

Apple Mini DisplayPort Connector Dimensions

Portions Copyright © 2008 Apple Inc. All Rights Reserved.

These drawings define the mating interface and printed circuit board footprint for the Apple Mini DisplayPort Connector and/or Error Corrections thereto which are subject to the Apple Mini DisplayPort Connector Evaluation License (“Evaluation License”) or to the Apple Mini DisplayPort Connector Implementation License (“Implementation License”). You may not use these drawings except in compliance with the Evaluation License or the Implementation License

The Apple Mini DisplayPort Connector Dimensions and all Error Corrections are distributed on an ‘AS IS’ basis, WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, AND APPLE HEREBY DISCLAIMS ALL SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, QUIET ENJOYMENT OR NON-INFRINGEMENT. Please see the Evaluation License for the specific language governing rights and limitations under the Evaluation License. Please see the Implementation License for the specific language governing rights and limitations under the Implementation License.

Version 1.1

Changes from previous versions

Version	Date	Section	Change
1.1	11/19/2008	Notices	Added reference to the Evaluation License
1.1	11/19/2008	2	Corrected error in default tolerances
1.1	11/19/2008	2	Detail K changed tolerances and corrected erroneous datum reference
1.1	11/19/2008	2	Section J-J corrected erroneous datum reference
1.1	11/19/2008	2	Section J-J clarified applicability of apparent double dimension
1.1	11/19/2008	3	Corrected error in default tolerances
1.1	11/19/2008	3	Changed dimension to reference in top view
1.1	11/19/2008	3	Section S-S deleted erroneous datum reference
1.1	11/19/2008	3	Detail T deleted two erroneous datum references
1.1	11/19/2008	6	Section D-D increased size of solder tabs

1 Mini DisplayPort Connector Pin Assignment

This license covers use or intended use of the Mini DisplayPort Connector with the following pin functions as defined by DisplayPort for source side and sink side use as indicated. Pin functions other than those shown below are not covered by this license.

Source-Side Mini DisplayPort Connector Pin Assignment

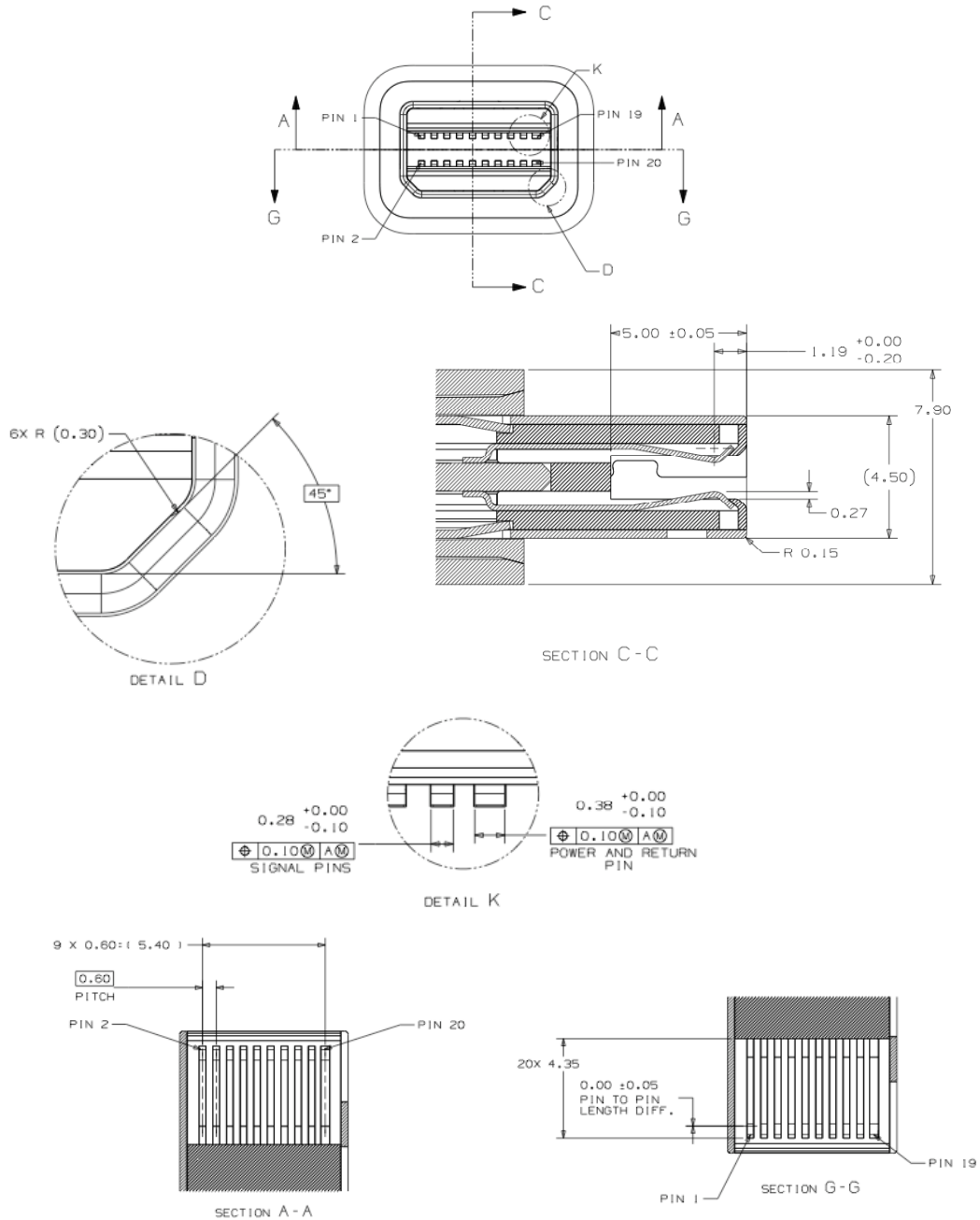
Top Row			Bottom Row		
Pin Number	Signal Type	Pin Name	Pin Number	Signal Type	Pin Name
1	GND	GND	2	In	Hot Plug Detect
3	Out	ML_Lane 0 (p)	4	CONFIG	CONFIG1
5	Out	ML_Lane 0 (n)	6	CONFIG	CONFIG2
7	GND	GND	8	GND	GND
9	Out	ML_Lane 1 (p)	10	Out	ML_Lane 3 (p)
11	Out	ML_Lane 1 (n)	12	Out	ML_Lane 3 (n)
13	GND	GND	14	GND	GND
15	Out	ML_Lane 2 (p)	16	I/O	AUX_CH (p)
17	Out	ML_Lane 2 (n)	18	I/O	AUX_CH (n)
19	GND	GND	20	PWR Out	DP_PWR

