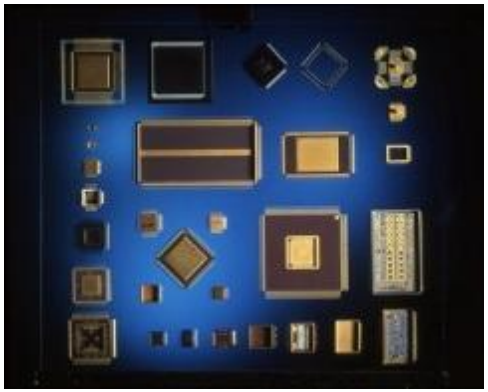
Fancort's Component Forming Services

LEAD FORMING AND TINNING FOR HIGH RELIABILITY RAD HARDENED PARTS USING TIN LEAD 63/37 SOLDER

31 Fairfield Place, West Caldwell, NJ 07006 http://www.fancort.com Tel: 888-fancort (326-2678)

Component Processing Services

- Fancort is the industry leader in component lead preparation services for the Semiconductor Defense and Aerospace industries. We have over forty years of experience in lead forming of a wide variety of packages, including large and small flat packs and quad packs, DIPs, fiber-optic headers and devices that require conversion from through-hole to SMT. We use our unique universal and dedicated tooling systems and complete process control to ensure accuracy and quick turnaround of your parts to JEDEC and/or MIL SPEC dimensions, with optional services such as leak testing and tinning, if required.



- Why Fancort? Fancort is the only company that make the tools and, also, provides the services. **Our experience is with every major defense and aerospace company in the USA, including NASA.** We are a world leader having major tool installations in over twenty-five countries worldwide. Fancort's experience in developing forming specifications and pad footprints sets us apart from all others.

How do we do it?

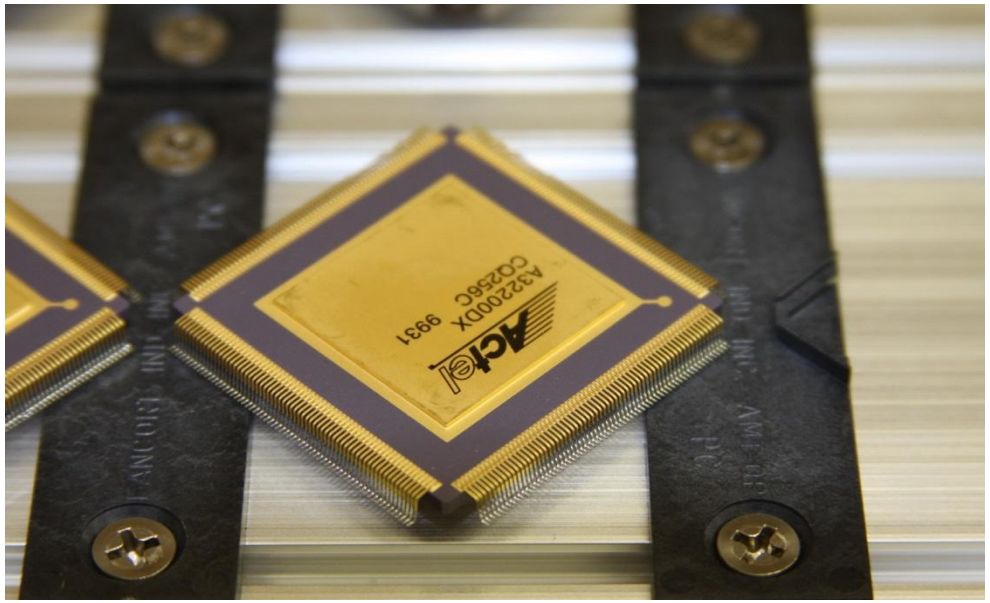
Fancort uses a combination of Universal (one-sided tools), Flex (two-sided tools) and Dedicated (four-sided tools) that are fabricated to form SMT parts to the most exacting specifications and tolerances. Here is what these three tools look like:

Fancort's Standard Process & Procedures

- ISO 9001:2008 Certificate # US 13/82686
- "ITAR registered, code M22953, as of 15_May_2008"
- Cage Code #6L 152. Fancort is an approved NASA supplier of Forming Services and Tools
- Lead forming to Mil-STD-883E and NASA-STD-FP 51 3414 Rev H Section 3 and IPC J-STD-001E-2010/April 2010
- Lead tinning is per IPC J-STD-001E-2010 & IPC J-STD-001ES-2010 (Requirements for Soldered Electrical & Electronic Assemblies).
- Fancort is IPC J-STD-001ES CERTIFIED for tinning Space Grade flat packs and quad packs as of 18-November-2013.
- Complete process control and documentation
- Standard footprint layouts available, or we will design your custom foot print
- All work is done in a controlled ESD Safe environment
- Our facility meets all requirements for Class Zero applications (0-250 volts)
- DOD MIL-STD-1686C Compliant
- Inspection Report and Certificate of Compliance
- Tinning and Gold Removal Features
    - Lead tinning to NASA STD 8739.3 with Change #5 or IPC-J-STD-001
- Fancort is NASA STD 8739.2 CERTIFIED for tinning Space Grade flat packs and quad packs as of 21_September_2011
- Tinning is done on our automated LTS200 machine in a 100% inert nitrogen environment and incorporating dual dynamic pot process
- Solder used is 63/37 ultra-pure standard
- Fancort uses a non-flux process with the automated tinning machine, utilizing a nitrogen blanket and dual dynamic pot process

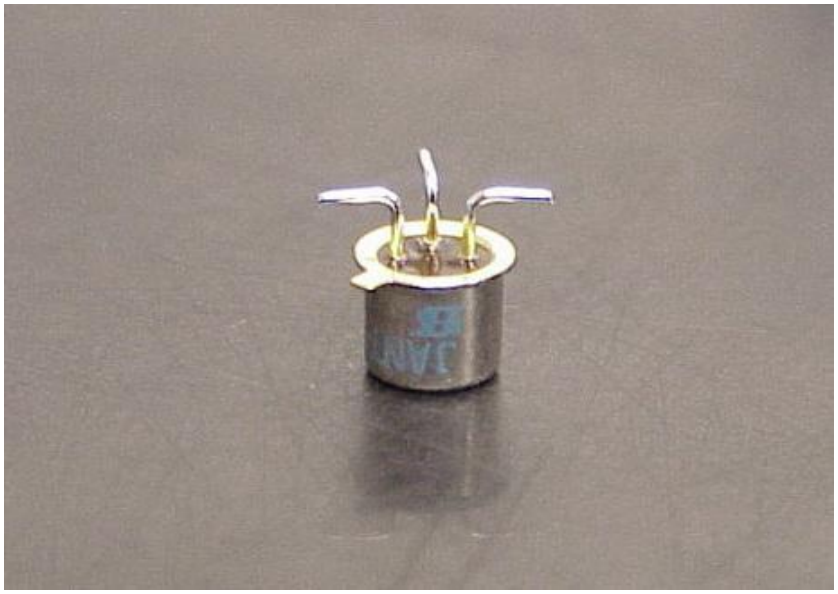
Example #1

A formed and tinned ceramic FPGA Actel Microsemi 256 lead quad pack. Shown is a Fancort adjustable matrix tray for storage and shipping SMDs.



Example #2

A TO-99 Can with glass seals formed, trimmed and tinned by our services.

