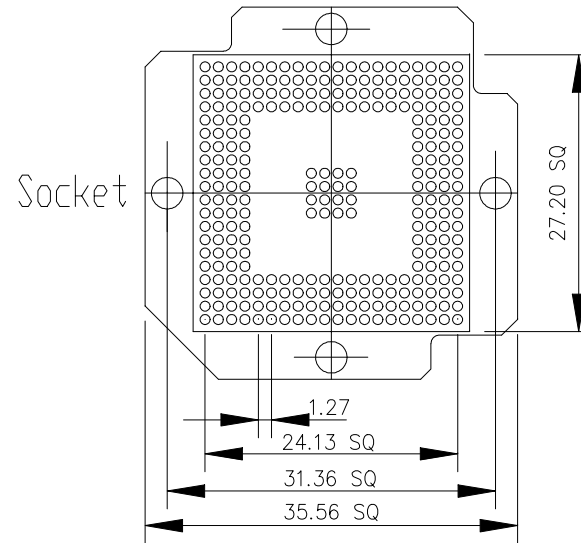
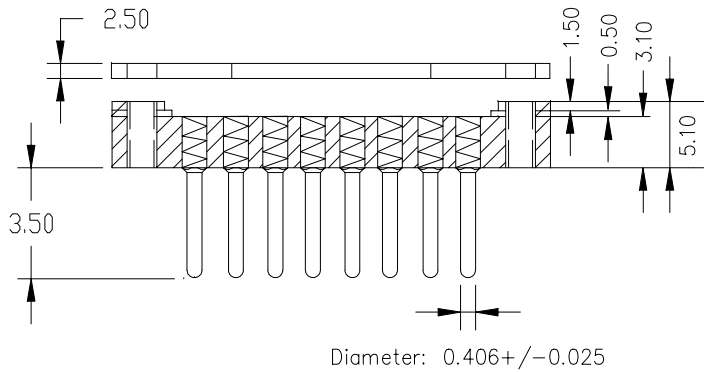


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 BE MAINTAINED IN STRICT CONFIDENCE, AND SHALL NOT BE RELEASED TO ANY THIRD PARTY WITHOUT THE EXPRESS  
 WRITTEN PERMISSION OF ACTEL.

ECN NO.	REV.	DESCRIPTION OF CHANGE	EFFECTIVE DATE	ORIGINATOR
980144	0	Initial	5/8/99	Ray Kuang
2000004	1	change E-tec number to BPW272-1270-20AC11	1/8/2000	Ray Kuang
2000200	2	change socket thickness to 5.10	06/16/2000	Lijie Zhao
2001392	3	add torque limiting screw driver info on page 2, 3 and 4	09/12/2001	Lijie Zhao



E-TEC PART#: BPW272-1270-20AC11

E-TEC PATENTS PENDING

NOTES: Dim: mm

- PIN MATERIAL: BRASS ALLOY 360, 1/2 HARD.
- PIN FINISH: 10 μm GOLD OVER 50 μm NICKEL.
- INSULATOR MATERIAL: FR-4 GLASS EPOXY
- Contact: BeCu with gold plated

