Mounting with Solder

Solder mounting has the potential to offer the greatest heat transfer capacity, but can also be the trickiest method of all.

When to Use : When you need minimal outgassing; when the TEC is smaller than 23 mm; when you need a high-strength junction; when the highest thermal conductivity is required.

Procedure:

1. Make sure that the TEC that is to be solder mounted is metallized or pre-tinned. If it is pre-tinned, you must know what the melt temperature of the pre-tinning is. If the TEC is not metallized, i.e., it has a ceramic face, you cannot solder mount this TEC. Call customer service for assistance.

2. Make sure that the surface that the TEC will be solder mounted to is solderable. this means the surface must be either copper, or copper plated, or pre-tinned. The surface must also be flat to within +/- 0.001 inches (+/- 0.025mm) in the area that the TEC is to be solder mounted to. If the surface is not flat enough, it must be machined, ground, or lapped to this level of flatness.

3. Clean the TEC twice with acetone using cotton swabs or other lintless applicator. Use force to reach down into the micro surface scratches and remove any oils and dirt. [Once completed, do NOT touch the cleaned surfaces. Oils from the skin will make a low strength epoxy bond and will also decrease the heat transfer.]

4. Clean the surface that the TEC is to be solder mounted to with acetone 2-3 times using cotton swabs or other lintless applicator. Use force to reach down into the micro surface scratches and remove any oils and dirt. If possible, use an ultrasonic cleaner (do NOT clean TECs in an ultrasonic) to first clean in a mild detergent, rinse, dry, and then again in acetone. Allow all parts to dry completely. [Once completed, do NOT touch the cleaned surfaces. Oils from the skin will make a low strength epoxy bond and will also decrease the heat transfer.]

5. Make note of the TEC's maximum temperature, pre-tinning melt temperature (if any), and the melt temperature of the solder you will use to mount with. You must have a hot-plate or other similar device that can be accurately controlled with a temperature setpoint. The main objective is to raise the temperature of the assembly to just above the mounting solder melt point, but stay below the TEC's maximum temperature.

6. Lightly and evenly flux the surface and the metallized surface of the TEC with the appropriate flux for the solder you are using.

7a. (*For a pre-tinned TEC or surface*) Place the cold plate or heat sink (to be soldered to) on the hot plate previously heated to the appropriate temperature. Place the TEC tinned side down onto the surface and in the correct and desired final position. Allow several minutes for the surface to reach full temperature. As a test, use a small (.125") piece of solder wire as a "witness" by placing it on the surface (but not on the mounting area) and waiting until it melts and beads up. Once the "witness" has melted, you should see that the pre-tinning on the TEC or surface has melted and is being squeezed out on the sides of the TEC. Position TEC correctly and then turn the hot plate off and allow to cool slowly. Do NOT rapidly cool the assembly.

7b. (*Soldering Iron method for tinning non-tinned TEC)* With a soldering iron and a new tip, pre-tin the TEC using solder with a melt point below that of the maximum TEC temp. Brighten the metallization on the TEC with 600 grit sandpaper to remove any oxides. Lightly flux with a general purpose Acid Flux. Use small amounts. Melt solder onto the iron tip and then apply iron to TEC and hold. Once you see the solder wet to the TEC, proceed with a swirling motion of the iron tip on the TEC, therby spreading the solder tinning evenly onto the TEC. You can heat the soldering iron to a maximum of 20-30°C above the melt point of the tinning solder, but extreme care must be taken since many TEC's are constructed with 138°C (min.) solder.
CAUTION: Do not mix solders. Use a separate soldering iron tip for each solder.

7c. (*For a non-tinned TEC or surface*) Place the cold plate or heat sink (to be soldered to) on the hot plate previously heated to the appropriate temperature. Also place the TEC onto the hot plate or surface, but not on the area to be mounted to. Allow several minutes for the surface and TEC to reach full temperature. As a test, use a small (.125") piece of solder wire as a "witness" by placing it on the surface (but not on the mounting area) and waiting until it melts and beads up. Once the "witness" has melted, apply solder to the mounting area to cover the mounting area as evenly as possible without creating a large pool of solder. Using tweezers or pliers, pick up the TEC and place it onto the solder. Molten solder should squeeze out around the sides of the TEC. Position TEC correctly and then turn the hot

plate off and allow to cool slowly. Do NOT rapidly cool the assembly.

8. After assembly has cooled, wash area with appropriate flux remover.

General guidelines:

1. There should be a minimum of at least 20°C between melt points used on a single assembly. It is preferred that the "steps" be 40°C to 50°C, but this is not always possible.

2. Set hot plates or soldering iron to 20-40°C above the melt point of solder being used, but make sure that this setpoint is still below the melt point of the TEC or other solder melt point used in the assembly.

3. Do not allow flux to "burn" or sit too long at an elevated temperature. Timing is crucial. Heat, apply solder, assemble, and cool as quickly as possible.

4. If solder, pre-tinning, or copper surface appears tarnished or dull, then it is likely oxidized. Remove oxidation from solder or pre-tinning with a course paper towel until it brightens. Remove copper oxidation with a LIGHT buffing with 600 or higher grit sandpaper or very fine steel wool. Re-clean parts as necessary.