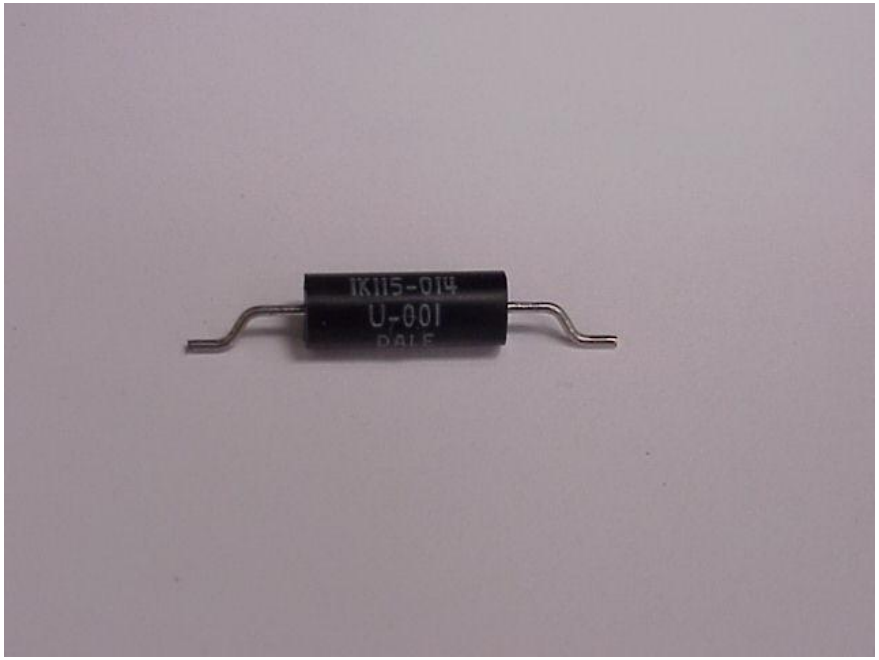


Example #3

A standard DIP formed, trimmed and tinned by our services.

Example # 4

An axial high reliability part formed, trimmed and tinned by our services.



Optional Tinning

Fancort's fully enclosed Automated Two-Pot Robotic Tinning System will remove the gold and/or old solder and apply fresh solder for Rad Hardened parts under a nitrogen blanket eliminating oxidation and contamination.

- The normal lead tinning height is approximately half way up the leg giving full heel coverage for excellent soldering to the PC Board
- Solder alloys used for solder dip are in accordance with J-STD-006, or equivalent and contain a minimum of 3% lead
- Hot solder dip meet the tinning requirements of ANSI/IPC-J-STD-001, Class 3.
- Tinned leads meet the solder ability requirements of J-STD-002, Category 3.
- Fancort's tinning process is not intended to eliminate and/or reduce the growth of tin whiskers on lead free (tin plated) leads.

Optional Leak Testing

MIL-STD-883G METHOD 1014.2

The purpose of this test is to determine the effectiveness (hermetically) of the seal of microelectronic and semiconductor devices with designed internal cavities. Normally, this test is done after lead forming because the parts are typically tested when made by the original device manufacturer. Fancort requires one set-up test part for destructive testing, if actual internal cavity volume value is not available.

Resources

Fancort's website offers standard footprints, bending specifications and technical assistance for most Rad Hardened parts.

http://www.fancort.com/Standard-SMT-Footprints.aspx (See page 12)

Here is an example of what we offer on our website:

The following product options are available for all footprints:

- Component Processing
- Universal One-Side
- Flex Two-Sided
- Dedicated
- Manual Dedicated
- Floating Anvil

