

APPLICATION NOTE

Mounting and Soldering of BC Series Products

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Note:

Please note that the process and parameters described in this document were developed on specific equipment. The parameters will apply to that equipment and it is very likely that alternative pieces of equipment will require adjustments and fine-tuning of those parameters to achieve an optimized result.

BC products covered by this section include the Maxwell BCAP0310 and BCAP0315 with radial connection points. All products comprising the BC series product line are RoHS compliant.

General Precautions

Excessive heat applied to the ultracapacitor during soldering process may damage the component causing deterioration in performance and life. The following precautions should be followed when soldering the Maxwell ultracapacitor.

- 1) The ultracapacitor is polarized. Reference the label for positive and negative potentials.
- 2) The ultracapacitor case is at the positive potential. Ensure that the case is adequately insulated from other components.

Mounting Recommendations

PCB Thickness Compatibility

PCB Thickness*	Compatibility
350F cell	
Below 1.5 mm	Possible, but not recommended. Board may not support the mass.
Between 1.5 to 2.4 mm	Recommended
Between 2.4 to 3.2 mm	Possible, but not recommended
Over 3.2 mm	Not recommended/not supported
310F cell	
Below 1.5 mm	Possible, but not recommended
Between 1.5 to 2.4 mm	Recommended
Over 2.4 mm	Not recommended/not supported

*Not including trace thickness

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Mounting and Soldering of BC Series Products

PCB Hole Layout Dimensions

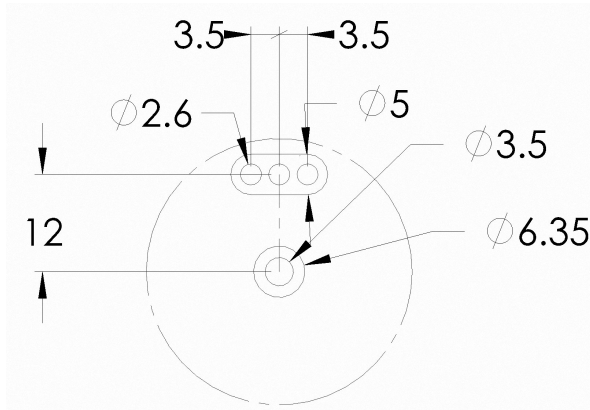


Figure 1. Board drillings for BCAP0310 P270 T10

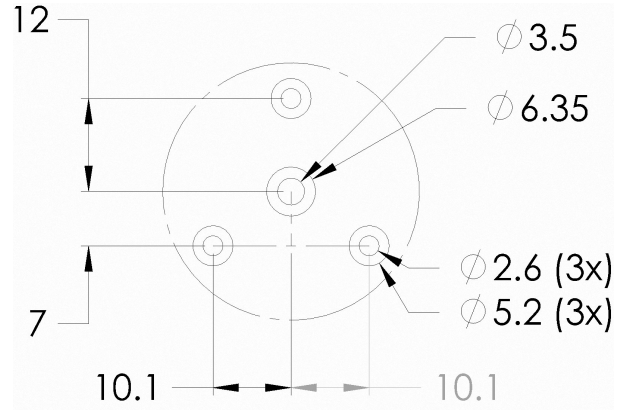


Figure 2. Board drillings for BCAP0350 E270 T11

Solder Tab Composition

The lead tabs are comprised of aluminum alloy. The tabs are nickel-plated followed by tin over the nickel.

Hand Soldering

In order to hand solder, good soldering practices must apply. It is assumed in this document that the user has experience with hand soldering of electronic components and that fundamental soldering processes are understood.

In general, lead-free soldering by hand requires higher heat and more active fluxes than solder containing lead as a constituent. The following are the parameters and materials that should be used for lead-free hand soldering:

- Recommended solder tip temperature: 343°C / 650°F
- Solder composition and size: Sn96.5Ag3.0Cu0.5 alloy, .062 diameter
- Recommended solder: Kester SN96227558 – includes flux core, other solders are available on the market, which are equivalent to this type. Flux – if not using flux core wire, use a halide-free, activated rosin-based flux. There are many such fluxes available on the market.
- Maximum contact time with component leads: 10 seconds

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Mounting and Soldering of BC Series Products

Note: Excessive time in contact with the component leads will potentially damage the device. Limit lead contact time to 10 seconds.

