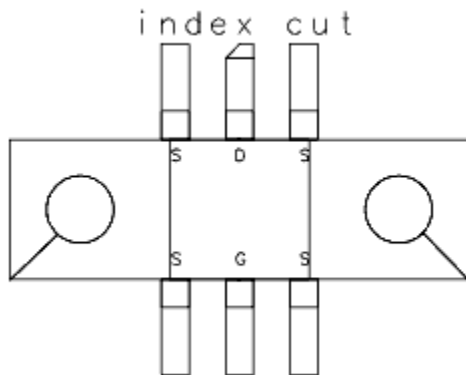
flange 820 × 250 mil

holes 120 mil diameter 570 mil center-to-center

leads 50 × 170 mil

pads 50 mil square

FET

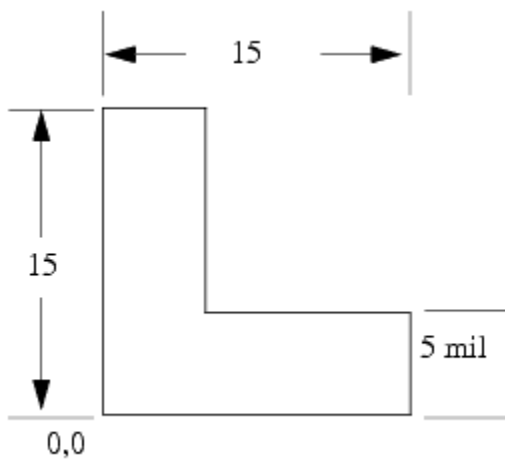


C-LL

Alignment corner marks

no ports

conductor 5 mil wide



C319BD01

Motorola Case 319B-01

5 ports

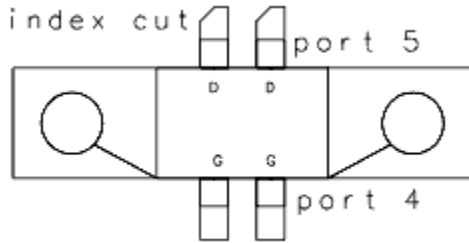
flange 975 × 233 mil

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

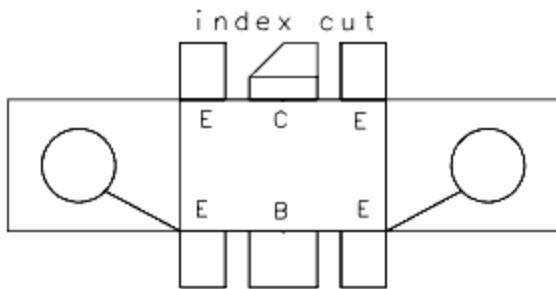
flange 975 × 233 mil

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

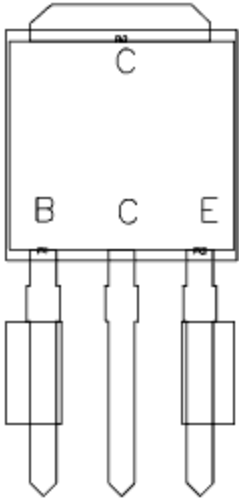


C369D03

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

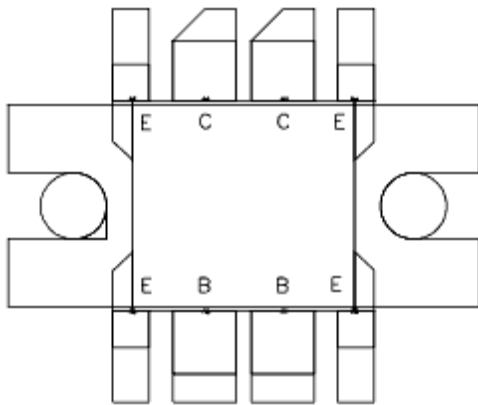
Motorola Case 51-02
2 ports
package 96 × 265 mil
2 leads 20 × 40 mil (bent)
2 holes 22 mil square
2 pads 44 mil square
Diode



C744AD01

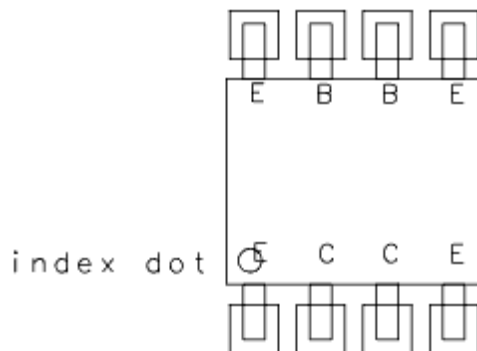
Motorola Case 744A-01
8 ports
flange 385 × 900 mil
package 424 × 400 mil
holes 126 mil diameter 650 mil center-to-center

4 leads 182 × 70 mil, 4 leads 182 × 120 mil
 4 pads 70 mil square, 4 pads 120 mil square
 BJT



C751D03

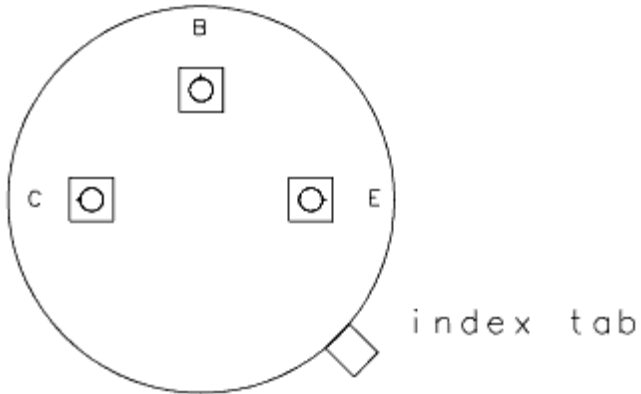
Motorola Case 751-03
 8 ports
 SMT
 single device inside
 package 192 × 154 mil
 8 leads 16.5 × 41.5 mil
 8 pads 36.5 mil square
 BJT



C7904

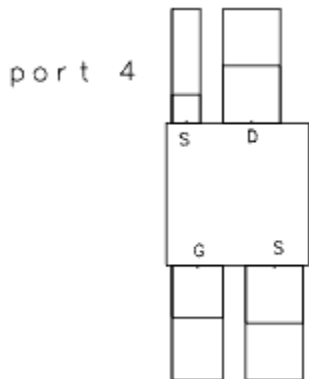
Motorola Case 79-04
 3 ports
 package 352.5 mil diameter

holes 21 mil diameter
100 mil from package center
pads 40 mil square
BJT



CD

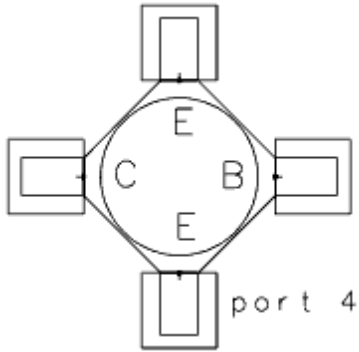
CD
4 ports
package 250 mil square
2 leads 100 × 200 mil, 1 lead 90 × 200 mil, 1 lead 50 × 200 mil
2 pads 100 mil square, 1 pad 90 mil square, 1 pad 50 mil square
FET



CERECX

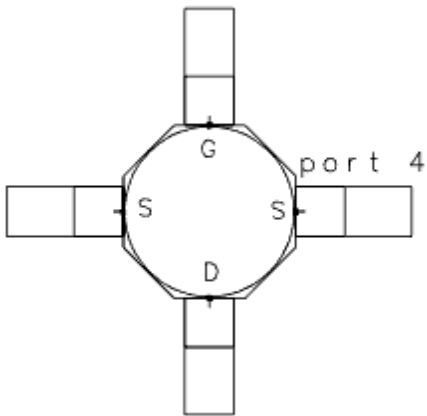
CEREC-X
4 ports

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

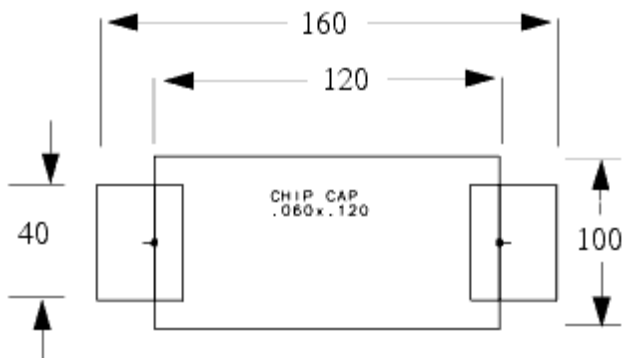
CEREC-XF
4 ports
SMT
package 70 mil octagon
leads 20 × 47.5 mil
pads 20 mil square
FET