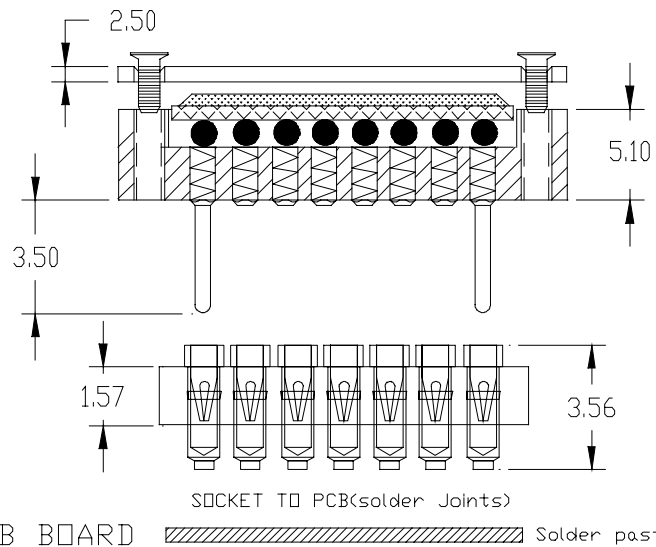
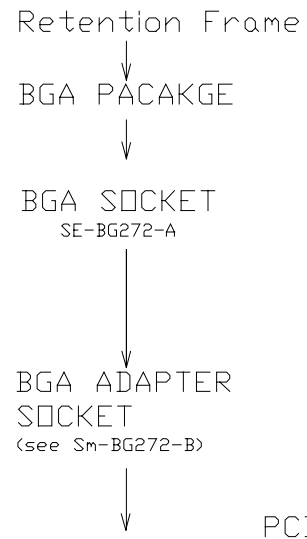
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS DECIMAL ANGULAR X.X ±0.10 ±1° X.XX ±0.05 X.XXX ±0.03	PROJECTION	ACTEL CORP SUNNYVALE CA 94086 955 E ARQUES AVE		
	APPROVALS	TITLE		
	DRAWN Ray Kuang	DATE 4/27/99	272-27 x 27mm, 1.27mm E-TEC BGA SOCKET	
	CHECKED	VENDOR NAME: E-TEC ACTEL DWG. NUMBER: 1-07-09038 REV 3		
MATERIAL SEE NOTES	ENG'R	SIZE B	VENDOR SID(PART) NUMBER BPW272-1270-20AC11 VENDOR DWG. NUMBER	
FINISH SEE NOTES	RELEASED	Actel Part#: SE-BG272-A SCALE: NONE SHEET 1 OF 2		
DO NOT SCALE DRAWING				

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ECN NO.	REV.	DESCRIPTION OF CHANGE	EFFECTIVE DATE	ORIGINATOR
990144	0	Initial	5/6/99	Ray Kuang
2000004	1	change E-tec number to BFW272-1270-20AC11	1/6/2000	Ray Kuang
2000200	2	change socket thickness to 5.10	06/16/2000	Lijie Zhao
2001392	3	add torque limiting screw driver info on page 2, 3 and 4	09/18/2001	Lijie Zhao

ASSEMBLY FLOW



Torque Limiting Screw Driver

Solder past thickness need to be at least 0.20mm(or0.008 inch) in order to have reliable solder joint

- Note: Dim: mm Please see detail drawing for part number
- To remove BGA socket from adapter socket, Use removal tool from Mill-Max
  - Mill-Max phone: 516-922-6000
  - Refer E-Tec "Screw Lock Type Instruction" (on page 3) for more infomation.
  - 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	PROJECTION 		ACTEL CORP SUNNYVALE CA 94088 955 E ARQUES AVE				
	APPROVALS DATE DRAWN Ray Kuang 4/27/99		TITLE 272-27x27mm, 1.27mm E-TEC BGA SOCKET (272 BGA E-TEC Socket Assembly)				
	MATERIAL SEE NOTES		CHECKED ENG'R		VENDOR NAME: e-tec VENDOR SID(PART) NUMBER	ACTEL DWG. NUMBER 1-07-09038 VENDOR DWG. NUMBER	REV 3 REV
	FINISH SEE NOTES DO NOT SCALE DRAWING		RELEASED		Actel Part#: SE-BG272-A SCALE: NONE SHEET 2 OF 2		

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# Ball / Land Grid Array Sockets

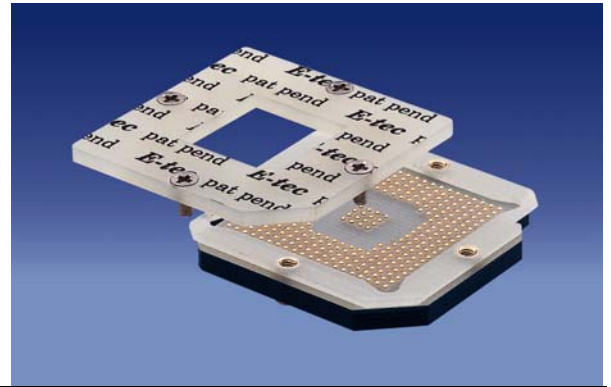
## Screw Lock Type

EP patents 0829188, 0897655  
Patents pending in other countries.



