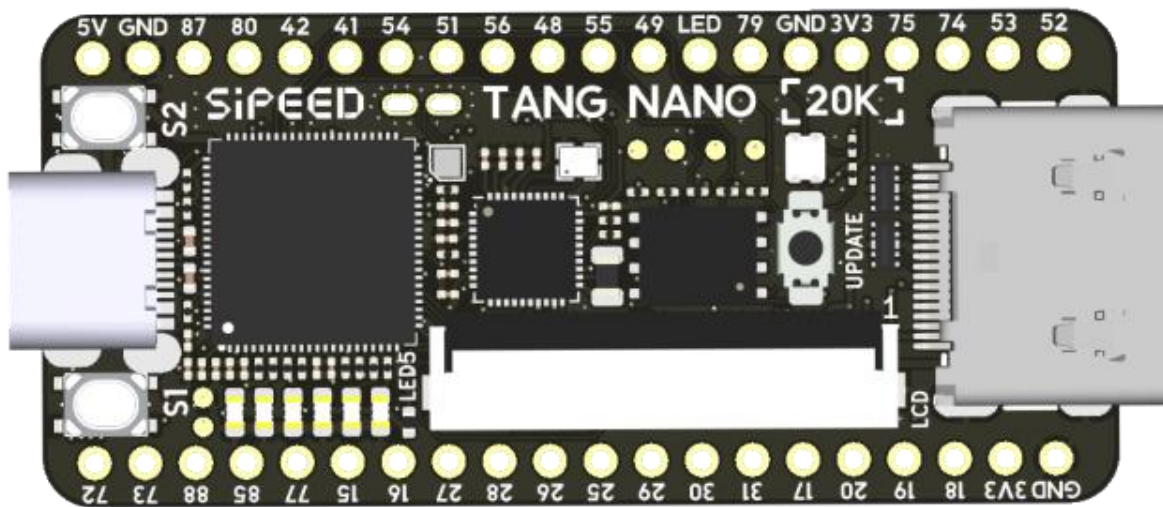


# Sipeed Tang Nano 20K

## Datasheet v1.0



### Characteristic:

- FPGA CHIP: GW2AR-18 with 20,736 LUT4 Logical Units
- USB-C to JTAG & UART Debugger with USB High-Speed
- Support TMDS Display Output or MIPI DPI Output
- Mono Audio CODEC+PA on Board for Speaker
- External PLL Chip can Generate Accurate Clock
- 32Mbit QSPI NOR FLASH + 64Mbit SDRAM
- Special Design for Retro-Games

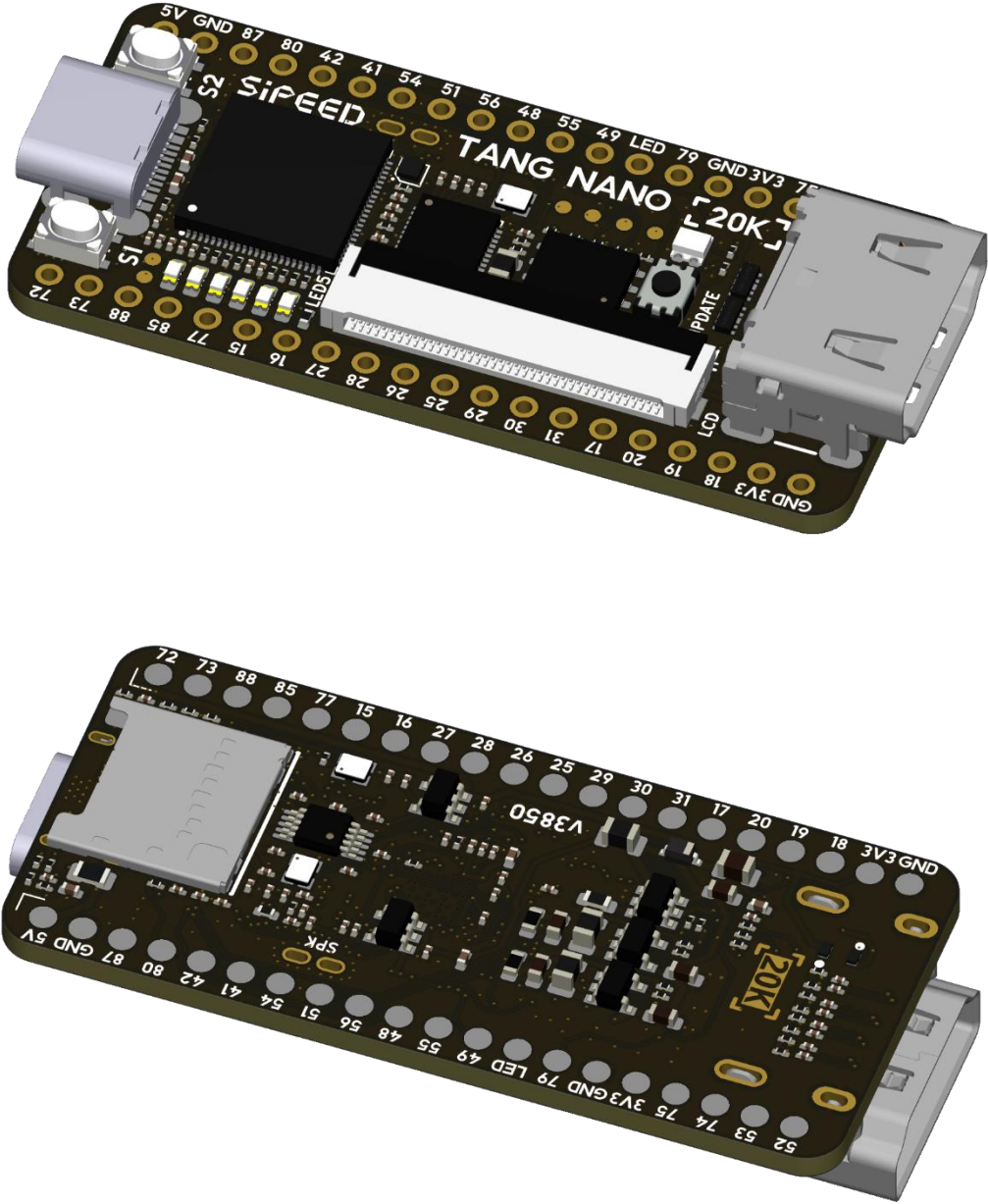
Update record of this document	
V1.0	Edited on December 23, 2022; Original document