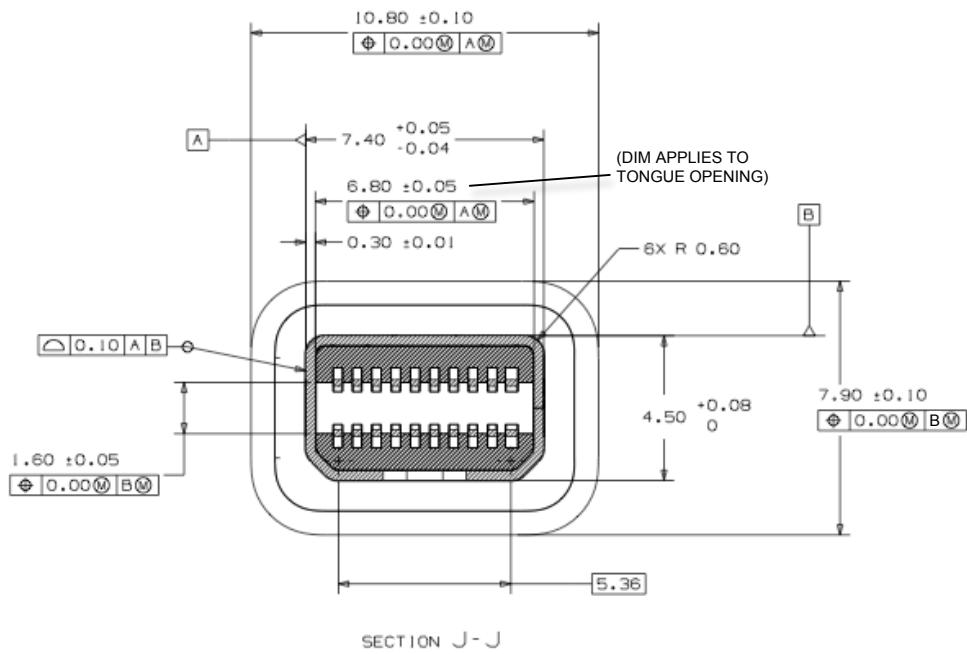
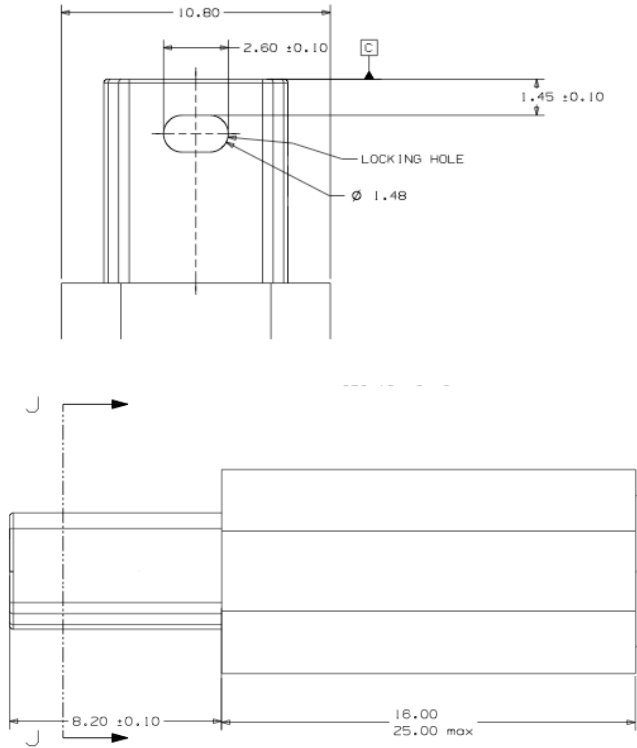
Sink-Side Mini DisplayPort Connector Pin Assignment

