

SFF specifications are available at <http://www.snia.org/sff/specifications>



SFF-TA-1006

Specification for

Enterprise and Datacenter 1U Short SSD Form Factor

Rev 1.1

June 1, 2018

Secretariat: SFF TA TWG

Abstract: This specification defines the mechanical attributes of a 1U short form factor for a solid state drive that will fit in 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).

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

POINTS OF CONTACT:

Anthony Constantine
Intel Corporation
2111 NE 25th Ave,
MS JF5-270
Hillsboro, OR 97124
Ph: 971 215 1128
Email: anthony.m.constantine@intel.com

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

Jonathan Hinkle
Lenovo
7001 Development Drive
Morrisville, NC 27560,
Ph: 919 257 6211
Email: jhinkle@lenovo.com

Intellectual Property

The user's attention is called to the possibility that implementation of this specification may require the use of an invention covered by patent rights. By distribution of this specification, no position is taken with respect to the validity of a claim or claims or of any patent rights in connection therewith. This specification is considered SNIA Architecture and is covered by the SNIA IP Policy and as a result goes through a request for disclosure when it is published. Additional information can be found at the following locations:

- Results of IP Disclosures: <http://www.snia.org/sffdisclosures>
- SNIA IP Policy: <http://www.snia.org/ippolicy>

Change History

- 1.0 January 16, 2018
 - Initial Release with editorial fixes to TOC and Fig 4-1 diagram
- 1.1 June 1, 2018
 - Updated IP section and foreword per current policy.
 - Corrected ASME reference in 2.3 for consistency.
 - Corrected dimension F1 in Table 4-1.
 - Corrected Figure 4-2 to remove E dimension and changed the radius of the notches in Detail A and B.
 - Further updates to TOC

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, the membership has included a mix of companies which are leaders across the industry.

When 2 1/2" diameter disk drives were introduced, there was no commonality on external dimensions e.g. physical size, mounting locations, connector type, connector location, between vendors. The SFF Committee provided a forum for system integrators and vendors to define the form factor of disk drives.

During their definition, other activities were suggested because participants in SFF faced more challenges than the form factors. In November 1992, the charter was expanded to address any issues of general interest and concern to the storage industry. The SFF Committee became a forum for resolving industry issues that are either not addressed by the standards process or need an immediate solution.

In July 2016, the SFF Committee transitioned to SNIA (Storage Networking Industry Association), as a TA (Technology Affiliate) TWG (Technical Work Group).

Industry consensus is not a requirement to publish a specification because it is recognized that in an emerging product area, there is room for more than one approach. By making the documentation on competing proposals available, an integrator can examine the alternatives available and select the product that is felt to be most suitable.

SFF meets during the T10 (see www.t10.org) and T11 (see www.t11.org) weeks, and SSWGs (Specific Subject Working Groups) are held at the convenience of the participants.

Many of the specifications developed by SFF have either been incorporated into standards or adopted as standards by ANSI, EIA, JEDEC and SAE.

For those who wish to participate in the activities of the SFF TWG, the sign-up for membership can be found at:

<http://www.snia.org/sff/join>

The complete list of SFF Specifications which have been completed or are currently being worked on by the SFF Committee is contained in the document SFF-8000 which can be found at:

<http://www.snia.org/sff/specifications>

Suggestions for improvement of this specification will be welcome, they should be submitted to:

<http://www.snia.org/feedback>

CONTENTS

1. Scope	5
1.1 Application Specific Criteria	5
1.2 Copyright	5
1.3 Disclaimer	5
2. References	6
2.1 Industry Documents	6
2.2 Sources	6
2.3 Conventions	6
2.4 Definitions	6
3. General Description	7
4. Physical Definition: 1U Short Form Factor	8
5. Informative: SFF-TA-1002 edge (plug) Mechanical drawing	11