CHPCAP

Surface mount components

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



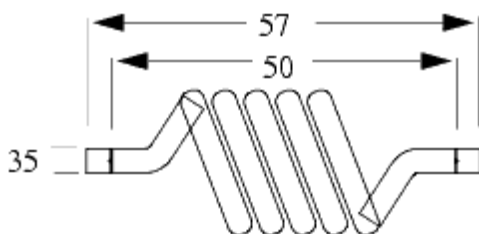
CHPRES

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



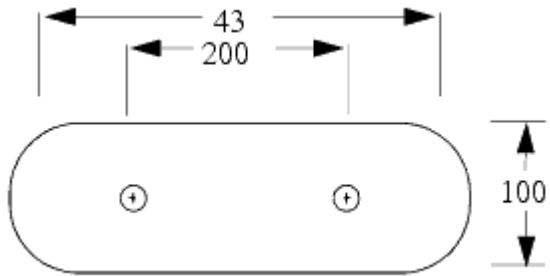
COIL1

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



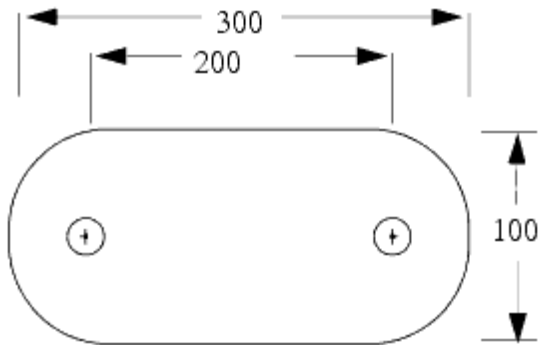
DISK_L

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



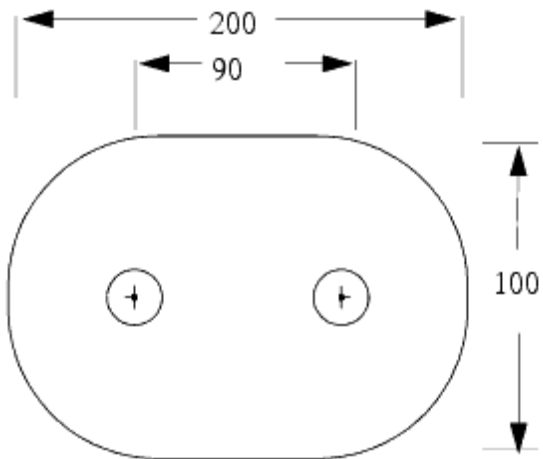
DISK_M

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



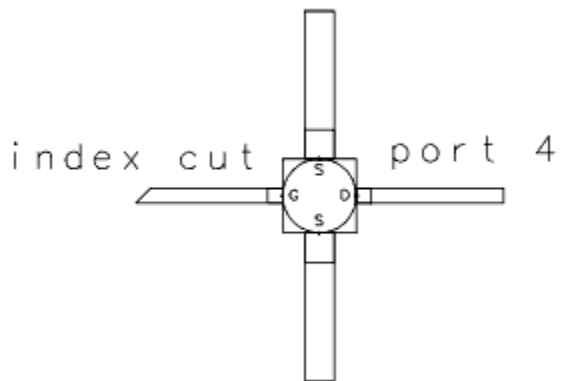
DISK_S

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



GD11

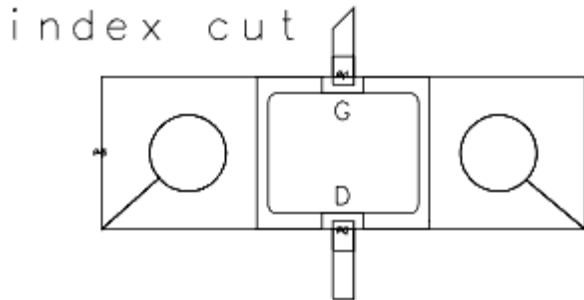
GD11
4 ports
SMT
package 98.4 mil square and circle
2 leads 39.4 × 196.9 mil, 2 leads 19.7 × 196.9 mil
2 pads 39.4 mil square, 2 pads 19.7 mil square
FET



GF7

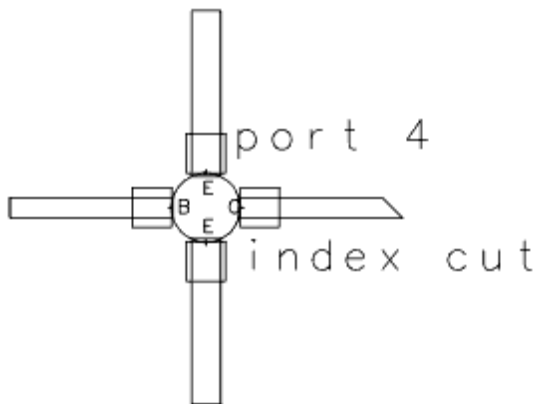
GF7
3 ports
flange 551 × 173 mil
package 197 × 173 mil minus indentations

holes 87 mil diameter 354 mil center-to-center
2 leads 24 × 79 mil
2 pads 24 mil square
FET



HP70GT

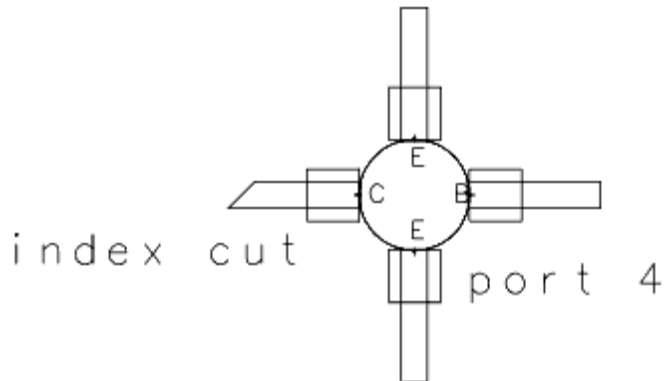
HPAC-70GT
4 ports
SMT
package 70 mil diameter
2 leads 30 × 165 mil, 2 leads 20 × 165 mil
pads 40 mil square
BJT



HP85PLAS

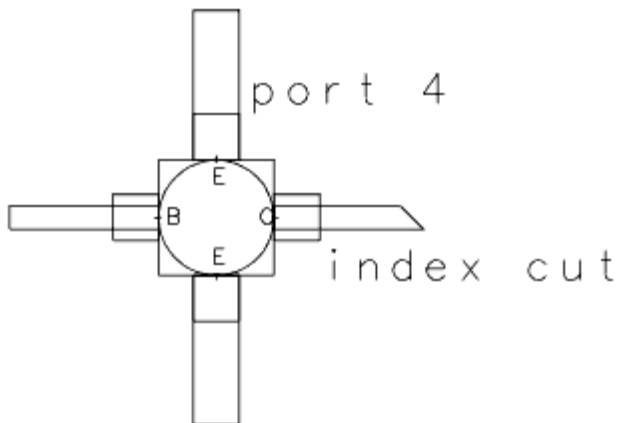
HP85 Plastic
4 ports
package and hole 85 mil diameter
leads 20 × 100.5 mil

pads 40 mil square
BJT



HPAC100

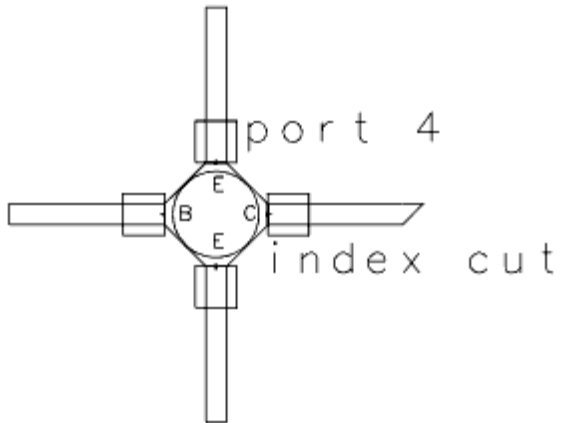
HPAC100
4 ports
SMT
package 100 mil square and diameter
2 leads 40 × 130 mil, 2 leads 20 × 130 mil
pads 40 mil square
BJT



