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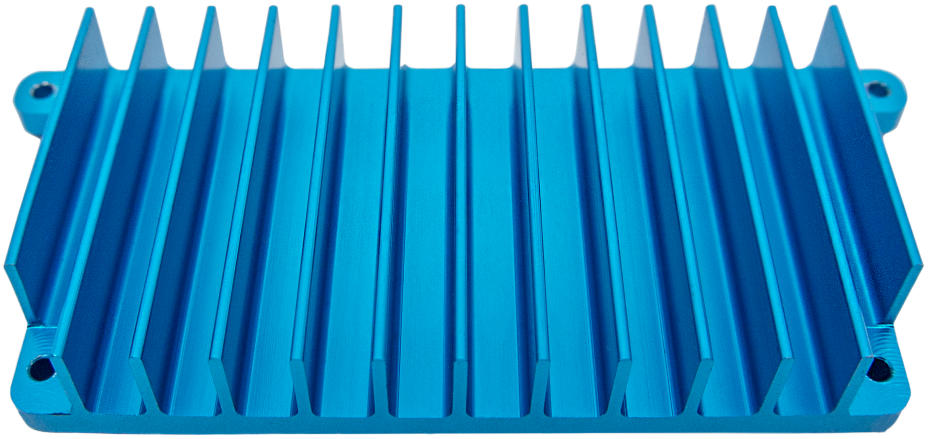
Verdin Industrial Heatsink

HW Datasheet



Revision History

Document Revisions

Date	Doc. Revision	Product Version	Changes
16-Apr-2021	Rev. 0.9	V1.0A	Initial release
07-Nov-2021	Rev. 1.0	V1.0B	Product picture updated Preliminary markings removed Section 2.1: added missing thermal resistance valued to the table Section 4: updated product pictures, added general tolerances Section 5.1: added details about screws maximum tightening torque Small improvements throughout the whole document
24-Jun-2025	Rev. 1.1	V1.0B	Update document layout following the new standard template.
06-Aug-2025	Rev. 1.2	V1.1A	Section 1.1.5: update link to the TGP-5000 Datasheet Section 1.2: add Abbreviations section following the new standard template Section 2.1: update Table 2 with the latest Hardware Revision test results Section 3: include Verdin AM62 and Verdin iMX95 in Table 4 following the extended product compatibility Section 4: update the drawing to reflect the latest Hardware Revision
11-Aug-2025	Rev. 1.3	V1.1A	Introduce Verdin Industrial Heatsink Type 2 technical details and specifications Section 2: add Section 2.2, Table 3 Section 3: add Verdin AM62P and Verdin Industrial Heatsink Type 2 to Table 4 Section 4.1: update Figure 1, add Table 5

Contents

1 Introduction **5**
1.1 Reference Documents . . . 5
1.1.1 Verdin Family Specification . . . 5
1.1.2 Verdin Carrier Board Design Guide . . . 5
1.1.3 Toradex Developer Website - Verdin Computer Modules . . . 5
1.1.4 Toradex Developer Website - Verdin Carrier Boards . . . 5
1.1.5 Thermal Interface Material (TGP 5000) Datasheet . . . 5
1.2 Abbreviations . . . 6

2 Technical Specifications **8**
2.1 Verdin Industrial Heatsink Type 1 . . . 8
2.2 Verdin Industrial Heatsink Type 2 . . . 8

3 Compatibility **9**

4 Mechanical Dimensions **10**
4.1 Heatsink Dimensions . . . 10
4.2 General Tolerances . . . 11

5 Assembly **12**
5.1 Assembly Procedure . . . 12

6 Product Compliance **13**

7 Storage Requirements **14**

List of Tables

1 Abbreviations 6
2 Technical Specifications - Verdin Industrial Heatsink Type 1 8
3 Technical Specifications - Verdin Industrial Heatsink Type 2 8
4 Compatibility 9
5 Heatsink Dimensions - TIM Thickness 10
6 Storage Requirements 14

