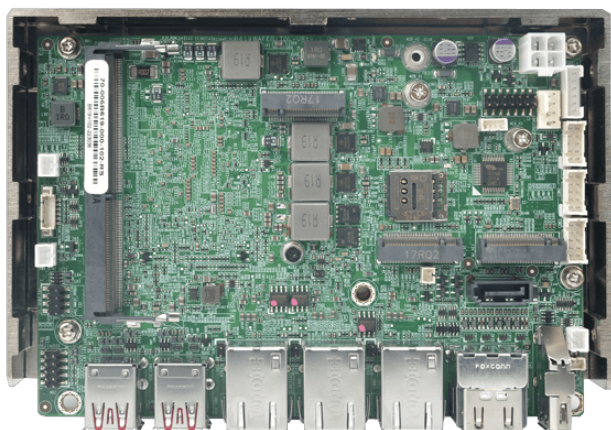


# WAFER-TGL-U

3.5" SBC supports Intel® Tiger Lake-UP3 Core I™ Celeron® Processor, with HDMI™, DP, iDPM, triple 2.5 GbE Lan port, USB 3.2, M.2, SATA 6Gb/s, COM, Audio and RoHS, -10°C ~60°C



## Features

1. 3.5" SBC with Intel® Tiger Lake-UP3 on board SOC processor, support SO-DIMM DDR4-3200 memory
2. Support Quadruple independent display: 2 x HDMI™ 1.4, 1 x DP 1.4, 1 x iDPM
3. High-speed I/O interface: 4 x USB 3.2 gen 2 (10Gb/s), SATA (6Gb/s)
4. Support three Intel® I225V/I226V 2.5GbE network port
5. Support M.2 A Key, B key extension

## Specifications

System	
CPU	11th Gen. Intel® mobile Tiger Lake-UP3 on board processor
	Intel® Core™ i7-1185G7E (up to 4.4GHz, quad-core, 12M Cache, TDP=28/15/12W)
	Intel® Core™ i5-1145G7E (up to 4.1GHz, quad-core, 8M Cache, TDP=28/15/12W)
	Intel® Core™ i3-1115G4E (up to 3.9GHz, dual-core, 6M Cache, TDP=28/15/12W)
	Intel® Celeron® 6305E (up to 1.8GHz, dual-core, 4M Cache, TDP=15W)
Memory	One 260-pin 3200 MHz DDR4 SO-DIMMs support up to 32 GB
Memory Max.	up to 32GB
Cooling method / System Fan	1 x System fan connector (1x4 pin, P=2.54)
Storage	
Storage	1 x SATA : 6Gb/s with 5V SATA power connector
	1 x M.2(NGFF) : B Key(2242/3052) with PCIe Gen3 x2,support NVME storage
I/O Interface	
Display Output	2 x HDMI™ : up to 4096 x 2160@30Hz
	1 x Display Port : up to 4096 x 2160@60Hz
	1 x iDPM : IEI iDPM 3040 slot (only for IEI eDP/LVDS/VGA module)
Ethernet	3 x LAN -
	LAN1: Intel® I225V/I226V 2.5GbE controller
	LAN2: Intel® I225V/I226V 2.5GbE controller
	LAN3: Intel® I225V/I226V 2.5GbE controller
Audio	1 x HD Audio : 1 x iAUDIO, support IEI AC-KIT-888S Audio Module (2 x 5 pin)
I/O Interface	1 x Internal RS-232 : 2x5 pin, P=2.0
	2 x Internal RS-232/422/485 : 2x5 pin, P=2.00 ,RS-485 support AFC
	2 x Internal USB 2.0 : 2x4 pin, P=2.00
	1 x DIO : 12-bit digital I/O (2x7 pin, P=2.0)
	4 x External USB 3.2 Gen2x1 : 10Gb/s
Expansion	2 x M.2(NGFF) -
	1 x M.2 A key (2230) with PCIe Gen3 x1/USB 2.0
	1 x M.2 B Key (2242/3052) for 5G with PCIe Gen3 x2/USB 2.0
Other Features	
TPM	Intel® PTT(TPM 2.0)
Power	
Power Supply	+12V DC input power (AT/ATX mode)

Environment	
Operating Temperature	0°C ~ 60°C
Storage Temperature	-20°C ~ 70°C
Humidity	5% ~ 95%, non-condensing
Certifications	
Safety & EMC	CE/FCC compliant