Wave Soldering

Components are wave solderable. Wave soldering is used in the fabrication of BMOD products based on the radial D-cell capacitors. The recommended schedule for wave soldering is provided below. These recommendations are based on specific wave soldering equipment. Adjustments may be necessary due to equipment. The equipment used for establishing the following recommendation is *Kirsten 5360*.

Recommended waved soldering profile for printed circuit assembly using leaded eutectic alloy

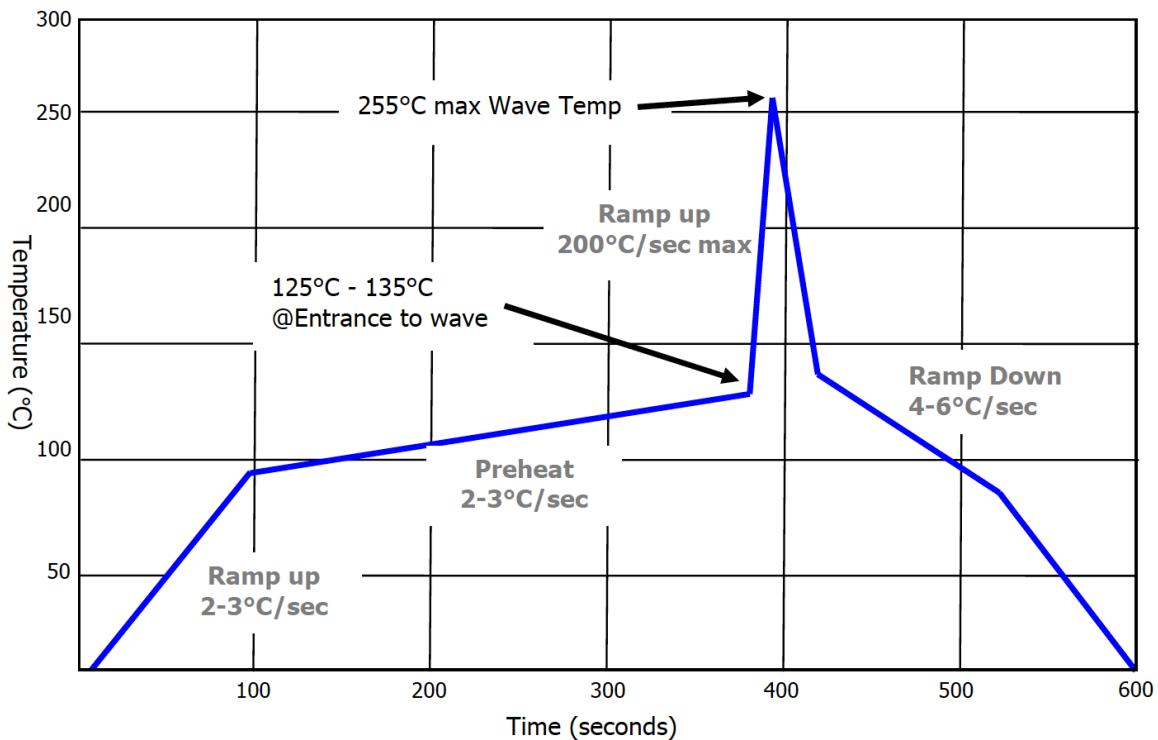


Figure 3 – Recommended wave solder profile for Eutectic solder

Total soldering process time from room temperature to peak temperature 255°C and cool down is 10 minutes maximum. The time to reach the required temperatures depends on the design of the application and on the power of pre-heating section of the soldering machine.

All temperatures are measured on the leads of the component on top of the PCB.

MAXWELL TECHNOLOGIES APPLICATION NOTE

Mounting and Soldering of BC Series Products

Solder:	Eutectic Solder (Sn63/Pb37) 183°C
Recommended Flux:	Kester 2331ZX
Ramp Up Rate:	1°-3°C/sec. max.
Preheat:	140° to 170°C for 150 sec. max.
Temperature Entrance into Wave:	~170°C
Ramp to Peak Temp:	200°C/sec
Peak Temp:	240°C for 1.5 to 5 sec. max.
Cool Down Rate:	6°C/sec. max.

