

Apalis Heatsink

HW Datasheet



Revision History

Document Revisions

Date	Doc. Revision	Product Version	Changes
07-Nov-2014	Rev. 1.0	V1.0A	Initial release
13-Nov-2014	Rev. 1.1	V1.0A	Section 4 : minor updates
25-Nov-2014	Rev. 1.2	V1.0A	Section 3 : updated details Section 5 : updated figure 1 (TIM pad thickness, Type 1) Section 6.1 : minor updates Section 7 : added compliance details
04-Apr-2016	Rev. 1.3	V1.0A	Section 4 : updated compatible module list. Apalis Heatsink Type 3 can be used with Apalis TK1 module
12-Jan-2017	Rev. 1.4	V1.0A	Section 4 : updated compatible module list. Added Apalis iMX6D IT
07-Jul-2017	Rev. 1.5	V1.0A	Section 2 : Added reference documents section Section 3 : Updated TIM Volume Resistivity value, added TIM supplier contact details
20-Dec-2017	Rev. 1.6	V1.0B	New product release V1.0B. New TIM details added to the document Various small modifications
26-Sep-2018	Rev. 1.7	V1.0B	Section 2 : Added reference to compatible Fans and Screws
07-Nov-2018	Rev. 1.8	V1.0A (Type 4)	Section 3 : Updated section headings Section 4 : Updated compatible module list. Added Apalis iMX8 Section 5 : Added Apalis Heatsink Type 4 dimensional diagram
21-Jan-2021	Rev. 1.9	V1.0B	Updated section headings to include the Apalis Heatsink Type 4 V1.0B product version. Various cosmetic improvements. Section 2 : Updated compatible Fan reference Section 4 : Updated compatible module list. Added Apalis iMX8X Section 5 : Updated Apalis Heatsink Type 4 mechanical drawing Section 8 : This section has been added to the document
06-Oct-2022	Rev. 1.10	V1.0B	Section 5 : Added general tolerances Section 6.1 : Added details about screws maximum tightening torque Section 7 : Changed contact email address
19-Sep-2025	Rev. 1.11	V1.0A (Type 0) V1.0B (Type 1–4)	Updated the document layout to follow the new standard template Grammar and clarity improvements throughout the document Section 2.1 : Added link to Toradex Developer Website - Apalis Heatsink Section 2.1 : Added new Thermal Interface Material datasheet to Section 2.1.4 Section 2.1 : Added supplier contact details to Section 2.1.6 Section 3 : Reorganized content in Tables 3 and 4 Section 3 : Added technical specifications for Apalis Heatsink Type 0 to Table 2 Section 4 : Added Apalis Heatsink Type 0 to Table 5 Section 4 : Highlighted EOL products on Table 5 Section 5 : Added Apalis Heatsink Type 0 dimensions to Section 5.1