HPAC100X

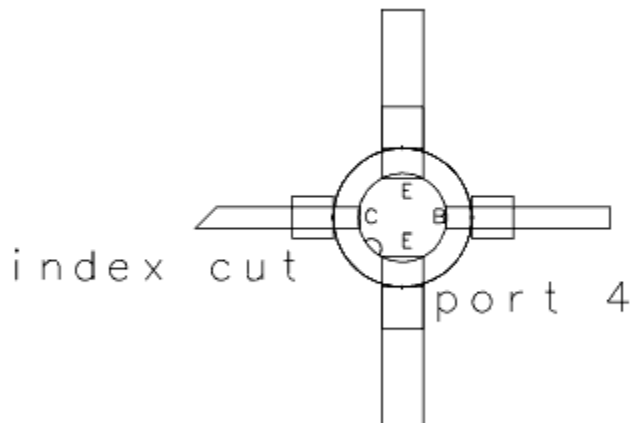
HPAC100X
4 ports
SMT

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

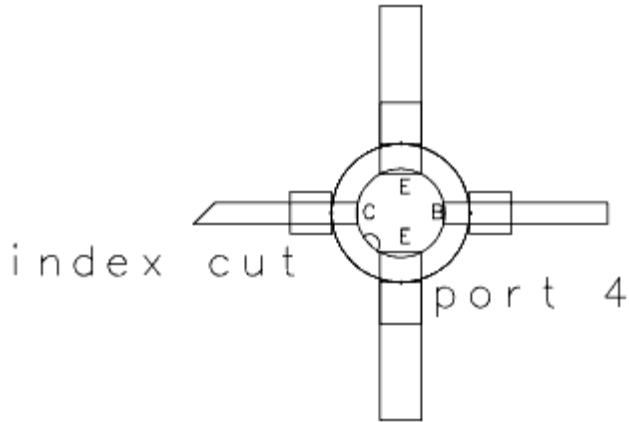
package and hole 200 mil diameter

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

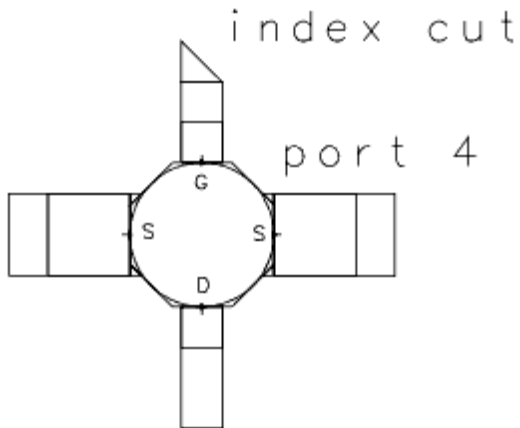
SMT

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

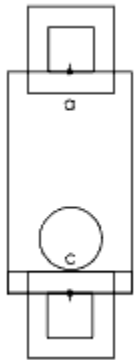
SMT

package 60×106.3 mil

2 leads 21.7×21.5 mil

2 pads 41.7×41.5 mil

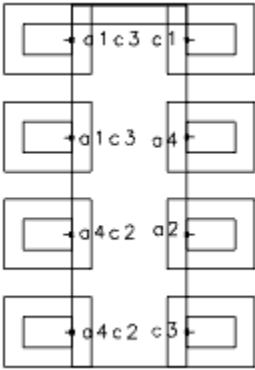
Diode



MOP

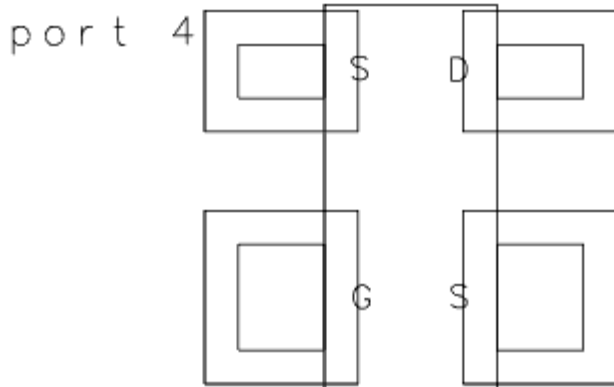
Mini Octal Package

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

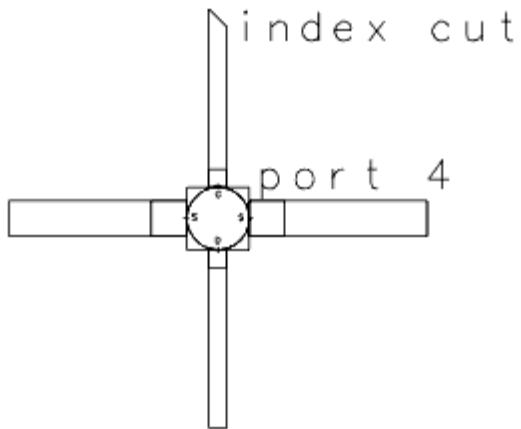
SMT

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

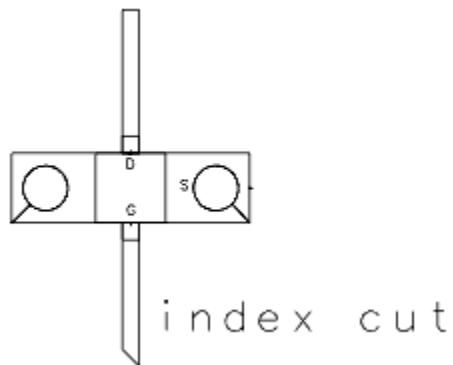
package 98 mil square

holes 63 mil diameter 240 mil center-to-center

2 leads 24 × 201 mil

2 pads 24 mil square

FET



MWT73

MWT73

4 ports

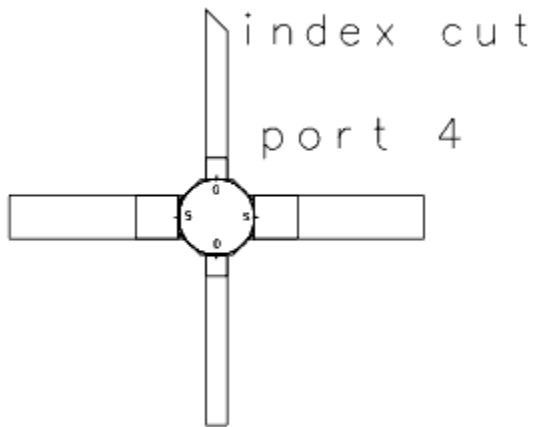
SMT

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

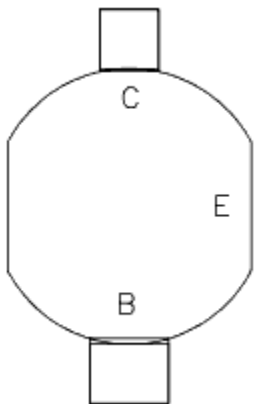
package 275.6 mil diameter circle cut to 244 mil width