Recommend wave soldering profile for printed circuit assembly using **lead-free alloy**

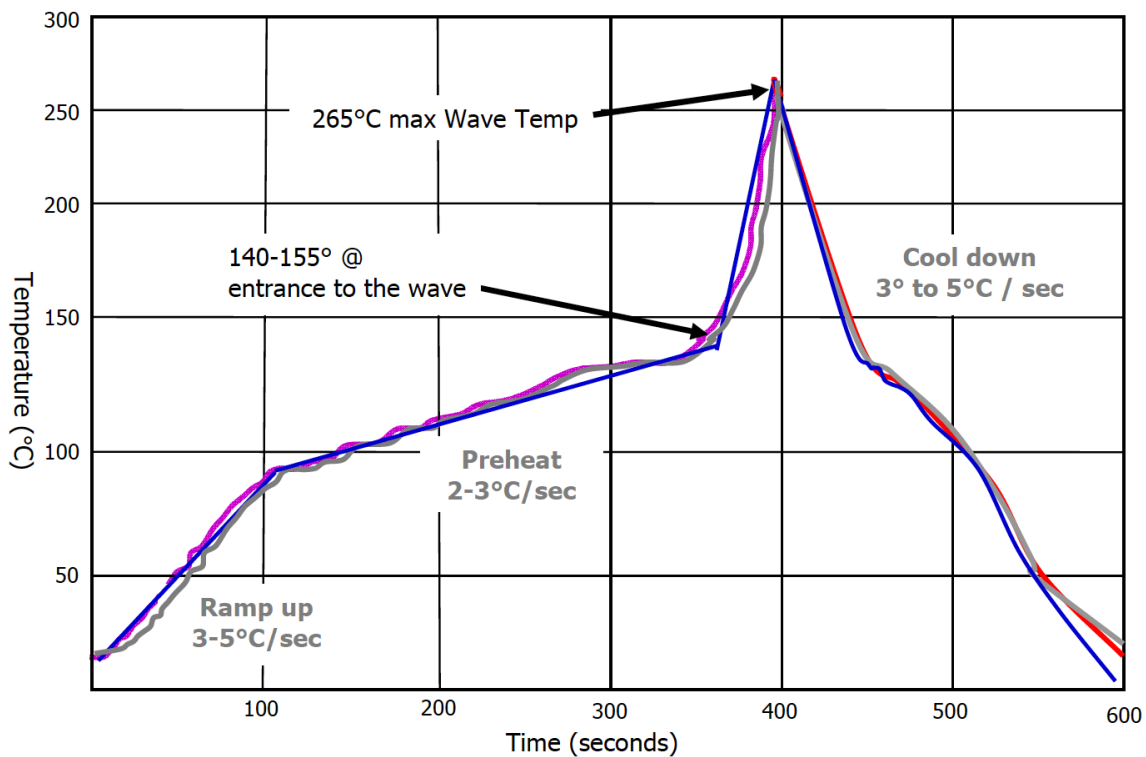


Figure 4 – Recommended wave solder profile for "lead-free" process.

Total soldering process time from room temperature to peak temperature 265°C and cool down is 10 minutes. The time to reach the required temperature depends on the design of the application and on the power of pre-heating section of the soldering machine. All temperatures are measured on the leads of the component on top of the PCB.

MAXWELL TECHNOLOGIES APPLICATION NOTE

Mounting and Soldering of BC Series Products

Solder:	Lead-free (Sn96.5/Ag 3.0/Cu0.5) liquidus point 217°C
Recommended Flux:	Kester 979T
Ramp Up Rate:	3°-5°C/sec. max.
Preheat:	140° to 155°C, 2°-3°C/sec on top of board
Temperature Entrance into Wave:	140° to 155°C on top of board
Ramp to Peak Temp:	200°C/sec
Peak Temp:	265°C for 1.5 to 5 sec. max.
Cool Down Rate:	3°-5°C/sec. max.
Conveyor Speed:	40-50 cm/min

Note: Due to the relatively high thermal mass of the component and especially if the total number or the density of components on the PCB is high, the use of a standard thermo-profiling device is strongly recommended to achieve good soldering results and to avoid excessive temperature in the capacitor.

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