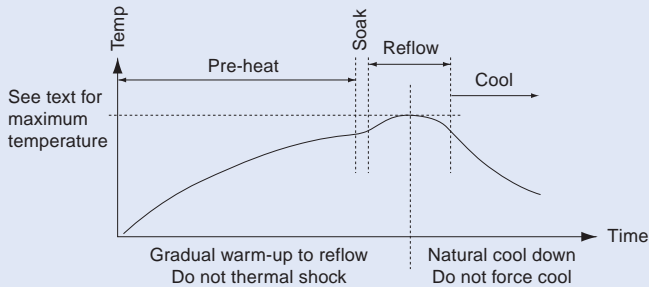


Feedthrough EMI Filters

Technical Summary

INSTALLATION OF SOLDER MOUNT FILTERS, PANEL MOUNT AND SURFACE MOUNT

Recommended Soldering Profile



Soldering of filters

The soldering process should be controlled such that the filter does not experience any thermal shocks which may induce thermal cracks in the ceramic dielectric.

The pre-heat temperature rise of the filter should be kept to around 2°C per second. In practice successful temperature rises tend to be in the region of 1.5°C to 4°C per second dependent upon substrate and components.

The introduction of a soak after pre-heat can be useful as it allows temperature uniformity to be established across the substrate thus preventing substrate warping. The magnitude or direction of any warping may change on cooling imposing damaging stresses upon the filter.

INSTALLATION OF SCREW MOUNT FILTERS

General

The ceramic capacitor, which is the heart of the filter, can be damaged by thermal and mechanical shock, as well as by over-voltage. Care should be taken to minimise the risk of stress when mounting the filter to a panel and when soldering wire to the filter terminations.

Mounting to chassis

Mounting torque - It is important to mount the filter to the bulkhead or panel using the recommended mounting torque, otherwise damage may be caused to the capacitor due to distortion of the case. When a threaded hole is to be utilised, the maximum mounting torque should be 50% of the specified figure which relates to unthreaded holes.

Tools - Hexagonal devices should be assembled using a suitable socket. Round bodied filters may be fitted to the panel in one of two ways (and should not be fitted using pliers or other similar tools which may damage them):

- ~ Round bodies with slotted tops are designed to be screwed in using a simple purpose-designed tool.
- ~ Round bodies without slotted tops are intended to be inserted into slotted holes and retained with a nut.

Grounding - To ensure the proper operation of the filters, the filter body should be adequately grounded to the panel to allow an effective path for the interference. The use of locking adhesives is not recommended, but if used should be applied after the filter has been fitted.

For SBSG, SBSM and SFSS ranges, solder time should be minimised, and the temperature controlled to a maximum of 220°C. For SFSR, SFST and SFSU ranges the maximum temperature is 250°C. E01, E03, E07 SBSP ranges are compatible with all standard solder types including lead-free.

Cooling to ambient temperature should be allowed to occur naturally. Natural cooling allows a gradual relaxation of thermal mismatch stresses in the solder joints. Draughts should be avoided. Forced air cooling can induce thermal breakage, and cleaning with cold fluids immediately after a soldering process may result in cracked filters.

Note: FlexiCap™ terminations can be processed in the same way as standard types.

Note: All 100% matte tin plated parts are annealed after plating for 3 hours min. at 150°C to inhibit tin whisker growth.

Soldering to axial wire leads

Soldering temperature - The tip temperature of the iron should not exceed 300°C.

Dwell time - Dwell time should be 3-5 seconds maximum to minimise the risk of cracking the capacitor due to thermal shock.

Heat sink - Where possible, a heat sink should be used between the solder joint and the body, especially if longer dwell times are required.

Bending or cropping of wire leads

Bending or cropping of the filter terminations should not be carried out within 4mm (0.157") of the epoxy encapsulation, and the wire should be supported when cropping.

Minimum plate thickness - Users should be aware that the filters in this catalogue have an undercut between the thread and the mounting flange of the body, equal to 1.5 x the pitch of the thread. Mounting into a panel thinner than this undercut length may result in problems with thread mating and filter position. It is recommended that a panel thicker than this undercut length be used wherever possible.

Maximum plate thickness - This is specified for each filter in order that the nut can be fully engaged even when using a washer.

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Dwell time - Dwell time should be 3-5 seconds maximum to minimise the risk of cracking the capacitor due to thermal shock.

Heat sink - Where possible, a heat sink should be used between the solder joint and the body, especially if longer dwell times are required.

Bending or cropping of wire leads

Bending or cropping of the filter terminations should not be carried out within 4mm (0.157") of the epoxy encapsulation, and the wire should be supported when cropping.