## Ordering Information

WAFER-TGL-U-i7-R11	3.5" SBC with Intel® Tiger Lake-UP3 Core™ i7-1185G7E Processor,DDR4 SO-DIMM,12V DC input,Quad Display,Triple M.2 with A/B key,Triple Intel® 2.5 GbE,SATA,USB3.2,SoC,RoHS
WAFER-TGL-U-i5-R11	3.5" SBC with Intel® Tiger Lake-UP3 Core™ i5-1145G7E Processor,DDR4 SO-DIMM,12V DC input,Quad Display,Triple M.2 with A/B key,Triple Intel® 2.5 GbE,SATA,USB3.2,SoC,RoHS
WAFER-TGL-U-i3-R11	3.5" SBC with Intel® Tiger Lake-UP3 Core™ i3-1115G4E Processor,DDR4 SO-DIMM,12V DC input,Quad Display,Triple M.2 with A/B key,Triple Intel® 2.5 GbE,SATA,USB3.2,SoC,RoHS
WAFER-TGL-U-CE-R11	3.5" SBC with Intel® Tiger Lake-UP3 Celeron 6305E Processor,DDR4 SO-DIMM,12V DC input,Quad Display,Triple M.2 with A/B key,Triple Intel® 2.5 GbE,SATA,USB3.2,SoC,RoHS