Examples: Standard Footprints

Manufacturer	Pin Count	Link to Footprint (PDF)
ACTEL/MICROSEMI	84	ACTEL 84
ACTEL/MICROSEMI	132	ACTEL 132
ACTEL/MICROSEMI	132 Pin Quad	ACTEL 132 Option 2
ACTEL/MICROSEMI	172	ACTEL 172
ACTEL/MICROSEMI	196	ACTEL 196
ACTEL/MICROSEMI	208	Special smaller form for use with smaller pad
ACTEL/MICROSEMI	208	ACTEL 208, 208f126f, 208f153f
ACTEL/MICROSEMI	256	ACTEL 256 SPECIFICATIONS
ACTEL/MICROSEMI	352	ACTEL 352 w/o Heat Sink
ACTEL/MICROSEMI	352	ACTEL/352/JPL/NASA
ACTEL/MICROSEMI	352	BGA Adaptor Socket (PDF)
AEROFLEX	14 Pin Count FP	UT54ACS14E/UT54ACTS14E
AEROFLEX	16 Pin Count FP	AEROFLEX CFP 16
AEROFLEX	18 Pin Count FP	LVDMO55LV
AEROFLEX	18 Pin Count FP	PCS5035
AEROFLEX	20 Lead Pin Count FP	UTMC 20
AEROFLEX	24 Lead Pin Count FP	UTMC 24
AEROFLEX	28 Lead Pin Count FP	UTMC 28
AEROFLEX	28 Lead Pin Count FP	UT16MX110MUX
AEROFLEX	28 Lead Pin Count FP	Omega Bend Form (PDF)
AEROFLEX	40 Lead Flat Pack UT8MR2M8	Omega Bend Form PDF
AEROFLEX	48 Pin Count FP	AEROFLEX 48
AEROFLEX	48 Pin Count FP	AEROFLEX CFP 48 #1
AEROFLEX	52 Pin Count	ACT50288 RAD HARD
AEROFLEX	56 Leads FPGA	MUX8533
AEROFLEX	56 Leads	56 Lead RAD HARD
AEROFLEX	68 Pin Count Quad Pack	AEROFLEX CQFP
AEROFLEX	68 Pin Count Quad Pacl V2	UT7C138/139
AEROFLEX	68 Pin Bottom Brazed	UT8ER512K32
AEROFLEX	96 Leads FPGA	ACT 8501
AEROFLEX	96 Pin Omega Bend /Bottom Brazed Bottom Brazed	FPGA/SMT
AEROFLEX	128 Lead Quad Pack UT8SDMQ64	Short-Side Omega Bend Form PDF Long-Side Omega Bend Form PDF
AEROFLEX	208 Lead CQFP	FPGA/SMT
AEROFLEX	256 Lead	AEROFLEX 256
AEROFLEX	352 Lead	AEROFLEX UT699

Example: Flat Pack
Standard Forming Specification Sheet

fancort industries, inc.

Fancort Industries
31 Fairfield Place, West Caldwell, New Jersey 07006
Phone 973-575-0610 www.fancort.com fax 973-575-9234

QCP-LFS6

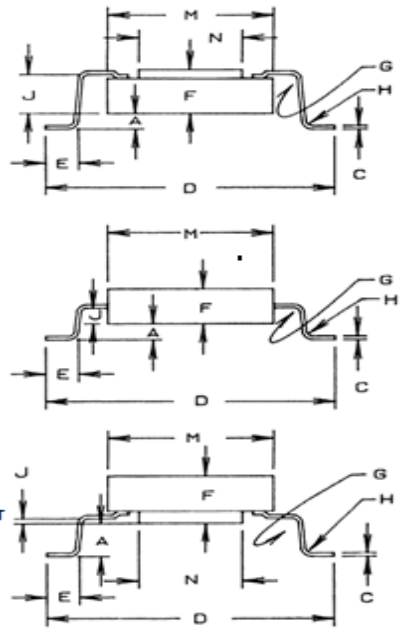
Flat Pack Specification Sheet

PACKAGE TYPE:

TOP BRAZE ☐

SIDE EXIT ☐

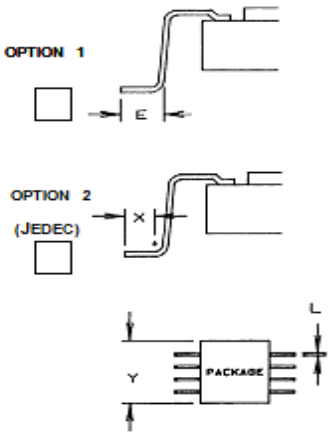
BOTTOM EXIT ☐



FOOT CONFIGURATION:

OPTION 1 ☐

OPTION 2 (JEDEC) ☐



FA / F8 NUMBER _____
CU8TOMER _____
PART NUMBER _____
DATE _____
DRAWN BY _____

		DIMEN8ION8	TOLERANCE
	A	0.	±0.
	C	0.	±0.
	D	0.	±0.
	E	0.	±0.
	X	0.	±0.
	F	0.	±0.
	G	0.	±0.
	H	0.	±0.
	J	0.	±0.
	M	0.	±0.
	N	0.	±0.
PACKAGE LENGTH	Y	0.	±0.
LEAD WIDTH	L	0.	±0.
PITCH			
# OF LEAD8 PER 8IDE			

LEAD8 TINNED: YE8 ☐ NO ☐

CONTROLLING UNIT8: METRIC ☐ INCHE8 ☐

PACKAGE TYPE: METAL ☐ CERAMIC ☐ PLA8TIC ☐ GLA88 8EAL ☐

LEAD TYPE: FLAT ☐ ROUND ☐ UP 0-4° ☐ DOWN 0-4° ☐

Template Version 3/13/14

Example: Quad Pack
Standard Forming Specification Sheet

fancort industries, inc.

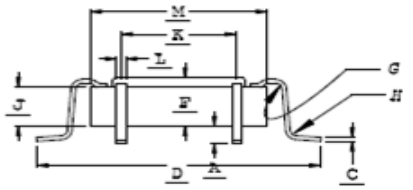
Fancort Industries
31 Fairfield Place, West Caldwell, New Jersey 07006
Phone 973-575-0610 www.fancort.com Fax 973-575-9234

QCP-LFS5

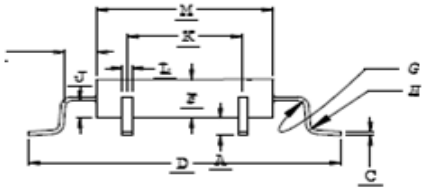
Quad Pack Specification Sheet

PACKAGE TYPE:

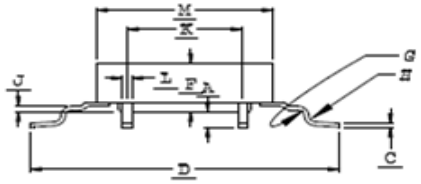
TOP BRAZE ☐



SIDE EXIT ☐

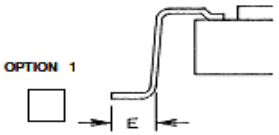


BOTTOM EXIT ☐

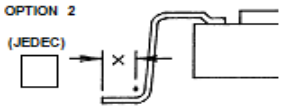


FOOT CONFIGURATION:

OPTION 1 ☐



OPTION 2 (JEDEC) ☐



FA / FS NUMBER _____
CUSTOMER _____
PART NUMBER _____
DATE _____
DRAWN BY _____

	DIM X	DIM Y	TOLERANCE
A	0.	0.	±0.
C	0.	0.	±0.
D	0.	0.	±0.
E	0.	0.	±0.
X	0.	0.	±0.
F	0.	0.	±0.
G	0.	0.	±0.
H	0.	0.	±0.
J	0.	0.	±0.
K	0.	0.	±0.
L	0.	0.	±0.
M	0.	0.	±0.
PITCH	0.	0.	±0.
# OF LEADS PER SIDE	0		
TOTAL # OF LEADS	0		

LEADS TINNED: YES ☐ NO ☐

CONTROLLING UNITS: METRIC ☐ INCHES ☐

PACKAGE TYPE: METAL ☐ CERAMIC ☐ PLASTIC ☐ GLASS SEAL ☐

LEAD TYPE: FLAT ☐ ROUND ☐ UP 0-4° ☐ DOWN 0-4° ☐

Template Version 3/13/14

Blank Specification Sheet Instructions

The following is a guide to help you fill out a quad pack or flat pack specification sheet. Please furnish the parameters listed below and call us if you need further information or technical assistance.

