SFF-TA-1007

Specification for

Enterprise and Datacenter 1U Long Device Form Factor (E1.L)

Rev 1.3 September 2, 2025

SECRETARIAT: SFF TWG

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ABSTRACT: This specification defines the mechanical attributes of a 1U long form factor with multiple thicknesses for a device that will fit in vertically in a standard 1U rack mounted host systems designed to support this new form factor.

This specification provides a common reference for host systems manufacturers, host system integrators, and device suppliers. This specification originates from Enterprise and Datacenter SSD Form Factor Working Group (EDSFF). Based on non-SSD devices also using EDSFF and agreement from the EDSFF Working Group, the SFF TWG agreed changing EDSFF to Enterprise and Datacenter Standard Form Factor.

POINTS OF CONTACT:
SNIA Technical Council Administrator
Email: TCAdmin@snia.org

Chairman SFF TWG
Email: SFF-Chair@snia.org

EDITORS:
Anthony Constantine, Micron Technology

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Foreword

The development work on this specification was done by the SNIA SFF TWG, an industry group. Since its formation as the SFF Committee in August 1990, as well as since SFF's transition to SNIA in 2016, the membership has included a mix of companies which are leaders across the industry.

For those who wish to participate in the activities of the SFF TWG, the signup for membership can be found at https://www.snia.org/join.

Revision History

Rev 1.0 *February 02, 2018:*
-Initial release

Rev 1.1 *March 11, 2018*:
-Converted to the new SFF document template
-Added new name (E1.L).
-Clarified abstract.
-Updated foreword per current policy.
-Section 2.3: Corrected ASME reference for consistency.
-Section 2.4: Reordered definitions alphabetically.
-Section 3: Clarified latch/front plate may add additional length.
-Section 4: Added clarification to label placement in presence of fins.
-Section 4: Added statement that Device requires LED isolation from LED bleeding.
-Figure 4-1: Datum F placement corrected along with measurement (no change to table).
-Figure 4-4: Added label area to top of device.
-Table 4-1: Modified Dimensions A7 and C4.-Section 5, 7: Clarified power is a recommendation.
-Section 5: Reworded light bleeding portion.
-Table 5-1: Modified nominal dimensions for C3 due to reference change to Datum W.
-Table 5-1: Modified nominal dimensions of A7, C4, D4.
-Table 5-1: Modified tolerances of A5, A7, C2, C4, C9.
-Table 5-1: Modified comment for C4.
-Section 5-2: Added Datum W to figures.
-Section 7.1: Editorial change to description.

Rev 1.2 *July 9, 2021*:
-Editorial changes to match the latest SFF document template.
-Changed SSD to device and abstract edit to reflect EDSFF name change.
-Section 5: Removal of Power references apart from section 5.1 recommendations.
-Section 5: Moved the power references in section 5.1 to an informative table.
-Section 5.1: Added statement allowing security labels to be placed anywhere on the enclosure.
-Section 5.1: Clarification that both 1C and 2C card edges are allowed.
-Section 5.2: Datum name change from "Y" to "G" to align with SFF-TA-1002 Datum.
-Section 5.2: Note added for recommended ground contact.
-Section 5: Moved the power references in section 5.1 to an informative table.
-Section 5.1: Added statement allowing security labels to be placed anywhere on the enclosure.
-Section 7: Deleted informative thermal guidance. Replaced with power and thermal requirements.

Rev 1.3 *September 2, 2025*:
-Changes to align with boiler plate.
-Section 7: Added additional description and context to Table 7-1 and removed Table 7-2.
-Editorial throughout

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1. Scope

This specification defines the mechanical attributes of a new form factor for a device that will fit in 1U rack mounted host systems designed to support this form factor.

1.1 Application Specific Criteria

This 1U long form factor provides external dimensions, card edge placement, mounting holes for the front panel and latch, and LED placement to assist host system manufacturers in integration of this form factor.

The environment for the 1U long form factor is an enclosure connecting one or more devices in a dedicated packaging environment.

