USB Thin Card Specification

Revision 1.0

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Acknowledgement of USB Thin Card Technical Contribution:

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1 Introduction

1.1 General

The popularity of USB and the continual shrinking of mechanical form factors has led to a wide variety of products which are mechanically nothing more than a USB Std-A plug with a small additional package. The most popular of these devices is the ubiquitous USB flash drive, but many other dongle-type products are also widely available, including WiFi adapters, Bluetooth adapters, fingerprint security devices and even TV receivers.

As our penchant for smaller and smaller products would suggest, many of these products are now being released in form factors that eliminate the metal shell originally defined as a part of the USB Standard-A plug. These products more closely resemble a memory card in size and shape, and they are intended to be fully compatible with the existing Std-A receptacles.

Prior to the adoption of this specification and its accompanying certification program, these devices were not able to be certified by the USB-IF because they did not use a certified USB plug. The goal of this work is to define the mechanical characteristics for Thin Card devices so that they are fully compatible with Standard-A receptacles – so that they make sound mechanical contact and so that they do not damage the receptacles.

1.2 Scope

1.2.1 Mechanical definition only

The specification will be limited to the mechanical characteristics of thin card devices. They are expected to be fully compliant with other aspects of the USB specifications as appropriate for their product definition, but the electrical and software definition is beyond the scope of this document. From the host perspective these thin card devices will not be distinguishable from products that would use a full Standard-A plug.

1.2.2 Categories

This document will define two categories of devices: Generic USB Thin Cards and Embedded USB Thin Cards.

- **Generic USB Thin Cards** will be rigorously defined in terms of their plug interface only. Some latitude is to be given the remaining mechanical form factor.
- **Embedded USB Thin Cards** are mechanically specified in total, and are intended for applications where the card would be fully embedded into a host product. As with all Thin Card, Embedded Thin Cards will be fully compatible with the normal Standard-A receptacles.

Although not defined here, we expect that Ultra-Thin Receptacles will be created for the Embedded USB Thin Cards as portable device vendors incorporate them into their products.

1.3 Intended Audience

This specification is intended for mechanical designers of thin card products and for the mechanical designers of portable devices that would utilize the Embedded Thin Cards. Electrical and Firmware designers are directed to the USB core specifications [USB] and any relevant USB device class documents.

1.4 Related Documents

Reference	Title	Location
[USB]	In the context of this document, this specifically refers to the following USB core specifications: The current USB 2.0 specification complete with all of the latest ECNs The current USB 3.0 specification complete with all of the latest ECNs	www.usb.org/

1.5 Acronyms and Terms

Term	Definition
EUTC	Embedded USB Thin Card – a specific type of Thin Card which is mechanically fully specified. The entire length, width and height and certain other mechanical features of the product are all defined.
Thin Card	A USB peripheral which is compliant with the mechanical dimensions in this specification, thereby allowing it to be fully mechanically compliant with USB 2.0 Standard-A receptacles and USB 3.0 SuperSpeed Standard-A receptacles.
Generic Thin Card	Generic Thin Cards are defined only with respect to their USB connector interface. The remainder of their mechanical package is not specifically defined.

Other acronyms and terms used in this specification are defined in the core specifications [USB].

2 Significant Features

This specification covers two main categories of Thin Card devices: a Generic USB Thin Card, and an Embedded USB Thin Card (EUTC). All thin cards are designed to work in USB Standard-A receptacles just like a common USB flash drive product, except that the thin cards don't have the metal shell usually associated with a USB Std-A plug; They fit into the bottom half of the Std-A receptacle, and so are thinner than the common USB flash drives. Each of these categories is defined in both USB 2.0 versions with four contacts, and in USB 3.0 SuperSpeed versions with nine contacts. USB2 and USB3 versions are fully interchangeable, in the same way as their full-sized counterparts with the metal shell.

