# See The New World Through
# i3system, Inc.

i3system

THERMAL™ EXPERT

Feb. 2019._Ver2

Intelligent Image & Information system

SEE THE NEW WORLD THROUGH

# i3system, Inc.

## Company overview

**Company Name** : i3system, Inc.
(Intelligent Image & Information System)
**CEO** : Dr. Han Chung
**Establishment** : 1998
**Number of Employees (2018)** : 380 people

Headquarter / Factory #1

Jang-Dong
(R&D Center)

Moonji-dong / Factory #2

- 2001 : R&D center initiated
- 2003 : Cooled IRFPA development initiated
- 2006 : Uncooled IRFPA development initiated
- 2010 : Volume production of cooled IRFPA & IDDCA started
- 2010 : "Defense contractors" designation by Korean Government
- 2015 : Listed on KOSDAQ(Stock market)
- 2015 : ISO9001:2008
- 2017 : Moonji-dong / Factory #2 initiated
- 2018 : ISO9001:2015

## Facilities

**Process**

**Assembly**

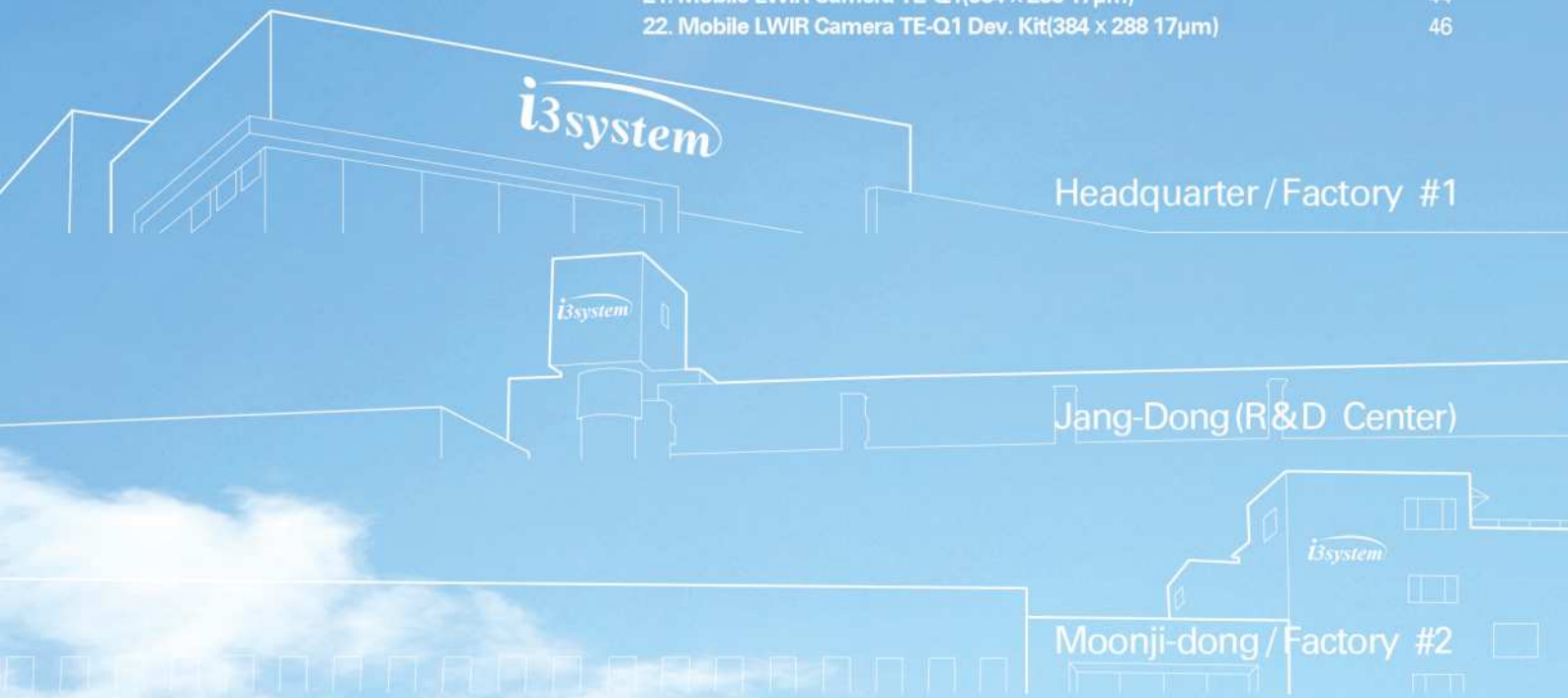

**In house manufacture facility and test equipments**

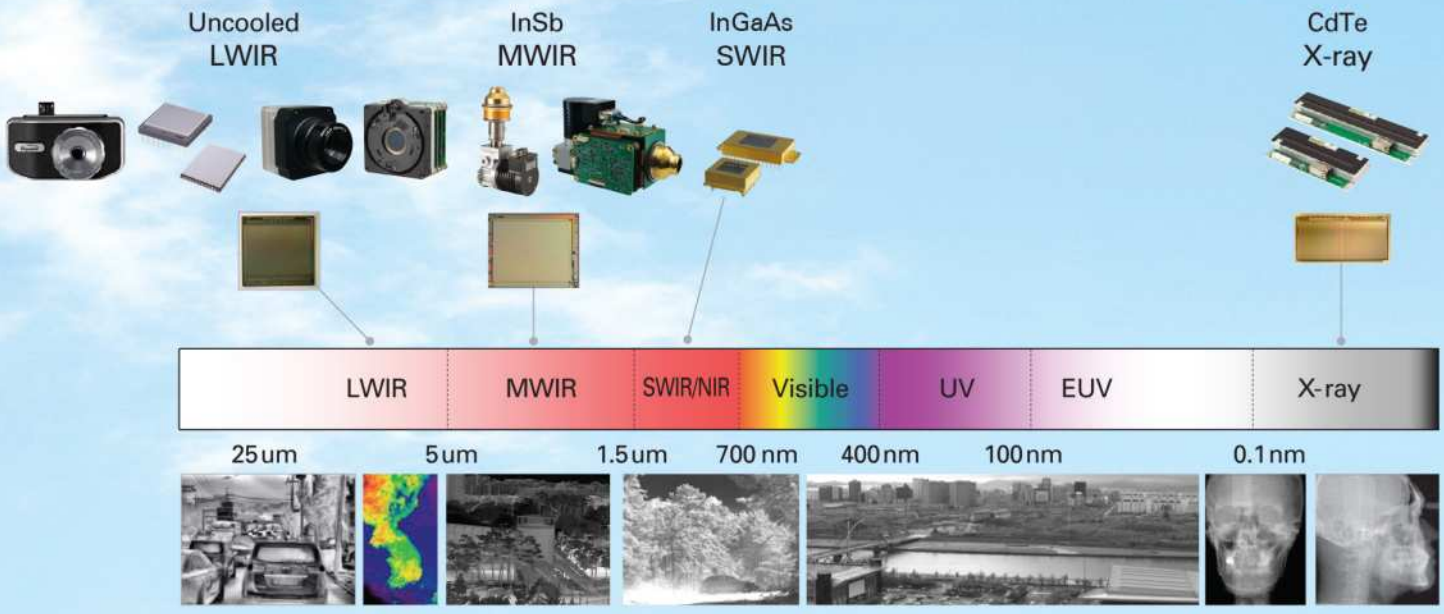
**Analysis**

**Test & Evaluation**

# Contents





# InSb Cooled IR Detector

## InSb 1280 x 1024 10㎛

DI1280-10M

## Array Features

- 1280 x 1024 10㎛ Pitch
- High Operability
- Very High Resolution
- High Sensitivity (Low readout noise, Low dark current)

## Applications

- Thermal Imaging System
- Infrared Military System
- Thermal Observation Device (Day and Night)
- Surveillance System

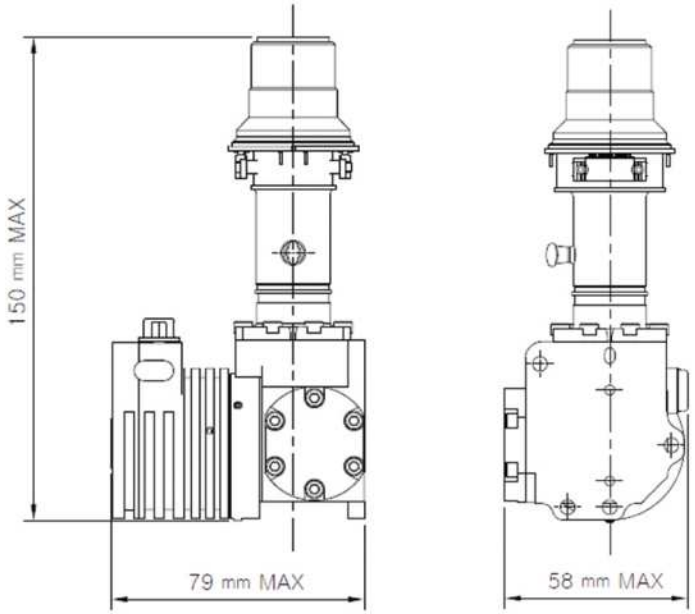
## Images from the 2D IR detector

# SEE THE NEW WORLD THROUGH
# i3system, Inc.

## Specifications

| | |
|---|---|
| Array format | 1280x1024 |
| Pixel pitch | 10㎛ |
| Infrared detector material | InSb |
| Wavelength band | MWIR (3㎛~5㎛) |
| No. of output channels | 4 or 8 channels |
| Operability | ≥ 99.5% (Typ. >99.8%) |
| NETD | ≤ 25mK |
| Max frame rate | 100Hz@1280x1024 Full frame |
| Readout mode | IWR |
| Cool down time | ≤ 7min. |
| Environmental condition | MIL-STD-810 |
| Operating temperature | -40~+71℃ |

## DI1280-10M Dimensions



# InSb Cooled IR Detector

## InSb 1280 x 1024 15㎛

DI1280-15M

## Array Features

- 1280 x 1024 15㎛ Pitch
- High Operability
- Very High Resolution
- High Sensitivity (Low readout noise, Low dark current)

## Applications

- Thermal Imaging System
- Infrared Military System
- Thermal Observation Device (Day and Night)
- Surveillance System

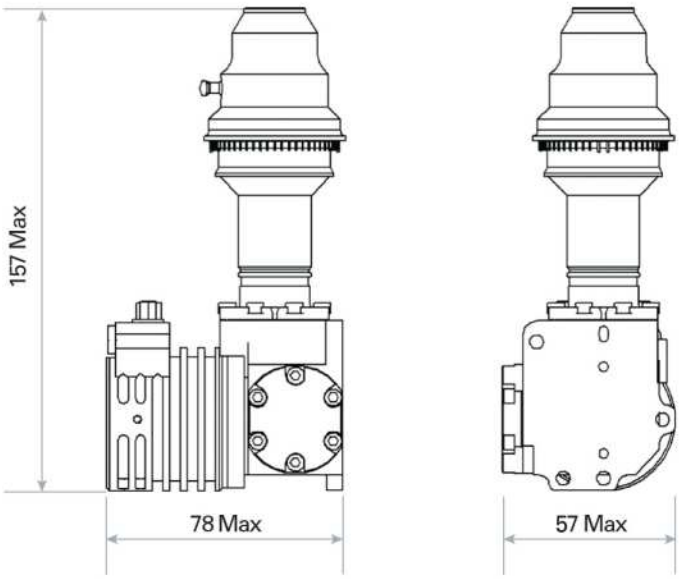
## Images from the 2D IR detector

# SEE THE NEW WORLD THROUGH
# i3system, Inc.

## Specifications

| | |
|---|---|
| Array format | 1280 x 1024 |
| Pixel pitch | 15㎛ |
| Infrared detector material | InSb |
| Wavelength band | MWIR (3㎛ ~ 5㎛) |
| No. of output channels | 4 or 8 channels |
| Operability | ≥ 99.5 % (Typ. > 99.8 %) |
| NETD | ≤ 20 mK |
| Max frame rate | 100 Hz @ 1280 x 1024 Full frame |
| Readout mode | IWR |
| Cool down time | ≤ 7min. |
| Environmental condition | MIL-STD-810 |
| Operating temperature | -40 ~ +71 ℃ |

## DI1280-15M Dimensions



# InSb Cooled IR Detector

**InSb 640 x 512 15㎛** DI640-15M

## Array Features

- 640 x 512 15㎛ Pitch
- High Operability

## Applications

- Thermal Imaging System
- Infrared Military System
- Thermal Observation Device(Day and Night)
- Surveillance System

