

전자부품

전자부품 분류

1. 능동 전자 부품

- 전자 부품을 통과하는 전자의 흐름을 제어
- 능동부품에는 트랜지스터, 반도체(다이오드), IC(직접회로), 전원(배터리, AC 및 DC 전원 공급장치)

2. 수동전자 부품

- 전류 흐름을 제어 할 수 는 없다
- 회로에 에너지를 도입할 수는 없지만 전압 및 전류를 증가 또는 감소시킬 수 있다.
- 수동부품에는 저항기, 커패시터, 인덕터 및 변압기 등

능동 전자 부품

1) 다이오드

- 전류가 한 방향으로 흐르도록 하는 비선형 반도체 장치
- 2개의 터미널 장치이고 각각 anode

다양한 유형의 다이오드 표

다이오드	신청
GUNN 다이오드	마이크로파 신호 생성에 사용
레이저 다이오드	광섬유 통신, 바코드 판독기, CD / DVD 드라이브에 사용
발광 다이오드	항공 조명, 교통 신호, 카메라 플래시와 같은 조명 응용 프로그램을 사용
포토 다이오드	고전압 정류기, 광 검출기, 무선 주파수 스위치로 사용
단계 복구 다이오드	고주파 펄스의 생성 및 형성에 사용
터널 다이오드	마이크로파 애플리케이션에 사용
버랙터 다이오드	주로 무선 주파수 애플리케이션에 사용
제너 다이오드	주로 전압 레퍼런스 다이오드로 사용

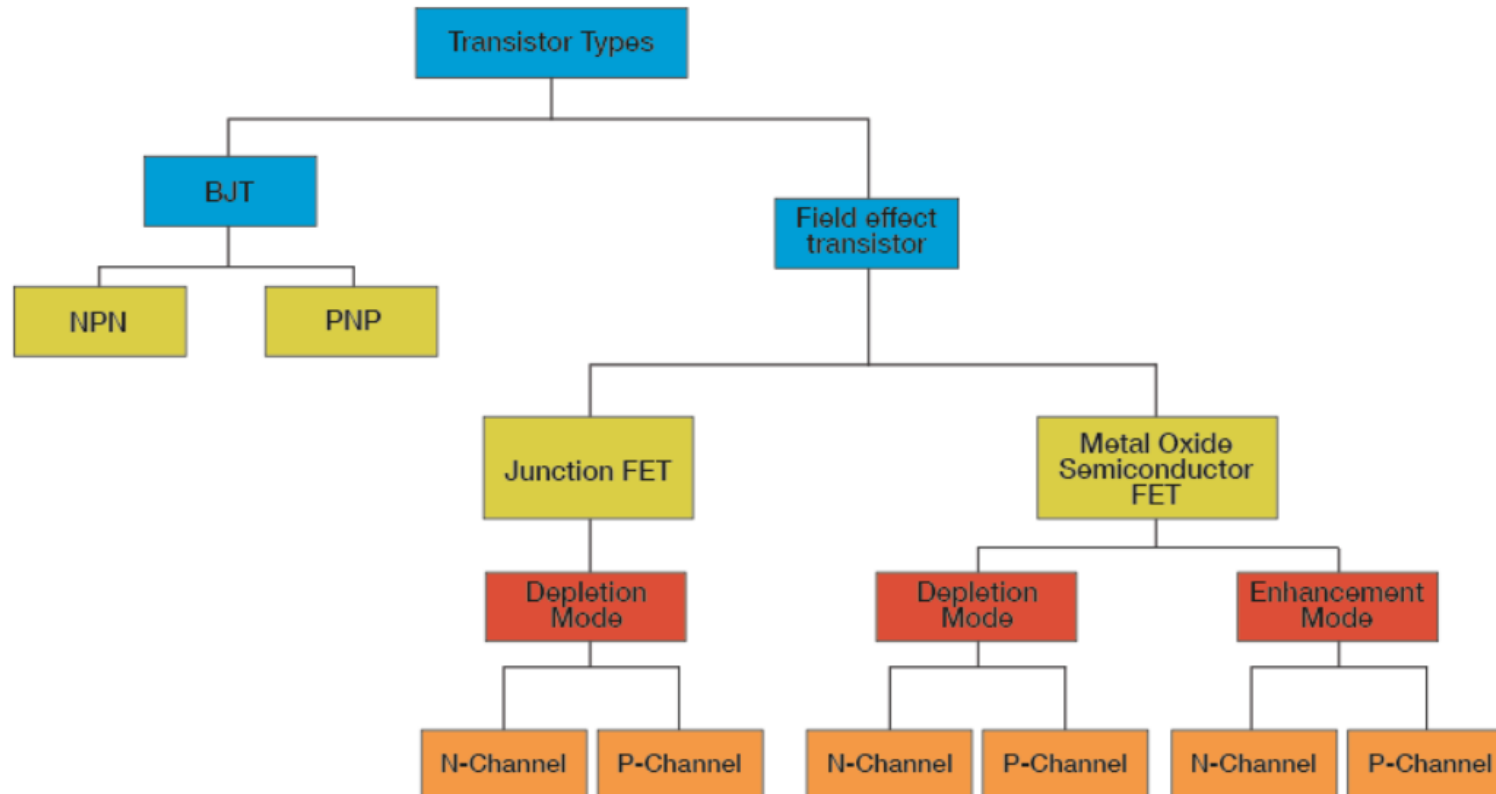
능동 전자 부품

2) 트랜지스터

- 전력을 전환하거나 전자 신호를 증폭하는데 사용하는 반도체

(1) 바이폴라 접합 트랜지스터(BJT)

(2) 전계 효과 트랜지스터 (FET)



능동 전자 부품

3) 집적 회로(IC)

- 실리콘(반도체 재료)으로 구성된 단일 장치에 여러 전자 부품을 통합한 것

Small Outline	Dual Flat No Lead DFN	Quad Flat No Lead QFN	Plastic Shrink Small Outline SSOP	Plastic Small Outline SOIC
Bumped Die (WLCSP)	8-lead DFN (MC) 2 × 3 × 0.9 mm	16-lead QFN (MG) 3 × 3 × 0.9 mm	8-lead MSOP (MS)	8-lead SOIC (SN)
Die/Wafer (WLCSP)	8-lead TDFN (MN) 2 × 3 × 0.75 mm	20-lead QFN (ML) 4 × 4 × 0.9 mm	10-lead MSOP (UN)	8-lead SOIC (SM)
3-lead DPAK (EB)	8-lead UDFN (MU) 2 × 3 × 0.5 mm	20-lead QFN (MQ) 5 × 5 × 0.9 mm	16-lead QSOP (QR)	14-lead SOIC (SL)
3-lead SC70 (LB)	8-lead DFN (MF) 3 × 3 × 0.9 mm	28-lead UQFN (MV) 4 × 4 × 0.5 mm	20-lead SSOP (SS)	16-lead SOIC (SL)
5-lead SC70 (LT)	8-lead DFN (MD) 4 × 4 × 0.9 mm	28-lead QFN (MQ) 5 × 5 × 0.9 mm	28-lead SSOP (SS)	18-lead SOIC (SO)
3-lead SOT-23 (TT/CB)	8-lead DFN (MF) 6 × 5 × 0.9 mm	28-lead QFN (MM & ML) 6 × 6 × 0.9 mm		20-lead SOIC (SO)
5-lead SOT-23 (OT)		40-lead UQFN (MV) 5 × 5 × 0.5 mm		28-lead SOIC (SO)
6-lead SOT-23 (OT/CH)		44-lead QFN (ML) 8 × 8 × 0.9 mm		
3-SOT-223 (DB)		64-lead QFN (MR) 9 × 9 × 0.9 mm		
4-lead SOT-143 (RC)				
5-lead TO-220 (AT)				
	Very Thin Thermal Leadless Array VTLA		Plastic Thin Shrink Small Outline TSSOP	
	36-lead VTLA (TL) 5 × 5 × 0.9 mm		8-lead TSSOP (ST)	
	44-lead VTLA (TL) 6 × 6 × 0.9 mm		14-lead TSSOP (ST)	
	124-lead VTLA (TL) 9 × 9 × 0.9 mm		20-lead TSSOP (ST)	

