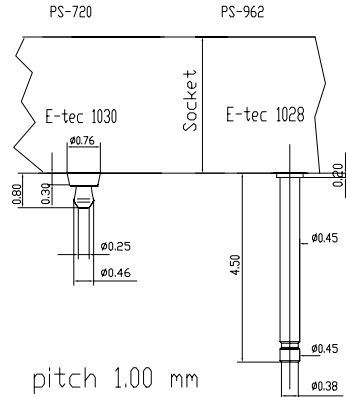


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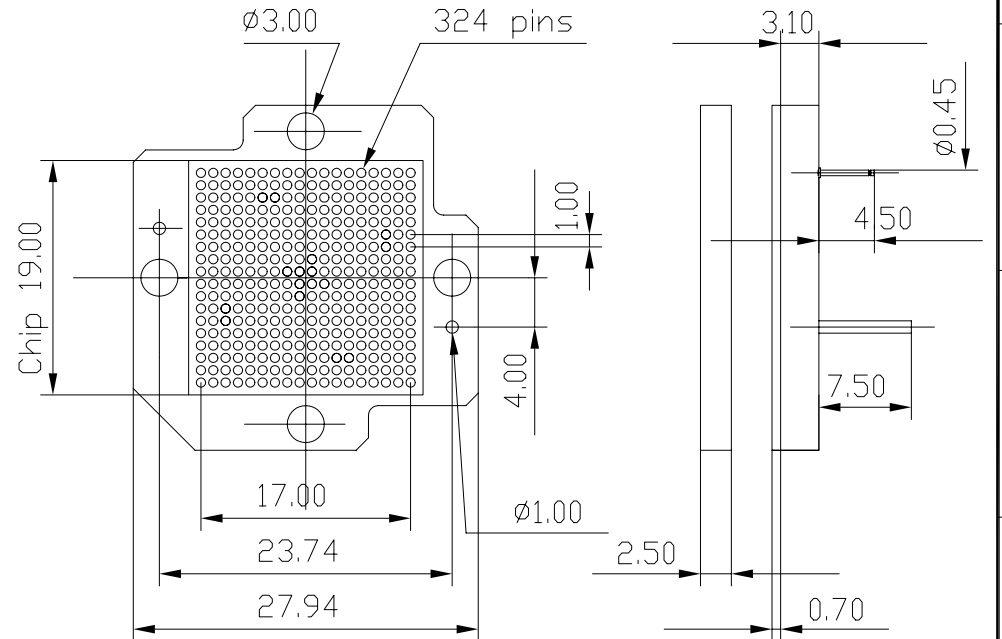
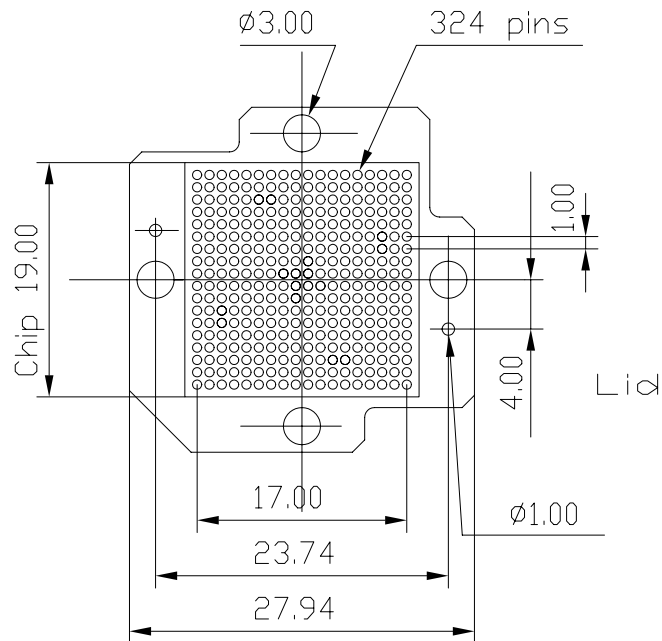
ECN NO.	REV.	DESCRIPTION OF CHANGE	EFFECTIVE DATE	ORIGINATOR
2003028	0	initial	01/31/2003	Lijie Zhao
2004049	1	add e-tec socket pin detail drawing	02/06/2004	Lijie Zhao
2005028	2	Remove word "Actel Confidential" from drawing	01/15/2005	Lijie Zhao