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



NEC34

NEC34

3 ports

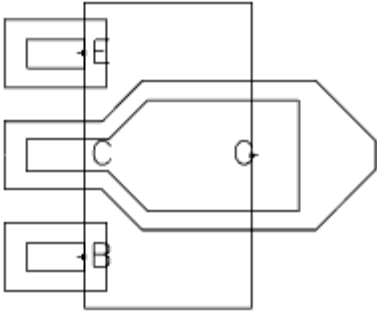
SMT

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

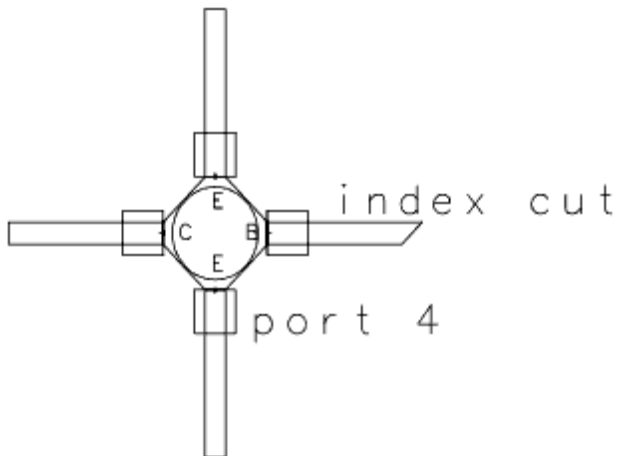
SMT

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

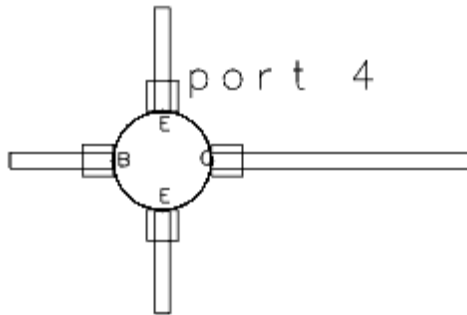
4 ports

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

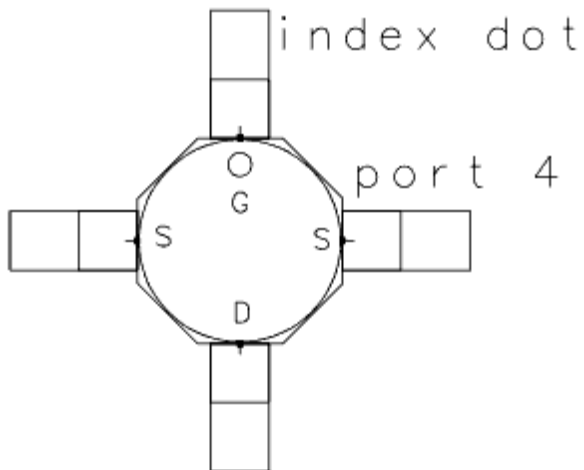
SMT

package 70 mil octagon

leads 20 × 43.5 mil

pads 20 mil square

FET



NEC39

NEC39

4 ports

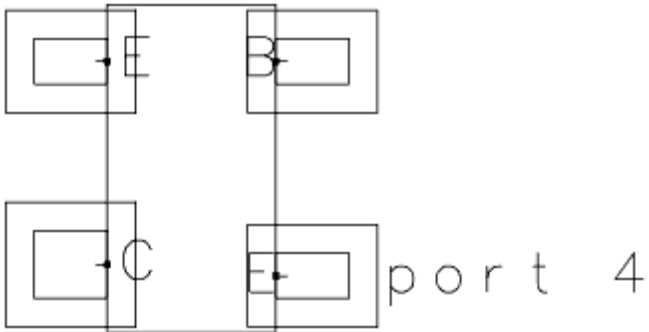
SMT

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

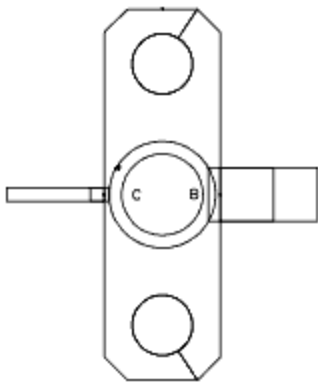
flange 800 × 250 mil

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

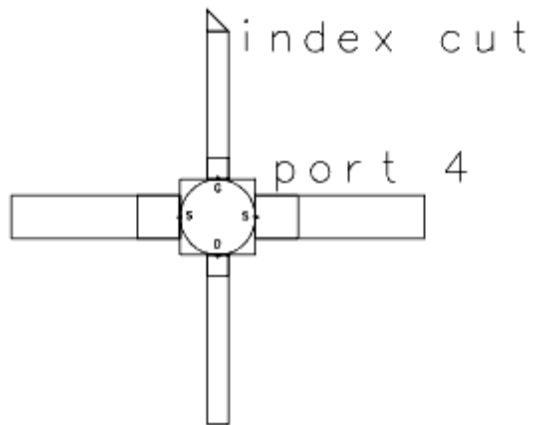
flange 385.8×90.6 mil

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

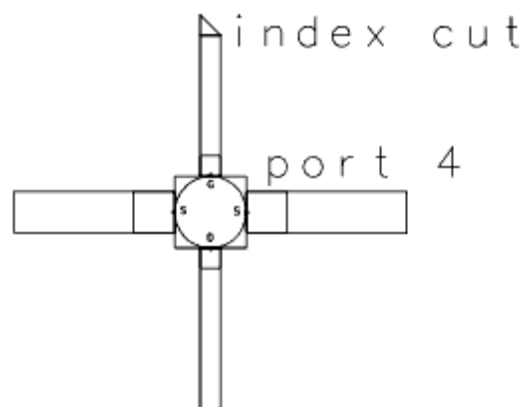
SMT

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

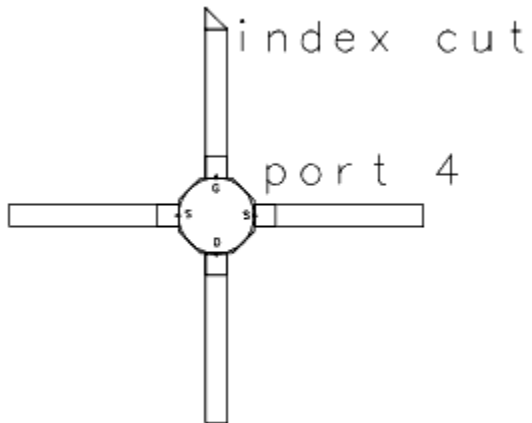
SMT

package 70 mil octagon

leads 20 × 157.5 mil

pads 20 mil square

FET



NEC84A

NEC84A

4 ports

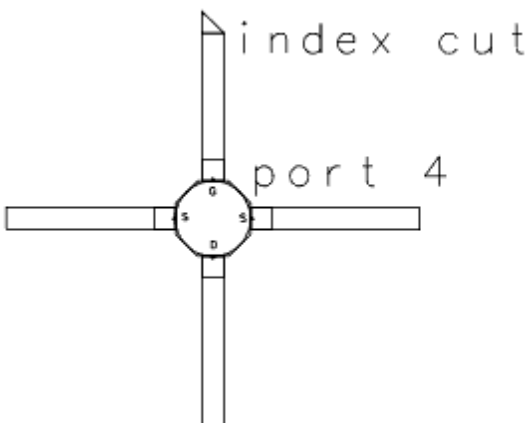
SMT

package 70 mil octagon

leads 20 × 157.5 mil

pads 20 mil square

FET



NEC87

NEC87

3 ports

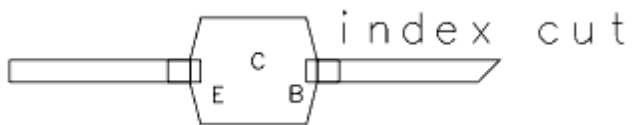
package 114.2 × 137.8 mil octagon

2 leads 23.6 × 196.9 mil

2 pads 23.6 mil square

collector on bottom

BJT



NEC89

NEC89

4 ports

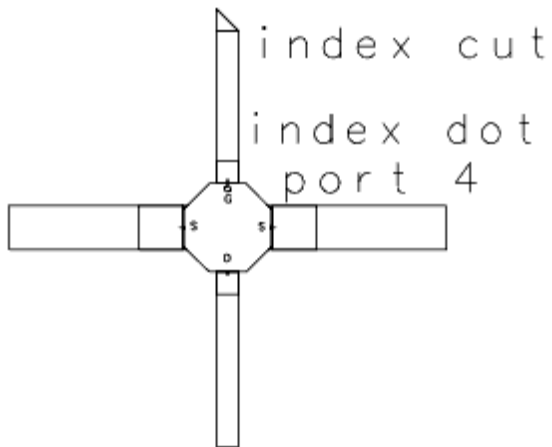
SMT

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

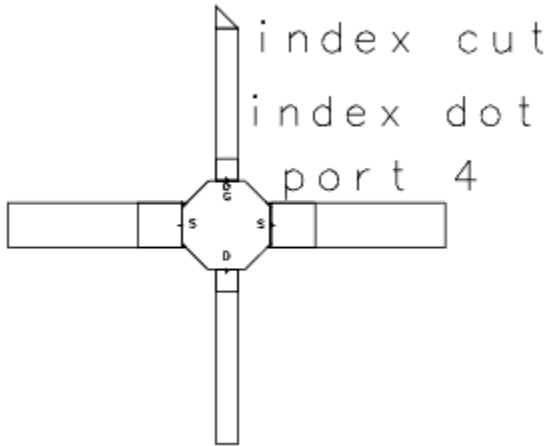
FET



NEC89A

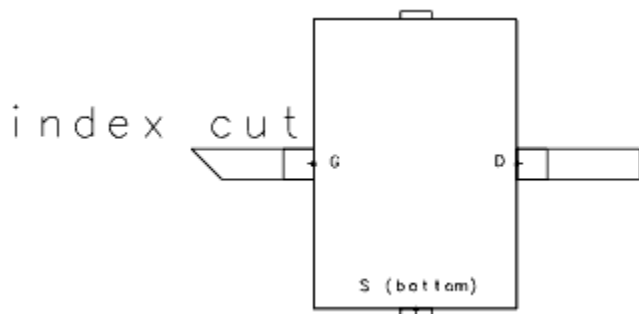
NEC89A

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

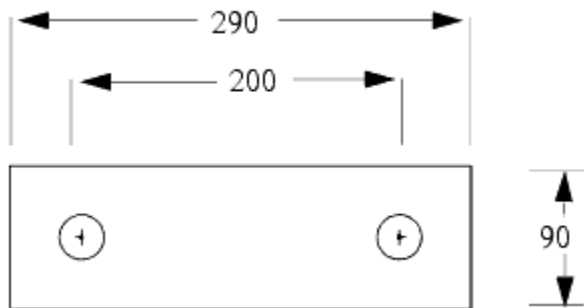
(no name given by vendor)
3 ports
package and hole 130 × 185 mil
2 leads 19.7 × 78.8 mil
2 pads 19.7 mil square
2 support bars 5 × 20 mil
FET



RADIAL_M

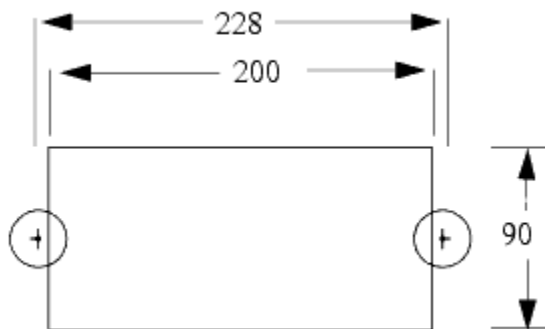
Radial leaded components

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



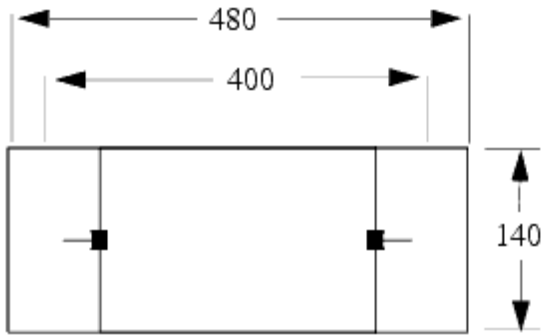
RADIAL_S

Radial leaved 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

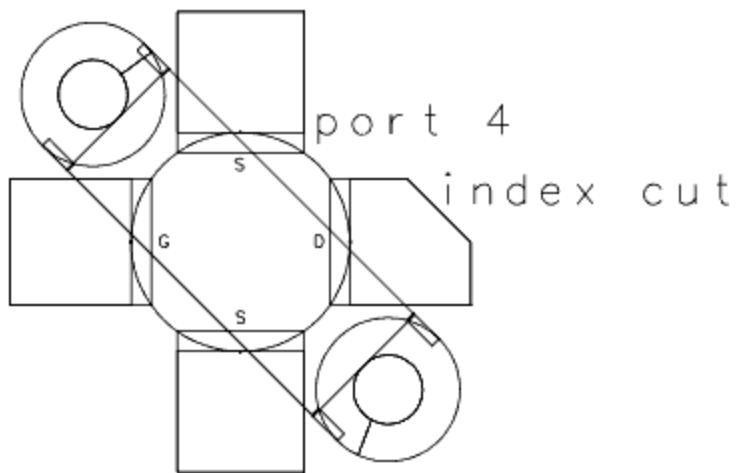
package 380 mil diameter

holes 120 mil diameter 725 mil center-to-center

leads 220 × 210 mil at 45°

pads 220 × 210 mil

FET



SOT223

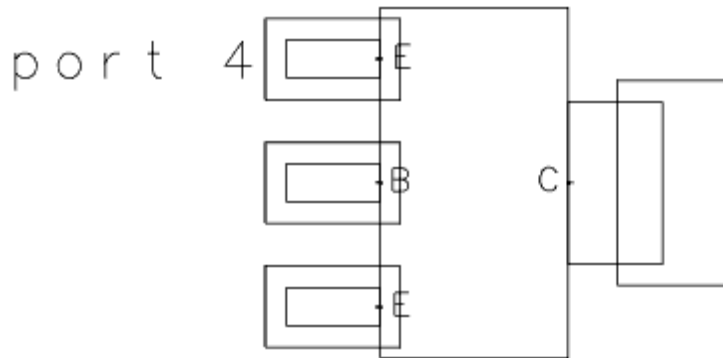
SOT223

4 ports

SMT

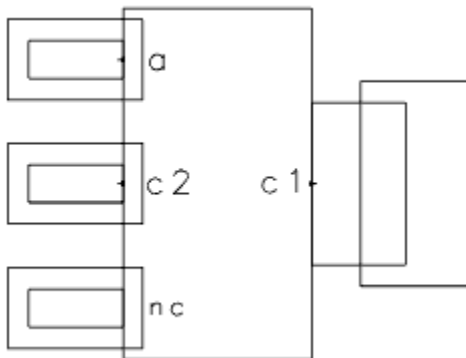
package 255.9 × 137.8 mil

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

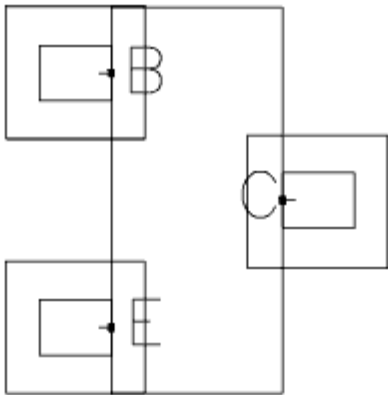
SOT223
 3 ports
 SMT
 package 255.9 × 137.8 mil
 3 leads 27.6 × 68.9 mil, 1 lead 118.1 × 68.9 mil
 3 pads 98.5 × 59.2 mil, 1 pad 78.9 × 149.6 mil
 Diode



