SFF-TA-1008

Specification for

Enterprise and Datacenter Standard Form Factor (E3)

Revision 3.0a **July 10, 2026**

SECRETARIAT: SFF TWG

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

ABSTRACT: This specification defines the mechanical attributes for a family of form factor devices known as E3 with multiple length and multiple thickness variants that can be used in 1U, 2U, and any other host systems designed to support this form factor.

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

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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 *March 3, 2020*

- First release

Rev 2.0 *November 6, 2020*

- **This revision of the specification supersedes and obsoletes all previous versions of this specification**.
- Changes to the nomenclature describing the devices
- Increasing the length of a short length device to 112.75mm
- Changed E3.S length tolerance to +/-0.4mm
- Changed E3.L length tolerance to +/-0.4m
- Changed the device nomenclature of thickness from 2x to 2T
- Changed thickness tolerance of 7.5mm devices to 7.5 +0.2/-0.5mm
- Updated the connector pin 1 location
- Changed Table 6-1 to informative
- Added Note 10 to allow for up to three screws in the riding surfaces
- Added a Section 0 for label requirements & added dimensions on label areas
- Added references governing use of Hot Surface Warning Label
- Changes to the LED requirements and location
- Updates to drawings & minor edits to drawing notes
- Made several editorial changes

Rev 2.1 *October 31, 2023*

- Updated Points of Contact
- Updated EDSFF acronym to Enterprise and Datacenter Standard Form Factor
- Clarified use models in Abstract and General Description
- Updated all mechanical drawings to show support for the 4C+ connector
- Section 3.3: Updated host and device definitions
- Section 4: Clarified the areas of the surfaces and screw holes that allowed to be either conductive or non-conductive. Clarified riding surfaces.
- Added example 3D view of E3.S 2T 2x1C device in Figure 4-1
- Section 5.2: Added requirements for LED apertures
- Added Section 5.4 E3.S 2T 2x1C connectors
- Section 5.5: Clarified language describing label size and positioning
- Section 5.6: Updated to better align LED definition with SFF-TA-1009
- Table 5-1: Changed nomenclature for form factor "height" to "width" to align with other form factor specs
- Figure 5-7: Added clarification on E3 2T minimum thickness
- Updated Figure 5-12 to include side and rear views
- Changed Figure 5-12 flatness and perpendicularity requirements from 0.1mm to 0.25mm
- Section 6: Updated Initial Slot Power requirements
- Section 6.3: Added "Sustained" to title for Section 6.3 and Table 6-2
- Section 7: Added Initial Slot Power requirements and reordered

Rev 3.0 *July 6, 2026*

- Editorial changes to boilerplate
- Section 4: Updated description of contact surfaces and DLC support
- Figure 4-1: Updated to show new Key feature on E3.S and E3.L
- Section 5.1: Clarified Datum H,J,K References

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- Section 5.2: Updated drawings, notes, and measurements for Direct Liquid Cooling (DLC) support. Devices based on Revision 2.1 and older may not be compatible, starting with Revision 3.0 specification.
- Figure 5-1: Updated device thickness tolerance to be symmetrical
- Section 5.3, 5.4: Removed secondary grounding strip in the 2T.
- Section 5.5: Updated drawings and notes for E3.S and E3.L labeling as a function of DLC enablement.
- Section 5.7: Added mechanical key for identifying devices supporting DLC vs. older devices.
- Section 6: Power/thermal requirements updated.
- Section 7: Refreshed all reference images to match SFF-TA-1002 Rev 1.6a
- Note: All Figures not mentioned above were re-rendered from the latest model for consistency in formatting with no substantive changes.
- Increased label area maximum length for E3.S and E3.L (1T)

Rev 3.0a *July 10, 2026*

- Editorial change to Figure 5-4
- Editorial changes to Figure cross references within Section 5.2

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1. Scope

This specification defines the mechanical attributes of a family of device form factors that fit in host systems designed to support this form factor.

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
- SFF-TA-1002 Protocol Agnostic Multi-Lane High Speed Connector specification
- SFF-TA-1009 Enterprise and Datacenter SSD Pin and Signal specification
- SFF-TA-1023 Thermal Specification for EDSFF Devices
- UL/IEC/EN 60950-1 Information Technology Equipment – Safety – Part 1: General Requirements
- UL/IEC/EN 62368-1 Audio/Video Information and Communication Technology Equipment

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.

Copies of ASME standards may be obtained from the American Society of Mechanical Engineers (https://www.asme.org).

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2.3 Conventions

DEFINITIONS: Certain words and terms used in this standard have a specific meaning beyond the normal English meaning. These words and terms are either defined in this section 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

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3. Keywords, Acronyms, and Definitions

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

3.1 Keywords

Mandatory: Indicates items to be implemented as defined by this specification

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, that feature shall be done in the same way as defined by the specification. Describing a feature as optional in the text is an informal 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 this term is used for a signal on a connector contact, the signal 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 the specification.

Should: Indicates flexibility of choice with a strongly preferred alternative. Equivalent to the phrase "it is recommended".

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

1C: Version of SFF-TA-1002 connector that supports an x4 PCIe interface
1U: 1 Standard Unit or Rack Unit 44.45 mm (1.75 inches)
2C: Version of SFF-TA-1002 connector that supports an x8 PCIe interface
2T: Double thick device (16.8mm)
2U: 2 Standard Units or Rack Unit 88.90 mm (3.50 inches)
2x1C: Device with two 1C card edge connectors to support a x8 PCIe interface in a x4 host infrastructure
4C: Version of SFF-TA-1002 connector that supports an x16 PCIe interface
4C+: Version of SFF-TA-1002 connectors that supports an x16 PCIe interface plus an additional tab
DLC: Acronym for Direct Liquid Cooling
NVM: Acronym for Non-Volatile Memory
SSD: Acronym for Solid State Drive
x4: 4 lane device interface link width
x8: 8 lane device interface link width
x16: 16 lane device interface link width

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3.3 Definitions

Host: Refers to the interface source or upstream connection
Device: Refers to the interface target
Thickness: Form factor dimension including PCB thickness, z-height of all components plus mechanicals

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4. General Description

The application environment for the device form factor is a cabinet or enclosure connecting to one or more devices. The device connects electrically to the system through a card edge connector as defined in SFF-TA-1002. This form factor is intended for use in 1U, 2U, and any other host systems designed to support this form factor (i.e., 1U refers to 1 standard unit of an IT equipment rack and the IT enclosures that fit in this space).

The primary usage of this form factor is for SSDs and/or storage class memory in storage and server systems. Additional use cases include but are not limited to CXL devices, accelerators, and network interface cards (NICs).

The form factor defines a family of devices that vary in length and thickness. Devices may support a variety of interface link widths.

This specification defines the outside dimensions and features of the device enclosure and system interface point. This specification defines the device card edge PCB mating interface with the system but does not define PCB design internal to the device. Internal PCB design is left to the implementer.

Figure 4-1 shows example 3D views for some of the device form factors.

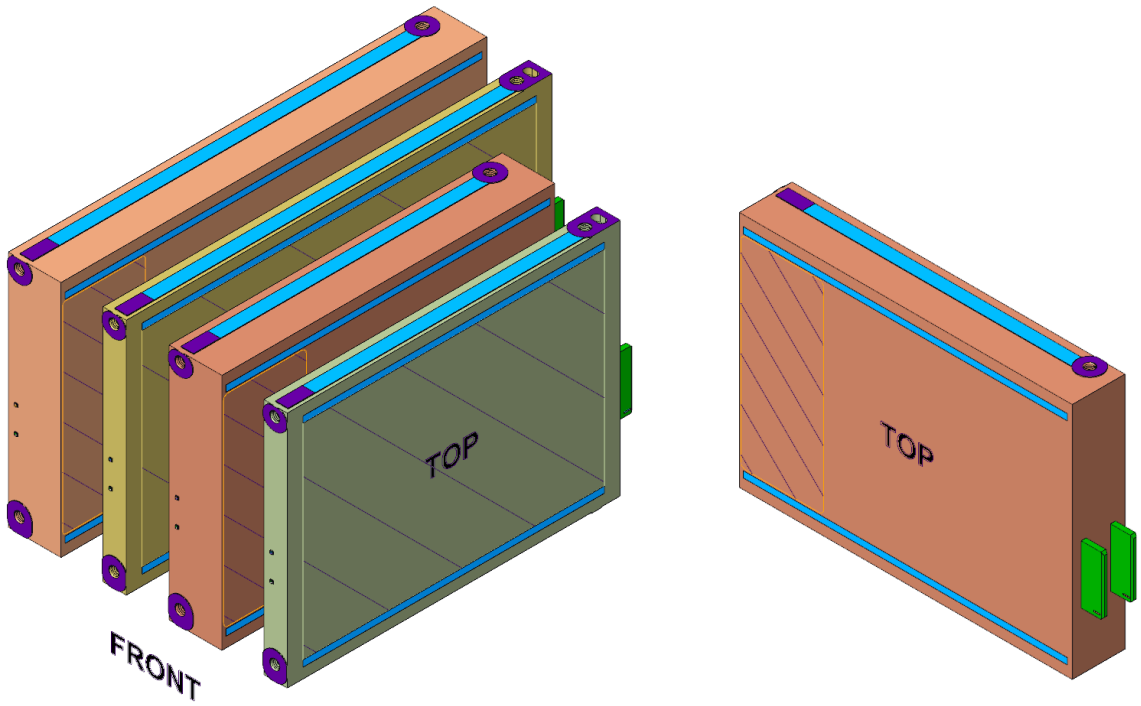


Figure 4-1. Example Device 3D Views

The example above includes the following device implementations starting from left to right.

- E3 long double thickness device (E3.L 2T)
- E3 long single thickness device (E3.L)
- E3 short double thickness device (E3.S 2T)
- E3 short single thickness device (E3.S)
- E3 short double thickness 2x1C device (E3.S 2T 2x1C)

Additional variations of the form factor may be defined in future versions of this specification.

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

Connector signal assignments are defined in SFF-TA-1009.

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The form factor is specified including an enclosure, with two (2) mounting holes at the front of the device enclosure and one (1) additional mounting hole on each side of the device enclosure which may be used for latch and/or carrier attachment points. The latch/carrier is beyond the scope of the specification.

Implementations conforming to this form factor may support multiple host connection link widths as defined by SFF-TA-1002. Link widths supported by this form factor include x4 (1C), x8 (2C), x8 (2x1C), x16 (4C), and extended x16 (4C+). The example devices in Figure 4-1 are shown with a x4 (1C) connector. Dashed lines show potential x8 (2C), x16 (4C), and x16 (4C+) implementations.

The form factor specifies the size and location for two (2) LED apertures. Additional LED requirements are defined by the SFF-TA-1009 specification.

This specification defines a series of surfaces that are used for contact or grounding. These defined surfaces are intentionally identified in the drawings with hatch markings and represent functional surfaces at outer extents of the form factor.

- If flatness is not specified, then the defined surface is not necessarily raised and may be coplanar with surrounding surfaces, but shall not be lower than surrounding surfaces.
- If flatness is specified, then the defined surface shall be coplanar with adjacent hatched surfaces, and shall not be lower than any adjacent surface not identified with hatch markings.
- Surfaces that are not used for grounding are allowed to be conductive or non-conductive. Screw holes shall be conductive.

This specification defines cooling interface areas and associated support areas for DLC enablement in E3.S and E3.L devices. A mechanical key is defined to prevent devices designed against earlier revisions of this specification from being deployed into DLC infrastructure and experiencing potentially damaging pressure that device was not designed for.

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5. Physical Configurations: Device Form Factor

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

This specification allows for device implementations that may vary in length and thickness. Table 5-1 lists the nominal dimensions for four device variations.

Table 5-1 Nominal Device Form Factor Dimensions

Device Variation	Width	Length	Thickness
E3.S	**76mm**	**112.75mm**	**7.5mm**
E3.S 2T	**76mm**	**112.75mm**	**16.8mm**
E3.L	**76mm**	**142.2mm**	**7.5mm**
E3.L 2T	**76mm**	**142.2mm**	**16.8mm**

5.1 Datum references

For all the dimensions shown for the different variants of the E3 form factor within this specification, the datums listed in Table 5-2 are defined by this specification or the SFF-TA-1002 specification mating card variants.

