



LI-KW33000-GMSL2-TOF-xxxH-yy



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INTRODUCTION

The LI-KW33000-GMSL2-TOF-xxxH-yy is equipped with Nuvoton 3D TOF (Time of Flight) and IR (Infrared) VGA-pixel image sensor KW33000A1K and Maxim GMSL2 serializer MAX9295A/B. This TOF camera outputs 12-bit RAW data. It offers the following advantages:

- Capable of detecting objects moving at high speed
- High robustness against sunlight change or temperature change
- Reliable performance under sunlight or in high temperature environment
- Integrated depth processing unit reduces data traffic and processing resource consumption from ECU

Key Features

- High accuracy $\leq 1\%$
- Wide range: 70 cm ~ 370 cm
- GMSL2 serializer
- 2-lane MIPI output
- 940 nm Multimode VCSEL included
- Connector: FAKRA Z TYPE

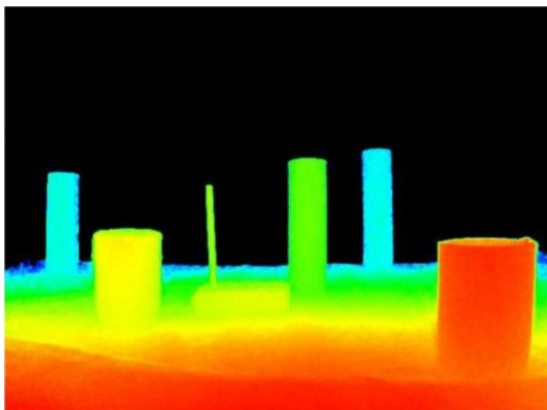
PART#: LI-KW33000-GMSL2-TOF-xxxH-yy

xxxH indicates lens FOVH, yy indicates focusing distance.

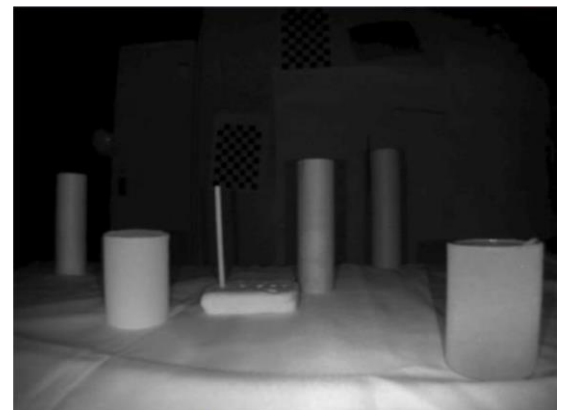
Focusing Distance	Part#
1 meter	LI-KW33000-GMSL2-TOF-088H-1M
	LI-KW33000-GMSL2-TOF-107H-1M

Applications

- Robot Navigation
- 3D Reconstruction
- Human-Machine Interaction
- Gesture Recognition
- Facial Recognition



Depth Image



IR Image

LI-KW33000-GMSL2-TOF-xxxH-yy Key Features



● SPECIFICATIONS

Sensor	Nuvoton VGA-Pixel TOF and IR Image Sensor KW33000A1K
Optical Size	1/4"
Resolution	640 (H) x 480 (V) (active pixels)
Pixel Size	5.6 x 5.6 μm
Output Format	12-bit RAW
Maximum Frame Rate	60 fps @ 640 x 480
Serializer	Maxim MAX9295A/B
Measurable Range	70 ~ 370 cm
Accuracy	$\leq 1\%$
Power Supply Range	9 ~ 19 VDC
VCSEL	Included
Connector	FAKRA Z TYPE
Power Consumption	171 mA @ 12 VDC (640 x 480 @ 30 fps)
Operating Temp	-30°C ~ +85°C
Storage Temp	-30°C ~ +85°C
Weight	~ 139 g

● LENS SPECIFICATIONS

LI-KW33000-GMSL2-TOF-088H	
Focal Length	2.36 mm
Aperture, F/#	1.3
IR Filter	940 nm IR filter
Field of View (FOV)	111.2° (D) / 88.2° (H) / 65.6° (V)
Relative Illumination	70.7% at $\varnothing 4.48$ mm
Optical Distortion	-35.3% at $\varnothing 4.48$ mm
TV Distortion	-10.0%