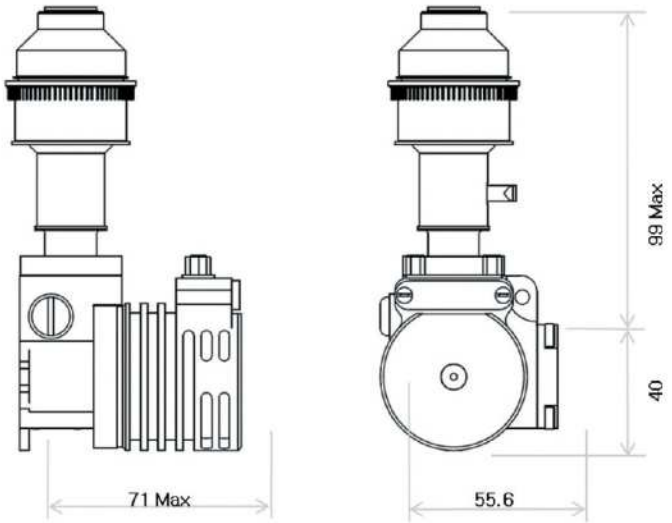
## Images from the 2D IR detector

# SEE THE NEW WORLD THROUGH
# i3system, Inc.

## Specifications

| | |
|---|---|
| Array format | 640 x 512 |
| Pixel pitch | 15㎛ |
| Infrared detector material | InSb |
| Wavelength band | MWIR(3㎛~5㎛) |
| No. of output channels | 1 or 4 channels |
| Operability | ≥ 99.5 % (Typ. > 99.9%) |
| NETD | ≤ 20 mK |
| Max frame rate | 200Hz@640 x 512 Full frame |
| Readout mode | ITR or IWR |
| Cool down time | ≤ 7min. |
| Environmental condition | MIL-STD-810 |
| Operating temperature | -40~+71℃ |

## DI640-15M Dimensions



# InSb Cooled IR Engine Gen 2

**InSb 640 x 512 15㎛** Detector / Engine iCE640

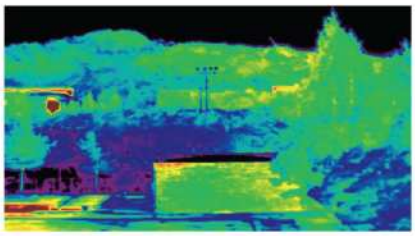
## Array Features

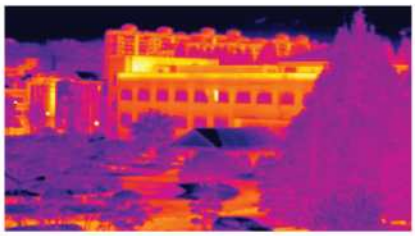
- 640 x 512 15㎛ Pitch
- High Operability

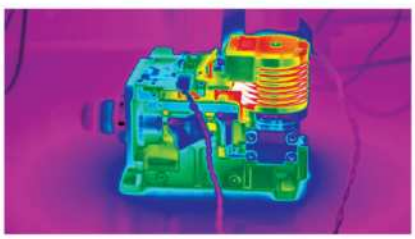
## Applications

- Thermal Imaging System
- Infrared Military System
- Thermal Observation Device (Day and Night)
- Surveillance System

## Images from the 2D IR detector





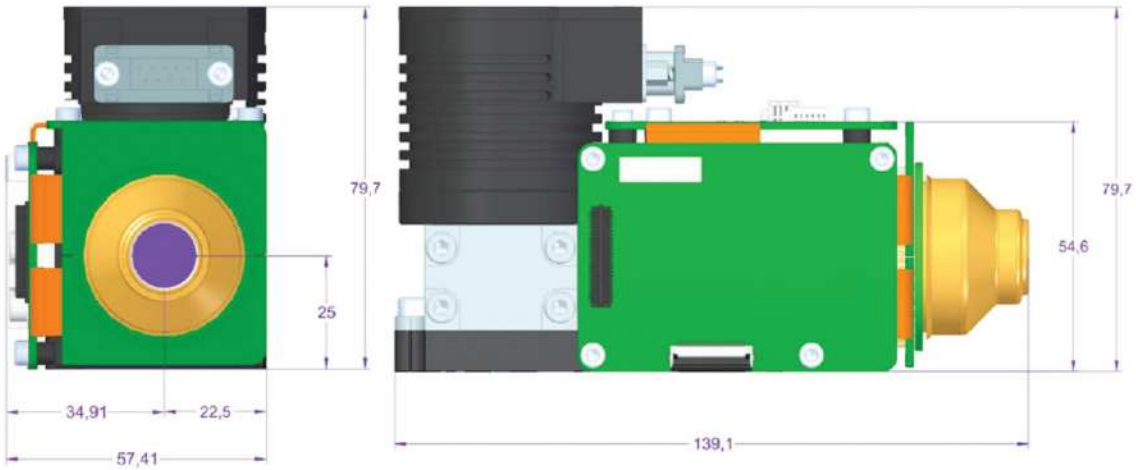


# SEE THE NEW WORLD THROUGH
# i3system, Inc.

## Specifications

| | |
|---|---|
| **Detector** | |
| Focal Plane Array | InSb |
| Array format and pitch | 640 x 512, 15㎛ |
| Thermal sensitivity(NETD) | < 20mK |
| Spectral range | MWIR(3~5㎛) |
| **Camera Engine** | |
| Input power supply | DC 24V~28V |
| Power consumption (Including cooler & electronics) | < 20W@during cool down |
| | < 15W@after cool down |
| Cool down time | ≤ 7min. |
| Max frame rate | 200 Hz@640 x 512 Full Frame |
| Video output | Camera Link (Optional : NTSC or PAL) |
| Control | RS232 |
| Dimensions (WxHxD) | 57 x 79 x 139 mm |
| Weight | < 760g |
| Operating temperature | −40~+71℃ |

## iCE640 Dimensions



# InSb Cooled IR Detector

## InSb 320 x 256 30㎛ / 15㎛

DI320-30M
DI320-15M

## Array Features

- 320 x 256 / 30㎛ pitch
- 320 x 256 / 15㎛ pitch
- Excellent Operability

## Applications

- Thermal Imaging System
- Infrared Military System
- Thermal Observation Device (Day and Night)
- Surveillance System

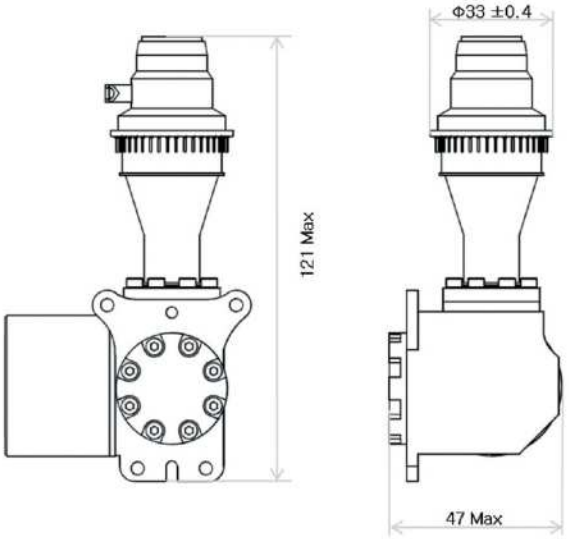
## Images from the 2D IR detector

# SEE THE NEW WORLD THROUGH
# i3system, Inc.

## Specifications

| | |
|---|---|
| Array format | 320 x 256 |
| Pixel pitch | 30㎛ or 15㎛ |
| Infrared detector material | InSb |
| Wavelength band | MWIR(3㎛~5㎛) |
| No. of output Channels | 1 or 4 channels |
| Operability | ≥ 99.5 % (Typ. > 99.9%) |
| NETD | ≤ 20 mK |
| Readout mode | ITR(30㎛) / IWR(15㎛) |
| Cool down time | ≤ 7min. |
| Environmental condition | MIL-STD-810 |
| Operating temperature | -40~+71℃ |

## DI320-30M and DI320-15M Dimensions



# QWIP Cooled IR Detector

## 320 x 256 30㎛ (QWIP)

DI320-30Q

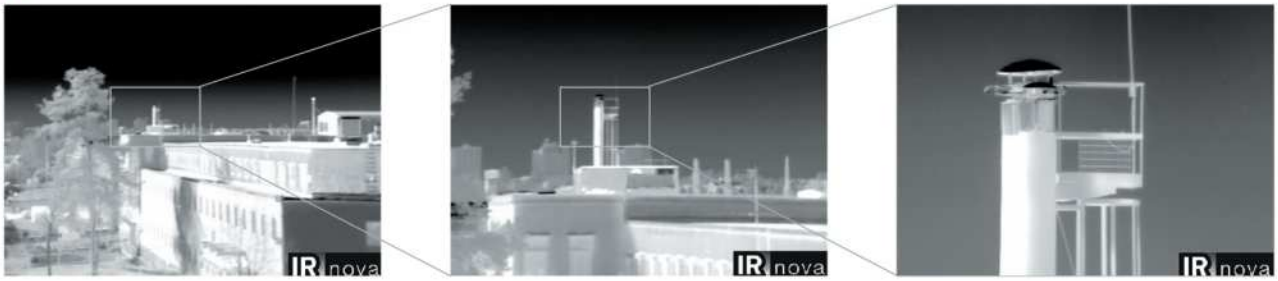
## Array Features

- 320 x 256 30㎛ pitch
- High Operability
- FPA Manufacture : IRnova, Sweden

## Applications

- Thermal Imaging System
- Military System
- Surveillance System


## Images from the 2D IR detector

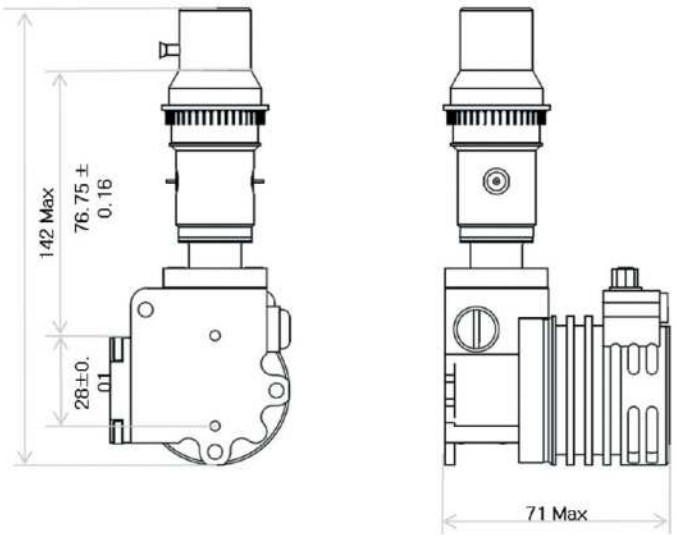


# SEE THE NEW WORLD THROUGH
# i3system, Inc.

## Specifications

| | |
|---|---|
| Array format | 320 x 256 |
| Pixel pitch | 30㎛ |
| Infrared detector material | QWIP |
| Wavelength band | LWIR(8.5㎛~9.0㎛) |
| Operability | ≥ 99.5 % (Typ. > 99.9%) |
| NETD | ≤ 25 mK |
| Readout mode | ITR or IWR |
| Cool down time | < 7m 30s |
| Environmental condition | MIL-STD-810 |
| Operating temperature | -40~+71℃ |

## DI 320-30Q Dimensions



# InGaAs SWIR Detector (0.9μm~1.7μm)

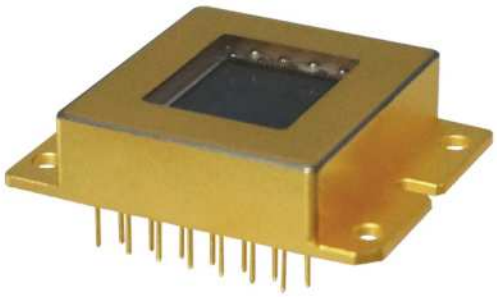
**640 x 512 15μm** DS640-15M

## Array Features

- 640 x 512 Array Format
- 15μm Pixel Pitch
- 28-pin Metal Package
- Thermoelectric Cooler
- Typical Pixel Operability ≥ 99.5%

## Applications

- Short wave infrared Imaging
- Imaging Spectroscopy
- Surveillance
- Semiconductor Inspection
- Medical Science and Biology
- Astronomy and Scientific