2. References and Conventions

2.1 Industry Documents

The following documents are relevant to this specification:

- ASME Y14.5-2009 Dimensioning and Tolerancing published by ASME at https://www.asme.org
- SNIA SFF-TA-1002 Protocol Agnostic Multi-Lane High Speed Connector specification
- SNIA SFF-TA-1009 Enterprise and Datacenter Standard Form Factor Pin and Signal Specification
- SNIA SFF-TA-1023 Thermal Characterization Specification for EDSFF Devices

2.2 Sources

The complete list of SFF documents which have been published, are currently being worked on, or that have been expired by the SFF Committee can be found at https://www.snia.org/sff/specifications. Suggestions for improvement of this specification are welcome and should be submitted to https://www.snia.org/feedback.

Other standards may be obtained from the organizations listed below:

Standard	Organization	Website
ASME	American Society of Mechanical Engineers (ASME)	https://www.asme.org

2.3 Conventions

The following conventions are used throughout this document:

DEFINITIONS: Certain words and terms used in this standard have a specific meaning beyond the normal English meaning. These words and terms are defined either in the definitions or in the text where they first appear.

ORDER OF PRECEDENCE: If a conflict arises between text, tables, or figures, the order of precedence to resolve the conflicts is text; then tables; and finally figures. Not all tables or figures are fully described in the text. Tables show data format and values.

LISTS: Lists sequenced by lowercase or uppercase letters show no ordering relationship between the listed items.

EXAMPLE 1 - The following list shows no relationship between the named items:

a. red (i.e., one of the following colors):
    A. crimson; or
    B. pink;
b. blue; or
c. green.

Lists sequenced by numbers show an ordering relationship between the listed items.

EXAMPLE 2 -The following list shows an ordered relationship between the named items:

1. top;
2. middle; and
3. bottom.

Lists are associated with an introductory paragraph or phrase and are numbered relative to that paragraph or phrase (i.e., all lists begin with an a. or 1. entry).

DIMENSIONING CONVENTIONS" The dimensioning conventions are described in ASME-Y14.5, Geometric Dimensioning and Tolerancing. All dimensions are in millimeters, which are the controlling dimensional units (if inches are supplied, they are for guidance only).

NUMBERING CONVENTIONS: The ISO convention of numbering is used (i.e., the thousands and higher multiples are separated by a space and a period is used as the decimal point). This is equivalent to the English/American convention of a comma and a period.

American	**French**	**ISO**
0.6	0,6	0.6
1,000	1 000	1 000
1,323,462.9	1 323 462,9	1 323 462.9

3. Keywords, Acronyms, and Definitions

For the purposes of this document, the following keywords, acronyms, and definitions apply.

3.1 Keywords

May: Indicates flexibility of choice with no implied preference.

May or may not: Indicates flexibility of choice with no implied preference.

Obsolete: Indicates that an item was defined in prior specifications but has been removed from this specification.

Optional: Describes features which are not required by the SFF specification. However, if any feature defined by the SFF specification is implemented, it shall be implemented as defined by the specification. Describing a feature as optional in the text is done to assist the reader.

Prohibited: Describes a feature, function, or coded value that is defined in a referenced specification to which this SFF specification makes a reference, where the use of said feature, function, or coded value is not allowed for implementations of this specification.

Reserved: Where the term is used for a signal on a connector contact, the function is set aside for future standardization. It is not available for vendor specific use. Where this term is used for bits, bytes, fields, and code values; the bits, bytes, fields, and code values are set aside for future standardization. The default value shall be zero. The originator is required to define a Reserved field or bit as zero, but the receiver should not check Reserved fields or bits for zero.

Restricted: Refers to features, bits, bytes, words, and fields that are set aside for other standardization purposes. If the context of the specification applies to the restricted designation, then the restricted bit, byte, word, or field shall be treated as a value whose definition is not in scope of this document, and is not interpreted by this specification.

Shall: Indicates a mandatory requirement. Designers are required to implement all such mandatory requirements to ensure interoperability with other products that conform to this specification.

Should: Indicates flexibility of choice with a strongly preferred alternative.

Vendor specific: Indicates something (e.g., a bit, field, code value) that is not defined by this specification. Specification of the referenced item is determined by the manufacturer and may be used differently in various implementations.