LI-KW33000-GMSL2-TOF-107H	
Focal Length	2.03 mm
Aperture, F/#	1.34
IR Filter	940 nm IR filter
Field of View (FOV)	140.3° (D) / 107.5° (H) / 78.5° (V)
Relative Illumination	> 60%
Optical Distortion	-60.0% (Design Value)
TV Distortion	-15.4% (Design Value)

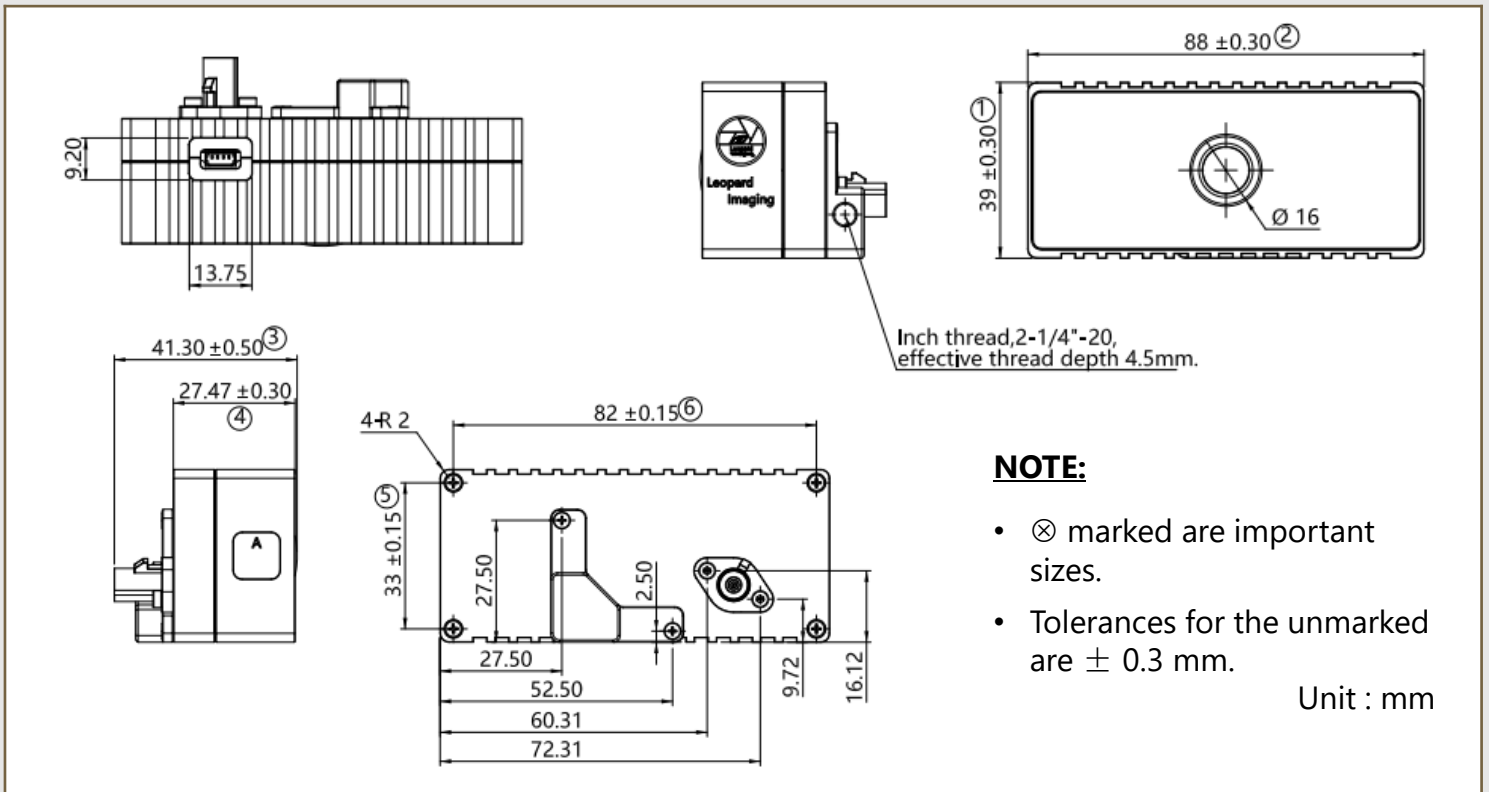
● VCSEL SPECS: LI-KW33000-GMSL2-TOF-088H and LI-KW33000-GMSL2-TOF-107H

