SFF-TA-1042

Specification for

Enterprise and Datacenter Device Form Factor (E2)

Rev 1.0 June 16, 2025

SECRETARIAT: SFF TWG

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The description of the form factor in this specification does not assure that the specific component is available from suppliers. If such a form factor is supplied, it should comply with this specification to achieve interoperability between suppliers.

ABSTRACT: This specification defines the mechanical attributes of the E2 form factor with the goal of supporting at least 64 NAND packages and fit vertically in standard 2U rack mounted host systems.

This specification provides a common reference for host systems manufacturers, host system integrators, and device suppliers. This specification is part of the Enterprise and Datacenter Standard Form Factor (EDSFF).

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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 *June 16, 2025:*

- Initial release

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1. Scope

This specification defines the mechanical attributes of the E2 form factor with the goal of supporting at least 64 NAND packages and fit vertically in standard 2U rack mounted host systems.

1.1 Application Specific Criteria

This E2 form factor provides external dimensions, card edge placement, grounded mechanical mounting hole locations and LED placement to assist host system manufacturers in integration of this form factor.

The environment for the E2 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, available at https://www.asme.org
- SFF-TA-1002 Protocol Agnostic Multi-Lane High Speed Connector specification
- SFF-TA-1009 Enterprise and Datacenter Standard Form Factor Pin and Signal Specification
- 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 an informational callout 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

2U: 2 Standard Units or Rack Units of 88.90 mm (3.5 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 E2 form factor is a cabinet or enclosure connecting to one or more add-in cards. The device form factor is intended for use in enclosures that fit within that given space. The primary usage is for datacenter server and storage systems that require high capacity. The device connects electrically to the system through a card edge connector as defined in SFF-TA-1002. E2 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. Figure 4-1 represents an example of the E2 form factor.

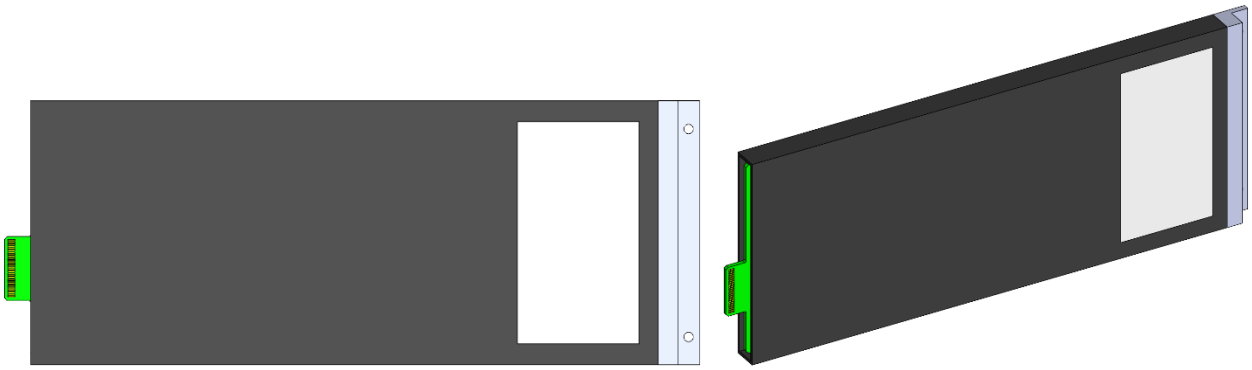


Figure 4-1. Example E2 Device Views.

Connector dimensions and mating interface details are defined in SFF-TA-1002. Connector signal assignments are defined in SFF-TA-1009.

5. Mechanical Specification

5.1 Overview

This section specifies the dimensions for the E2 form factor. The dimensioning convention is per ASME-Y14.5-2009 Dimensioning and Tolerancing. For mating interface details, Datum "E", refer to SFF-TA-1002.

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.

Except for the card edge connector, each defined edge may have rounding. For the label placement, 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. Labels shall be placed in the label placement area. Security labels are permitted on any surface of the enclosure. The device supports the 1C card edge as defined in SFF-TA-1002.

The host should make grounding contact to at least 1 of these surfaces where the latch attaches to the device.