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1 Abbreviations

Table 1: Abbreviations

Abbreviation	Explanation
ADC	Analog to Digital Converter
CAN	Controller Area Network, a bus that is mainly used in the automotive and industrial environment
CAN FD	Controller Area Network Flexible Data-Rate, an extension to the original CAN bus protocol which allows higher data rates and larger message sizes.
CEC	Consumer Electronic Control, HDMI feature that allows controlling CEC compatible devices
CPU	Central Processor Unit
CSI	Camera Serial Interface
DAC	Digital to Analog Converter
DDC	Display Data Channel, interface for reading out the capability of a monitor. In this document DDC2B (based on I2C) is always meant.
DFP	Downstream Facing Port, USB Type-C port that acts as a host
DRP	Dual-Role Port, USB Type-C port that can operate as power sink and source
DSI	Display Serial Interface
DVI	Digital Visual Interface, digital signals are electrically compatible with HDMI
EDID	Extended Display Identification Data, timing setting information provided by the display in a PROM
EMI	Electromagnetic Interference, high-frequency disturbances
ESD	Electrostatic Discharge, high voltage spike or spark that can damage electrostatic-sensitive devices
FPD-Link	Flat Panel Display Link, high-speed serial interface for liquid crystal displays. In this document is also called the LVDS interface.
GBE	Gigabit Ethernet, Ethernet interface with a maximum data rate of 1000Mbit/s
GND	Ground
GND_CHASSIS	Chassis Ground
GPIO	General Purpose Input/Output, pin that can be configured as an input or output
GSM	Global System for Mobile Communications
HDA	High-Definition Audio (HD Audio), the digital audio interface between CPU and audio codec
I2C	Inter-Integrated Circuit, the two-wire interface for connecting low-speed peripherals
I2S	Integrated Interchip Sound, serial bus for connecting PCM audio data between two devices
I/O	Input-Output
JTAG	Joint Test Action Group, widely used debug interface
LCD	Liquid Crystal Display
LSB	Least Significant Bit
LVDS	Low-Voltage Differential Signaling, electrical interface standard that can transport high-speed signals over twisted-pair cables. Many interfaces like PCIe or SATA use this interface. Since the first successful application was the Flat Panel Display Link, LVDS became a synonymous for this interface. In this document, the term LVDS is used for the FPD-Link interface.
MAC	Medium Access Control is part of the second layer (data link layer) in the Ethernet stack
MIPI	Mobile Industry Processor Interface Alliance
MDI	Medium Dependent Interface, the physical interface between Ethernet PHY and cable connector
MDIO	Management Data Input/Output, an interface that is used for controlling the Ethernet PHY. The bus consists of the MDC clock and the MDIO bidirectional data signal.
mini PCIe	PCI Express Mini Card, the card form factor for internal peripherals. The interface features PCIe and USB 2.0 connectivity

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Table 1: Abbreviations (Continued)

Abbreviation	Explanation
MMC	MultiMediaCard, flash memory card
MSB	Most Significant Bit
NC	Not Connected
OD	Open-Drain
OTG	USB On-The-Go, a USB host interface that can also act as USB client when connected to another host interface
PCB	Printed Circuit Board
PCI	Peripheral Component Interconnect, parallel computer expansion bus for connecting peripherals
PCIe	PCI Express, a high-speed serial computer expansion bus, replaces the PCI bus
PCM	Pulse-Code Modulation, digitally representation of analog signals, standard interface for digital audio
PD	Pull-Down Resistor
PHY	The physical layer of the OSI model
PU	Pull-up Resistor
PWM	Pulse-Width Modulation
PWR	Power
QSPI	Quad SPI, SPI interface with four bidirectional data signals
RGMI	Reduced Gigabit Media-Independent Interface, the interface between Ethernet MAC and PHY for up to 1Gb/s
RJ45	Registered Jack, common name for the 8P8C modular connector that is used for Ethernet wiring
RS232	The single-ended serial port interface
RS485	Differential signaling serial port interface, half-duplex, multi-drop configuration possible
R-UIM	Removable User Identity Module, identifications card for CDMA phones and networks, an extension of the GSM SIM card
SD	Secure Digital, flash memory card
SDIO	Secure Digital Input Output, an external bus for peripherals that uses the SD interface
SIM	Subscriber Identification Module, an identification card for GSM phones
SMBus	System Management Bus (SMB), a two-wire bus based on the I ² C specifications, is used in x86 designs for system management.
SoC	System on a Chip, IC which integrates the main component of a computer on a single chip
SoM	System on a Module, PCB which integrates the main component of a computer on a single board
SPI	Serial Peripheral Interface Bus, synchronous four-wire full-duplex bus for peripherals
TIM	Thermal Interface Material, thermally conductive material between CPU and heat spreader or heat sink
TMDS	Transition-Minimized Differential Signaling, serial high-speed transmitting technology that is used by DVI and HDMI
TVS Diode	Transient-Voltage-Suppression Diode, a diode that is used to protect interfaces against voltage spikes
UFP	Upstream Facing Port, USB Type-C port that acts as a client
UART	Universal Asynchronous Receiver/Transmitter, serial interface, in combination with a transceiver an RS232, RS422, RS485, IrDA or similar interface can be achieved
USB	Universal Serial Bus, serial interface for internal and external peripherals

2 Introduction

The Apalis Heatsink provides a complete thermal solution for Apalis modules. It is mounted directly onto Apalis carrier boards using four M3 screws, which can be fastened from the top side.