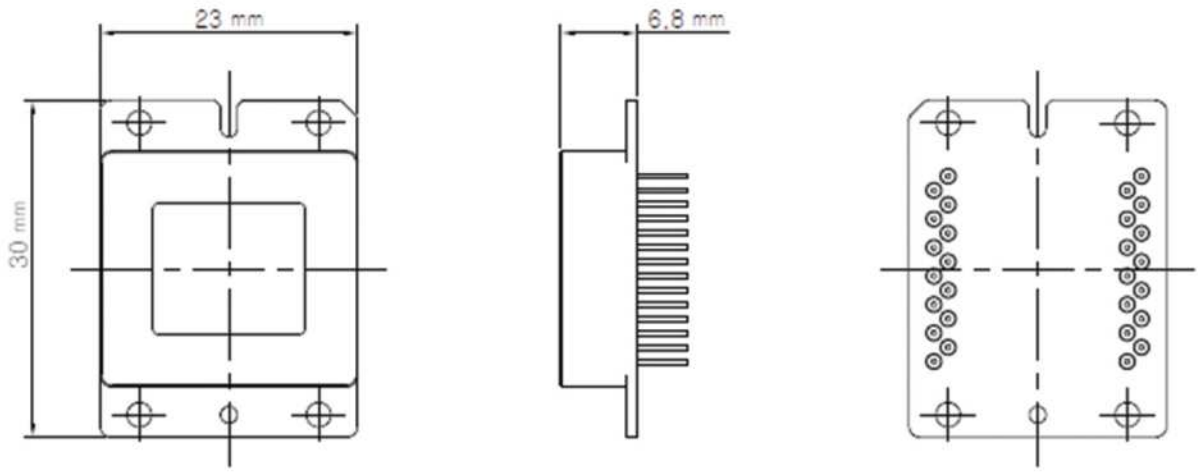


## Images from the 2D IR detector

## Specifications

| | |
|---|---|
| **Array Features** | |
| Sensor type | InGaAs |
| Array format / Pixel Pitch | 640 x 512, 15㎛ |
| Spectral range | SWIR (0.9㎛~1.7㎛)<br>Vis-SWIR (0.6㎛~1.7㎛) Optional |
| **Detector Features** | |
| Integration time | 10us to full frame |
| Maximum frame rate | 30Hz / 60Hz / 100Hz (1ch / 2ch / 4ch) |
| D* (Detectivity) | ≥ 1.0 x 10^13 Jones (@1550nm) |
| Full well | High Gain : 100ke-<br>Low Gain : 1Me- |
| Output signal swing | 2.1V (1.0V to 3.1V) |
| Input Bias | 3.3V |
| Power consumption | Max. < 5W (@25℃), Max. < 9W(@71℃) |
| Windowing | Programmable |
| Temperature sensor output | Yes |
| Noise with ROIC | ≤ 100e- [HighGain] |
| Dark current | ≤ 0.2pA@0.1V detectorbias |
| Operability | ≥ 99.5% |
| Operating temperature | -35℃ to 71℃ |
| Storage temperature | -40℃ to 71℃ |
| **Packaging Features** | |
| Dimension (W x H x D) | 23 x 30 x 6.8mm |
| Windows | Sapphire |
| Number of pins | 28 |
| Cooler | Single stage TEC [9W Max] |
| Packaging characteristics | Hermetically sealed |

## DS640-15M Dimensions



# InGaAs SWIR Detector (0.9μm~1.7μm)

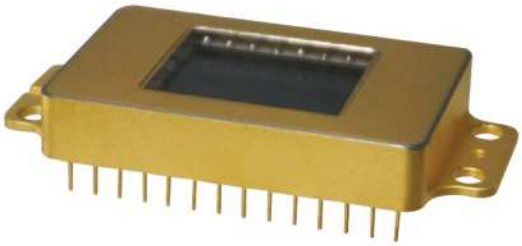
**640 x 512 25μm** DS640-25M

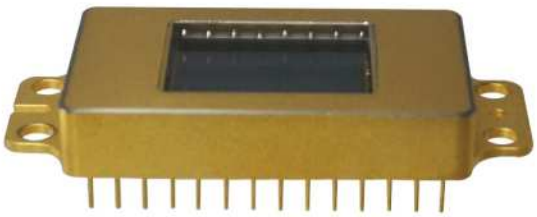
## Array Features

- 640 x 512 Array Format
- 25μm Pixel Pitch
- 28-pin Metal Package
- Thermoelectric Cooler
- Typical Pixel Operability ≥ 99.5%

## Applications

- Short wave infrared Imaging
- Imaging Spectroscopy
- Surveillance
- Semiconductor Inspection
- Medical Science and Biology
- Astronomy and Scientific



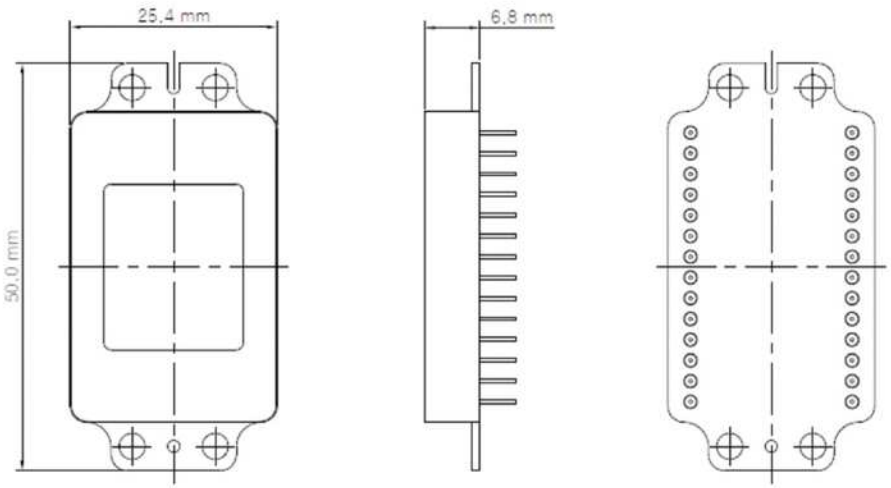


## Images from the 2D IR detector

## Specifications

| | |
|---|---|
| **Array Features** | |
| Sensor type | InGaAs |
| Array format / Pixel Pitch | 640 x 512, 25㎛ |
| Spectral range | SWIR (0.9㎛~1.7㎛)<br>Vis-SWIR (0.6㎛~1.7㎛) Optional |
| **Detector Features** | |
| Integration time | 10us to full frame |
| Maximum frame rate | 30Hz / 60Hz / 100Hz (1ch / 2ch / 4ch) |
| D* (Detectivity) | ≥ 1.0 x 10^13 Jones (@1550nm) |
| Full well | Gain 1 : 100ke-<br>Gain 2 : 1Me-<br>Gain 3 : 4Me-<br>Gain 4 : 5Me- |
| Output signal swing | 2.1V (1.0V to 3.1V) |
| Input Bias | 3.3V |
| Power consumption | Max. < 5W (@25℃), Max. < 9W(@71℃) |
| Windowing | Programmable |
| Temperature sensor output | Yes |
| Noise with ROIC | ≤ 100e- [Gain 1] |
| Dark current | ≤ 0.2pA@0.1V detectorbias |
| Operability | ≥ 99.5% |
| Operating temperature | -35℃ to 71℃ |
| Storage temperature | -40℃ to 71℃ |
| **Packaging Features** | |
| Dimension (W x H x D) | 50 x 25 x 6.8mm |
| Windows | Sapphire |
| Number of pins | 28 |
| Cooler | Single stage TEC [9W Max] |
| Packaging characteristics | Hermetically sealed |

## DS640-25M Dimensions



# Uncooled Infrared Detector

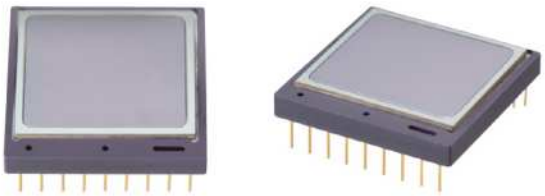
**LWIR 1024 x 768 12㎛** DB1024-12C-A

## Overview

DB1024-12C-A is the high performance 1024 x 768, 12㎛ micro-bolometer used in thermal imagers that are designed for commercial and military market. Our higher performance uncooled infrared detector helps infrared camera manufacturers to lead the market in thermography, surveillance & security, car night vision and many other commercial markets, as well as the military market.

## Description

- DB1024-12C-A is an uncooled infrared detector with a reliable, small and lightweight, low input power focal plane array.



Ceramic Package

## Main Features

- TECless operation
- Power supply : 5V for analog and digital
- Output dynamic range : 1V to 4V
- Image flip/mirror capability
- 27-lead ceramic vacuum package
- On-chip temperature sensor
- Typical responsivity : 10mV/K
- User defined windowing capability

## Applications

- Security-Surveillance
- Night Vision
- Marine Navigation
- Next Generation Rifle
- Health and Medical
- Electrical Machinery Field

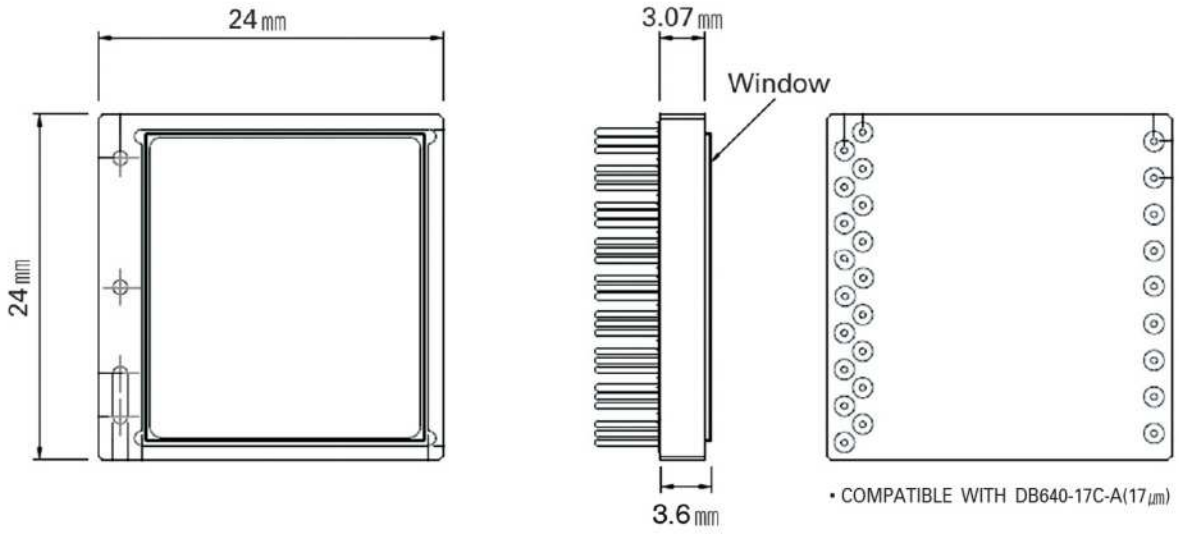
## Images from the 2D IR detector

# SEE THE NEW WORLD THROUGH
# i3system, Inc.

## Specifications

| Performance | |
|---|---|
| Detector type | Microbolometer (uncooled) |
| Array format | 1024 x 768 |
| Pixel pitch | 12㎛ |
| NETD | ≤ 45mK or ≤ 50mK @ F/1, 300K, 30㎐ |
| Operability | ≥ 99 % |
| Frame rate | Max 30㎐ |
| Video output | 2ch |
| Thermal time constant | ≤ 15㎳ |
| Operating temperature | -40℃ ~ 65℃ |
| **Features** | |
| Wavelength band | LWIR |
| Spectral range | 8 ~ 14㎛ |
| Dimensions | 24(W) x 24(H) x 3.6(D)㎣ (Without pin) |
| Weight | ≤ 7g |
| Windowing | Windowing capability |

## DB1024-12C-A Dimensions



# Uncooled Infrared Detector

**LWIR 640 x 480 12㎛** DB640-12C-A

## Overview

DB640-12C-A is the high performance 640 x 480, 12㎛ micro-bolometer used in thermal imagers that are designed for commercial and military market. Our higher performance uncooled infrared detector helps infrared camera manufacturers to lead the market in thermography, surveillance & security, car night vision and many other commercial markets, as well as the military market.

## Description

- DB640-12C-A is an uncooled infrared detector with a reliable, small and lightweight, low input power focal plane array.