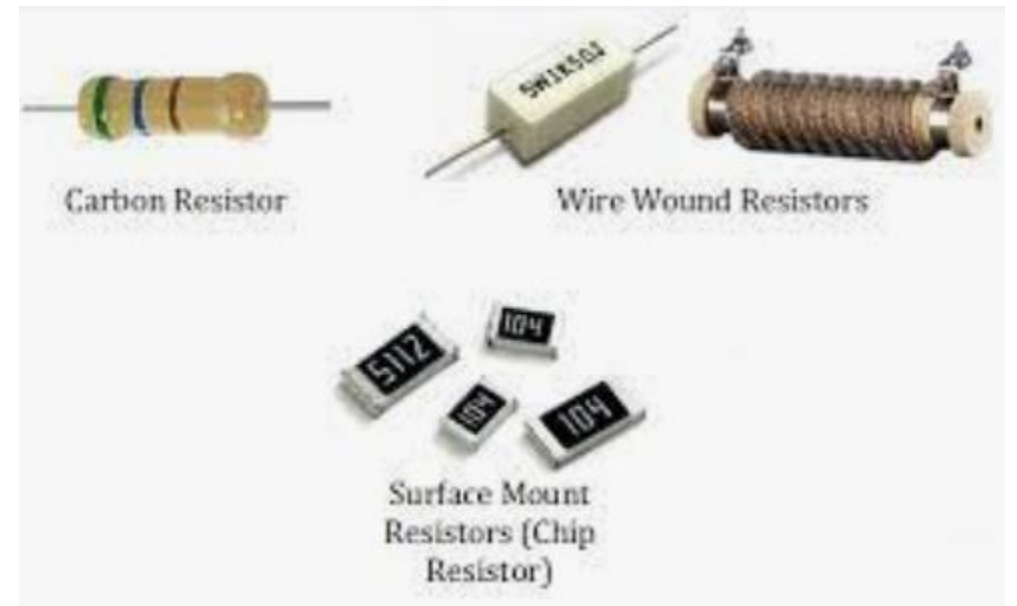
IC 패키지 종류

- https://m.blog.naver.com/PostView.naver?isHttpsRedirect=true&blogId=bae3421_&logNo=221260053942

수동 전자 부품

(1) 저항

- 저항을 사용하여 전류를 줄이고 전압을 나누고 트랜지스터의 바이어스 설정 등을 할 수 있다.
- 기능, 크기, 특성 등에 따라 다양한 유형의 저항으로 구성되며
- 저항은 고정 저항과 가변저항으로 구분
 - ① 탄소피막 저항기 (Carbon Film Resistor)
 - ② 솔리드 저항기 (Solid Resistor)
 - ③ 금속피막 저항기
 - ④ 산화 금속피막 저항기
 - ⑤ 메탈 글래즈 저항기 (Metal Glaze Resistor)
 - ⑥ 휴즈형 저항기 (Fusible Resistor)



수동 전자 부품

(1)탄소 피막 저항

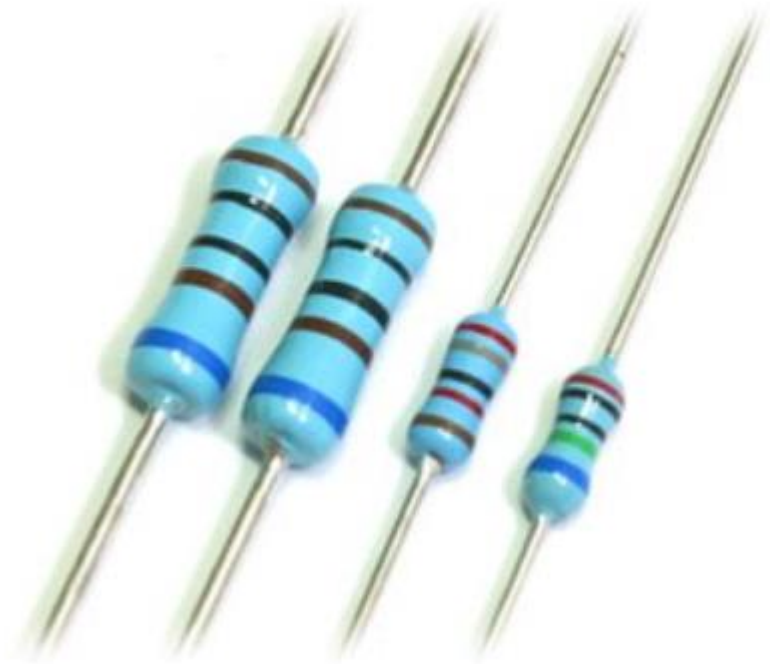
- 탄소 피막 저항은 레이저 흠집의 길이에 따라 저항값이 결정되는데, 흠집이 짧을수록 전류가 지나가는 경로가 짧아 저항이 작고 흠집이 길수록 전류가 지나가는 경로가 길어 저항이 커진다.



수동 전자 부품

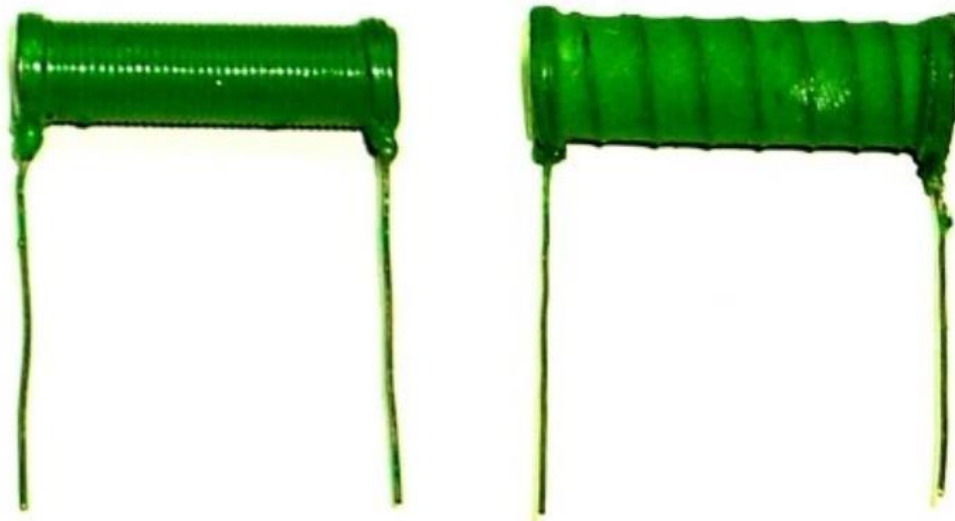
(2) 금속 피막 저항

- 탄소 피막과 동일하지만 코팅할 재료를 니크롬과 같은 금속을 사용한다.
- 온도에 따른 저항값의 변화가 작고 노이즈가 강인하여 오차가 매우 작다(1% 이하).
- 가격이 다소 비싸며 정밀 측정기기나 고급 오디오 등에 사용된다.



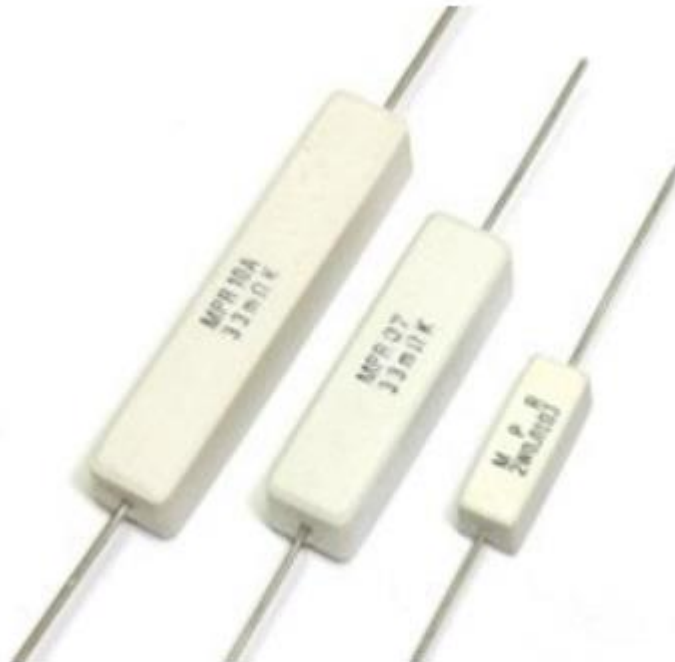
(3) 권선 저항

- 권선형 저항은 망간선 또는 니크롬선을 길게 말아 넣는 저항이다.
- 저항체가 금속이기 때문에 열에 강하고 잡음에 강하다(1% 이하).



(4) 시멘트저항

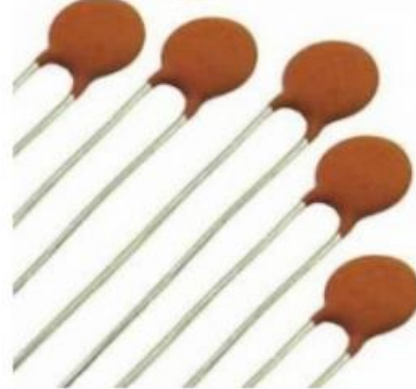
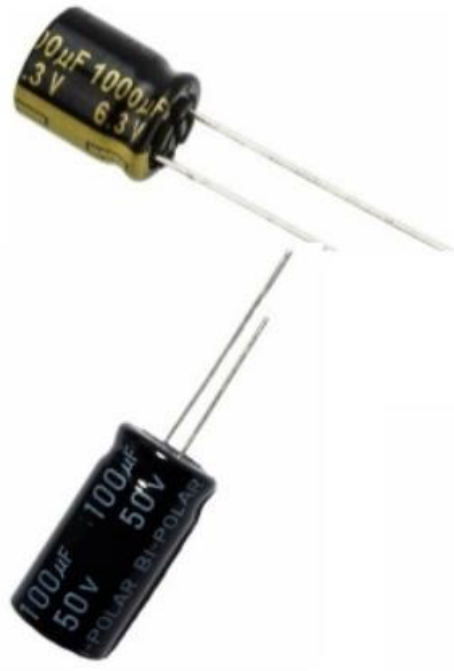
- 시멘트 저항은 권선형 저항기를 시멘트 케이스에 넣은 것으로 열이 많이 발생해도 안전하여 수 W 급의 대전력 저항으로 많이 사용됩니다.