For applications that require active cooling, there are additional threaded holes to attach a fan to the carrier board.

2.1 Reference Documents

For detailed technical information about suitable computer modules, refer to the documents listed below.

2.1.1 Apalis Computer Modules

An overview of the Apalis product family:

<https://www.toradex.com/computer-on-modules/apalis-arm-family>

2.1.2 Toradex Developer Website - Apalis Heatsink

<https://developer.toradex.com/hardware/apalis-som-family/add-ons/apalis-heatsink/>

2.1.3 Toradex Developer Website - Apalis Carrier Boards

<https://developer.toradex.com/hardware/apalis-som-family/carrier-boards/>

2.1.4 Thermal Interface Material (TSP600) Datasheets

The datasheets for the Thermal Interface Material (TIM) used on the Apalis Heatsink can be downloaded using the following links:

- **Apalis Heatsink V1.0A (Type 0):**

<https://docs.toradex.com/117678-apalis-heatsink-tim-tgp5000-datasheet.pdf>

- **Apalis Heatsink V1.0A (Type 1/2/3):**

<https://docs.toradex.com/104905-apalis-heatsink-tim-tsp600-g35-datasheet.pdf>

- **Apalis Heatsink V1.0B (Type 1/2/3) and V1.0A/V1.0B (Type 4):**

<https://docs.toradex.com/104906-apalis-Heatsink-tim-tsp600-z45-datasheet.pdf>

2.1.5 Compatible Fan: Apalis Heatsink Fan

<https://developer.toradex.com/hardware/apalis-som-family/add-ons/apalis-heatsink-fan/>

2.1.6 TIM Supplier Contact Details

2.1.6.1 CTX Thermal Solutions GmbH

Lötscher Weg 104
D-41334 Nettetal, Germany
Phone: +49 2153 7374-0
Fax: +49 2153 7374-10
Email: info@ctx.eu
Website: <https://www.ctx.eu>

2.1.6.2 Henkel AG & Co. KGaA

Henkelstraße 67
D-40589 Düsseldorf, Germany
Phone: +49-211-797-0
Email: info.klebstoffe.dech@henkel.com
Website: <https://next.henkel-adhesives.com>

3 Technical Specifications

3.1 Apalis Heatsink V1.0A (Type 0)

Table 2: Technical Specifications - Apalis Heatsink V1.0A (Type 0)

Property	Value	Remarks
Material	Aluminum alloy AL6063-T5	
Coating	Black anodized	
Thermal conductivity	190–221 W/(m·K)	Valid for temperature range 40–100 °C
Weight	39 g	
Thermal Interface Material	TGP 5000	Refer to the TGP 5000 Datasheet for specific information on Density, Temperature, and related specifications.
Thermal resistance (Module-Alu)	TBD	Temperature of the module measured by on-module thermal sensor
Thermal resistance (Alu-Ambient without fan)	< 5.9 °C/W	
Thermal resistance (Alu-Ambient with fan)	< 2.9 °C/W	Test fan details: Dimensions: 40 × 40 × 10 mm (L × W × H) Speed: 4000 RPM Airflow: 4.81 CFM

3.2 Apalis Heatsink V1.0A (Type 1/2/3)

Table 3: Technical Specifications - Apalis Heatsink V1.0A (Type 1/2/3)

Property	Value	Remarks
Material	Aluminum alloy AL6063-T5	
Coating	Black anodized	
Thermal conductivity	190–221 W/(m·K)	Valid for temperature range 40–100 °C
Weight	39 g	
Thermal Interface Material	TSP600-G35	Refer to the TSP600-G35 Datasheet for specific information on Density, Temperature, and related specifications.
Thermal resistance (Module-Alu)	TBD	Temperature of the module measured by on-module thermal sensor
Thermal resistance (Alu-Ambient without fan)	< 5.9 °C/W	
Thermal resistance (Alu-Ambient with fan)	< 2.9 °C/W	Test fan details: Dimensions: 40 × 40 × 10 mm (L × W × H) Speed: 4000 RPM Airflow: 4.81 CFM