LI-KW33000-GMSL2-TOF-088H	
Wavelength	940 nm
Field of View (FOV) at FWHM	90° horizontal 70° vertical
Optical Output Power	Maximum 3.7 W per VCSEL
QTY on Camera	2

LI-KW33000-GMSL2-TOF-107H	
Wavelength	940 nm
Field of View (FOV) at FWHM	120° horizontal 90° vertical
Optical Output Power	Maximum 3.7 W per VCSEL
QTY on Camera	2

LI-KW33000-GMSL2-TOF-xxxH-yy Key Features

DIMENSIONS: LI-KW33000-GMSL2-TOF-107H

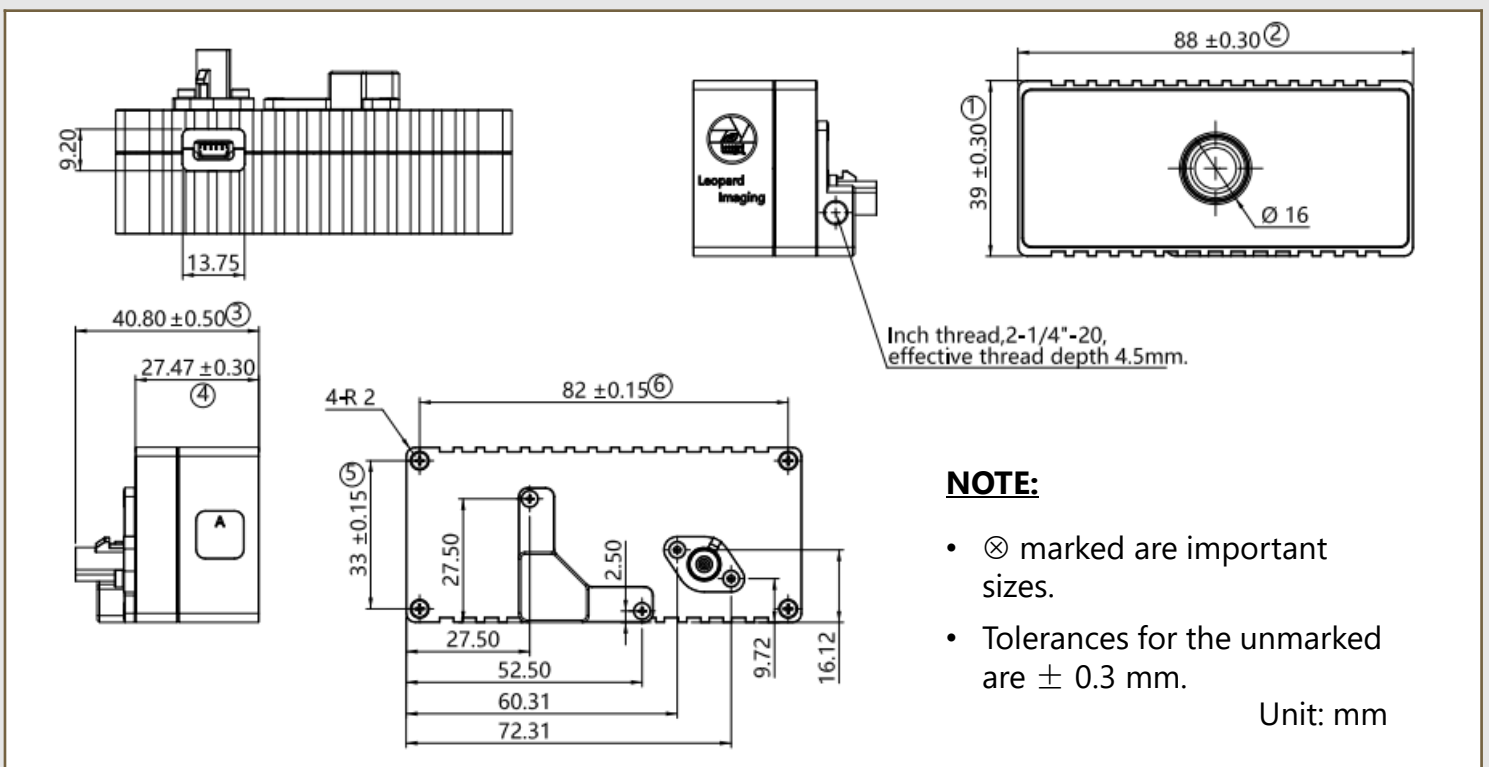


NOTE:

- ⊗ marked are important sizes.
- Tolerances for the unmarked are ± 0.3 mm.