Table 5-2 Datum Reference for Device Form Factor Dimensions

Datum	Reference
A	SFF-TA-1008
B	SFF-TA-1008
C	SFF-TA-1008
D	SFF-TA-1002
E	SFF-TA-1002
F	SFF-TA-1002
G	SFF-TA-1002
H	SFF-TA-1002 Datum E (for 2x1C)
J	SFF-TA-1002 Datum D (for 2x1C)
K	SFF-TA-1002 Datum G (for 2x1C)

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5.2 E3 Single Thickness Form Factor Physical Dimensions

This section defines the physical dimensions for the E3 single thickness variations of the E3 form factor. These variations include a short version and a long version. All dimensions and geometric tolerances are based on values when no force is applied. The shape of each form factor is shown for example purposes only.

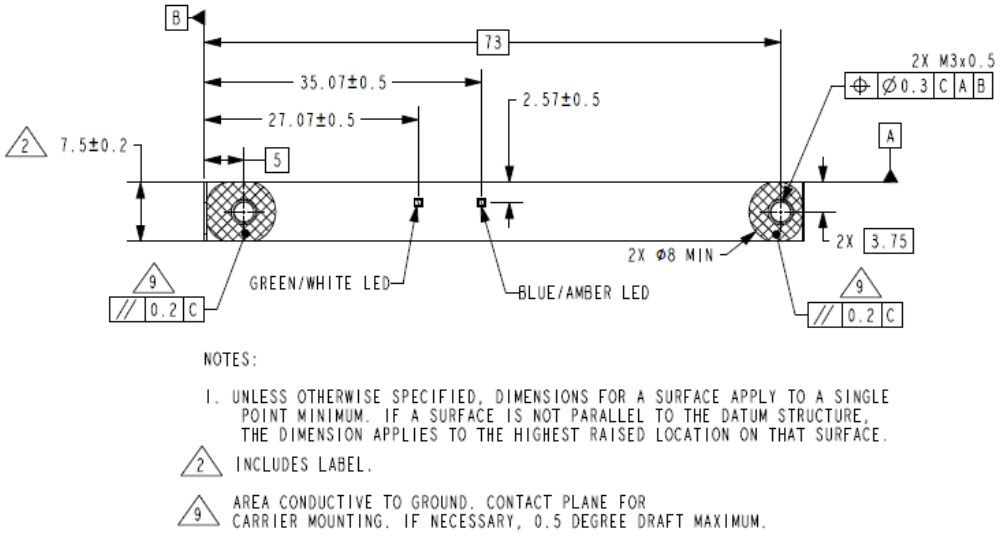


Figure 5-1 E3 Front View

Figure 5-1 defines the center point of the LED apertures. The aperture for each LED shall be a 1.8mm +/- 0.2mm diameter hole. LEDs and any internal light pipes shall be shielded from each other to prevent bleed from one LED to another. LED light shall be prohibited from escaping the case through openings other than the respective LED apertures (e.g., thermal relief holes). Additional LED requirements are found in the SFF-TA-1009 specification.

Planes except for keep-out areas (e.g., riding surfaces, screw holes, or labels) may have cutouts for debugging or thermal relief.

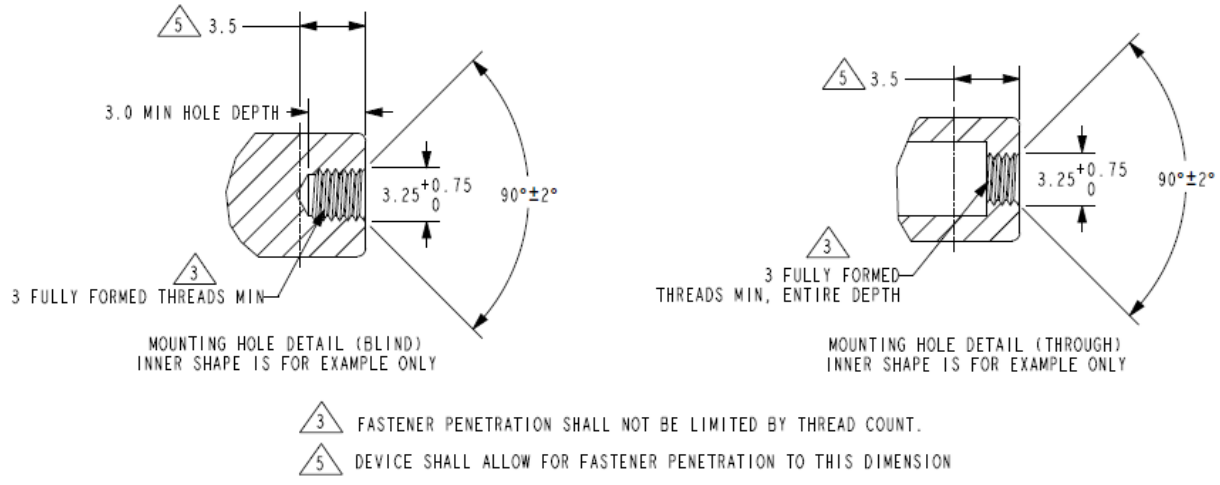


Figure 5-2 Mounting Hole Details

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E3.S and E3.L support both air and DLC. Single sided (Top only) and dual sided (Top and Bottom) DLC is supported.

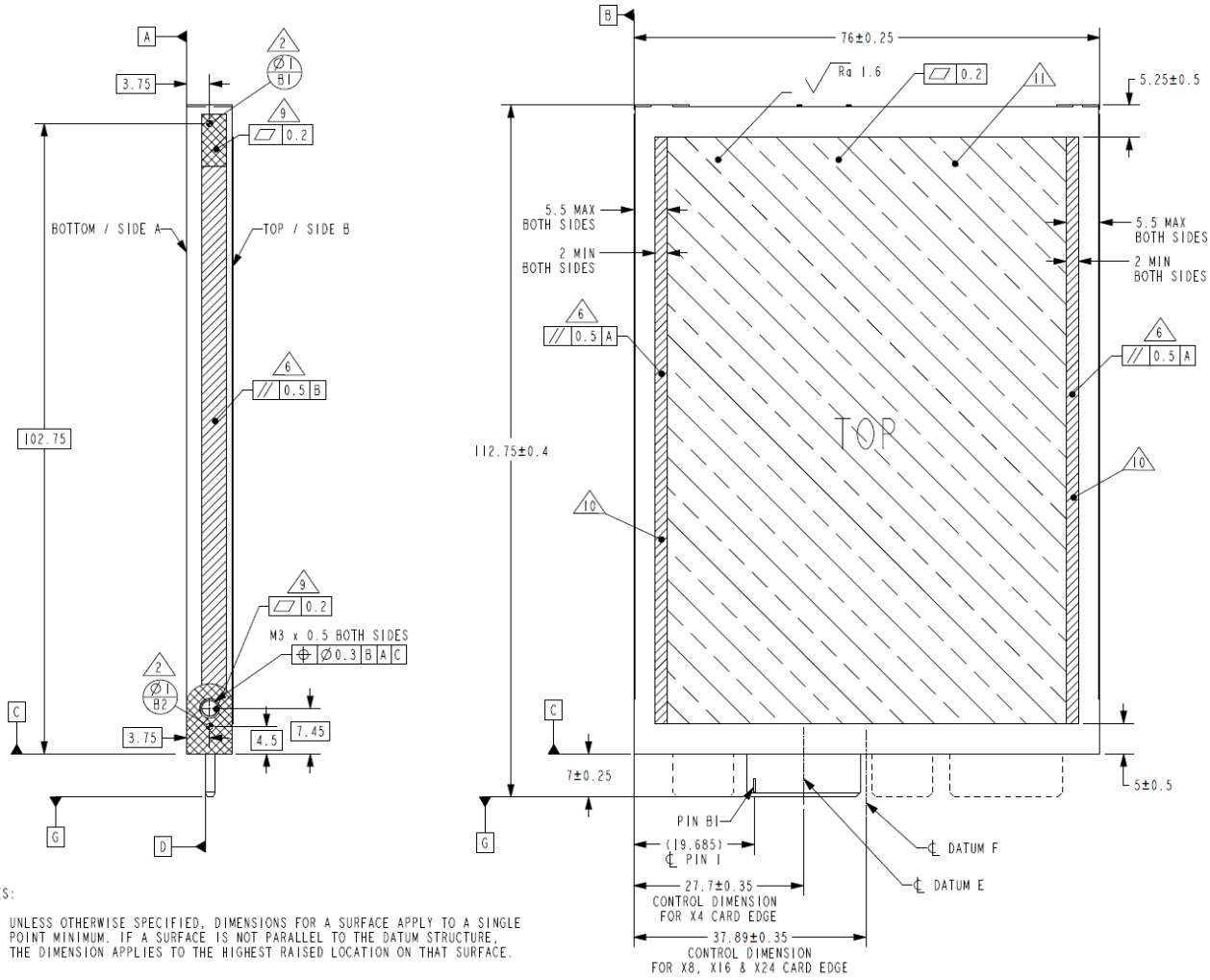
When single sided cooling is implemented, pressure shall be applied in the primary cooling interface area as shown in Figure 5-3 (E3.S) and Figure 5-5 (E3.L). Two support areas for the applied pressure are defined on the bottom side in Figure 5-4 (E3.S) and Figure 5-6 (E3.L); systems may choose to utilize either or both support areas.

When dual sided cooling is implemented, pressure shall be applied in the primary cooling interface area on the top and the secondary cooling interface area on the bottom as shown in Figure 5-4 (E3.S) and Figure 5-6 (E3.L). When primary and secondary cooling interfaces are both used, forces should be equal and opposite, with each cooling interface acting as support for the other.

E3.S and E3.L devices shall support 103 kPa applied to the primary and/or secondary cooling interface areas.

Warning: In DLC usage, the force applied to the cooling interface area(s) should not be applied such that there is excessive shear force applied to the card edge and connector. This is a host responsibility and could result to the card edge and/or connector due to this excessive force.

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NOTES:

1. UNLESS OTHERWISE SPECIFIED, DIMENSIONS FOR A SURFACE APPLY TO A SINGLE POINT MINIMUM. IF A SURFACE IS NOT PARALLEL TO THE DATUM STRUCTURE, THE DIMENSION APPLIES TO THE HIGHEST RAISED LOCATION ON THAT SURFACE.

2. B1 & B2 ARE DATUM TARGETS USED FOR GD&T MEASUREMENT PURPOSES. THEY ARE NOT PHYSICAL FEATURES ON THE DEVICE.

6. DEVICE RIDING SURFACE. IF NECESSARY, 1.5 DEGREE DRAFT MAXIMUM. COOLING INTERFACE AREAS MAY EXTEND INTO RIDING SURFACES BUT SHOULD NOT EXTEND TO THE EDGE OF THE DEVICE.