3.3 Apalis Heatsink V1.0B (Type 1/2/3) and V1.0A/V1.0B (Type 4)

Table 4: Technical Specifications - Apalis Heatsink V1.0B (Type 1/2/3) and V1.0A/V1.0B (Type 4)

Property	Value	Remarks
Material	Aluminum alloy AL6063-T5	
Coating	Black anodized	
Thermal conductivity	190–221 W/(m·K)	Valid for temperature range 40–100 °C
Weight	39 g	
Thermal Interface Material	TSP600-Z45	Refer to the TSP600-Z45 Datasheet for specific information on Density, Temperature, and related specifications.
Thermal resistance (Module-Alu)	TBD	Temperature of the module measured by on-module thermal sensor
Thermal resistance (Alu-Ambient without fan)	< 5.9 °C/W	
Thermal resistance (Alu-Ambient with fan)	< 2.9 °C/W	Test fan details: Dimensions: 40 × 40 × 10 mm (L × W × H) Speed: 4000 RPM Airflow: 4.81 CFM

4 Compatibility

There are multiple types of Apalis heatsinks. Each type is compatible with specific Apalis modules.

The Apalis Heatsink Types 1, 3 and 4 have reached End-of-life (EOL) status. Moving forward, the Apalis Heatsink Type 0 is the supported replacement. For more information, see the PCN document available on the [Apalis Heatsink product page](#).

The following table shows the compatibility between Apalis heatsinks and Apalis modules:

Table 5: Heatsink compatibility

Apalis Module	Compatible Apalis Heatsink
Apalis iMX6Q IT Apalis iMX6D IT	23051000 Apalis Heatsink Type 1 V1.0A (EOL) 23051001 Apalis Heatsink Type 1 V1.0B (EOL) 23151000 Apalis Heatsink Type 0 V1.0A
Apalis T30	23061000 Apalis Heatsink Type 2 V1.0A (EOL) 23061001 Apalis Heatsink Type 2 V1.0B
Apalis iMX6Q Apalis iMX6D Apalis TK1	23071000 Apalis Heatsink Type 3 V1.0A (EOL) 23071001 Apalis Heatsink Type 3 V1.0B (EOL) 23151000 Apalis Heatsink Type 0 V1.0A
Apalis iMX8	23081000 Apalis Heatsink Type 4 V1.0A (EOL) 23151000 Apalis Heatsink Type 0 V1.0A
Apalis iMX8 Apalis iMX8X	23081001 Apalis Heatsink Type 4 V1.0B (EOL) 23151000 Apalis Heatsink Type 0 V1.0A

5 Mechanical Dimensions

The following drawings illustrate the mechanical dimensions of the Apalis Heatsink. All measurements are in millimeters (mm).

5.1 Heatsink Dimensions

Figure 1: Apalis Heatsink dimensions (Type 0)