5.2 Physical Definition: E2 Form Factor

DRAWING NOTES:

1. AREA CONDUCTIVE TO GROUND
2. DIMENSION FOR LIGHT EXITING THE FORM FACTOR (PRIMARY AND SECONDARY SIDES)
3. LABEL PLACEMENT AREA, DIMENSIONS APPLY TO BOTH SIDES
4. MEASUREMENT TO LED CENTER

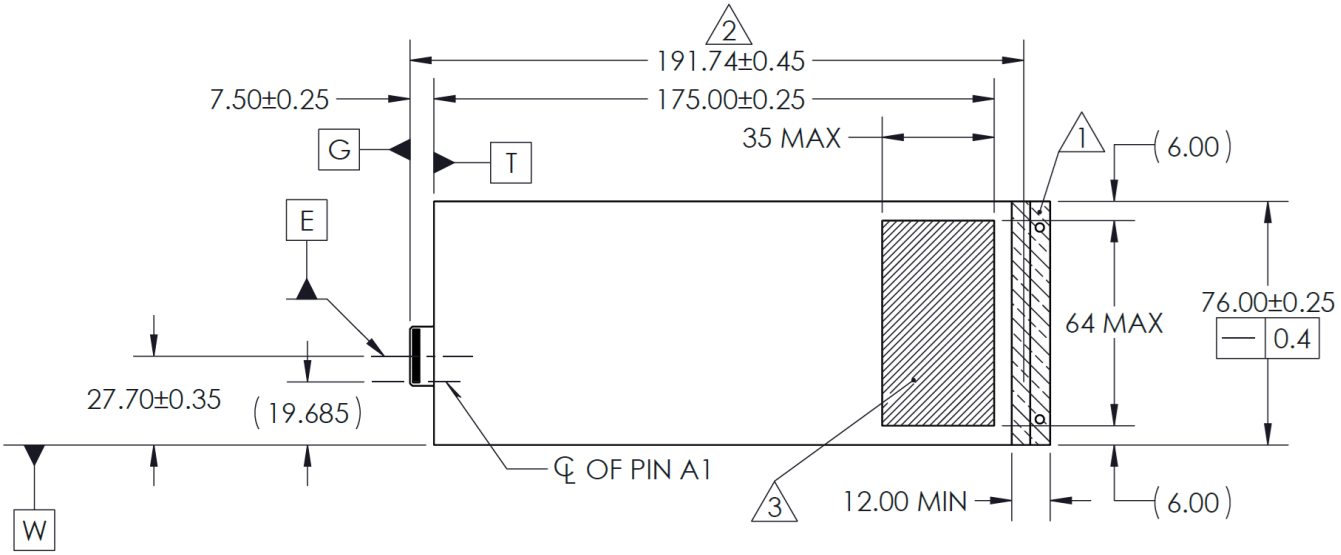


Figure 5-1. Primary Side of E2

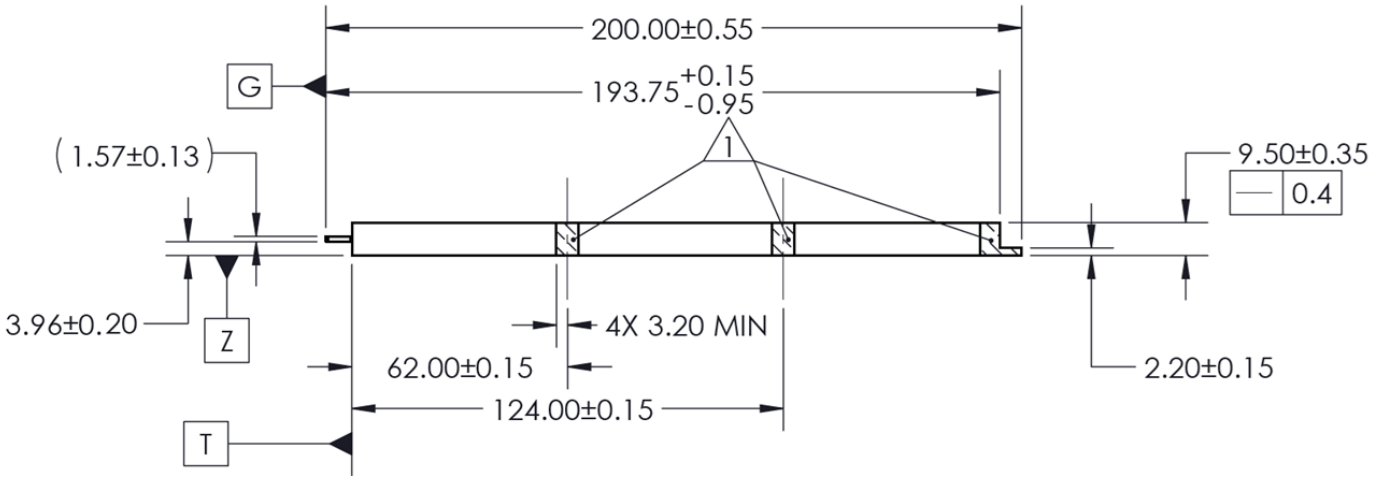


