

Guide for the use of Meritec SOP sockets



Guide for selecting, handling and mounting Meritec SOP sockets

Thank you for considering Meritec for your SOP socketing needs. This guide is intended to aid the user in the selection and application of Meritec SOP sockets. It covers both the original SnPb plated contact and the new “lead-free” versions.

Regarding the “lead-free” and “lead-bearing” versions of our SOP sockets...your decision as to which version to use in your application should be guided by the type of solder you will be using for your PC Board assembly:

° If you’re using a **lead** solder, then you can use either version, there is no difference. Please refer to our suggested SnPb solder profile on page 5.

° If you’re using a “**lead-free**” solder, then you must use only the “lead-free” version, and in this case, you’ll need to refer to our suggested “lead-free” solder profile on page 7.

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Meritec SOP Socket Part Numbers

SnPb Part Numbers:

<u>Component Package</u>	<u>Lead Count</u>	<u>Meritec Socket P/N's</u>	
		<u>without alignment pins</u>	<u>with alignment pins</u>
0.50mm TSOP	40	980020-40-01	980020-40-02
0.50mm TSOP	48	980020-48-01	980020-48-02
0.50mm TSOP	56	980020-56-01	980020-56-02
1.27mm PSOP	44	980021-44-01	980021-44-02
0.80mm SSOP	56	980022-56-01	980022-56-02

“Lead-Free” Part Numbers:

<u>Component Package</u>	<u>Lead Count</u>	<u>Meritec Socket P/N's</u>	
		<u>without alignment pins</u>	<u>with alignment pins</u>
0.50mm TSOP	40	980020-40-P1	980020-40-P2
0.50mm TSOP	48	980020-48-P1	980020-48-P2
0.50mm TSOP	56	980020-56-P1	980020-56-P2
1.27mm PSOP	44	980021-44-P1	980021-44-P2
0.80mm SSOP	56	980022-56-P1	980022-56-P2

FEATURES AND SPECIFICATIONS:

For OEM, programming, prototyping and test applications
Surface mount
Land-pad footprint is common for package and socket
Zero insertion force
Effortless package loading and unloading
High normal force contacts
Positive locking lid design
Body, Lid and Lock material: Liquid Crystal Polymer
Insulation resistance: 500 megohms
Dielectric withstanding voltage: 250 VAC
Terminal material: Cu alloy with SnPb plating (Pd plating on lead-free version)
Contact resistance: 30 milliohms max
Current rating: 0.5 amp
Minimum insertion/withdrawal cycles: 50
Temperature range: -55 degrees C to +105 degrees C
Flammability: 94V-0
Available in tape & reel or tray packaging

HANDLING

As with any close pitch surface mount device, good lead alignment and coplanarity are essential. You can avoid mounting problems by observing the following:

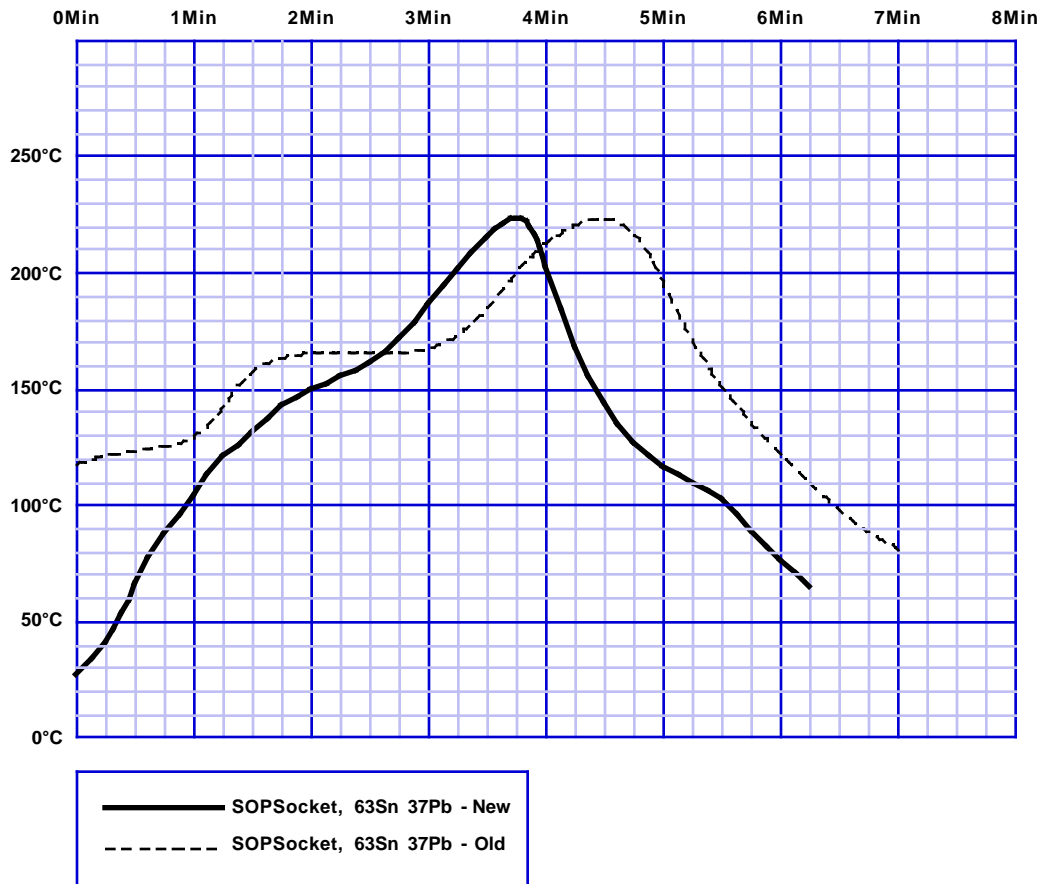
- Your sockets were shipped in a protective package. It is recommended that you keep them protected until you are ready to mount them.
- Please call or visit our web site for more information on our **tray** packaging.
- Please call or visit our web site for more information on our **tape and reel** packaging.
- During handling, avoid coming in contact with the terminals. This will minimize the potential for damage or contamination which may adversely effect solderability.

SMT Mounting with SnPb Solder

To assist you in the creation of your P.C. Board artwork and component layouts, a disk of DXF files is available. These design aids can be imported into most popular CAD software. Contact Meritec for your copy...ask for the disk titled "SKTDES01".

We suggest using one of two methods for mounting your sockets. The most conventional way is to reflow solder them in either a convection or a combination convection/infrared oven. The use of an exclusively infrared oven may not yield the desired solder joint quality and, in fact, may lead to damage to the socket.

Here's a typical oven profile when using a SnPb alloy solder:



Note the new profile that reflects current thinking in PCB assembly...a profile that has both reduced "popcorning" of BGA devices and reduced the overall time of the cycle. Though the peak temperature is the same, the time spent above the liquidus point of the solder has been significantly reduced. Our testing indicates that our SOP sockets solder very well with either profile.