FIGURES

Figure 3-1. Example system implementations of 1U short form factor.	7
Figure 4-1. 5.9mm Thick (12W) 1U Short Form Factor caseless drawing	8
Figure 4-2. 1U Short Form Factor drawing with heatspreader option	10
Figure 5-1. 1C (x4) Mating Card Dimensions	11

TABLES

Table 4-1. 1U Short Form Factor Common Dimensions	9
Table 4-2. 1U Short Form Factor – Optional Heatspreader Dimensions	10

1. Scope

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

1.1 Application Specific Criteria

This 1U short 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 1U short form factor is an enclosure connecting one or more drives in a restricted packaging environment.

1.2 Copyright

The SNIA hereby grants permission for individuals to use this document for personal use only, and for corporations and other business entities to use this document for internal use only (including internal copying, distribution, and display) provided that:

1. Any text, diagram, chart, table or definition reproduced shall be reproduced in its entirety with no alteration, and,
2. Any document, printed or electronic, in which material from this document (or any portion hereof) is reproduced shall acknowledge the SNIA copyright on that material, and shall credit the SNIA for granting permission for its reuse.

Other than as explicitly provided above, there may be no commercial use of this document, or sale of any part, or this entire document, or distribution of this document to third parties. All rights not explicitly granted are expressly reserved to SNIA.

Permission to use this document for purposes other than those enumerated (Exception) above may be requested by e-mailing copyright_request@snia.org. Please include the identity of the requesting individual and/or company and a brief description of the purpose, nature, and scope of the requested use. Permission for the Exception shall not be unreasonably withheld. It can be assumed permission is granted if the Exception request is not acknowledged within ten (10) business days of SNIA's receipt. Any denial of permission for the Exception shall include an explanation of such refusal.

1.3 Disclaimer

The information contained in this publication is subject to change without notice. The SNIA makes no warranty of any kind with regard to this specification, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. The SNIA shall not be liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this specification.

Suggestions for revisions should be directed to <http://www.snia.org/feedback/>

2. References

2.1 Industry Documents

- ASME Y14.5-2009 published by ASME
- SNIA SFF-TA-1002 Protocol Agnostic Multi-Lane High Speed Connector specification available at <http://www.snia.org>.

2.2 Sources

There are several projects active within the SFF TWG. The complete list of specifications which have been completed or are still being worked on are listed in <http://www.snia.org/sff/specifications/SFF-8000.xls>

ASME documents are available at <https://www.asme.org>

2.3 Conventions

The dimensioning conventions are described in ASME Y14.5-2009, Geometric Dimensioning and Tolerancing. All dimensions are in millimeters, which are the controlling dimensional units (if inches are supplied, they are for guidance only).

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

2.4 Definitions

For the purpose of SFF Specifications, the following definitions apply:

1U: 1 Standard Unit or Rack Unit 44.50 mm (1.752 inches).

Card: Refers to the device plugged into a connector

Device: Refers to the interface slave

Host: Refers to the interface source or master

NVM: Acronym for Non-Volatile Memory

SSD: Acronym for Solid State Drive

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

3. General Description

The application environment for the 1U short 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 SSD 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 and performance highly scalable in 1U. The device connects electrically to the system through a card edge connector as defined in SFF-TA-1002. There are multiple thicknesses of the 1U short form factor depending on the max power rating. The definition of mounting holes and component placement area allows for attachment of mechanicals to adapt among different enclosure chassis, such as rails and latching. The form factor is designed not to require a fully enclosed case, but outer dimensions of a case version are included for compatibility if one is desired. Figure 3-1 represents some high-level system implementations and usage model examples for the form factor.

