

ANN-8803 REV D.

## RECOMMENDED SOLDERING TECHNIQUES

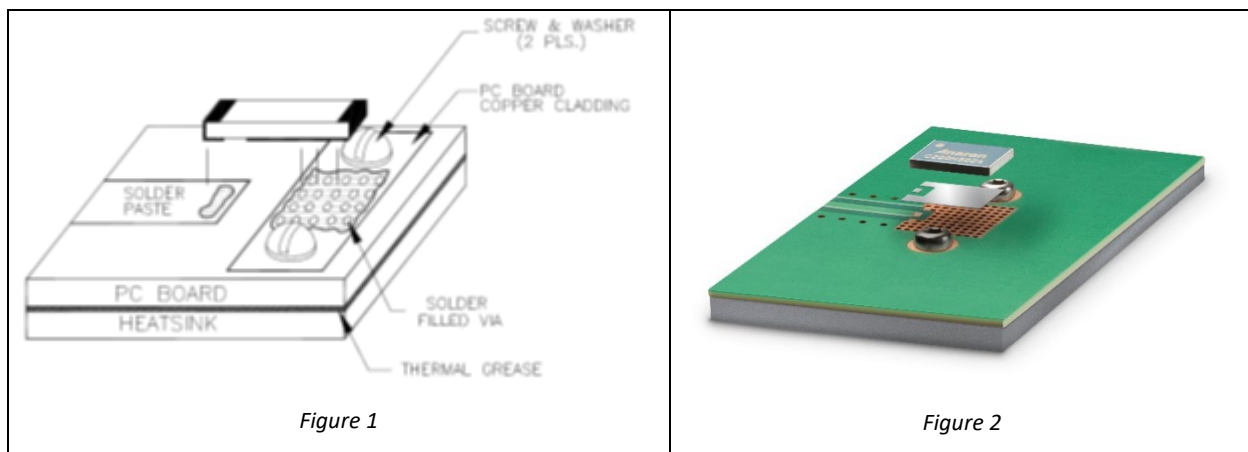
When attaching TTM Wireless SMD, chip, flangeless, and flanged resistive products, a good solder joint is critical in achieving maximum performance out of the chip. All TTM Wireless resistive products have a matte tin outside finish to achieve good solderability and RoHS compliancy. TTM Wireless resistive products are designed to be soldered in accordance with the IPC-A-610 standard.

### SMD MOUNTING CONSIDERATIONS

Adequate cooling is a concern for all surface mountable components in power handling conditions. To achieve optimum power handling and RF performance of TTM Wireless resistive products, the following items are recommended:

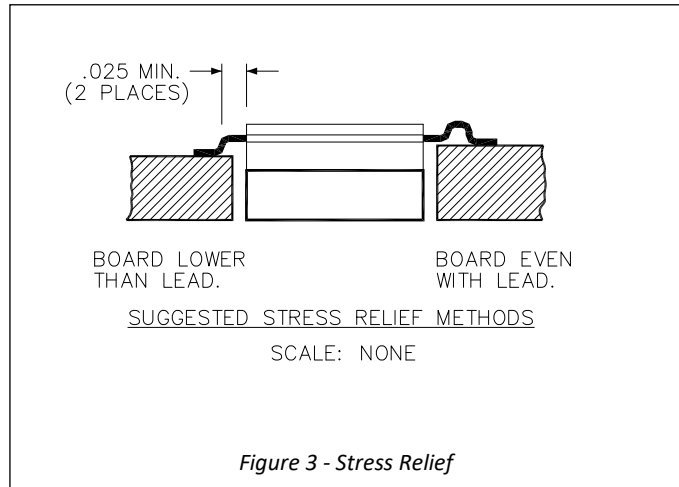
1. Maximize thermal vias around the perimeter of the chip.
2. Maximize the number of thermal vias under the device without compromising the solder joint.
3. Use heavy copper cladding on the circuit board as a heat spreader.
4. Mounting footprint for the chip should have PCB pad sizes at least 0.25mm larger than the pads on the chip for acceptable solder fillets.
5. Two screws as close to the device as possible to maximize heat transfer.

The recommended surface mount layout for a SMD resistive component is shown in Figure 1, and Figure 2.



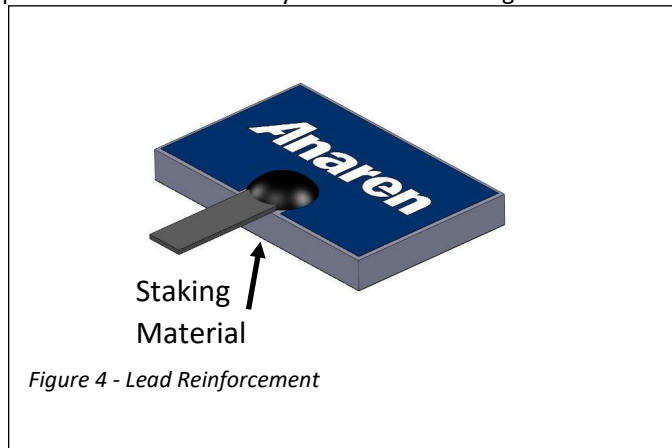
## HEAT SINK MOUNTING CONSIDERATIONS

All chip, flangeless and flanged components must have adequate stress relief between the customer interface and the input tab on the chip component. The stress relief is typically an omega shaped bend in the input tab or a change in elevation between lead exit height and PCB mounting interface. TTM Wireless does not recommend using its heat sink mounted resistive products without acceptable stress relief. The stress relief is critical in achieving a reliable design that will handle the expansion and contraction of the PCB it is attached to. Two different acceptable methods of stress relief are shown in Figure 3.