3.2 Acronyms and Abbreviations

EDSFF: Enterprise and Datacenter Standard Form Factor
NVM: Non-Volatile Memory
SSD: Solid State Drive

3.3 Definitions

1U: 1 Standard Unit or Rack Unit 44.45 mm (1.75 inches).

Card: Refers to the device plugged into a connector

Device: Refers to the interface target

Enclosure: The housing that protects the internal components and acts as a heat sink.

Host: Refers to the interface source or initiator

Thickness: Form factor dimension including PCB thickness, z-height of all components plus mechanicals.

4. General Description

4.1 Configuration Overview/Descriptions

The application environment for the 1U long form factor is a cabinet or enclosure connecting to one or more add in cards. 1U refers to 1 standard unit of an IT equipment rack and the IT enclosures that fit in this space. The device form factor is intended for use in enclosures that fit within that given space. An example use case of the 1U long form factor is to implement very high storage capacities in a 1U storage system as shown in Figure 4-1. The device connects electrically to the system through a card edge connector as defined in SFF-TA-1002. The 1U long form factor is specified including an enclosure and mounting points for a latch/front plate. The latch/front plate is beyond the scope of the specification and may add additional dimensional impact beyond what is documented. There are multiple thicknesses of the 1U long form factor depending on the max power rating.

Figure 4-1. Example system implementation of 1U long form factor.

5. Mechanical Specification

5.1 Overview

This section specifies the dimensions for the 1U long form factor. The dimensioning convention is per ASME-Y14.5-2009 Dimensioning and Tolerancing. For mating interface details, Datum "E" and Datum "F", refer to SFF-TA-1002. There are two thicknesses specified:

- A 9.5mm thick form factor
- An 18mm thick form factor

No part of the host chassis/guide rails of a host enclosure or parts connected to the mounting holes (e.g., a latch) should encroach into any part of the bounding volume of the device form factor dimensions and tolerances as specified in this standard when the device is inserted into the host enclosure.

For the label/Fin placement area and Dimension "B1" (Device Width), dimensions for a surface apply to a single point minimum. If a surface is not flat, the dimension applies to the highest raised location on that surface. Except for the card edge connector, each defined edge may have rounding. Labels shall be placed in the label/fin placement area. Security labels are permitted on any surface of the enclosure. Fins may be eliminated to accommodate the label, but integrity of the thermal solution should be ensured. The device supports either the 1C or 2C card edge as defined in SFF-TA-1002.

The device is responsible for sufficient light isolation between the two LEDs to prevent light bleed.

