

## **Notification about the transfer of the semiconductor business**

The semiconductor business of Panasonic Corporation was transferred on September 1, 2020 to Nuvoton Technology Corporation (hereinafter referred to as "Nuvoton"). Accordingly, Panasonic Semiconductor Solutions Co., Ltd. became under the umbrella of the Nuvoton Group, with the new name of Nuvoton Technology Corporation Japan (hereinafter referred to as "NTCJ").

In accordance with this transfer, semiconductor products will be handled as NTCJ-made products after September 1, 2020. However, such products will be continuously sold through Panasonic Corporation.

Publisher of this Document is NTCJ.

If you would find description "Panasonic" or "Panasonic semiconductor solutions", please replace it with NTCJ.

※ Except below description page

"Request for your special attention and precautions in using the technical information and semiconductors described in this book"

**Nuvoton Technology Corporation Japan**

### 1. Mounting method with solder

#### 1-1 Recommended reflow soldering condition

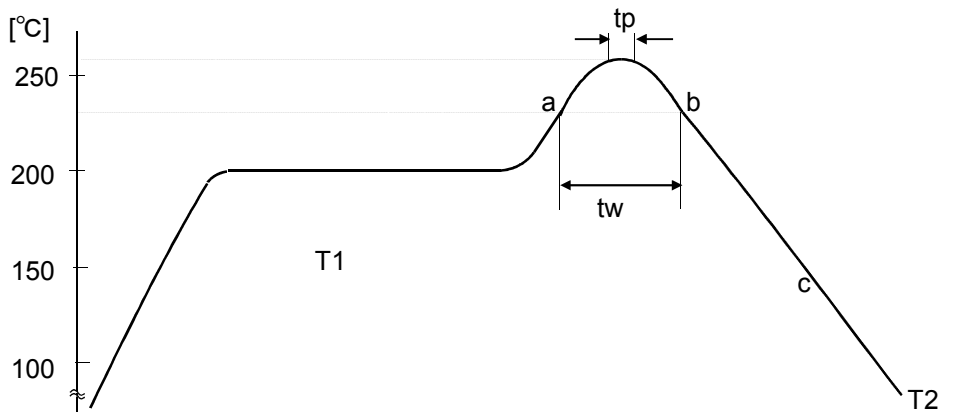
In reflow soldering process, exact temperature-cycle management is essential.

We recommend pre-heating before soldering, so that you can prevent not only package damages or stains but also damages on a printed circuit board, and your process becomes stable.

The following shows our recommended reflow temperature profile.

No	Symbol	Contents	Value
1	T1	Pre-Heating Temperature	150 °C to 200 °C (No Time Regulation)
2	a	Average Ramp-Up Rate	2 °C/s to 3 °C/s
3	Tp	Peak Temperature	max. 260 °C
4	tp	Duration at Peak Temperature	10 s or below
5	tw	Time above Liquid	30 s to 40 s ( over 230 °C )
6	b-c	Average Ramp-Down Rate	1.5 °C/s or below
7	T2	Unload Temperature	100 °C
8	-	The Number of Reflow Soldering Repetition	up to 2 times

Above-mentioned temperature is package surface temperature.





## 2. Precautions for mounting

When you assemble or mount discrete devices, the following cautions should be kept in mind because of their structural design and mounting operation.

Explaining below is about mechanical shock, soldering and cleaning which need attention in designing and mounting.

In order not to damage electrical characteristics and reliability, the following cautions are required.

### 2-1 Mechanical shock

Do not apply excessive force to the body. That may become the cause of the distortion of electrical terminal and have a bad influence on mounting. And there is a risk of leading to short circuit, breaking of wire, and damages of package. Be aware not to apply force even after mounting.

### 2-2 Soldering

- 1) To leave a semiconductor device at high temperature for many hours is undesirable, and also, soldering should be conducted at low temperature in a short time whichever you use a solder iron, dipping (dipping / flow), or reflow method.
- 2) The standard of solder heat resistance test for discrete devices is at 260 °C for 10 seconds and at 350 °C for 3 seconds in keeping distance with a device body by 1 to 1.5 mm.
- 3) We conduct solderability test with flux at 230 °C for 5 seconds.  
When you use high acid or alkaline flux, it might cause lead corrosion or peculiar influence. Please note the usage.
- 4) When a printed circuit board has warpage by soldering, please note that a semiconductor device has stress.
- 5) The condition for a soldering iron and solder tub is no electric leakage. Especially for FET type transistors and high frequency devices, consideration such as earthing of soldering instruments is required.

### 2-3 Cleaning (Flux cleaning )

1) Generally flux cleaning after soldering is necessary for system reliability.

Neglecting cleaning will cause a trouble such as corrosion or lower isolation, and it might result in an electronic circuit trouble.

On account of corrosion, please use rosin type flux and remove it after soldering.

When you conduct flux cleaning, please handle it in a short time.

Although we recommend a dipping method, If you conduct ultrasonic cleaning, please follow as below.

#### Ultrasonic cleaning condition

Ultrasonic frequency	:	28 kHz (Tolerance=10 %)
Ultrasonic output	:	10 W/L
Cleaning time	:	Within 30 s

You should make devices and printed circuit boards not to touch to ultrasonic source.

This may cause lead broken, wire broken and reliability degradation.

2) Washing is unnecessary when rosin flux of an unwashed type is being used.

### 3. Precautions for using

#### 3-1 Storage condition and term

Expiration date for device storage is for two years from the date shown in the packing label at temperature ( 5 °C - 35 °C) and relative humidity (45 % - 75 %).

Please be careful not to pass this period.

As for an expired device, please confirm the solderability before using.

#### 3-2 Transportation

During transportation, please do not expose devices to excessive mechanical vibration and shock, and also prevent them from being wet with water.

#### 3-3 Measurement

When you inspect characteristics of devices, please give attention to surge voltage prevention from measuring instruments, wrong connections and short circuits between terminals.

Also, an inspection over product ratings should not be conducted.

As for high frequency or electrostatic sensitive devices, human body and machines should be grounded.

#### 3-4 Maximum ratings

1) In general, maximum ratings are regulated as the absolute maximum ratings, and they are device limit values which shall be never exceeded in any condition at any time. By exceeding the rating a device will be deteriorated or destroyed and its characteristics will not be restored.

2) Applied voltage, current, reverse voltage, dissipation power, junction temperature, and storage temperature etc., have their maximum ratings.  
Please refer to product specifications for the ratings.

## Request for your special attention and precautions in using the technical information and semiconductors described in this book

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Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.
- (6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. We do not guarantee quality for disassembled products or the product re-mounted after removing from the mounting board.  
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