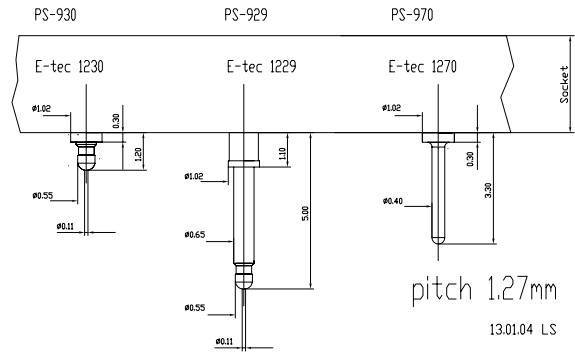
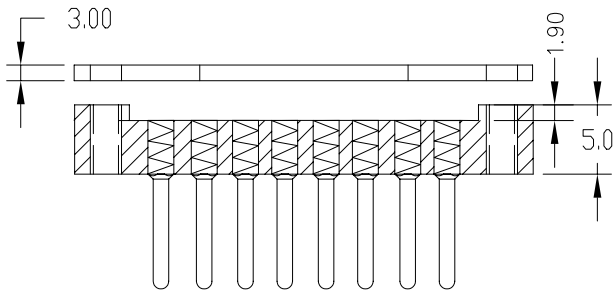


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ECN NO.	REV.	DESCRIPTION OF CHANGE	EFFECTIVE DATE	ORIGINATOR
990136	0	initial	4/30/99	Ray Kuang
2001393	1	add torque limiting screw driver info on page 2, 3 and 4	09/12/2001	Lijie Zhao
2004068	2	add e-tec socket pin detail drawing change Actel doc # from 1-07-09037 to 1-07-11032	02/24/2004	Lijie Zhao
2005028	3	Remove word "Actel Confidential" from drawing	01/15/2005	Lijie Zhao

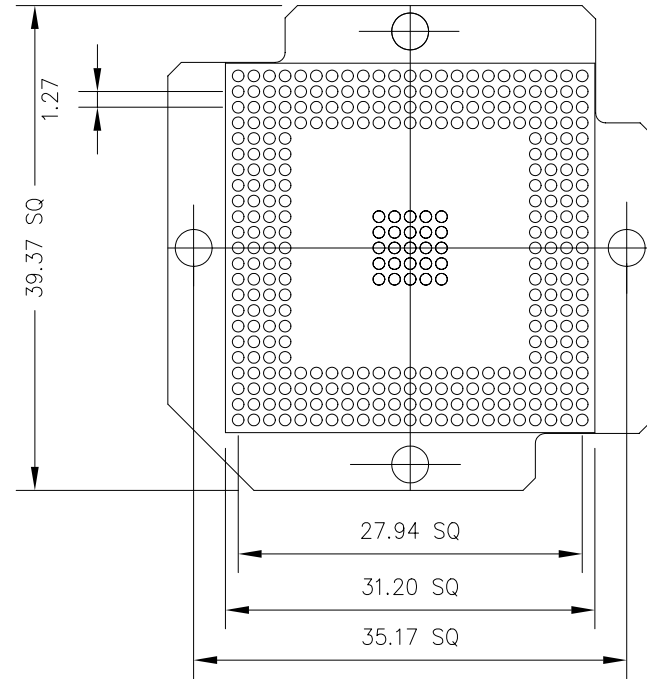


e-tec socket pin detail drawing




NOTES: Dim: mm

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



E-TEC PART#: BPW329-1270-23AB11

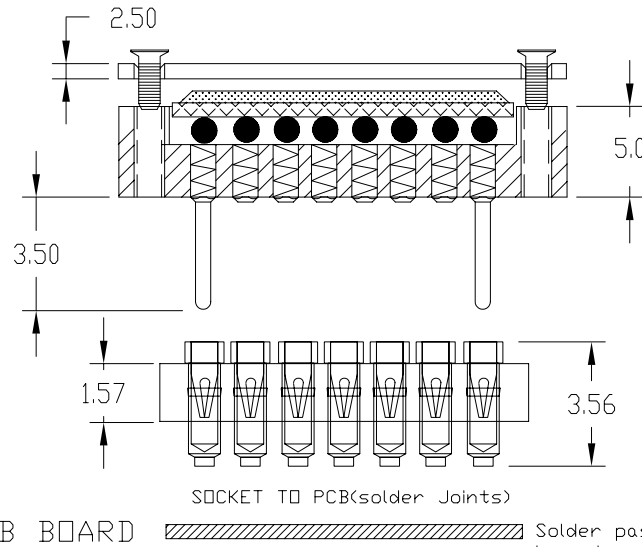
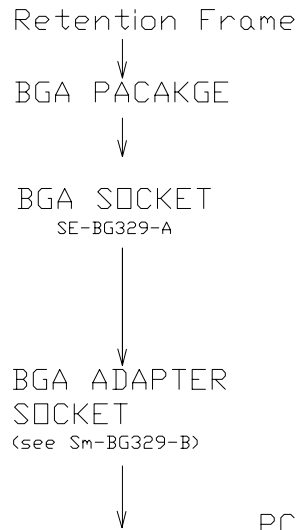
E-TEC PATENTS PENDING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS DECIMAL X.X ±0.10 X.XX ±0.05 X.XXX ±0.03	PROJECTION	 ACTEL CORPORATION 2081 Stierlin Court Mountain View, CA 94043-4655		
	ANGULAR ±1°	APPROVALS	DATE	TITLE
MATERIAL SEE NOTES	DRAWN Ray Kuang	4/27/99	329-31x31mm, 1.27mm E-TEC BGA SOCKET	
FINISH SEE NOTES	CHECKED		VENDOR NAME: E-TEC	ACTEL DWG. NUMBER 1-07-11032
DO NOT SCALE DRAWING	ENG'R		SIZE B	VENDOR SID(PART) NUMBER BPW329-1270-23AB11
	RELEASED		Actel Part#: SE-BG329-A	VENDOR DWG. NUMBER
			SCALE: NONE	SHEET 1 OF 2