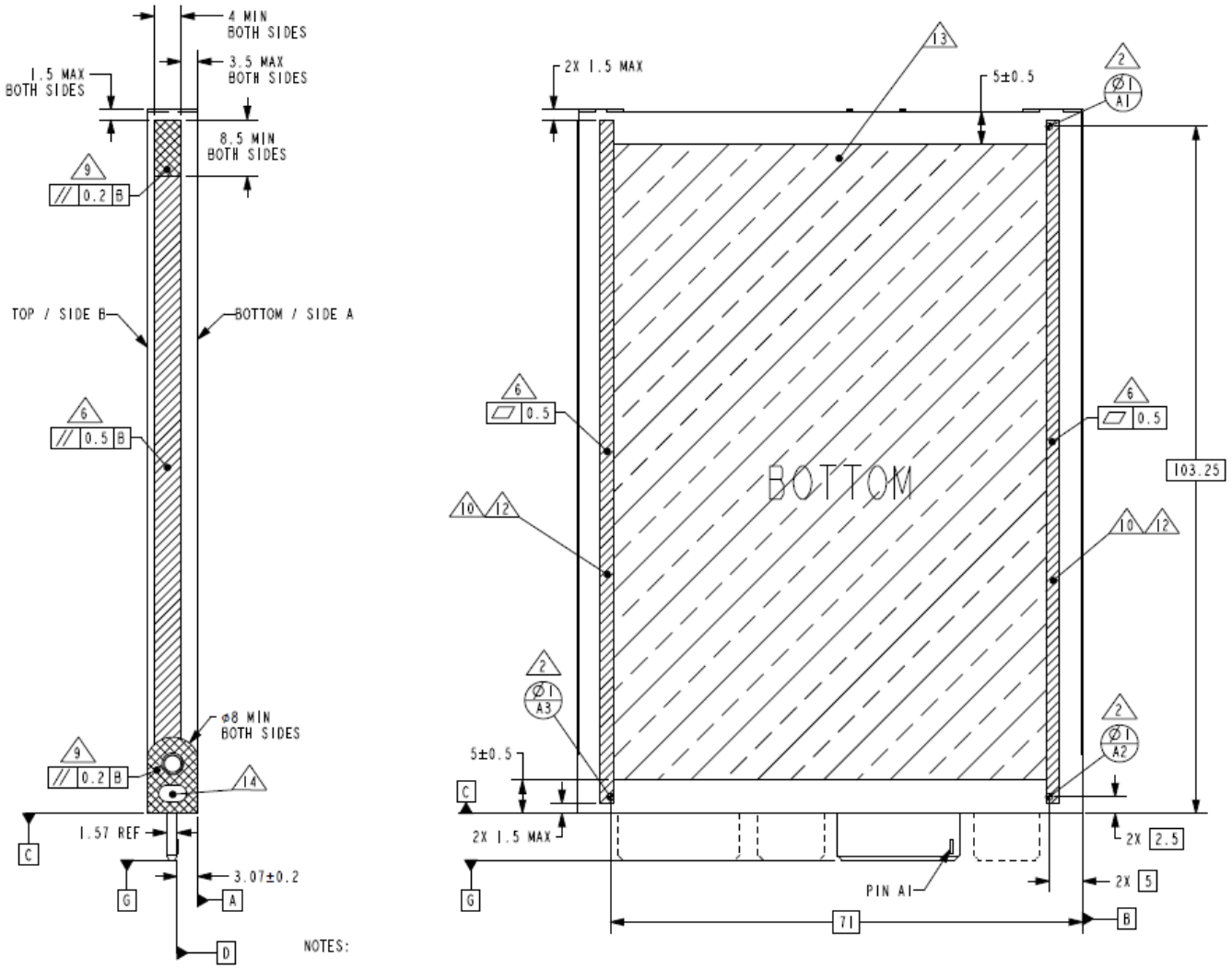
9. AREA CONDUCTIVE TO GROUND. CONTACT PLANE FOR CARRIER MOUNTING. IF NECESSARY, 0.5 DEGREE DRAFT MAXIMUM.

10. MAXIMUM 3 SEPARATE CONCAVE SURFACES Ø10 MAX ALLOWED IN THESE AREAS AND CONCAVE SURFACES MAY EXTEND INTO THE COOLING INTERFACE AREA.

11. PRIMARY COOLING INTERFACE AREA.

Figure 5-3 E3.S Top & Side View

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NOTES:

1. UNLESS OTHERWISE SPECIFIED, DIMENSIONS FOR A SURFACE APPLY TO A SINGLE POINT MINIMUM. IF A SURFACE IS NOT PARALLEL TO THE DATUM STRUCTURE, THE DIMENSION APPLIES TO THE HIGHEST RAISED LOCATION ON THAT SURFACE.

2. A1, A2 & A3 ARE DATUM TARGETS USED FOR GD&T MEASUREMENT PURPOSES. THEY ARE NOT PHYSICAL FEATURES ON THE DEVICE.

6. DEVICE RIDING SURFACE. IF NECESSARY, 1.5 DEGREE DRAFT MAXIMUM.

9. AREA CONDUCTIVE TO GROUND. CONTACT PLANE FOR CARRIER MOUNTING. IF NECESSARY, 0.5 DEGREE DRAFT MAXIMUM.

10. MAXIMUM 3 SEPARATE CONCAVE SURFACES Ø10 MAX ALLOWED IN THESE AREAS AND CONCAVE SURFACES MAY EXTEND INTO THE COOLING INTERFACE AREA.

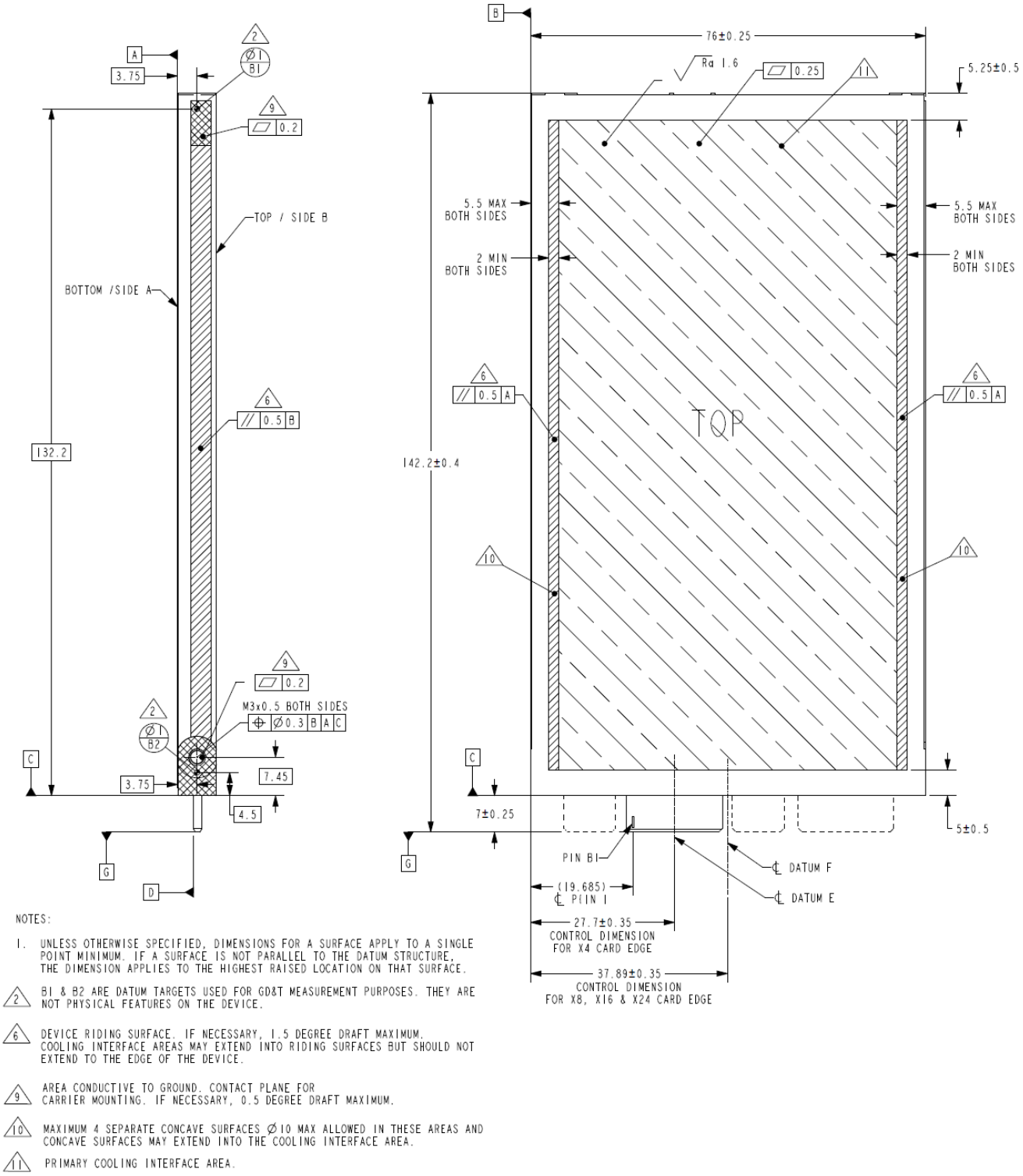
12. SUPPORT AREAS FOR PRIMARY COOLING INTERFACE.

13. SUPPORT AREA FOR PRIMARY COOLING INTERFACE AREA / SECONDARY COOLING INTERFACE AREA.

14. SEE SECTION 5.7 OF SFF-TA-1008

Figure 5-4 E3.S Bottom & Side View

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NOTES:

1. UNLESS OTHERWISE SPECIFIED, DIMENSIONS FOR A SURFACE APPLY TO A SINGLE POINT MINIMUM. IF A SURFACE IS NOT PARALLEL TO THE DATUM STRUCTURE, THE DIMENSION APPLIES TO THE HIGHEST RAISED LOCATION ON THAT SURFACE.

2. B1 & B2 ARE DATUM TARGETS USED FOR GD&T MEASUREMENT PURPOSES. THEY ARE NOT PHYSICAL FEATURES ON THE DEVICE.

6. DEVICE RIDING SURFACE. IF NECESSARY, 1.5 DEGREE DRAFT MAXIMUM. COOLING INTERFACE AREAS MAY EXTEND INTO RIDING SURFACES BUT SHOULD NOT EXTEND TO THE EDGE OF THE DEVICE.

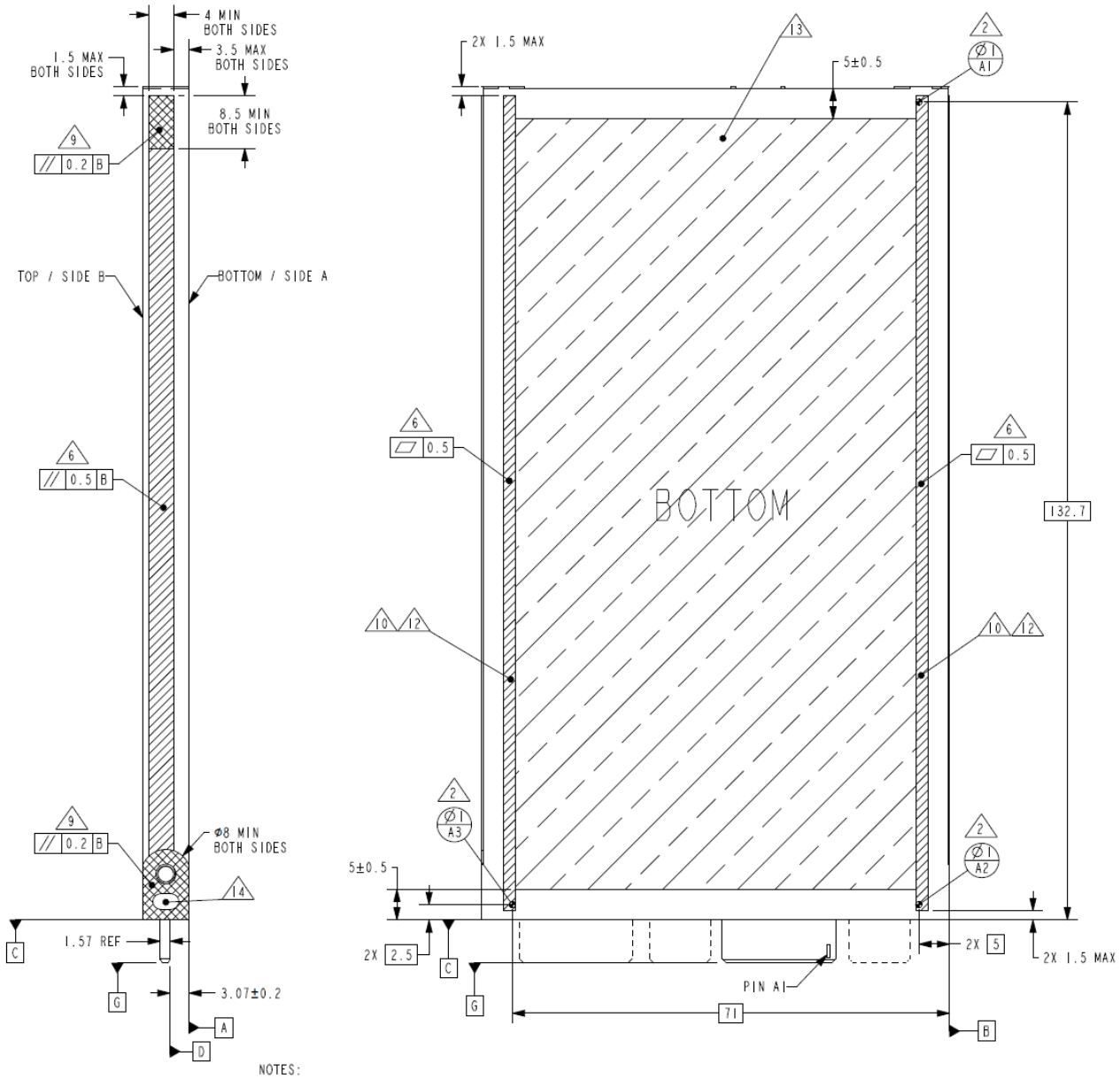
9. AREA CONDUCTIVE TO GROUND. CONTACT PLANE FOR CARRIER MOUNTING. IF NECESSARY, 0.5 DEGREE DRAFT MAXIMUM.