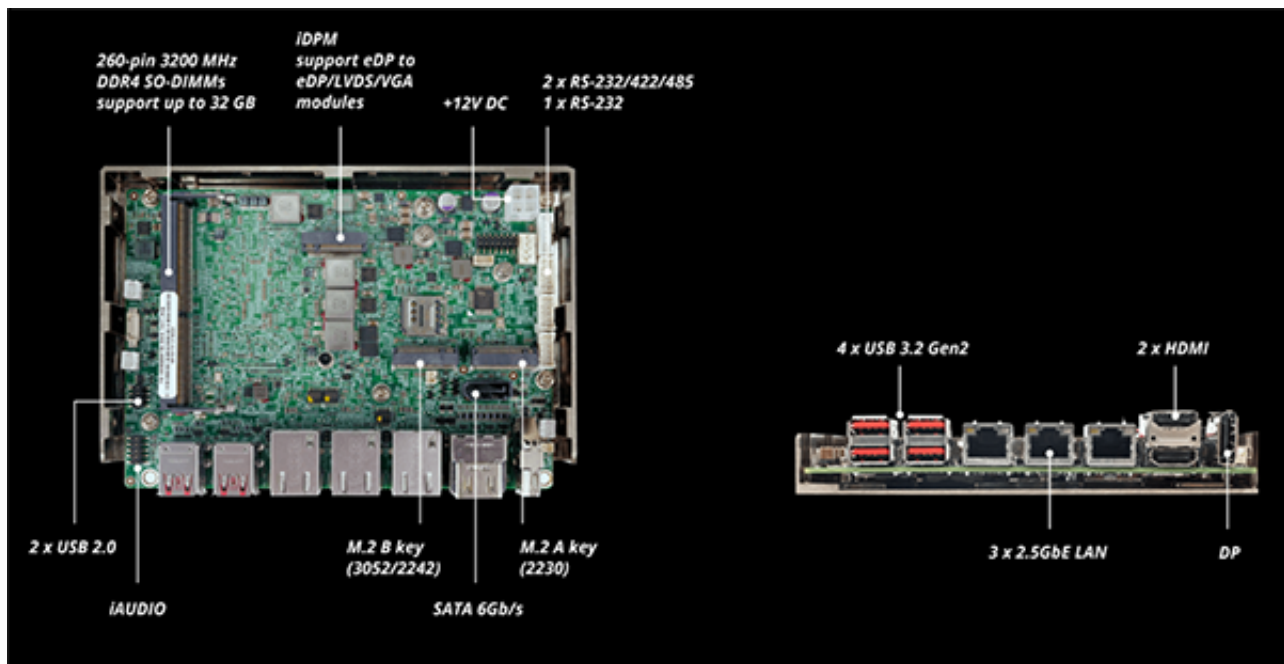
## Packing List

1 x WAFER-TGL-U single board computer	1 x SATA cable
1 x I/O shielding	1 x QIG



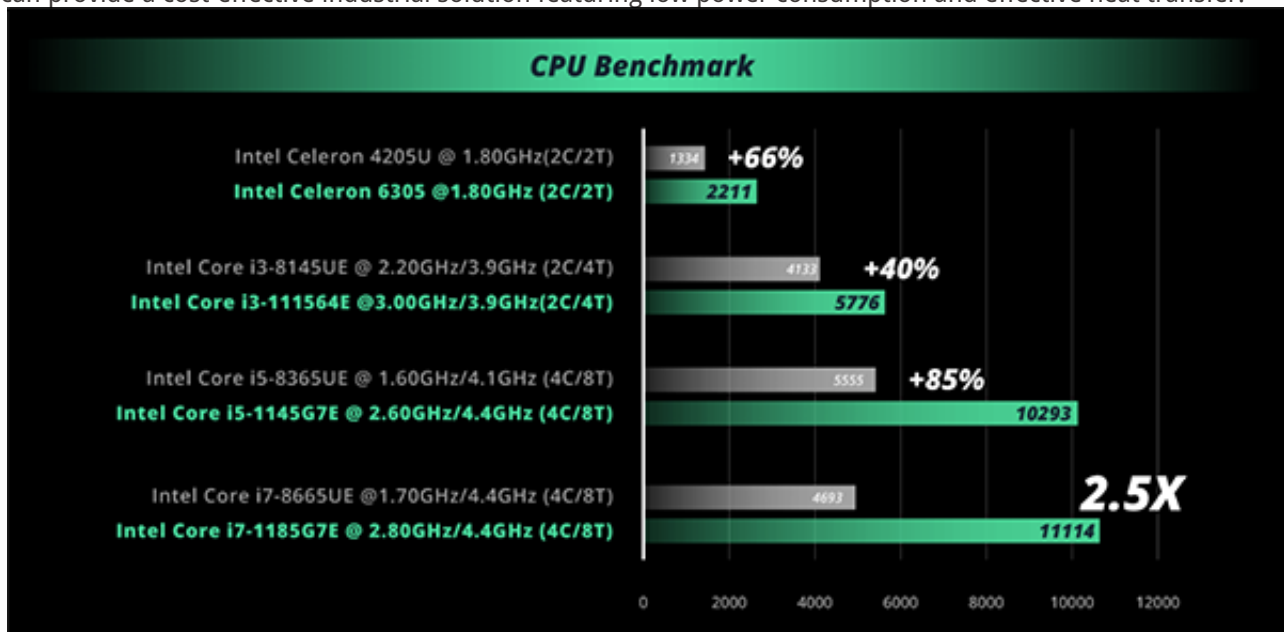
IEI WAFER-TGL takes all the essential elements of the latest 11th Gen. Intel® Core™ U-series processors and combines them with smart manufacturing features and proven durability in the compact size 3.5" form factor. It is ideal for space-constraints installation, notably AGVs(Automated Guided Vehicle), AMR (Autonomous Mobile Robot) and small cabinets in factories. It features complete I/O interfaces such as three 2.5 GbE LAN ports for motion control / IP cameras, an M.2 B-key with SIM slot for LTE cellular communication, and USB 3.2 Gen 2, serial ports for connecting sensors and communicating with other devices.






## 11th Gen. Intel® Core™ U-series

IEI WAFER-TGL is a 3.5" embedded board equipped with the 11th generation Intel® Core™ U processor supporting up to 4 cores, 8 threads, turbo up-to 4.40 GHz. The Intel® Core™ i7 and i5 processors are integrated with Intel® Iris® Xe 96EU graphics core, delivering high AI inference performance for the SoC. With no graphics card required, it can provide a cost-effective industrial solution featuring low power consumption and effective heat transfer.