Ceramic Package

WLP Package

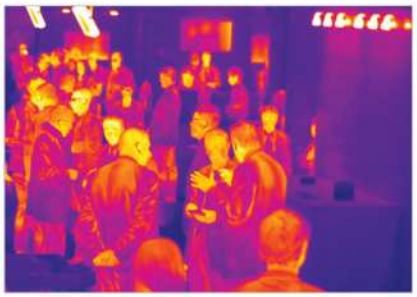
## Main Features

- TECless operation
- Power supply : 5V for analog and digital
- Output dynamic range : 1V to 4V
- Image flip/mirror capability
- 27-lead ceramic vacuum package
- On-chip temperature sensor
- Typical responsivity : 10mV/K
- User defined windowing capability

## Applications

- Security-Surveillance
- Night Vision
- Marine Navigation
- Next Generation Rifle
- Health and Medical
- Electrical Machinery Field

## Images from the 2D IR detector

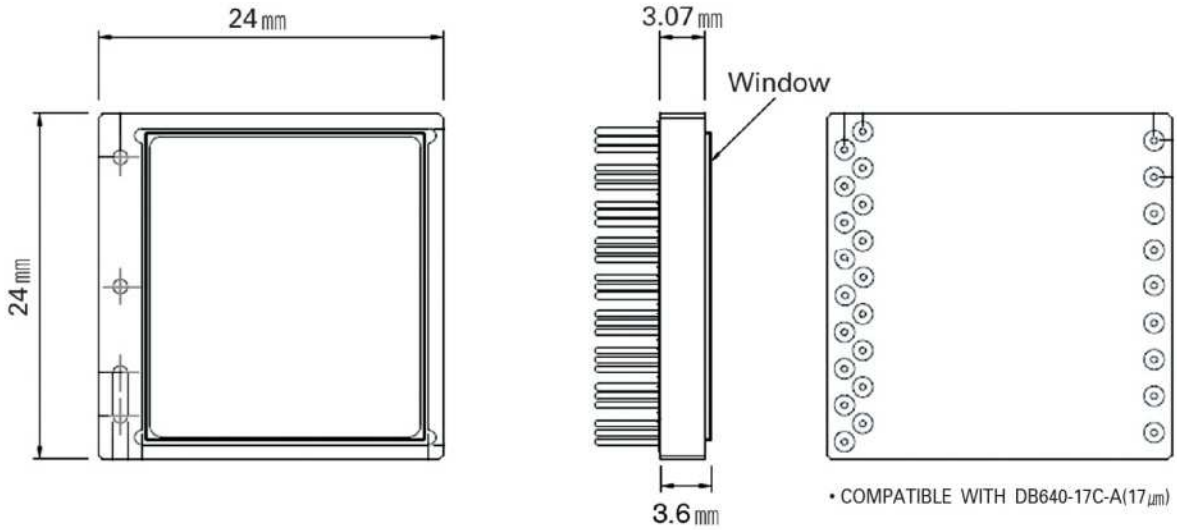





## Specifications

| Performance | |
|---|---|
| Detector type | Microbolometer (uncooled) |
| Array format | 640 x 480 |
| Pixel pitch | 12㎛ |
| NETD | ≤ 40mK or ≤ 50mK @ F/1, 300K, 30㎐ |
| Operability | ≥ 99 % |
| Frame rate | Max 60㎐ @ 2ch |
| | Max 30㎐ @ 1ch |
| Video output | 1ch or 2ch (Selectable) |
| Thermal time constant | ≤ 15㎳ |
| Operating temperature | -40℃ ~ 65℃ |
| **Features** | |
| Wavelength band | LWIR |
| Spectral range | 8 ~ 14㎛ |
| Dimensions | 24(W) x 24(H) x 3.6(D)㎟ (Without pin) |
| Weight | ≤ 7g |
| Windowing | Windowing capability |

## DB640-12C-A Dimensions



# Uncooled Infrared Detector

**LWIR 384 x 288 12㎛** DB384-12C-A

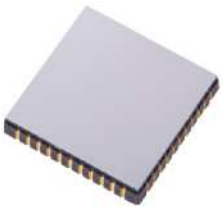
## Overview

DB384-12C-A is the high performance 384 x 288, 12㎛ micro-bolometer used in thermal imagers that are designed for commercial and military market. Our higher performance uncooled infrared detector helps infrared camera manufacturers to lead the market in thermography, surveillance & security, car night vision and many other commercial markets, as well as the military market.

## Description

- DB384-12C-A is an uncooled infrared detector with a reliable, small and lightweight, low input power focal plane array.

Ceramic Package



WLP Package

## Main Features

- TECless operation
- Power supply : 5 V for analog and digital
- Output dynamic range : 1 V to 4 V
- Image flip/mirror capability
- 44-leadless ceramic vacuum package
- On-chip temperature sensor
- Typical responsivity : 10 mV/K
- User defined windowing capability

## Applications

- Security-Surveillance
- Night Vision
- Marine Navigation
- Next Generation Rifle
- Health and Medical

## Images from the 2D IR detector

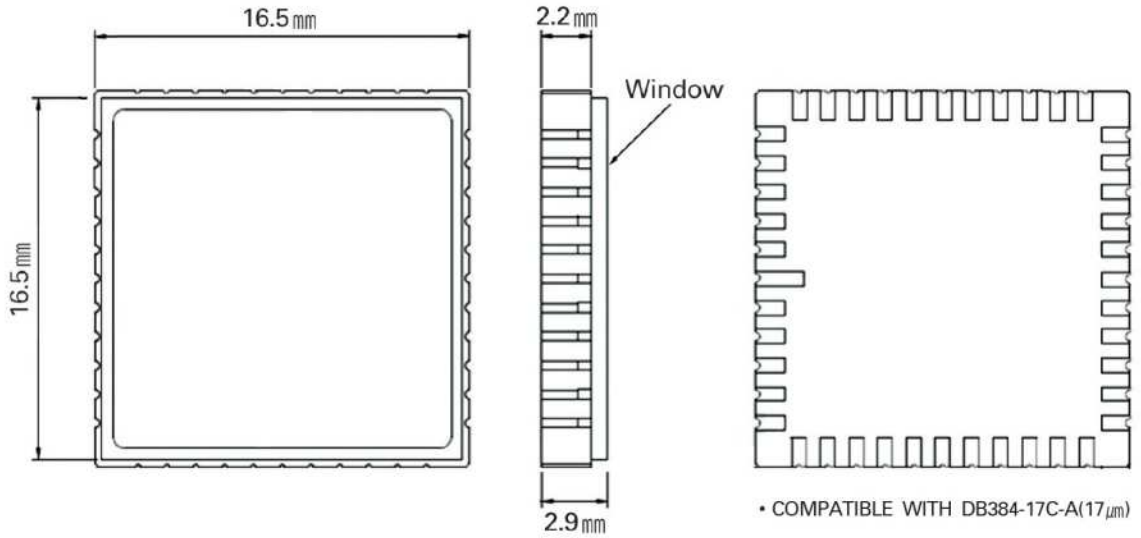





## Specifications

| Performance | |
|---|---|
| Detector type | Microbolometer (uncooled) |
| Array format | 384 x 288 |
| Pixel pitch | 12 ㎛ |
| NETD | ≤ 50 mK @ F/1, 300 K, 30 Hz |
| Operability | ≥ 99 % |
| Frame rate | Max 60 Hz |
| Video output | 1 ch |
| Thermal time constant | ≤ 15 ms |
| Operating temperature | -40 ℃ ~ 85 ℃ |
| **Features** | |
| Wavelength band | LWIR |
| Spectral range | 8 ~ 14 ㎛ |
| Dimensions | 16.5(W) x 16.5(H) x 2.9(D) ㎣ |
| Weight | ≤ 3g |
| Windowing | Windowing capability |

## DB384-12C-A Dimensions




• COMPATIBLE WITH DB384-17C-A(17 ㎛)

# Uncooled Infrared Detector

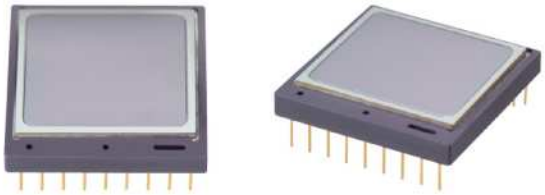
**LWIR 640 x 480 17㎛** DB640-17C-A

## Overview

DB640-17C-A is the high performance 640 x 480, 17㎛ micro-bolometer designed for industrial-commercial thermal imagers. Our higher performance uncooled infrared detector helps infrared camera manufacturers to lead the market in thermography, surveillance & security, car night vision and many other commercial markets, as well as the military market.

## Description

- DB640-17C-A is an uncooled infrared detector with a reliable, small and lightweight, low input power focal plane array.



Ceramic Package

## Key Features

- TECless operation
- Power supply : 5V for analog and digital
- Output dynamic range : 1V to 4V
- Image flip/mirror capability
- 27-lead ceramic vacuum package
- On-chip/Off-chip dual temperature sensor
- Typical responsivity : 10mV/K
- User defined windowing capability

## Applications

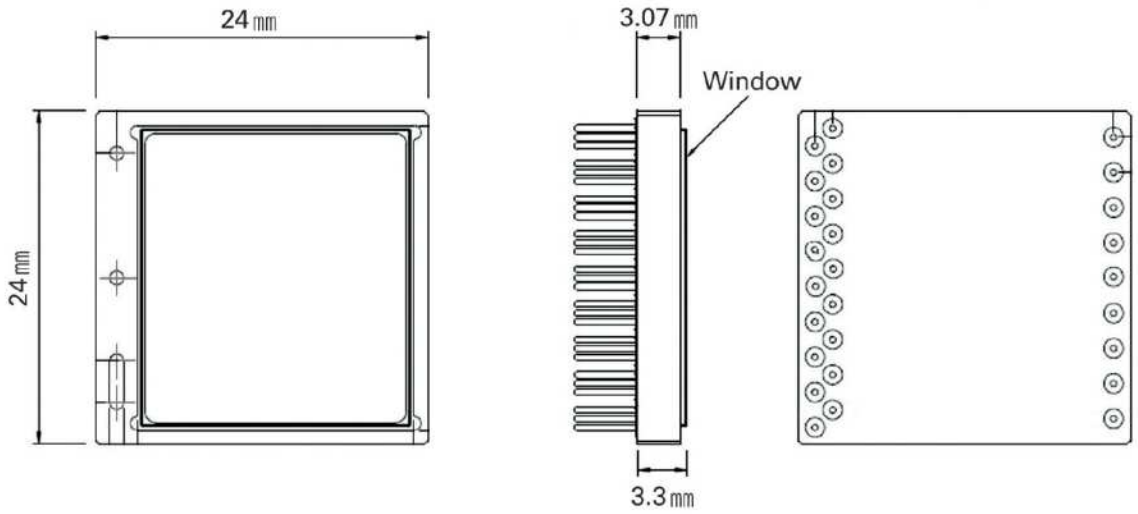
- Security / Surveillance
- Night Vision
- Marine Navigation
- Next Generation Rifle
- Health and Medical
- Electrical machinery field

## Images from the 2D IR detector

## Specifications

| Performance | |
|---|---|
| Detector type | Microbolometer (uncooled) |
| Array format | 640 x 480 |
| Pixel pitch | 17㎛ |
| Thermal Sensitivity(NETD) | ≤ 50mK@F/1, 300K, 30㎐ |
| | ≤35mK@F/1, 300K, 30㎐(Optional) |
| Operability | ≥ 99 % |
| Frame rate | Max 60㎐ @ 2ch |
| | Max 30㎐ @ 1ch |
| Video output | 1ch or 2ch (Selectable) |
| Thermal time constant | ≤ 15㎳ |
| Operating temperature | -40℃ ~ 65℃ |
| **Features** | |
| Wavelength band | LWIR |
| Spectral range | 8 ~ 14㎛ |
| Dimensions | 24 (W) x 24 (H) x 3.3 (D)㎟ (Without pin) |
| Weight | ≤ 7g |
| Windowing | Windowing capability |

## DB640-17C-A Dimensions



# Uncooled Infrared Detector

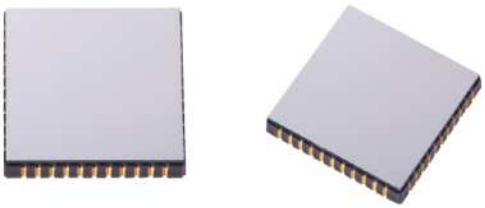
**LWIR 384 x 288 17㎛** DB384-17C-A

## Overview

DB384-17C-A is the high performance 384 x 288, 17㎛ micro-bolometer designed for industrial-commercial thermal imagers. Our higher performance uncooled infrared detector helps infrared camera manufacturers to lead the market in thermography, surveillance & security, car night vision and many other commercial markets, as well as the military market.

## Description

- DB384-17C-A is an uncooled infrared detector with a reliable, small and lightweight, low input power focal plane array.



