

Soldering Recommendations for Pressure Sensor Devices

by: Bill McDonald

INTRODUCTION

Pressure sensor devices require the internal cavity containing the silicon transducer to be exposed to ambient in order for the device to function. Exposed cavity packages require special considerations during board assembly to prevent damage to the device during soldering and subsequent cleaning operations.

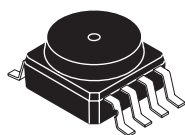


Figure 1. Basic Element

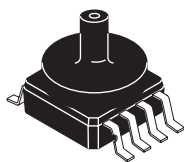


Figure 2. Port Adapter

SURFACE MOUNT COMPONENTS

Components can be mounted using solder paste stencil, screen printed or dispensed onto the PCB pads prior to placement of the component. The volume of solder paste applied to the PCB is normally sufficient to secure the component during transport to the subsequent reflow soldering process. Use of adhesives to secure component is not recommended, but where necessary can be applied providing the vent at the underside of the package does not become blocked. This is applicable only to a gauge pressure sensor device. Absolute pressure sensor devices do not have a backside vent so vent blocking is not an issue.

Solder pastes are available in variety of metal compositions, particle size and flux types. The solder paste consists of metals and flux required for a reliable connection between the component lead and the PCB pad. Flux aids the removal of oxides that may be present on PCB pads and prevents further oxidation from occurring during the solder process.

The use of a No-Clean (NC) flux is recommended for exposed cavity components. Using pressure spray or other methods of cleaning is not recommended. If cleaning of the pcb is performed Water Soluble (WS) flux can be used, but it is recommended the component cavity to be protected by adhesive Kapton tape, vinyl cap or other means prior to the cleaning process to prevent contamination and foreign materials from being introduced into device cavity as result of cleaning processes. Refer to this link for info.

<http://www.stockcap.com/products.asp>

Ultrasonic cleaning is not recommended as the frequencies can damage wire bond interconnections.

Reflow soldering is typically used for surface mount components and accomplished by convection heat from the sides of the reflow furnace utilizing air circulation to produce uniform temperature across the PCB. Hot spots and shielding of the smaller components by adjacent larger components can be minimized thus achieving more reliable solder connection.

THROUGH-HOLE (DIP) STYLE COMPONENTS

Dual in-line and other styles of through-hole components packages are typically wave soldered where the leads protrude through the circuit board and exposed to a flux bath then immersed into molten solder as the board is passed over a solder wave to create the solder connection. In this application the top board surface and component body are not directly exposed to high temperatures.

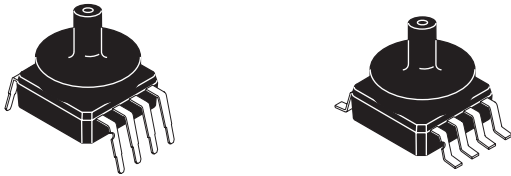
SOLDERING PRECAUTIONS

Wave solder does not typically expose component to excessive temperature, but there may be cases where components are subjected to secondary reflow cycle during double side board assembly.

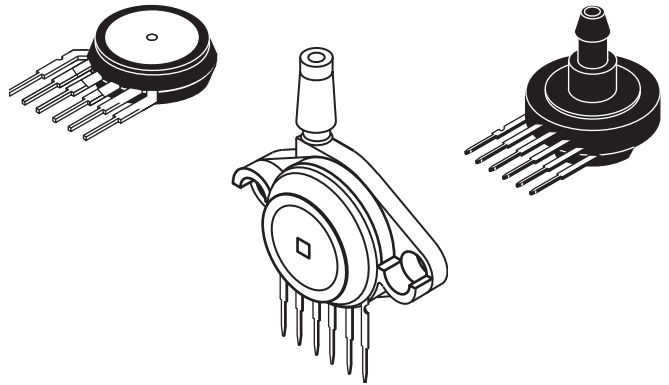
Vapor phase soldering process is not recommended for open cavity devices. There is a potential for liquid to ingress into the cavity or possibility of condensation to form in cavity of the device.

IR reflow is not recommended due to potential damage to plastic features as result of radiation heat transfer.

MPXA, MPXH, MPXM and MPXV series pressure sensors with port adapters should not be exposed to temperatures greater than 245°C. Suffix designations for these devices are; C, AP, DP and GSX.



MPX series pressure sensors with port adapters should not be exposed to temperatures greater than 220°C. The suffix designations for these devices are; AP, GP, DP, AS, GS, ASX or GSX.



Refer to the following table for listing of device types and recommended maximum temperature exposure. The reflow temperature profile for surface mount devices must be in accordance with JEDEC STD. 020. Refer to following link for specific profile details.

<http://www.jedec.org/download/search/jstd020c.pdf>

Devices provided with a mounting bracket for special applications are to be excluded.

REWORK OF SOLDERED COMPONENTS

Rework is not recommended, but should it be necessary, maximum temperature exposure for devices should not exceed the limits shown in Table 1 with minimized duration.

Table 1. Pressure Sensors

Device Number	Suffix Designation	Package	Maximum Temperature °C
MPX	A,D	BASIC ELEMENT	245
	AP	PORT ADAPTER	220
	GP	PORT ADAPTER	220
	DP	PORT ADAPTER	220
	AS	PORT ADAPTER	220
	GS	PORT ADAPTER	220
	ASX	PORT ADAPTER	220
	GSX	PORT ADAPTER	220
MPXA	A	BASIC ELEMENT	245
	C	PORT ADAPTER	245
	GSX	PORT ADAPTER	245
MPXV	G	BASIC ELEMENT	245
	C	PORT ADAPTER	245
	DP	PORT ADAPTER	245
	GP	PORT ADAPTER	245
	GVP	PORT ADAPTER	245
	GSX	PORT ADAPTER	245
MPXH	A	BASIC ELEMENT	250
	C	PORT ADAPTER	250
MPXM	A,D	BASIC ELEMENT	250
	AS,GS	PORT ADAPTER	250

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