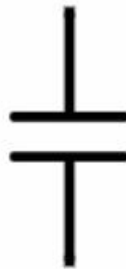
수동 전자 부품

(2) 캐패시터

- 전기장 형태로 에너지를 저장하는 장치
- 유전체 재료로 분리된 두개의 전도판으로 구성됨



CAPACITOR



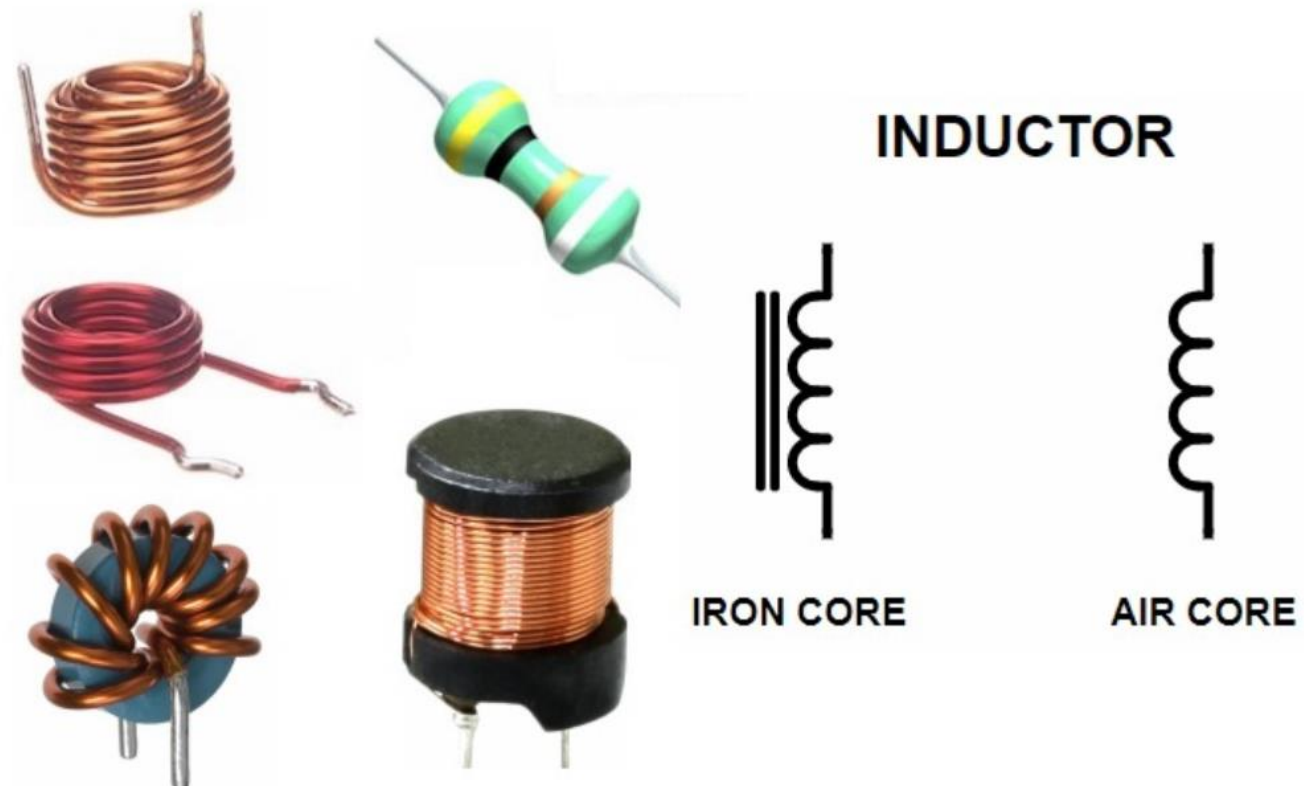
NON POLARIZED



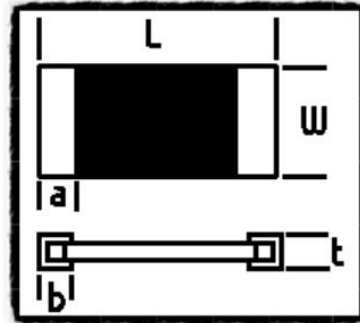
POLARIZED

(3)인덕터

-인덕터는 자기장의 형태로 에너지를 저장하는 장치



SMD 저항 alc 커패시터 규격



Chip Size Lists

mm	inches		mm	inches
1005	0402	P	2012	0805
1608	0603	A	3216	1206
2012	0805	B	3528	1311
2520	1008	C	6032	2312
3216	1206	D	7343	2816
4516	1806	E	7343	2816
4532	1812	V	7361	2824

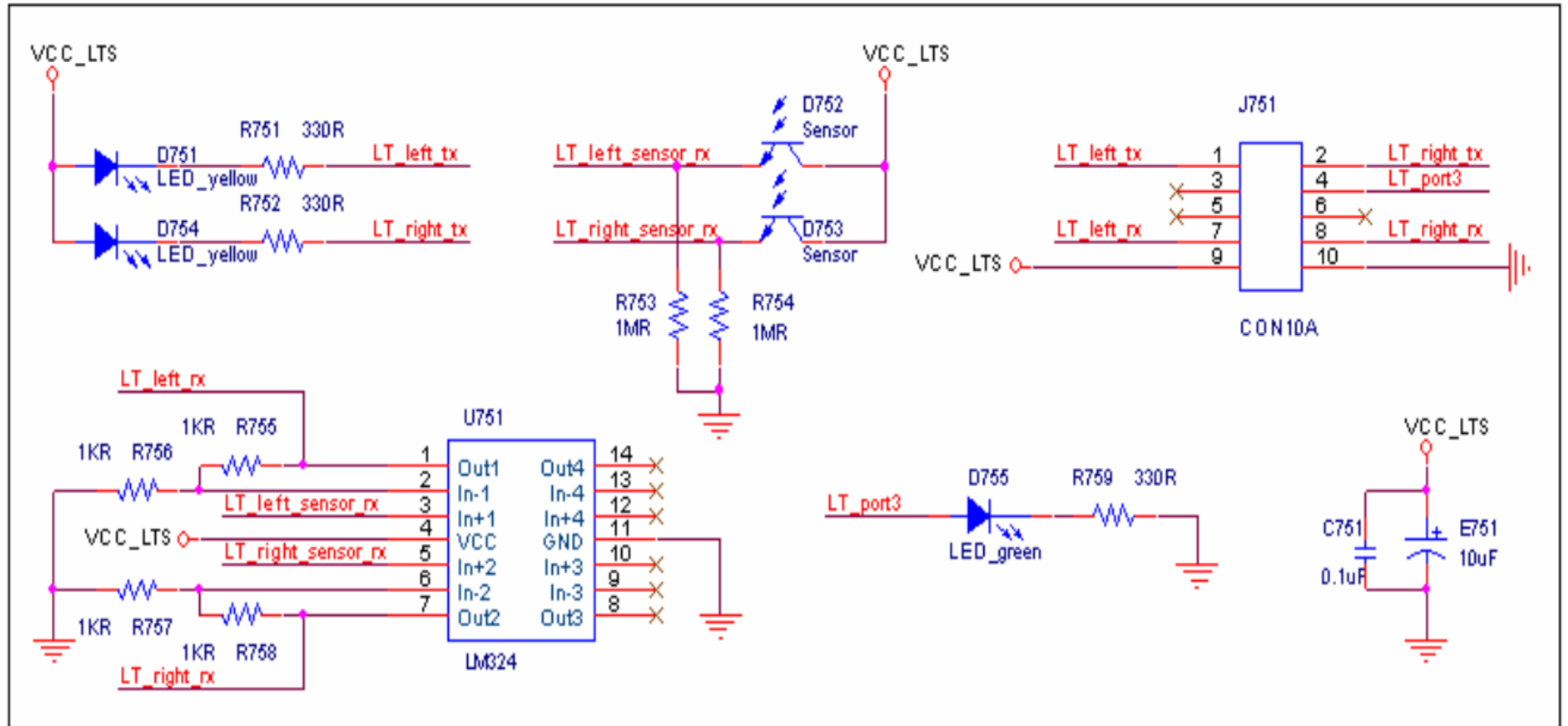
SIZE CODE	L	W	t	a	b
1005 (0402)	1.0 ± 0.05	0.5 ± 0.05	0.35 ± 0.05	0.20 ± 0.10	0.25 ± 0.05 $0.25 - 0.10$
1608 (0603)	1.6 ± 0.10	0.80 ± 0.10	0.45 ± 0.05	0.30 ± 0.20	0.30 ± 0.20
2012 (0805)	2.0 ± 0.10	1.25 ± 0.10	0.55 ± 0.10	0.40 ± 0.20	0.40 ± 0.20
3216 (1206)	3.2 ± 0.15	1.60 ± 0.15	0.55 ± 0.10	0.50 ± 0.25	0.50 ± 0.25
3225 (1210)	3.2 ± 0.20	2.60 ± 0.20	0.55 ± 0.10	0.50 ± 0.20	0.50 ± 0.20
5021 (2010)	5.00 ± 0.20	2.50 ± 0.20	0.55 ± 0.10	0.60 ± 0.20	0.60 ± 0.20
6432 (2512)	6.30 ± 0.20	3.15 ± 0.20	0.55 ± 0.10	0.60 ± 0.20	0.60 ± 0.20