pitch 1.00 mm

13.01.04 LS

e-tec socket pin detail drawing



E-tec PATENTS PENDING

Unit: mm

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS DECIMAL X.X ±0.10 X.XX ±0.05 X.XXX ±0.03 ANGULAR ±1° MATERIAL SEE NOTES FINISH SEE NOTES DO NOT SCALE DRAWING	PROJECTION		ACTEL CORPORATION 2061 Stierlin Court Mountain View, CA 94043-4655			
	APPROVALS		TITLE			
	DRAWN Lijie Zhao		FG324 19x19mm 1.00mm E-tec Raised Height SOCKET			
	CHECKED		VENDOR NAME: E-tec			
ENG'R		DATE 1/31/2003		ACTEL DWG. NUMBER 1-07-11008		REV 2
RELEASED		VENDOR SID(PART) NUMBER BPW324-1028-18AB01L		VENDOR DWG. NUMBER		REV
Actel Part# SE-FG324-H		SCALE: NONE		SHEET 1 OF 2		

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ASSEMBLY FLOW



Retention Frame



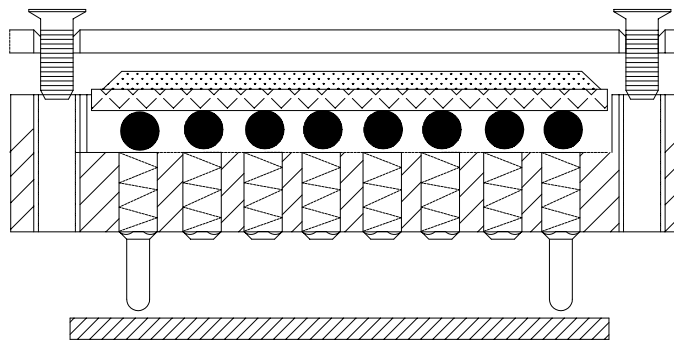
BGA PACKAGE



BGA SOCKET



Surface Mount
to PCB



Target PCB



Torque Limiting Screw Driver

- Note: 1. Refer E-tec "Screw Lock Type Instruction" (on page 3) for more information.
2. Must use torque limiting screw driver to tighten screws (refer Mountz minimaster 020074 gold, preset 7cN.m/10ozf.in on page 4).
Under torque limit tighten could fail continuity and over torque limit tighten could crack package .

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS	
DECIMAL	ANGULAR
X.X ±0.10	±1°
X.XX ±0.05	
X.XXX ±0.03	
MATERIAL	
SEE NOTES	
FINISH	
SEE NOTES	
DO NOT SCALE DRAWING	

PROJECTION	
APPROVALS	
DRAWN	DATE
Lijie Zhao	1/31/2003
CHECKED	
ENG'R	
RELEASED	

		ACTEL CORPORATION 2061 Sterlin Court Mountain View, CA 94043-4655	
TITLE		TITLE	
FG324 19x19mm 1.00mm E-tec Raised Height SOCKET			
VENDOR NAME: E-tec		ACTEL DWG. NUMBER	1-07-11008
VENDOR SUB(PART) NUMBER		VENDOR DWG. NUMBER	
BPW324-1028-18A01L			
Actel Part#:		SCALE: NONE	SHEET 2 OF 2
SE-FG324-H			

Ball / Land Grid Array Sockets

Screw Lock Type

EP patents 0829188, 0897655
US patents 6190181, 6249440
Patented in other countries.

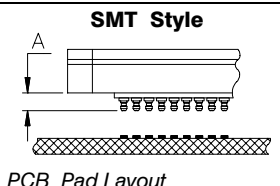
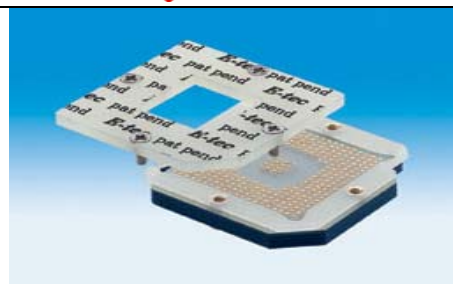


E-tec is now the leading BGA socket manufacturer.

