

# i.MX 7 Dual/Solo Product Lifetime Usage

## 1. Introduction

This document describes the estimated product lifetimes for the i.MX 7 Dual/Solo Application Processors based on the criteria used in the qualification process.

The product lifetimes described here are estimates and do not represent guaranteed lifetime for a particular product.

The i.MX 7 Series consists of several processors that deliver a wide range of processing and multimedia capabilities across two qualification levels.

This document is intended to provide users with guidance on how to interpret the different i.MX 7 Dual/Solo qualification levels in terms of target operating frequency of the device, the maximum supported junction temperature ( $T_j$ ) of the processor, and how this relates to the lifetime of the device.

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## 2. Device Qualification Level and Available PoH

Each qualification level supported (Commercial and Industrial) defines a number of power on hours (PoH) available to the processor under a given set of conditions such as:

1. The target voltage for the application (Consumer and Industrial).
  - a) The lifetime is limited by the SOC operating voltage.
2. The percentage of active use vs. standby.
  - a) Active use means that the processor is running at an active performance mode.
    - For the consumer tier, there are three available performance modes: 800MHz, 1GHz and 1.2GHz. For the Industrial tier, only the 800Mhz and 1Ghz are available.
  - b) In standby mode, the VDD\_ARM and the VDD\_SOC are lowered, reducing power consumption and junction temperature. In this mode, the voltage and temperature are set low enough so that the effect on the lifetime calculation is negligible and treated as if the device were powered off.
3. The junction temperature of the processor ( $T_j$ ).
  - a) The maximum junction temperature of the device is different for a given qualification level, for instance 105 °C for Industrial and 95 °C for the Consumer Tier.
  - b) Users must ensure that their device is appropriately thermally managed such that the maximum junction temperature is not exceeded.

All data provided within this document are estimates for PoH that are based on extensive qualification experience and testing with the i.MX 7 Series. These statistically derived estimates should not be viewed as a limit on an individual device's lifetime, nor should they be construed as a guarantee by NXP as to the actual lifetime of the device.

### 2.1. Commercial lifetime estimates

*Table 1* provides the number of PoH for the typical use condition for a commercial device.

**Table 1. Consumer qualification lifetime estimates**

ARM® Core Speed (MHz)	Power-on Hours [PoH] (Hrs)	SOC Operating Voltage (V)	ARM® Core Operating Voltage (V)	Junction Temperature [T <sub>j</sub> ] (°C)
800	21900	1.0	1.0	95
1000	21900	1.0	1.1	95
1200	21900	1.0	1.225	85

*Figure 1* establishes guidelines for estimating PoH as a function of the junction temperature. PoH can be read directly from the chart below to determine the necessary trade-offs to be made to CPU.