Ceramic Package

## Main Features

- TECless operation
- Power supply : 5 V for analog and digital
- Output dynamic range : 1 V to 4 V
- Image flip / mirror capability
- 44-leadless ceramic vacuum package
- On-chip / Off-chip dual temperature sensor
- Typical responsivity : 10 mV / K
- User defined windowing capability

## Applications

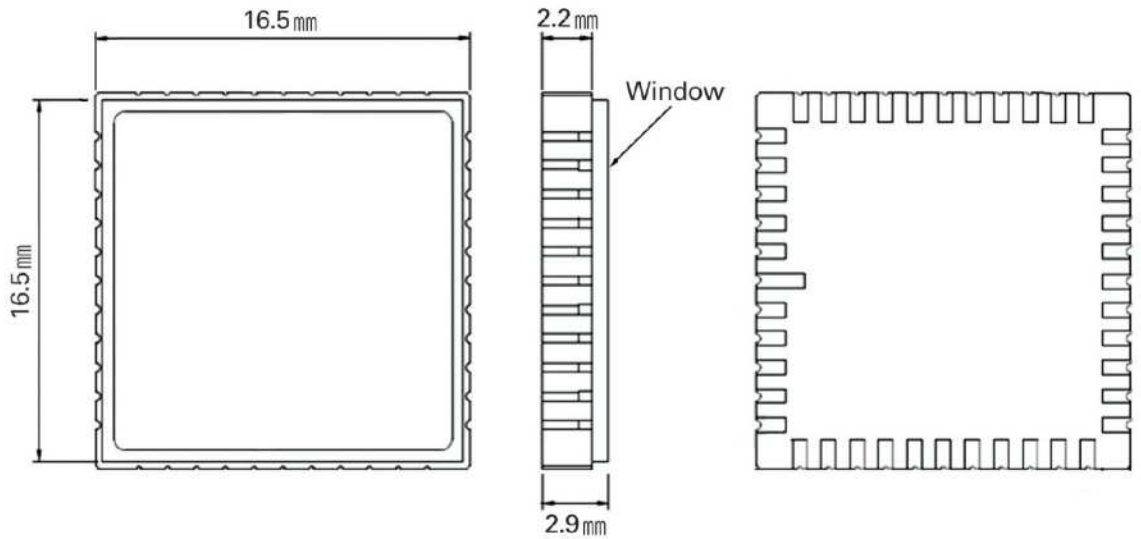
- Security-Surveillance
- Night Vision
- Marine Navigation
- Next Generation Rifle
- Health and Medical

## Images from the 2D IR detector

## Specifications

| Performance | |
|---|---|
| Detector type | Microbolometer (uncooled) |
| Array format | 384 x 288 |
| Pixel pitch | 17㎛ |
| NETD | ≤ 50mK @ F/1, 300K, 30㎐ |
| Operability | ≥ 99% |
| Frame rate | Max 60㎐ |
| Video output | 1ch |
| Thermal time constant | ≤ 15㎳ |
| Operating temperature | -40℃ ~ 65℃ |
| **Features** | |
| Wavelength band | LWIR |
| Spectral range | 8 ~ 14㎛ |
| Dimensions | 16.5(W) x 16.5(H) x 2.9(D) ㎣ |
| Weight | ≤ 4g |
| Windowing | Windowing capability |

## DB384-17C-A Dimensions



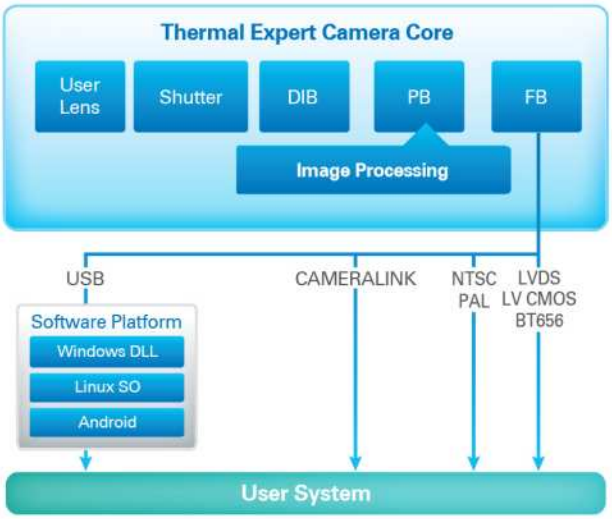
# THERMAL EXPERT™

## Uncooled Infrared Engine

TE-EV1

## Description

TE-EV1 is an infrared camera system which integrates a 640 x 480 17μm pitch, long-wave infrared(LWIR) micro bolometer, shutter, signal processing electronics(DIB, PB, FB) and selectable lenses.



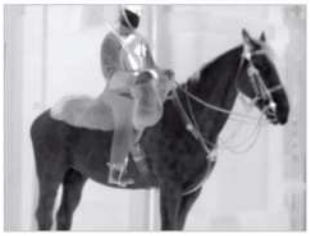

## Component

- DIB(Detector Interface Board) : A/D converting of Detector data.
- PB(Process Board) : Detector control and image processing.
- FB(Feature Board) : Output board.
  - USB output mode
  - Camera Link output mode
  - LVDS or LV CMOS or BT656 output mode
  - NTSC or PAL output mode

## Applications

- Security / Surveillance
- Night Vision
- Marine Navigation
- Medical Application
- Electrical Maintenance

## Images from Thermal Expert Engine



# SEE THE NEW WORLD THROUGH
# i3system, Inc.

## Specifications

| Detector | |
|---|---|
| Detector type | Micro-Bolometer (uncooled) |
| Array format | 640 x 480 |
| Pixel pitch | 17㎛ |
| Thermal sensitivity (NETD) | ≤ 50mK@F/1, 300K |
| | ≤ 35mK@F/1, 300K (Optional) |
| Spectral range | 8 to 14㎛ |
| **Camera Engine** | |
| Power supply | DC 5V |
| Power consumption | < 2.0 W @ (30 Hz) |
| Video output format | Digital : Camera Link, USB, LVDS, LV CMOS, BT656, IP(OnVif)<br>Analog : NTSC, PAL |
| Control | USB2.0, RS-232, I2C, UART |
| Frame rate | 30 Hz or 60 Hz |
| Time to First Image | < 10 sec |
| Dimensions (WxHxD) (with lens mount) | 42.5 mm x 44.6 mm x 41.1 mm |
| Weight | < 110 g (without lens) |
| Operating temperature | -10 ℃ ~ 65 ℃ (-40 ℃ ~ 65 ℃ optional) |
| Storage temperature | -40 ℃ ~ 85 ℃ |
| Scene range temperature | -10 ℃ ~ 150 ℃ (at Digital output) |

## Lens Information

| Focal Length | F-number | FOV (H x V - Diagonal) |
|---|---|---|
| 8.5 mm | F/1.2 | 73.2 x 54.5 - 93.3 |
| 19 mm | F/1.0 | 32.3 x 24.4 - 40.1 |
| 25 mm | F/1.2 | 24.2 x 18.4 - 29.8 |
| 35 mm | F/1.1 | 17.0 x 13.0 - 20.9 |

## TE-EV1 Dimensions

(Unit mm)


## Range Performance

8.5mm, F/1.2

Detection, Recognition, Identification of Human — 1.8m x 0.5m

| | Optimal | Typical |
|---|---|---|
| Detection | 288m | 255m |
| Recognition | 73m | 62m |
| Identification | 36m | 31m |

19mm, F/1.0

Detection, Recognition, Identification of Human — 1.8m x 0.5m

| | Optimal | Typical |
|---|---|---|
| Detection | 640m | 570m |
| Recognition | 160m | 144m |
| Identification | 80m | 72m |

25mm, F/1.2

Detection, Recognition, Identification of Human — 1.8m x 0.5m

| | Optimal | Typical |
|---|---|---|
| Detection | 930m | 820m |
| Recognition | 230m | 210m |
| Identification | 116m | 104m |

35mm, F/1.1

Detection, Recognition, Identification of Human — 1.8m x 0.5m

| | Optimal | Typical |
|---|---|---|
| Detection | 1080m | 940m |
| Recognition | 272m | 238m |
| Identification | 136m | 120m |

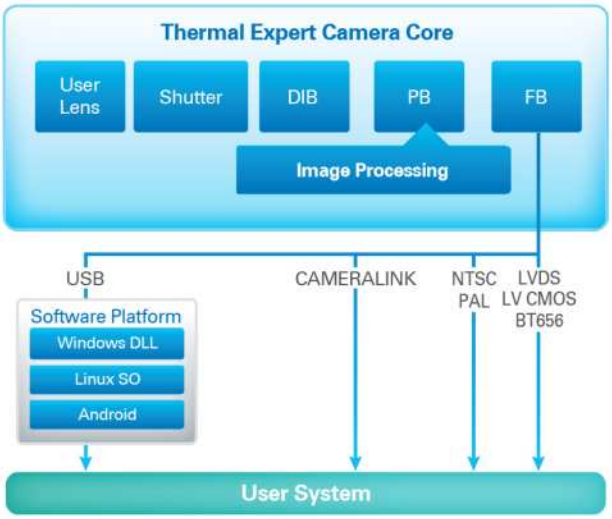
# THERMAL EXPERT™

## Uncooled Infrared Engine

TE-EQ1

## Description

TE-EQ1 is an infrared camera system which integrates a 384 x 288 17μm pitch, long-wave infrared (LWIR) micro bolometer, shutter, signal processing electronics (DIB, PB, FB) and selectable lenses.



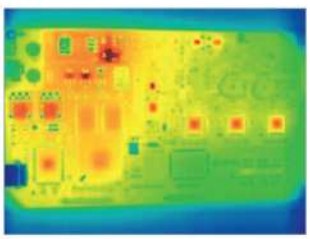

## Components

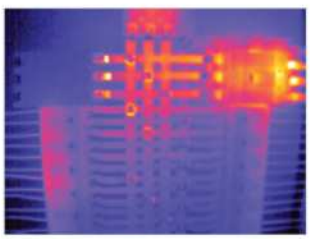
- DIB (Detector Interface Board) : A/D converting of Detector data.
- PB (Process Board) : Detector control and image processing.
- FB (Feature Board) : Output board.
  - USB output mode
  - Camera Link output mode
  - LVDS or LV CMOS or BT656 output mode
  - NTSC or PAL output mode

## Applications

- Security / Surveillance
- Night Vision
- Marine Navigation
- Medical Application
- Electrical Maintenance

## Images from Thermal Expert Engine





# SEE THE NEW WORLD THROUGH
# i3system, Inc.

## Specifications

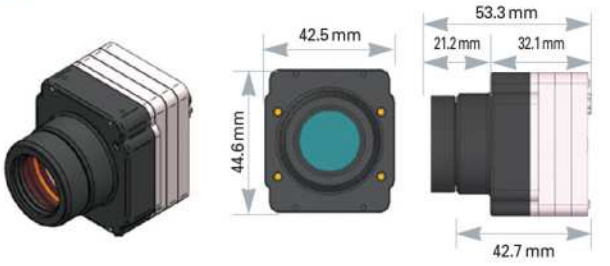
| Detector | |
|---|---|
| Detector type | Micro-Bolometer (uncooled) |
| Array format | 384 x 288 |
| Pixel pitch | 17㎛ |
| Thermal sensitivity(NETD) | ≤ 50mK@F/1, 300K |
| Spectral range | 8 to 14㎛ |
| **Camera Engine** | |
| Power supply | DC 5V |
| Power consumption | < 1.8W @ (30Hz) |
| Video output format | Digital : Camera Link, USB, LVDS, LV CMOS, BT656, IP(OnVif)<br>Analog : NTSC, PAL |
| Control | USB2.0, RS-232, I2C, UART |
| Frame rate | 30 Hz or 60 Hz |
| Time to First Image | < 10 sec |
| Dimensions (W x H x D) (with lens mount) | 42.5 mm x 44.6 mm x 42.7 mm |
| Weight | < 110g (without lens) |
| Operating temperature | -10℃ ~ 65℃(-40℃ ~ 65℃ optional) |
| Storage temperature | - 40 ℃ ~ 85 ℃ |
| Scene range temperature | - 10 ℃ ~ 150 ℃ (at Digital output) |

## Lens Information

| Focal Length | F-number | FOV(H x V - Diagonal) |
|---|---|---|
| 6.8mm | F/1.4 | 56.3 x 41.8 - 71.4 |
| 8.5mm | F/1.2 | 43.5 x 32.8 - 54.7 |
| 13mm | F/1.0 | 28.7 x 21.7 - 35.3 |
| 19mm | F/1.0 | 19.6 x 14.7 - 24.4 |
| 25mm | F/1.2 | 14.8 x 11.1 - 18.4 |
| 35mm | F/1.1 | 10.5 x 7.9 - 13.0 |

## TE-EQ1 Dimensions

(Unit mm)




## Range Performance


6.8mm, F/1.4

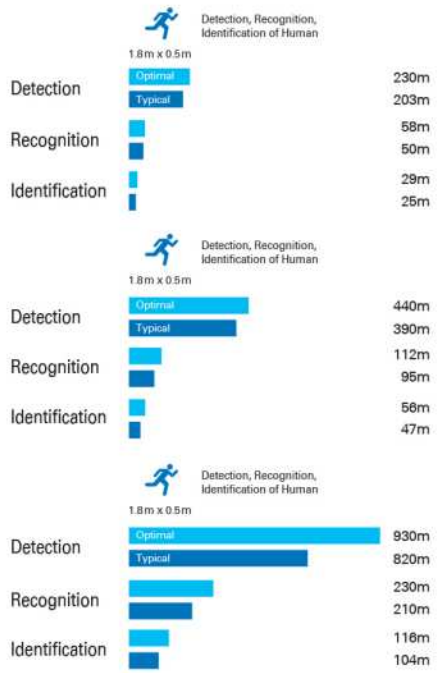

13mm, F/1.0

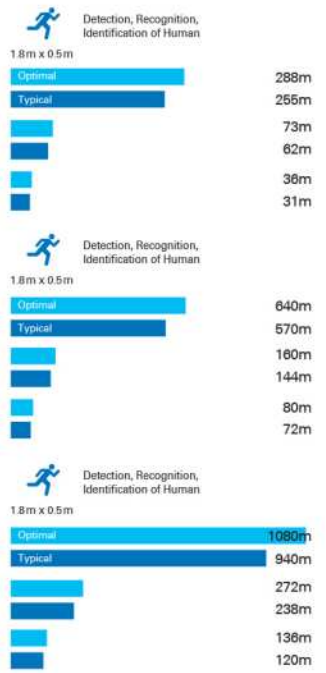

25mm, F/1.2


8.5mm, F/1.2


19mm, F/1.0


35mm, F/1.1



# THERMAL EXPERT™

## Uncooled Infrared Engine

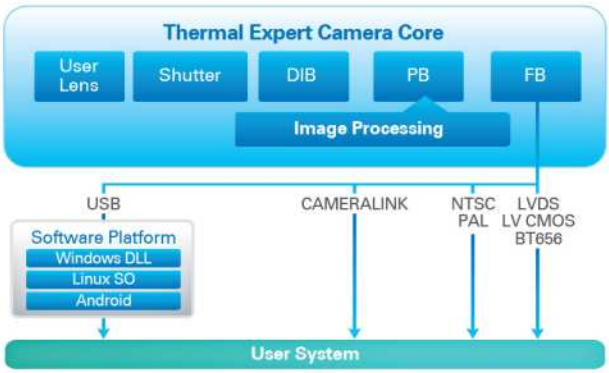
TE-EX2/EV2/EQ2

## Description

TE-EX2/EV2/EQ2 is an infrared camera system which integrates a long-wave infrared(LWIR) micro bolometer, shutter, signal processing electronics(DIB, PB, FB) and selectable lenses.