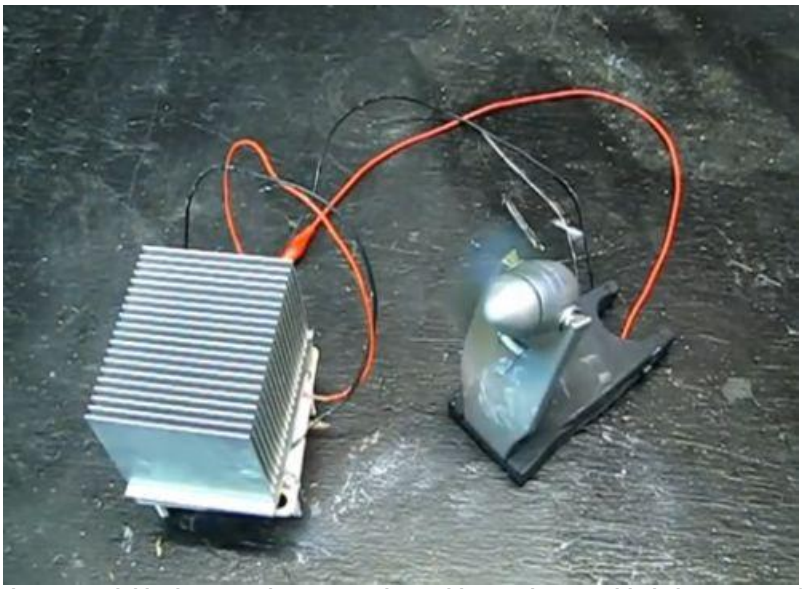
To glue Peltzier to heatsink use:

Thermal Adhesive Glue

Arctic Silver Thermal Adhesive

Many thermal glues can be found starting at $3.00 at this source:

http://www.newegg.com/Thermal-Compound-Grease/SubCategory/ID-85?Order=PRICE



The peltizer used to turn the fan in the image on the left is

TEC1-12703

Available on Amazon between $5 and $10 – As low as $2.50 from a reputable supplier from China.

LxBxH = 40x40x4,9mm

Heatsink Guidelines:

Construction and materials[edit]

A heat sink usually consists of a base with one or more flat surfaces and an array of comb or fin-like protrusions to increase the heat sink's surface area contacting the air, and thus increasing the heat dissipation rate. While a heat sink is a static object, a fan often aids a heat sink by providing increased airflow over the heat sink — thus maintaining a larger temperature gradient by replacing the warmed air more quickly than passive convection achieves alone — this is known as a forced-air system.

Ideally, heat sinks are made from a good thermal conductor such as silver, gold, copper, or aluminum alloy. Copper and aluminum are among the most-frequently used materials for this purpose within electronic devices. Copper (401 W/(m·K) at 300 K) is significantly more expensive than aluminum (237 W/(m·K) at 300 K) but is also roughly twice as efficient as a thermal conductor. Aluminum has the significant advantage that it can be easily formed by extrusion, thus making complex cross-sections possible. Aluminum is also much lighter than copper, offering less mechanical stress on delicate electronic components. Some heat sinks made from aluminum have a copper core as a trade off. The heat sink's contact surface (the base) must be flat and smooth to ensure the best thermal contact with the object needing cooling. Frequently a thermally conductive grease is used to ensure optimal thermal contact; such compounds often contain colloidal silver. Further, a clamping mechanism, screws, or thermal adhesive hold the heat sink tightly onto the component, but specifically without pressure that would crush the component

Craigslist has heat sinks for sale - especially in beaverton area

---

The Peltizer used to drive a fan is : Tec1-07110T200 TEC1-12706 Thermoelectric Peltier Cooler 12 Volt 92 Watt

This is readily available and for under $5.00 or even $1.00 from Chinese supplier.

Motor used is: Mabuchi RF-500TB-12560 1.5 to 12 VDC - Solar Motor - Recommended operating voltage range 1.5VDC to 12VDC

SOLAR MOTORS MAY WORK BEST WITH PELTZIERS

Heavy Duty Heatsinks:

I found a 40x40mm TEG that produce 5.9W (4.2V/1.4A) at 180ºC difference. It has a maximum operating temp of 350ºC (180ºC cold side), that should be enough. This Peltizer number is: TEP1-1264-1.5. It can be bought for $10 from:
http://www.sitechina.com/thermoelectric/Price.html

Peltizer driving by hand energy and joule theif:

http://www.youtube.com/watch?v=B_w5z8WY1pQ

The LTC®3108-1 is a highly integrated DC/DC converter ideal for harvesting and managing surplus energy from extremely low input voltage sources such as TEGs (thermoelectric generators), thermopiles and small solar cells. The step-up topology operates from input voltages as low as 20mV.

Using a small step-up transformer, the LTC3108-1 provides a complete power management solution for wireless sensing and data acquisition. The 2.2V LDO powers an external microprocessor, while the main output is programmed to one of four fixed voltages to power a wireless transmitter or sensors. The power good indicator signals that the main output voltage is within regulation. A second output can be enabled by the host. A storage capacitor provides power when the input voltage source is unavailable. Extremely low quiescent current and high efficiency design ensure the fastest possible charge times of the output reservoir capacitor. The LTC3108-1 is functionally equivalent to the LTC3108 except for its unique fixed V_{OUT} options.

Abstract: , supercapacitor or rechargeable battery, using energy harvested from a Peltier or photovoltaic cell. 31081f , a Peltier Cell THERMOELECTRIC GENERATOR + 220µF C1 VSTORE + 100 PGOOD PGD , available for a burst. Peltier Cell (Thermoelectric Generator) A Peltier cell (also known as a , parallel ceramic plates. Although Peltier cells are often used as coolers by applying a DC voltage to , Sources The LTC3108-1 LTC3108-1 can operate from a number of low input voltage sources, such as Peltier cells ...