SOT23

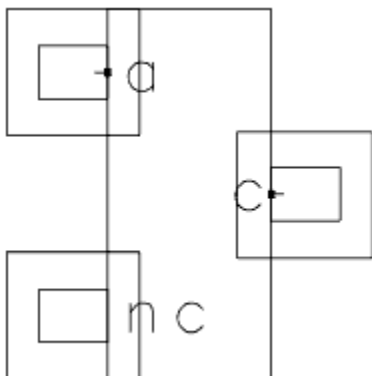
SOT23
 3 ports
 SMT
 package 115 × 51 mil

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

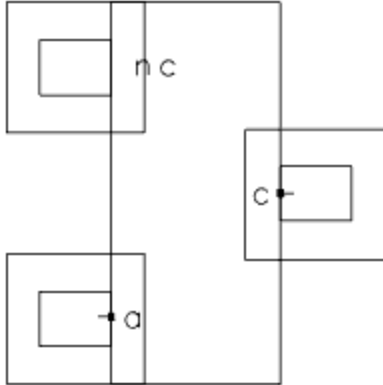
SMT

package 115 × 51 mil

leads 16.5 × 21.5 mil

pads 41.5 × 39.4 mil

Diode



SOT23V4

SOT23

2 ports

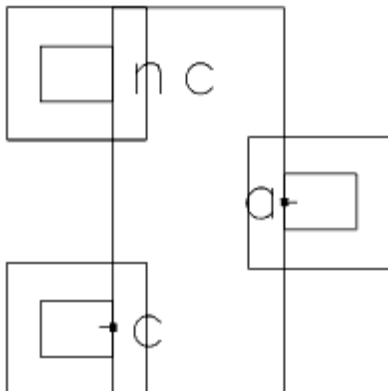
SMT

package 115 × 51 mil

leads 16.5 × 21.5 mil

pads 41.5 × 39.4 mil

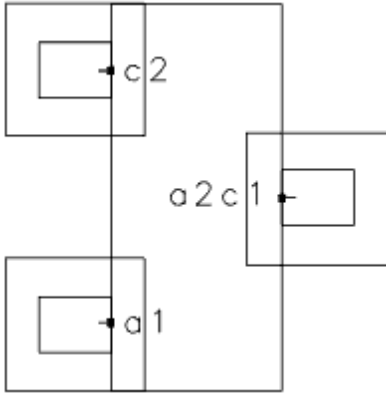
Diode



SOT23V5

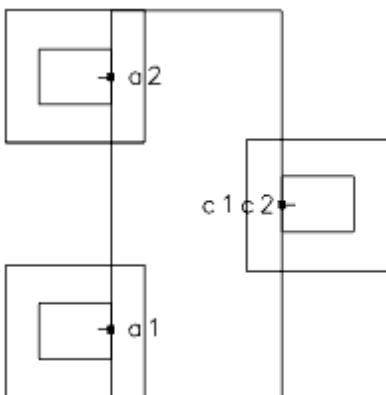
SOT23

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

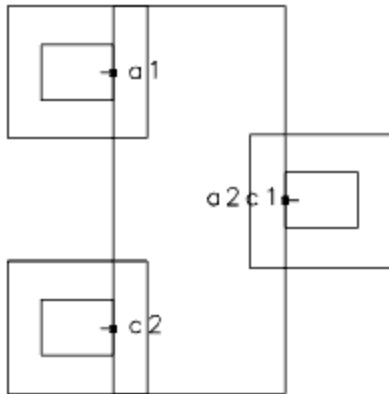
SMT

package 115 × 51 mil

leads 16.5 × 21.5 mil

pads 41.5 × 39.4 mil

Diode



SOT23V8

SOT23

3 ports

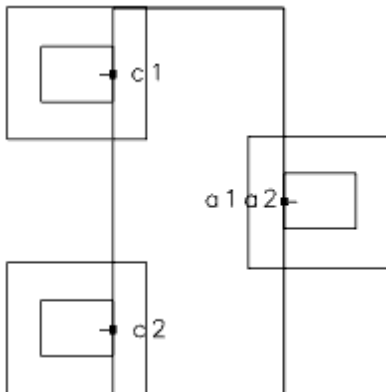
SMT

package 115 × 51 mil

leads 16.5 × 21.5 mil

pads 41.5 × 39.4 mil

Diode



SOT323

SOT323

3 ports

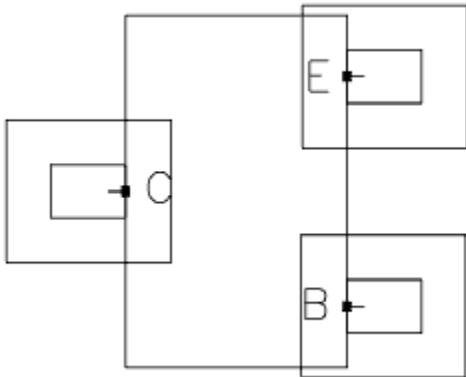
SMT

package 78.6×49.4 mil

leads 11.8×16.8 mil

pads 31.8×36.8 mil

BJT



SOT37

SOT37

3 ports

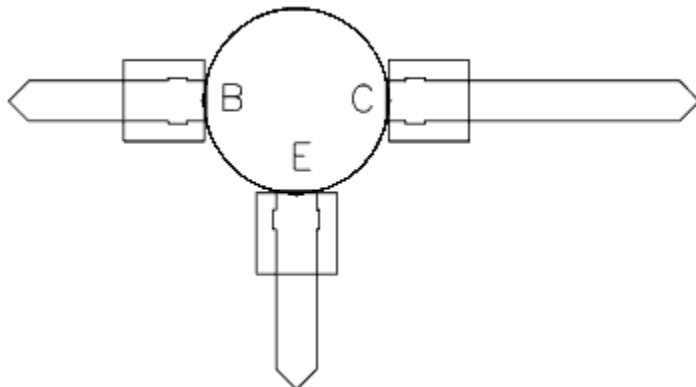
package and hole 189 mil diameter

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

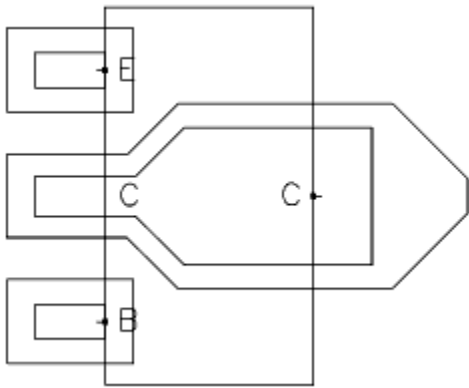
package 177.2×97.7 mil

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

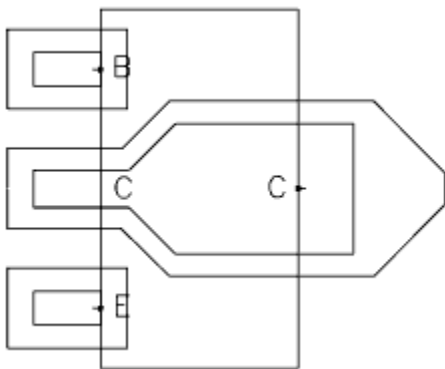
package 177.2×97.7 mil

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

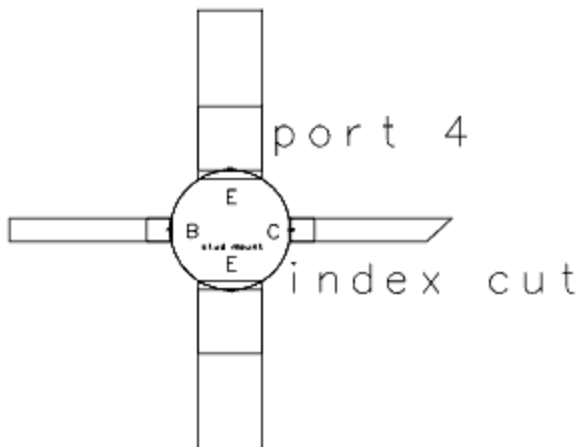
4 ports

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



TPLAST

TPLAST

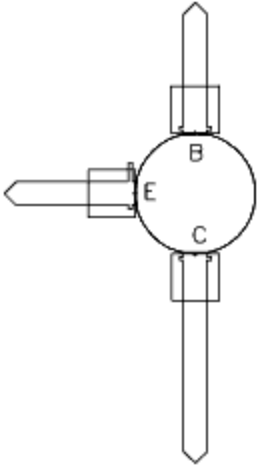
3 ports

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

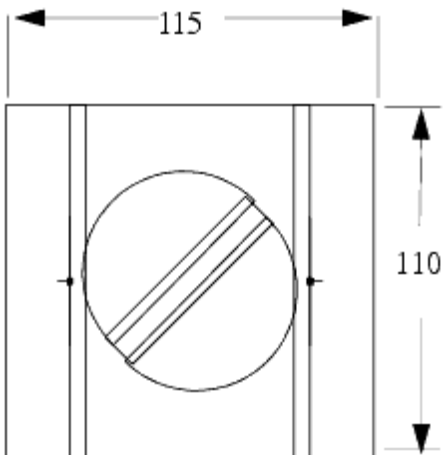
Tunable chip capacitor

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



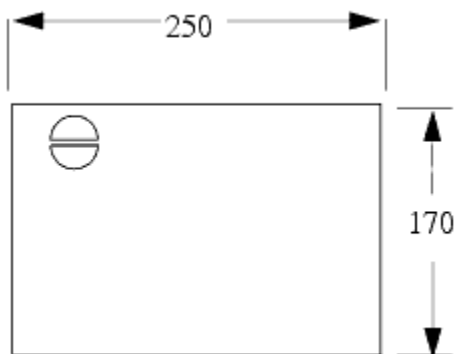
UPRIGHT

Upright mounted variable resistor

no ports

packages 170×250 mil

Text



URP

URP

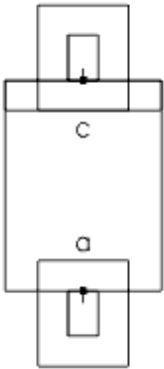
2 ports

SMT

package 52×70 mil

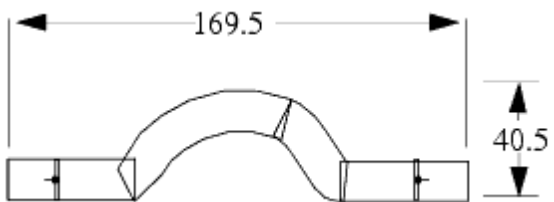