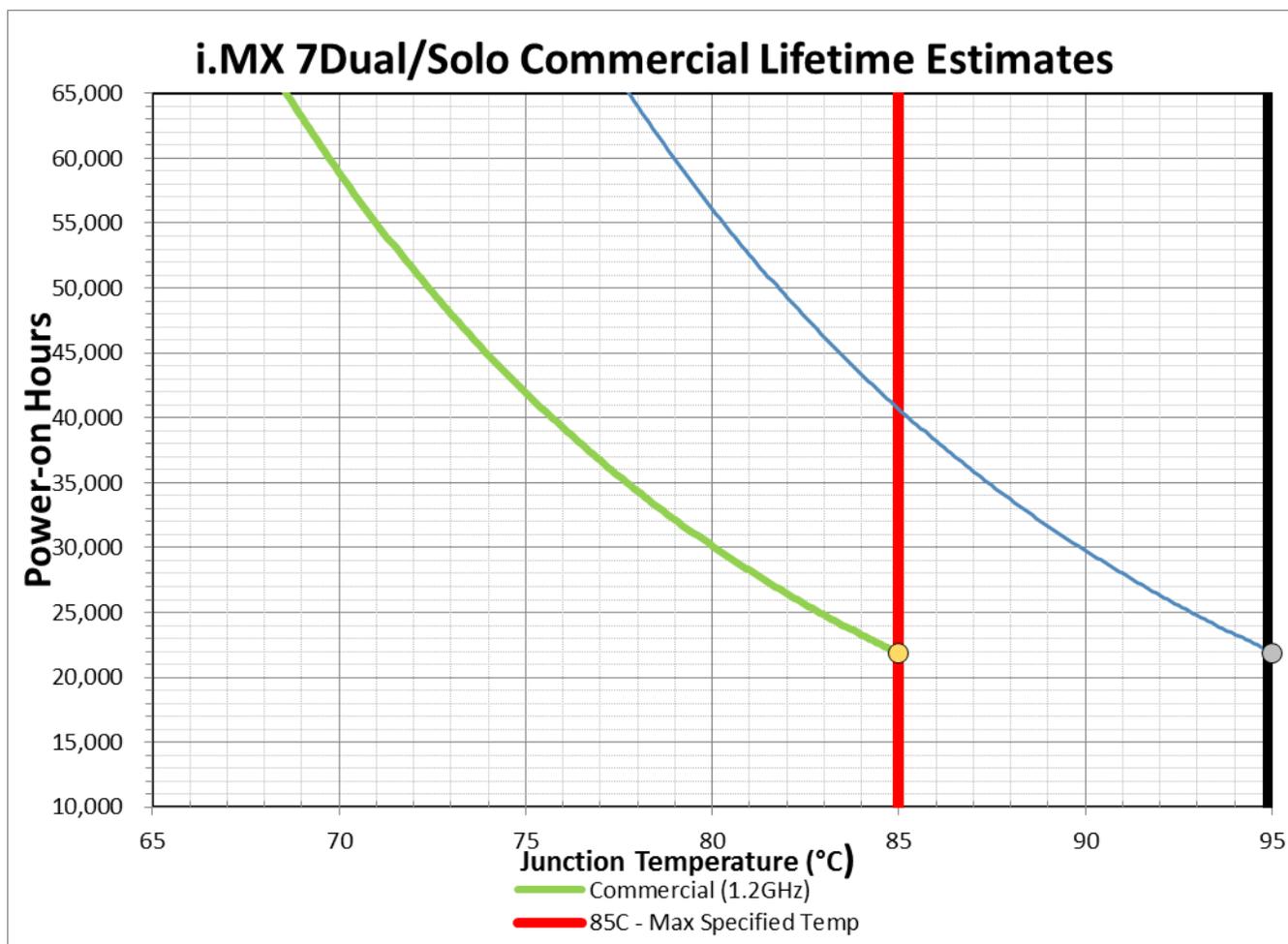


Figure 1. Consumer qualification lifetime estimates

## 2.2. Industrial lifetime estimates

Table 2 provides the number of PoH the typical use conditions for an industrial device.

Table 2. Industrial qualification lifetime estimates

ARM® Core Speed (MHz)	Power-on Hours [PoH] (Hrs)	SOC Operating Voltage (V)	Junction Temperature [Tj] (°C)
800	110000	1.0	105
1000	110000	1.0	105

Figure 2 establishes guidelines for estimating PoH as a function of junction temperature. PoH can be read directly off of the chart below to determine the necessary trade-off to be made for junction temperature to increase the estimated PoH of the device.