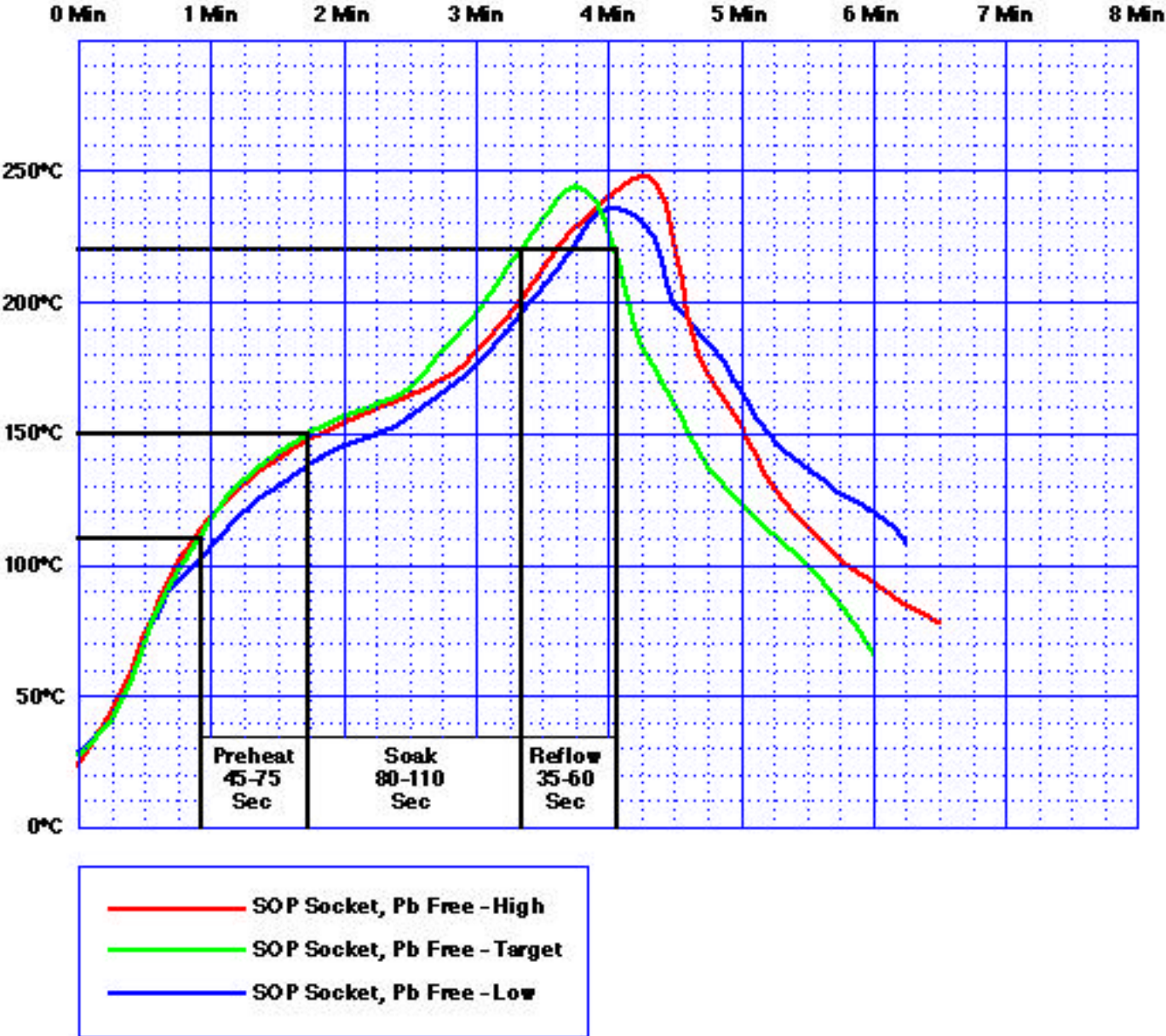
SMT Mounting with SnPb Solder (continued):

When soldering, these points should be noted:

- Solder mask must be present between the device pads. Be aware that a number of PC board manufacturers are still not capable of applying it satisfactorily between the closely spaced pads of a TSOP or SSOP pattern.
- The solder paste stencil should be of a high quality, .006" thick stainless steel.
- A suggested solder paste is #NC-SMQ92J available from Indium Corporation of America.
- Use a flux with an activity level strong enough for surface mounted devices.
- Apply flux sparingly...excessive flux may wick up into the terminal area, restricting terminal movement.
- Observe the expiration date on the flux or solder paste container.
- Take care to assure that solder paste is applied only to the solder pads. Close-pitch devices such as these bridge easily.
- Because the socket terminals are SnPb plated, the use of lead-free solders is NOT recommended. Their use may result in unexpected cosmetic or structural problems in the solder joint.
- The plastic components of the socket may be damaged if exposed to a temperature exceeding 250 degrees C.
- Hand soldering is NOT recommended. Tip temperatures of soldering irons may degrade or distort the plastic components of the socket. If a resin core solder is used, the flux may wick up into the terminal area, causing intermittent opens between the terminal and the SOP device.

SMT Mounting with "Lead-Free" Solder

And here's a sample oven profile when using a lead-free alloy solder. The user should establish a profile appropriate for their application:



Reflow soldering of components using the new lead-free solders is a challenge. The 20° C temperature increase necessary to reflow the lead-free solder alloys imposes higher stresses on the plastic components of Meritec’s SOP sockets. This said, the user would be well advised to use the minimum time and temperature that will result in a satisfactory solder joint.

A detailed test report titled “[Mounting of Meritec SMT Products Using Lead-Free Solder](#)” is available from Meritec.

