

## Reflow Soldering Guidelines for RoHS\* Compliant E-Series Surface Mount Components

Rev. B

### Introduction

This application note describes recommended practices and guidelines for the successful assembly of M/A-COM Technology Solutions E-Series surface mount components using automated solder reflow techniques. Incorrect handling, storage, reflow and cleaning may damage the components.

### Handling and Storage Precautions

Most E-series components are static sensitive and are packaged accordingly. Appropriate handling precautions should be observed. The typical shelf life of these components is 24 months. However, corrosive, salty or high humidity atmospheres can have an adverse affect on the solderability of contact pads/pins. Manual handling of the components is not recommended.

### Solder Pad Layout

Each E-series surface mount data sheet recommends a solder pad layout based on IPC standards. Deviation from these recommended layouts can adversely effect the solder joint strength and integrity.

### Component Construction

All M/A-COM Technology Solutions E-series components are designed to withstand solder reflow conditions, as recommended in this application note. The table below details the construction of our most popular surface mount components.

### Component Construction

Substrate	Type	Plating Construction	Cover Material (where applicable)
Ceramic	Leadless	Electroless Nickel Immersion Gold (ENIG)	High temperature polymer mould High temperature 6/6 nylon disk
DAP	SOT	Sn over Copper	
FR-4	Leadless	ENIG	High temperature polymer mould High temperature 6/6 nylon disk Galvanised steel

### Solder Paste

M/A-COM Technology Solutions E-series components are designed to work with most recommended reflow profiles for the SAC305/SAC405 type solders, and are fully compatible with the standard reflow profiles used for the SN60, SN62 and SN63 solder pastes, including no-clean pastes. For most case styles, a paste thickness of 0.25mm  $\pm$  0.05mm will provide an adequate solder joint. For the SM-22 case style, a solder paste thickness of 0.20mm  $\pm$  0.025mm is recommended.

### Component Placement

E-Series components are designed for placement using automatic Pick and Place equipment. Component placement is critical to negate shorts caused by solder bridging. Most E-series components can accept a side overhang of up to 50% of the pad width, and a toe overhang of up to 10% of pad length. For the SM-22 case style, side overhang must be less than 25%, and toe overhang less than 5%.

\* Restrictions on Hazardous Substances, European Union Directive 2002/95/EC.

### General Soldering Precautions: Lead-Free Soldering Process

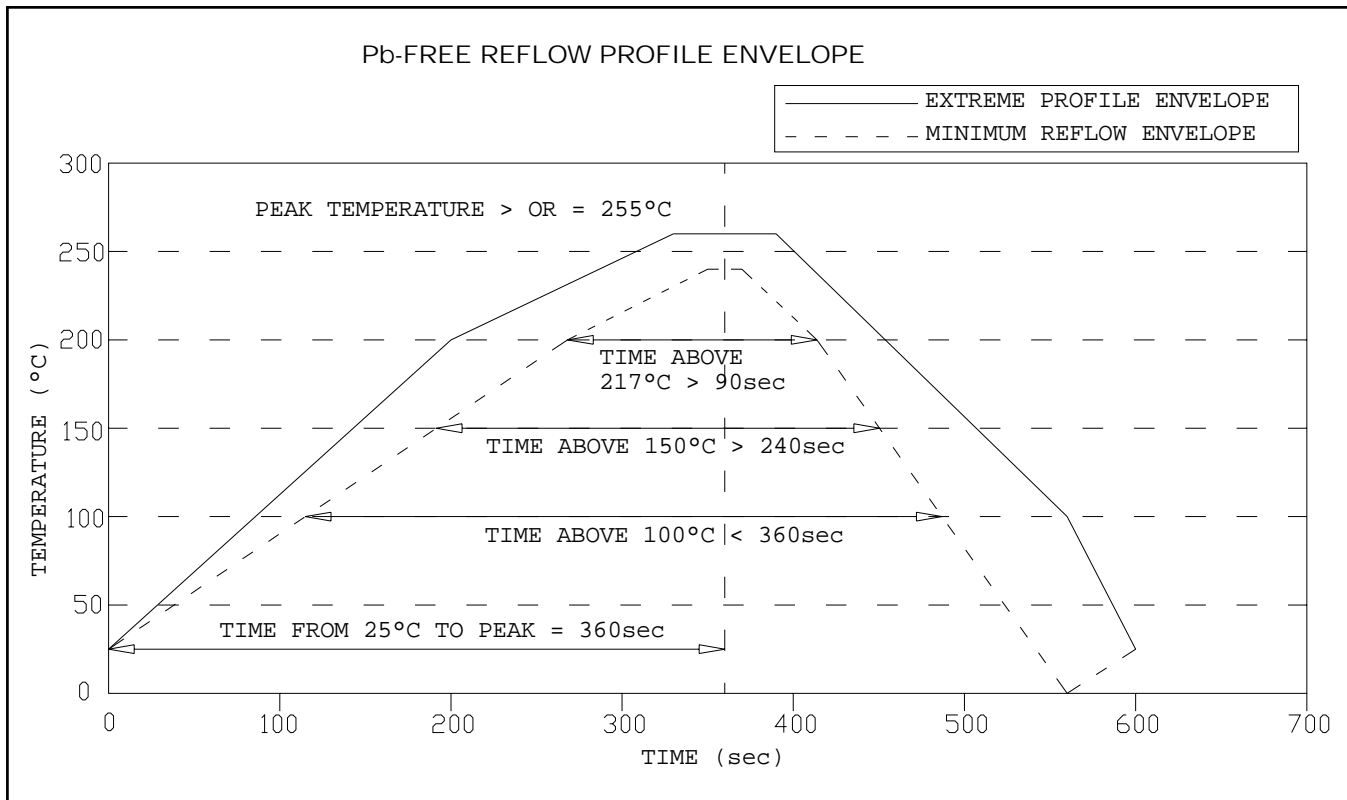
#### Relation of qualification profile and actual production profile

The profiles listed in this document are not production reflow profiles, but are related to those profiles with an added margin of safety to account for oven variation, temperature drift, and product variation and process robustness. The actual profile used in production will be dictated primarily by the solder composition selected.

#### Process Requirements

The ovens used should be 100% convection reflow. Where applicable, thermocouples should be securely attached to the top surface of a representative component to insure the temperature exposure. This can be done three times.

We recommended 90 seconds above 217°C with a maximum temperature of 260°C. The 60 seconds at temperatures >250°C is the maximum duration these package types should be exposed to.



#### Condition

Average ramp-up rate (30°C to 217°C)  
 > 100°C  
 > 150°C  
 > 217°C  
 Peak Temperature  
 Cool-down rate (Peak to 50°C)  
 Time from 30°C to 255°C  
 All temperatures shown are +5/-0°C

#### Exposure

less than 3°C / second  
 between 360-600 seconds  
 at least 240 seconds  
 at least 90 seconds  
 greater or equal to 255°C at least 15 seconds  
 less than 6°C / second  
 no greater than 360 seconds