2 leads 10×15 mil

2 pads 30 × 35 mil
Diode



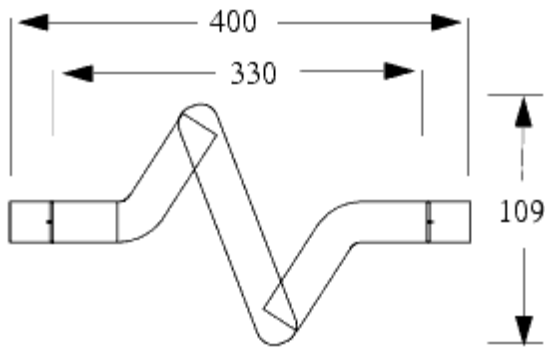
WIRE0

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



WIRE1

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



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)

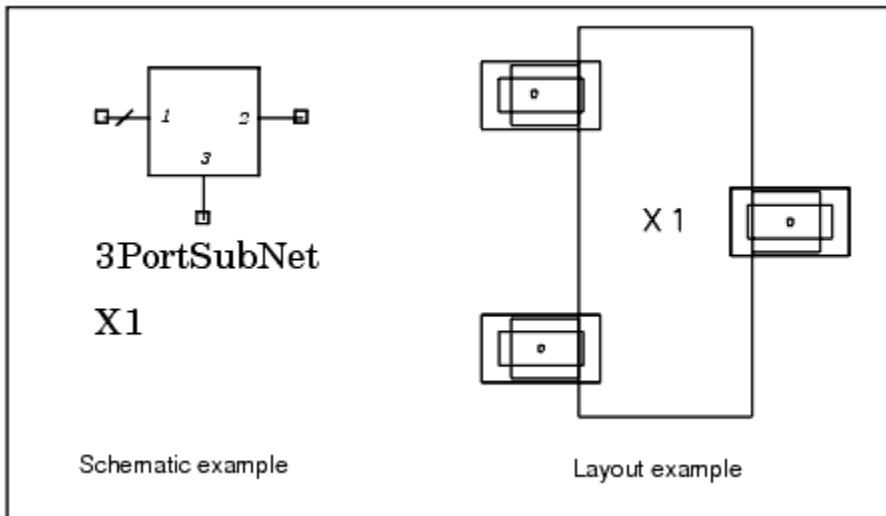
This chapter describes the library, including the package type and name, the AEL interface function name (AEL macro name), and the dimensions of the package. A diagram is shown for each package type.

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 .

[SMT Artwork Replacement Examples](#) 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.



SMT Artwork Replacement Examples

Ceramic Flat Pack (CFP) Packages

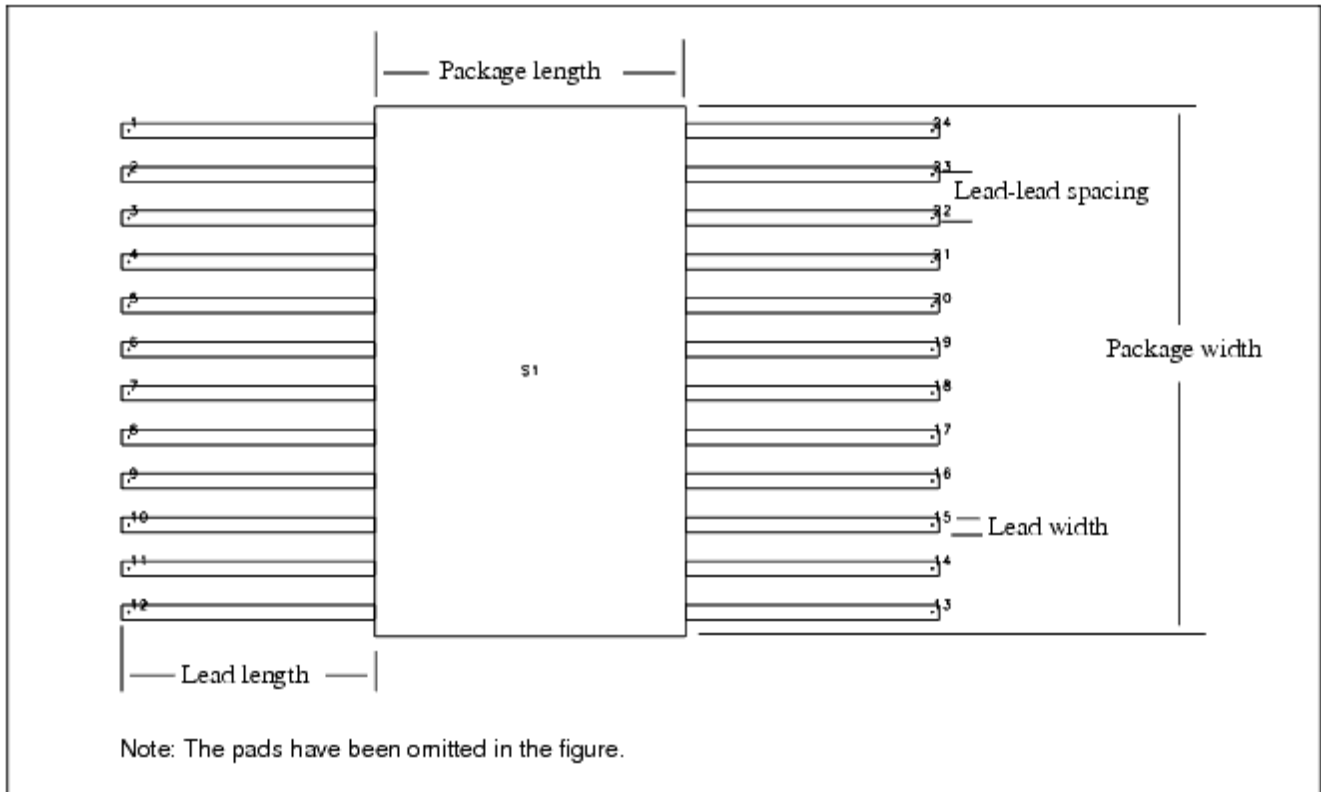
[Ceramic Flat Pack \(CFP\) Packages](#) lists 17 CFP packages and the associated layout artwork AEL macro name and dimensions for each package. [Ceramic Flat Pack \(CFP\) Layout Artwork](#) shows the layout artwork for a typical CFP with the marked dimensions given in the table.

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

Advanced Design System 2008

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



Ceramic Flat Pack (CFP) Layout Artwork

Chip and MELF Components

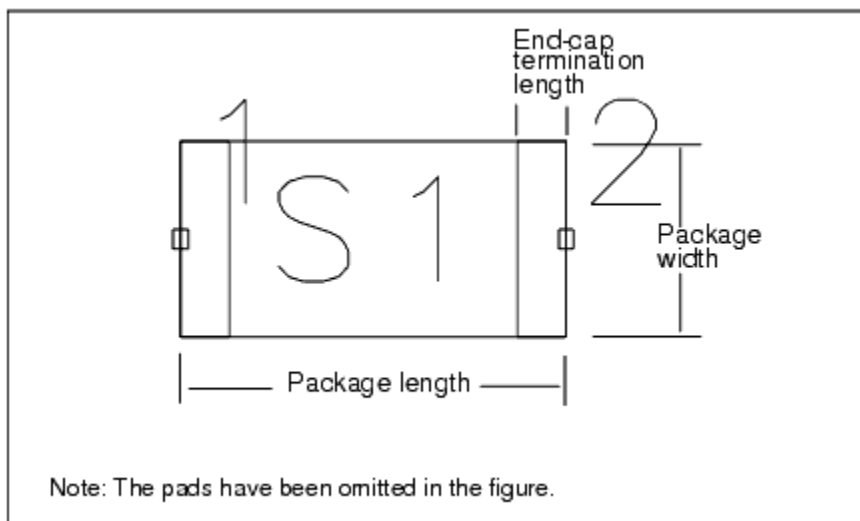
[Chip and MELF Component Packages](#) lists 15 chip component packages and 4 MELF components, and the associated layout artwork AEL macro name and dimensions for each package. [Chip Component Layout Artwork](#) shows the layout artwork for a typical chip component, 0402, with the marked dimensions given in the table.

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

Advanced Design System 2008

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
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



SOT, DPAK, D2PAK Packages

[SOT, DPAK, D2PAK Packages](#) 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.