Major feature and performance highlights are as follows:

- Full mechanical compatibility with USB 2.0 and 3.0 Standard-A receptacles
- Full electrical and software compatibility with their full-size counterparts

In addition, Embedded Thin Cards will offer:

- Fully defined mechanical outline to allow for slots in portable devices which are designed specifically to contain the Embedded Thin Card completely within the portable host product.

2.1 Generic USB Thin Card

The Generic USB Thin Card portion of the specification defines the mechanical requirements for only the contact area of a Thin Card. The mechanical definition beyond the contact area is only defined to be within certain broader mechanical limits. A wide variety of products could be designed to meet the Generic Thin Card definition.

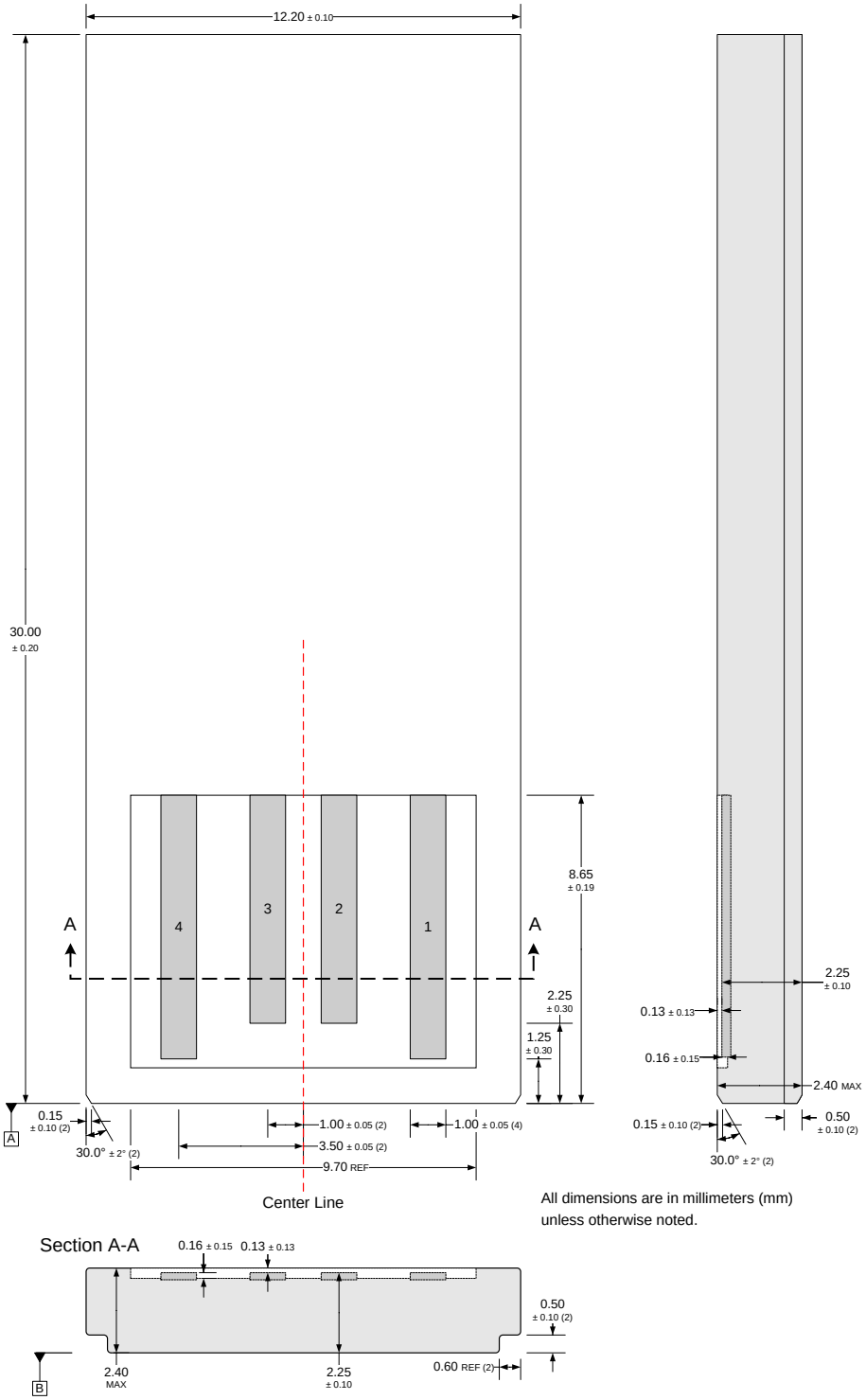
2.2 Embedded USB Thin Card (EUTC)