10. MAXIMUM 4 SEPARATE CONCAVE SURFACES Ø10 MAX ALLOWED IN THESE AREAS AND CONCAVE SURFACES MAY EXTEND INTO THE COOLING INTERFACE AREA.

11. PRIMARY COOLING INTERFACE AREA.

Figure 5-5 E3.L Top & Side View

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NOTES:

1. UNLESS OTHERWISE SPECIFIED, DIMENSIONS FOR A SURFACE APPLY TO A SINGLE POINT MINIMUM. IF A SURFACE IS NOT PARALLEL TO THE DATUM STRUCTURE, THE DIMENSION APPLIES TO THE HIGHEST RAISED LOCATION ON THAT SURFACE.

2. A1, A2 & A3 ARE DATUM TARGETS USED FOR GD&T MEASUREMENT PURPOSES. THEY ARE NOT PHYSICAL FEATURES ON THE DEVICE.

6. DEVICE RIDING SURFACE. IF NECESSARY, 1.5 DEGREE DRAFT MAXIMUM.

9. AREA CONDUCTIVE TO GROUND. CONTACT PLANE FOR CARRIER MOUNTING. IF NECESSARY, 0.5 DEGREE DRAFT MAXIMUM.

10. MAXIMUM 4 SEPARATE CONCAVE SURFACES Ø10 MAX ALLOWED IN THESE AREAS AND CONCAVE SURFACES MAY EXTEND INTO THE COOLING INTERFACE AREA.

12. SUPPORT AREAS FOR PRIMARY COOLING INTERFACE.

13. SUPPORT AREA FOR PRIMARY COOLING INTERFACE / SECONDARY COOLING INTERFACE AREA.

14. SEE SECTION 5.7 OF SFF-TA-1008

Figure 5-6 E3.L Side & Bottom View

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5.3 E3 Double Thickness Form Factor Physical Dimensions

This section defines the physical dimensions for the E3 2T variations of the E3 form factor. These variations include a short version and a long version. The shape of each form factor is shown for example purposes only.

Planes except for keep-out areas (e.g., riding surfaces, screw holes, or labels) may have cutouts for debugging or thermal relief.

Dimensions not shown are identical to the E3 single thickness variations.

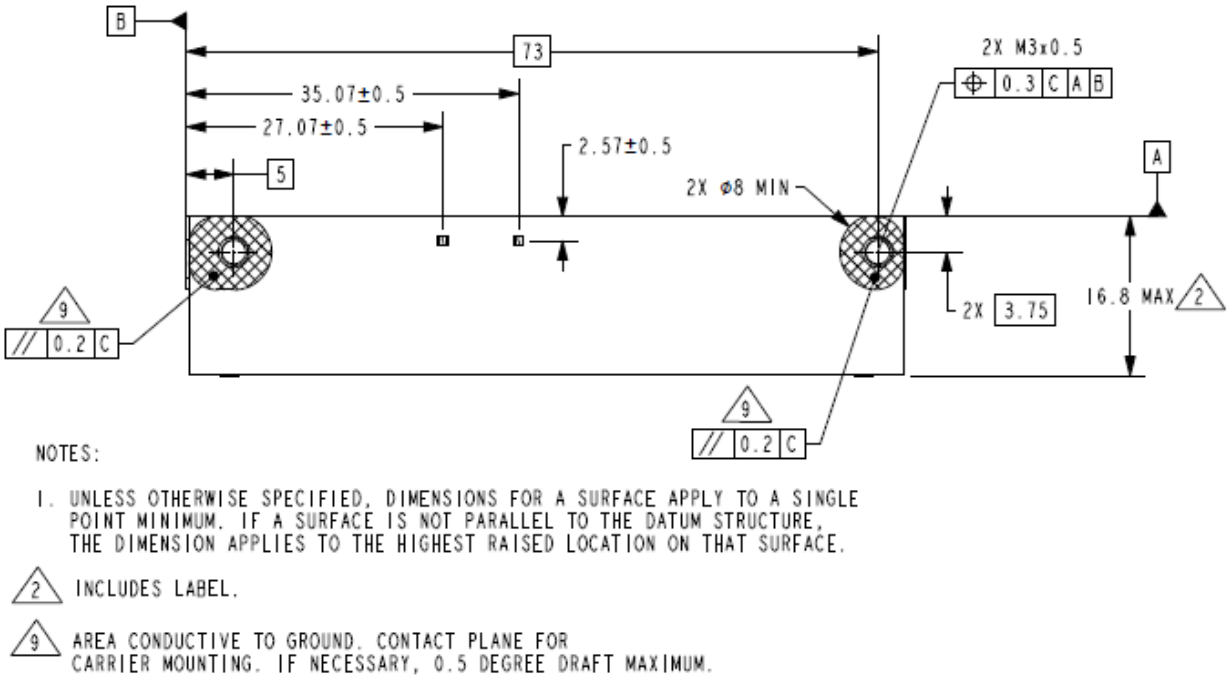


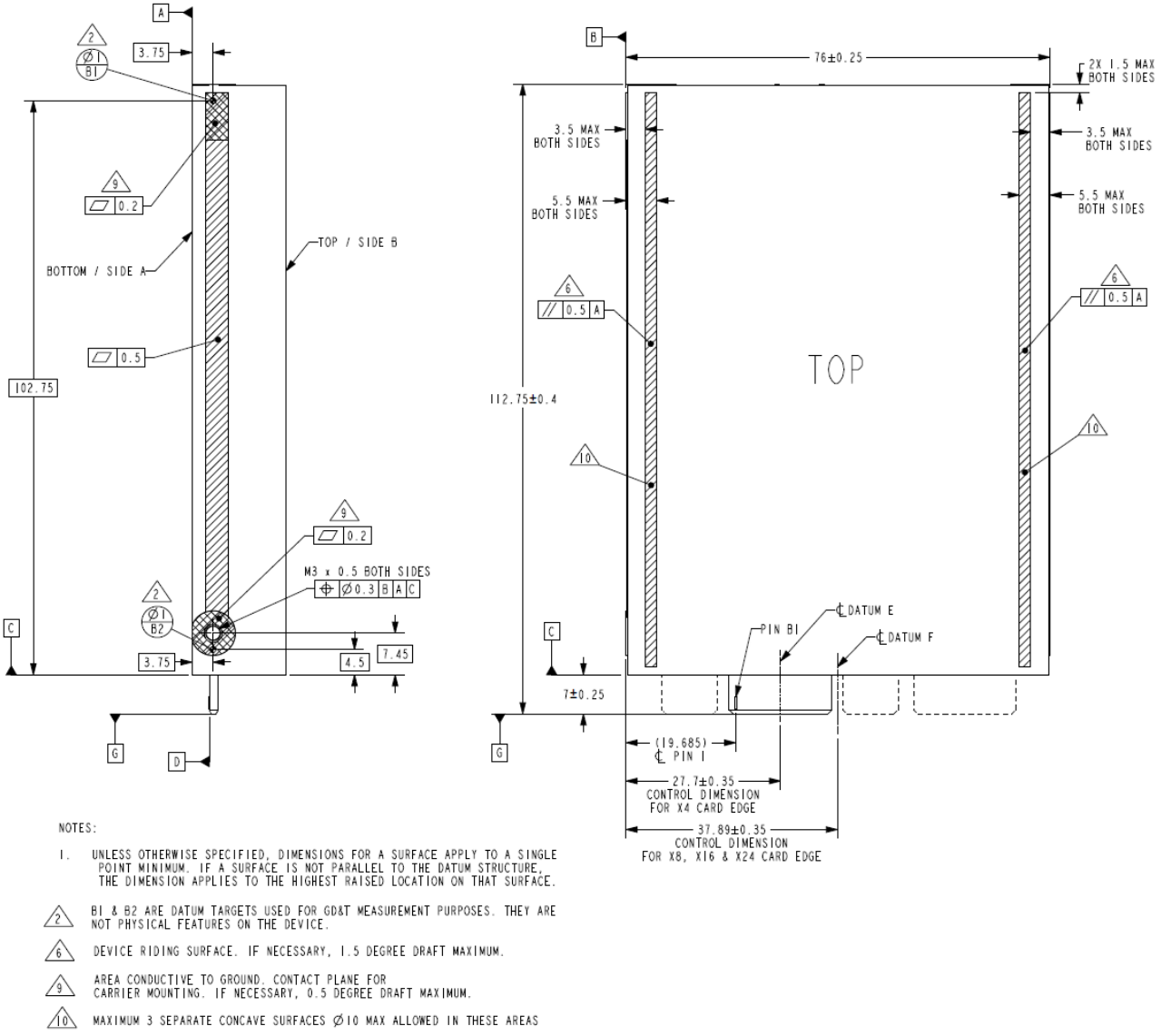
Figure 5-7 E3 2T Front View

Figure 5-7 defines the center point of the LED apertures. The aperture for each LED shall be a 1.8mm +/- 0.2mm diameter hole. LEDs and any internal light pipes shall be shielded from each other to prevent bleed from one LED to another. LED light shall be prohibited from escaping the case through openings other than the respective LED apertures (e.g., thermal relief holes). Additional LED requirements are found in the SFF-TA-1009 specification.

The example in Figure 5-7 shows a solid body implementation. Implementations may implement finned structures to maximize thermal performance. E3 2T device implementations may be less than 16.8mm thickness as long as that device is greater than the minimum thickness of a single thickness E3 device, e.g. 7mm. Refer to SFF-TA-1023 for thermal requirements and characterizations for device implementations.

Planes except for keep-out areas (e.g., riding surfaces, screw holes, or labels) may have cutouts for debugging or thermal relief.

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NOTES:

1. UNLESS OTHERWISE SPECIFIED, DIMENSIONS FOR A SURFACE APPLY TO A SINGLE POINT MINIMUM. IF A SURFACE IS NOT PARALLEL TO THE DATUM STRUCTURE, THE DIMENSION APPLIES TO THE HIGHEST RAISED LOCATION ON THAT SURFACE.

2. B1 & B2 ARE DATUM TARGETS USED FOR GD&T MEASUREMENT PURPOSES. THEY ARE NOT PHYSICAL FEATURES ON THE DEVICE.

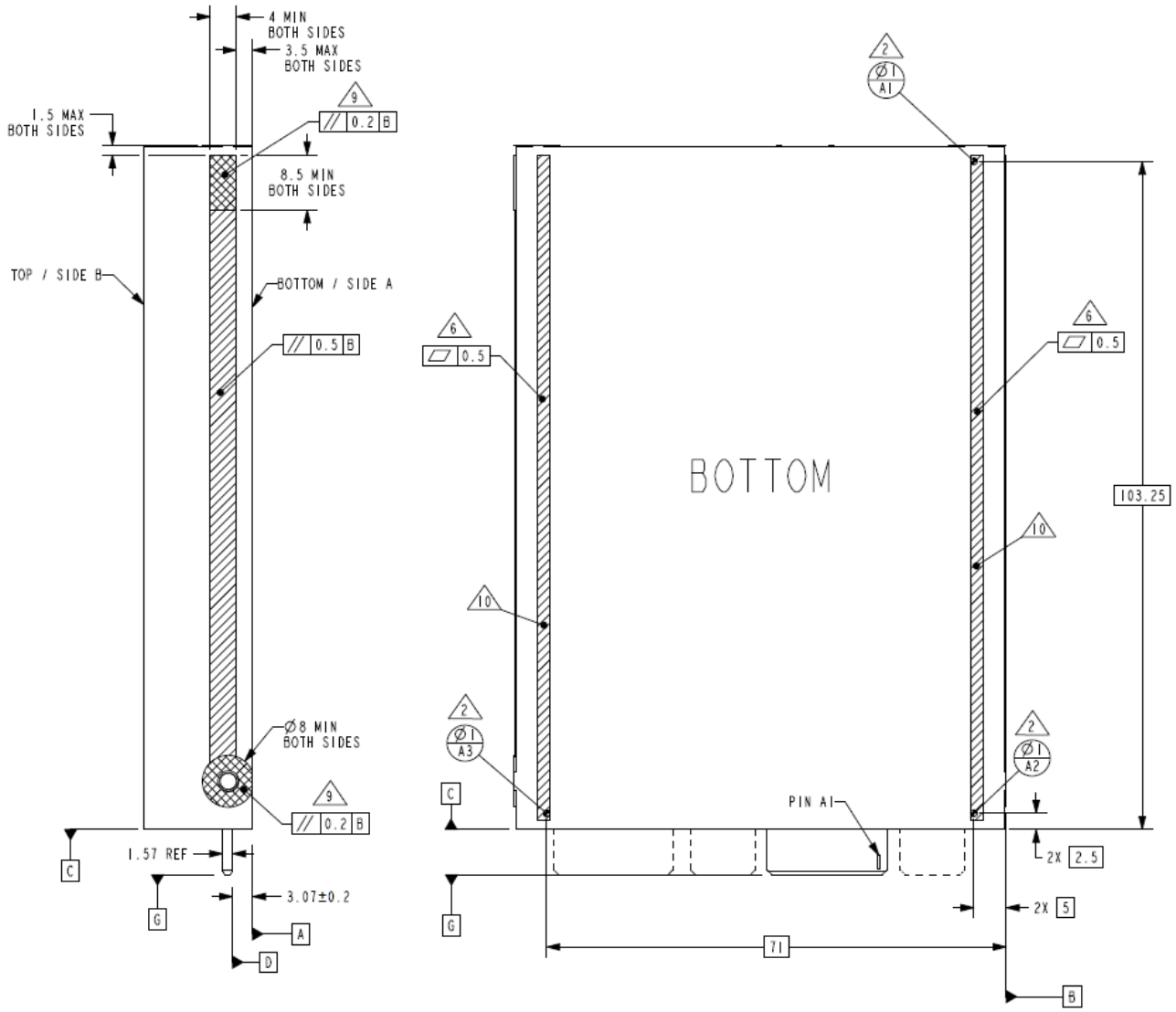
6. DEVICE RIDING SURFACE. IF NECESSARY, 1.5 DEGREE DRAFT MAXIMUM.