Sockets range from 5 x 5 upwards and some of the existing patterns are shown on the following pages. Many more exist and your exact requirements can easily be added to our extensive product library. The SMT socket is simply placed and reflowed onto the PCB in the same way as the chip and occupies only a small amount of additional board space. The 1.27mm pitch screw lock socket extends ≈ 6,00 mm beyond the outer ball row with no fixing holes.

We aim to solve your requirements - many different terminals and configurations are available. Your custom sets our standards!

Please note, we will always request the chip data to ensure we offer a compatible socket.

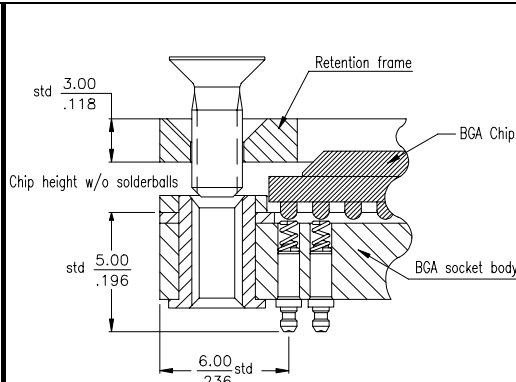


PCB Pad Layout

Pitch

Solder Pad

Ø 0,70mm/.028" if pitch 1,27mm
Ø 0,60mm/.023" if pitch 1,00mm
Ø 0,50mm/.019" if pitch 0,80mm
Ø 0,30mm/.012" if pitch 0,50mm



dimensions if BGA Socket pitch 1,27mm with contact type 30
Coplanarity 0,10mm/.004"

Important Note:

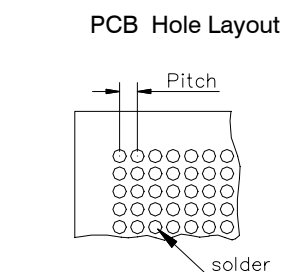
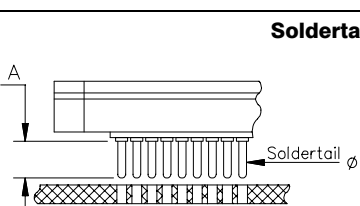
Please check the ball diameters & heights of your chip prior to ordering the standard E-tec BGA (BPW/BCW) sockets. Any deviation has to be communicated to E-tec in order to check compatibility with the standard socket design and if necessary to obtain a special order code adapted to your chip dimensions.

The standard solderball diameters & heights are the following:

Pitch	ball diameters min/max	ball height min/max
0.50mm	0.25mm / 0.35mm	0.15mm / 0.30mm
0.65mm	0.25mm / 0.50mm	0.15mm / 0.30mm
0.75mm & 0.80mm	0.40mm / 0.55mm	0.25mm / 0.45mm
1.00mm	0.50mm / 0.70mm	0.30mm / 0.50mm

1.27mm & 1.50mm

a) plastic chips (BPW)	0.60mm / 1.00mm	0.50mm / 0.70mm
b) ceramic chips (BCW)	0.60mm / 1.00mm	0.80mm / 1.00mm



Soldertail Style

Soldertail:

Ø 0,45mm/.017" if pitch 1,27mm
Ø 0,29mm/.011" if pitch 1,00mm
Ø 0,29mm/.011" if pitch 0,80mm
Ø 0,25mm/.010" if pitch 0,50mm

PCB solder hole:

Ø 0,60mm/.024" if pitch 1,27mm
Ø 0,50mm/.020" if pitch 1,00mm
Ø 0,40mm/.016" if pitch 0,80mm
Ø 0,35mm/.014" if pitch 0,50mm

Mechanical data

Contact life
Retention System life
Solderability
Individual contact force
Max. torque for retention screws

Specifications

10.000 cycles min.
1.000 cycles min.
exceeds MIL-STD-202 Method 208
40 grams max.
up to 800 pins = 7cN per meter or 10 oz per inch
as of 800 pins = 7cN to 10cN per meter or 10 oz to 14 oz per inch