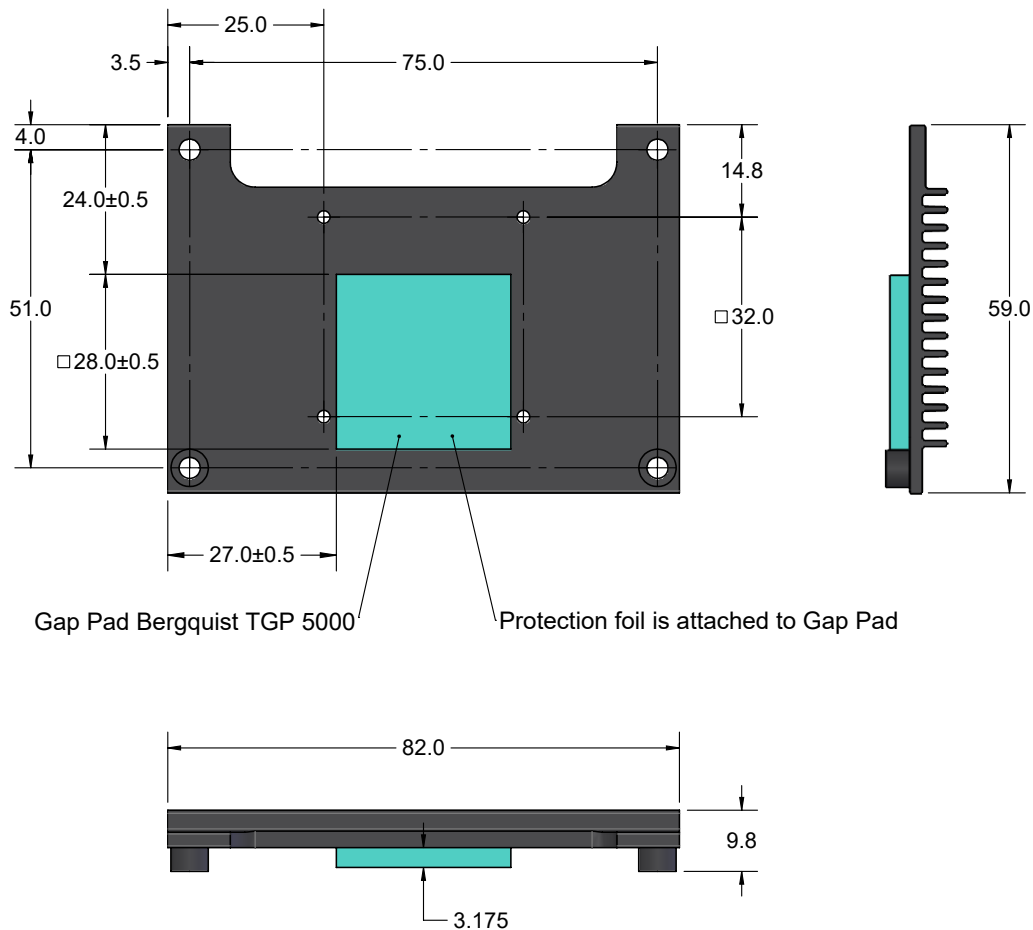


Figure 2: Apalis Heatsink dimensions (Type 1/2/3)

