# VITA 62.1 Hold-Up Module
## VITHU270H3U50C01

## VITA 62.1 Hold-Up Module

## Features & Benefits

- OpenVPX™ – VITA 62.1
- 270$V_{DC}$ Nominal Working Voltage
- 50ms minimum hold-up time
- 3U OpenVPX
- Conduction cooled
- Military standard compliance: [a]
  - MIL-STD-704F
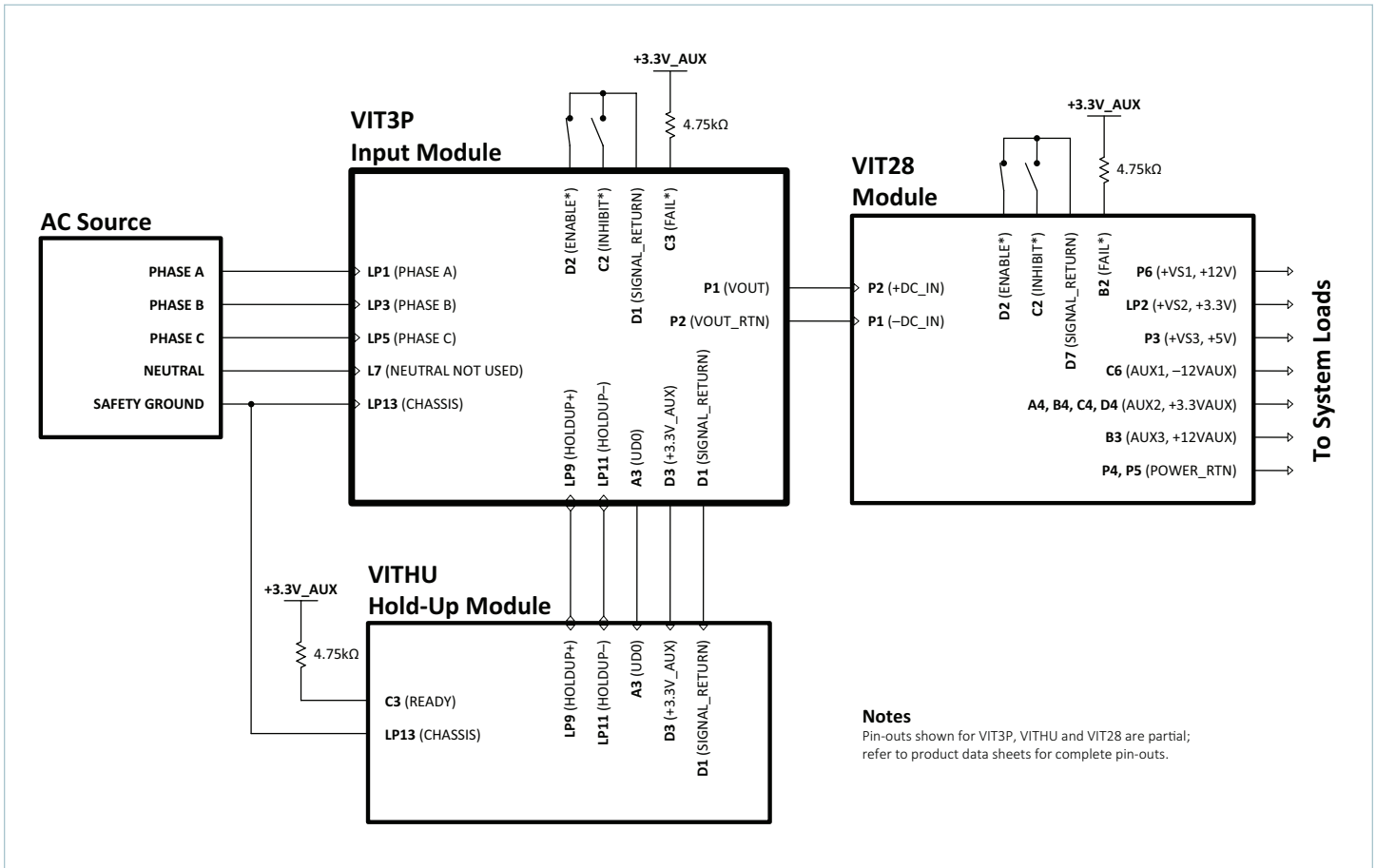  - MIL-STD-461G
  - MIL-STD-810G