[SOT-23 Layout Artwork](#) shows the layout artwork for a typical SOT-23 package with the marked dimensions given in the table.

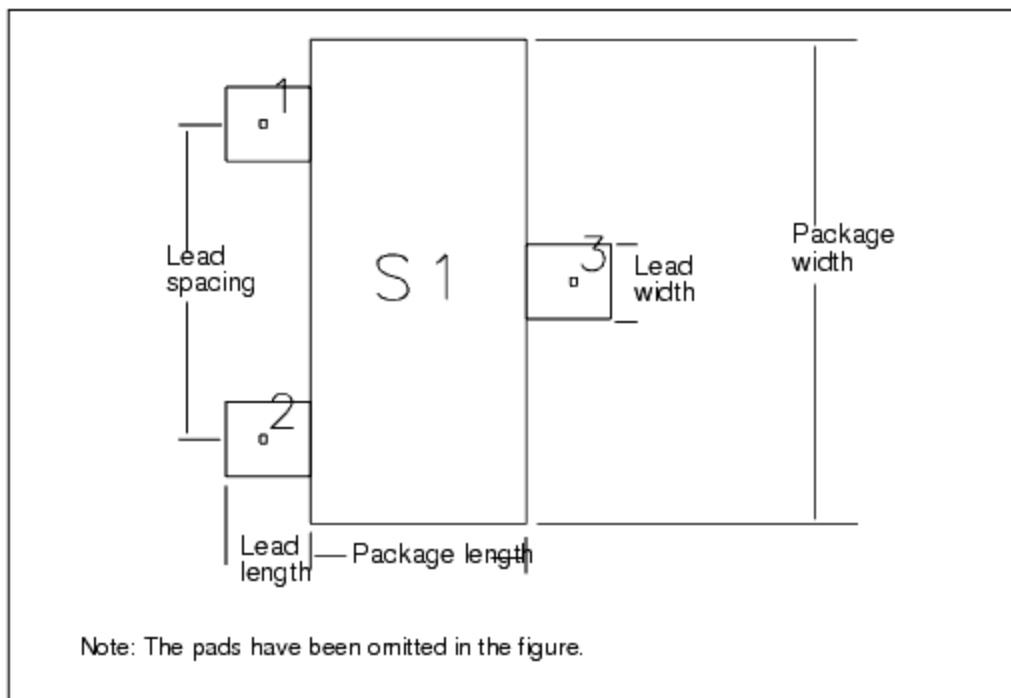
SOT, DPAK, D2PAK Packages

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_SOT2302	1.30	1.30	0.45	0.51	0.45	0.51	1.90	N/A
SOT-23, Metric	smtart_SOT2301	1.30	1.50	0.45	0.50	0.45	0.50	1.90	N/A
SOT-23, Metric	smtart_SOT2302	1.30	1.50	0.45	0.65	0.45	0.65	1.90	N/A
SOT-23, Metric	smtart_SOT2303	1.30	0.80	0.30	0.40	0.30	0.40	1.00	N/A
SOT-23, Metric	smtart_SOT2304	1.30	1.25	0.30	0.43	0.30	0.43	1.30	N/A
SOT-23, Metric	smtart_SOT2305	1.30	1.30	0.40	0.55	0.40	0.55	1.90	N/A
SOT-25	smtart_SOT2502	1.50	1.50	0.30	0.65	0.30	0.54	1.90	0.95
SOT-25	smtart_SOT2503	0.90	0.90	0.20	0.60	0.20	0.60	1.30	0.65
SOT-25	smtart_SOT2500	1.25	1.25	0.20	0.43	0.20	0.43	0.65	0.65
SOT-25	smtart_SOT2505D	2.90	1.60	0.30	0.60	0.30	0.60	0.95	0.95

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SOT-36	smtart_SOT36	2.90	1.60	0.30	0.60	0.30	0.60	0.95	0.95
SOT-143	smtart_SOT143A	2.40	1.30	0.88	0.75	0.48	0.75	1.70	1.90
SOT-143	smtart_SOT143B	2.40	1.30	0.88	0.60	0.48	0.60	1.70	1.90
SOT-223	smtart_SOT223	7.50	3.50	3.00	1.75	0.74	1.75	2.30	N/A
DPAK	smtart_DPAK50	6.50	5.50	5.20	2.79	0.51	2.00	4.60	N/A
DPAK	smtart_DPAK50	6.50	5.50	5.20	12.0	0.51	2.00	2.30	N/A
DPAK	smtart_DPAK39	6.39	6.09	5.20	2.74	0.79	1.07	4.60	N/A
DPAK	smtart_DPAK47	6.47	6.10	4.83	2.74	0.79	1.07	4.57	N/A
DPAK	smtart_DPAK55	6.55	5.82	5.38	4.45	1.14	1.55	4.57	N/A
D2PAK	smtart_D2PAK41	9.41	9.96	0.71	4.83	9.96	1.27	2.54	N/A

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



SOT-23 Layout Artwork

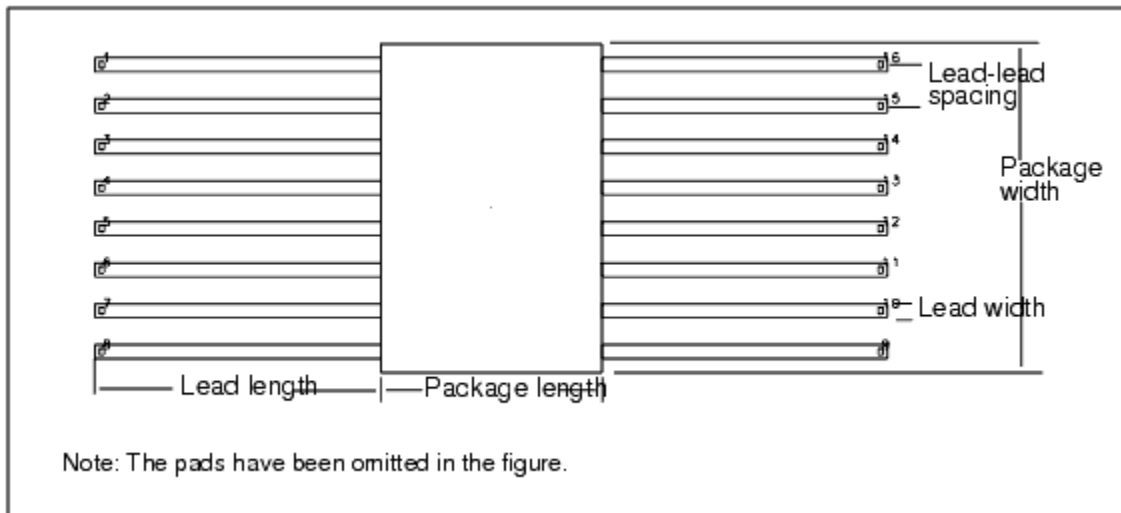
Plastic Flat Pack (PFP) Packages

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[Plastic Flat Pack \(PFP\) Packages](#) lists 3 Plastic Flat Pack (PFP) packages and the associated layout artwork AEL macro name and dimensions for each package. [Plastic Flat Pack \(PFP\) Layout Artwork](#) shows the layout artwork for a PFP with the marked dimensions given in the table.

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



Plastic Flat Pack (PFP) Layout Artwork

Quad Flat Pack (QFP) Packages

[Quad Flat Pack \(QFP\) Packages](#) lists 48 Quad Flat Pack (QFP) and the associated layout artwork AEL macro name and dimensions for each package. [Quad Flat Pack \(QFP\) Layout Artwork](#) shows the layout artwork for a typical QFP package with the marked dimensions given in the table.

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Quad Flat Pack \((QFP) Packages

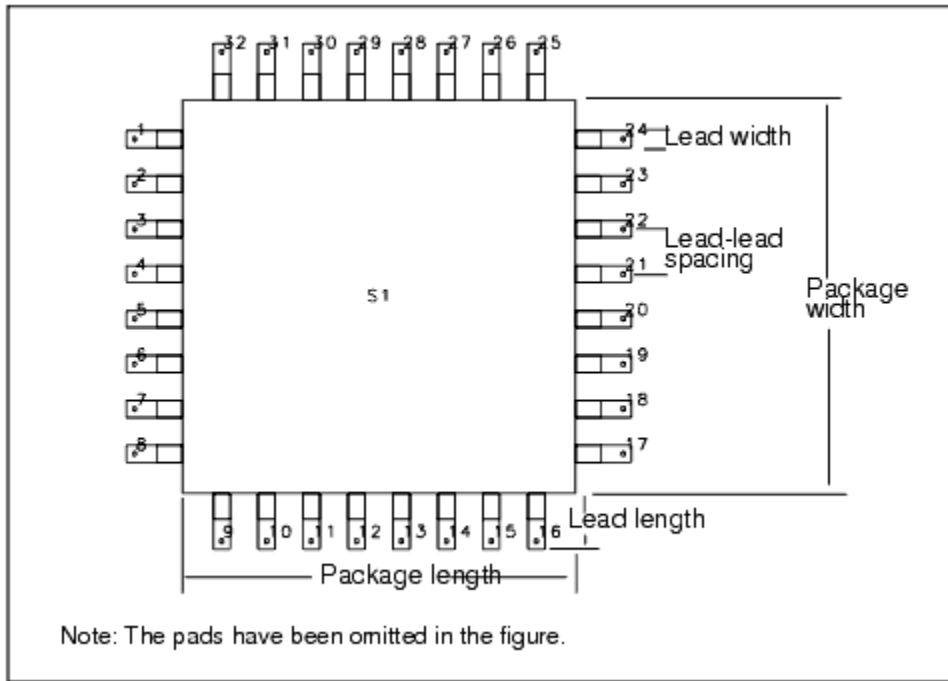
Part Name	AEL Macro Name	Package		Lead		Lead-lead Spacing (mm)	Description
		Width (mm)	Length (mm)	Width (mm)	Length (mm)		
QFP32A	smtart_QFP32A	7.0	7.0	0.3	1.0	0.8	8 leads/side
QFP32B	smtart_QFP32B	5.0	5.0	0.2	1.0	0.5	8 leads/side
QFP40A	smtart_QFP40A	6.0	6.0	0.2	1.0	0.5	10 leads/side
QFP40B	smtart_QFP40B	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