Top Row			Bottom Row		
Pin Number	Signal Type	Pin Name	Pin Number	Signal Type	Pin Name
1	GND	GND	2	In	Hot Plug Detect
3	Out	ML_Lane 3 (n)	4	CONFIG	CONFIG1
5	Out	ML_Lane 3 (p)	6	CONFIG	CONFIG2
7	GND	GND	8	GND	GND
9	Out	ML_Lane 2 (n)	10	Out	ML_Lane 0 (n)
11	Out	ML_Lane 2 (p)	12	Out	ML_Lane 0 (p)
13	GND	GND	14	GND	GND
15	Out	ML_Lane 1 (n)	16	I/O	AUX_CH (p)
17	Out	ML_Lane 1 (p)	18	I/O	AUX_CH (n)
19	GND	GND	20	PWR Out	DP_PWR

2 Mini DisplayPort Plug Dimensions

The figure below shows the Mini DisplayPort plug dimensions, including the maximum external dimensions for the overmold. The external shape of the overmold cross-section is shown for illustration only and is not included in this license. A plug must meet all dimensions and tolerances shown. This license does not cover plugs that do not meet all the dimensions and tolerances shown. All dimensions are in mm. Except where otherwise specified, tolerances are $x.x \pm 0.2$, $x.xx \pm 0.10$, $x.xxx \pm 0.050$, angles $\pm 0.5^\circ$.