## Components

- DIB(Detector Interface Board) : A/D converting of Detector data.
- PB(Process Board) : Detector control and image processing.
- FB(Feature Board) : Output board.
  - USB output mode
  - Camera Link output mode
  - LVDS or LV CMOS or BT656 output mode
  - NTSC or PAL output mode




TE-EQ2(Module)

TE-EX/EV2(Module)

* Including lens

## Images from Thermal Expert Engine

# SEE THE NEW WORLD THROUGH
# i3system, Inc.

## Specifications

| | TE-EQ2 | TE-EV2 | TE-EX2 |
|---|---|---|---|
| Detector Type | Micro-Bolometer(Uncooled) | | |
| Array format and Pitch | 384x288, 12㎛ | 640x480, 12㎛ | 1024x768 12㎛ |
| Thermal Sensitivity(NETD) | 50mK / F#1.0, Room Temperature | | |
| Spectral Range | 8 to 14㎛ | | |
| Power Supply | DC 5V (< 0.46A) | DC 5V (< 0.5A) | DC 5V (< 0.5A) |
| Power Consumption | < 1.6W@30Hz(Steady State) | < 2.0W@30Hz(Steady State) | < 2.5W@30Hz(Steady State) |
| Video Output Format | Digital : USB, CameraLink, LVCMOS 3.3V, LVDS,BT656<br>Analog : NTSC, PAL | | |
| Frame Rate | 30Hz | | |
| Time to First Image | < 7 Sec Max.(Typ. < 6 sec) | | |
| Control Command Protocols | RS-232(Option RS-485) | | |
| Dimensions(WxHxD) | 30x30x27mm | 30x36x27mm | 30x36x27mm |
| Weight | < 50g(Without Lens) | | |
| Operating Temperature | -10℃ ~ 65℃(Optional -40℃ ~ 65℃) | | |
| Storage Temperature | -40℃ ~ 85℃ | | |
| Scene Range Temperature | -10℃ ~ 150℃(Optional 0℃ ~ 500℃) | | |

## Lens Information

| | F/L | FOV(H x V) | Mount |
|---|---|---|---|
| TE-EX2 1024x768 12μm | 13mm@f/1.0 | 54 x 40.6 | M34 x 0.75 |
| | 19mm@f/1.0 | 38.4 x 28.4 | M34 x 0.75 |
| | 25mm@f/1.0 | 27.7 x 20.9 | M34 x 0.75 |
| | 35mm@f/1.0 | 20 x 15.1 | M45 x 1 |
| | 50mm@f/1.2 | 13.9 x 10.5 | M45 x 1 |

| | F/L | FOV(H x V) | Mount |
|---|---|---|---|
| TE-EV2 640x480 12μm | 4.9mm@f/1.0 | 95 x 69.6 | M24 x 0.5 |
| | 8.7mm@f/1.0 | 50.8 x 38 | M24 x 0.5 |
| | 13.5mm@f/1.0 | 32 x 24 | M24 x 0.5 |
| | 18mm@f/1.0 | 24 x 18.1 | M24 x 0.5 |
| | 24mm@f/1.0 | 18 x 13.6 | M24 x 0.5 |

| | F/L | FOV(H x V) | Mount |
|---|---|---|---|
| TE-EQ2 384x288 12μm | 2.5mm@f/1.0 | 110.4 x 81.2 | M18 x 0.5 |
| | 4.4mm@f/1.0 | 60.4 x 44.9 | M18 x 0.5 |
| | 6.3mm@f/1.0 | 42.2 x 31.6 | M18 x 0.5 |
| | 9.1mm@f/1.0 | 28.4 x 19.3 | M18 x 0.5 |
| | 13.5mm@f/1.0 | 19.3 x 14.5 | M24 x 0.5 |
| | 18mm@f/1.0 | 14.5 x 10.9 | M24 x 0.5 |

# Uncooled Infrared Camera Engine

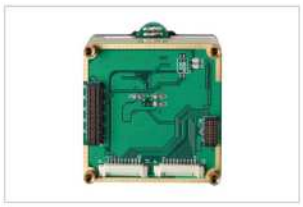
**640 x 480 17㎛** iE640

## Introduction

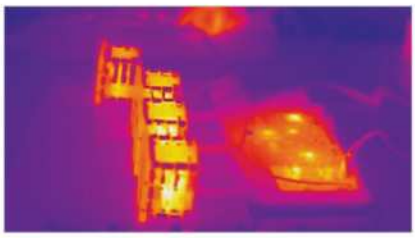
The Infrared Camera Core of iE640 consists of an Uncooled Infrared detector for LWIR(Long Wavelength Infrared,) 8~14㎛ range and Circuit Board for Imaging Processing, which can be used as the Detector and core IR camera.

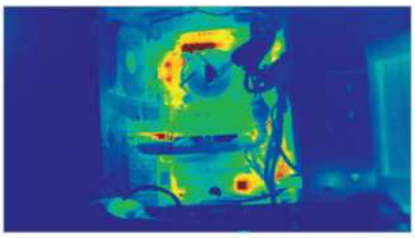
## Applications

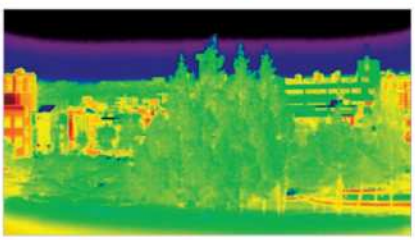
- Security-Surveillance
- Night Vision
- Marine Navigation
- Medical Application
- Electrical Maintenance
- Non Destructive Test
- Temperature Measurement



## Images from the iE640





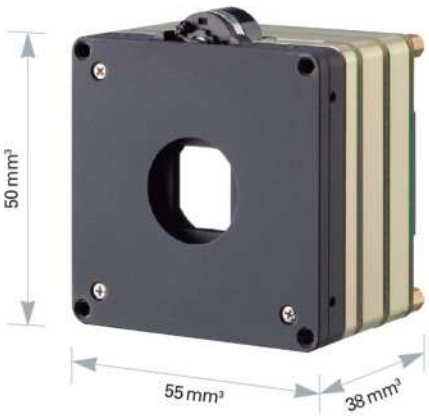


# SEE THE NEW WORLD THROUGH
# i3system, Inc.

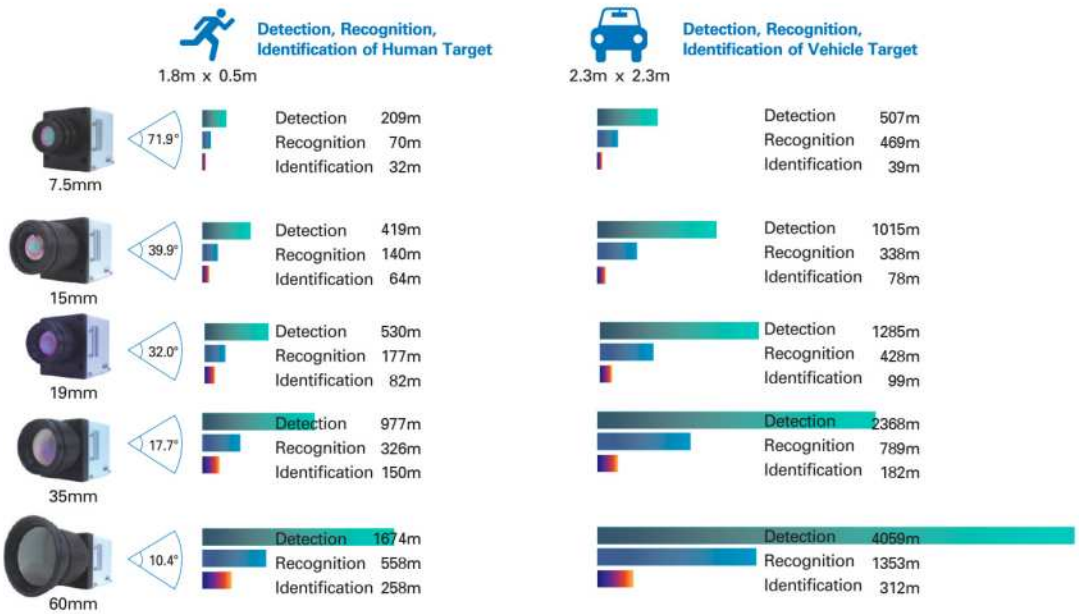
## Specifications

| Detector | |
|---|---|
| Detector type | Microbolometer |
| Array format | 640 x 480 |
| Pixel Pitch | 17㎛ |
| Thermal sensitivity(NETD) | <50mK at F/1.0 |
| Spectral range | 8~14㎛ |
| **Camera Engine** | |
| Input power supply | DC 9~12V |
| Power consumption | <1.5W (at Room temperature) |
| Output format | 640 x 480, 30Hz |
| Video output | 16bit TTL 3.3V Level |
| Time to Image | <5sec |
| Scene temperature range | -20~120℃ |
| | -20~650℃ (Optional) |
| Control | I²C |
| Dimensions(W x H x D) | 55 x 50 x 38mm³ |
| Weight | 126g |
| Operating temperature | -10℃~65℃ (-40℃~65℃ optional) |

## iE640 Dimensions




## Range Performance



# Uncooled Infrared Camera Engine

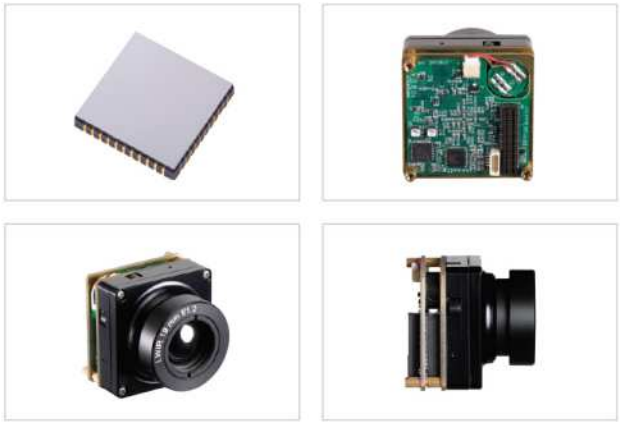
**384 x 288 17㎛** iE320M

## Introduction

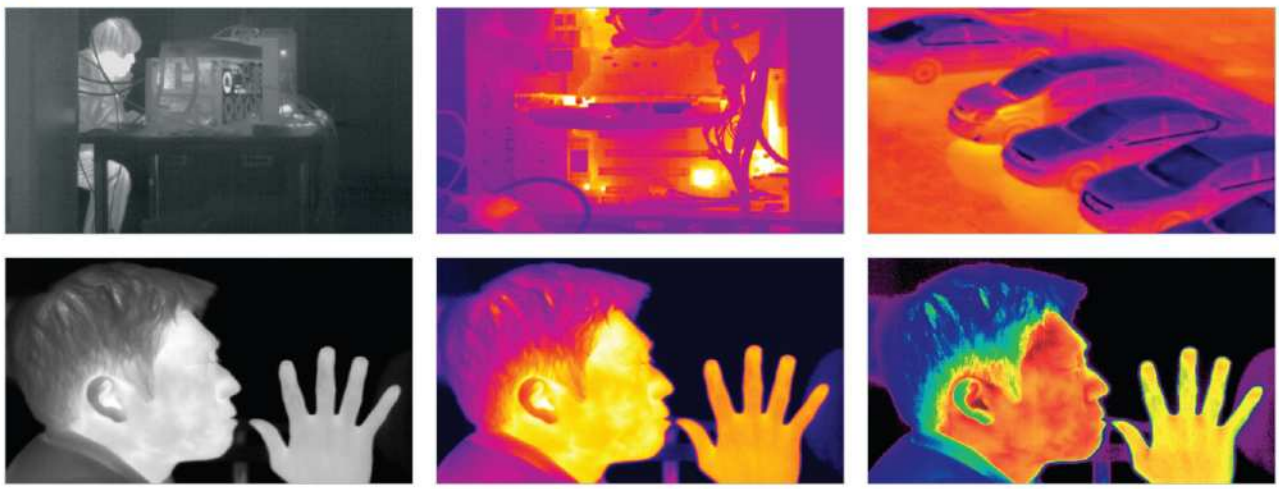
The Infrared Camera Core of iE320M consist of an Uncooled Infrared detector for LWIR(Long Wavelength Infrared,) 8~14㎛ range and Circuit Board for Imaging Processing, which can be used as the Detector and core IR camera.