Unit : mm

DIMENSIONS: LI-KW33000-GMSL2-TOF-088H



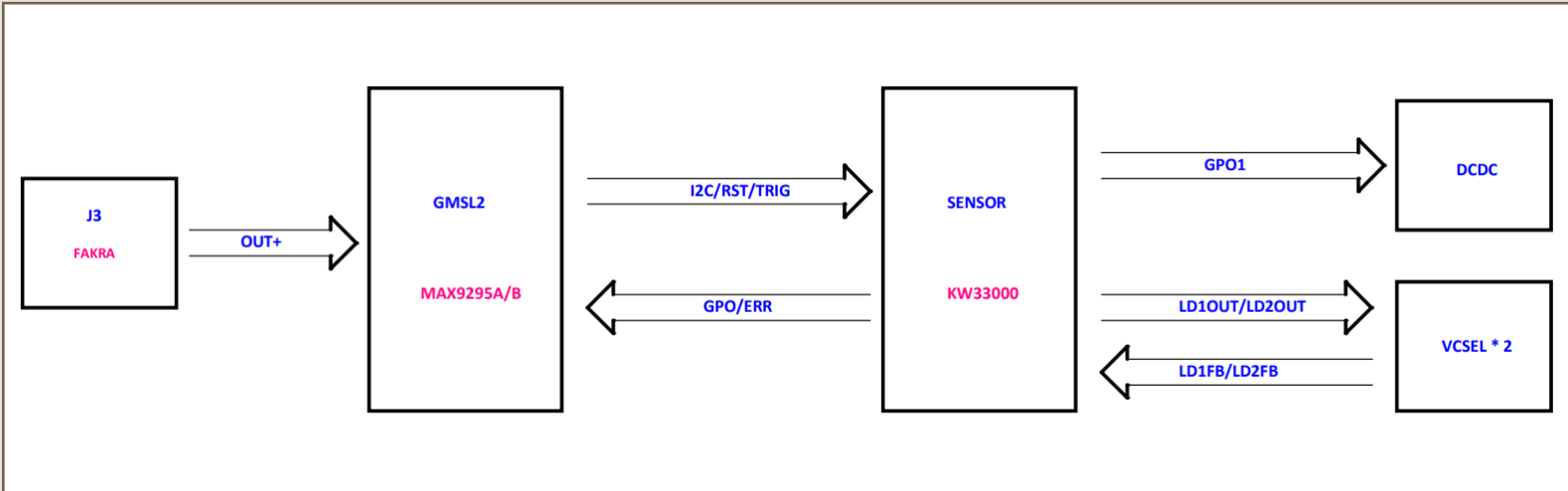
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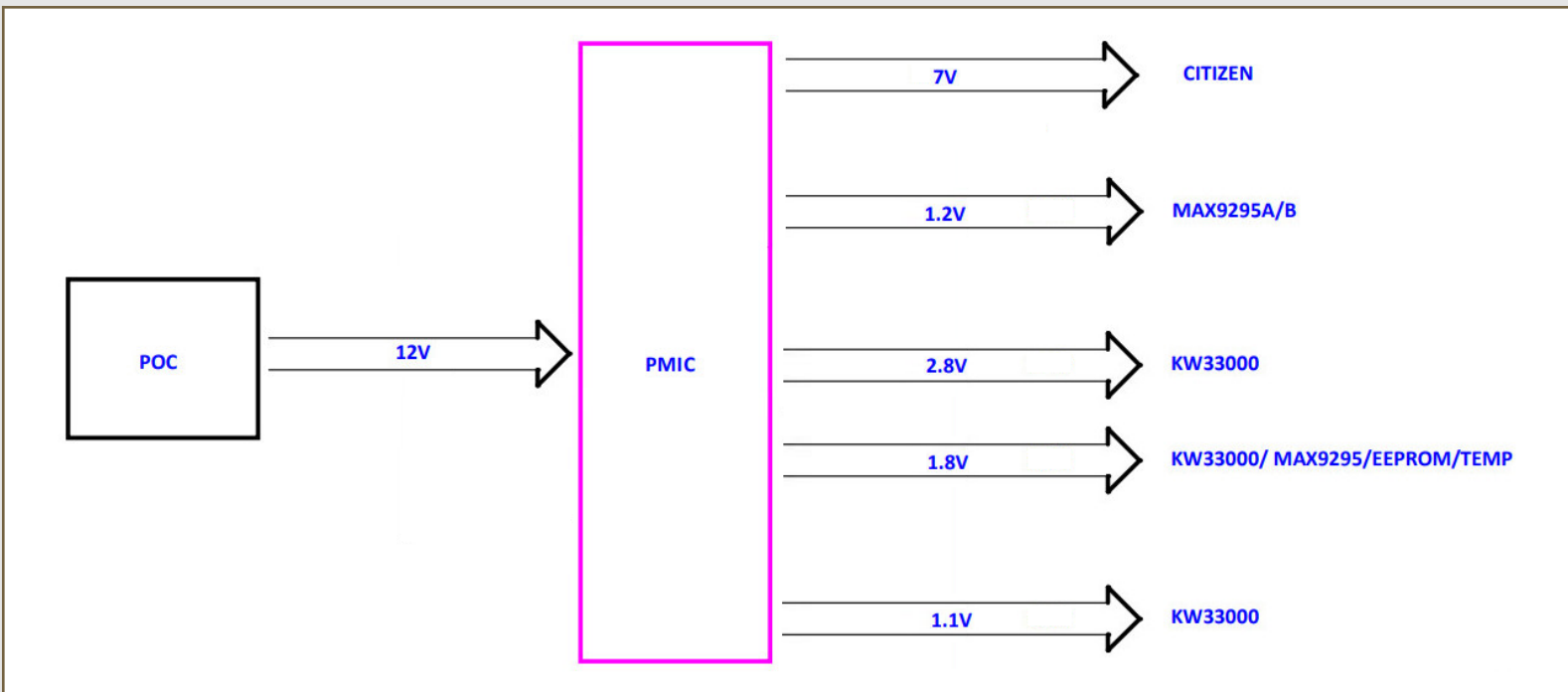
Unit: mm