*E-tec is now the leading BGA socket manufacturer.*

Sockets range from 5 x 5 upwards contacts with even larger parts currently in design. 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 SMD 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 screw lock socket extends  $\approx 6,00$  mm beyond the outer ballrow 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.**

**SMT Style**

**PCB Pad Layout**

Pitch

Solder Pad

$\varnothing 0,70\text{mm}/.028''$  if pitch 1,27mm  
 $\varnothing 0,60\text{mm}/.023''$  if pitch 1,00mm  
 $\varnothing 0,50\text{mm}/.019''$  if pitch 0,80mm

Retention frame

BGA Chip

BGA socket body

std 3.00  
.118

Chip height w/o solderballs

std 5.00  
.196

6.00 std  
.236

dimensions if BGA Socket pitch 1,27mm with contact type 30

**Soldertail Style**

**PCB Hole Layout**

Pitch

Solder Hole

**Soldertail:**

$\varnothing 0,45\text{mm}/.017''$  if pitch 1,27mm  
 $\varnothing 0,45\text{mm}/.017''$  if pitch 1,00mm  
 $\varnothing 0,40\text{mm}/.015''$  if pitch 0,80mm

**PCB Hole:**

$\varnothing 0,60\text{mm}/.024''$  if pitch 1,27mm  
 $\varnothing 0,60\text{mm}/.024''$  if pitch 1,00mm  
 $\varnothing 0,55\text{mm}/.021''$  if pitch 0,80mm

*The pitch dimension depends on your Ball Grid Array*

**Specifications**

**Mechanical data**

Contact life	100000 cycles min.
Retention System life	100 cycles min.
Solderability	exceeds MIL-STD-202 Method 208
Individual contact force	40 grams max.
Max. torque for retention screws	7 cN per meter, or 10oz per inch

**Material**

Insulator	Glass Epoxy FR 4
Terminal	Brass
Contact	BeCu

**Electrical data**

Contact resistance	< 30 m $\Omega$
Current rating	1 A max.
Insulation resistance at 500V DC	> 10 <sup>4</sup> M $\Omega$
Breakdown voltage at 60 Hz	1 KV min.
Inductance	< 5 nH

**Operating temperature**

-55°C to +130°C ; 220°C for 10 sec.

### 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**

**07** = 0,75mm  
**08** = 0,80mm  
**10** = 1,00mm  
**12** = 1,27mm  
**15** = 1,50mm

**Grid Code**

*please refer to the footprint pages 42 to 50*

**Config Code**

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

**Plating**

**01** = tin/gold

**Nbr of contacts**

*refer to the next pages*

**Contact Type**

**30** = standard SMD („A“ = 1,20mm if 1,27mm pitch; 0,80mm if 1,00mm & 0,80mm pitch)  
**29** = raised SMD („A“ = 5,00mm; other dim. on request)  
**70** = solder tail („A“ = 3,30mm if 1,27mm pitch; 2,80mm if 1,00mm & 0,80mm pitch)

# 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	-	-	<b>020083</b>	Red	3 - 32 ozf.in	2 - 22 cN.m	216 - 2300 gf.cm	1.8	50
Minimaster	-	-	<b>020074</b>	Gold	0.7 - 32 ozf.in	0.5 - 22 cN.m	50 - 2306.2 gf.cm	2.5	72
Minor	<b>020062</b>	Blue	<b>020066</b>	Blue	3 ozf.in - 12 lbf.in	2 - 135 cN.m	200 gf.cm - 14 kgf.cm	7.4	210
	<b>020063</b>	Gold	<b>020067</b>	Gold					
	<b>020064</b>	Green	<b>020068</b>	Green					
	<b>020065</b>	Red	<b>020069</b>	Red					
Standard	<b>020075</b>	Blue	<b>020079</b>	Blue	8 ozf.in - 36 lbf.in	6 - 406 cN.m	600 gf.cm - 40 kgf.cm	9.9	280
	<b>020076</b>	Gold	<b>020080</b>	Gold					
	<b>020077</b>	Green	<b>020081</b>	Green					
	<b>020078</b>	Red	<b>020082</b>	Red					
TLS 1360	<b>020060</b>	Black	<b>020061</b>	Black	10 - 120 lbf.in	113 - 1360 cN.m	11 - 138 kgf.cm	11.5	325