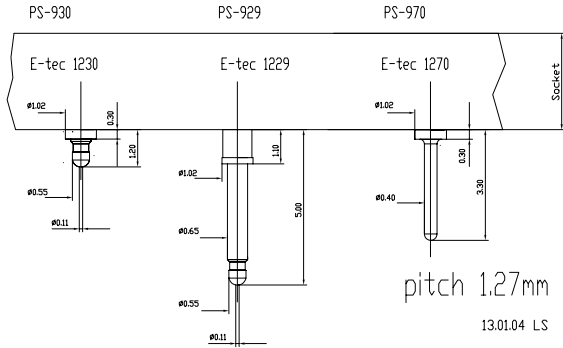


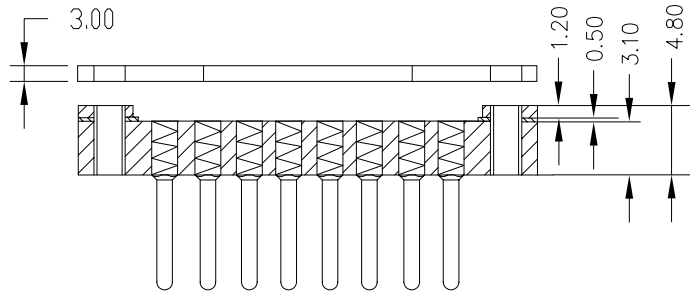
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 WRITTEN PERMISSION OF ACTEL.

ECN NO.	REV.	DESCRIPTION OF CHANGE	EFFECTIVE DATE	ORIGINATOR
2000205	0	initial	06/21/2000	Lijie Zhao
2001394	1	Add torque limiting screw driver info on page 2.3 and 4	09/13/2001	Lijie Zhao
2004069	2	add e-tec socket pin detail drawing change Actel doc# from 1-07-09043 to 1-07-11033	02/24/2004	Lijie Zhao
2005028	3	Remove word "Actel Confidential" from drawing	01/15/2005	Lijie Zhao



pitch 1.27mm
13.01.04 LS

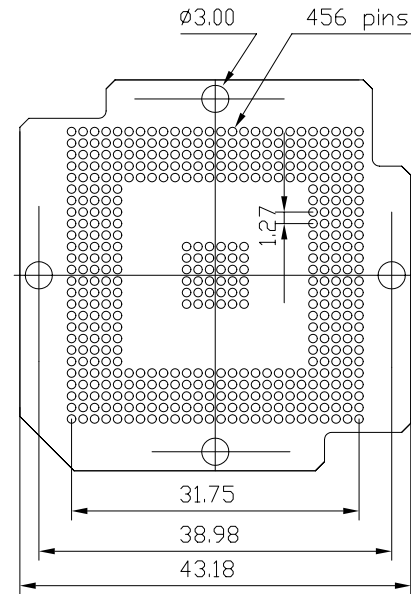
e-tec socket pin detail drawing



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

Socket



E-TEC PART(order as): BPW456-1270-26AB11

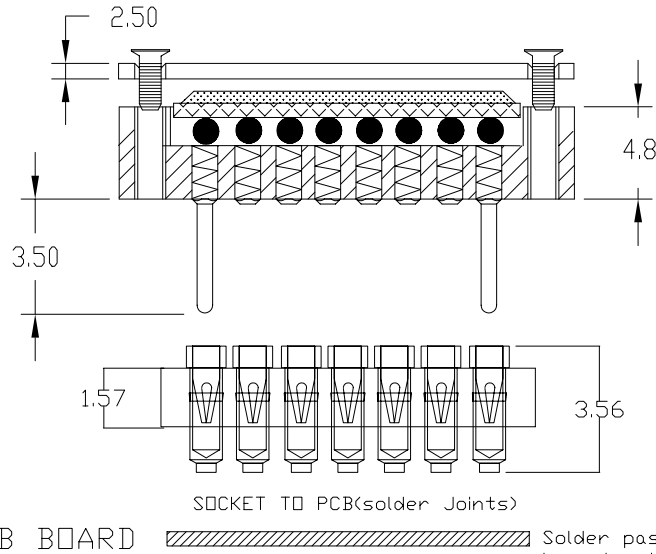
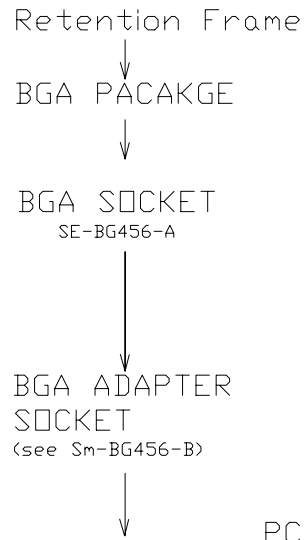
E-TEC PATENTS PENDING