LI-KW33000-GMSL2-TOF-xxxH-yy Key Features

SYSTEM BLOCK DIAGRAM



POWER BLOCK DIAGRAM



KW33000A1K Sensor Specification

FEATURES

Product Family	3D TOF Sensors
Product Series	KW330 Series
Optical Size	1/4" at VGA (640 x 480) format
Total Number of Pixels	722 (H) x 564 (V) = 407,208 (pixels)
Number of Effective Pixels	672 (H) x 496 (V) = 333,312 (pixels)
Number of Active Pixels	640 (H) × 480 (V) = 307,200 (pixels)
Pixel Size	5.6 x 5.6 μm
Functions	Full scan mode: VGA output
	2 x 2 binning mode: QVGA output
	Full scan trimming mode (ROI) : QVGA output
	Outputs 4 types of image data per 60 fps (ROI mode 120 fps) (Depth / IR / Confidence data1 / Confidence data2)
	Build-in Depth calculation and Depth adjustment function
Filter	B/W

USB3.0 CAMERA KIT

LI-GMSL2-USB



Top View



Bottom View

LI-KW33000-GMSL2-TOF-xxxH-yy can connect to LI-GMSL2-USB as a USB 3.0 camera.

Part#: **LI-USB30-KW33000-GMSL2-TOF-xxxH-yy**

SPECIFICATIONS

- USB 3.0 Super Speed support
- UVC compliant
- Allows customization
- 12 VDC power supply for camera
- Weight: ~ 294 g
- Single Coax Cable transmits up to 12 meters PoC (Power over Cable)
- Resolution: 640 x 480 @ 30 fps
- Power consumption: 171 mA @ 12 VDC
- Compatible with Windows, Linux, and other operating systems that have UVC drivers



BOM

#	Items	QTY
1	LI-KW33000-GMSL2-TOF-xxxH-yy	1
2	LI-GMSL2-USB	1
3	3-Meter Fakra Cable	1
4	12 VDC Power Supply for DESER	1
5	USB3.0 Cable	1

SDK SUPPORTED

- Camera Tool Source Code in C#
- Capture & Display
- Register Access Function

● REVISION HISTORY

Revision	Description	Release Date
1.0	First release.	13 Jul 2022

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