## Effortless Upgrade

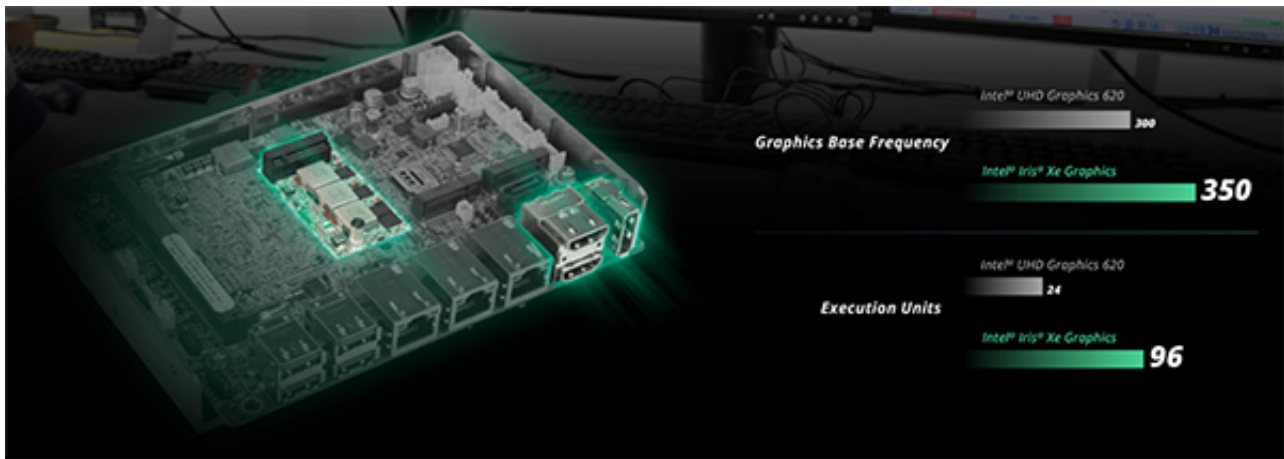
Compared with the previous generation, the WAFER-TGL features high performance CPU and GPU, along with AI deep learning capabilities in a compact 3.5" form factor. The WAFER-TGL provides effortless upgrade, allowing new version replacement to improve performance without changing the original mechanical design.

<b>WAFER-ULT5</b>		<b>WAFER-TGL</b> 	
<i>8th Generation Intel® Processors 14 nm</i>	<i>CPU</i>	<i>11th Generation Intel® Processors 10 nm SuperFin</i>	
<i>Triple display 2 x HDMI 1.4, LVDS</i>	<i>Display</i>	<i>4 simultaneous displays 2 x HDMI 1.4, 1 x DP 1.4, 1 x IEI IDPM 3040 slot</i>	
<i>1 x PCIe Mini card slot 1 x M.2 A Key</i>	<i>Expansion Slots</i>	<i>1 x M.2 2230 A key 1 x M.2 3052/2042 B key with SIM holder</i>	
<i>3 x 1GbE</i>	<i>Ethernet</i>	<i>3 x 2.5GbE</i>	
<i>4 x USB 3.2 Gen1x1 5Gb/s</i>	<i>USB</i>	<i>4 x USB 3.2 Gen2x1 10Gb/s</i>	
<i>Intel® UHD Graphics 620</i>	<i>Graphics</i>	<i>Intel® Iris® Xe Graphics (Core™ i7 / i5) Intel® UHD Graphics (Core™ i3 / Celeron®)</i>	
<i>X</i>	<i>Intel® Deep Learning Boost</i>	<i>O</i>	