Figure 5-2. Bottom Side of E2

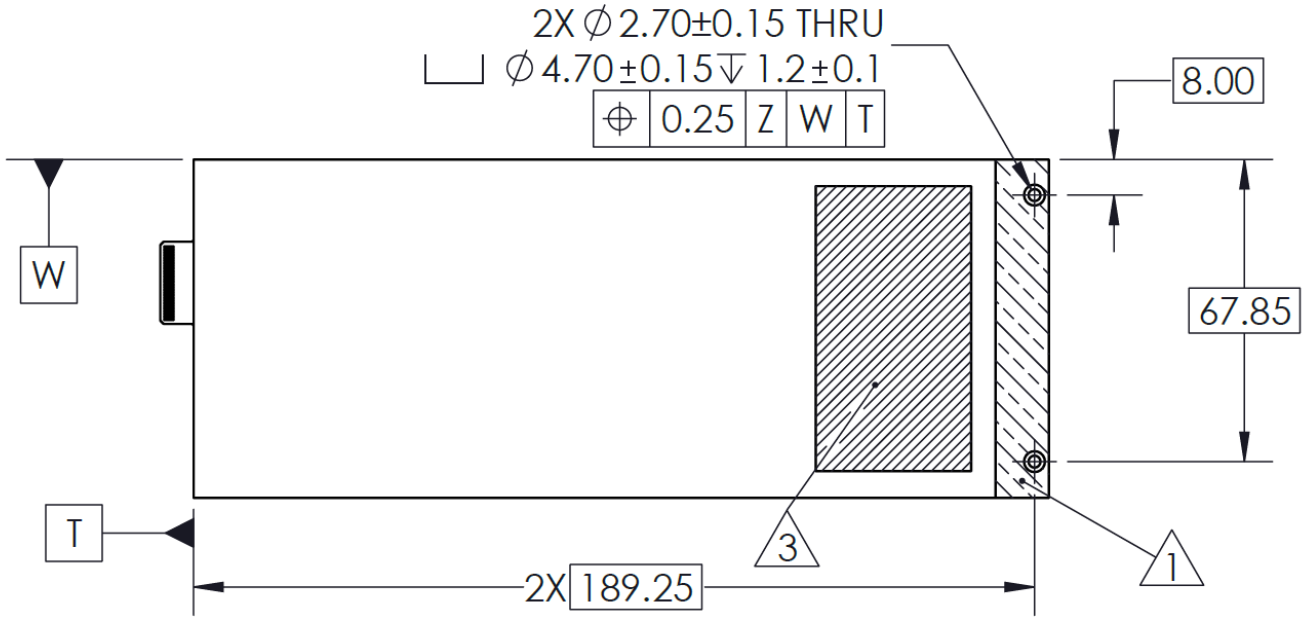


Figure 5-3. Secondary Side of E2

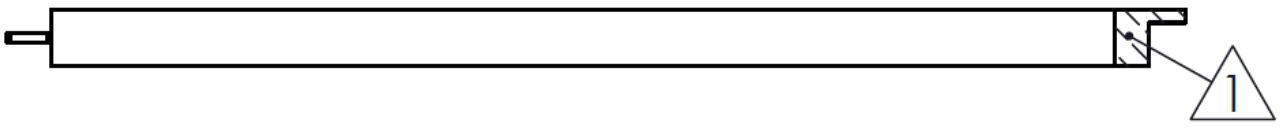


Figure 5-4. Top Side of E2

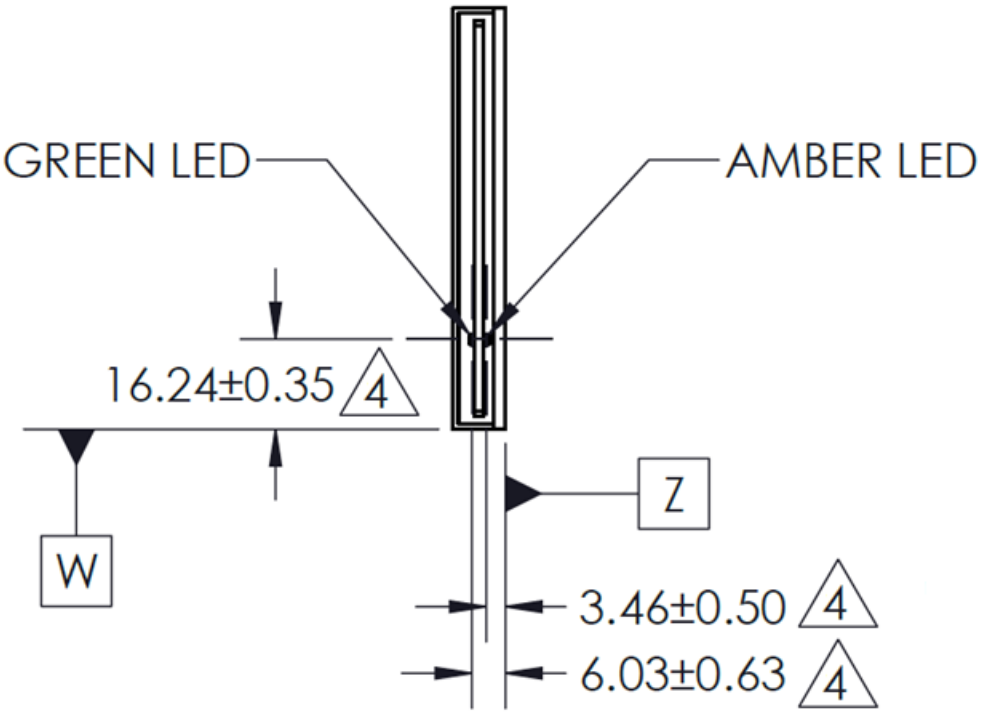
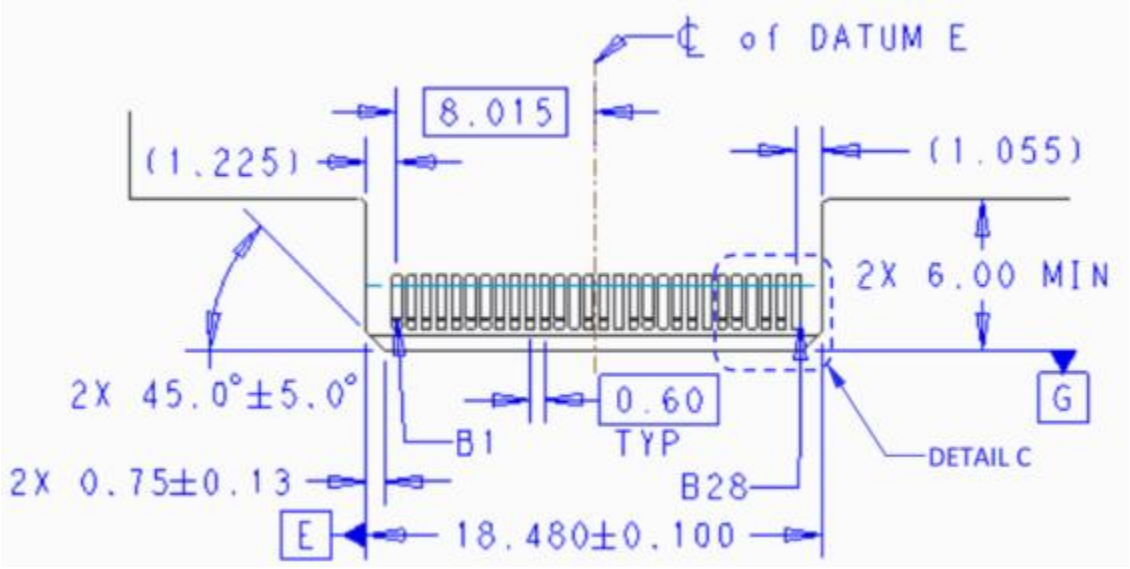


Figure 5-5. Front (LED Facing) Side of E2

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

7. E2 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. Device Power Requirements for E2 system implementation

Parameter	E2	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 host provided requirements on E2 cooling requirements. If none exist, then 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*.