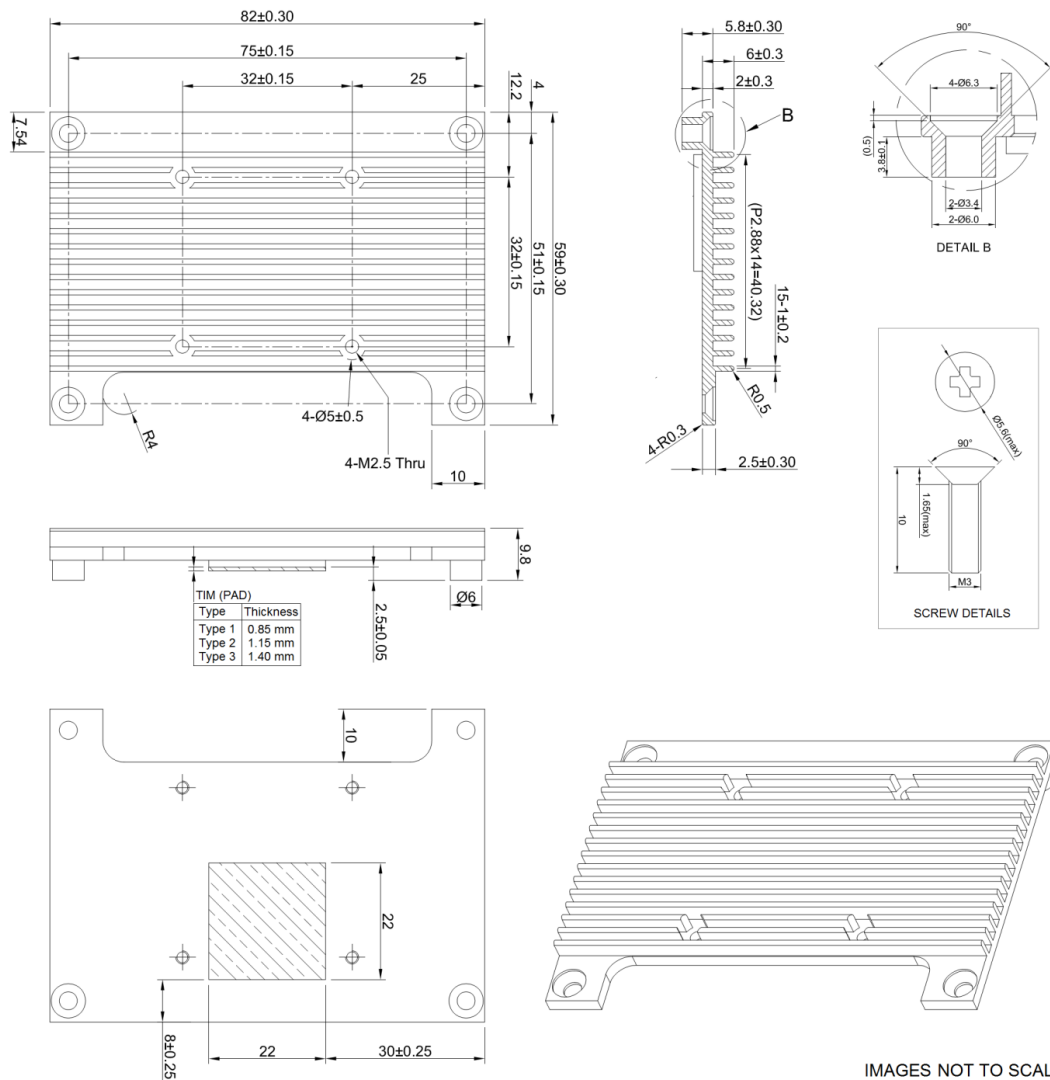
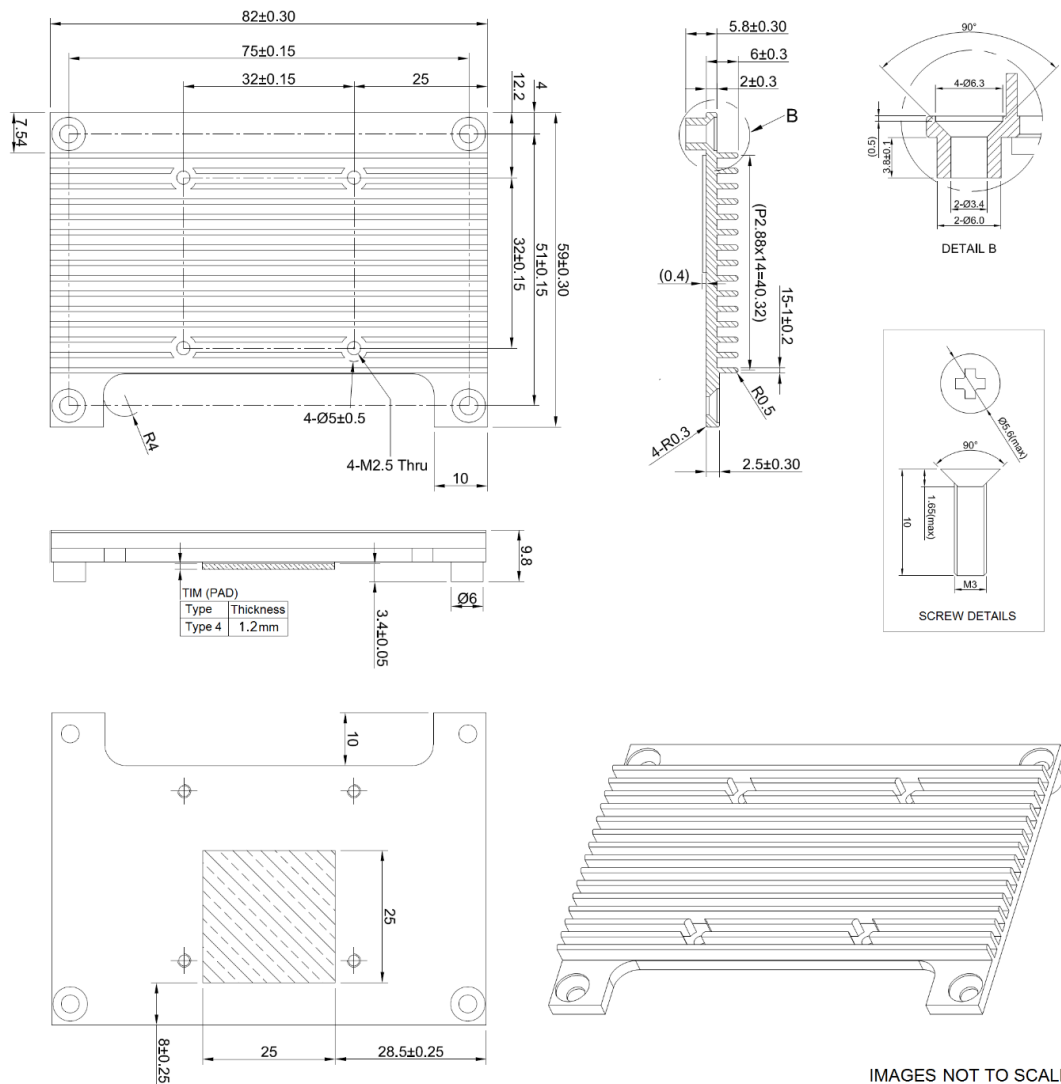