9. AREA CONDUCTIVE TO GROUND. CONTACT PLANE FOR CARRIER MOUNTING. IF NECESSARY, 0.5 DEGREE DRAFT MAXIMUM.

10. MAXIMUM 3 SEPARATE CONCAVE SURFACES Ø10 MAX ALLOWED IN THESE AREAS

Figure 5-8 E3.S 2T Top & Side View

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NOTES:

1. UNLESS OTHERWISE SPECIFIED, DIMENSIONS FOR A SURFACE APPLY TO A SINGLE POINT MINIMUM. IF A SURFACE IS NOT PARALLEL TO THE DATUM STRUCTURE, THE DIMENSION APPLIES TO THE HIGHEST RAISED LOCATION ON THAT SURFACE.

2. A1, A2 & A3 ARE DATUM TARGETS USED FOR GD&T MEASUREMENT PURPOSES. THEY ARE NOT PHYSICAL FEATURES ON THE DEVICE.

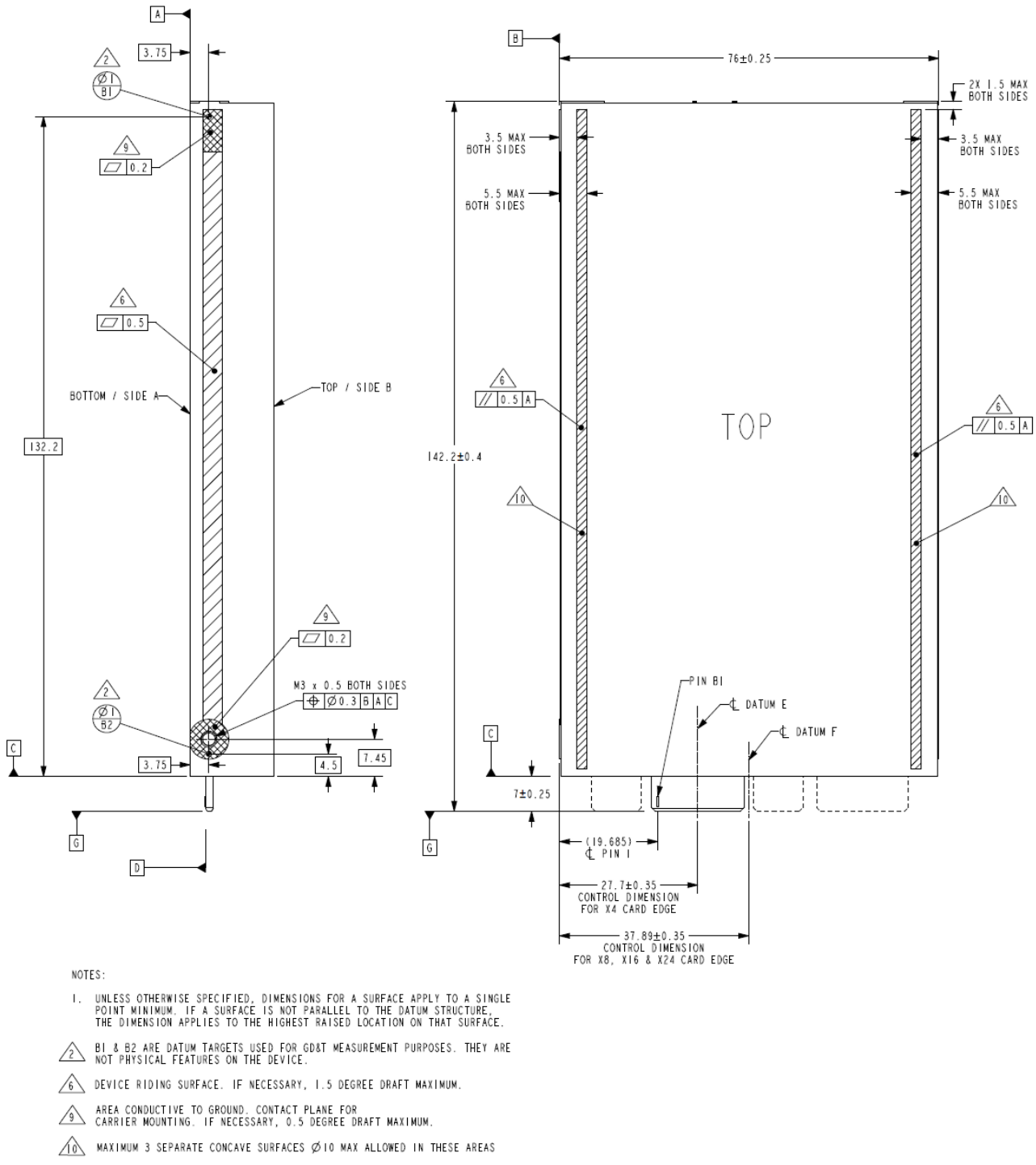
6. DEVICE RIDING SURFACE. IF NECESSARY, 1.5 DEGREE DRAFT MAXIMUM.

9. AREA CONDUCTIVE TO GROUND. CONTACT PLANE FOR CARRIER MOUNTING. IF NECESSARY, 0.5 DEGREE DRAFT MAXIMUM.

10. MAXIMUM 3 SEPARATE CONCAVE SURFACES Ø10 MAX ALLOWED IN THESE AREAS

Figure 5-9 E3.S 2T Side & Bottom View

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NOTES:

1. UNLESS OTHERWISE SPECIFIED, DIMENSIONS FOR A SURFACE APPLY TO A SINGLE POINT MINIMUM. IF A SURFACE IS NOT PARALLEL TO THE DATUM STRUCTURE, THE DIMENSION APPLIES TO THE HIGHEST RAISED LOCATION ON THAT SURFACE.

2. B1 & B2 ARE DATUM TARGETS USED FOR GD&T MEASUREMENT PURPOSES. THEY ARE NOT PHYSICAL FEATURES ON THE DEVICE.

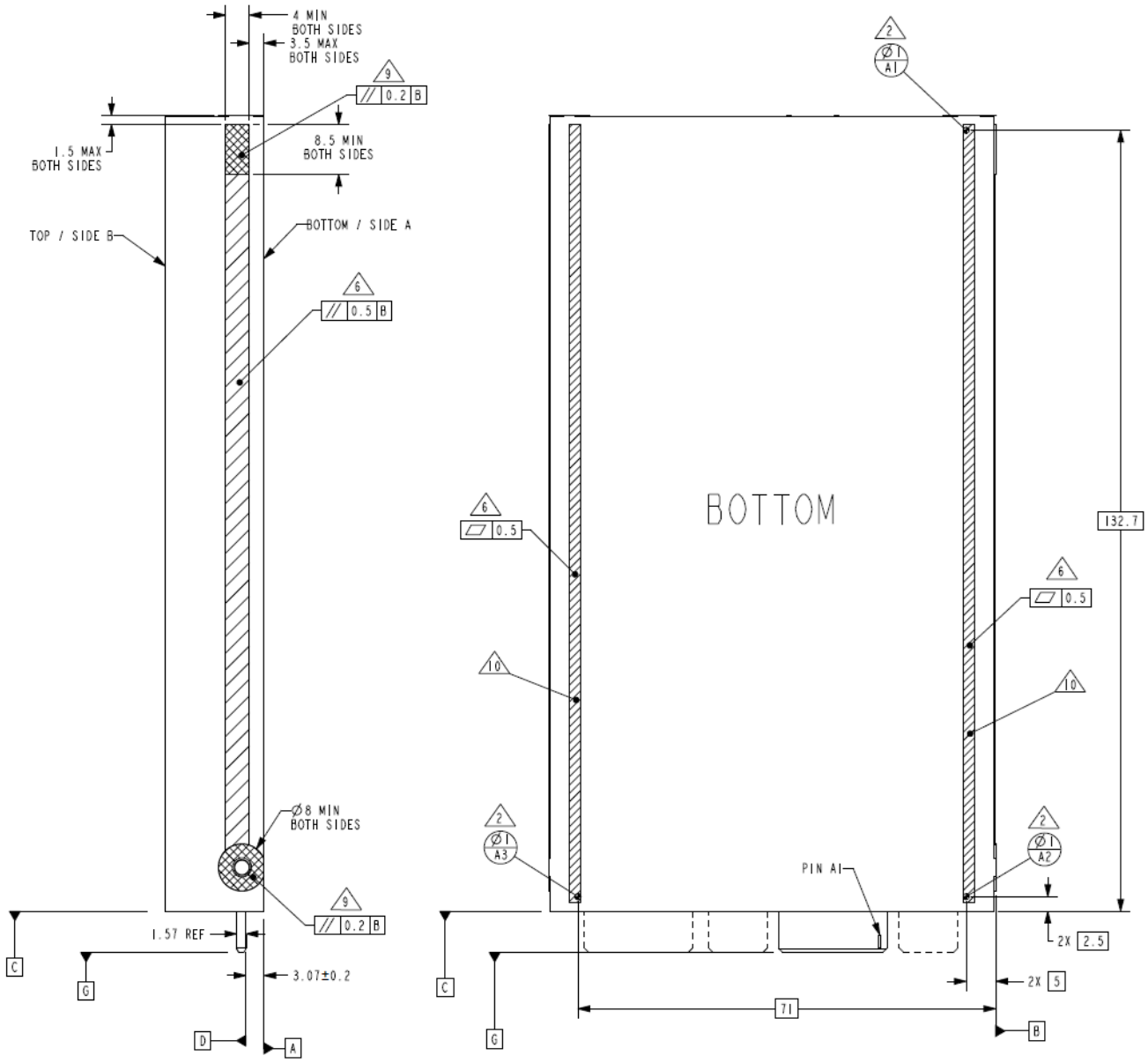
6. DEVICE RIDING SURFACE. IF NECESSARY, 1.5 DEGREE DRAFT MAXIMUM.

9. AREA CONDUCTIVE TO GROUND. CONTACT PLANE FOR CARRIER MOUNTING. IF NECESSARY, 0.5 DEGREE DRAFT MAXIMUM.

10. MAXIMUM 3 SEPARATE CONCAVE SURFACES Ø10 MAX ALLOWED IN THESE AREAS

Figure 5-10 E3.L 2T Top & Side View

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NOTES:

1. UNLESS OTHERWISE SPECIFIED, DIMENSIONS FOR A SURFACE APPLY TO A SINGLE POINT MINIMUM. IF A SURFACE IS NOT PARALLEL TO THE DATUM STRUCTURE, THE DIMENSION APPLIES TO THE HIGHEST RAISED LOCATION ON THAT SURFACE.