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 2061 Stierlin Court Mountain View, CA 94043-4655		
	APPROVALS	DATE	TITLE				
	DRAWN Lijie Zhao	06/21/2000	BGA456 - 35x35mm, 1.27mm E-TEC SOCKET				
	MATERIAL SEE NOTES	CHECKED	VENDOR NAME: E-TEC	ACTEL DWG. NUMBER: 1-07-11033	REV 3		
FINISH SEE NOTES	ENG'R	SIZE B	VENDOR SID(PART) NUMBER: BPW456-1270-26AB11	VENDOR DWG. NUMBER	REV		
DO NOT SCALE DRAWING	RELEASED	Actel Part#: SE-BG456-A	SCALE: NONE	SHEET 1 OF 2			

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ASSEMBLY FLOW



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 information.
- 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 2061 Stierlin Court Mountain View, CA 94043-4655	
	APPROVALS	DATE	TITLE		
	DRAWN Lijie Zhao	06/21/2000	BGA456 - 35x35mm, 1.27mm E-TEC SOCKET		
	CHECKED		VENDOR NAME: e-tec and Mill-Max	ACTEL DWG. NUMBER 1-07-11033	REV 3
MATERIAL SEE NOTES	ENG'R	SIZE B	VENDOR SID(PART) NUMBER	VENDOR DWG. NUMBER	REV
FINISH SEE NOTES	RELEASED	Actel Part#: SE-BG456-A		SCALE: NONE	SHEET 2 OF 2
DO NOT SCALE DRAWING					

Ball / Land Grid Array Sockets

Screw Lock Type

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

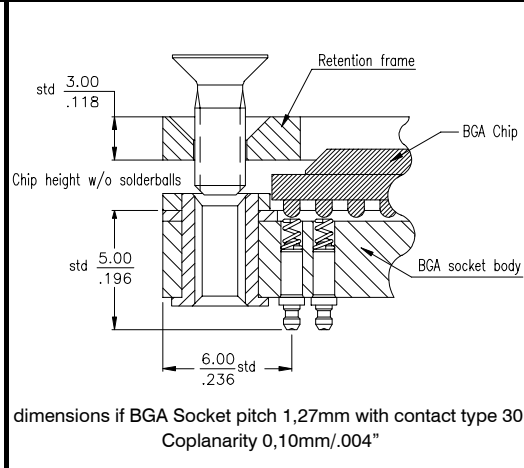
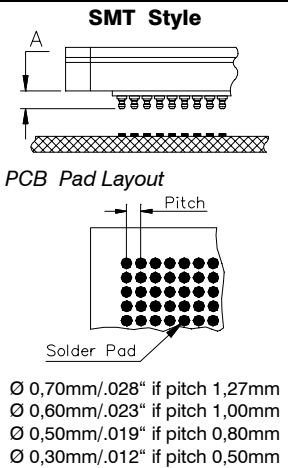
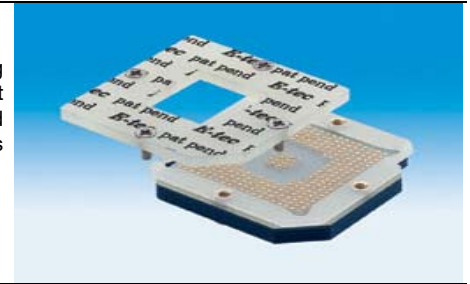


E-tec is now the leading BGA socket manufacturer.

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.

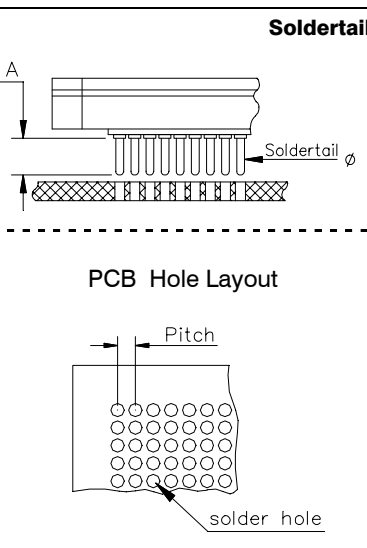


Important Note:
 Please check the ball diameters & heights of your chip prior to ordering the standard E-tec BGA (BPW/BCW) sockets. Any deviation has to be communicated to E-tec in order to check compatibility with the standard socket design and if necessary to obtain a special order code adapted to 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	10.000 cycles min.
Contact life	1.000 cycles min.
Retention System life	exceeds MIL-STD-202 Method 208
Solderability	40 grams max.
Individual contact force	up to 800 pins = 7cN per meter or 10 oz per inch
Max. torque for retention screws	as of 800 pins = 7cN to 10cN per meter or 10 oz to 14 oz per inch
Material	Glass Epoxy FR 4
Insulator	Brass
Terminal	BeCu
Contact	
Electrical data	< 100 mΩ
Contact resistance	500 mA max.
Current rating	100 MΩ if 0.50 to 0.80mm pitch
Insulation resistance at 500V DC	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	Refer to page "Tools" of this catalog
Torque limiting screw driver	Please use a solderpaste w/o any silver!
Solder paste	Please refer to our website www.e-tec.ch
Solder profile	

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

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