A. Stand-off/PCB Offset Height: This dimension can vary and may sometimes include clearance for a heat sink. On the forming tool this dimension is adjustable with a micrometer. The usual tolerance is ± .002.

B. Shoulder: This is only noted on our Universal specification sheets. It is the distance from the body of the device to the vertical tangent of the first bend, "G." This dimension is critical and size range depends on body type and lead thickness. For instance, the "B" dimension for ceramic parts can be as small as .030" and for plastic parts could be as low as .010." Metal Glass Seal parts will require a substantially larger "B" dimension. A suitable dimension is often a judgment call based on the required footprint versus part size and type.

C. Lead Material Thickness: This is the total thickness including plating(and tinning, if applicable.) This is a very critical dimension, which effects spring-back, foot position, burnish (on the leg) and tip-to-tip "D" tolerance. The smaller range the better. Usual tolerance is ± .002". Ideal is ± .001".

D. Tip-to-Tip: This is the required size of the device after form and trim. This dimension includes spring back ad cumulative tolerance. Usual tolerance is ± .010".

E. Foot Option #1: This is the total foot length that will encounter solder, measured from the tip to the vertical tangent. Tolerance is ± .005". This dimension typically ranges from .030" to .060".

F. Foot Option #2: This represents the JEDEC method of specifying a dimension. As in the case with Foot Option #1 tolerance is normally ± .005" and size range typically varies from .025" to .060". Overall Body Thickness: This dimension should include covers and/or heat sinks. Significant variations in this dimension within part lots can cause unacceptable variations in the fine "D" dimension. Please use or send us the manufacturers case drawing to eliminate confusion.

Blank Specification Sheet Instructions

G. Overall Body Thickness: This dimension should include covers and/or heat sinks. Significant variations in this dimension within part lots can cause unacceptable variations in the fine "D" dimension. Please use or send us the manufacturers case drawing to eliminate confusion.

H. / H. Upper & Lower Radii: These, as a rule, should be 1-1/2 to 2 x the maximum thickness "C". A typical tolerance range for these values is + .004 to .002, or slightly greater depending on the lead thickness tolerance. Please contact us if you have any questions.

J. Body Thickness: Vertical distance between the bottom of the lead as it exits the body and the bottom of the part body. (Refer to "F".) Specify a required tolerance.

L. Lead Width & Pitch: This is important to set up the tooling. We need dimensions for lead width, "L", and lead pitch.

M. Body Width: Specify a tolerance or maximum dimension.

N. Heat Sink Width: Specify a tolerance or maximum dimension.

Y. Body Length: Specify a tolerance or maximum dimension. Note: For two-sided flat packs, only.

** Leads Per Side: Specify number. Also, note required package orientation (Part ID # side up or down.)

** Total Number of Leads: It's important to highlight if the part body is square or rectangular. Note: For rectangular parts, use dimension "X" and dimension "Y" on the quad sheet.

** Leads Tinned: It is important to note whether the leads have been tinned prior to forming. The 'as measured' "C" dimension will thus include the tinning layer thickness.

** Lead Type: Fancort tools can be used with standard setups for flat leads. Round leads generally require more spring pressure and stepped pressure pads to reduce coining. The radius should be increased on round leads to 2 to 2-1/2 x "C" and flatting within mil-spec (10%) should be expected. Please note the "B" dimension (shoulder) should be extended as much as possible. The same as for a metal package.

** Toe Up or Toe Down: Most customers using hot bar soldering want the toe angle to be 0º flat to 4º down. This dimension can be held fairly accurate if the "C" dimension is maintained at ± .001". For customers using IR oven soldering, the typical foot position is 0º flat to 4º toe up.

** Package Type: Specify whether the package is top exit, side exit or bottom.

Fancort's
Lead Forming Services Department

Lead Forming Services Department

Inspection

Optical Inspection Syste