2. A1, A2 & A3 ARE DATUM TARGETS USED FOR GD&T MEASUREMENT PURPOSES. THEY ARE NOT PHYSICAL FEATURES ON THE DEVICE.

6. DEVICE RIDING SURFACE. IF NECESSARY, 1.5 DEGREE DRAFT MAXIMUM.

9. AREA CONDUCTIVE TO GROUND. CONTACT PLANE FOR CARRIER MOUNTING. IF NECESSARY, 0.5 DEGREE DRAFT MAXIMUM.

10. MAXIMUM 3 SEPARATE CONCAVE SURFACES Ø10 MAX ALLOWED IN THESE AREAS

Figure 5-11 E3.L 2T Side & Bottom View

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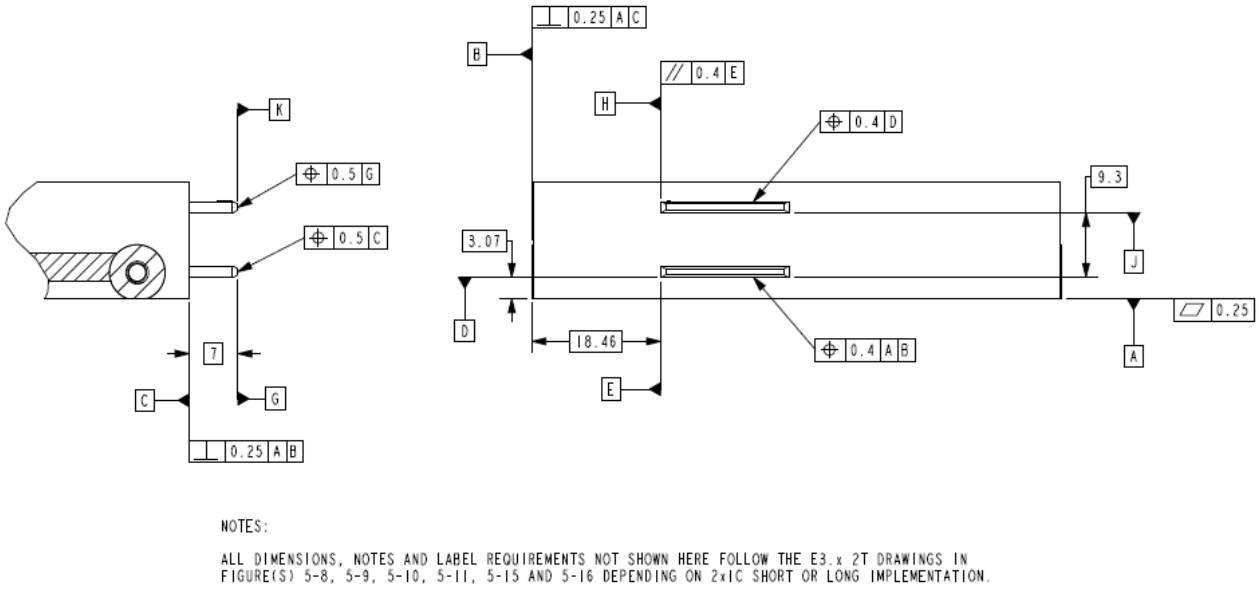
5.4 E3 Double Thickness 2x1C Form Factor Physical Dimensions

This section defines the physical dimensions for the placement of the secondary 1C connector for E3.x 2T 2x1C form factors for use cases where a x8 host connection is desired when plugging into a x4 backplane infrastructure.

Implementation Note:

The carrier for a 2x1C device should be keyed to prevent insertion into bays not designed for a 2x1C device.

Figure 5-12 shows an example device implementation of 2x1C for the E3.S 2T form factor. The same connector spacing applies to E3.L 2T.



Notes:

All dimensions, notes, and label requirements not shown here follow the E3.x 2T drawings in Figure(s) 5-8, 5-9, 5-10, 5-11, 5-15, and 5-16 depending on 2x1C short or long implementation.

Figure 5-12 E3.S 2T 2x1C Side & Rear View

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5.5 E3 Labels

The size and positioning of labels on a surface has an impact on the thermal performance of the E3 devices. This section defines the maximum label area allowed as well as location of the label to avoid thermal performance degradation.

Refer to UL/IEC/EN 60950-1 Information Technology Equipment – Safety – Part 1: General Requirements and/or UL/IEC/EN 62368-1 Audio/Video Information and Communication Technology Equipment for requirements governing the use of the Hot Surface Warning Label. If a Hot Surface Warning Label is required, that label shall be placed as shown in Figure 5-13, Figure 5-14, Figure 5-15, and Figure 5-16.

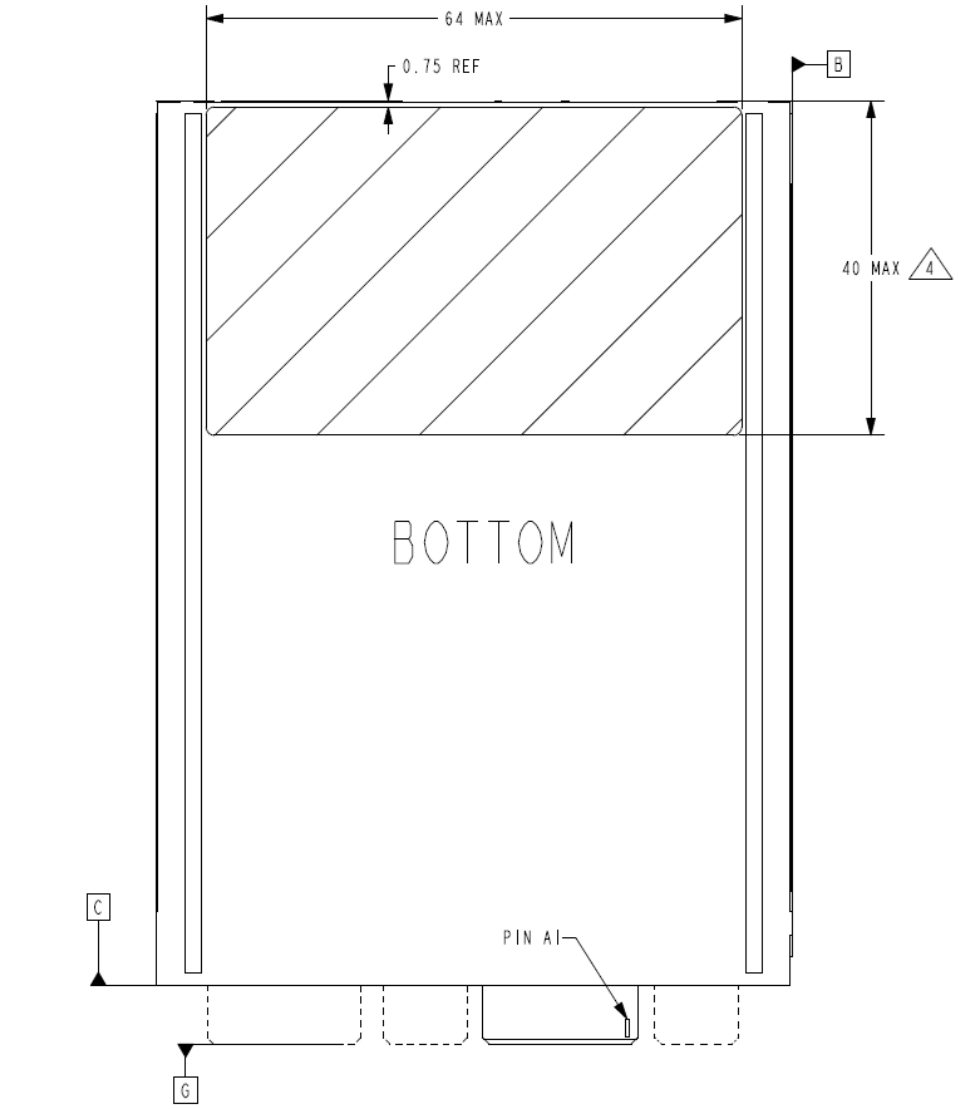


Figure 5-13 E3.S Label Area

Labels should only be placed in the hatched area as shown in Figure 5-13. Labels shall be confined to the bottom surface.

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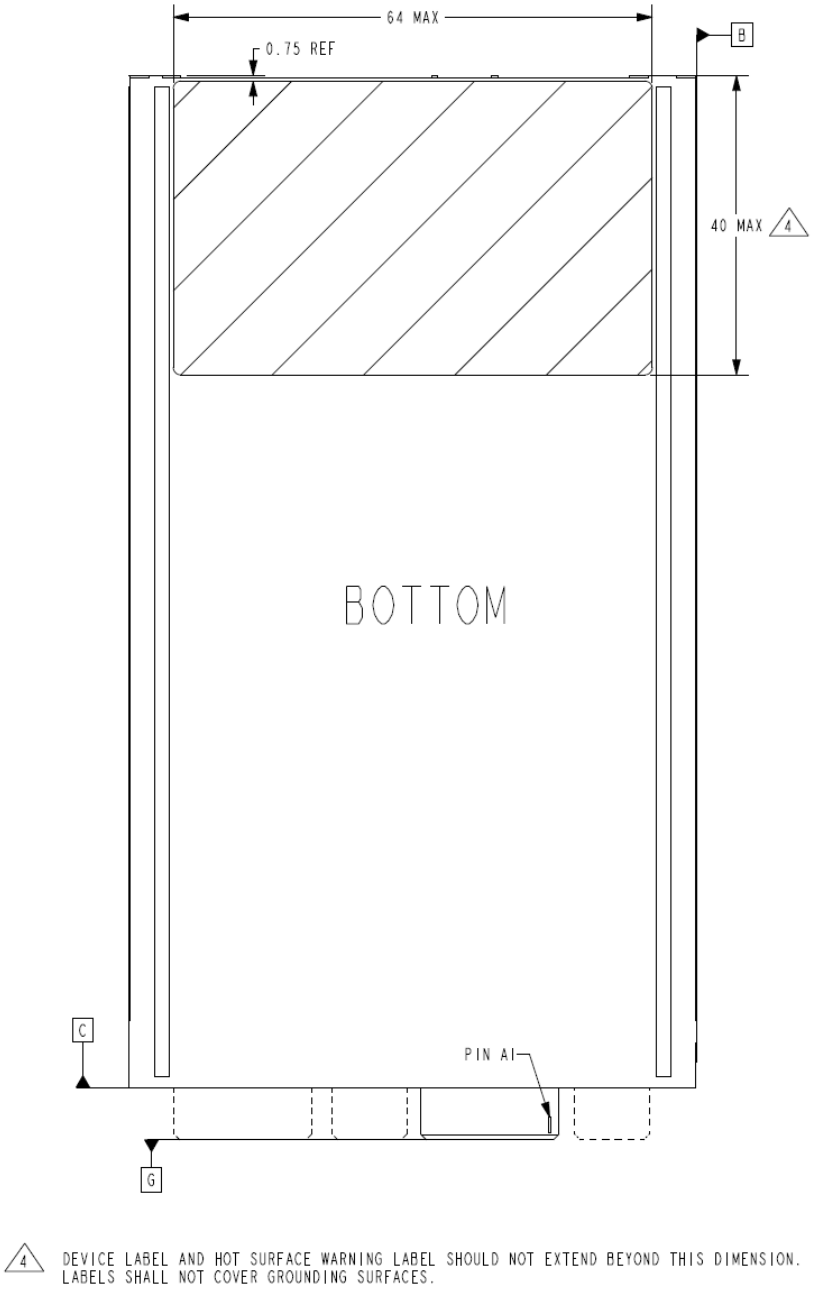


Figure 5-14 E3.L Label Area

Labels should only be placed in the hatched area as shown in Figure 5-14. Labels shall be confined to the bottom surface.