The Embedded USB Thin Card portion of the specification defines the full mechanical outline of the card so that all Embedded USB Thin Cards can be fully interchangeable in a host product that completely encloses the card within its case parts – think portable media player with slot in the side for an Embedded USB Thin Card. The card is inserted into the slot and fully absorbed by the host product.

3 Mechanical Specifications

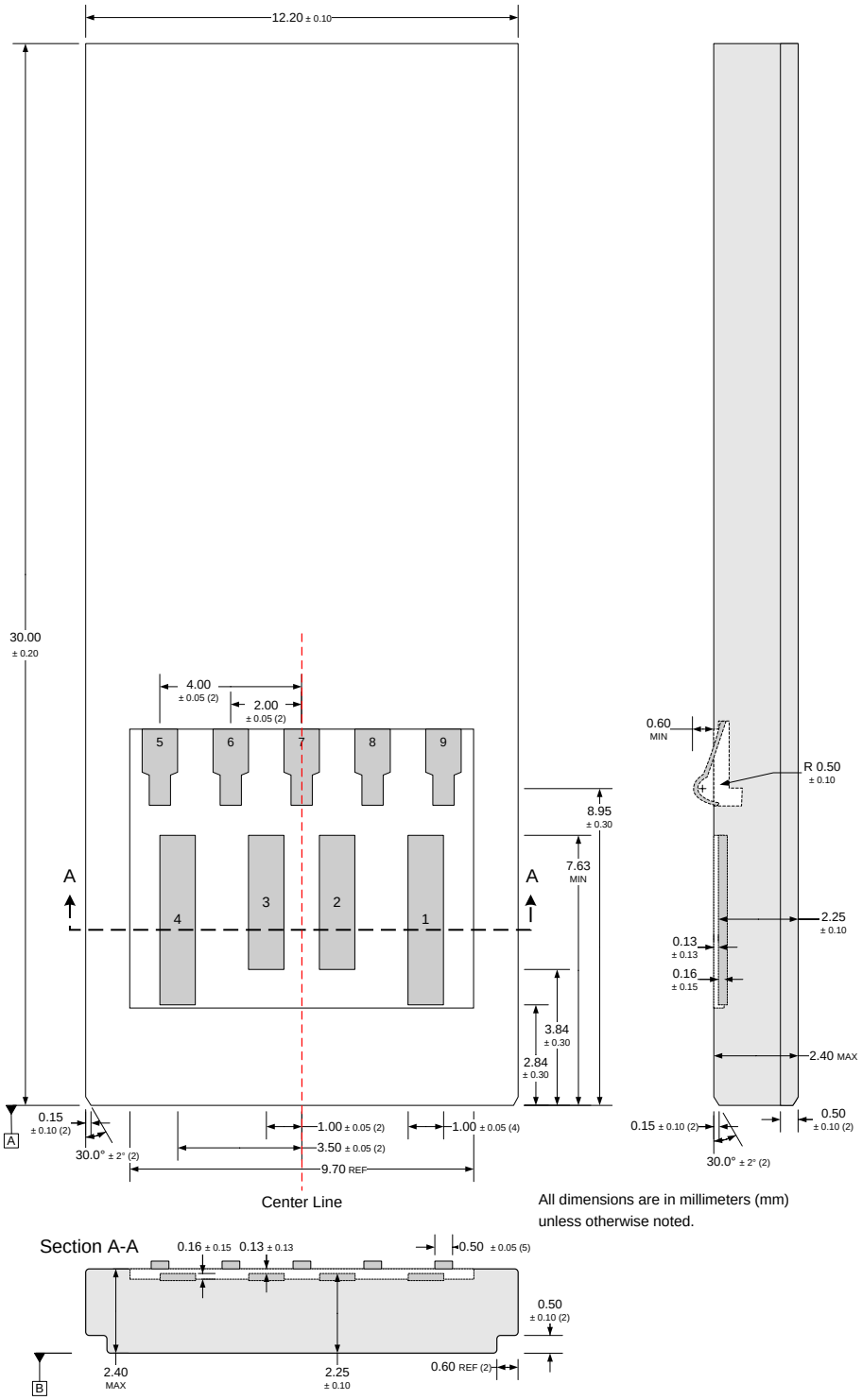
3.1 Embedded Thin Cards

3.1.1 USB 2.0-compliant Embedded Thin Cards



All dimensions are in millimeters (mm) unless otherwise noted.