Hardware overview	
LUT4	20,736
Flip-Flop (FF)	15,552
Shadow SRAM SSRAM (bits)	41,472
Block SRAM BSRAM	828K
BSRAM quantity BSRAM	46
DSRAM (bits)	64M
High performance DSP	Support 9x9,18x18,36x36bits multiplier and 54bits accumulator
18 x 18 Multiplier	48
QSPI FLASH (bits)	32M
PLLs	2
Display interface	HDMI Connector, MIPI DPI FPC Connector
Debugger	Onboard BL616, which provides USB-JTAG & USB-UART
IO Drive capability	<ul style="list-style-type: none"> <li>• Support 4mA, 8mA, 16mA, 24mA and other driving capabilities</li> <li>• Independent bus keeper, pull-up / pull-down resistor and open drain output options are provided for each I/O</li> </ul>
Storage	microSD Card Slot
IO Fanout	2x20P 2.54mm DIP Pin Headers
Button	Onboard 2 user buttons
LED	Onboard 6 LED + 1 WS2812

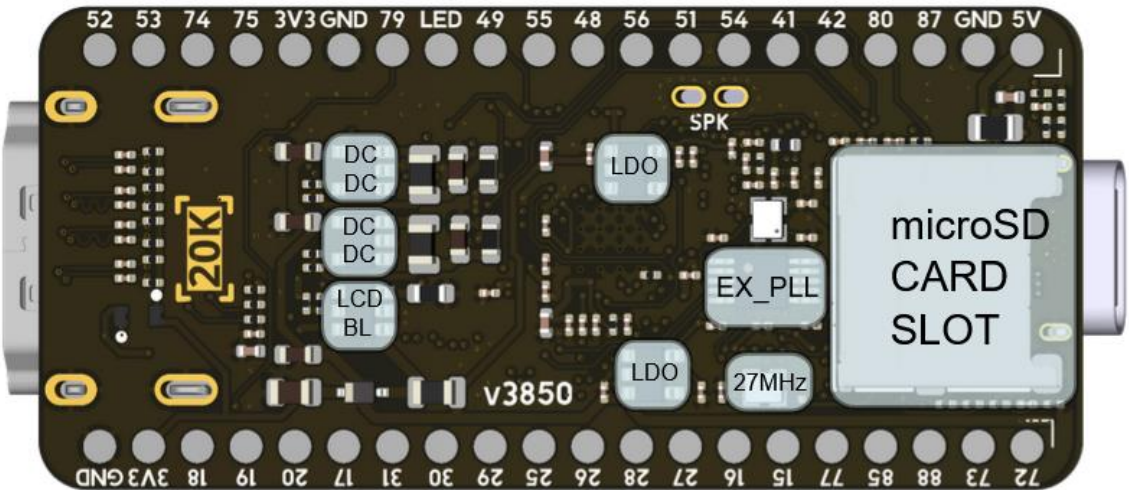
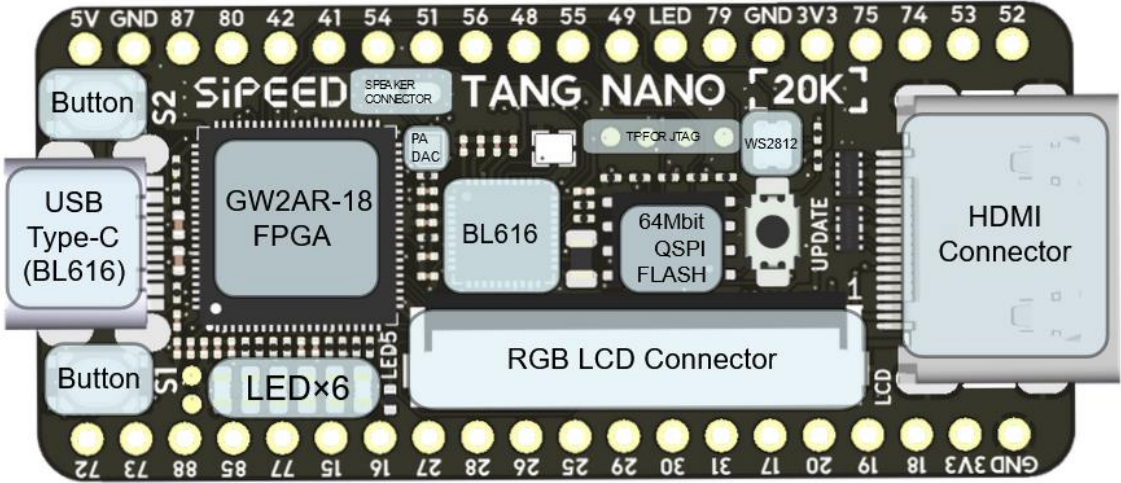
Software overview	
IDE	Support Gowin IDE(Version>1.9.8) ; Support Gowin Synthesis
IDE	<a href="https://www.gowinsemi.com/en/support/home/">https://www.gowinsemi.com/en/support/home/</a>
GOAI brief introduction	<a href="https://www.gowinsemi.com/en/support/ip_detail/119/">https://www.gowinsemi.com/en/support/ip_detail/119/</a>
GOAI Official project	<a href="https://github.com/gowinsemi/GoAI">https://github.com/gowinsemi/GoAI</a>
Sipeed Reference example	<a href="https://github.com/sipeed/TangNano-20K-example">https://github.com/sipeed/TangNano-20K-example</a>

Working conditions	
Power supply demand	Via USB-C: 5V±10% 0.5A
Temperature rise	<30K
Operating ambient temperature range	0°C ~ 65°C