적외선 센서 보드 회로

- 라인트레이서용 적외선 센서보드
- 2Ch 적외선 센서보드 발광,수광 각 2EA
- 10Pin Cable 연결되며 커넥터로 전원 공급 받음
- 외관 크기 48 X 37 mm



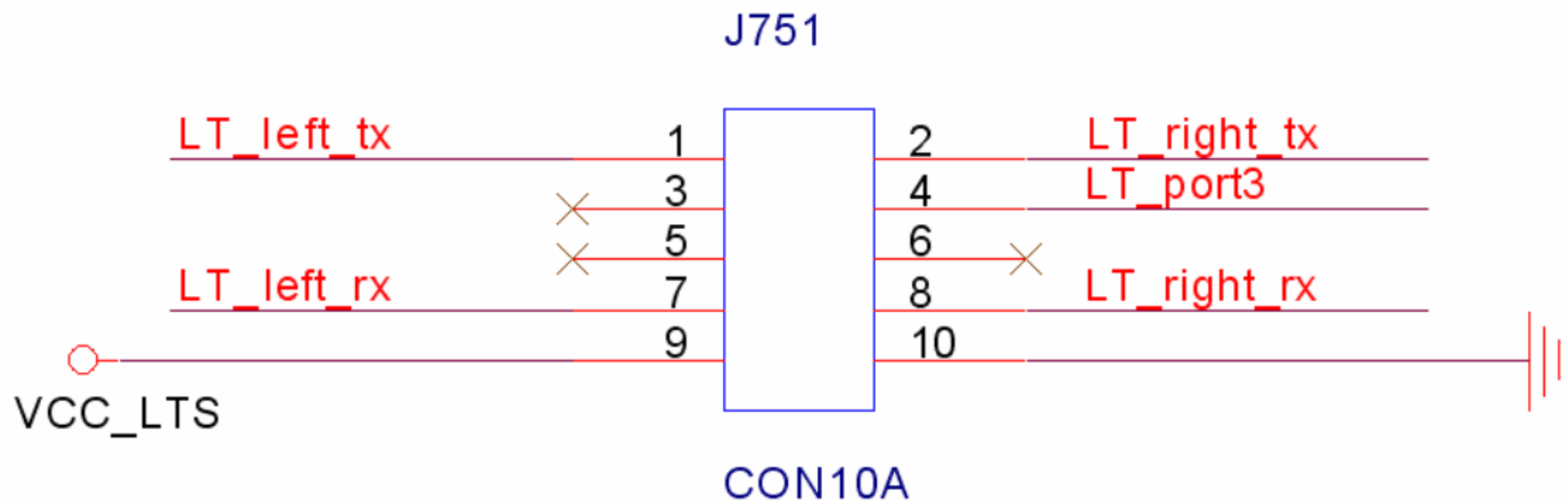
적외선 센서 보드 회로도



적외선 센서 보드 회로 부품 목록

	전자 부품	
1	LM324N (DIP14)	1
2	저항 330R	10
3	저항 1MR	10
4	저항 1KR	10
5	IC Socket DIP14	1
6	ST3311-H 적외선 발광 센서 (3mm 투명)	2
7	ST3311 적외선 수광 센서 (3mm 검정)	2
8	LED_green 3mm	1
9	전해 콘덴서 10uF	2
10	세라믹 콘덴서 0.1uF	1
11	HeaderBox 2X5 Straight	1

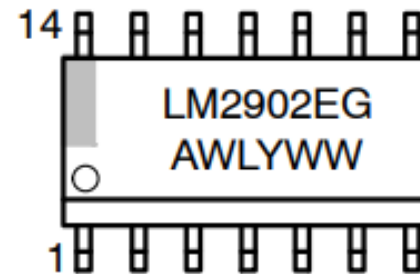
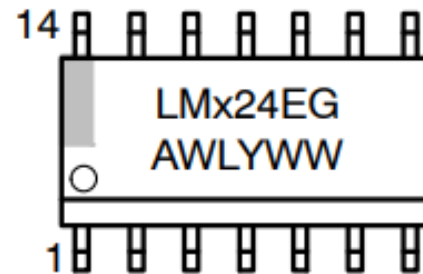
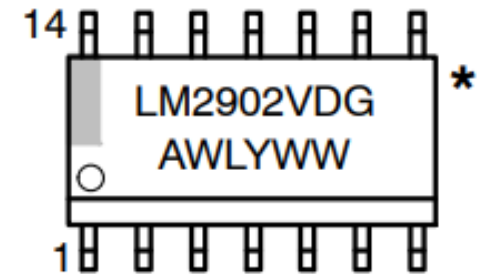
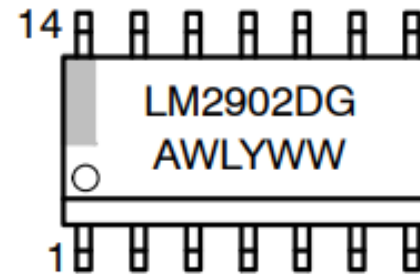
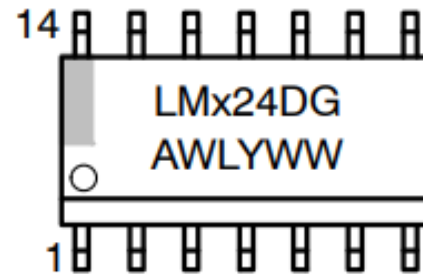
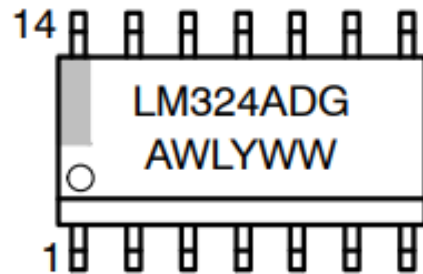
AM-IRS 적외선 센서 커넥터



1 번	3 번	5 번	7 번	9 번
왼쪽센서 발광	N.C	N.C	왼쪽센서 수광	전원 5V
2 번	4 번	6 번	8 번	10 번
오른쪽센서 발광	LED 출력	N.C	오른쪽센서 수광	전원 GND

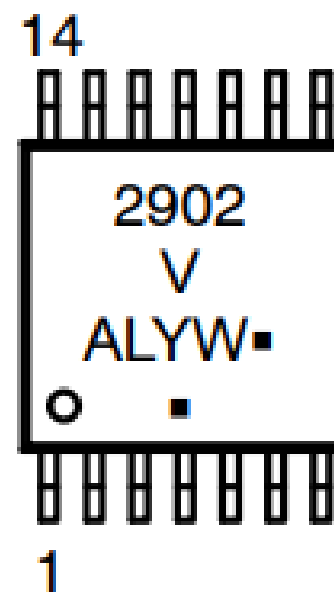
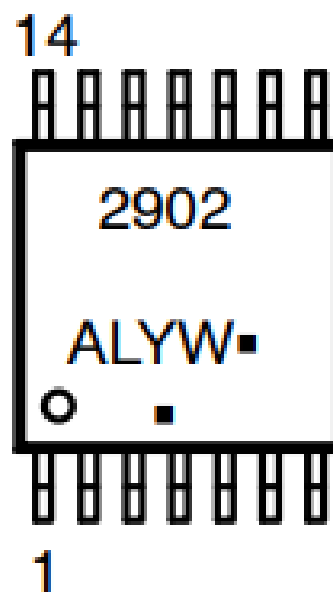
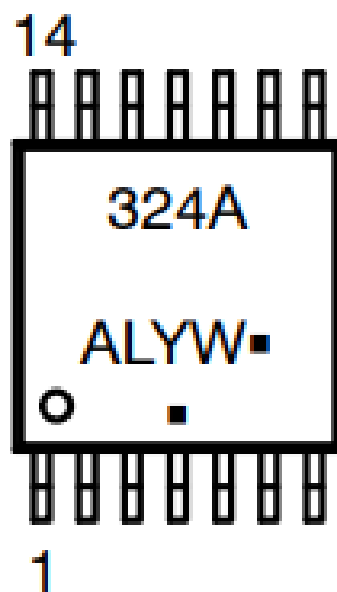
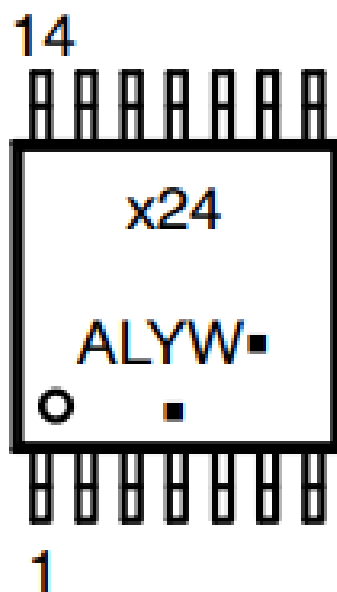
LM324 의 package 종류