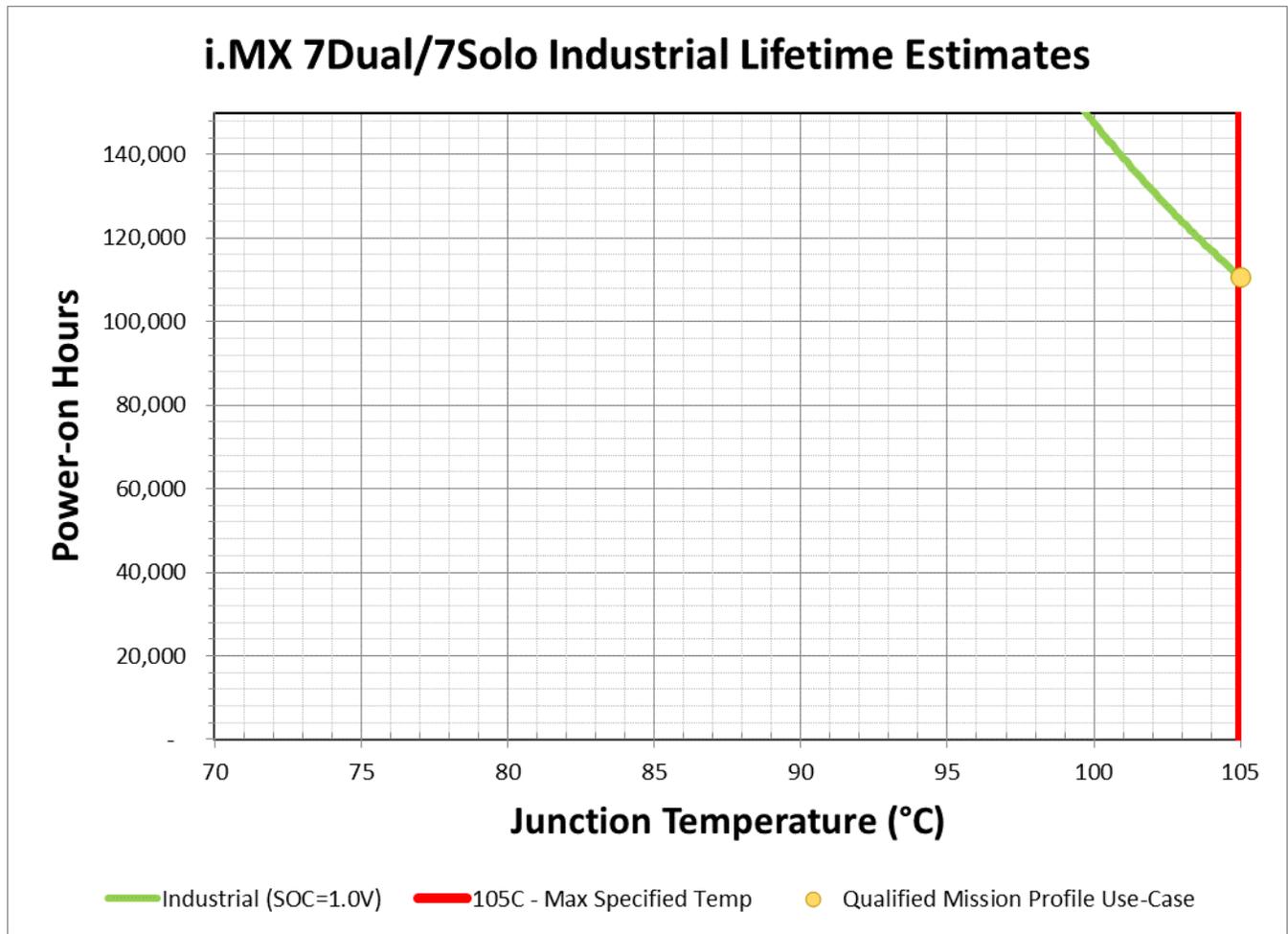


Figure 2. Industrial qualification lifetime estimates

### 3. Combining Use Cases

In some applications, a constant operating use case cannot deliver the target PoH. In this case, it is advantageous to use multiple operating conditions. This method provides some of the lifetime benefits of running at a lower temperature use case, while keeping the ability of the system to use the highest performance state dictated by the application demands. See [Figure 3](#).