## Quad Independent Displays with up to 4K Resolution

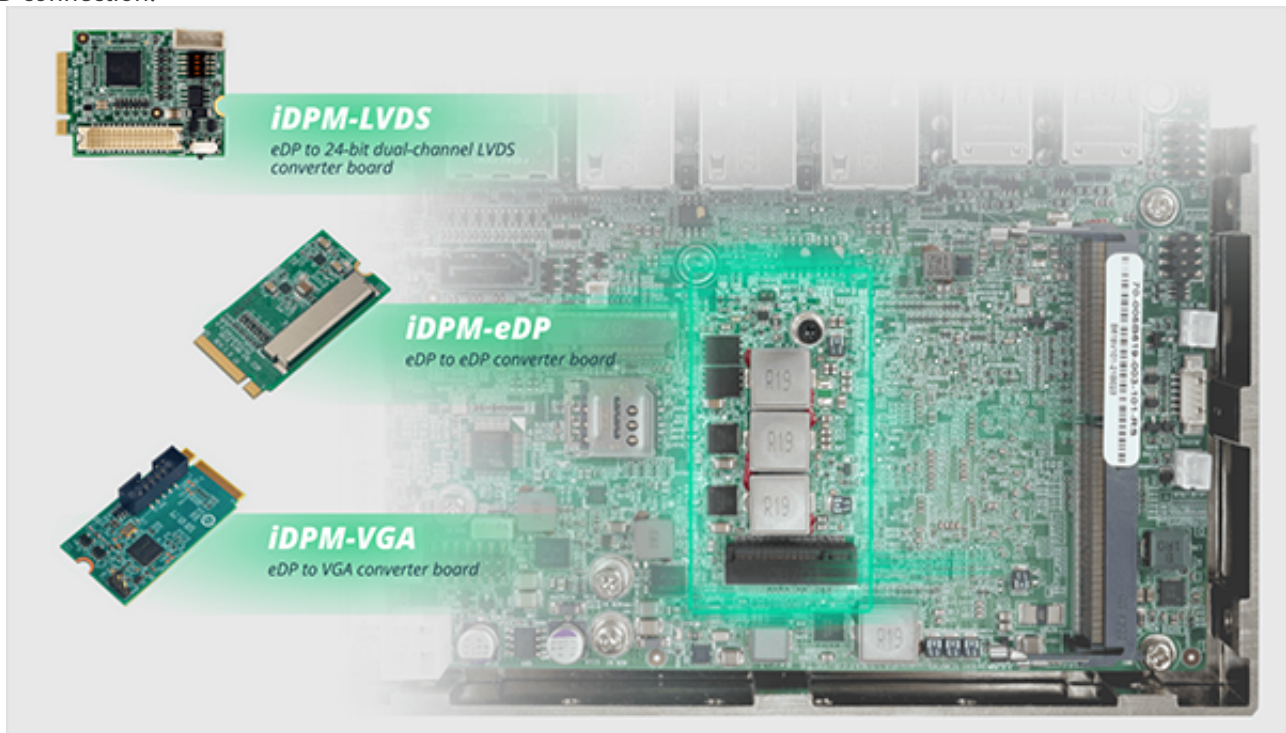
The WAFER-TGL 3.5" motherboard integrates the latest Intel® Iris® Xe graphics (Gen12), offering max. 96 EUs and up to 2.95 times faster graphics performance to deliver excellent graphics performance. With two HDMI™ 1.4 (up to 4096 x 2160@30Hz), one DP 1.4 (up to 4096 x 2160 @60Hz) and the option to use the iDPM interface to support four independent displays, it is ideal for video surveillance, kiosks, digital signage, or medical imaging application which requires high graphics performance.





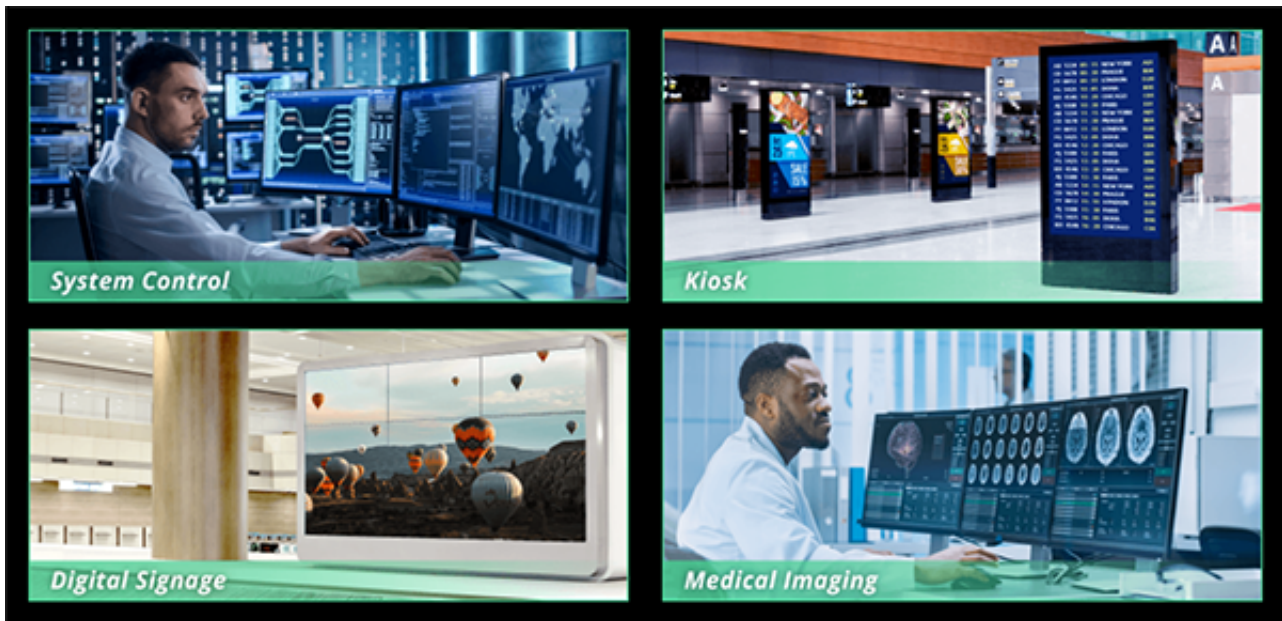
## Free to choose display connections with iDPM modules

More display I/Os are supported via IEI iDPM connector. The iDPM display converter boards allow the WAFER-TGL to meet customers' diverse display interface requirements such as the legacy display port, VGA and LVDS, or eDP for TFT LCD connection.