SOIC-14
D SUFFIX
CASE 751A



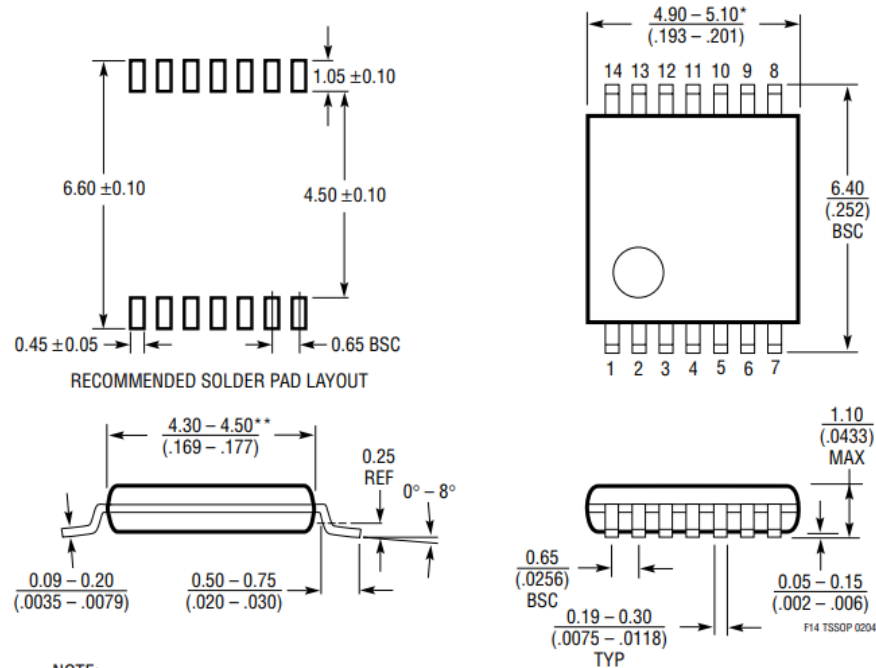
LM324 의 package 종류

TSSOP-14
DTB SUFFIX
CASE 948G

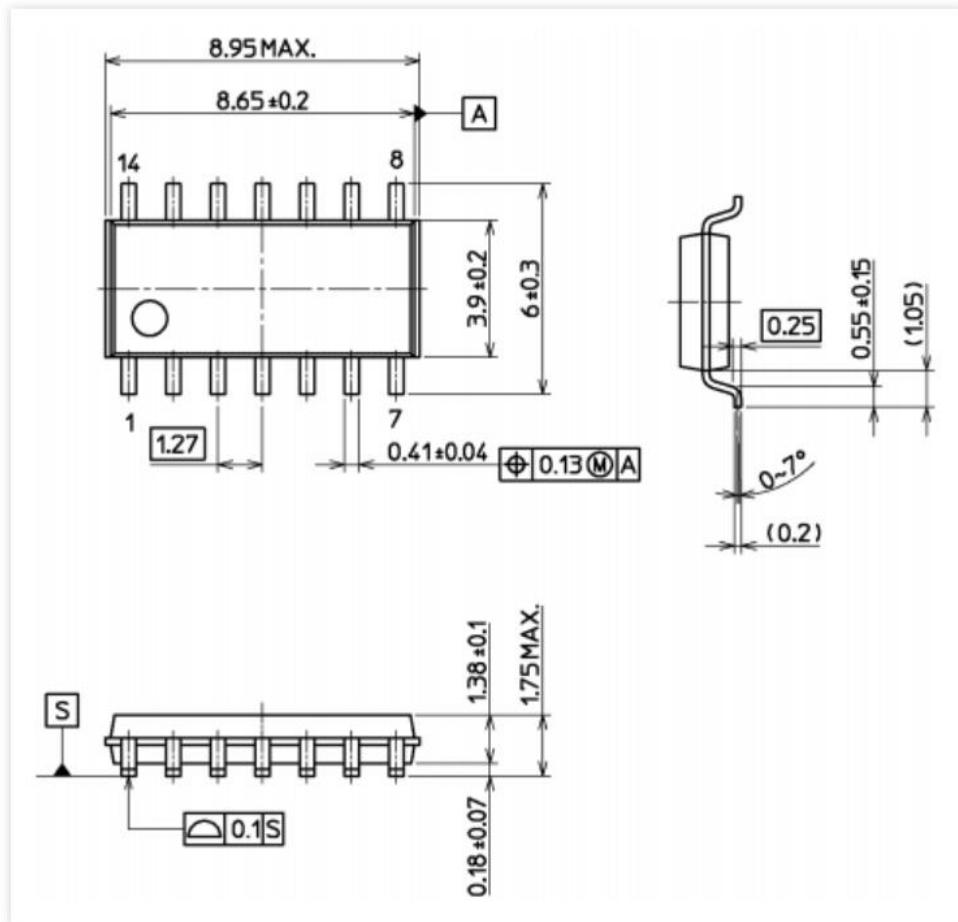


LM324 의 package 종류

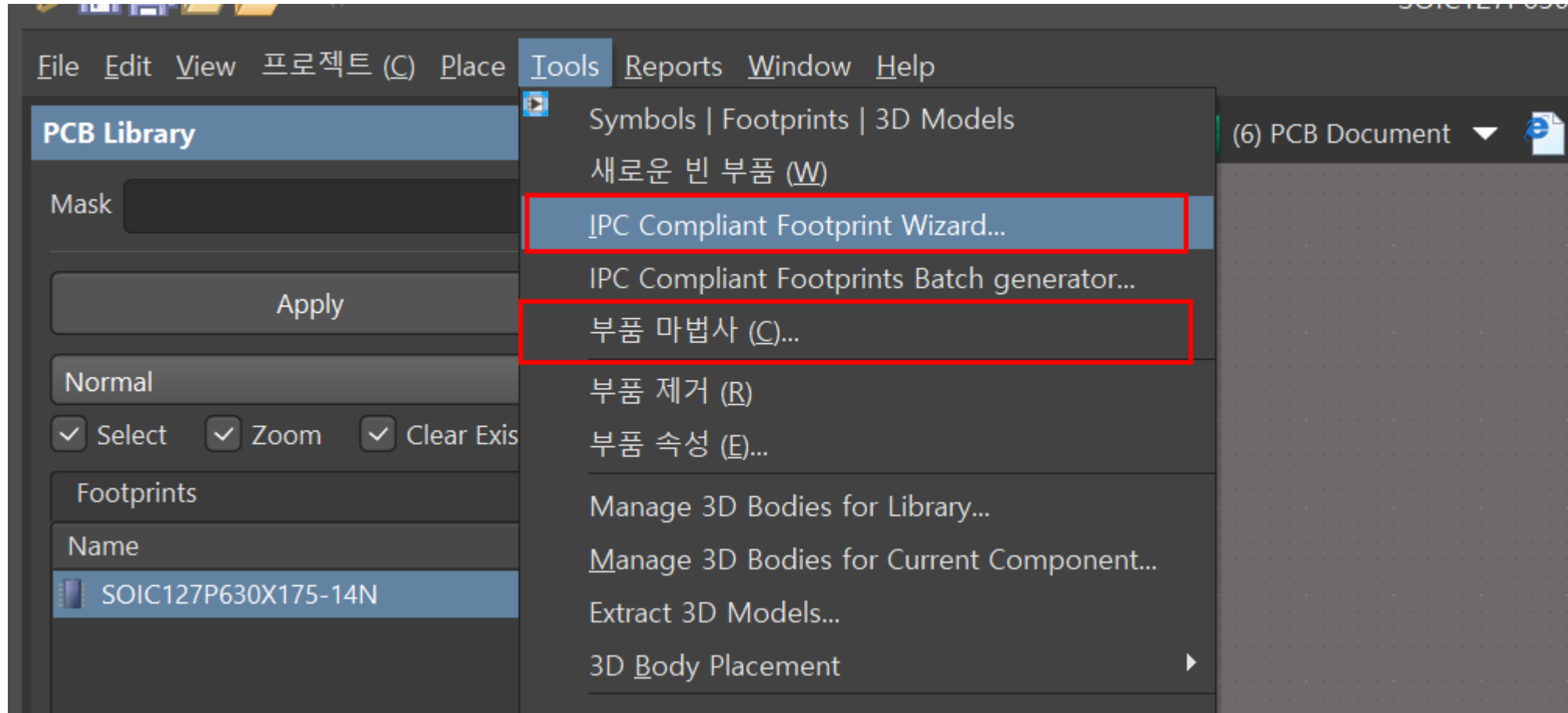
F Package
14-Lead Plastic TSSOP (4.4mm)
 (Reference LTC DWG # 05-08-1650)



