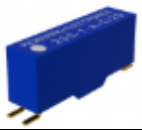
Pickering Electronics Limited
Stephenson Road
Gorse Lane Industrial Estate
Clacton-on-Sea
Essex
CO15 4NL

Pickering Electronics

GUIDELINES FOR SOLDERING PICKERING RELAYS

Soldering Method	**Manual**	**PTH Wave-solder**	**SMT Reflow**	**SMT Vapor Base**
Package / Footprint	SILs		SMD's	
				
Recommended peak temp.	340°C /3 secs	265°C /10 secs	250°C /30 secs	240°C /30 secs
Typical Profile		see graph 1	see graph 2	see graph 3

Notes:

Temperatures are based on using a lead-free (SAC) alloy.

Solder wetting is affected by many factors such as storage conditions, handling; choice of alloy, equipment, ventilation, the board thermal mass and AQL (ref IPC-A-610 class 1,2 or 3)

We recommend the customer performs appropriate tests to verify their suitability any application.

Hand Solder Special Instructions:

The tip should be set to the minimum temperature required to produce a consistent solder joint.

It should first be accurately measured using calibrated equipment (traceable to National and International standards) to determine whether there is an offset. We recommend any offset is adjusted out by recalibrating the solder iron because offset may not be linear across the temperature range.

It may be possible to solder at a lower temperature than indicated and this should always be the aim of an assembler soldering any type of component. Lower temperatures reduce heat stresses and the possibility of flux within the solder wire being burnt off too quickly which can create dry joints. Lower temperatures will also help to maximize the tip life.

The solder alloy and tip size will also have an influence. We always recommend using as large a tip size as possible because this improves the contact. It will also have a better heat mass which means its temperature is less likely to reduce as contact is made with the component lead and printed circuit board (pcb).

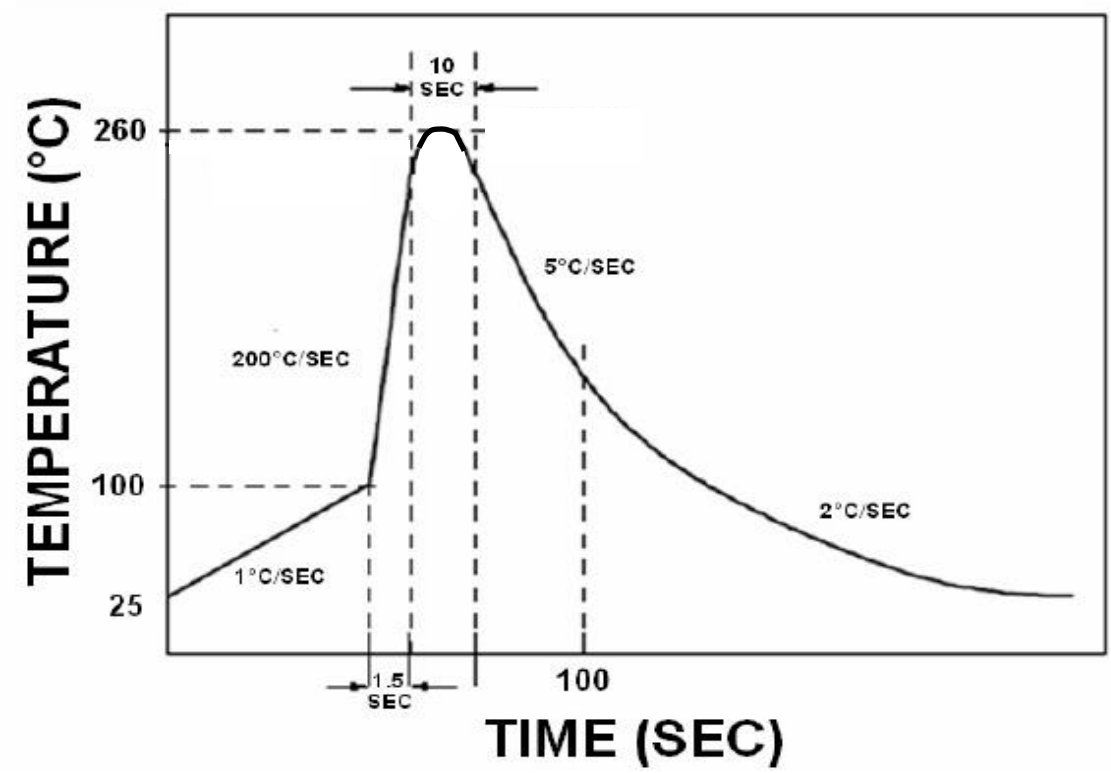
The pcb will also act as a thermal mass. Single layer boards can generally be soldered at a lower temperature than multi-layer boards or those with extensive grounding.

We recognise there may be other components on pcb that require a higher temperature and/or different tip etc. It may seem possible to find a set up that works for all components, but this can lead to stresses on the most sensitive components. A common mistake is to set an iron at its maximum temperature.