SMT Mounting with “Lead-Free” Solder (cont)

When soldering, these points should be noted:

- Solder mask must be present between the device pads. Be aware that a number of PC board manufacturers are still not capable of applying it satisfactorily between the closely spaced pads of a TSOP or SSOP pattern.
- The solder paste stencil should be of a high quality, .006" thick stainless steel.
- A suggested solder paste is SAC305 NC254 available from AIM Solder, Inc. It's fine grained consistency and use of no clean flux has yielded good results.
- Use a flux with an activity level strong enough for surface mounted devices.
- Apply flux sparingly...excessive flux may wick up into the terminal area, restricting terminal movement.
- Observe the expiration date on the flux or solder paste container.
- Take care to assure that solder paste is applied only to the solder pads. Close-pitch devices such as these bridge easily.
- The plastic components of the socket may be damaged if exposed to a temperature exceeding 250 degrees C.
- Hand soldering is NOT recommended. Tip temperatures of soldering irons may degrade or distort the plastic components of the socket. If a resin core solder is used, the flux may wick up into the terminal area, causing intermittent opens between the terminal and the SOP device.

SMT Mounting by Other Means

A viable alternative to soldering is conductive epoxy. They are available in both isotropic or anisotropic versions. The former is equally conductive in all directions...the latter is conductive across its thickness only. Though anisotropic is preferred, isotropic CAN be used to mount the larger pitch PSOP socket. The following should be observed:

- The applied thickness of a paste epoxy must be <.003" (0.08mm) to prevent wicking up into the terminal slot during curing.
- As with reflow soldering, the use of a convection or combination convection/infrared oven is suggested. Satisfactory results may also be achieved with the careful application of a heat gun.
- Cure per epoxy manufacturer's instructions, but do not exceed the temperature limit defined above.
- Some possible sources for conductive epoxies are:

AI Technology, Incorporated
70 Washington Road
Princeton Junction, New Jersey 08550
(609)799-9388 (609)799-9308 (FAX)
URL: <http://www.aitechnology.com>
Anisotropic Product Numbers...ZSP8150 or ZSP8410

Creative Materials, Incorporated
141 Middlesex Road
Tyngsboro, Massachusetts 01879
(978)649-4700 (978)649-2040 (FAX)
URL: <http://www.creativematerials.com>
Anisotropic Product Numbers...111-29 or 112-05

One further suggestion regarding the use of anisotropic epoxy... A common requirement for a quality connection with these materials is the application of pressure during the cure cycle. This forces the conductive particles together, forming the electrical path. If, at a later time, it is exposed to a temperature exceeding the epoxy's softening point, the film may relax and the conductive path will be broken. So...consider carefully what subsequent processes your product may undergo and what its end use is...you may feel more secure using solder.

Final Notes on Mounting:

Hand soldering is NOT recommended. Tip temperatures of soldering irons may degrade or distort the plastic components of the socket. If a resin core solder is used, the flux may wick up into the terminal area, causing intermittent opens between the terminal and the SOP device.

Whether you are soldering or using anisotropic epoxy to mount your sockets, Meritec recommends that the lock be in the unlocked position during the heat cycle.

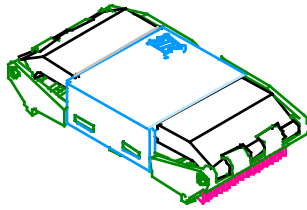
If you are using a pick and place robot equipped with a vision system, you will achieve more accurate contact to pad location if you use features on the socket body as your primary datum. The most natural datum would seem to be a feature on one or more of the contacts, but these contacts are designed to "float" in the body and using them as your datum may add an error to the placement.

We are occasionally asked...Why isn't there a "delta" or "pin #1" mark on the Meritec SOP sockets? The pin #1 marking is purposely omitted from our sockets to allow the PCB designer maximum flexibility in his application. From a PCB assembly perspective, it's best to think of any "pin #1" markings on the PCB as being intended for referencing the SOP package, not the socket.

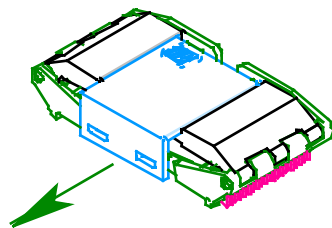
Finally...be mindful that air currents in a typical convection/infrared oven can be strong enough to move the socket off its pads. You may have to employ some means of fixing the socket in place during the heat cycle.