## TAB ATTACHMENT

Flangeless and Flanged components come with a lead attached to the input pad of the device. The tab is made of pure silver for solderability and ease of forming. Stand alone chips need a tab attached to the input pad on the device.



This can be done by soldering the tab to the top pad using solder wire or solder paste. Another method of attachment is using a parallel gap welder to spot weld the lead to the top pad. The tab should be in direct contact with the pad on the device and no more than 0.13mm thick. It should also be at least .25mm narrower than the width of the top pad on the device. This allows room for a good solder fillet between the tab and the top pad. It is not recommended to have the tab encased in the solder. After attaching the tab to the top pad on the resistive device, a staking material should be used to cover the pad area to

increase the strength of the joint between the tab and the top pad of the device (Figure 4).

## SOLDER

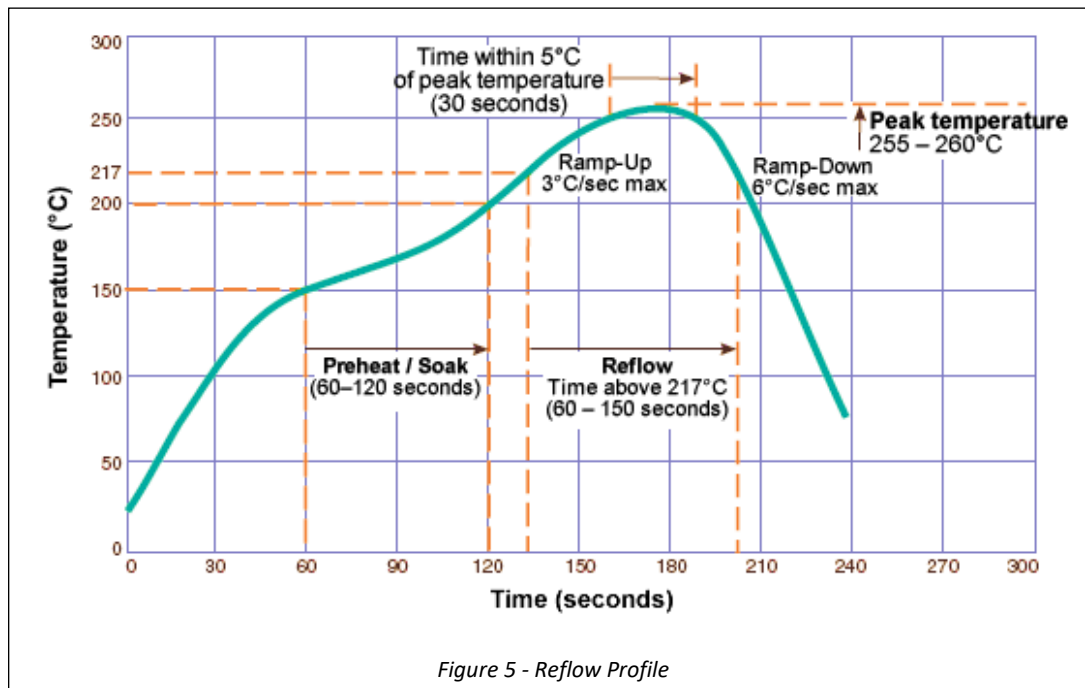
All conventional solder paste formulations including no clean and water soluble fluxes are compatible with TTM Wireless resistive components. When laying out the solder pattern for the component, a 0.075mm - 0.13mm solder joint under the device is preferred after reflow. Using the correct solder/flux formulation should result in solder voiding under the chip of no more than 30%.

## SOLDER JOINT QUALITY

All of the power dissipated in the SMD component must pass through solder before reaching the heat sink. A poor quality solder joint could reduce the power handling capability of the part. It is important to maintain solder joints that are 0.002" to 0.003" in height and have 20% or lower, void percentage.

## REFLOW

TTM Wireless chip components can be reflowed in a number of ways. The most common methods of reflow are by hot plate or convection reflow oven. If a hot plate is used the plate should be set to 20°C-50°C above the reflow temperature of the solder being used. The hot plate temperature should not exceed 320°C or reliability and RF performance issues could degrade. A typical lead free reflow profile is shown in Figure 5. This is only a guideline and actual zone temperatures are determined by the actual application. Consult the solder paste and flux manufacturer's data sheets for more accurate information.



## MOUNTING RECOMMENDATIONS

Component	Solder	Recommended Solder	Recommended Flux
SMD	Paste	Indium 8.9	No additional flux needed
Flanged	Wire	Core 230 wire .020"	Tacflux 18
Flangeless	Paste/preform	Indium 8.9 or SAC305 preform	2% NC-9 flux coated preform
Chip	Paste/preform	Indium 8.9 or SAC305 preform	2% NC-9 flux coated preform

Note: The products above have been tested by TTM Wireless with successful results.