5.2 Physical Definition: 1U Long Form Factor

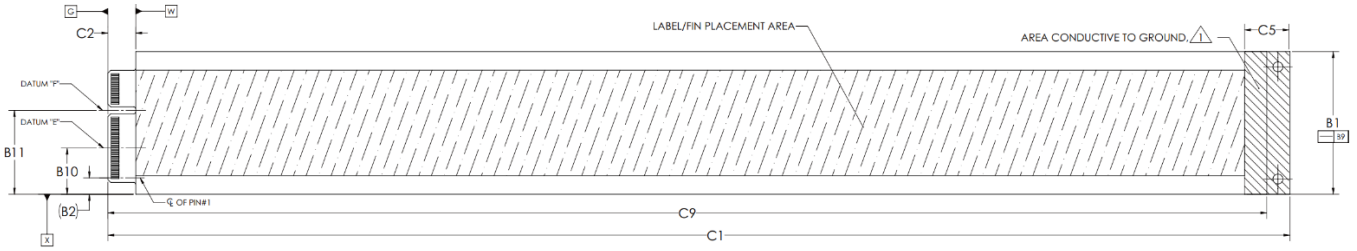


Figure 5-1. Primary Side of 1U long

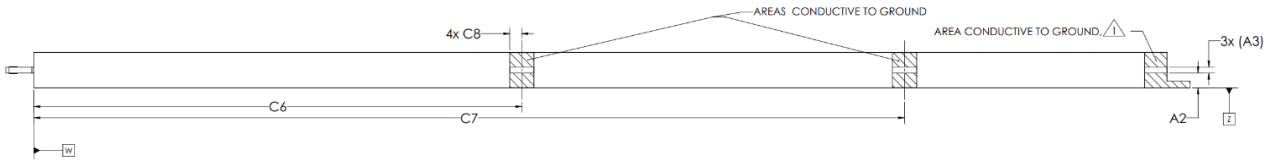


Figure 5-2. Bottom side of 1U long

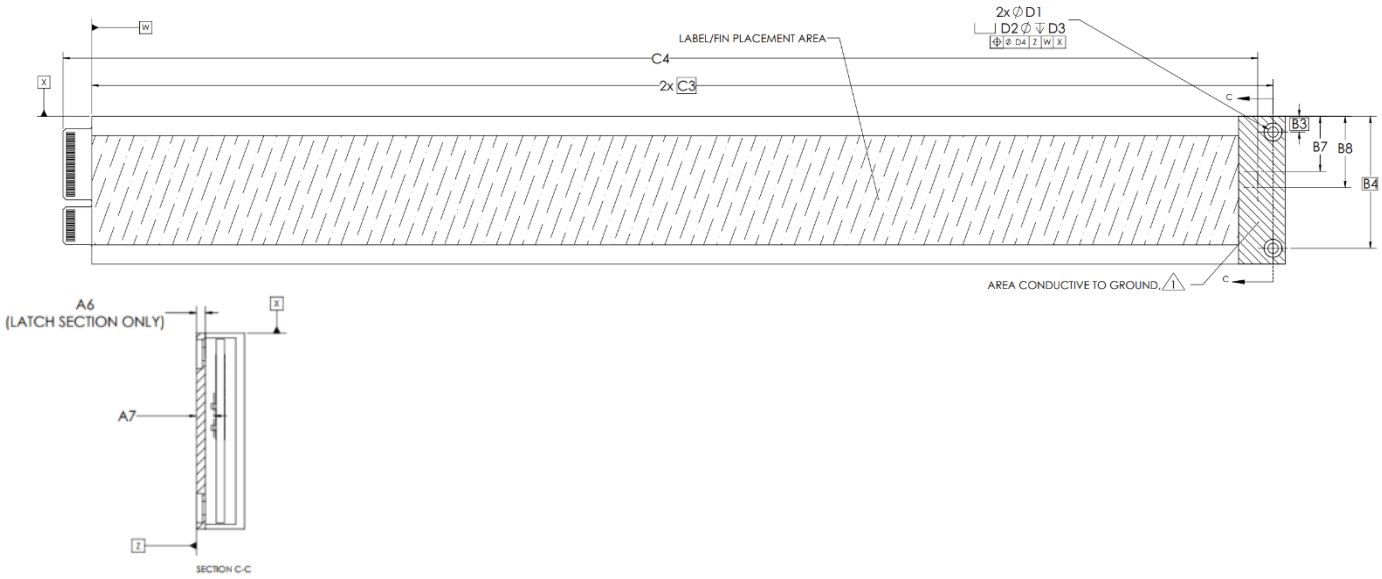


Figure 5-3. Secondary Side of 1U long and latch section