3.1.2 USB 3.0-compliant Embedded Thin Cards



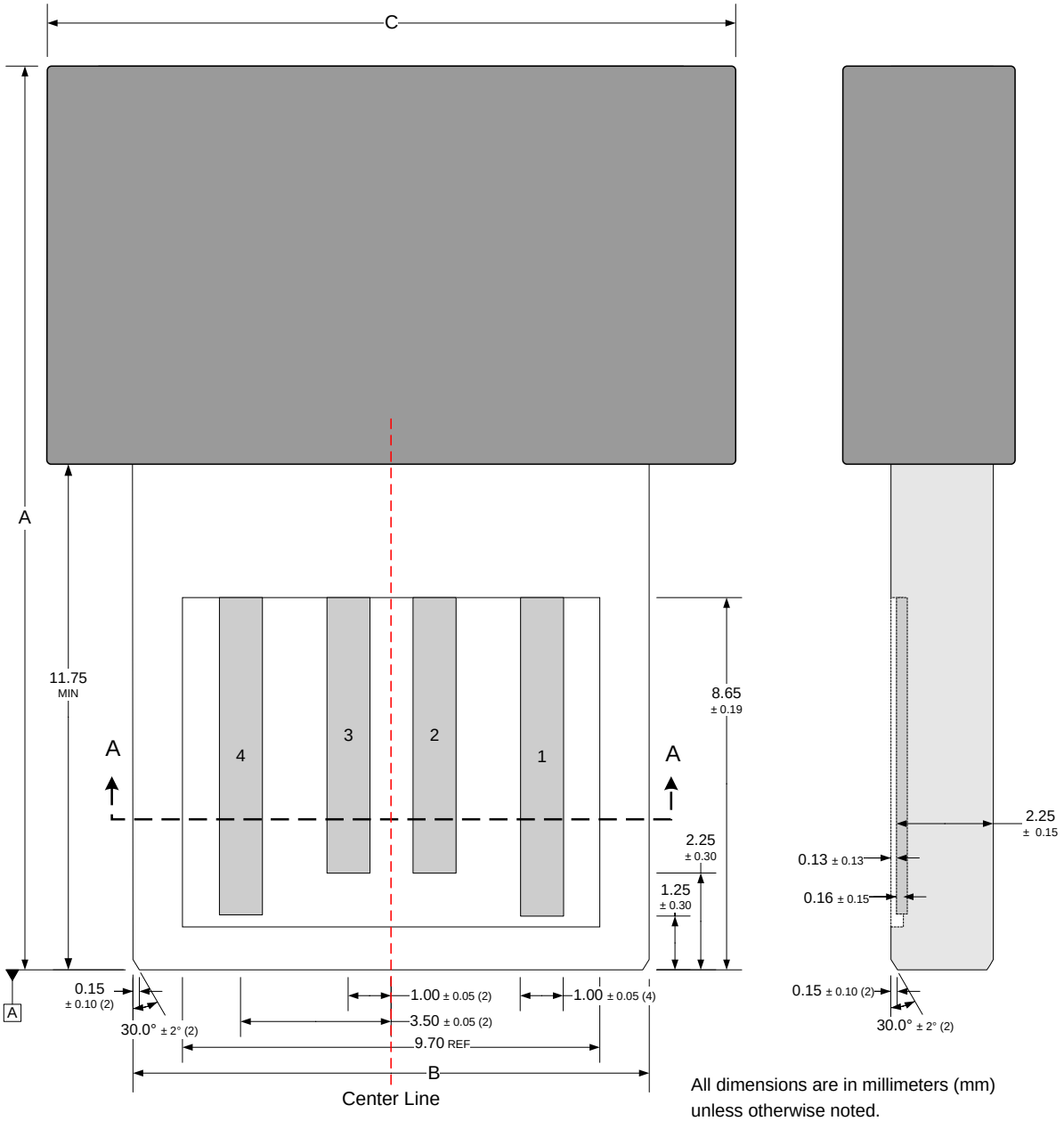
3.2 Generic Thin Cards

In the following subsections the mechanical drawings contain lettered dimensions with ranges as specified in the following table.

Description	Min	Max
A – Overall length of card	21.00	30.00
B – Width of card at contact area	12.00	12.30
C – Width of back of card	B	16.00
D – Thickness of back of card	2.20	4.00

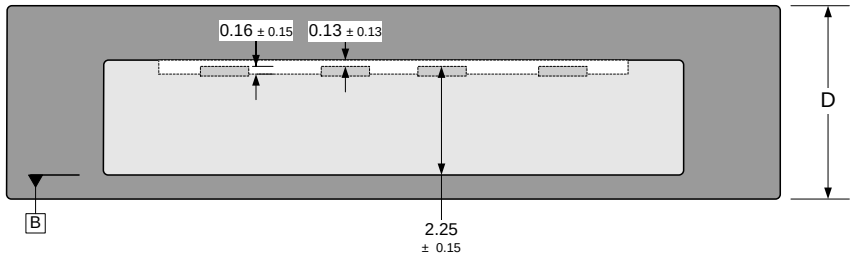
In order to qualify as a Generic Thin Card (and not meet all of the requirements for an Embedded Thin Card, either the width or the thickness of the back of the card must be at least 2mm different from the Embedded Thin Card requirements. A card that exceeds the range allowed by any one of the maximum lettered dimensions is in violation of this specification.