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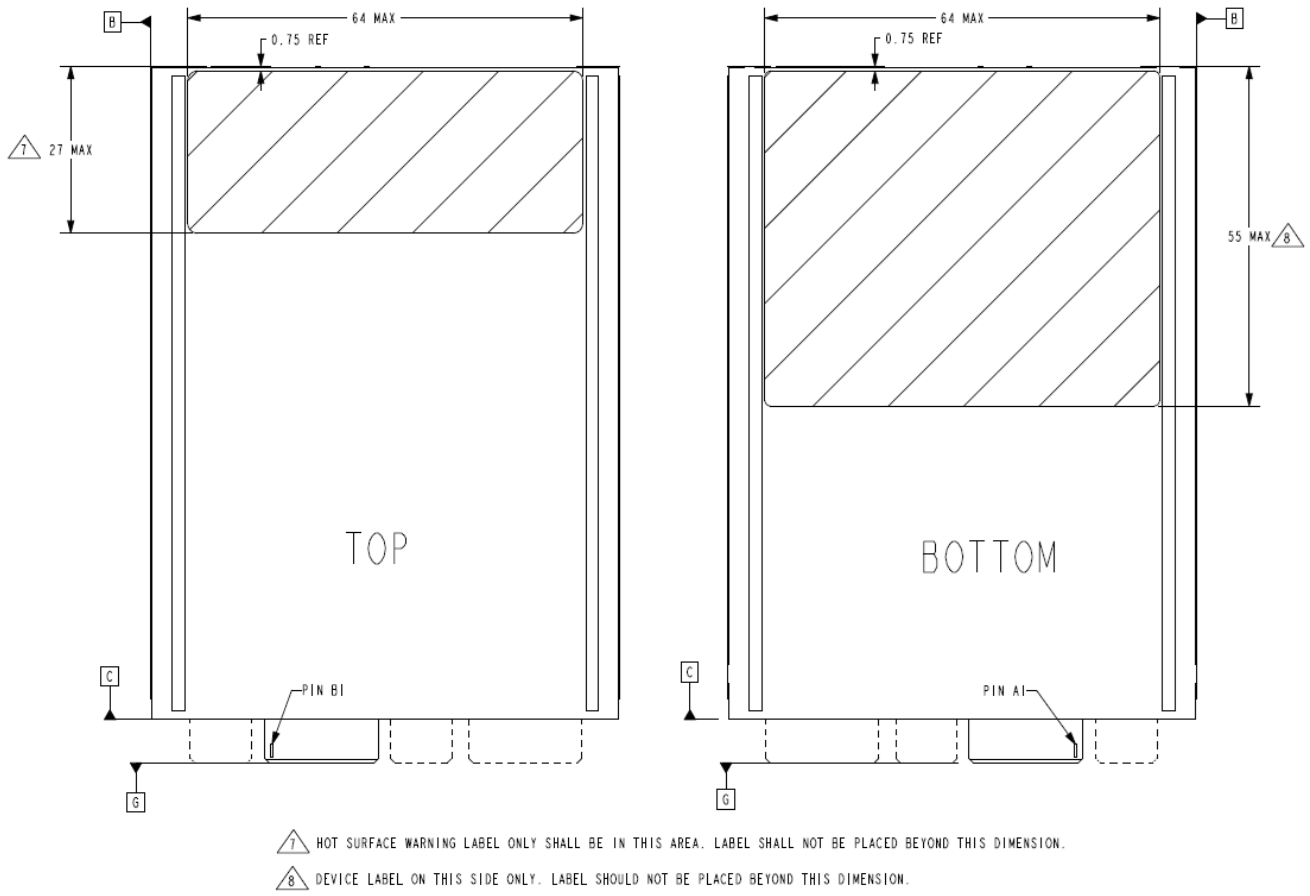


Figure 5-15 E3.S 2T Label Area

Labels shall only be placed in the hatched area as shown in Figure 5-15. It is recommended that labels be confined to a single surface but if more space is needed then labels may be placed on both surfaces.

Implementation Note:

For 2T devices, especially with heatsink fins, the placement of labels on the top versus bottom may affect airflow impedance (AFI).

SFF-TA-1023 should be used to characterize the potential AFI impact of label placement.

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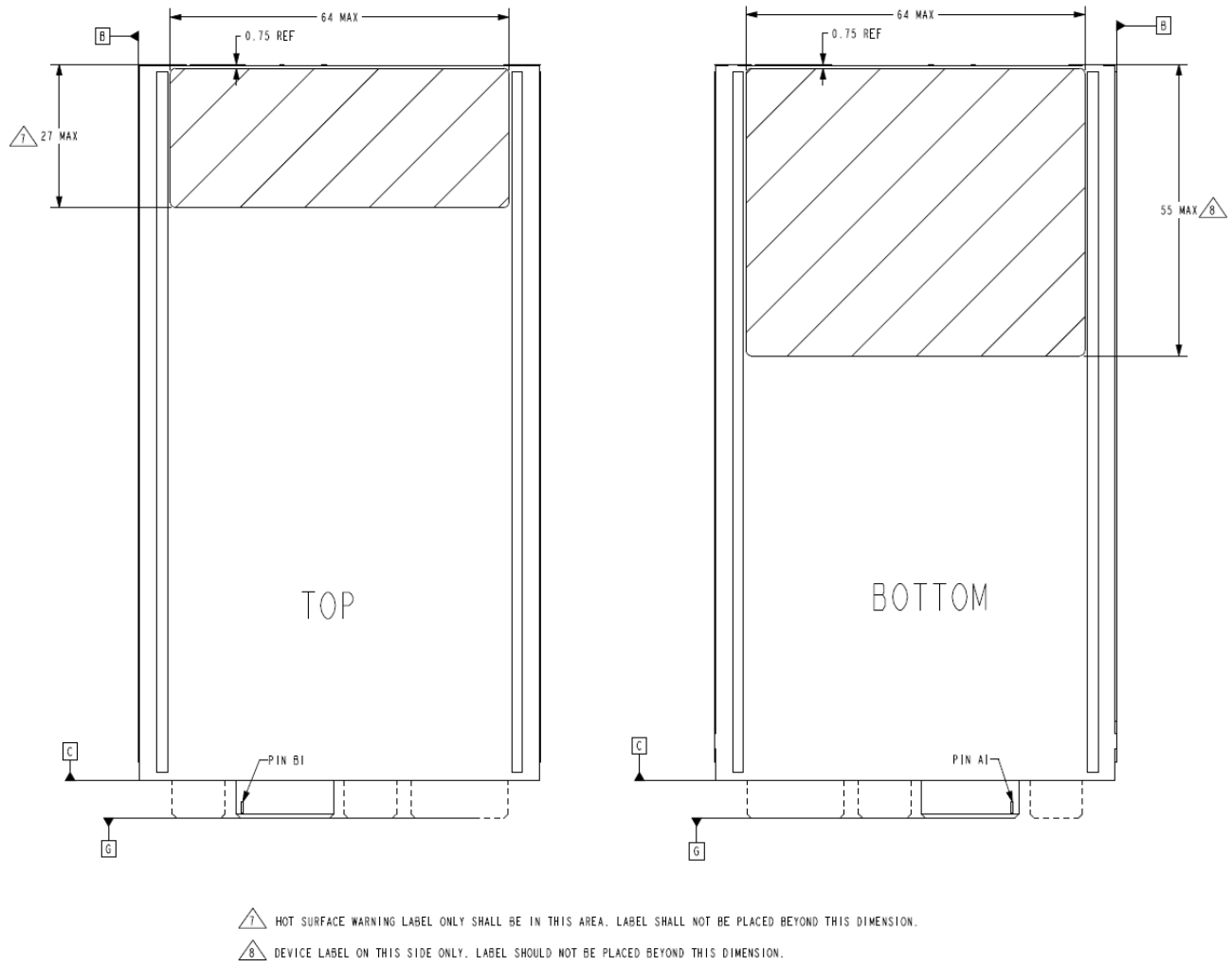


Figure 5-16 E3.L 2T Label Area

Labels shall only be placed in the hatched area as shown in Figure 5-16. It is recommended that labels be confined to a single surface but if more space is needed then labels may be placed on both surfaces.

Implementation Note:

For 2T devices, especially with heatsink fins, the placement of labels on the top versus bottom may affect airflow impedance (AFI).

SFF-TA-1023 should be used to characterize the potential AFI impact of label placement.

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5.6 E3 LEDs

E3 devices shall support two LEDs on the front of the device. The LEDs have the following functions:

Power/Activity LED: Green or Green/White bi-color

The Power/Activity LED is driven and completely controlled by the device. The green element is mandatory for all device variations. The green element has two functions, indicating when the device has power with no issues with its power regulation and when there is host-initiated I/O activity.

The white element is optional and may be implemented by devices to indicate when that device is able to safely be removed from the host.

For NVMe SSD devices the white element shall not be implemented.

Fault/Identify LED: Amber/Blue bi-color

The Fault/Identify LED indicates when a device is in a fault condition or when the host needs to identify the device in a chassis. The amber and blue elements are mandatory for all device variations and are controlled by the LED pin on the device connector.

Specific properties such as wavelength, luminosity, and behaviors for the various LEDs are defined in SFF-TA-1009. Definition of the LED control pin is also defined in SFF-TA-1009.

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5.7 E3.S and E3.L Mechanical Key

E3.S and E3.L devices shall implement a key slot as shown in Figure 5-17. This mechanical key allows systems to prevent devices designed to earlier revisions of this specification, which were not designed for DLC, from being installed into a DLC system and potentially experiencing damaging pressure on the device.

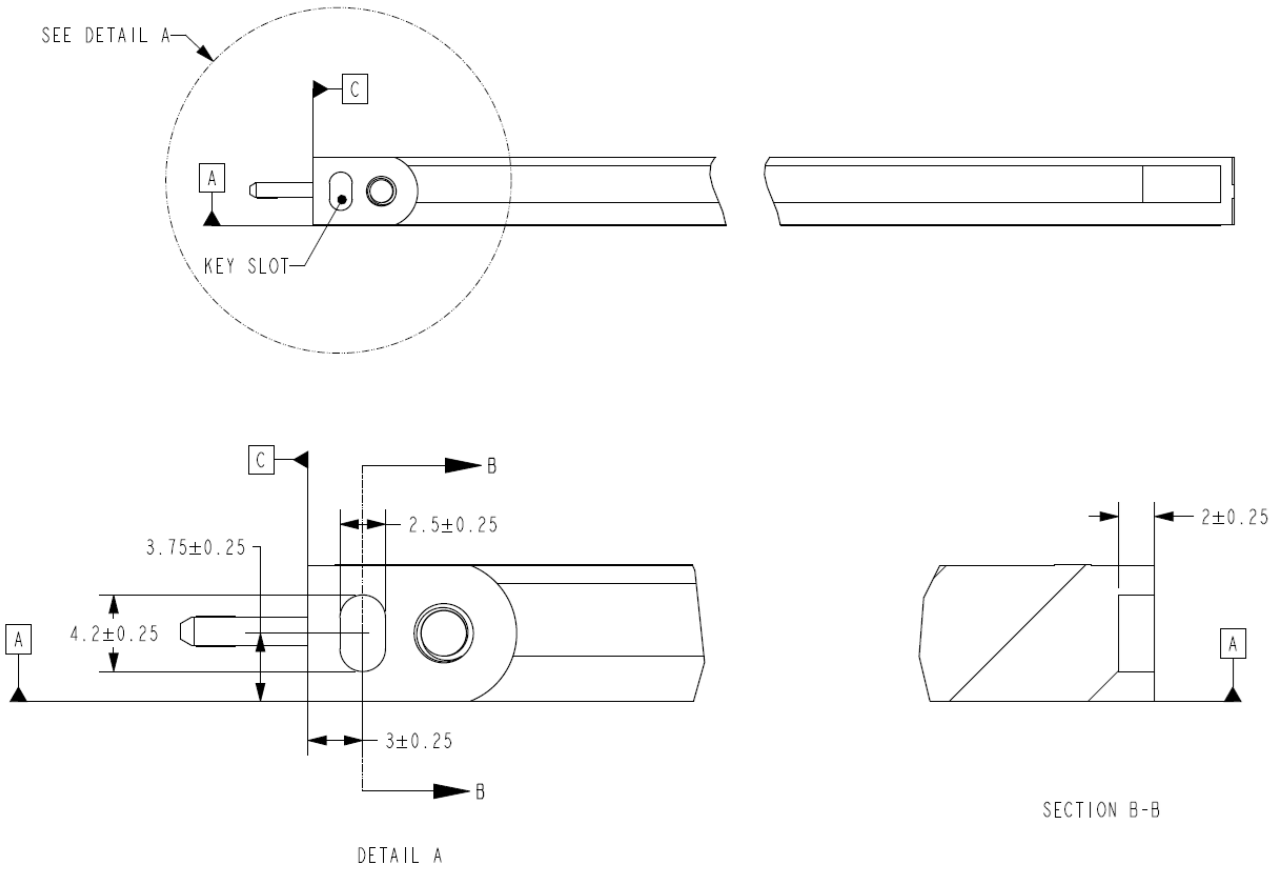


Figure 5-17 E3.S and E3.L Key Slot

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6. E3 Power/Thermal Requirements

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

6.1 Power Requirements

Power constraints for this device form factor are summarized in Table 6-1. For more information, refer to SFF-TA-1009 *Enterprise and Datacenter Standard Form Factor Pin and Signal Specification*.