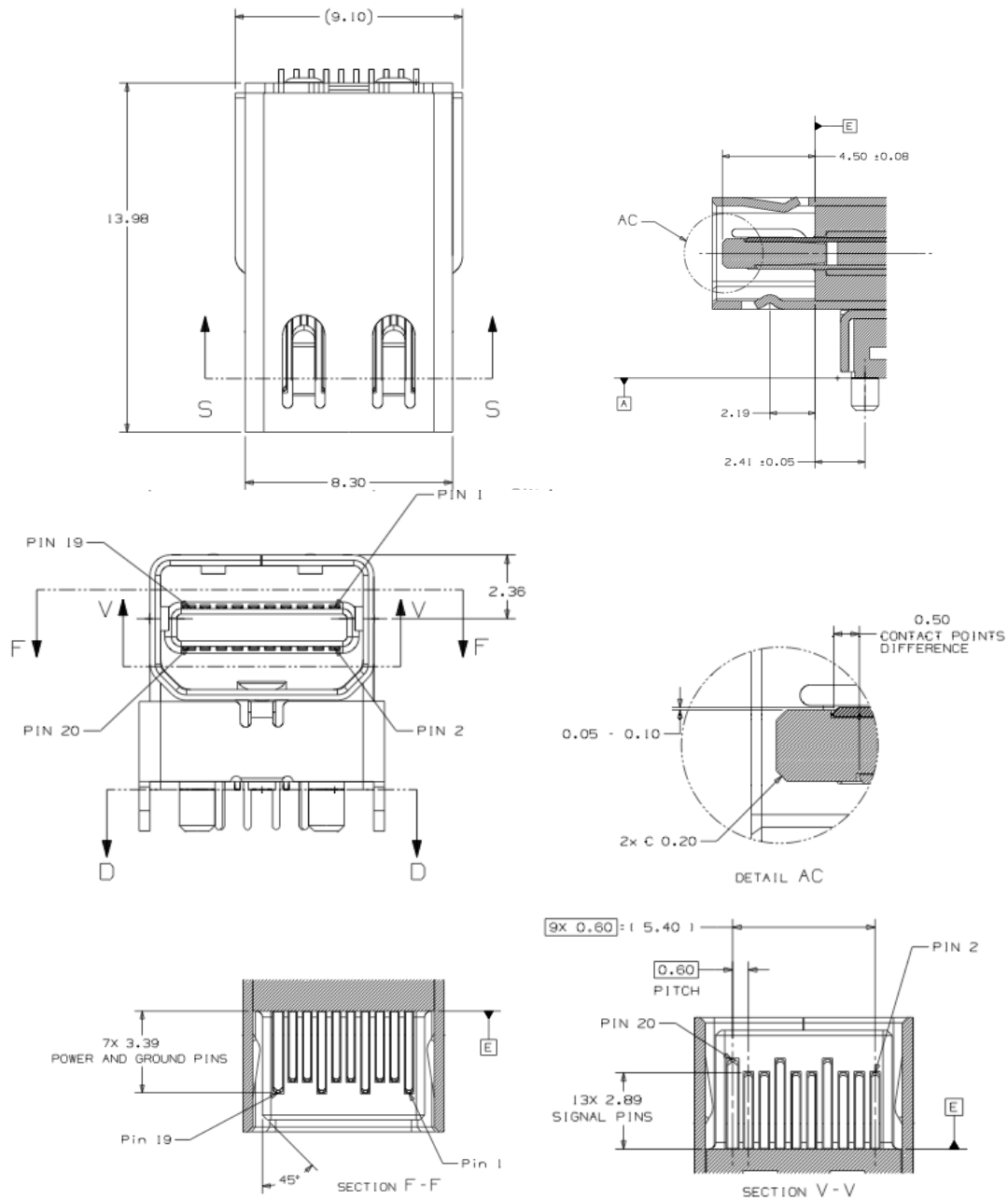




Mini DisplayPort Plug Dimensions

3 Mini DisplayPort Receptacle Dimensions

The following figure shows the Mini DisplayPort receptacle dimensions. A receptacle must meet all dimensions and tolerances shown. This license does not cover receptacles that do not meet all the dimensions and tolerances shown. All dimensions are in mm. Except where otherwise specified, tolerances are $x.x \pm 0.2$, $x.xx \pm 0.10$, $x.xxx \pm 0.050$, angles $\pm 0.5^\circ$. See also 4 below for the required mating sequence. See also 5 below for the required panel allowance. See also 6 below for an appropriate PCB layout.



4 Mini DisplayPort Contact Sequence

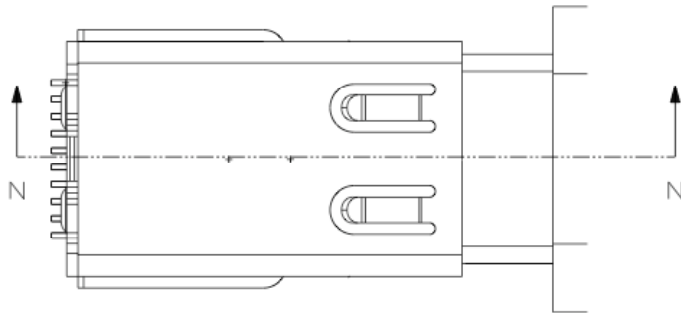
A Mini DisplayPort receptacle must be designed to ensure the correct mating sequence. This license does not cover receptacles that do not implement the correct mating sequence as shown.

The following table shows the legend for signal name / type mating level.

