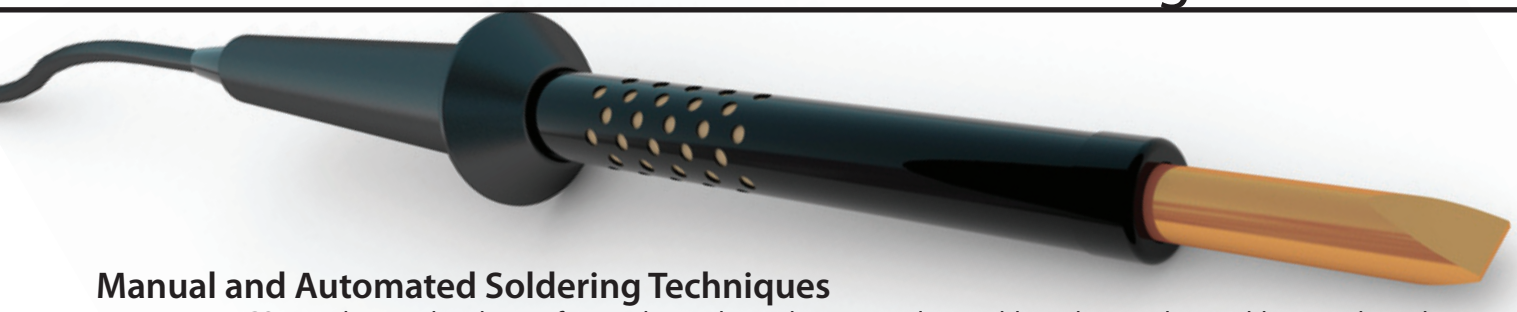
Soldering Instructions



Manual and Automated Soldering Techniques

Micronetics VCOs are designed and manufactured to withstand automated assembly and manual assembly procedures, however care should be taken to avoid reflow within the component during the installation process. The following guide details suggested installation procedures for Micronetics VCOs.

Our VCOs are assembled using an SN96 solder alloy (melting temperature of 225°C) and so consideration should be taken in soldering iron temperature, IR or convection reflow profiles.

- Final assembly substrate should be a smooth, clean, flat area free of deformity and residue.
- Solder Masks should not be used, as it may degrade performance
- FR-4 VCO substrate should be soldered to final assembly with similar thermal characteristics to avoid mechanical damage.

Manual Assembly

Soldering Iron Selection:

Soldering iron tips should be of appropriate size and shape so as to allow ease of soldering and control without damaging the VCO, connections or surrounding areas.

Due to a difference in connection point surface area for ground area as compared to RF OUT, VCC and VT solder points; we highly recommend selecting a separate soldering iron or soldering iron tip to accommodate the ground connections.

Surface Mount VCO (SMT) Installation:

1. Ensure VCO is flat against substrate and press firmly to avoid mechanical stress during installation.
2. Solder all radial ground connections around VCO periphery using SN63 rosin core solder. Ensure all ground connections are soldered for proper RF grounding.
3. Solder remaining connections, carefully avoid excess solder use.
4. Inspect all solder points to ensure high quality connections.
5. (Optional) for additional grounding, copper tap or braid may be used to provide ground from VCO's metal cover to surrounding ground areas.*

   *Micronetics strongly recommends against the use of a solder fillet from VCO cover to ground as the excess heat may cause internal reflow and/or cover shift, damaging the component.

Pin Mount VCO Installation:

1. Ensure VCO is flat against substrate and press firmly to avoid mechanical stress during installation.
2. Trim contacts to appropriate length.
3. If available, solder all radial ground connections around VCO periphery using SN63 rosin core solder. VCO should be flat against substrate.
4. Solder the VCO pins, taking care not to overheat the pin, which may cause upward movement into the VCO.*
5. Inspect all solder points to ensure high quality connections. VCO should be flat against substrate.
6. (Optional) for additional grounding, copper tap or braid may be used to provide ground from VCO's metal cover to surrounding ground areas.*
   *Micronetics strongly recommends against the use of a solder fillet from VCO cover to ground as the excess heat may cause internal reflow and/or cover shift, damaging the component.

Soldering Instructions

IR/Forced Convection Reflow:

- •Solder stencils may be used to dispense solder around outer edge of VCO.
- •Do NOT apply solder paste to center of mounting area, as wicking/spreading may cause electrical shorts and damage/difficulty should VCO need to be replaced at a later time.
- •Select installation profile appropriate for final assembly.

Micronetics provides suggested reflow profiles for our VCOs. The below profiles are suggest profiles based on our VCOs, and may not be suitable for your final assembly. Ensure that the reflow profile you choose is suitable for all components in your assembly to avoid damage.