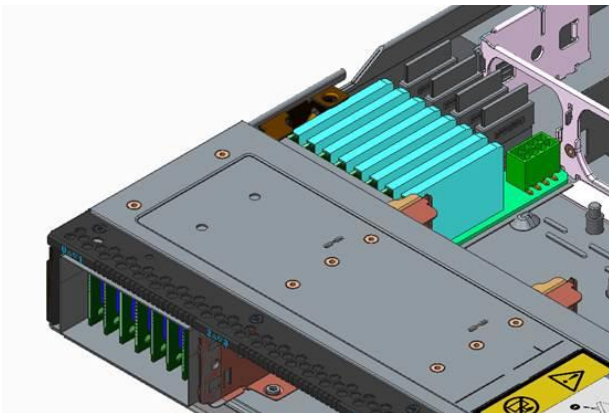
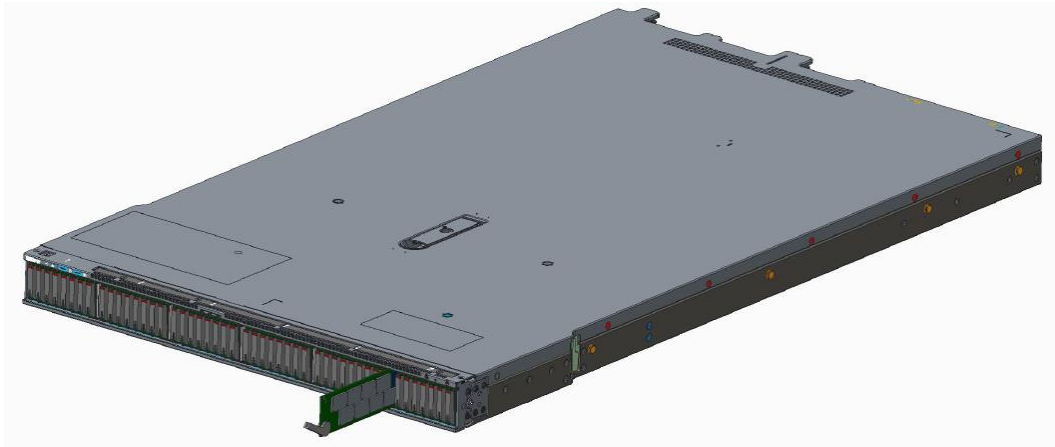


FIGURE 3-1. EXAMPLE SYSTEM IMPLEMENTATIONS OF 1U SHORT FORM FACTOR.

4. Physical Definition: 1U Short Form Factor

This section specifies the dimensions for the 1U short form factor including the caseless board with a max sustained power rating of 12W and an optional heat spreader. All specified mounting holes shall be grounded and mechanical attachment should not exceed radius of defined copper pads. The defined hatched area is component placement area. Any labels must be in component placement or optional heat spreader area. Default tolerance is +/- 0.15mm. All dimensions provided in mm.