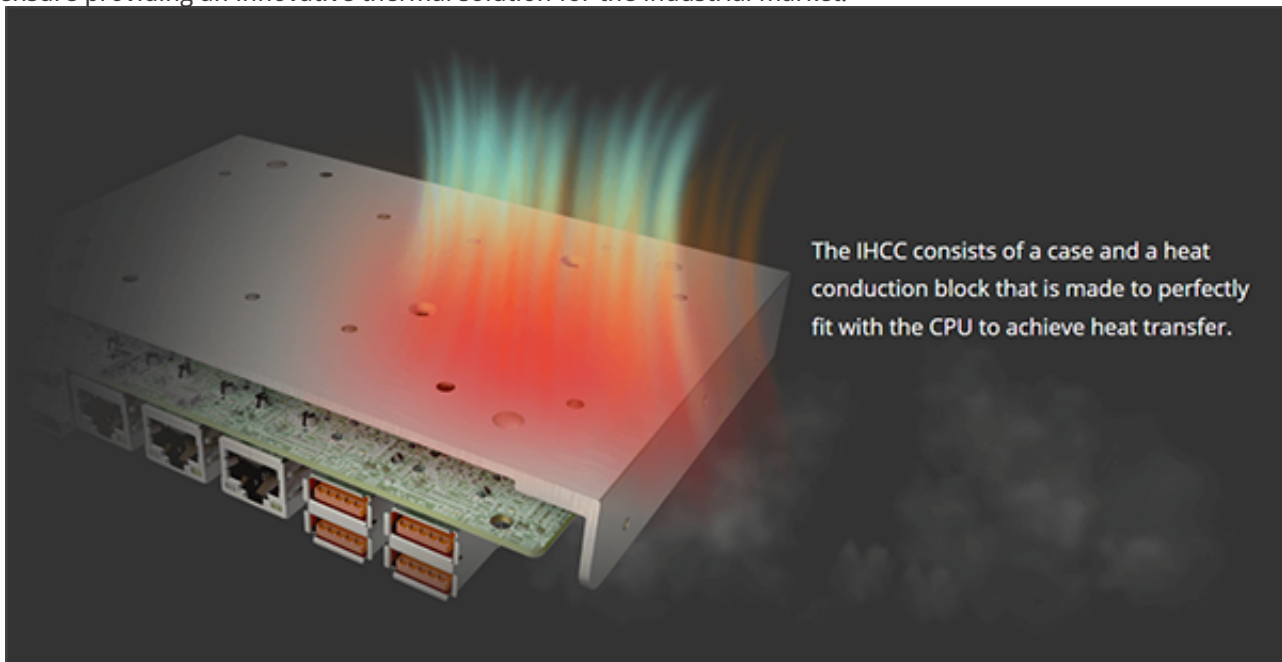
## Ready for Any Scenario

The WAFER-TGL supports up to quad independent display, thus it is flexible to use in multi-display applications. Its diverse display outputs offered by the iDPM modules make the WAFER-TGL more suitable for any feasible scenario.



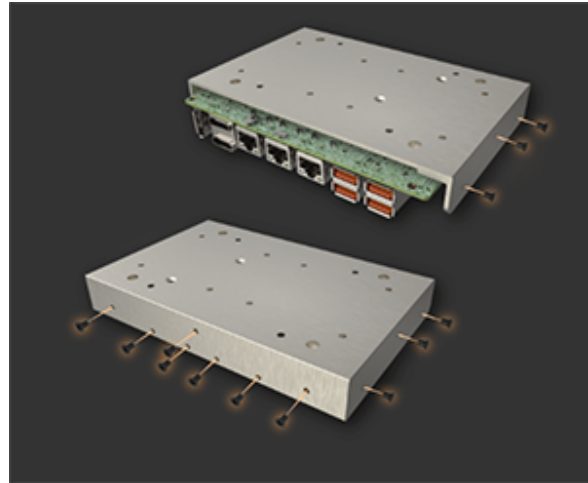
## Well-design Thermal Solution

IEI has developed a highly efficient thermal solution for the 3.5" motherboard - IEI Heat Conduction Casing (IHCC). The IHCC can effectively improve heat transfer performance, and we will keep on improving our heat sink design to ensure providing an innovative thermal solution for the industrial market.