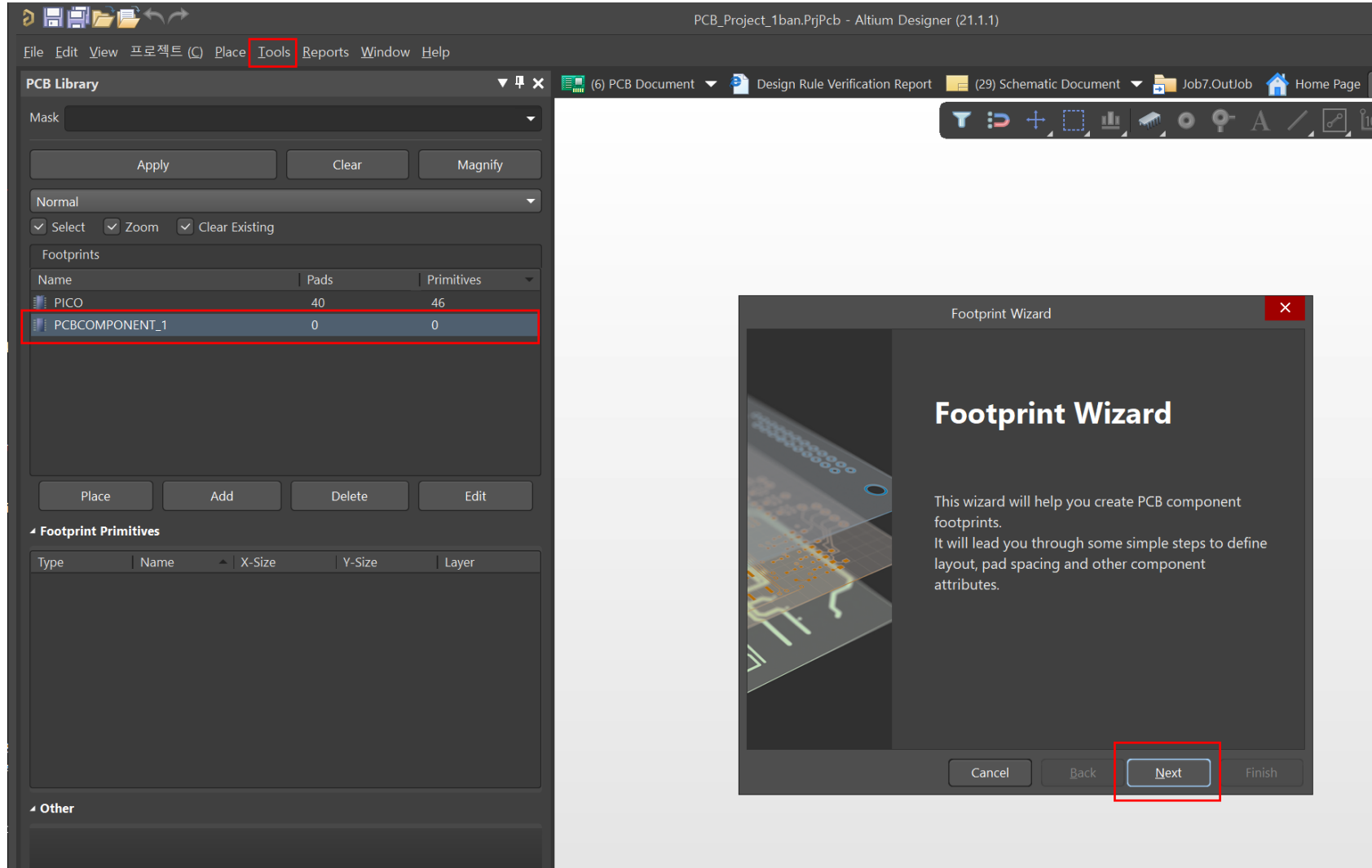
SOIC-14 Package



부품 자동 생성 방법

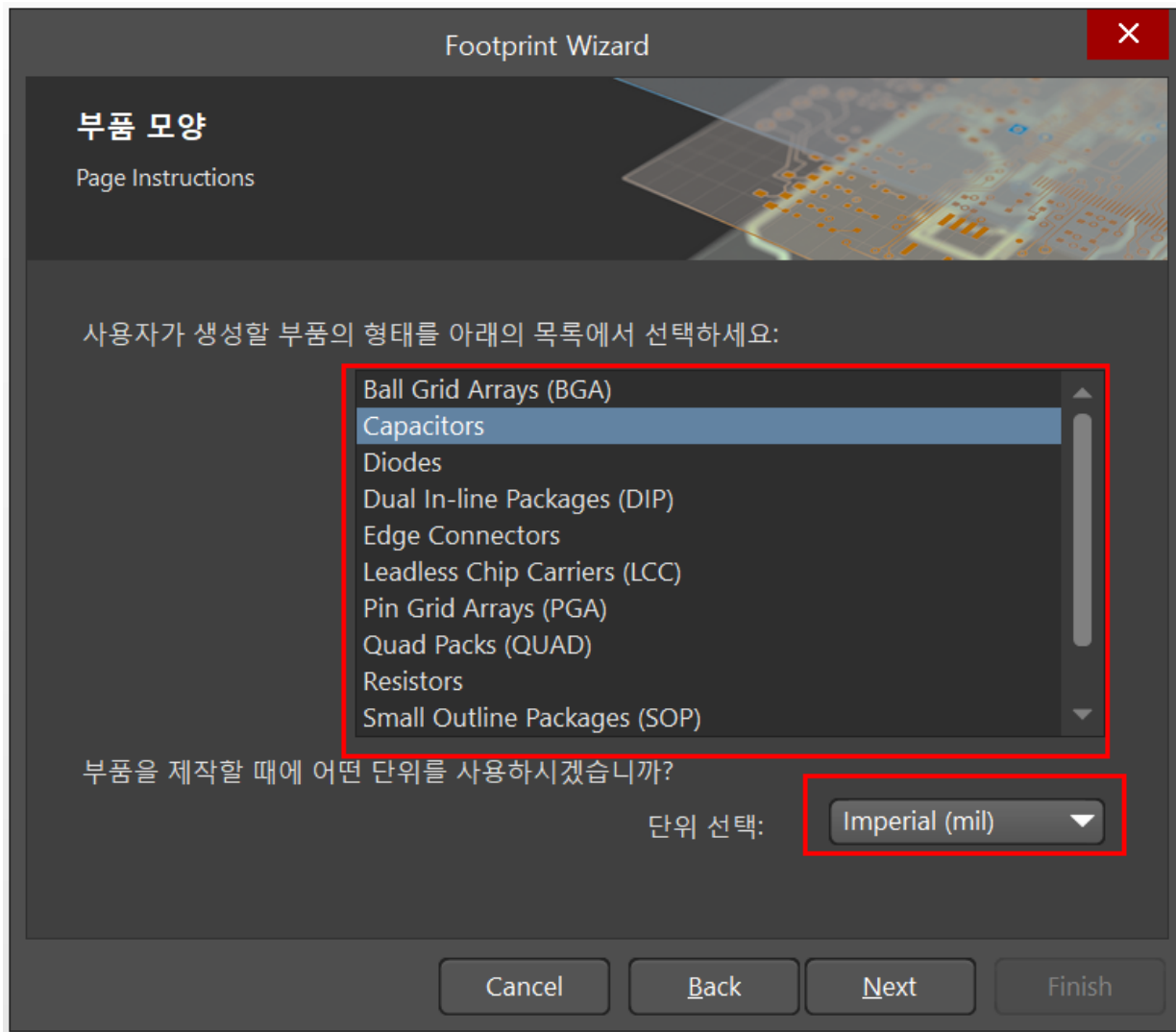


부품 마법사

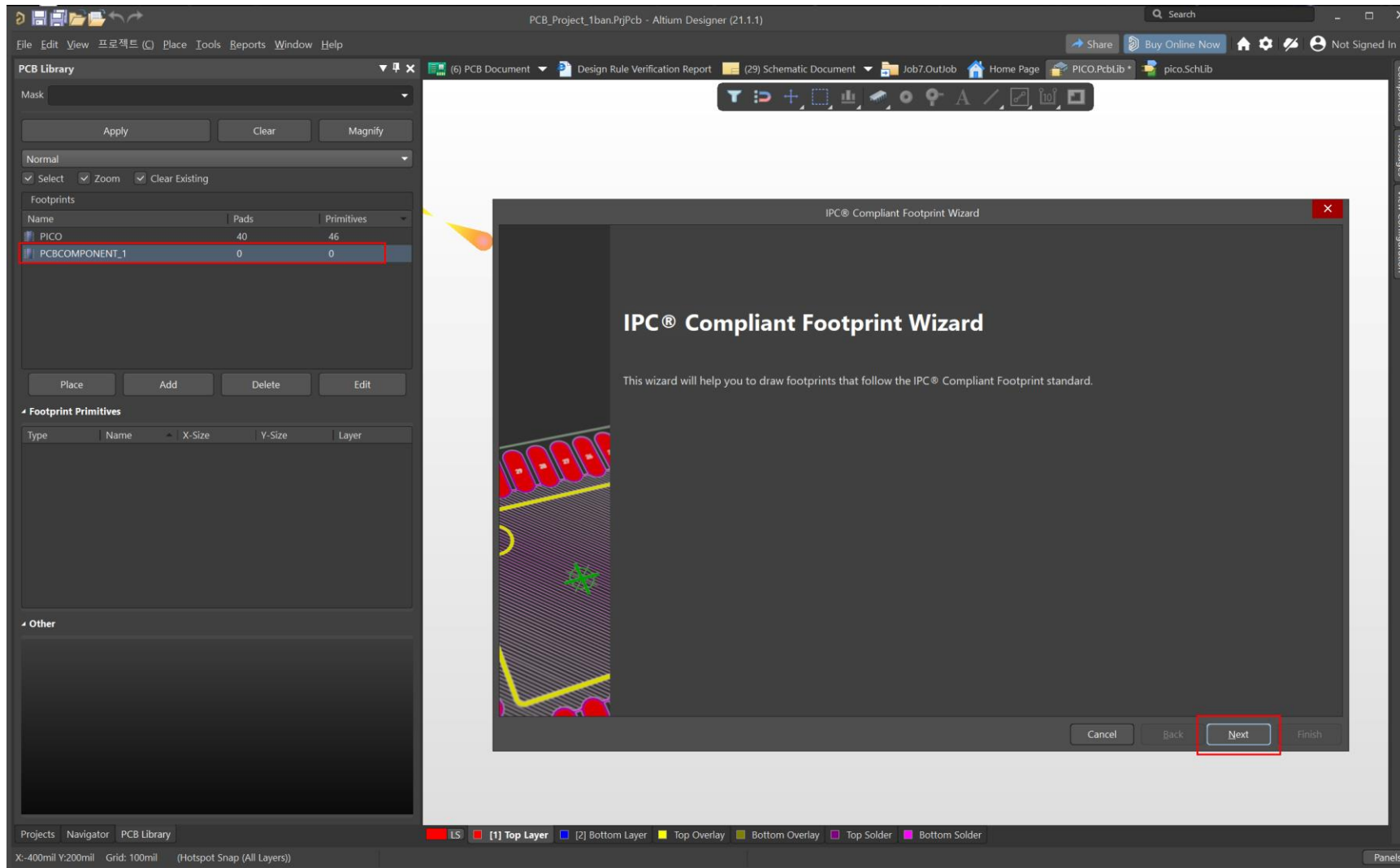


부품 마법사

- Datasheet 단위 확인 후 아래 단위 선택 한다.



부품 마법사



Compliant Footprint Wizard

IPC® Compliant Footprint Wizard

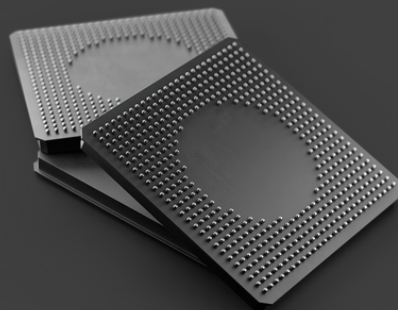
Select Component Type

Select the family of components you wish to create.

Component Types

Name	Description	Included Packages
BGA	Ball Grid Array	BGA, CGA
BQFP	Bumpered Quad Flat Pack	BQFP
CAPAE	Electrolytic Aluminum Capacitor	CAPAE
CFP	Ceramic Dual Flat Pack - Trimmed and formed Gullwing Leads	CFP
Chip Array	Chip Array	Chip Array
DFN	Dual Flat No-lead	DFN
CHIP	Chip Components, 2-Pins	Capacitor, Inductor, Resistor
CQFP	Ceramic Quad Flat Pack - Trimmed and formed Gullwing Leads	CQFP
DPAK	Transistor Outline	DPAK
LCC	Leadless Chip Carrier	LCC
LGA	Land Grid Array	LGA
MELF	MELF Components, 2-Pins	Diode, Resistor
MOLDED	Molded Components, 2-Pins	Capacitor, Inductor, Diode
PLCC	Plastic Leaded Chip Carrier, Square - J Leads	PLCC
PQFN	Pullback Quad Flat No-Lead	PQFN
PQFP	Plastic Quad Flat Pack	PQFP, PQFP Exposed Pad
PSON	Pullback Small Outline No-Lead	PSON
QFN	Quad Flat No-Lead	QFN, LLP
QFN-2ROW	Quad Flat No-Lead, 2 Rows, Square	Double Row QFN

The selected component is BGA.
This will allow you to generate BGA, CGA packages.



NOTE: All wizard measurement dimensions are required to be entered as metric (mm) units.

Cancel

Back

Next

Finish

Compliant Footprint Wizard

SOIC-14

IPC® Compliant Footprint Wizard

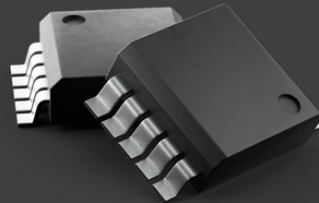
Select Component Type

Select the family of components you wish to create.

Component Types

Name	Description	Included Packages
LCC	Leadless Chip Carrier	LCC
LGA	Land Grid Array	LGA
MELF	MELF Components, 2-Pins	Diode, Resistor
MOLDED	Molded Components, 2-Pins	Capacitor, Inductor, Diode