Material

Insulator
Terminal
Contact

Glass Epoxy FR 4
Brass
BeCu

Electrical data

Contact resistance
Current rating
Insulation resistance at 500V DC
Breakdown voltage at 60 Hz
Capacitance
Inductance

< 100 mΩ
500 mA max.
100 MΩ if 0.50 to 0.80mm pitch
500 MΩ 1.00mm pitch upwards
500V min.
< 1 pF
< 2 nH

Operating temperature

Recommendations

Torque limiting screw driver
Solder paste
Solder profile

Refer to page "Tools" of this catalog
Please use a solderpaste w/o any silver!
Please refer to our website www.e-tec.ch

The pitch dimension depends on your Ball Grid Array

How to order

X X W x x x x - x x x x - x x x x x x

Device Type

B = Ball Grid
L = Land Grid
C = Column Grid

Device Material

C = Ceramic
P = Plastic

Pitch

05 = 0,50mm
06 = 0,65mm
07 = 0,75mm
08 = 0,80mm
10 = 1,00mm
12 = 1,27mm
15 = 1,50mm

Grid Code

please refer to
the footprint
pages
38 to 45

Config Code

will be given by
the factory after
receipt of the
chip datasheet

Plating

01 = tin/gold

Nbr of contacts

please refer to the
footprint pages
38 to 45

Contact Type

30 = standard SMT... („A" = 1,20mm if 1,27mm pitch; 0,80mm if 1,00mm, 0.60 if 0,80mm pitch; 0,40mm if 0,50mm pitch)
29 = raised SMT..... („A" = 5,00mm if 1,27mm pitch; 3,20mm if 1,00mm; 2,80mm if 0,80mm pitch, 2,30mm if 0,50mm pitch)
28 = special raised SMT - only for 1.00 & 0.80mm pitch..... („A" = 4,50mm)
70 = standard solder tail..... („A" = 3,30 if 1,27mm pitch, 2,80 if 1,00mm or 0,80mm pitch, 2,30mm if 0,50mm pitch)
65 = special short solder tail - only for 1,27mm pitch..... („A" = 2,80mm)

TLS

Torque Screwdrivers Limiting, Internally Adjustable

Designed and manufactured to meet or exceed the accuracy and repeatability requirements of ISO 6789:1992.

Various models that range from 0.7 ozf.in to 120 lbf.in.

Precision radial ball clutch "slips-free" when the preset torque is reached preventing overtorquing.

Thrust bearings insure that the torque setting is independent of any end load applied by the operator.

Tamper-proof internal adjustment.

All models provide bi-directional operation. Available with a one-way clutch system so the screwdriver will operate in one direction but lock solid in the opposite direction for easy screw removal.

Can be clean room modified upon request.

Four different colored lightweight aluminum handles allow color coding of specific torque values in production areas.



Model	1/4" MALE SQUARE DRIVES		1/4" FEMALE HEX DRIVES		Presettable Torque Ranges			Weight	
	Item#	Color	Item#	Color	American	S.I.	Metric	oz.	g.
Micro Minimaster	-	-	020083	Red	3 - 32 ozf.in	2 - 22 cN.m	216 - 2300 gf.cm	1.8	50
Minimaster	-	-	020074	Gold	0.7 - 32 ozf.in	0.5 - 22 cN.m	50 - 2306.2 gf.cm	2.5	72
Minor	020062	Blue	020066	Blue	3 ozf.in - 12 lbf.in	2 - 135 cN.m	200 gf.cm - 14 kgf.cm	7.4	210
	020063	Gold	020067	Gold					
	020064	Green	020068	Green					
	020065	Red	020069	Red					
Standard	020075	Blue	020079	Blue	8 ozf.in - 36 lbf.in	6 - 406 cN.m	600 gf.cm - 40 kgf.cm	9.9	280
	020076	Gold	020080	Gold					
	020077	Green	020081	Green					
	020078	Red	020082	Red					
TLS 1360	020060	Black	020061	Black	10 - 120 lbf.in	113 - 1360 cN.m	11 - 138 kgf.cm	11.5	325