## Diverse mounting options

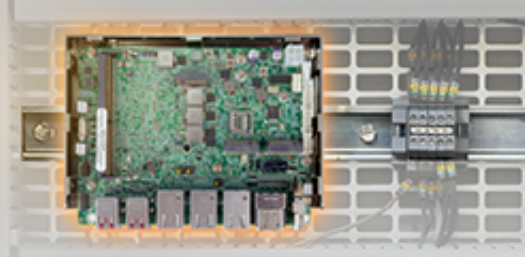
With its well-design thurmal casing,the WAFER-TGL provides 13 holes on three sides. It can be installed on a control cabinet's rear panel, door, or onto a DIN rail. And it is easy to install additional thermal module for operating under high ambient temperatures.



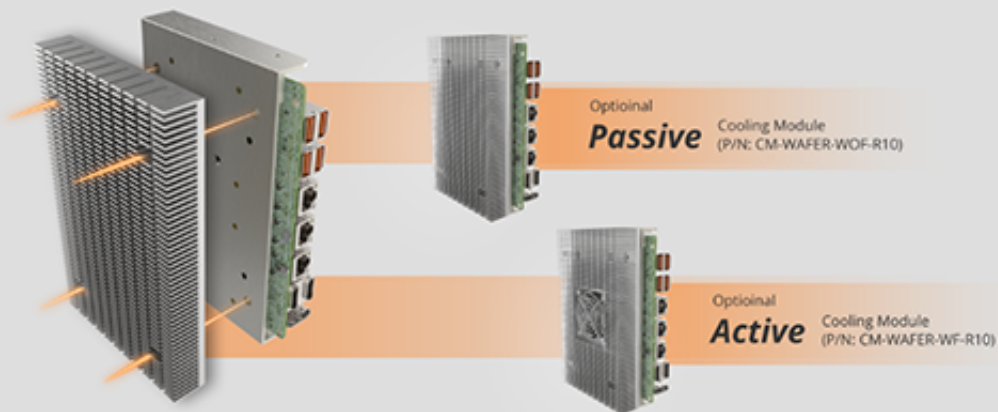
## Fitting different mounting needs



*A. Embedded System*



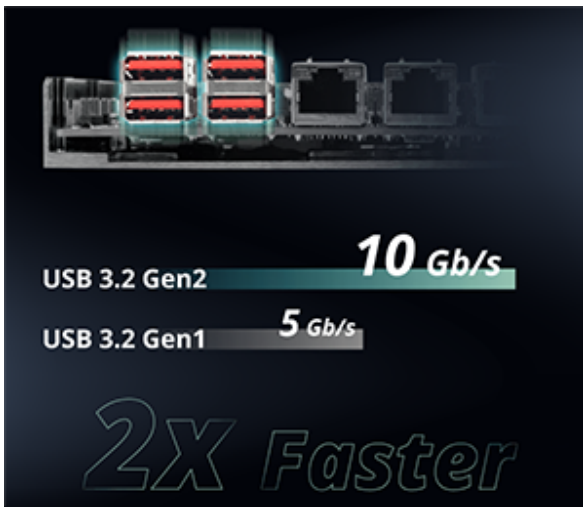
*B. Electrical Cabinet*



*C. Flexible Thermal Module Stacking*



## High Speed Transmission

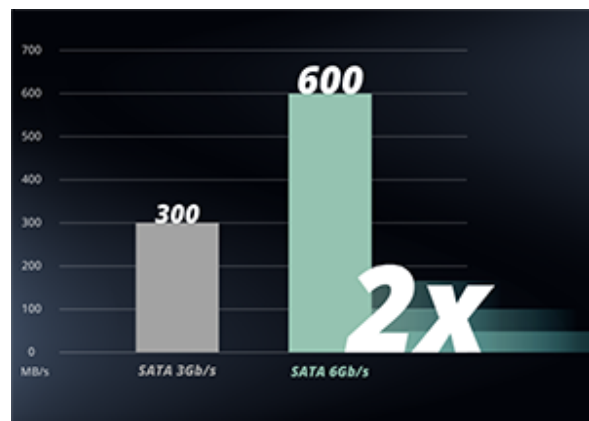


### Four USB 3.2 Gen 2 (10Gb/s)

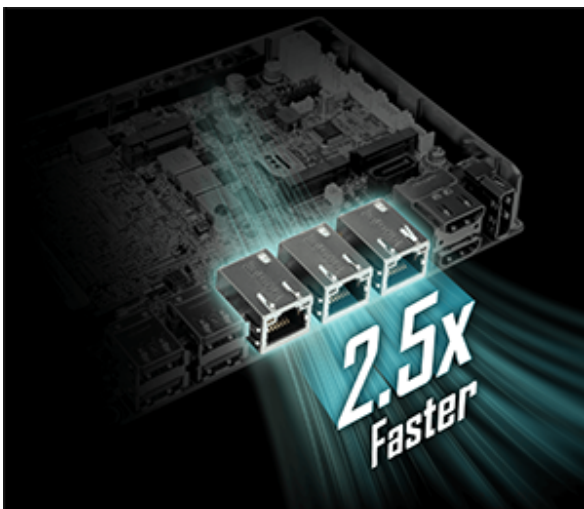
Four USB 3.2 Gen 2 (10 Gb/s) ports are integrated to support high density data transmission.

## SATA 6Gbps Provides faster transfer speeds

Twice as fast data processing it is capable of delivering lightning fast data transfer experience for edge AI data process applications.