Figure 3: Apalis Heatsink dimensions (Type 4)



IMAGES NOT TO SCALE

5.2 General Tolerances

Unless explicitly specified, the following tolerances apply to the product:

Table 6: Dimension tolerances

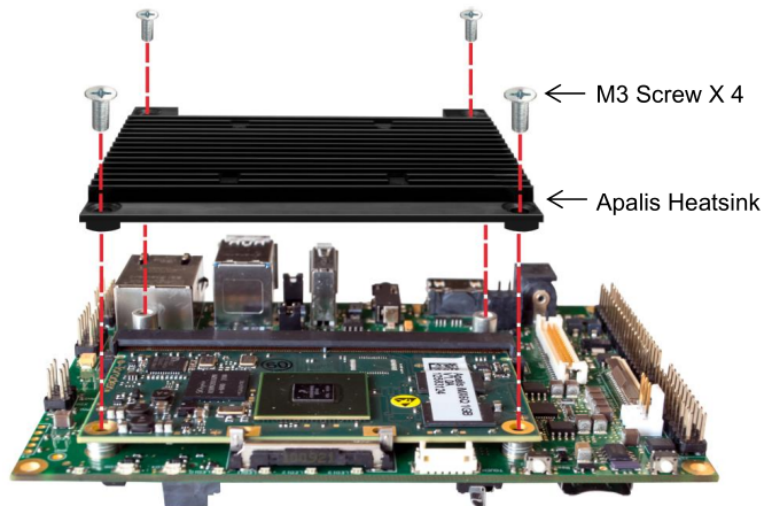
Dimension Range (mm)	Tolerance (mm)
Over 1000	±1.20
400–1000	±0.80
120–400	±0.50
30–120	±0.30
6–30	±0.20
0.5–6	±0.10

Note: Radius or chamfer angle is less than 0.5° if not indicated.

6 Assembly

Assembly must be done carefully, as placing the Apalis heatsink in the wrong orientation can damage the Apalis module or prevent the system from working correctly. The illustration below shows how to attach the heatsink solution.

Figure 4: Apalis Heatsink assembly



6.1 Assembly procedure

The following procedure demonstrates how to attach the Apalis Heatsink to the Apalis module to complete the heatsink solution. Read the instructions and follow the procedure carefully to ensure the module is not damaged. Take the necessary precautions to avoid electrostatic charge build-up.