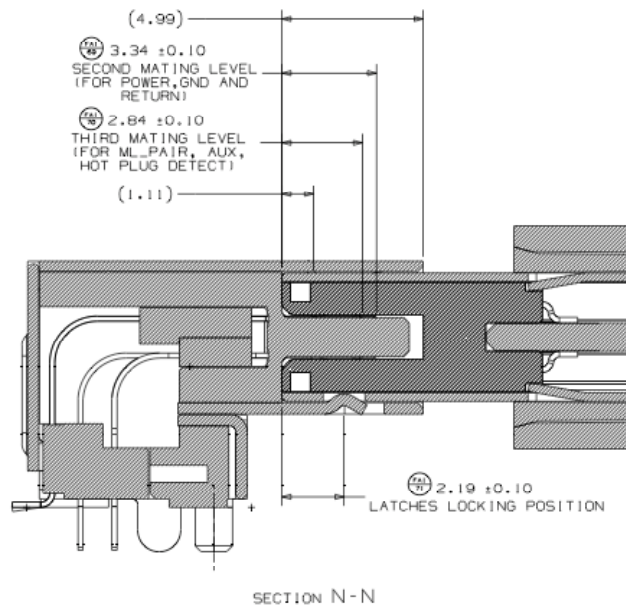
Mating Sequence Level		Level
Signal Type		Level
Connector Shell		First Mate ¹
DP_PWR	GND	Second Mate
Auxiliary (+) / (-) ML_Lane (i) (+) / (-)	Hot Plug Detect, CONFIG1, CONFIG2	Third Mate

Note 1: the EMC fingers on the shell may mate after all contacts have mated.

The following figure shows the mating levels of the fully mated Mini DisplayPort receptacle and plug