## Networking



### Delivers Triple Low-Latency 2.5G LAN Powered by Intel

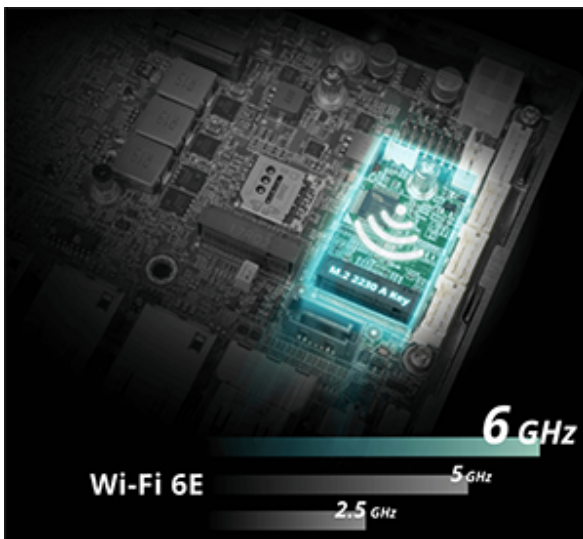
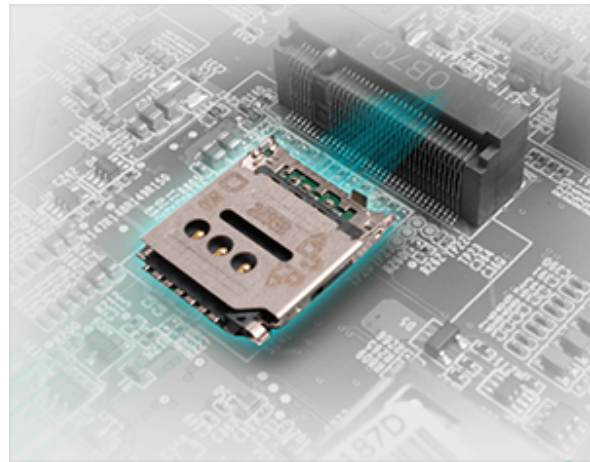
The on-board triple Intel® I225V 2.5GbE controllers enable the WAFER-TGL to meet the bandwidth-intensive requirements such as large file transfers and high-resolution video streaming.



## M.2 3042 B Key with SIM Slot for 4G LTE Cellular Communication

The M.2 3042 B key connector supporting PCI Gen3 x2 and USB 2.0 signals allows you to use a dedicated LTE radio frequency to ensure secure and delay-free data transmission in smart manufacturing.

\*For any 5G requirements, please contact IEI for support.



## M.2 2230 A Key for Wi-Fi / Bluetooth

The M.2 2230 A key slot carrying with PCIe Gen3 x1 and USB 2.0 signals allows it to adopt the latest Wi-Fi 6E technology.

Wi-Fi 6E enhances low latency and supports service levels that are equivalent to 5G networks.

## Dimensions (Unit: mm)