Figure 5-4. Top side of 1U long

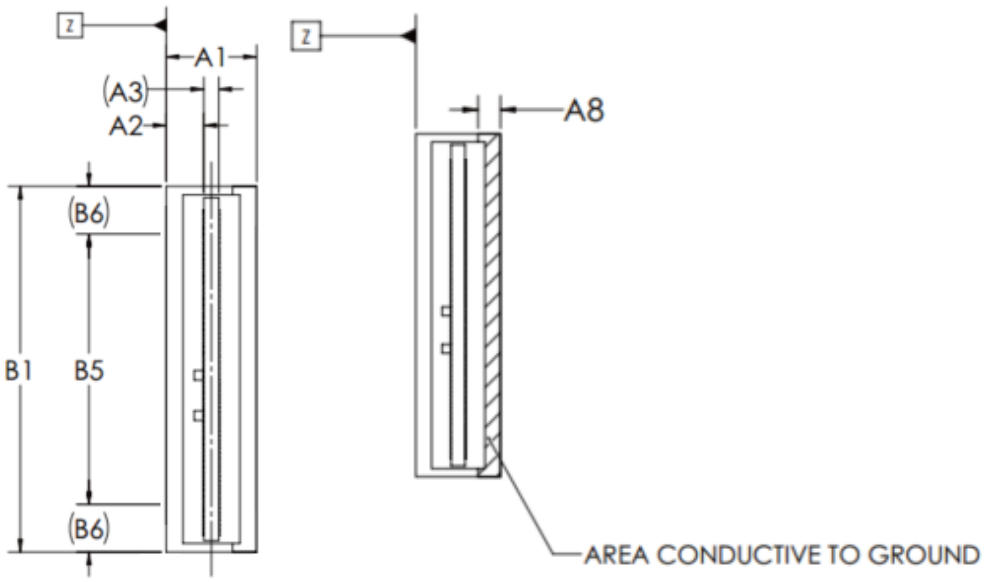


Figure 5-5. Back of 1U long (connector facing) of 9.5mm device

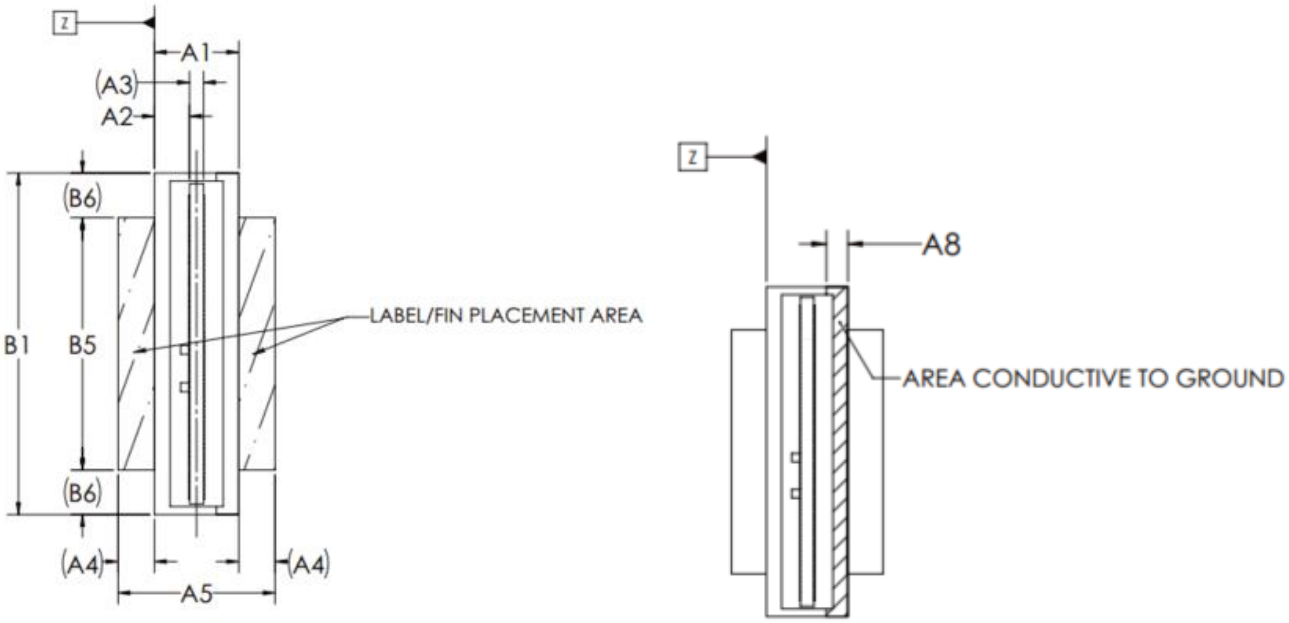


Figure 5-6. Back of 1U long (connector facing) of 18mm device

Notes:

1. Hosts should make grounding contact to at least 1 of these surfaces at the front of the device.

5.2.1 1U Long Form Factor

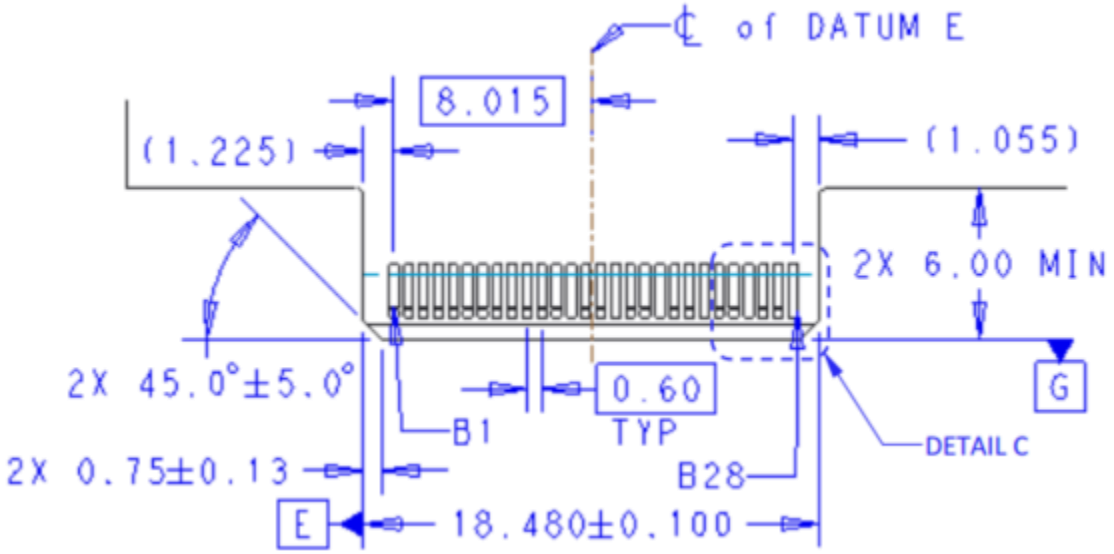
Table 5-1. 1U Long Form Factor Dimensions

Dimensions	Millimeters	Tolerance	Comment
A1	9.5	0.35	Device Thickness for 9.5 mm device
A2	3.96	0.15	PCB Card Edge location
A3	1.57	REF	PCB card edge Thickness (Ref: See SFF-TA-1002)
A4	4.25	REF	Fin height (reference)
A5	18	+0.35/-0.60	Device thickness including fins for 18 mm device
A6	2.2	0.15	Latch mounting area thickness
A7	3.46	0.50	LED center position
A8	2.35	MIN	Conductive area thickness on back of device
A9	0.4	MAX	Straightness
B1	38.4	0.25	Device width
B2	4.4	REF	Center - Connector Pin A1 location from Datum X
B3	4.1	BASIC	Mounting Hole 1
B4	34.3	BASIC	Mounting Hole 2
B5	28.4	0.25	Fin, label placement region
B6	5	REF	Host alignment structure region (reference)
B7	14.33	0.35	Attention or error (Amber) LED center position
B8	18.53	0.35	Power and activity (Green) LED center position
B9	0.4	MAX	Straightness
B10	12.415	0.35	Control dimension for x4 card edge; TA-1002 DATUM “E”
B11	22.605	0.35	Control dimension for x8 card edge; TA-1002 DATUM “F”
C1	318.75	0.55	Device length
C2	7.5	0.25	Card edge length
C3	308	BASIC	Mounting Hole 1 and 2
C4	311.05	0.45	LED edge closest to latch area
C5	12	MIN	Minimum Conductive area length
C6	131.3	0.15	Bottom conductive area 1
C7	234.3	0.15	Bottom conductive area 2
C8	3.2	MIN	Bottom conductive area length
C9	312.5	+0.15/-0.95	Datum G to latch area keep out zone
D1	2.7	0.15	
D2	4.7	0.15	
D3	1.2	0.1	
D4	0.25	MAX	Position Tolerance