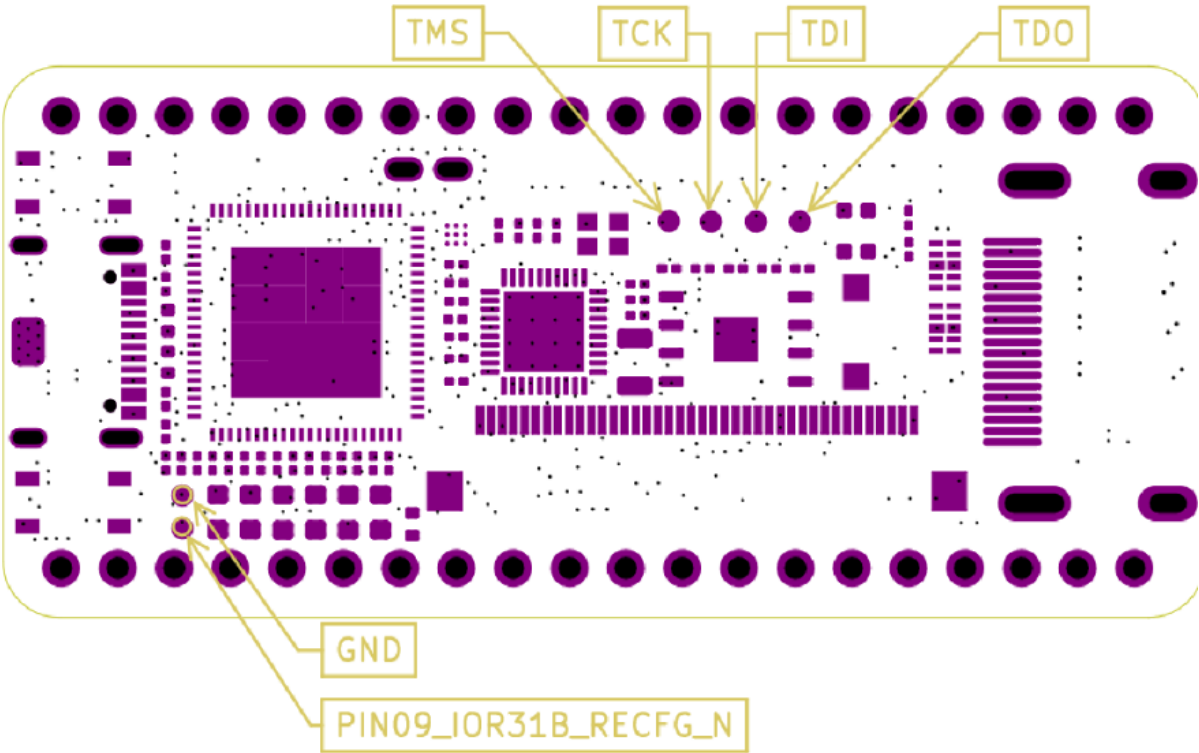
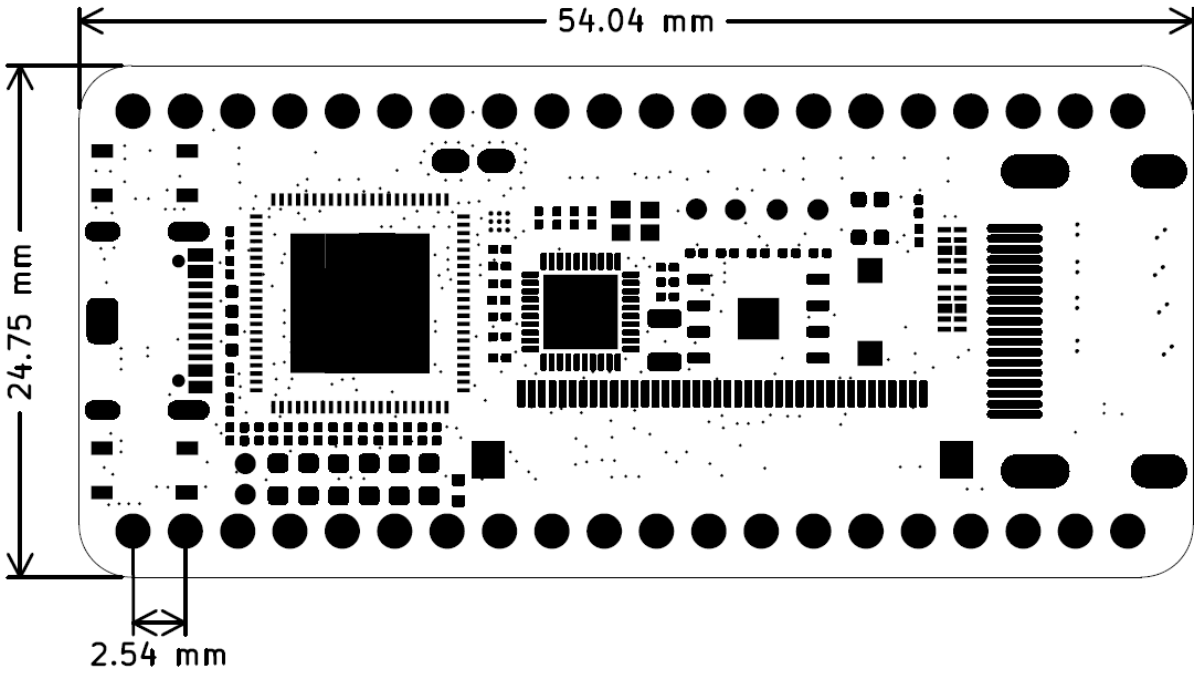
Appearance Drawing



Functional Annotation



Dimension information	
Length	54.04 mm
Width	24.75mm
Thickness	Please check the 3D drawing



Matters needing attention	
ESD protection	Please pay attention to avoid static electricity hitting PCBA. Please release the static electricity from the handle before contacting PCBA
Tolerance voltage	The working voltage of each GPIO has been marked in the schematics. Please do not let the actual working voltage of GPIO exceed the rated value, otherwise it will cause permanent damage to PCBA
FPC connector	When connecting FPC flexible cable, please ensure that the cable is completely inserted into the cable without offset;
Plugging	Please disconnect the power completely before plugging in and out the camera
Avoid short circuit	Please avoid any liquid or metal touching the pads of components on PCBA during power on, otherwise it will cause short circuit and burn PCBA

Resources	
Official website	<a href="http://www.sipeed.com">www.sipeed.com</a>
Github	<a href="https://github.com/Sipeed">https://github.com/Sipeed</a>
BBS	<a href="http://bbs.sipeed.com">http://bbs.sipeed.com</a>
Wiki	<a href="http://wiki.sipeed.com">wiki.sipeed.com</a>
SDK /HDK Relevant information	<a href="https://dl.sipeed.com/">https://dl.sipeed.com/</a>
E-mail (For Technical support & Business cooperation)	<a href="mailto:support@sipeed.com">support@sipeed.com</a>



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