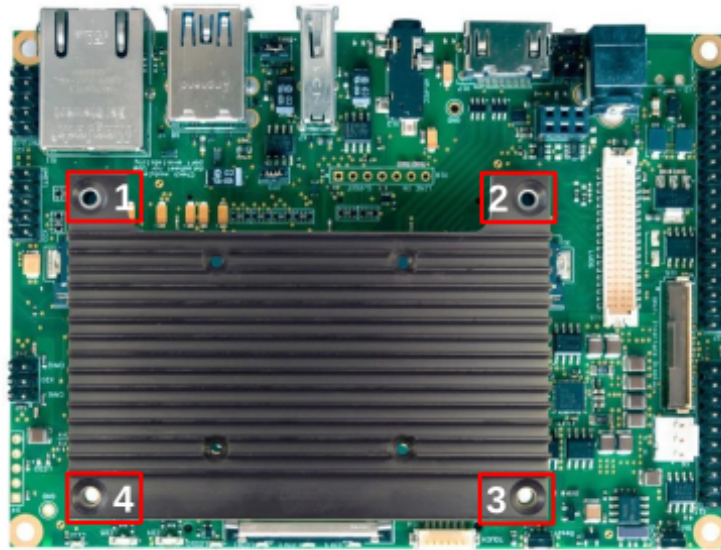
1. Clean the top surface of the processor using an anti-static cloth.
2. Insert the Apalis module into the MXM socket X1 on the Apalis carrier board.
3. Carefully remove the plastic film from the TIM.

Figure 5: Removing the plastic film from the TIM



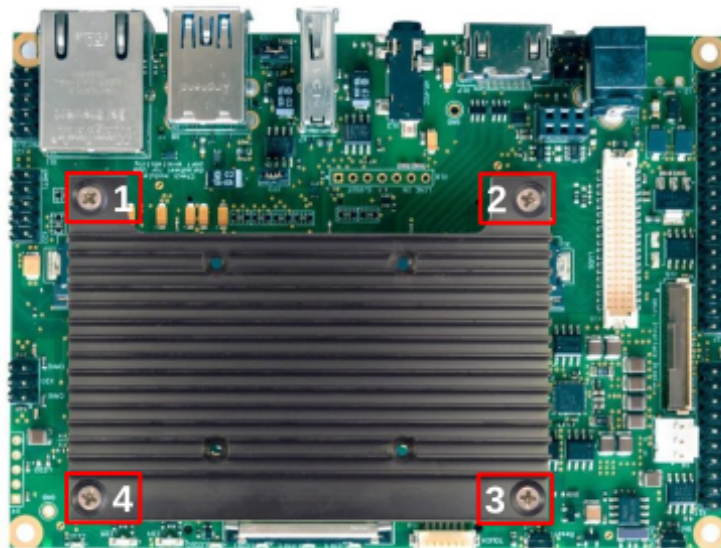
4. Carefully align mounting holes {1}, {2}, {3}, and {4} on the Apalis Heatsink with the fasteners on the Apalis carrier board. Place the Apalis Heatsink on the system.

Figure 6: Align Apalis Heatsink screw holes with the fasteners



5. Use four M3 screws to affix the Apalis heatsink to the system. The maximum tightening torque specified by the spacers on the Apalis carrier board is 0.2 Nm.

Figure 7: Affix Apalis Heatsink with the system using M3 sized screws



The system is now ready for use. For applications that may result in prolonged processor overheating—either due to environmental conditions (such as high ambient temperature) or high computational load—a DC fan can be mounted on top of the Apalis heatsink using four 2.5 mm screws.

For most end applications, an additional heatsink fan is not required.

7 Product Compliance

Up-to-date information about product compliance (such as RoHS, CE, UL 94, conflict minerals, REACH and more) can be found on our website at <https://www.toradex.com/support/product-compliance>.

8 Storage Requirements

Shelf life is the period during which a product is expected to remain within its approved specifications when stored under defined conditions.

The most significant factor limiting the Apalis Heatsink's shelf life is the Mylar film used to protect the TIM when the product is not assembled on the computer module.

The following table shows the storage requirements and shelf life of the Apalis Heatsink.

Table 7: Storage conditions for shelf life management

Storage measures	Ambient atmosphere	Storage temperature	Storage relative humidity	Maximum storage time
Original packing	Air	20°C to 30°C	40% to 60%	24 months

Note that short periods of exposure to slightly off-specification environmental conditions will not significantly affect shelf life.

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