Table 6-1 Device Power Requirements for an E3 system implementation

Parameter	E3.S	E3.L	E3.S 2T	E3.L 2T	Comment
Initial Slot Power Limit (12Vpinit)	25W	40W	40W	70W	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

6.2 Thermals

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

6.3 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.

Table 6-2 defines the recommended maximum sustained power for air-cooled E3 devices. DLC cooled E3 devices may exceed these recommendations. This recommendation serves as a starting point as SFF-TA-1023 should be used to determine how much power is air-cooled based on the thermal design of the E3 device.

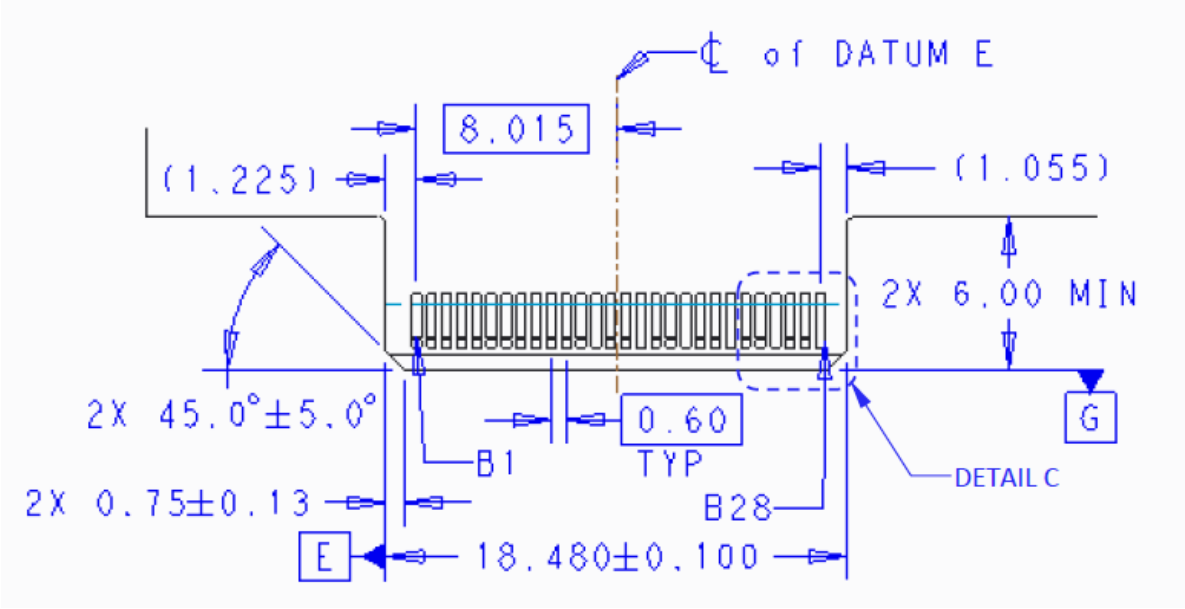
Table 6-2 Recommended Sustained Maximum Power for Air-Cooled E3 Devices

Device	**E3.S**	**E3.L**	**E3.S 2T**	**E3.L 2T**
Max Power	25W	40W	40W	70W

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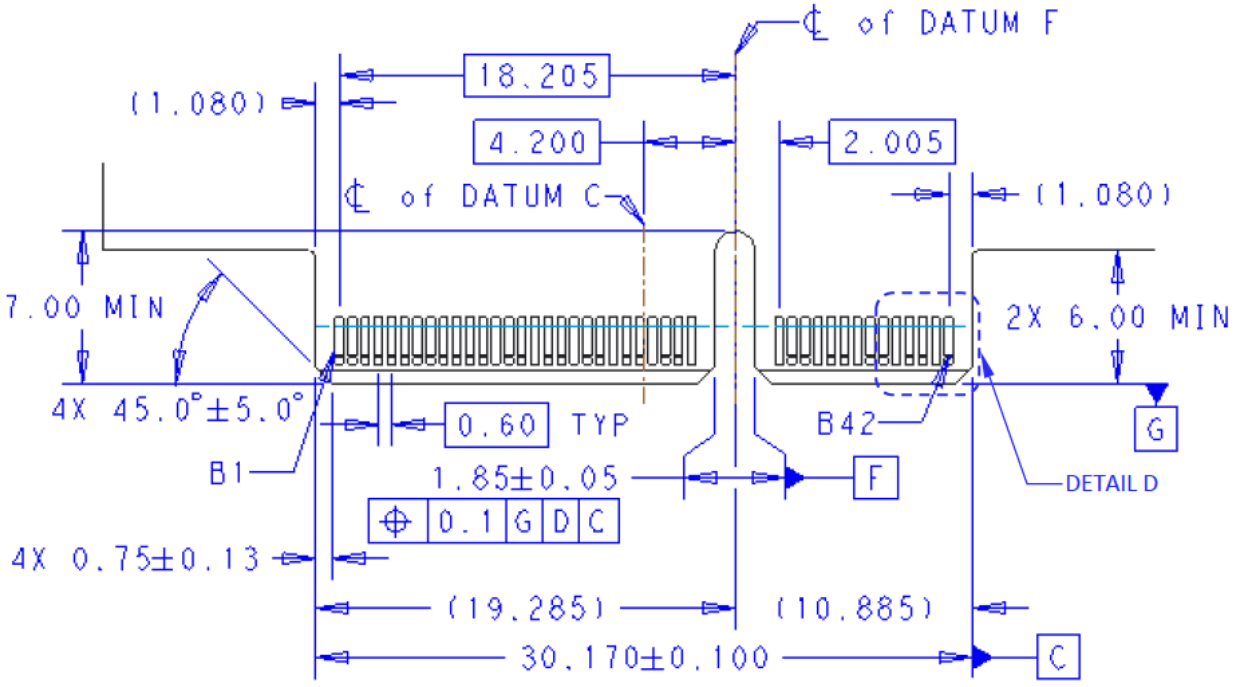
7. Informative: SFF-TA-1002 Edge (Plug) Mechanical Drawings

This section shows the card edge mechanical drawing for convenience only. This section's drawings are from SFF-TA-1002 Rev 1.6a. See the latest SFF-TA-1002 for normative dimensional, Detail views, and performance requirements.



Note: Position A1 on opposite side of card of B1. Dimensions for pad locations are to center of the pad

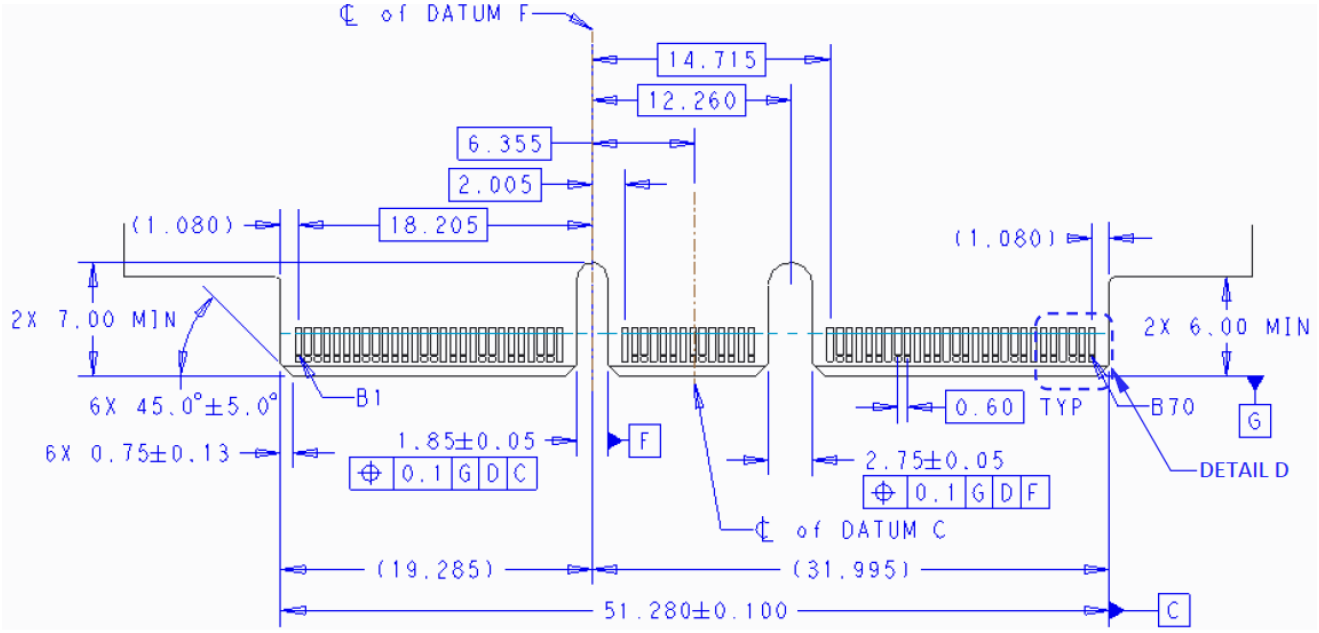
Figure 7-1. 1C (x4) Mating Card Dimensions



Note: Position A1 on opposite side of card of B1. Dimensions for pad locations are to center of the pad

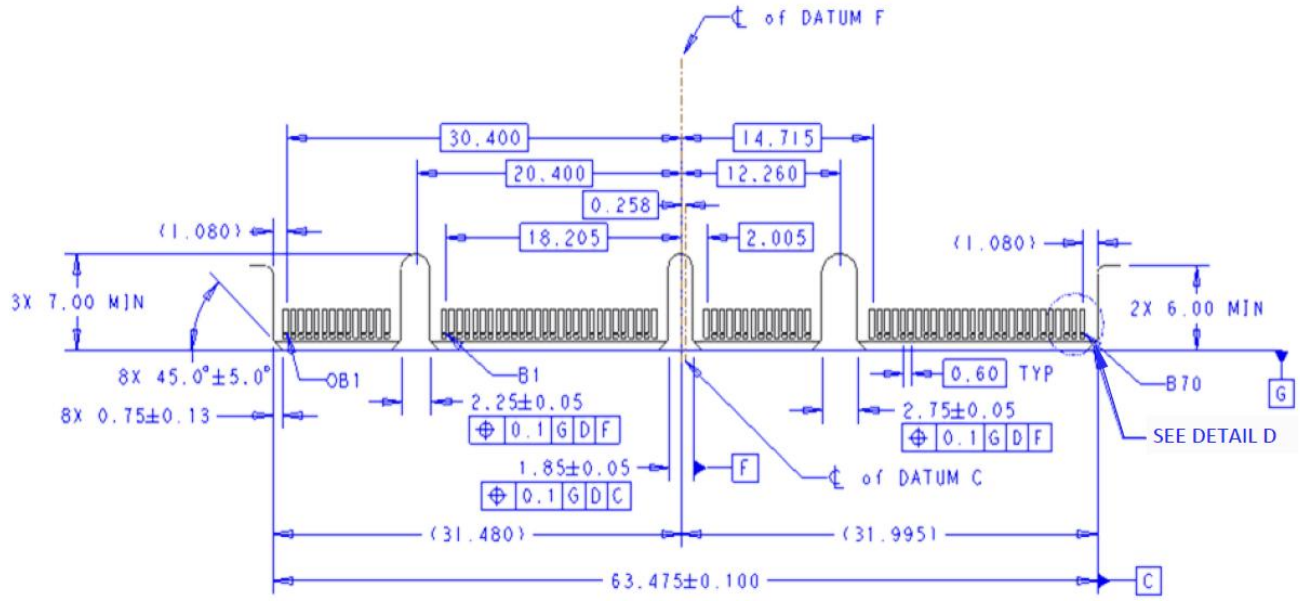
Figure 7-2. 2C (x8) Mating Card Dimensions

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Note: Position A1 on opposite side of card of B1. Dimensions for pad locations are to center of the pad

Figure 7-3. 4C (x16) Mating Card Dimensions



Note: Position A1 on opposite side of card of B1. Dimensions for pad locations are to center of the pad

Figure 7-4. 4C+ (x16) Mating Card Dimensions

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