## Typical Applications

- VPX power modules
- Avionics
- Shipborne electronics

## Product Description

The Hold-Up Module is an optional addition to the VIT3P28x3U750C1 3-Phase AC-DC Front-End Module. Together the pair when used with the downstream VIT028x3U600y000 form a complete system compliant to VITA 62.1 and VITA 62 with a minimum hold-up time of 50ms.

[a] When used as illustrated in typical application.

## Typical Application

**+3.3V_AUX**
4.75kΩ

**VIT3P Input Module**

**AC Source**

PHASE A — LP1 (PHASE A)
PHASE B — LP3 (PHASE B)
PHASE C — LP5 (PHASE C)
NEUTRAL — L7 (NEUTRAL NOT USED)
SAFETY GROUND — LP13 (CHASSIS)

D2 (ENABLE*)
C2 (INHIBIT*)
D1 (SIGNAL_RETURN)
C3 (FAIL*)

P1 (VOUT)
P2 (VOUT_RTN)

LP9 (HOLDUP+)
LP11 (HOLDUP−)
A3 (UD0)
D3 (+3.3V_AUX)
D1 (SIGNAL_RETURN)

**VIT28 Module**

**+3.3V_AUX**
4.75kΩ

D2 (ENABLE*)
C2 (INHIBIT*)
D7 (SIGNAL_RETURN)
B2 (FAIL*)

P2 (+DC_IN)
P1 (−DC_IN)

P6 (+VS1, +12V)
LP2 (+VS2, +3.3V)
P3 (+VS3, +5V)
C6 (AUX1, −12VAUX)
A4, B4, C4, D4 (AUX2, +3.3VAUX)
B3 (AUX3, +12VAUX)
P4, P5 (POWER_RTN)

**To System Loads**

**VITHU Hold-Up Module**

**+3.3V_AUX**
4.75kΩ

C3 (READY)
LP13 (CHASSIS)

LP9 (HOLDUP+)
LP11 (HOLDUP−)
A3 (UD0)
D3 (+3.3V_AUX)
D1 (SIGNAL_RETURN)

**Notes**
Pin-outs shown for VIT3P, VITHU and VIT28 are partial;
refer to product data sheets for complete pin-outs.

*System configuration: VIT3P28x3U750C1 AC front end with VITHU hold-up module powering a VIT28 module.*
*Note: this device is intended for use only as described above. The following specifications may not apply or be valid for any other use.*

## Connector Pin Configuration

| ROWS | POWER | | | | | | | | | | | | | SIGNAL | | | POWER | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **LP1** | LP2 | **LP3** | LP4 | **LP5** | LP6 | **LP7** | LP8 | **LP9** | LP10 | **LP11** | LP12 | **LP13** | 1 | 2 | 3 | **P1** | **P2** |
| D | LM | | LM | | LM | | LM | | LM | | LM | | LM | J | J | J | TM | TM |
| C | | | | | | | | | | | | | | K | K | K | | |
| B | | | | | | | | | | | | | | N | N | N | | |
| A | | | | | | | | | | | | | | S | S | S | | |
| | | | | | | | | | | | | | | | | | | |

### Hold-Up Module Connector

Note: See mechanical drawing on page 7 for connector information.