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ECN NO.	REV.	DESCRIPTION OF CHANGE	EFFECTIVE DATE	ORIGINATOR
990138	0	initial	4/30/99	Ray Kuang
2001393	1	add torque limiting screw driver info on page 2, 3 and 4	09/12/2001	Lijie Zhao
2004068	2	add e-tec socket pin detail drawing change Actel doc # from 1-07-09037 to 1-07-11032	02/24/2004	Lijie Zhao
2005028	3	Remove word "Actel Confidential" from drawing	01/15/2005	Lijie Zhao

ASSEMBLY FLOW



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



Torque Limiting Screw Driver

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 CORPORATION		
	APPROVALS						DATE		2061 Stierlin Court
	DRAWN Ray Kuang		4/27/99		TITLE		TITLE		
	MATERIAL		CHECKED		VENDOR NAME: e-tec		ACTEL DWG. NUMBER 1-07-11032		REV 3
FINISH		ENGR		SIZE B		VENDOR DWG. NUMBER		REV	
DO NOT SCALE DRAWING		RELEASED		Actel Part#: SE-BG329-A		SCALE: NONE		SHEET 2 OF 2	

Ball / Land Grid Array Sockets

Screw Lock Type

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

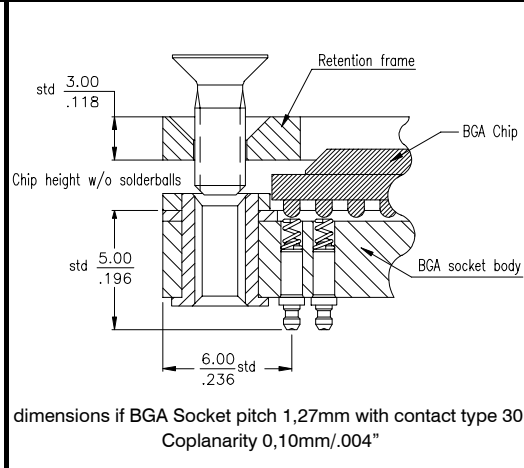
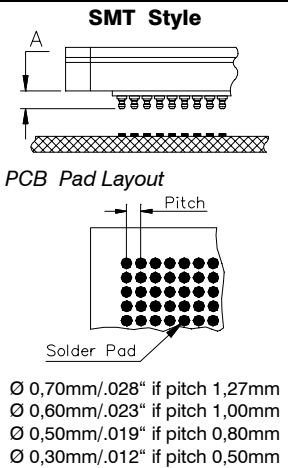
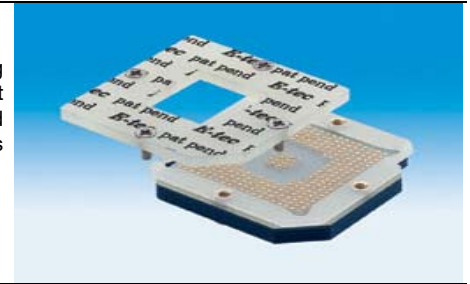


E-tec is now the leading BGA socket manufacturer.

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.

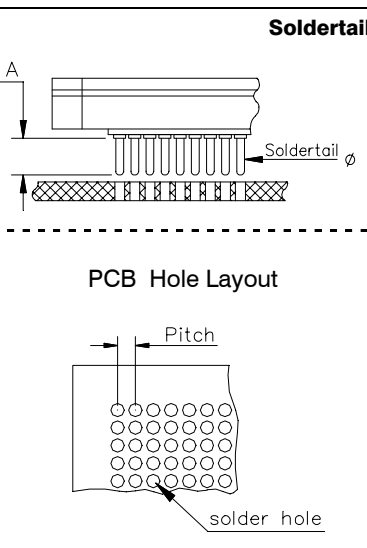


Important Note:
 Please check the ball diameters & heights of your chip prior to ordering the standard E-tec BGA (BPW/BCW) sockets. Any deviation has to be communicated to E-tec in order to check compatibility with the standard socket design and if necessary to obtain a special order code adapted to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

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

Specifications	
Mechanical data	Contact life: 10.000 cycles min. Retention System life: 1.000 cycles min. Solderability: exceeds MIL-STD-202 Method 208 Individual contact force: 40 grams max. Max. torque for retention screws: 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: Glass Epoxy FR 4 Terminal: Brass Contact: BeCu
Electrical data	Contact resistance: < 100 mΩ Current rating: 500 mA max. Insulation resistance at 500V DC: 100 MΩ if 0.50 to 0.80mm pitch, 500 MΩ 1.00mm pitch upwards Breakdown voltage at 60 Hz: 500V min. Capacitance: < 1 pF Inductance: < 2 nH
Operating temperature	-55°C to +130°C ; 220°C for 10 sec.
Recommendations	Torque limiting screw driver: Refer to page "Tools" of this catalog Solder paste: Please use a solderpaste w/o any silver! Solder profile: 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
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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