6. Informative: SFF-TA-1002 edge (plug) Mechanical drawing

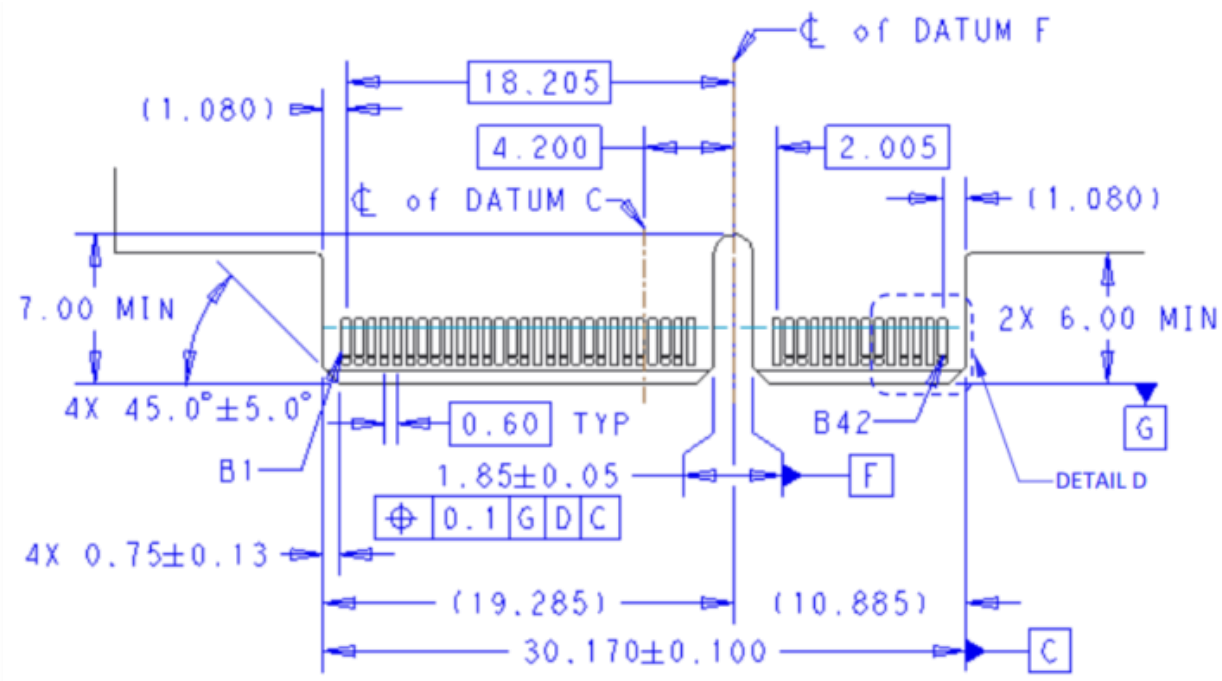
6.1 Overview

This section shows the card edge mechanical drawing for convenience only. See SFF-TA-1002 for normative and performance requirements.



Note: Position A1 on opposite side of card of B1

Figure 6-1. 1C (x4) Mating Card Dimensions



Note: Position A1 on opposite side of card of B1

Figure 6-2. 2C (x8) Mating Card Dimensions

7. E1.L Power/Thermal Requirements

The following section covers the power and thermal requirements of the device.

7.1 Power

Power constraints for this device form factor are summarized in Table 7-1. For more information, refer to SFF-TA-1009 *Enterprise and Datacenter Standard Form Factor Pin and Signal Specification*.

Table 7-1. Power Requirements for a 1U long (E1.L) system implementation

Parameter	E1.L	Comment
Initial Slot Power Limit (12Vpinit)	25 W	Refer to SFF-TA-1009 for definitions and additional details.
Maximum device power capability	Up to 79.2 W at 12 V	Limited by the current capability of SFF-TA-1002

7.2 Thermals

For detailed device thermal requirements, refer to SFF-TA-1023 *Thermal Specification for EDSFF Devices*.

7.3 Informative: Maximum Sustained Device Power

There is no specified maximum sustained power for this device apart from the connector limits. The connector is defined to supply a maximum sustained current of 6.6 A which at 12 V nominal limits the form factor to 79.2 W of power. This value, however, is further limited by the operating environment of the host and device. The host manufacturer should provide their requirements and communicate this value as defined by the 12Vpsus definition in SFF-TA-1009 *Enterprise and Datacenter Standard Form Factor Pin and Signal Specification*.