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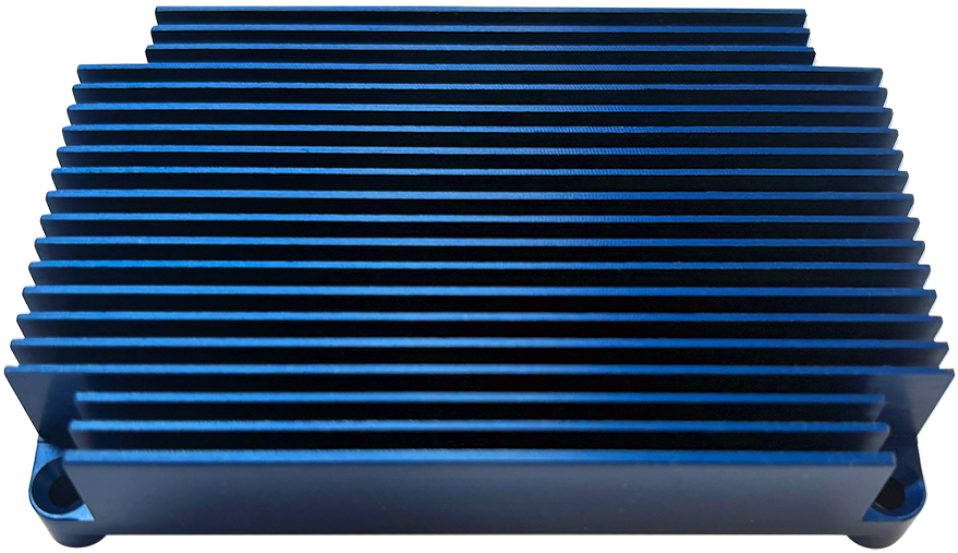
Aquila Heatsink Passive

HW Datasheet



Revision History

Document Revisions

Date	Doc. Revision	Product Version	Changes
25-Feb-2026	Rev. 1.0	V1.0A	Initial release

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1 Introduction

The Aquila Passive Heatsink is a complete thermal solution. It is mounted to the Aquila carrier board by means of four M3×14mm Phillips cross slot screws.

1.1 Reference Documents

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

1.1.1 Aquila Family Specification

https://docs.toradex.com/116801-aquila_family_specification.pdf

1.1.2 Aquila Carrier Board Design Guide

https://docs.toradex.com/116803-aquila_carrier_board_design_guide.pdf

1.1.3 Toradex Developer Website - Aquila Computer Modules

https://developer.toradex.com/hardware/aquila-som-family/modules

1.1.4 Toradex Developer Website - Aquila Carrier Boards

https://developer.toradex.com/hardware/aquila-som-family/carrier-boards

1.1.5 Thermal Interface Material (LAIRD TFLEX HD7.5) Datasheet

The datasheet of the Thermal Interface Material used on the Aquila Passive Heatsink can be downloaded by using the following link:

https://www.laird.com/sites/default/files/2023-08/Tflex%20HD7.5%20DS%2006122023RevF.pdf

1.2 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
MMC	MultiMediaCard, flash memory card

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Table 1: Abbreviations (Continued)

Abbreviation	Explanation
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
RGMII	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^2C 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 Technical Specifications

2.1 Aquila Passive Heatsink

Table 2: Technical Specifications - Aquila Passive Heatsink

Material	Aluminum alloy AA6063-T5	Remarks
Surface	Degreased blue anodized	
Thermal Interface Material	LAIRD TFLEX HD7.5	Refer to the Laird Tflex Datasheet for specific information on Density, Temperature, and related specifications.
Thermal Conductivity	201 to 218 W/(mK)	Temperature Range: 40°C to 100°C
Weight	Approx. 95 grams	
Thermal Resistance (Module-Alu)	TBD	
Thermal Resistance (Alu-Ambient)	TBD	

3 Compatibility

The following table shows the compatibility of the Aquila Passive Heatsinks and the Aquila modules:

Table 3: Compatibility

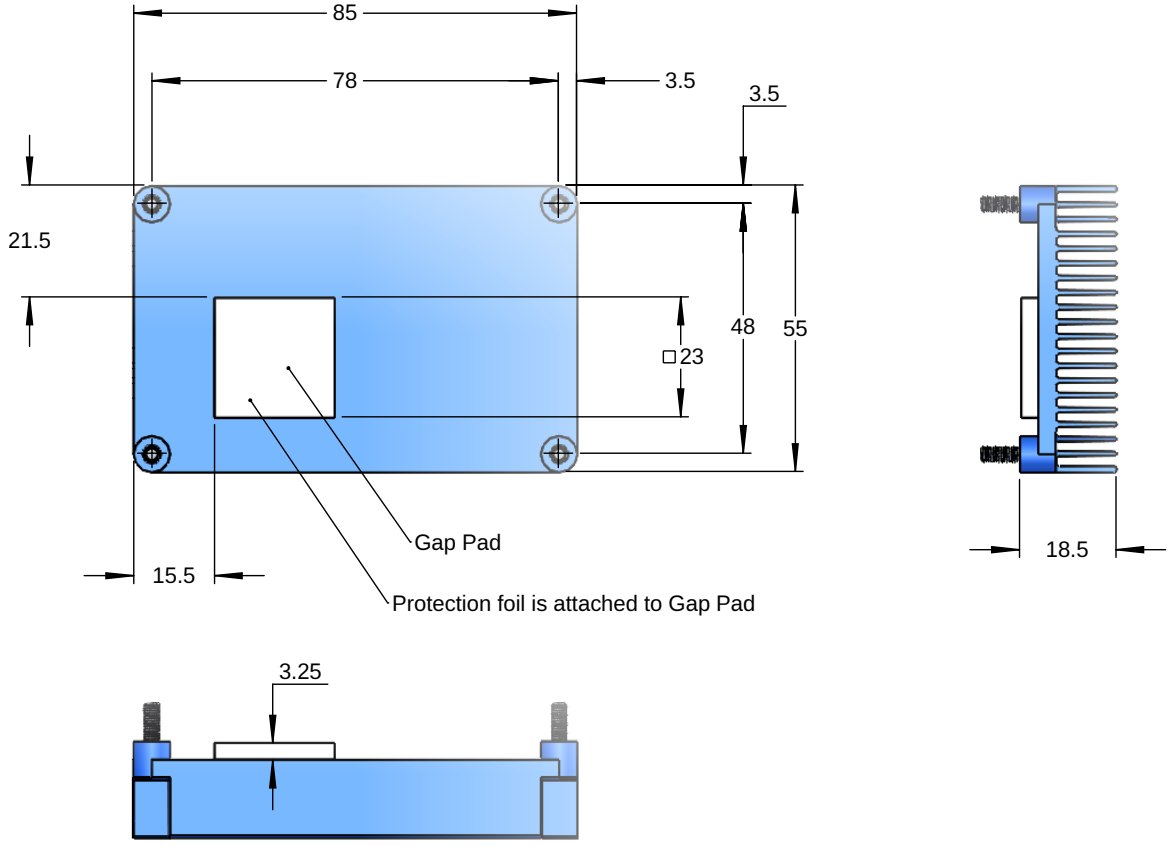
Aquila Module	Aquila Heatsink Passive
Aquila iMX95 V1.0A and newer	23111100 Aquila Heatsink Passive V1.0A

4 Mechanical Dimensions

The following drawings illustrate the mechanical dimensions of the Aquila Heatsink Passive. All measures are in millimeters(mm); the images are not to scale.

4.1 Heatsink Dimensions

Figure 1: Aquila Heatsink Passive Dimensions



4.2 General Tolerances

When not explicitly specified, the following tolerances apply to the product:

- Machining dimensions: DIN ISO 2768mK
- Extrusion dimensions: DIN EN12020-2
- Diecasting dimensions: DIN1688-4 GTA14

5 Assembly

Assembly must be done very carefully since putting the Aquila Passive Heatsink in a wrong orientation will damage the Aquila module or prevent the system from working correctly.

5.1 Assembly Procedure

The following procedure indicates how to attach the Aquila Passive Heatsink to the Aquila module to complete the heatsink solution. Please read the instructions and follow the procedure very carefully to ensure that the module does not get damaged. Necessary precautions should be taken to avoid the build-up of electrostatic charges.

1. Clean the processor's top surface using an anti-static cloth.
2. Insert the Aquila module in the board-to-board M1 connector on the Aquila carrier board.
3. Carefully remove the plastic foil from the TIM.
4. Carefully align the mounting holes of the Aquila Passive Heatsink to be in line with the stand-offs available on the Aquila carrier board. Place the Aquila Passive Heatsink on the system.
5. Use four units of M3-sized screws to affix the Aquila Passive Heatsink to the system. The maximum tightening torque specified by the spacers mounted on the Aquila carrier boards is 0.2 Nm.
6. Done. The system is now ready for use.

6 Product Compliance

Up-to-date information about product compliance such as RoHS, CE, UL-94, Conflict Mineral, REACH, etc. can be found on our website at http://www.toradex.com/support/product-compliance

7 Storage Requirements

Shelf life is the period of time that a product is expected to remain within its approved product specification while stored under defined conditions.

The most significant factor limiting the Aquila Passive 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 the shelf life of the Aquila Passive Heatsink.

Short periods during which the product is subjected to slightly off-specification environmental conditions will not significantly impact shelf life.

Table 4: Storage Requirements

Storage Measures	Ambient Atmosphere	Storage Temperature	Storage Relative Humidity	Maximum Storage Time
Original packing	Air	22°C to 28°C	40% to 60%	12 months

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