Advanced Design System 2008

							leads/side
QFP52D	smtart_QFP52D	7.0	5.0	0.15	1.0	0.40	16 × 10 leads
QFP54	smtart_QFP54	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
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

Advanced Design System 2008

QFP80A	smtart_QFP80A	14.0	14.0	0.3	1.6	0.65	20 leads/side
QFP80B	smtart_QFP80B	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



Quad Flat Pack (QFP) Layout Artwork

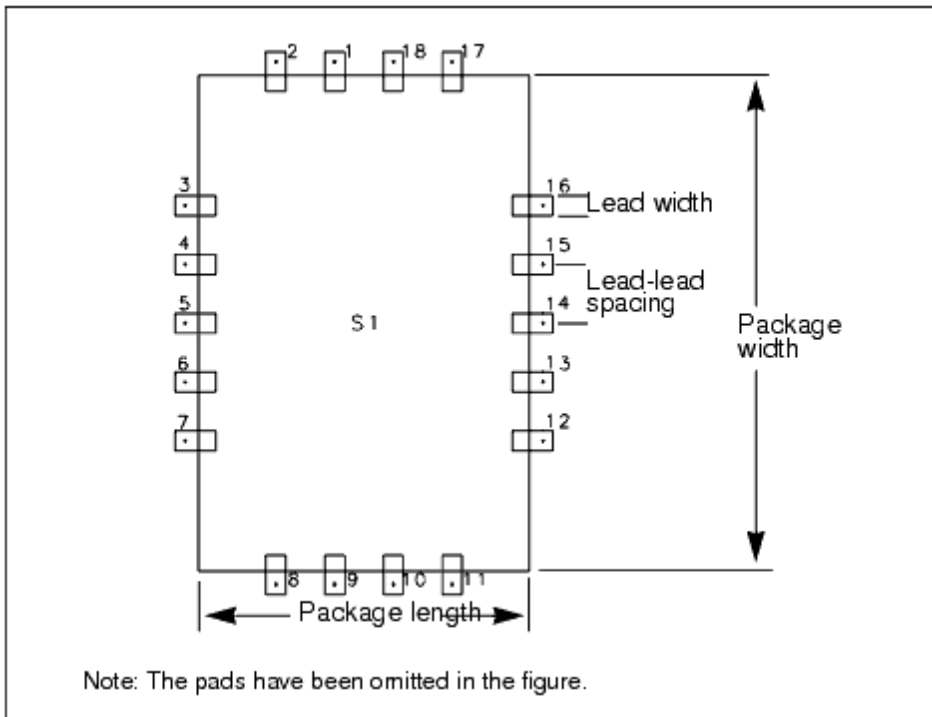
Plastic Leaded Chip Carrier (PLCC)

[Plastic Leaded Chip Carrier \(PLCC\) Packages](#) lists 11 Plastic Leaded Chip Carrier (PLCC) packages and the associated layout artwork AEL macro name and dimensions for each package. [Plastic Leaded Chip Carrier \(PLCC\) Layout Artwork](#) shows the layout artwork for a typical PLCC package with the marked dimensions given in the table.

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	8.13	8.13	0.431	1.27

	SQ				
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
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

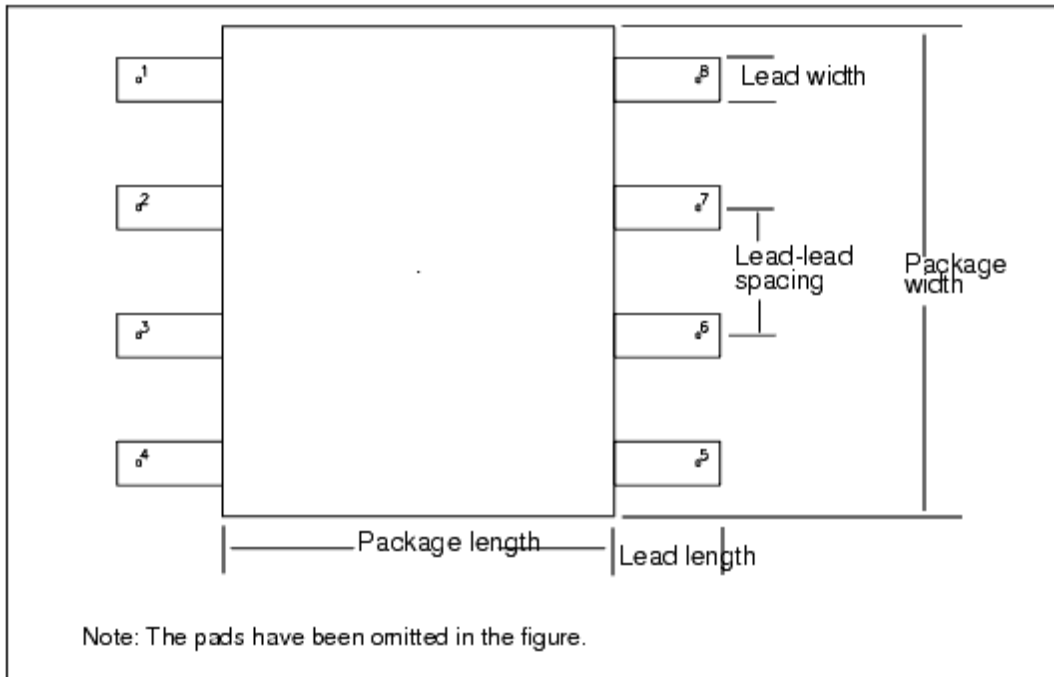


Small Outline IC (SOIC)

[Small Outline IC \(SOIC\) Packages](#) lists 13 Small Outline IC (SOIC) packages and the associated layout artwork AEL macro name and dimensions for each package. [Small Outline IC \(SOIC\) Package Layout Artwork](#) shows the layout artwork for a typical SOIC package with the marked dimensions given in the table.

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



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
```

Advanced Design System 2008

```

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 [Arguments for the Generic Function smtart_draw_SMT\(\)](#) below:

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.
DelX	Not used
Units	Dimension units - "um", "mm", "mts", "mil", "in"
PackageStyle	Package style option. Choices are:

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 smtart_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);
  smtart_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 smtart_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);
  smtart_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);
}
```

Font Definitions

din17

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
' 1234567890 - = |
~ ! @ # \$ % ^ & * () _ + \
[] { } < > ; : ' " , . / ?

iso3098

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
' 1234567890 - = |
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[] { } < > ; : ' " , . / ?

roman

a b c d e f g h i j k l
m n o p q r s t u v w x y z
A B C D E F G H I J K L
M N O P Q R S T U V W X Y Z
□ 1 2 3 4 5 6 7 8 9 0 - = □
□ ! □ □ \$ % ' & * () □ + □
□ □ □ □ □ ' ; : ' " , . / ?

smooth

a b c d e f g h i j k l
m n o p q r s t u v w x y z
A B C D E F G H I J K L
M N O P Q R S T U V W X Y Z
' 1 2 3 4 5 6 7 8 9 0 - = |
□ ! @ # \$ % ^ & * () - + \
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italic

a b c d e f g h i j k l
m n o p q r s t u v w x y z
A B C D E F G H I J K L
M N O P Q R S T U V W X Y Z
□ 1 2 3 4 5 6 7 8 9 0 - = □
□ ! □ □ \$ □ □ & * () □ + □
[] { } □ □ ; : ' " , . / ?

standard

a b c d e f g h i j k l
m n o p q r s t u v w x y z
A B C D E F G H I J K L
M N O P Q R S T U V W X Y Z
' 1 2 3 4 5 6 7 8 9 0 - = |
~ ! @ # \$ % ^ & * () _ + \
[] { } < > ; : ' " , . / ?

gothic

a b c d e f g h i j k l
m n o p q r s t u v w x y z
A B C D E F G H I J K L
M N O P Q R S T U V W X Y Z
□ 1 2 3 4 5 6 7 8 9 0 - = □
□ ! ' ' \$ % □ & * () □ + □
□ □ □ □ □ □ ; : ' " , . / ?

math

α β γ δ ε ζ η θ ι κ λ μ
ν ξ ο π ρ σ τ υ φ χ ψ ω θ φ
Α Β Γ Δ Ε Ζ Η Θ Ι Κ Λ Μ
Ν Ξ Ο Π Ρ Σ Τ Υ Φ Χ Ψ Ω ∇ α
· 1 2 3 4 5 6 7 8 9 0 - = √ ∫
≠ √ ∫ ∞ ÷ ∞ α x () + √ ∫
ζ ≠ ω ≡ < > ε e ' " , . / √ ∫

sans

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
' 1234567890 - = |
~ ! @ # \$ % ^ & * () _ + \
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sansbold

abcdefghijklmnopqrstuvwxyz
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' 1234567890 - = |
~ ! @ # \$ % ^ & * () _ + \
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filled

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
' 1234567890 - = |
~ ! @ # \$ % ^ & * () _ + \
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filledbold

abcdefghijklmnopqrstuvwxyz
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' 1234567890 - = |
~ ! @ # \$ % ^ & * () _ + \
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straight

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
`1234567890-=_|
~!@#\$%^&*()_+\
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straightfilled

abcdefghijklmnopqrstuvwxyz
ABCDEFGHIJKLMNOPQRSTUVWXYZ
MNO PQRSTU VWXYZ
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[] { } < > ; : ' " , . / ?