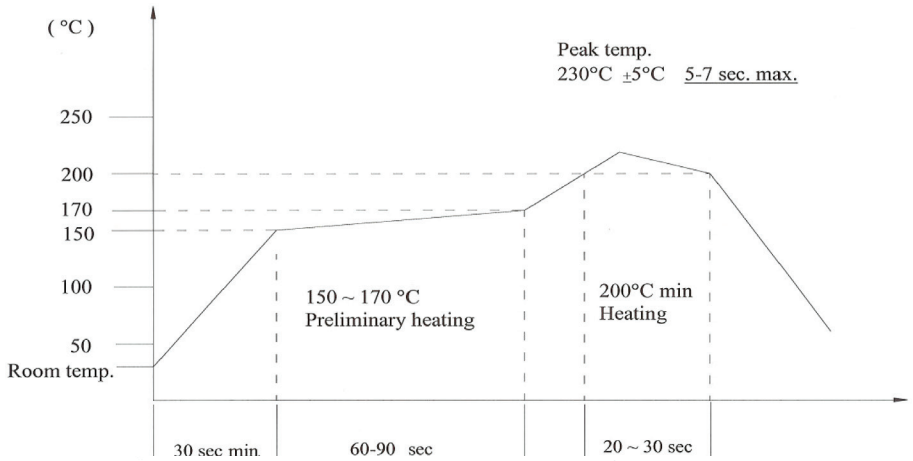
Recommended Reflow Profiles:

For Standard (Non-RoHS) devices:

Raise temperature to 150°C for preliminary heating over 30 seconds or longer

1. Preliminary heating at 160°C ±10° for 60 to 90 seconds
2. Heat at 215°C to 220°C for 20 to 30 seconds

- Peak temperature is 230°C 5 to 7 seconds maximum

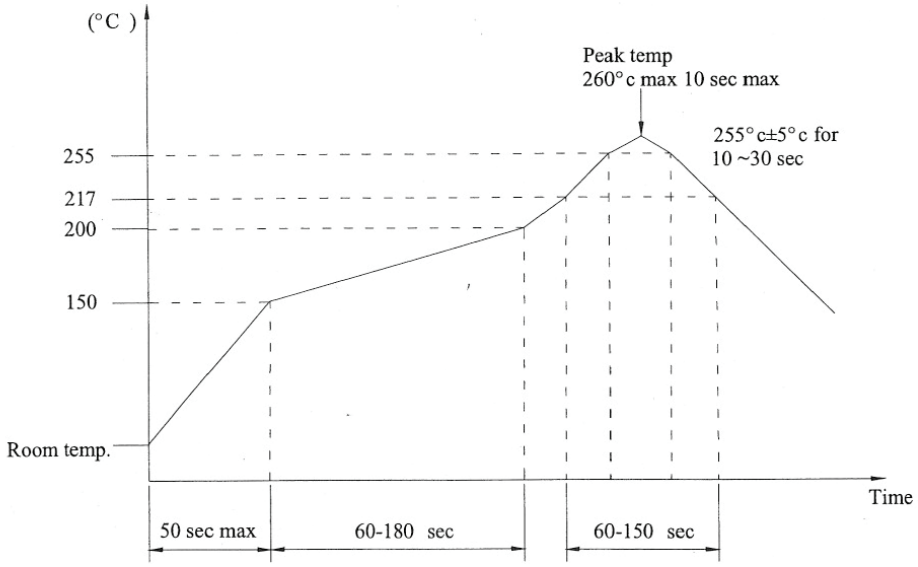


For Standard (Non-RoHS) devices:

Raise temperature to 150°C for preliminary heating over 30 seconds (50 seconds max)

1. Preliminary heating at 175°C ±25° for 60 to 180 seconds
2. Heat at 217°C to 255°C for 60 to 150 seconds

- Peak temperature is 260°C 10 seconds maximum
- One reflow cycle permissible. Max 3 reflow cycles.



Soldering Instructions

Solvents and Cleaning

Choose solvents or aqueous cleaners to remove both ionic and nonionic contamination. Avoid Trichlorethylene and similar solvents as some components within the VCO are encased in plastic, and can be damaged by certain solvents.
The use of immersion, vapor and ultrasonic cleaning methods may all be used without damaging the device.
Most surface and pin mount devices contain clots to allot solvents and cleaners to flow easily through the device. Remaining cleaners or solvents may remain trapped in or stuck onto the device. This can easily be baked away from the assembly at +85°C. This step is recommended regardless of visible evidence of stuck solvent/cleaner to prevent internal contamination and/or operating difficulties. Remaining liquid cleaning solvents may lead to low power output or erratic behavior.

Removing VCO from assembly

An experience technician should verify device failure prior to removal. Heat required for removal may cause damage to internal circuitry.

Removal of Leaded Devices

1. Select Soldering Iron Tip. Soldering iron tips should be of appropriate size and shape so as to allow ease of soldering and control without damaging connections or surrounding areas.
2. Heat leads and wick solder away using braid or vacuum.
3. Ensure all leads are free from holes.
4. Gently remove VCO from board.

Removal of Surface Mount Devices

Surface mount devices are considerably more difficult than pin mount devices, and removal should only be attempted by an experienced, trained technician.

The following heat gun approach is only a suggestion, but is no substitute for an experienced technician.

Heatgun SMT Device Removal

1. Secure assembly in a vice.
2. Use a heat gun with a reducer, heat the area of a solder point opposite mounting side for approximately 1 minute.
3. Using desolder braid, wick as much solder as possible away from the contact points.
4. Gently pull on the device to see if it can be safely removed from board. If the device is still secure, continue heat and wick process and attempt removal again.

Although Micronetics VCOs are designed and manufactured to withstand automated assembly and manual assembly procedures, care should be taken to avoid reflow within the component during the installation process. With your careful installation of our high quality products, we're confident our VCOs are the right fit for your final assembly.