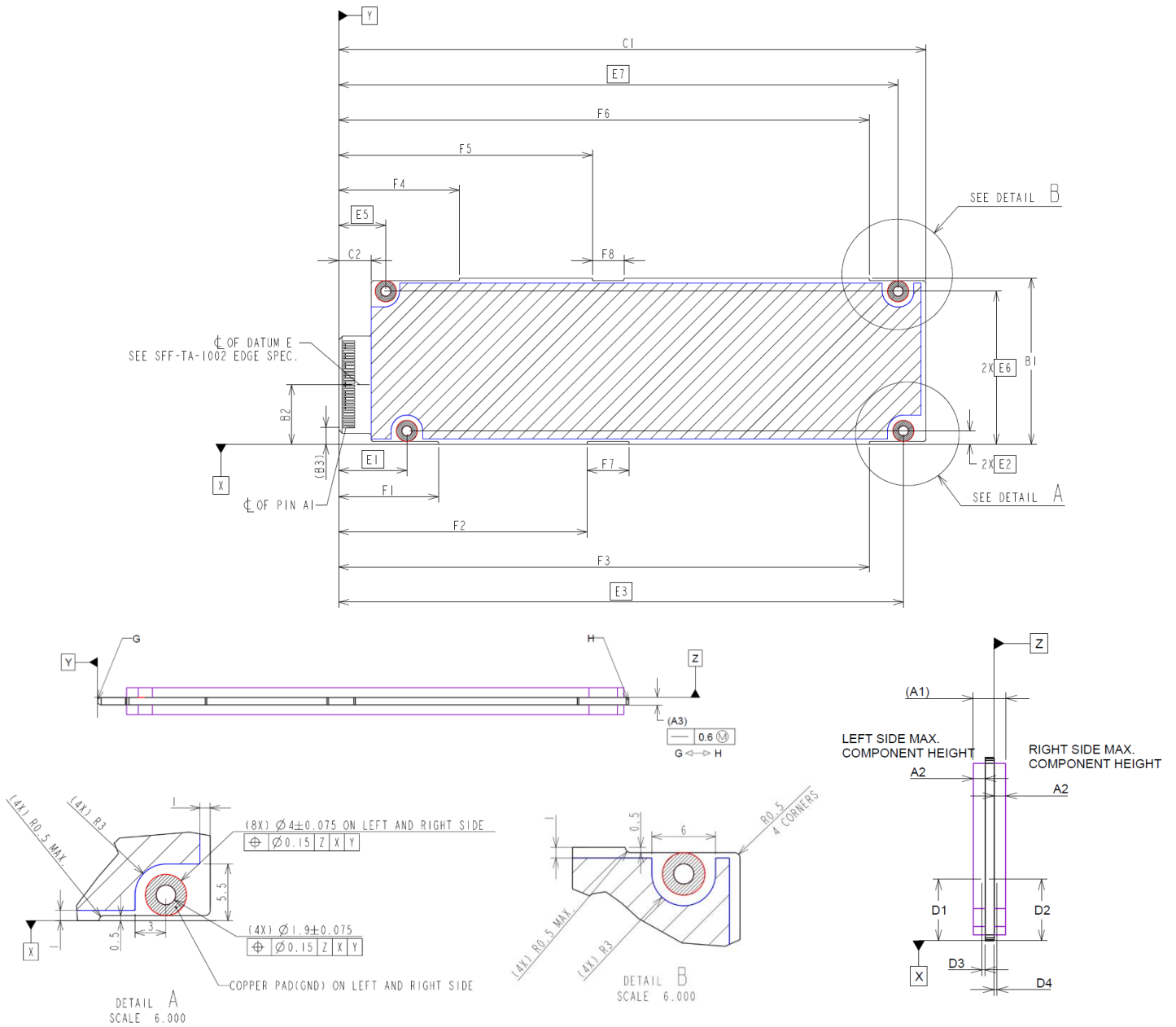


Figure 4-1. 5.9mm Thick (12W) 1U Short Form Factor caseless drawing

TABLE 4-1. 1U SHORT FORM FACTOR COMMON DIMENSIONS

Dimensions	Millimeters	Tolerance	Comment
A1	5.9		Maximum drive thickness (reference)
A2	2.10		Maximum component height
A3	1.57	0.13	PCB Card Edge thickness (ref: see SFF-TA-1002)
B1	31.5	0.2	Drive height with defined cutouts
B2	11.23	0.15	Card Bottom Edge to centerline of Datum E
B3	3.21	0.15	Center of Connector Pin A1 location from PCB (reference)
C1	111.49	0.15	Add in card Length
C2	6.15	0.15	Card edge length
D1	10.6	0.15	Power and activity (Green) LED position, edge of keep in
D2	10.6	0.15	Attention or error (Amber) LED position, edge of keep in
D3	0.5		Power and activity (Green) LED center position
D4	0.5		Attention or error (Amber) LED center position
E1	12.95		Mounting hole 1 x position
E2	2.5		Mounting hole 1 y and 2y positions
E3	107.19		Mounting hole 2 x position
E5	8.95		Mounting hole 3 x position
E6	29		Mounting hole 3 y and 4y positions
E7	106.19		Mounting hole 4 x position
F1	18.95	0.15	Cutout 1 - 12.8x0.5
F2	47.15	0.15	Cutout 2 - 8x0.5
F3	100.69	0.15	Cutout 3 - 10.8x0.5
F4	22.95	0.15	Cutout 4 - 16.8x0.5
F5	48.15	0.15	Cutout 5 - 6x0.5
F6	100.69	0.15	Cutout 6 - 20.8x0.5
F7	8	0.15	Width of cutout 2
F8	6	0.15	Width of cutout 5

