

## APPLICATION NOTES

## Quartz Based Frequency Products Shelf Life

There is a growing trend amongst a significant minority of quality departments, including some distributors, which will not accept quartz based frequency products that are over two years old, despite there being no technical justification for this.

This issue is important because exaggerated date code policies damage competitiveness at a time when, perhaps as always, businesses are under pressure to minimise costs without compromising quality. If component manufacturers have to scrap parts as soon as they are more than 2 years old, it creates unnecessary waste which is environmentally irresponsible and ultimately adds cost which is passed on to customers. It may also mean that inventory is not available at the time it is needed, leading to manufacturing delays, which adds further cost and inconvenience.

The issue is not entirely a new one. Back in 2002, Electronic Components Industry Association (ECIA) formerly known as National Electronic Distributors Association (NEDA), after consultation with 13 major component manufacturers and distributors, published a white paper that recommended: "The ECIA member component manufacturers and their authorised distributors recommend that general date code restrictions be eliminated from purchase order requirements for electronic components". It came to this conclusion with the proviso that component makers and their authorised distributors have in place procedures to deal with exceptions.

- When customer's product design is intolerant of many electrical variations of parts that are still operating in the manufacturer's specifications.
- In case of suspected component variation issues that are not confirmed by manufacturers yet. Here, customers can demand date codes from distributor to support test for production requirements.
- Lastly, if there are any other specific technical requirements.

In other words, the recommendation is that the supply chain manages the very few exceptional circumstances that are critical with respect to component date codes, rather than imposing unnecessary blanket rules for all components.

In addition, there are various other documents (available on request) from leading chipset/IC manufacturers that come to the same conclusion.

### Ageing Performance of Quartz Based Frequency Products

A critical factor of a quartz based frequency product's performance is the ageing characteristics of the crystal. There is a lot of empirical evidence to suggest that an extended shelf life actually has a beneficial effect on the ageing characteristics as changes in ageing are more pronounced in the initial period while the internal stresses relax and any contaminations within the package take their effect. Over longer time periods these effects are minimal.

### IQD Product Storage

All IQD products are stored in dedicated air-conditioned locations and packaged in sealed bags. Storing quartz based frequency products under these conditions, means the frequency and ageing parameters will be more stable over time.

### MSL Level 2-6 (JDEC-STD-020) Rated Products

Any products that are MSL Level 2-6 rated are stored in packaging that conforms to JDEC-STD-033 ensuring that levels of moisture and hence corrosion are further reduced.

### Solderability of Quartz Based Frequency Products Over Two Years Old

One performance criterion that some customers worry about in relation to quartz-based frequency products being over two years old is solderability. While the risk of this being a problem is negligible (especially given that the terminations on most modern surface mount products are gold flashed to eradicate such risk), we ensure that all such products undergo solderability testing (and are provided with a 'Solderability Test Certificate') to ensure that the terminations are free of any corrosion that may cause issues during soldering in production. Thru-hole products are solderability tested as per IEC-60068-2-20 and SMD product as per EN 60068-2-58. In practice, we have yet to find a problem in the over 50 years we have been in business.

### Summary

IQD's products are designed and manufactured to provide many years of reliable performance in customer's circuits. The vast majority of our products are delivered to customers within two years of manufacture. However, on the very rare occasions that we do supply products that were manufactured more than two years previously, the product will have been stored in an appropriate environment, solderability tested and will still be covered by IQD's normal guarantee. Supported by the evidence of 50+ years' experience that quartz based frequency products suffer no detrimental effects in performance from an extended shelf life, customers need not have any concerns about accepting such products, in line with the recommendations of other leading component manufacturers.