## Connector Pin Descriptions

| Pin | Rated Current (A) | Pin Name | Description |
|---|---|---|---|
| LP1 | 20 | PHASE A | Factory use only |
| LP3 | 20 | PHASE B | |
| LP5 | 20 | PHASE C | |
| LP7 | 20 | NEUTRAL | Factory use only |
| LP9 | 20 | +HOLD-UP | +Output/Input to/from Hold-Up Module [b] Connect to LP9 of VIT3P through backplane. The current through these traces will be less than 7A. |
| LP11 | 20 | −HOLD-UP | −Output/Input to/from Hold-Up Module [b] Connect to LP11 of VIT3P through backplane. The current through these traces will be less than 7A. |
| LP13 | 20 | CHASSIS | Chassis (safety ground) |
| A1 | < 1 | GAO* | Factory use only |
| A2 | < 1 | GA1* | Factory use only |
| A3 | < 1 | UD0 | +12VHK from VIT3P [c] Connect to A3 of VIT3P through backplane. The current through this trace will be less 10mA. |
| B1 | < 1 | SM0 | Factory use only |
| B2 | < 1 | SM1 | Factory use only |
| B3 | < 1.5 | SM2 | Factory use only |
| C1 | < 1 | SM3 | Factory use only |
| C2 | < 1 | INHIBIT* | Factory use only |
| C3 | < 1 | READY* | External 4.7kΩ pull-up is required.<br>  High:  if hold-up time at max load < 50ms    (Note: monitor LED will be red)<br>  Low:  if hold-up time at max load > 50ms    (Note: monitor LED will be green) |
| D1 | < 1 | SIGNAL_RETURN | Return for READY* and +3.3V_AUX [d] Connect to D1 of VIT3P through backplane. The current through these traces will be less 30mA. |
| D2 | < 1 | ENABLE* | Factory use only |
| D3 | < 1 | +3.3V_AUX | From 3-Phase +3.3V_AUX [d] Connect to D3 of VIT3P through backplane. The current through these traces will be less 30mA. |
| P1 | 40 | VOUT | Factory use only |
| P2 | 40 | VOUT RTN | Factory use only |

[b] The hold-up voltage is generated by the VIT3P, after a short charge-time (less than 0.5s), the hold-up module will have adequate hold-up capability to support a loss of input power that does not exceed 50ms in duration.  For example: If there is a 50ms loss input power, the downstream VPX power supply (with any output load condition between 0 and 600W) will remain within tolerance during and after the temporary loss of the VIT3P input power.

[c] The +12VHK (UD0) is generated by the VIT3P.

[d] The isolated +3.3V_AUX power is generated by the VIT3P.

## Part Ordering Information

| Part Number | Product Grade | Conformal Coating |
|---|---|---|
| VITHU270**H**3U50**C**01 | **H** = −40 to 85°C | **C** = Coated |

## Absolute Maximum Ratings

The absolute maximum ratings below are stress ratings only. Operation at or beyond these maximum ratings can cause permanent damage to the device.

| Parameter | Comments | Min | Max | Unit |
|---|---|---|---|---|
| Input Voltage, Continuous | From 3-Phase Front-End Module | | 320 | $V_{DC}$ |
| Input Voltage, Transient | Meets MIL-STD-704F | | 440 | $V_{DC}$ |
| Operating Temperature | Measured at card edge | −55 | 85 | °C |
| Storage Temperature | | −55 | 125 | °C |
| Isolation Voltage | +Output/Input to CHASSIS | | 1000 | V |
| | −Output/Input to CHASSIS | | 1000 | |
| Altitude | Operational and storage | | 60,000 | ft |

## Electrical Characteristics

Unless otherwise specified all data refers to nominal line, nominal load at room temperature.