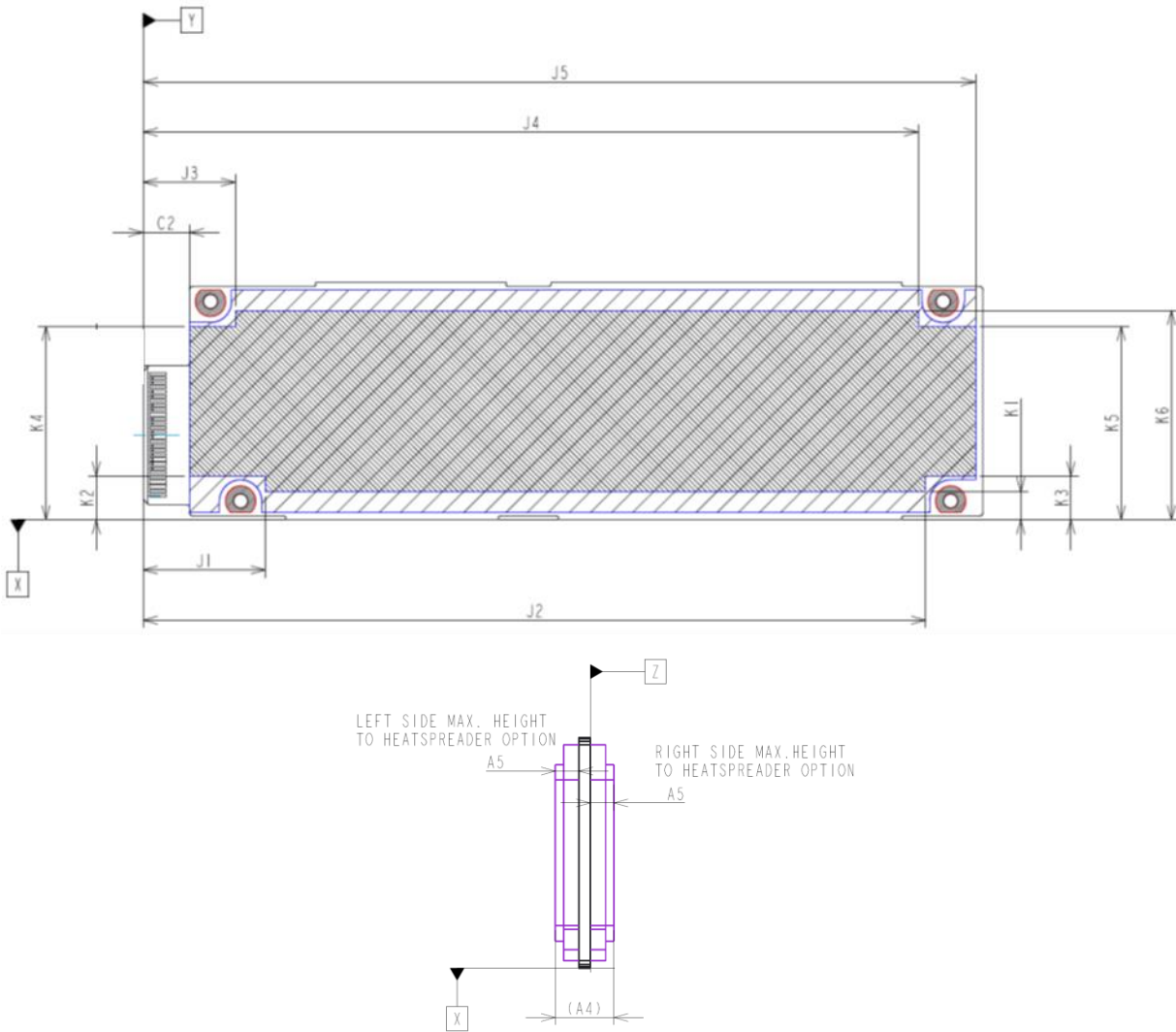


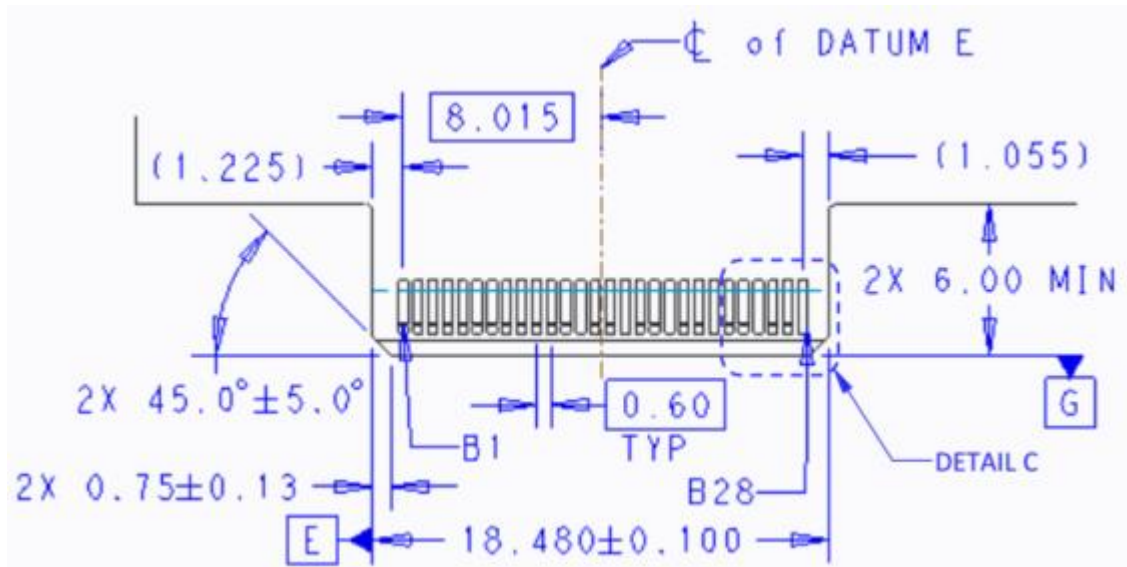
FIGURE 4-2. 1U SHORT FORM FACTOR DRAWING WITH HEATSPREADER OPTION

TABLE 4-2. 1U SHORT FORM FACTOR – OPTIONAL HEATSPREADER DIMENSIONS

Dimensions	Millimeters	Tolerance	Comment
A4	8.01		Drive thickness including heatspreader (reference)
A5	3.22	0.25	PCB to outer thickness for heatspreader option
J1	16.25		Heatspreader option 1x position
J2	103.89		Heatspreader option 2x position
J3	12.25		Heatspreader option 3x position
J4	102.89		Heatspreader option 4x position
J5	110.49		Heatspreader option 5x position
K1	3.7		Heatspreader option 1y position
K2	5.8		Heatspreader option 2y position
K3	5.8		Heatspreader option 3y position
K4	25.7		Heatspreader option 4y position
K5	25.7		Heatspreader option 5y position
K6	27.8		Heatspreader option 6y position

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

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 5-1. 1C (X4) MATING CARD DIMENSIONS