3.2.1 USB 2.0-compliant Generic Thin Cards

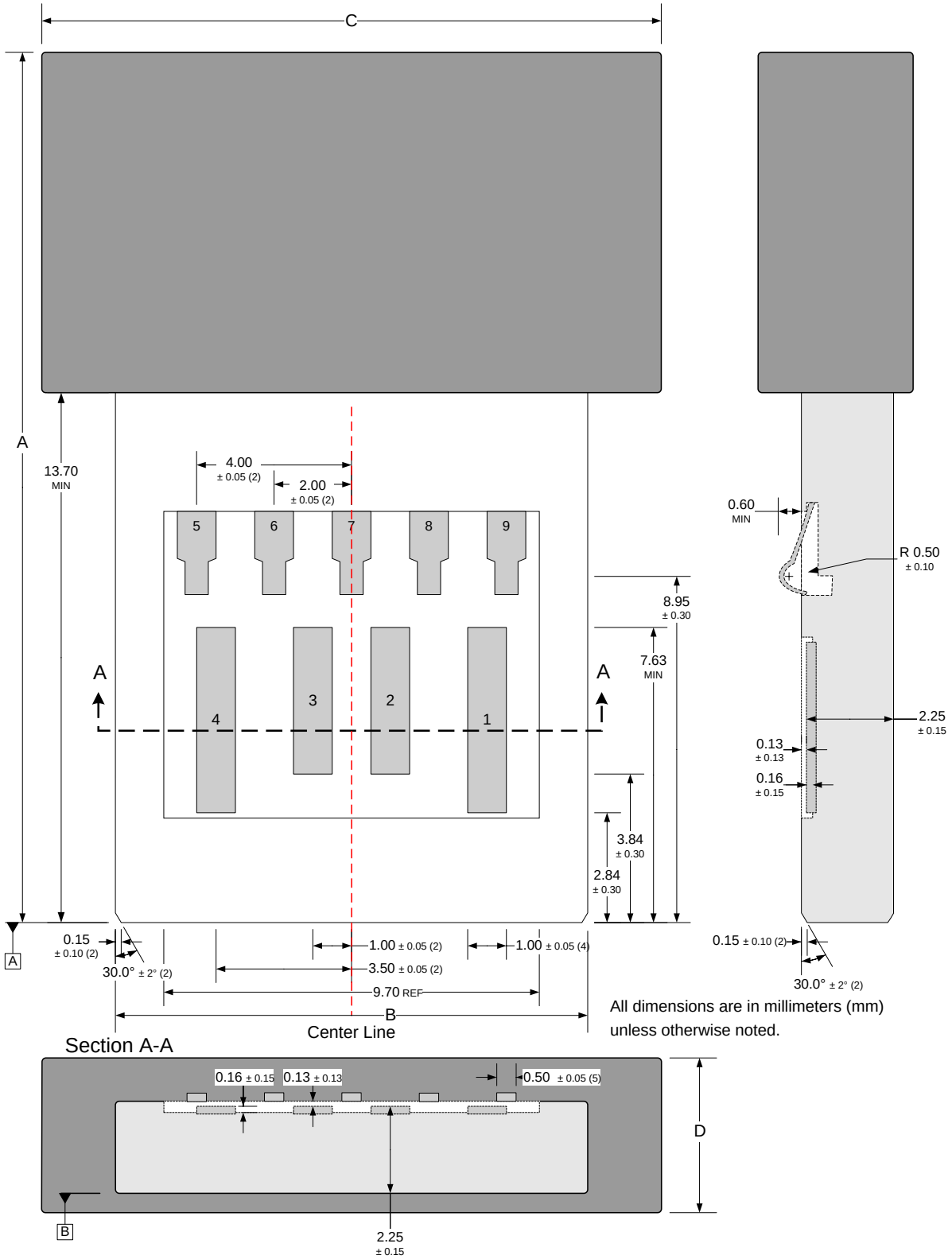


All dimensions are in millimeters (mm) unless otherwise noted.

Section A-A



3.2.2 USB 3.0-compliant Generic Thin Cards



4 Mechanical Compliance Requirements

4.1 Operating Temperature Range

-25C to +85C

4.2 Storage Temperature Range

-40C to +85C

4.3 Insertion Force

35 Newtons maximum (at a maximum rate of 12.5 mm (0.492”) per minute)

4.4 Contact Plating

Manufacturers shall comply with contact plating requirements, per the following options:

Thin Cards

Option I:

Contact area: (Min) 0.05 µm Au + (Min) 0.75 µm Ni-Pd on top of (Min)2.0 µm Ni

Option II:

Contact area: (Min) 0.75 µm Au on top of (Min) 2.0 µm Ni

Contact plating should be applied after stamping and forming.

4.5 SuperSpeed contacts

The leading edge of the SuperSpeed contacts must be below the plastic surface to avoid stubbing

4.6 Thin Card Housing

No burs or sharp edges are allowed on the non-contact area of the Thin Card. Thin Cards must have no adverse effect on receptacles in the event that the card is inserted incorrectly. Specifically, the outer surface of the Thin Card must be made of a smooth material such as plastic to avoid wear of the receptacle contact plating in the event that the card is inserted upside down. Fiberglass PCBs are not allowed as the exterior surface of the card.

4.7 Thin Card Shielding

Some product vendors may choose to include a conductive shield to the outer surface of their product to assist with RFI and EMC mitigation. This shielding must be done in a manner that avoids any risk of the USB 2 contacts becoming shorted in the event that the ThinCard product is inserted upside down in a Standard-A receptacle.

4.8 No wires attached

Thin Cards may not be used as plugs on cable assemblies.