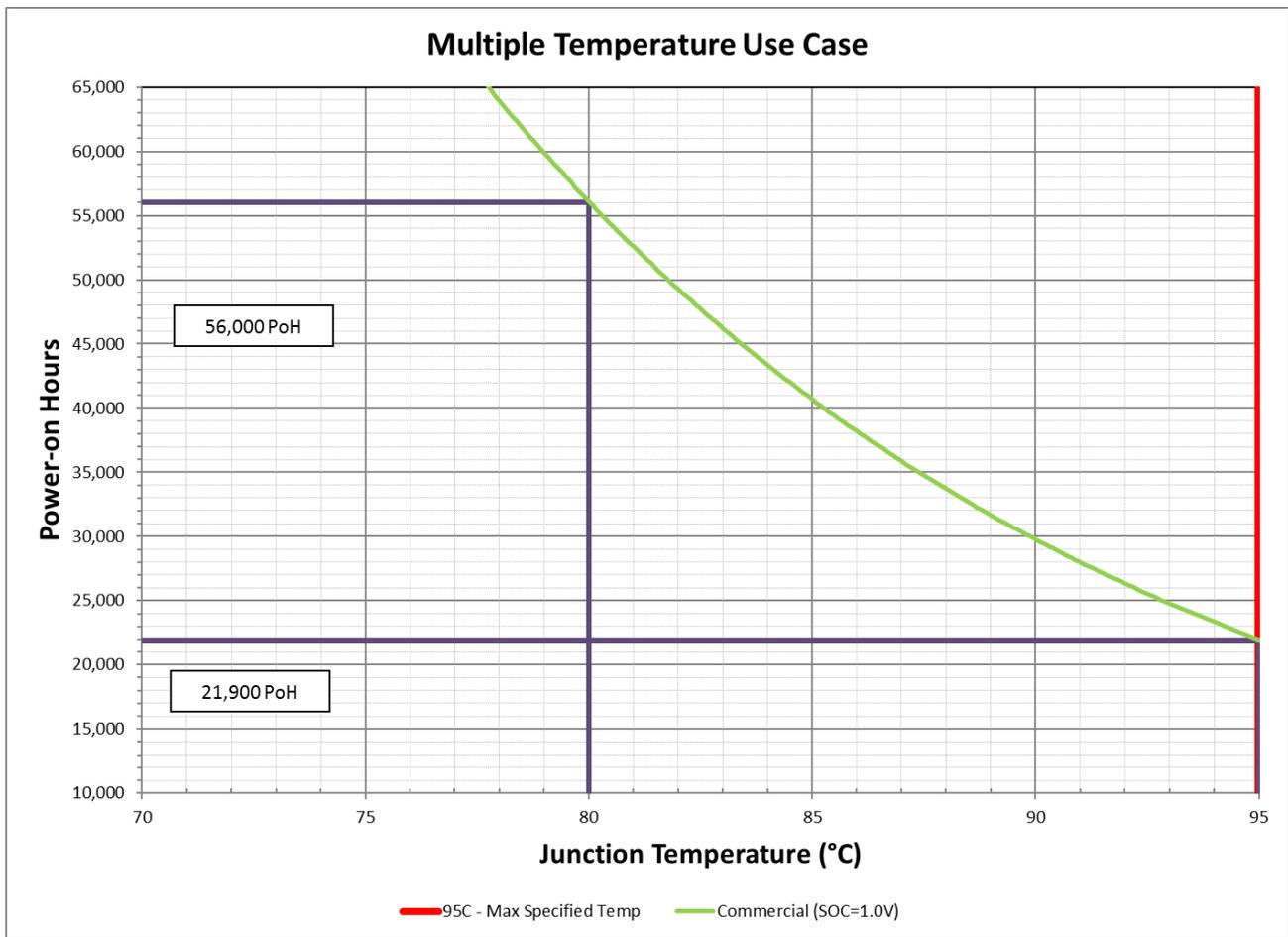


Figure 3. Multiple temperature use case

## 4. Revision History

**Table 3. Revision history**

<b>Revision number</b>	<b>Date</b>	<b>Substantive changes</b>
0	09/2016	Initial release
1	05/2017	Added 1.2 GHz Use Case



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