List of Figures

1 Verdin Industrial Heatsink Type 1 and 2 Heatsink Dimensions 10

1 Introduction

The Verdin Industrial Heatsink is a complete thermal solution. It is mounted to the Verdin carrier board by means of four M2×10mm 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 Verdin Family Specification

https://docs.toradex.com/109262-verdin-family-specification.pdf

1.1.2 Verdin Carrier Board Design Guide

https://docs.toradex.com/108140-verdin-carrier-board-design-guide.pdf

1.1.3 Toradex Developer Website - Verdin Computer Modules

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

1.1.4 Toradex Developer Website - Verdin Carrier Boards

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

1.1.5 Thermal Interface Material (TGP 5000) Datasheet

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

https://datasheets.tdx.henkel.com/BERGQUIST-GAP-PAD-TGP-5000-en_GL.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 Verdin Industrial Heatsink Type 1

Table 2: Technical Specifications - Verdin Industrial Heatsink Type 1

Material	Aluminum alloy AL6063-T5	Remarks
Surface	Degreased blue anodized	
Thermal Interface Material	TGP 5000	Refer to the TGP 5000 Datasheet for specific information on Density, Temperature, and related specifications.
Thermal Conductivity	190 to 221 W/(mK)	Temperature Range: 40°C to 100°C
Weight	Approx. 33 grams	
Thermal Resistance (Module-Alu)	~ 2°C/W (Estimated)	
Thermal Resistance (Alu-Ambient)	~ 7.5°C/W (Estimated)	

2.2 Verdin Industrial Heatsink Type 2

Table 3: Technical Specifications - Verdin Industrial Heatsink Type 2

Material	Aluminum alloy AL6063-T5	Remarks
Surface	Degreased blue anodized	
Thermal Interface Material	TGP 5000	Refer to the TGP 5000 Datasheet for specific information on Density, Temperature, and related specifications.
Thermal Conductivity	190 to 221 W/(mK)	Temperature Range: 40°C to 100°C
Weight	Approx. 33 grams	
Thermal Resistance (Module-Alu)	~ 2°C/W (Preliminary)	
Thermal Resistance (Alu-Ambient)	~ 7.5°C/W (Preliminary)	

3 Compatibility

The following table shows the compatibility of the Verdin Industrial Heatsinks and the Verdin modules:

Table 4: Compatibility

Verdin Module	Compatible Verdin Industrial Heatsink
Verdin iMX8M Mini V1.1A and newer Verdin iMX8M Plus V1.0B and newer Verdin iMX95 V1.0A and newer Verdin AM62 V1.1A and newer	23111100 Verdin Industrial Heatsink Type 1 V1.1A
Verdin AM62P V1.0A and newer	23171100 Verdin Industrial Heatsink Type 2 V1.1A

4 Mechanical Dimensions

The following drawings illustrate the mechanical dimensions of the Verdin Industrial Heatsink. All measurements are in millimeters (mm); the images are not to scale.