CONTACT SEQUENCE



Fully mated Mini DisplayPort Connector showing mating levels

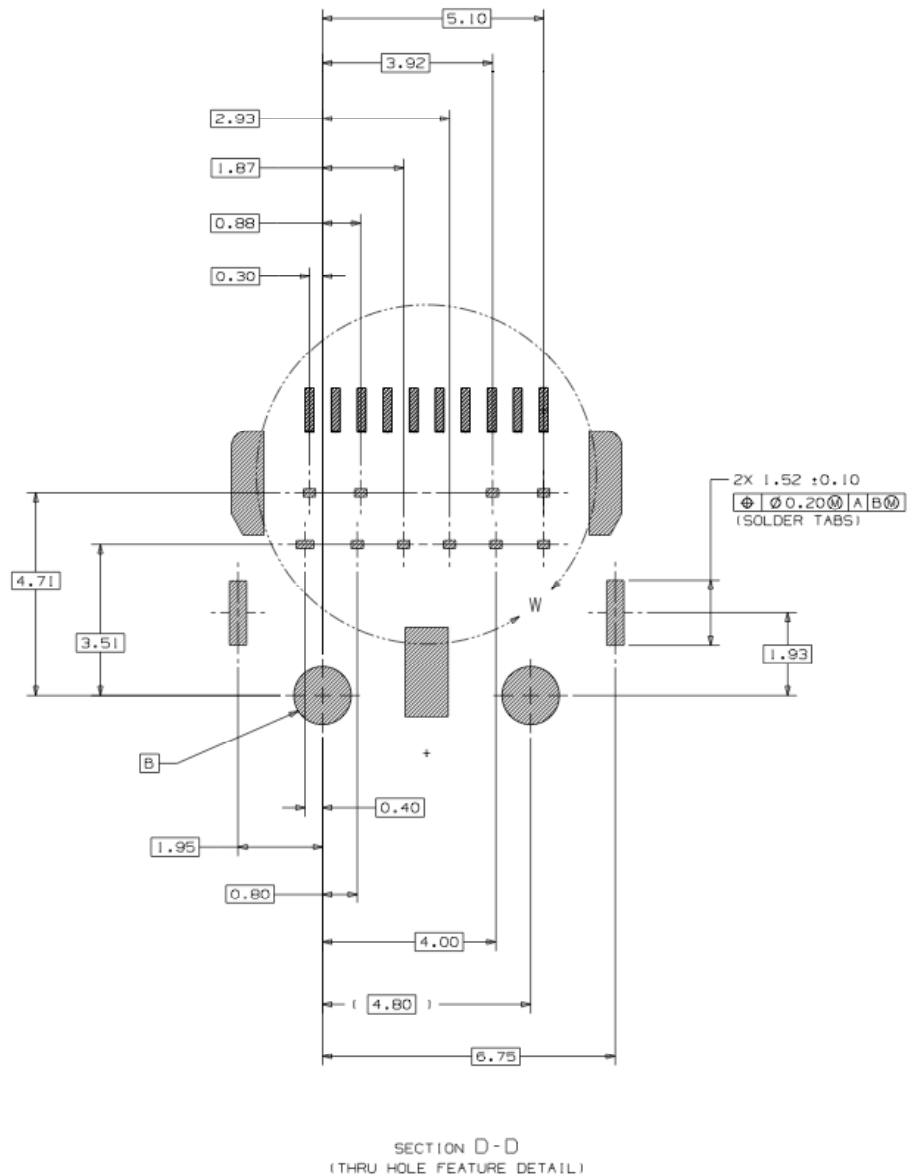
5 Mini DisplayPort Panel allowances

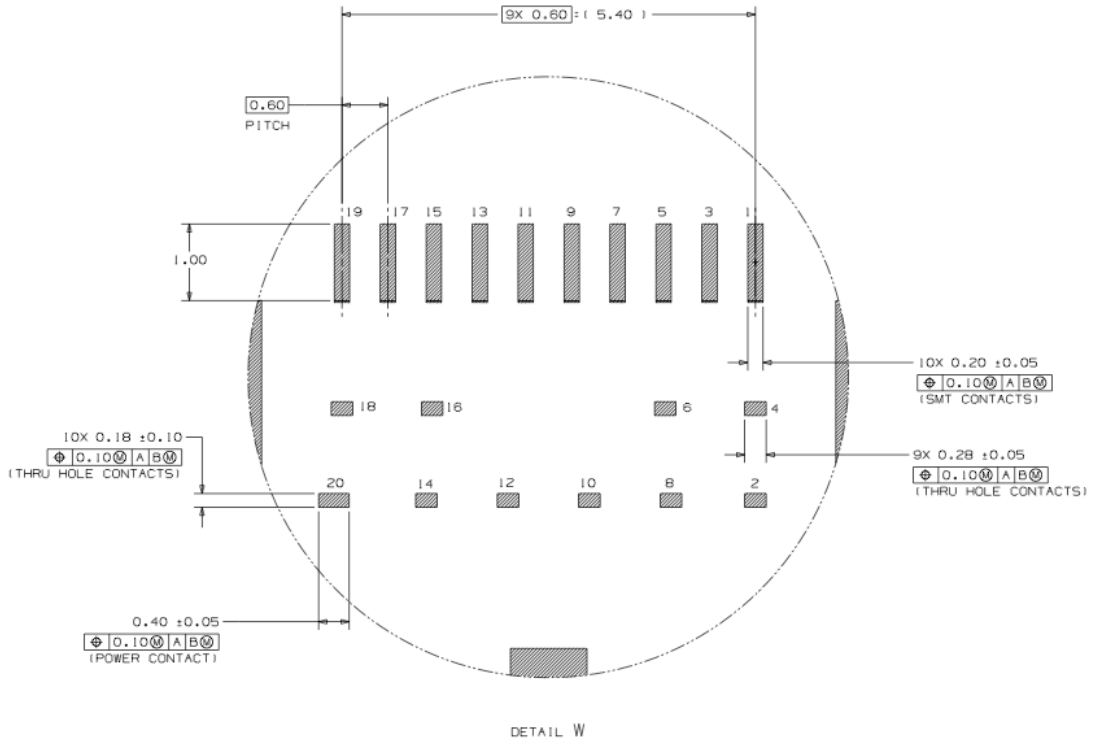
The figure in the previous section shows the plug protrusion in the fully mated condition of the plug and the board receptacles. The system design incorporating a Mini DisplayPort receptacle must be designed so that a Mini DisplayPort plug fully mates with the Mini DisplayPort receptacle with appropriate margin, but sufficient control to prevent an incorrect contact sequence due to angled insertion. The receptacle design must provide an appropriate allowance for a panel, bezel or similar (when used) so that this requirement is met. To meet these requirements, the distance from datum E in the receptacle to the externally accessible mating interface on the device shall be at least 5.7mm and shall not exceed 8.0mm.

6 Mini DisplayPort Receptacle PCB Mounting

A Mini DisplayPort receptacle licensed under this license may use any desired PCB mounting interface. This license covers the following PCB mounting interface.

This mounting interface uses surface-mount contacts for the mating interface top row of pins and thru-hole contacts for the mating interface bottom row of pins. The figure below shows the Mini DisplayPort receptacle's PCB interface, i.e. the sizes and positions of the surface mount contacts, the thru-hole contacts and the locating lugs. The actual landing pad design to receive these contacts will be system dependent





PCB Mounting interface for Mini DisplayPort receptacle