## Applications

- Security-Surveillance
- Night Vision
- Marine Navigation
- Medical Application
- Electrical Maintenance
- Non Destructive Test
- Temperature Measurement



## Images from the iE320M

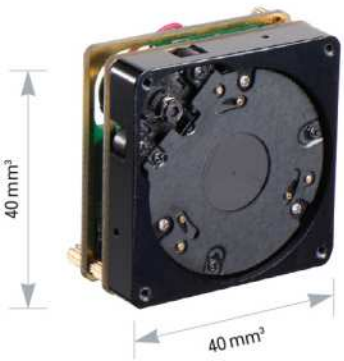


# SEE THE NEW WORLD THROUGH
# i3system, Inc.

## Specifications

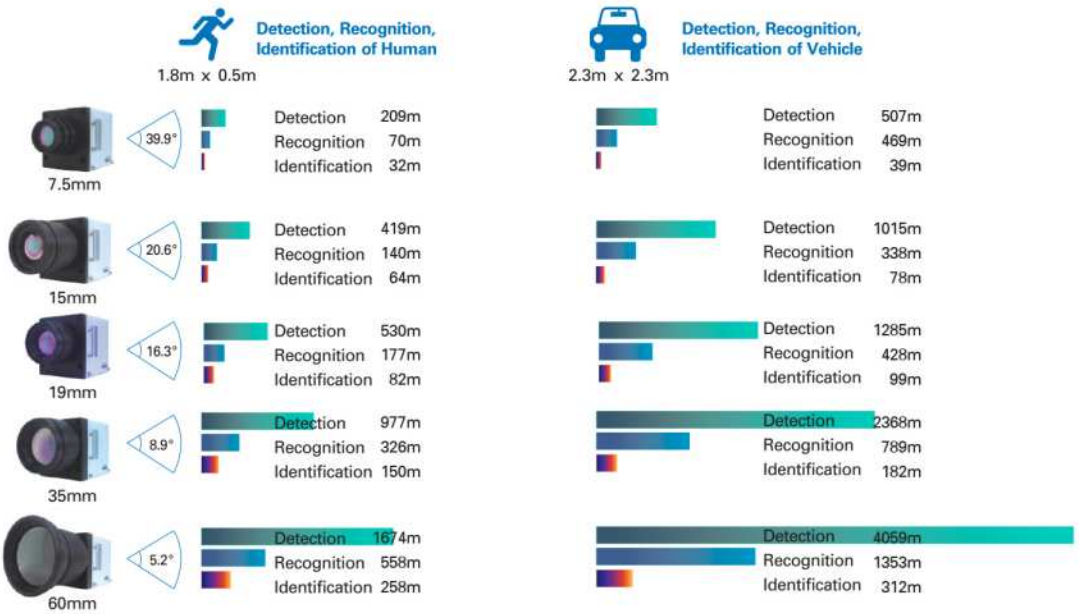
| Detector | |
|---|---|
| Detector type | Microbolometer |
| Array format | 384 x 288 |
| Pixel Pitch | 17㎛ |
| Thermal sensitivity(NETD) | < 50mK at F/1.0 |
| Spectral range | 8~14㎛ |
| **Camera Engine** | |
| Input power supply | DC 5V(± 10%) |
| Power consumption | < 1.2W(at Room temperature) |
| Output format | 384 x 288, 30Hz |
| Video output | 16bit TTL 3.3V Level |
| | NTSC/PAL Video(Optional) |
| Time to Image | < 5sec |
| Scene temperature range | – 20 ~ 120 ℃ |
| | – 20 ~ 650 ℃ (Optional) |
| Control | RS232 |
| Dimensions(WxHxD) | 40 x 40 x 19.8mm³ |
| Weight | < 36g |
| Operating temperature | -10 ℃ ~ 65 ℃ (-40 ℃ ~ 65 ℃ optional) |

## iE320M Dimensions





## Range Performance



# THERMAL EXPERT™

## Mobile Infrared Camera

TE-V1

8.5mm lens
Optional

19mm lens
Default

25mm lens
Optional

35mm lens
Optional

## Description

- High performance
- High resolution : 640 x 480 (17㎛ pitch)
- High sensitivity : < 50 mk

## Features

- Temperature measurement for whole pixel
- Superior image with native 307,200 pixels(640x480) resolution
- Interchangeable Lens
- Shutterless operation
- Easy graphical user interface
- Optional Lens(8.5mm / 25mm / 35mm)

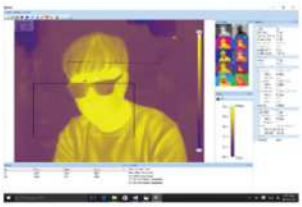
## THERMAL EXPERT™ for Android

- Color palettes(12 color maps)
- Storage images(IR, visible with snapshot and video)
- Digital zooming(640 x 480, 480 x 360, 384 x 288, 240 x 180)
- Image view with visible(50:50, Twin, Overlay, Floating)
- Temperature Measurement
  (Alarm, Min / Max, Point / Line / Rectangle / Circle profile)
- Report(Generate pdf report)
- Level and Span function

Level and Span

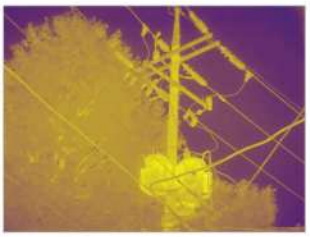
## THERMAL EXPERT™ for Windows

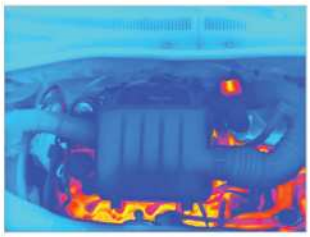
- Realtime Analysis Tool
- Check the temperature anywhere in picture using mark of Dot, Line, Square
- Alarm with sound by user's setting temperature degree
- Save and Load infrared Image with mark
- Saving the movie with mark is being implemented
- AIE Program(Adaptive Image Enhancement)



Window PC program

## Images from the THERMAL EXPERT™





# SEE THE NEW WORLD THROUGH
# i3system, Inc.

## Specifications

| | |
|---|---|
| Array Format | 640 x 480 |
| Pixel pitch | 17㎛ |
| Wavelength band | 8~14㎛ (Longwave infrared) |
| Sensitivity | ≤ 50mK@F/1, 300K |
| Frame rate | < 9 Hz or 30 Hz (Export Lisence) |
| Scene range temperature | -10 ℃ ~ 120 ℃ |
| Operating temperature | -10 ℃ ~ 50 ℃ |
| Power Consumption | ≤ 500 mW |
| Weight | < 60g, without lens |
| Dimensions | 50 mm x 32 mm x 30 mm, without Lens |
| Interface | Micro USB |
| Platform | Android, Windows |
| Type of lens | 8.5mm, F/1.2(Optional) |
| | 19mm, F/1.0(Default) |
| | 25mm, F/1.2(Optional) |
| | 35mm, F/1.1(Optional) |
| FOV | 8.5 mm : 73.2° (H) x 54.5° (V) - 93.3° (diagonal) |
| | 19 mm : 32.3° (H) x 24.4° (V) - 40.1° (diagonal) |
| | 25 mm : 17.3° (H) x 13.1° (V) - 21.5° (diagonal) |
| | 35 mm : 12.3° (H) x 9.3° (V) - 15.2° (diagonal) |
| Focus range | 8.5 mm : 0.4 m to infinity |
| | 19 mm : 2.4 m to infinity |
| | 25 mm : 1.0 m to infinity |
| | 35 mm : 5.0 m to infinity |

## TE-V1 Dimensions


## Range Performance

8.5mm, F/1.2

Detection, Recognition, Identification of Human

1.8m x 0.5m

| | Optimal | Typical |
|---|---|---|
| Detection | 288m | 255m |
| Recognition | 73m | 62m |
| Identification | 36m | 31m |

19mm, F/1.0

Detection, Recognition, Identification of Human

1.8m x 0.5m

| | Optimal | Typical |
|---|---|---|
| Detection | 640m | 570m |
| Recognition | 160m | 144m |
| Identification | 80m | 72m |

25mm, F/1.2

Detection, Recognition, Identification of Human

1.8m x 0.5m

| | Optimal | Typical |
|---|---|---|
| Detection | 930m | 820m |
| Recognition | 230m | 210m |
| Identification | 116m | 104m |

35mm, F/1.1

Detection, Recognition, Identification of Human

1.8m x 0.5m

| | Optimal | Typical |
|---|---|---|
| Detection | 1080m | 940m |
| Recognition | 272m | 238m |
| Identification | 136m | 120m |

# THERMAL EXPERT™

## Mobile Infrared Camera_Dev. Kit

TE-V1 Dev. Kit

8.5mm lens
Optional

19mm lens
Default

25mm lens
Optional

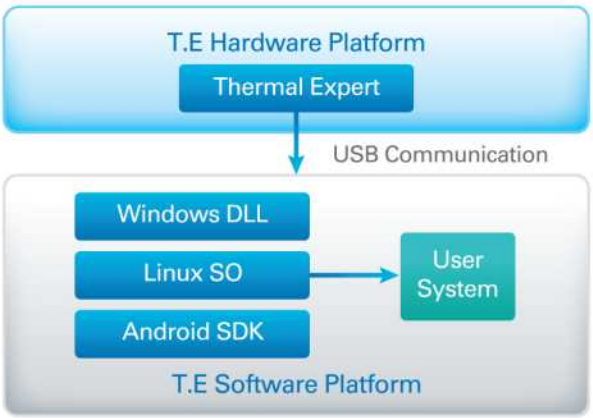
35mm lens
Optional

## Description

- High performance
- High resolution : 640 x 480 (17㎛ pitch)
- High sensitivity : < 50 mk

## Features

- Temperature measurement for whole pixel
- Superior image with native 307,200pixels(640x480) resolution
- Interchangeable Lens
- Shutterless operation
- Easy graphical user interface
- Optional Lens(8.5mm / 25mm / 35mm)



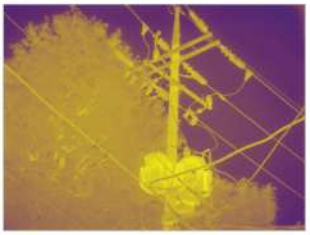

## T.E. Software Platform

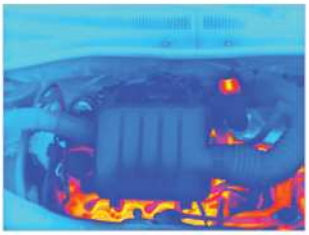
- The platform of T.E. software includes Non-Uniformity Correction(NUC), dead correction replacement and temperature calculation at user's device
- The Android SDK, Windows DLL and Linux SO are available. It provides the output of thermal data and temperature data.

## T.E. Hardware Platform

- The platform of T.E. hardware includes detector control, A/D conversion, USB communication and calibration data storage(in flash memory)
- There is no mechanical shutter. Shutterless algorithm is used to stabilize the output characteristics of the detector against the ambient temperature.