PLCC	Plastic Leaded Chip Carrier, Square - J Leads	PLCC
PQFN	Pullback Quad Flat No-Lead	PQFN
PQFP	Plastic Quad Flat Pack	PQFP, PQFP Exposed Pad
PSON	Pullback Small Outline No-Lead	PSON
QFN	Quad Flat No-Lead	QFN, LLP
QFN-2ROW	Quad Flat No-Lead, 2 Rows, Square	Double Row QFN
SODFL	Small Outline Diode, Flat Lead	SODFL
SOIC	Small Outline Integrated Package, 1.27mm Pitch - Gullwing Lead SOIC, SOIC Exposed Pad	
SOJ	Small Outline Package - J Leads	SOJ
SON	Small Outline Non-lead	SON, SON Exposed Pad
SOP/TSOP	Small Outline Package - Gullwing Leads	SOP, TSOP, TSSOP
SOT143/343	Small Outline Transistor	SOT143, SOT343
SOT223	Small Outline Transistor	SOT223
SOT23	Small Outline Transistor	3-Leads, 5-Leads, 6-Leads
SOT89	Small Outline Transistor	SOT89

The selected component is SOIC.
This will allow you to generate SOIC, SOIC Exposed Pad packages.



NOTE: All wizard measurement dimensions are required to be entered as metric (mm) units.

Cancel Back **Next** Finish

Compliant Footprint Wizard

- SOIC-14 수치 입력

IPC® Compliant Footprint Wizard

SOIC Package Dimensions
Enter the required package values.

Overall Dimensions

Width Range (H)	Minimum	6.03mm
	Maximum	6.5mm
Maximum Height (A)		1.75mm
Minimum Standoff Height (A1)		0.25mm
Body Width Range (E)	Minimum	3.9mm
	Maximum	3.9mm
Body Length Range (D)	Minimum	8.95mm
	Maximum	8.95mm

Pin Information

Number of pins		14
Lead Width Range (B)	Minimum	0.41mm
	Maximum	0.41mm
Lead Length Range (L)	Minimum	0.55mm
	Maximum	1.55mm

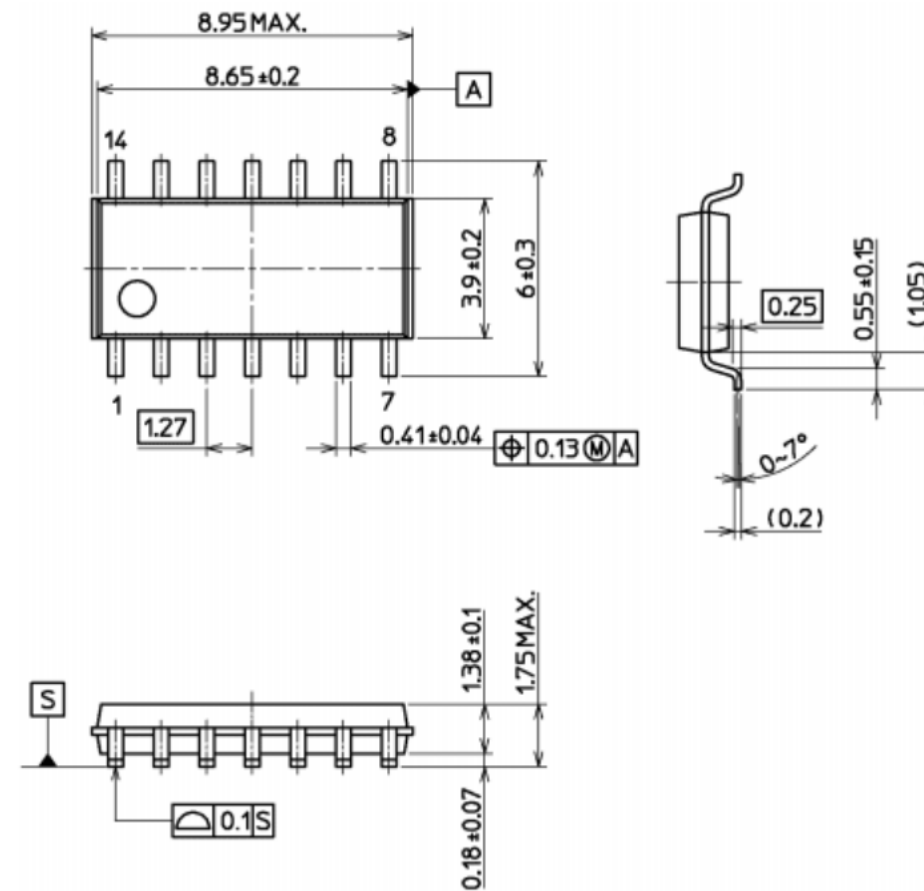
All SOIC packages have a pitch (e) of 1.27mm

Preview

3D

Generate STEP Model Preview

Cancel Back Next Finish



Compliant Footprint Wizard

IPC® Compliant Footprint Wizard

SOIC Courtyard, Assembly and Component Body Information

The mechanical dimensions can now be inferred from the package dimensions.
You can review and modify them here.