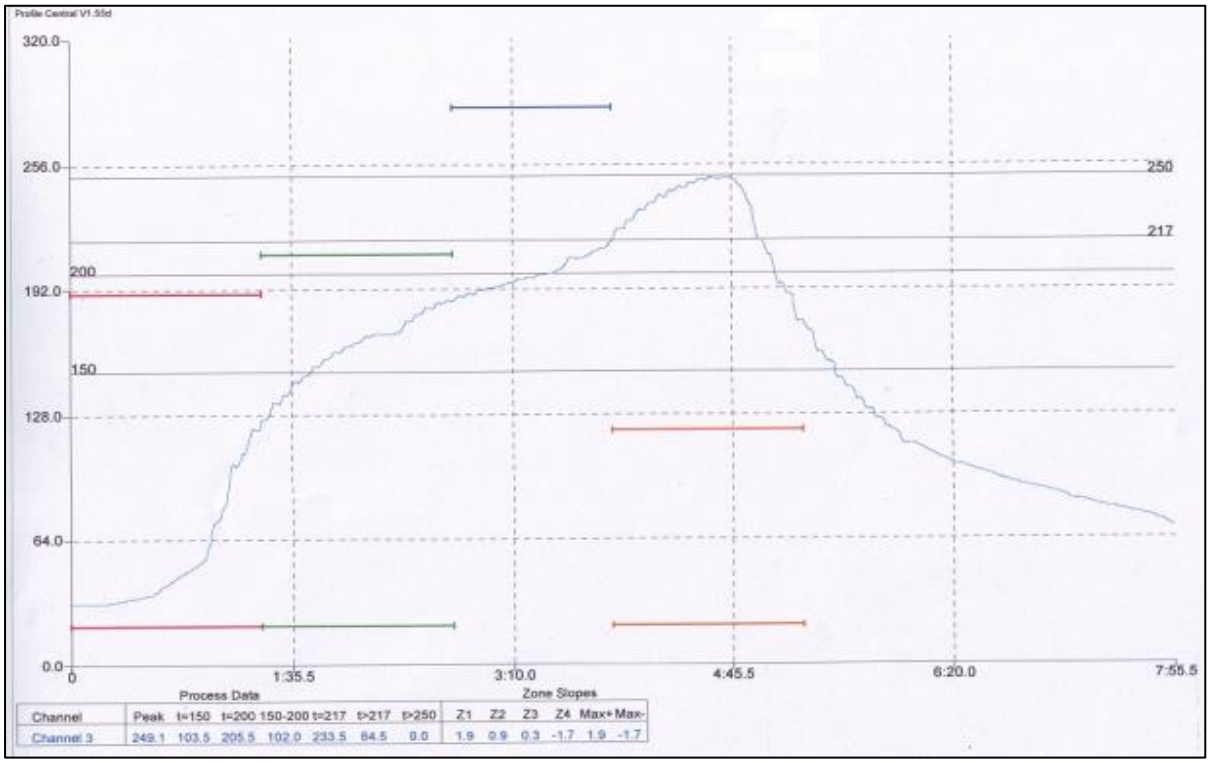
In summary, incorrect calibration, tip degradation, insufficient tip contact time / position and thermal mass can mistakenly be overcome by increasing the temperature. Too hot can be as bad as too cold.!!!

Optimizing the tip size to take into the above variables will usually mean it's possible to use much lower tip temperature.

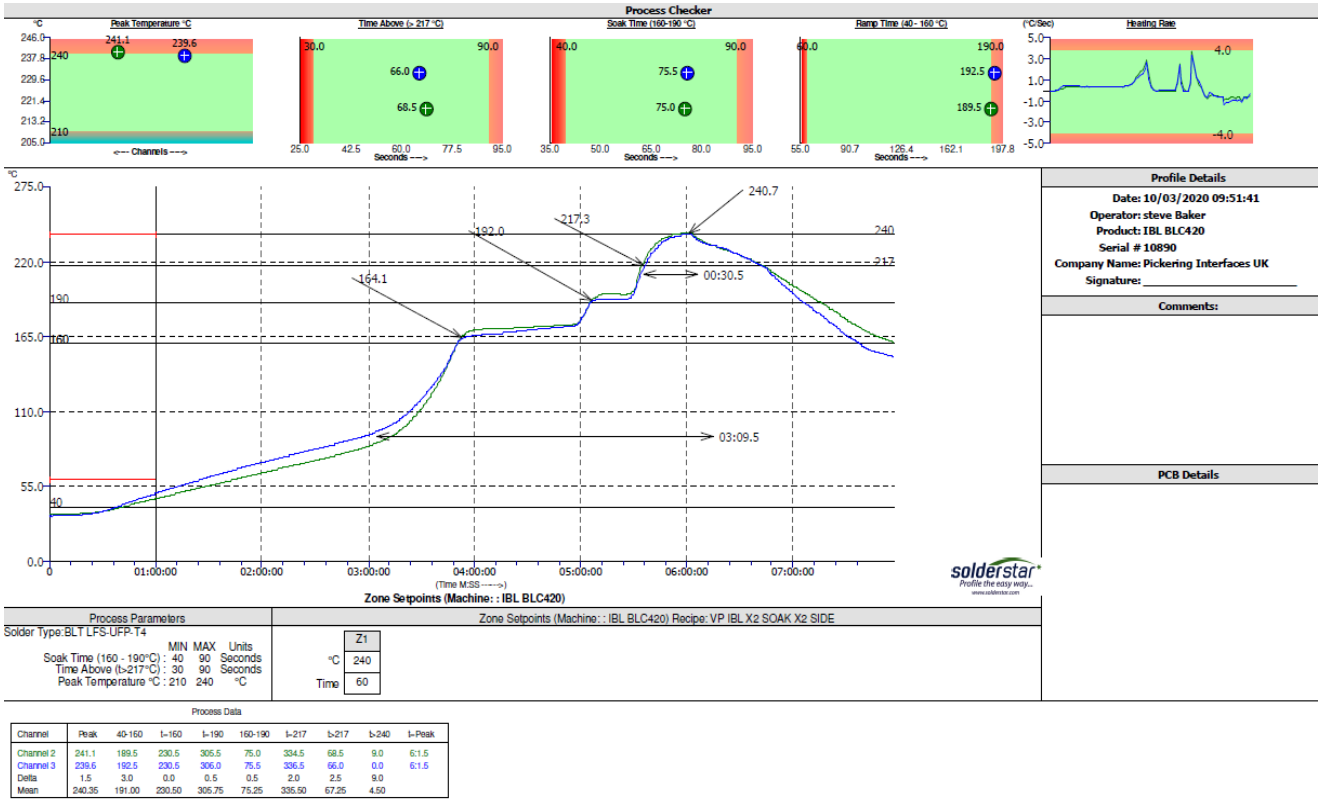
Graph 1: Typical (lead free) Wave-solder Profile