## Product Mix / Images from the THERMAL EXPERT™



# SEE THE NEW WORLD THROUGH
# i3system, Inc.

## Specifications

| | |
|---|---|
| Array Format | 640 x 480 |
| Pixel pitch | 17㎛ |
| Wavelength band | 8~14㎛ (Longwave infrared) |
| Sensitivity | ≤ 50 mK@F/1, 300 K |
| Frame rate | < 9 Hz or 30 Hz (Export Lisence) |
| Scene range temperature | -10℃ ~ 120℃ |
| Operating temperature | -10℃ ~ 50℃ |
| Power Consumption | ≤ 500 mW |
| Weight | < 60 g, without lens |
| Dimensions | 50 mm x 32 mm x 30 mm, without Lens |
| Interface | Micro USB |
| Platform | Android, Windows |
| Type of lens | 8.5 mm, F/1.2 (Optional) |
| | 19 mm, F/1.0 (Default) |
| | 25 mm, F/1.2 (Optional) |
| | 35 mm, F/1.1 (Optional) |
| FOV | 8.5 mm : 73.2° (H) x 54.5° (V) - 93.3. (diagonal) |
| | 19 mm : 32.3° (H) x 24.4° (V) - 40.1. (diagonal) |
| | 25 mm : 17.3° (H) x 13.1° (V) - 21.5. (diagonal) |
| | 35 mm : 12.3° (H) x 9.3° (V) - 15.2. (diagonal) |
| Focus range | 8.5 mm : 0.4 m to infinity |
| | 19 mm : 2.4 m to infinity |
| | 25 mm : 1.0 m to infinity |
| | 35 mm : 5.0 m to infinity |

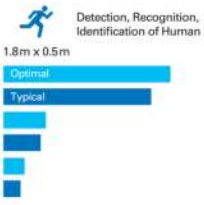
## Software Platforms

| Platform (OS) | Format |
|---|---|
| Windows | DLL |
| Android | SDK |
| Linux | SO |

## TE-V1 Dimensions

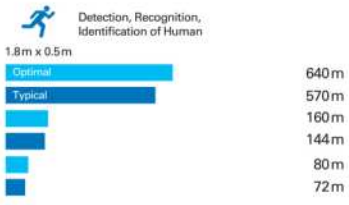

## Range Performance


8.5mm, F/1.2



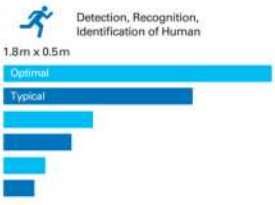


19mm, F/1.0



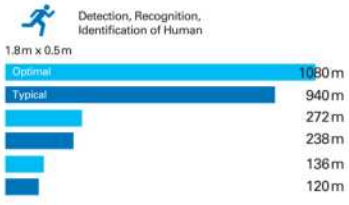


25mm, F/1.2





35mm, F/1.1



# THERMAL EXPERT™

## Mobile Infrared Camera

TE-Q1

6.8mm Lens
**Thermal Expert**
SCENE RANGE
−10℃ to 150℃

13mm Lens
**Thermal Expert_PLUS**
SCENE RANGE
−10℃ to 120℃

6.8mm Lens
**Thermal Expert_PRO**
SCENE RANGE
−10℃ to 250℃

## Description

**• High performance**

- High resolution : 384 x 288 (17㎛ pitch)
- High sensitivity : ≤ 50 mK @ f/1.0, ≤ 80 mK @ f/1.3

## Features

- Temperature measurement for whole pixels
- Convenient image view functions with infrared and visible
- Easy graphical user interface (digital zooming, color Palette.)
- Interchangeable Lens

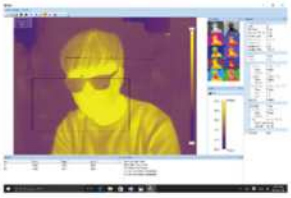
## THERMAL EXPERT™ for Android

- Color palettes (12 color maps)
- Storage images (IR, visible with snapshot and video)
- Digital zooming (384 x 288, 320 x 240, 240 x 160, 160 x 120)
- Image view with visible (50:50, Twin, Overlay, Floating)
- Temperature Measurement
  (Alarm, Min / Max, Point / Line / Rectangle / Circle profile)
- Report (Generate pdf report)
- Level and Span function (High Definition)

## THERMAL EXPERT™ for Windows

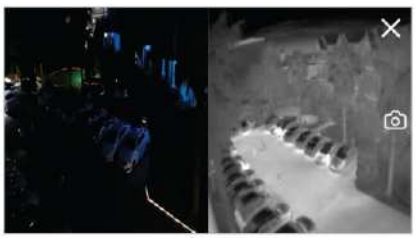
- Realtime Analysis Tool
- Check the temperature anywhere in picture using mark of Dot, Line, Square
- Alarm with sound by user's setting temperature degree
- Save and Load infrared Image with mark
- Saving the movie with mark is being implemented
- AIE Program (Adaptive Image Enhancement)

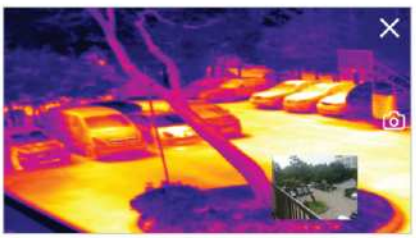
Level and Span

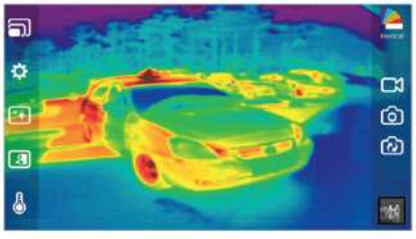


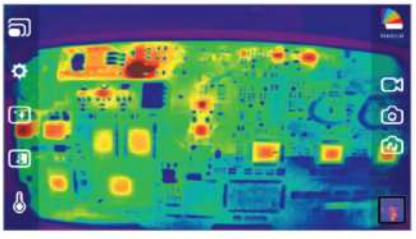
Window PC program

## Images from the THERMAL EXPERT™









# SEE THE NEW WORLD THROUGH
# i3system, Inc.

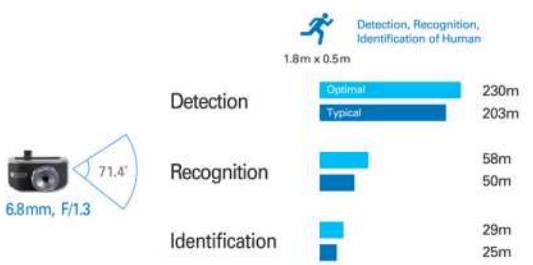
## Specifications

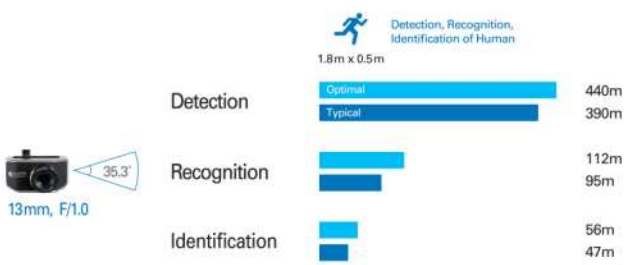
| | |
|---|---|
| Array format | 384 x 288 |
| Pixel pitch | 17 ㎛ |
| Wavelength band | 8 ~ 14 ㎛ (Longwave Infrared) |
| Sensitivity | ≤ 50 mK@F/1, 300 K |
| | ≤ 80 mK@F/1.3, 300 K |
| Frame rate | < 9 Hz |
| Scene range temperature | -10 ℃ ~ 150 ℃ (PLUS : -10 ℃ ~ 120 ℃, PRO : -10 ℃ ~ 250 ℃) |
| Operating temperature | -10 ℃ ~ 50 ℃ |
| Power consumption | ≤ 500 mW |
| Weight | < 27 g (with lens) |
| Dimensions (W x H x D) | 47 mm x 25 mm x 16 mm (Without Lens) |
| Interface | Micro USB or USB-C |
| Platform | Android, Windows |
| Type of lens | Wide : 6.8 mm f/1.3 |
| | Narrow : 13 mm f/1.0 |
| FOV[°] | Wide FOV (default) : 56.3°(H) x 41.8°(V) - 71.4°(diagonal) |
| | Narrow FOV (option) : 28.7°(H) x 21.7°(V) - 35.3°(diagonal) |
| Focus range | Wide FOV : 0.2 m to infinity |
| | Narrow FOV : 0.4 m to infinity |

## TE-Q1 Dimensions



## Range Performance



# THERMAL EXPERT™

## Mobile Infrared Camera_Dev. Kit

TE-Q1 Dev. Kit

• Thermal Expert for third-party developer is composed of hardware and software.

6.8mm lens (default)

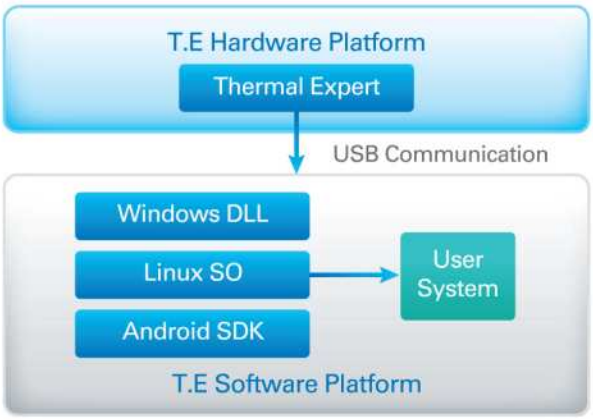
13mm lens (optional)

## Description

- High resolution : 384 x 288 (17㎛ pitch)
- High sensitivity : ≤ 50mK@ f/1.0, ≤ 80mK@ f/1.3

## Features

- Temperature measurement for whole pixels
- Interchangeable Lens
- Small sized hardware platform
- Various software platforms
- No shutter




## T.E. Hardware Platform

- Hardware Platform has basic functions such as detector control, A/D conversion, USB communication and calibration data storage (in flash memory).
- There is no mechanical shutter. The algorithm is used to stabilize the output characteristics of the detector against the ambient temperature.

## T.E. Software Platform

- Software Platform provides the calculation such as detector non-uniformity correction, dead pixel correction and temperature calculation in user system.
- The Android SDK, Windows DLL and Linux software platforms are available. Each provides the output of thermal data and temperature data.

## Product Mix

# SEE THE NEW WORLD THROUGH
# i3system, Inc.

## Specifications

| | |
|---|---|
| Array format | 384 x 288 |
| Pixel pitch | 17 ㎛ |
| Wavelength Band | 8~14 ㎛ (Longwave Infrared) |
| Sensitivity | 0.05 ℃ @ f/1.0 |
| | 0.08 ℃ @ f/1.3 |
| Frame rate | < 9 Hz |
| Scene range temperature | -10 ~ 150 ℃ (f/1.3) |
| Operating temperature | -10 ~ 50 ℃ |
| Power consumption | ≤ 500 mW |
| Weight | < 27 g (with Wide FOV Lens) |
| Dimensions (W x H x D) | 47 mm x 25 mm x 16 mm (Without Lens) |
| Interface | Micro USB or USB-C |
| Type of lens | Wide : 6.8mm f/1.3 |
| | Narrow : 13mm f/1.0 |
| FOV[°] | Wide FOV (default) : 56.3°(H) x 41.8°(V) - 71.4°(diagonal) |
| | Narrow FOV (option) : 28.7° (H) x 21.7° (V) - 35.3° (diagonal) |
| Focus range | Wide FOV : 0.2m to infinity |
| | Narrow FOV : 0.4m to infinity |

## Software platforms

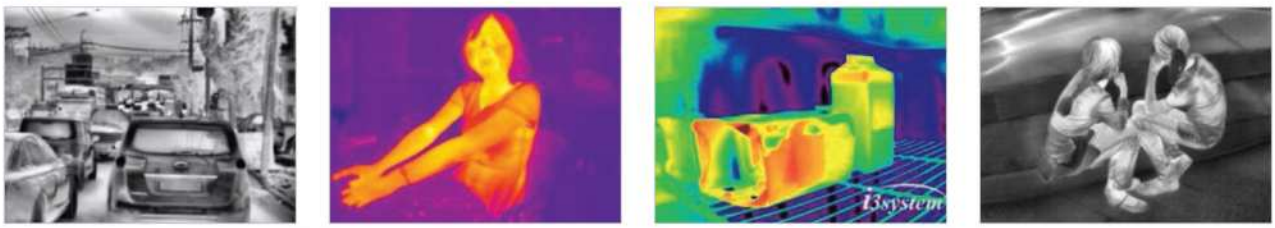
| Platform (OS) | Format |
|---|---|
| Windows | DLL |
| Android | SDK |
| Linux | SO |

## TE-Q1 Dimensions


W x H x D : 47mm x 25mm x 16mm (without lens)

## Range Performance


## Thermal Images



Intelligent Image & Information System

i3system

THERMAL EXPERT™

**i3system (Headquarter)**
69, Techno 5-ro, Yuseong-gu, Daejeon, 34014 Republic of Korea
Tel : +82 70 7784 2506, Fax : +82 42 931 2555

**i3system (Jang-dong)**
26-32, Gajeongbuk-ro, Yuseong-gu, Daejeon, 34113 Republic of Korea
Tel : +82 42 360 2500, Fax : +82 42 360 2555

**i3system (Moonji-dong)**
435, Expo-ro, Yuseong-gu, Daejeon, 34051 Republic of Korea
Tel : +82 70 4944 7700, Fax : +82 42 863 3555

Webpage : www.i3system.com / www.i3-thermalexpert.com
E-mail : marketing@i3system.com
Tel : +82-42-360-2505,Fax : +82-42-360-2555