| Attribute | Symbol | Conditions / Notes | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| | | | | | | |
| Input Characteristics – Normal Operation | | | | | | |
| Operating Voltage | $V_{OP}$ | IAW MIL-STD-704F Normal The table values are the line-to-neutral voltages | | 270 | | $V_{DC}$ |
| Overvoltage Transients | | IAW MIL-STD-704F Figure 3 | | | 440 | $V_{DC}$ |
| Hold-Up Time | $t_{HU}$ | When the VIT3P+VITHU system is providing the input power to a downstream VIT28 3U module with VIT28 outputs at maximum load (600W). | 50 | | | ms |
| | | | | | | |
| Output Characteristics – Normal Operation | | | | | | |
| Hold-Up Output | $V_{HU}$ | This user shall not draw any power from this output. If the system has a hold-up module, this output interfaces with hold-up module. During normal operation, this output charges hold-up capacitors inside of the Hold-up Module. If there is power interruption or there is an undervoltage condition, the hold-up voltage provides the input power to the 3P Input Module. | | 270 | | $V_{DC}$ |

## Application Characteristics
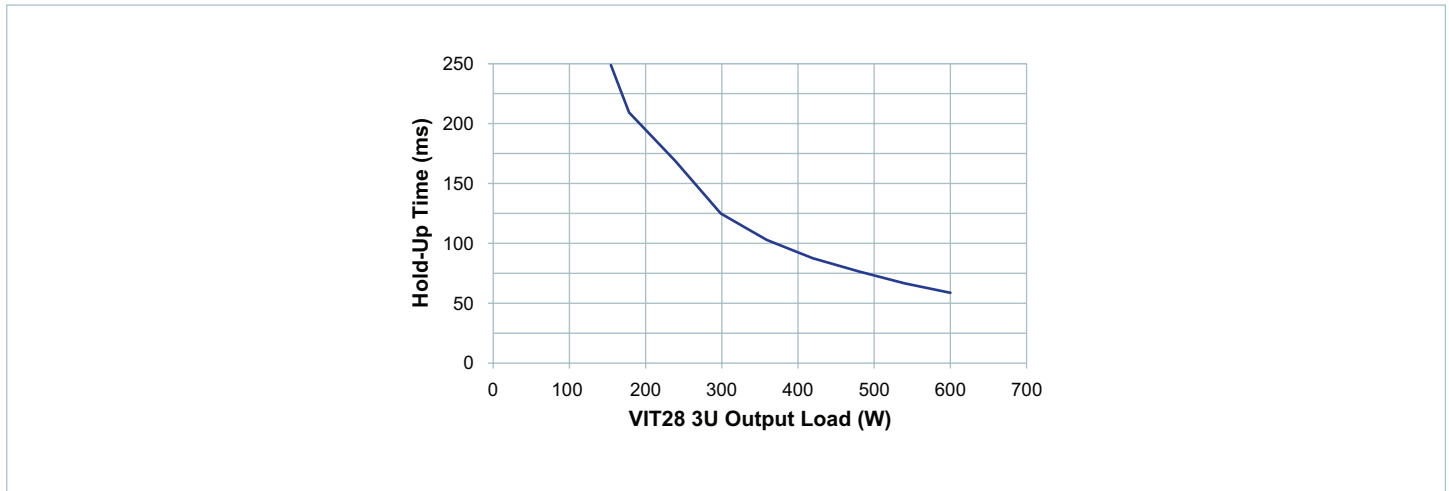


*Figure 1 — Hold-up times as measured in a system comprised of VIT3P, VITHU and VIT28 3U modules at 115$V_{AC}$ line.*
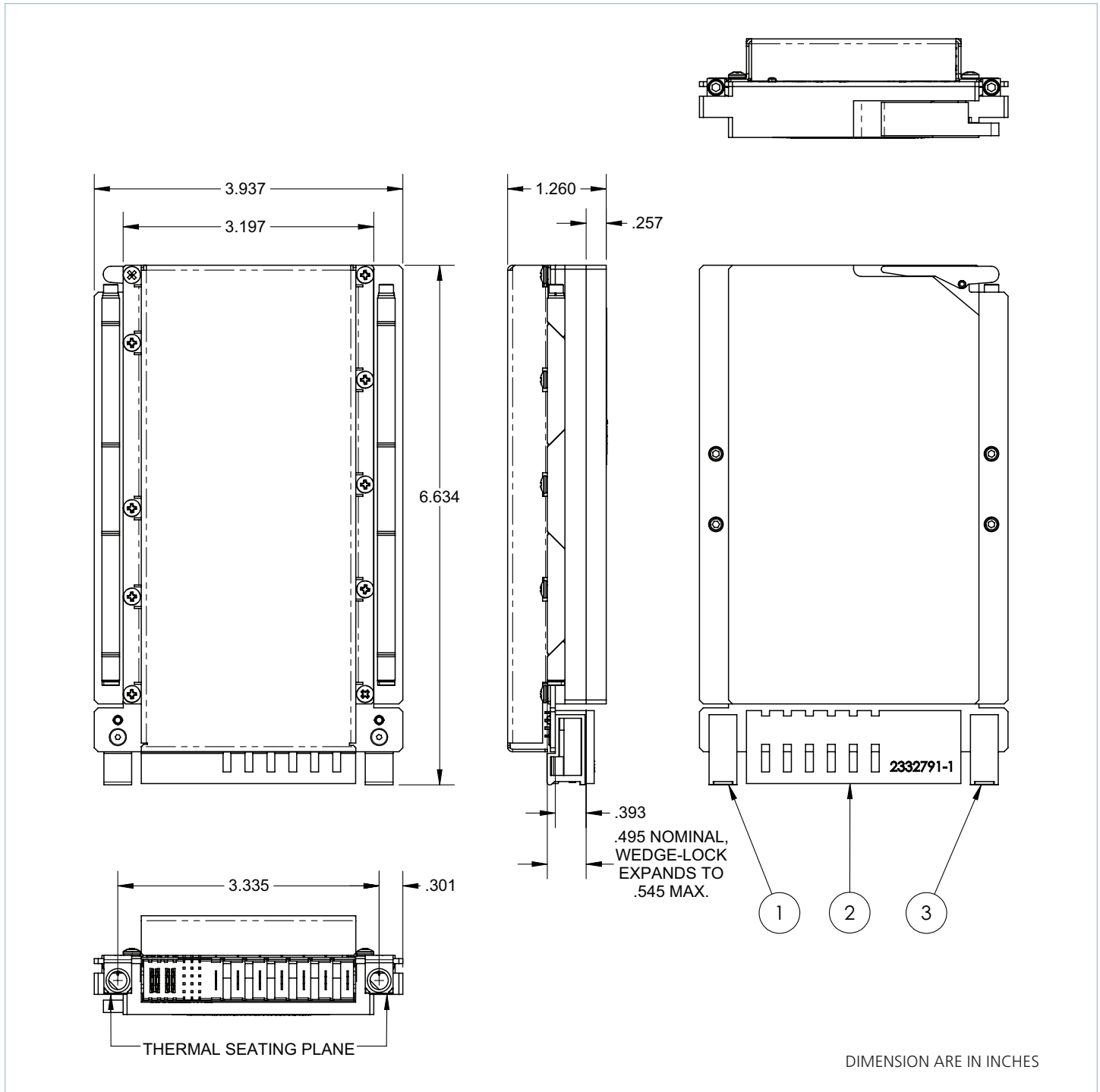
## General Characteristics