Graph 2: Typical (lead-free) SMT Reflow Profile



Graph 3: Typical (lead free) Vapour Phase Profile



Use of Sockets Advisory:

Pickering is aware some customers may choose to use sockets for serviceability however it should be noted inserting relays into sockets does bring risks.

Due to the tolerances of relays pins and the sockets there is a possibility of a mismatch with respect to the pitch. In addition, if a relay is not inserted extremely carefully this can lead to excess forces being induced into the switch.

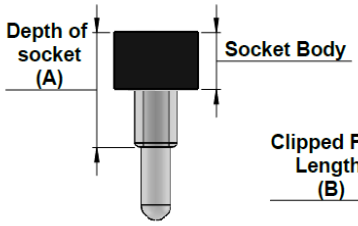
The package stand-off is designed to ensure there is a gap between the underside of the relay package and pcb. This aids the formation of solder fillets around pins on the component / top side of a pcb.

The package stand-off also ensures excess pressure is not applied from the top of the package as it is inserted into a pcb (if a SIL) or when placed onto a pcb (if a SMD).

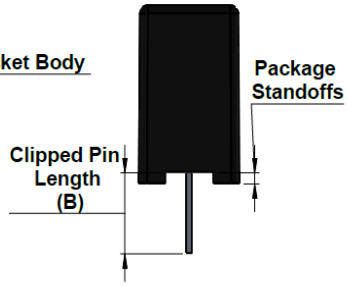
The switch blades of a reed relay are encapsulated in a very fragile glass sealed capsule to maximise its performance and long-term reliability. Any excess pressure being induced into the switch via the package or pins could compromise the integrity of the glass and thus affect the working life of a relay.

Pickering relays have only been designed for soldering. If a customer wishes to use a socket, Pickering may be able to offer a non-standard clip length to accommodate the depth of the socket. See diagrams below for an explanation.

Socket Example



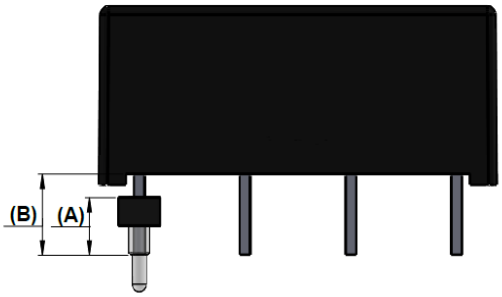
Clipped Pins



If sockets are used the package standoffs may not perform as intended. The standoffs may not make contact with any surface.

Refer to the **Socket Awareness** and **Improved Socket Application** sections for more detail.

Socket Awareness



If **depth of socket (A)** is smaller than **clipped pin length (B)** then the socket depth is insufficent. This will allow the relay pins to "bottom out".

This means the pins will make contact with the bottom of the holes within the socket. If any further force is applied this will lead to stress being induced into the switch.

Recommended PCB Application (B) Clipped Pin Length is not critical.

Relay pins are inserted into PCB through holes.
The standoffs make contact with the PCB.
No further force (downward pressure) is applied to the pins.

Improved Socket Application

NB (1) Depth of socket (A) must be greater than **clipped pin length (B).**
NB (2) The socket shall be wider and longer than the relay footprint.

This reduce stress being applied into the switch; the pins do not make contact with the bottom of the holes within the socket as the standoffs are utilised.