Using Meritec SOP Sockets:

The Meritec SOP Sockets have a positive locking lid design. The lock is attached to the left lid and slides back and forth in a direction parallel to the hinge pins. Your sockets will be shipped in the locked condition.

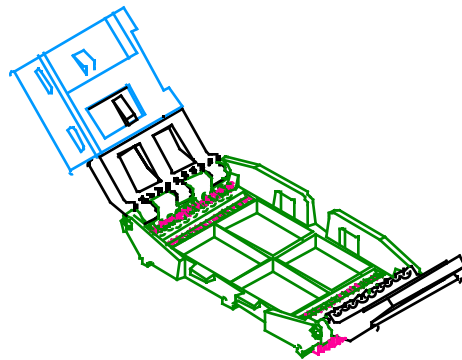


To open them, first slide the lock sideways (approximately 1mm) to the unlocked position.

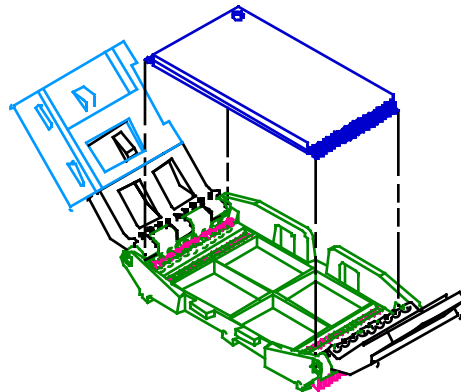


Using Meritec SOP Sockets (continued):

Both lids are now free to be opened by rotating them on their respective hinges.



Place the SOP component into the socket.



The lids must be closed simultaneously to assure proper seating of the SOP component. If this is not observed, the component will shift off center in the socket resulting in an unsatisfactory electrical connection. Now, while maintaining a downward pressure on the lock, slide it sideways to its locked position.

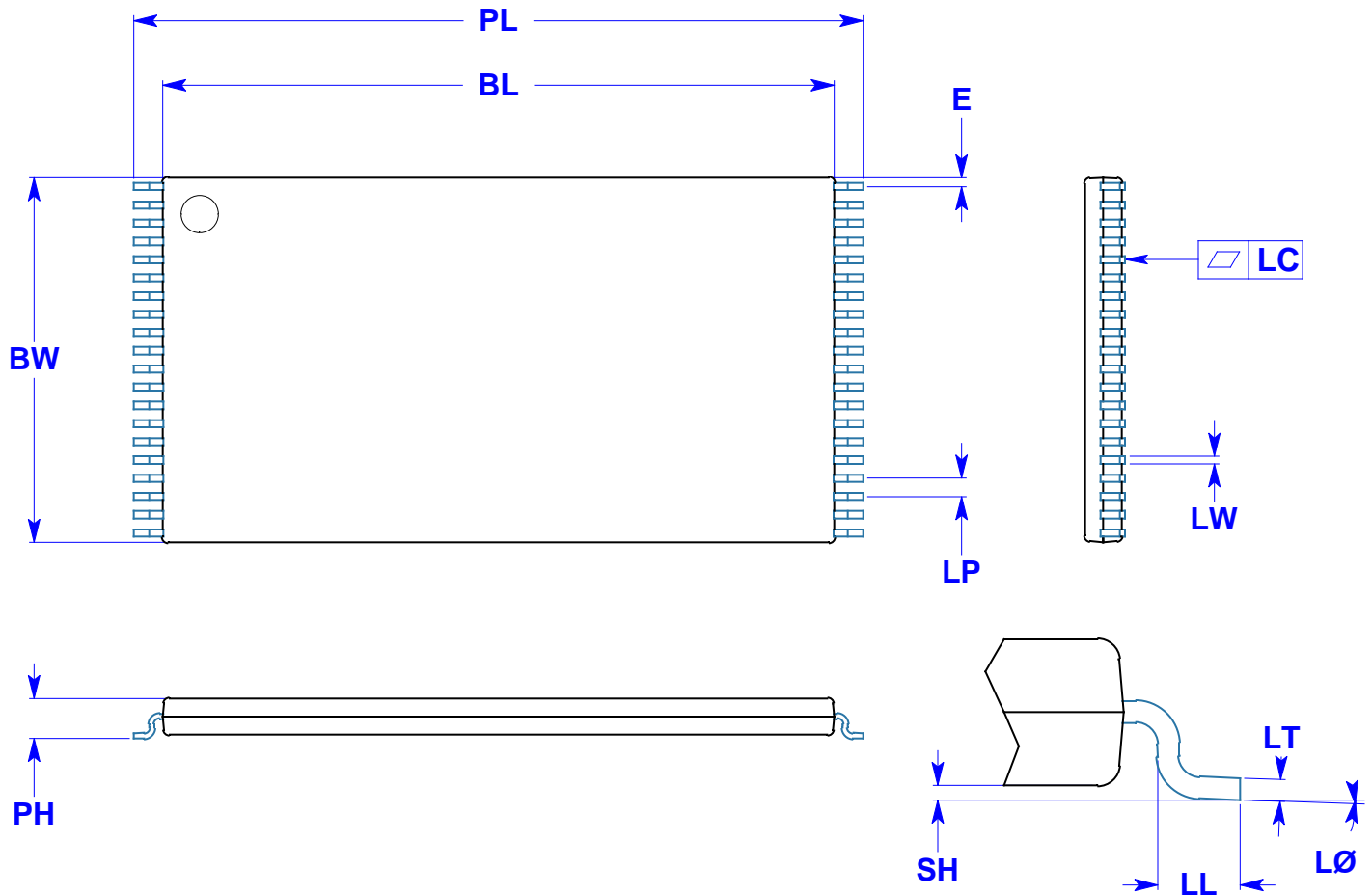
SOP Package Dimensional Limits:

The Meritec socket was designed to accommodate as generously as possible, the full range of dimensions published in the current JEDEC "SOP" specifications. The drawing and table on the next page define the acceptable dimensional limits of "SOP" packages for use with Meritec sockets.

On occasion, you may encounter "SOP" components which are still within JEDEC specs, but fail to make satisfactory connection with the Meritec socket. This is most likely to occur with respect to dimensions "PL" and "LW" in the table below, and is an indicator of marginal component quality.

Fortunately, most component manufacturers embrace quality philosophies (such as Taguchi's) which are more advanced than the "goalpost" thinking of 2 decades ago. So long as your component manufacturer is capable of producing with a Cpk of 1.33 or greater to the JEDEC specifications, you should have good results using the Meritec sockets.

SOP Package Dimensional Limits (continued):



Dimensional Limits of SOP Packages for Mating With Meritec Surface Mount SOP Sockets

DIM	DESCRIPTION	40TSOP		48TSOP		56TSOP		44PSOP		56SSOP	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
PL	Package Length	.777	.795	.777	.795	.777	.795	.620	.637	.620	.637
PL	Package Length (Shifted) *	.786	.795	.786	.795	.786	.795	.628	.637	.628	.637
PH	Package Height	-	.047	-	.047	-	.047	-	.116	-	.073
BL	Body Length	-	.732	-	.732	-	.732	-	.531	-	.531
BW	Body Width	-	.402	-	.481	-	.559	-	1.118	-	.941
SH	Standoff Height	.002	-	.002	-	.002	-	.004	-	.004	-
E	Edge Offset	.006	.014	.006	.014	.006	.014	.026	.034	.037	.045
LP	Lead Pitch	.0197 Nom						.050 Nom		.0315 Nom	
LW	Lead Width	.0065	.0100	.0065	.0100	.0065	.0100	.014	.020	.011	.016
LT	Lead Thickness	.0045	.0075	.0045	.0075	.0045	.0075	.0045	.0075	.0045	.0075
LL	Lead Length	.020	.028	.020	.028	.020	.028	.030	.033	.030	.033
LØ	Lead Angle	0°	5°	0°	5°	0°	5°	0°	8°	0°	6°
LC	Lead Coplanarity	-	.004	-	.004	-	.004	-	.004	-	.004

All Dimensions in Inches

* These are the dimensional limits if the lids of the socket are NOT closed simultaneously and the package is permitted to shift...See text.

We hope that you've benefited from these application tips. If you require further assistance, please contact Meritec at:

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