Choose here whether to add Courtyard and Assembly information to the component drawing. For each of these, you can use either the IPC® calculated dimensions values, or enter the values manually. You can also choose the mechanical layer on which the drawing will be added, and the used line thickness. Finally you can decide whether or not to add a component body, which contains the volumetric information corresponding to the package dimensions.

☒ Add Courtyard Information

☒ Use calculated values

V17.7mm

V29.5mm

Line Width0.05mm

LayerMechanical Layer 15

☒ Add Assembly Information

☒ Use calculated values

A3.9mm

B9mm

Line Width0.1mm

LayerMechanical Layer 13

☒ Add Component Body Information

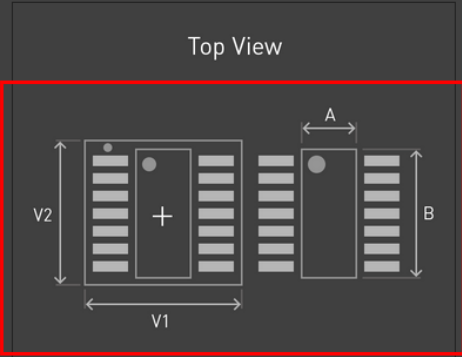
☒ Use calculated values

Width3.9mm

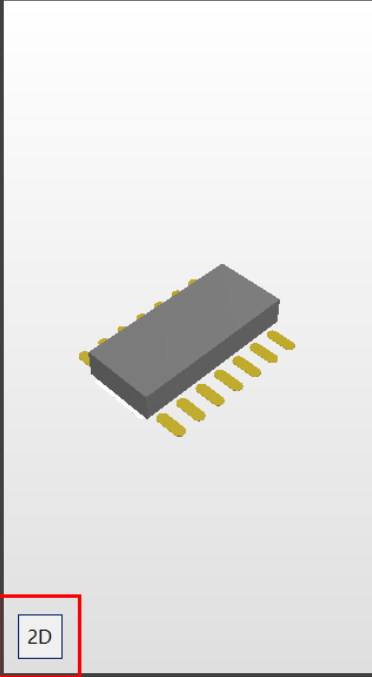
Length9mm

LayerMechanical Layer 13

Top View



Preview



2D

☐ Generate STEP Model Preview

Cancel

Back

Next

Finish

Compliant Footprint Wizard

IPC® Compliant Footprint Wizard

SOIC Footprint Description

The footprint values can now be inferred from the package dimensions.
You can review and modify them here.

☒ Use suggested values

Name

SOIC127P630X175-14N

Description

SOIC, 14-Leads, Body 8.95x3.90mm, Pitch 1.27mm, IPC Medium Density

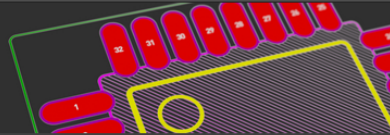
☐ Generate STEP Model Preview

Cancel

Back

Next

Finish



Compliant Footprint Wizard

IPC® Compliant Footprint Wizard

Footprint Destination
Select where to store the finished footprint.

☐ Existing PcbLib File D:\2022년도 1학기 강의\회로패턴설계\PCB_Project_1ban\PICO.PcbLib

☐ New PcbLib File .PcbLib

☒ Current PcbLib File D:\2022년도 1학기 강의\회로패턴설계\PCB_Project_1ban\PICO.PcbLib

☒ Produce 3D/STEP model

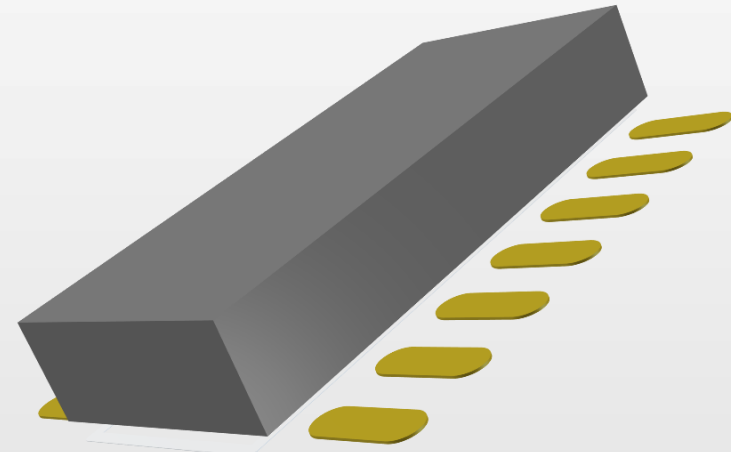
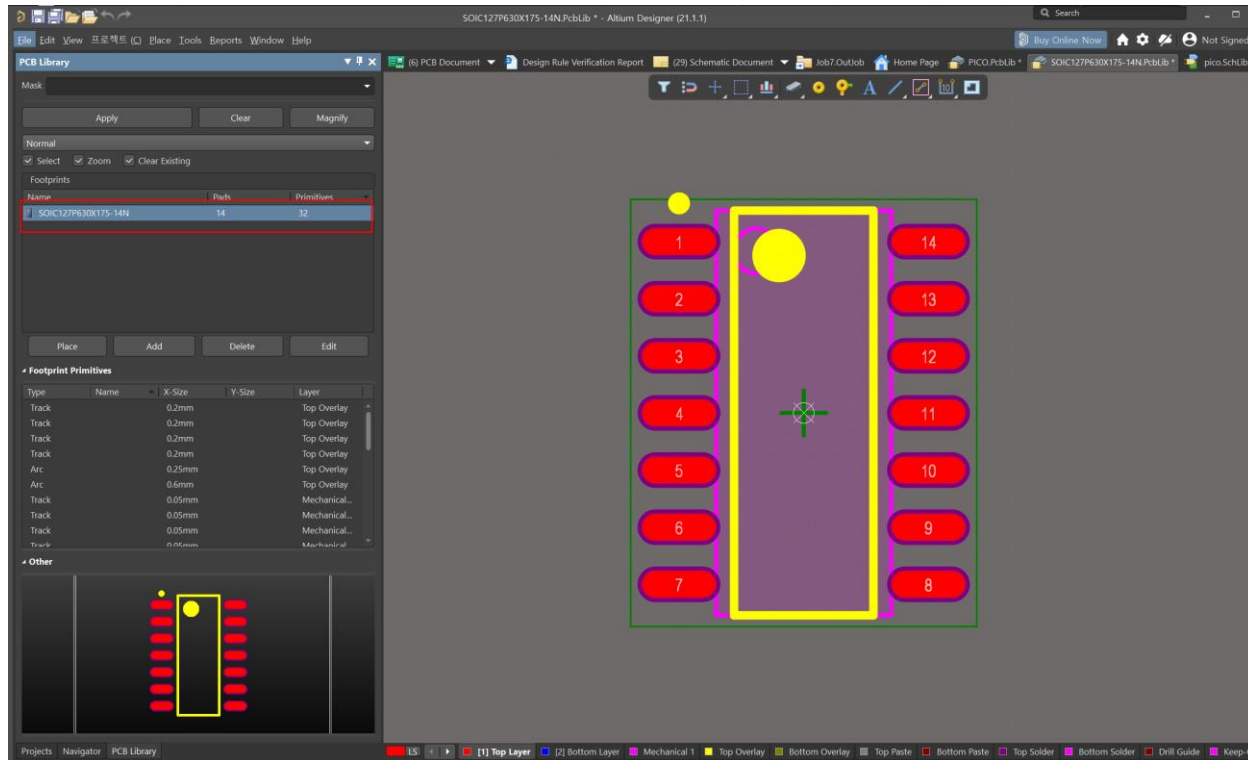
Format STEP

☐ Embedded

☒ External File C:\Users\최영규\Documents\SOIC127P630X175-14N.step

Cancel Back Next Finish

Compliant Footprint Wizard



Compliant Footprint Wizard