| Attribute | Symbol | Conditions / Notes | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| | | | | | | |
| **Mechanical** | | | | | | |
| Length | L | Per VITA62 | | 6.634 | | in |
| Width | W | Per VITA62 | | 3.937 | | in |
| Height | H | Per VITA62 | | 1.26 | | in |
| Weight | W | | | 800 [28.2] | | g [oz] |
| Wedge-Lock Torque | | Manufacturer's recommended value | | 7 | | in·lbs |
| | | | | | | |
| **Thermal** | | | | | | |
| Operating Temperature | $T_{WEDGE-LOCKS}$ | H-Grade | –40 | | 85 | °C |
| | | | | | | |
| **Assembly** | | | | | | |
| Storage Temperature | | | –55 | | 125 | °C |
| ESD Withstand | $V_{ESD}$ | Human Body Model | | | 2000 | V |
| | | | | | | |
| **Safety** | | | | | | |
| MTBF | | MIL-HDBK-217Plus Parts Count - 25°C Ground Benign, Stationary, Indoors / Computer | | 5,378,800 | | Hrs |
| | | Telcordia Issue 2 - Method I Case III; 25°C Ground Benign, Controlled | | 10,699,445 | | Hrs |

## Standards Compliance

| MIL-STD-461G | | |
|---|---|---|
| CE102 | Conducted emissions, power leads, 10kHz to 10MHz [b] | Passed |
| CS101 | Conducted susceptibility, power leads, 30Hz – 150kHz) | Passed |
| CS114 | Conducted susceptibility, bulk cable injection, 10kHz – 200 MHz | Passed |
| CS115 | Conducted susceptibility, bulk cable injection, impulse excitation | Passed |
| CS116 | Conducted susceptibility, damped sinusoidal transients, cables and power leads, 10kHz – 100MHz | Passed |
| CS118 | ESD with 8kV for contact discharge and 15kV for air discharge | Passed |
| | | |

| MIL-STD-810G | | |
|---|---|---|
| Random Vibration | Method 514.6, Procedure I | Passed |
| | Vibration Class V3 | |
| | The plug-in unit shall withstand vibration as defined below for 1 hour per axis: | |
| | 5 – 100Hz PSD increasing at 3dB/octave | |
| | 100 – 1000Hz PSD = 0.1g$^2$/Hz | |
| | 1000 – 2000Hz PSD decreasing at 6dB/octave | |
| Shock | Method 516.6, Procedure I | Passed |
| | Operational Shock Class OS2 | |
| | The plug-in unit shall withstand exposure to either 40g, 11ms shock half-wave; or 40g, 11ms, terminal sawtooth shock pulses in all three axis. | |
| Altitude | Method 500.5, Procedure II | Passed |
| | Sea level to 60,000 feet | |
| Humidity | Method 507.5, Procedure II | Passed |
| | Five 48-hour cycles with exposures up to 95% relative humidity | |
| Fungus | Method 508.6 | N/A Designed to meet by close similarity to an- other that was tested and verified to meet this item. |
| Operating Temperature | VITA 47 Section 4.1.2 class CC4 | Passed |
| Temperature Cycling | MIL-STD-202 Method 107 per VITA 47 Section 4.3 | Passed |
| ESD | Human Body Model, JEDEC JS-001-2012, Table 2B, Class 2, ±2000V minimum | Passed |
| | Charged Device Model, JESD22-C101-E, Class III ±500V minimum | Passed |

[b] CE102 compliance requires a few small filtering components to be installed on the user's backplane.

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## Mechanical Drawing



THERMAL SEATING PLANE

.495 NOMINAL, WEDGE-LOCK EXPANDS TO .545 MAX.

2332791-1

DIMENSION ARE IN INCHES

| Connector Components | | | | | |
|---|---|---|---|---|---|
| Item # | Description | Notes | Manufacturer | Manufacturer Part Number | Quantity |
| 1 | VITA46 315 DEG GUIDE SOCKET | | TE Connectivity | 1-1469492-8 | 1 |
| 2 | VITA62.1 CONNECTOR PLUG | Mates TE Connectivity P/N 2332795-1 | TE Connectivity | 2332791-1 or 2332793-1 | 1 |
| 3 | VITA46 315 DEG GUIDE SOCKET | | TE Connectivity | 1-1469492-8 | 1 |

## Revision History

| Revision | Date | Description | Page Number(s) |
|---|---|---|---|
| 1.0 | 06/21/22 | Initial release | n/a |

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