4.1 Heatsink Dimensions

Figure 1: Verdin Industrial Heatsink Type 1 and 2 Heatsink Dimensions

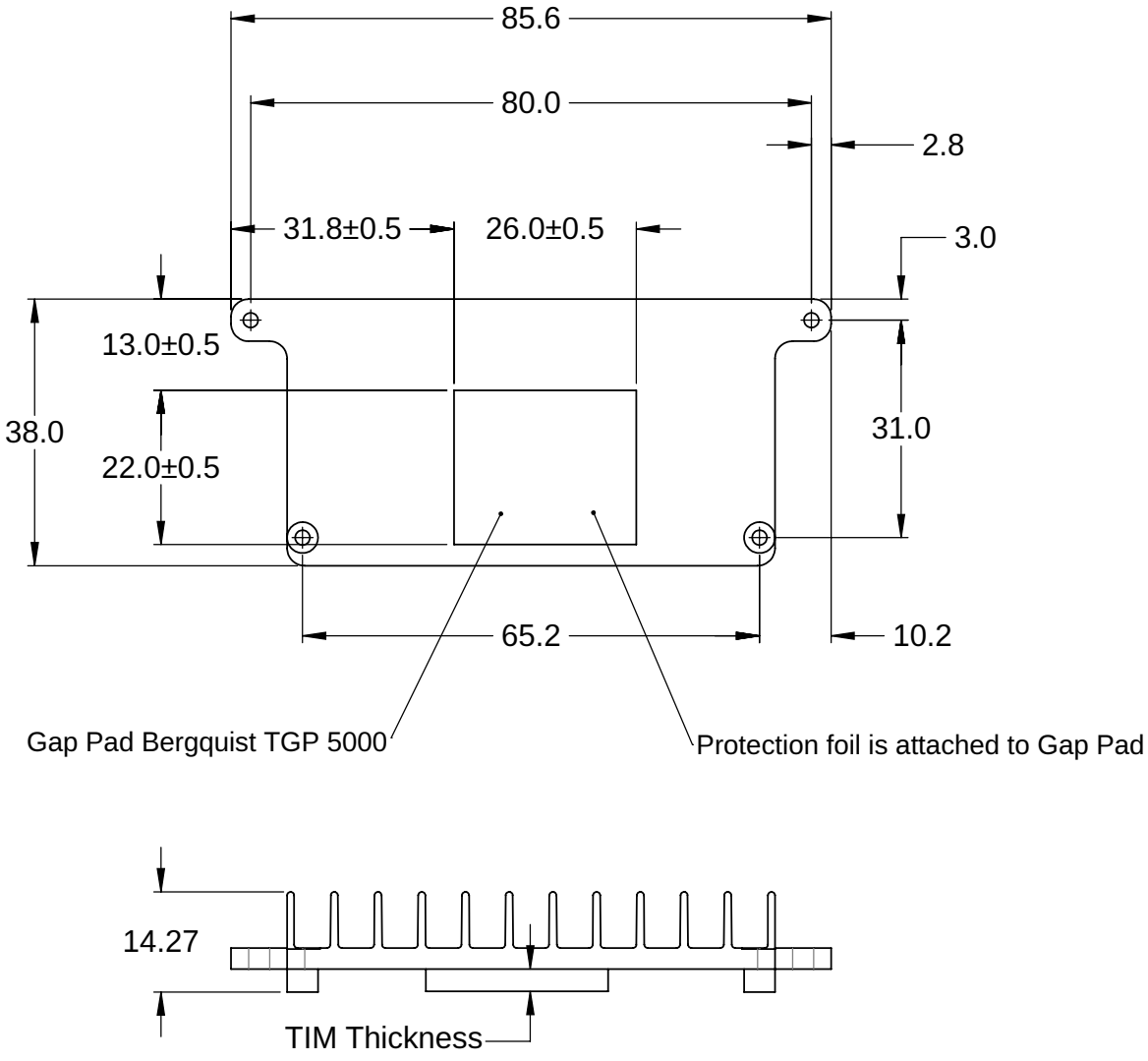

Table 5: Heatsink Dimensions - TIM Thickness

Verdin Industrial Heatsink	TIM Thickness
23111100 Verdin Industrial Heatsink Type 1 V1.1A	3.175 mm
23171100 Verdin Industrial Heatsink Type 2 V1.1A	1.524 mm

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 Verdin Industrial Heatsink in a wrong orientation will damage the Verdin module or prevent the system from working correctly.

5.1 Assembly Procedure

The following procedure indicates how to attach the Verdin Industrial Heatsink to the Verdin 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 Verdin module in the SO-DIMM socket X1 on the Verdin carrier board.
3. Carefully remove the plastic foil from the TIM.
4. Carefully align the mounting holes of the Verdin Industrial Heatsink to be in line with the stand-offs available on the Verdin carrier board. Place the Verdin Industrial Heatsink on the system.
5. Use four units of M2-sized screws to affix the Verdin Industrial Heatsink to the system. The maximum tightening torque specified by the spacers mounted on the Verdin 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 Verdin Industrial 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 Verdin Industrial Heatsink.

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

Table 6: 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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