

# Thermal F1

Emission microscope C14229-01

The "Thermal F1" is the next generation in thermal emission microscopy. Completely redesigned from the ground up by the same engineers responsible for the PHEMOS, the F1 features an automated microscope stage, best-in-class sensitivity, high frame rate lock-in thermography, and the ability to cover a wide range of devices from die-level to board-level fault isolation.



## Features

01  
High  
sensitivity

### Custom designed low-noise InSb camera with thermal lock-in achieves world class sensitivity

Covering the ideal thermal emission range from 3.7  $\mu\text{m}$  to 5.2  $\mu\text{m}$ , the Stirling cooled thermal emission camera seamlessly integrates with a lock-in amplifier to reduce noise and pinpoint thermal emissions.

02  
Wide field  
of view

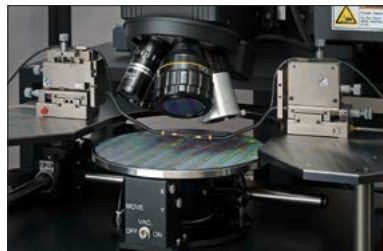
### Automated stitching function allows for board-level field of view (FOV)

Designed with ease-of-use in mind, the automated microscope stage movement combines with software image stitching function to cover an area much larger than is possible with a single objective lens.

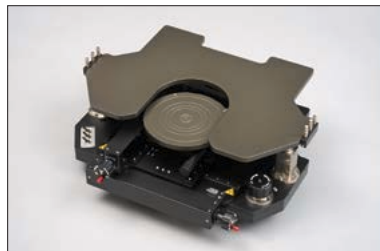
03  
Multi  
analysis  
target

### Flexible selection of sample stage

A large area accommodating many probing stage form factors allows users to choose a stage with the best work flow and probing set-up for each lab's custom needs.



▲ Simple standard prober

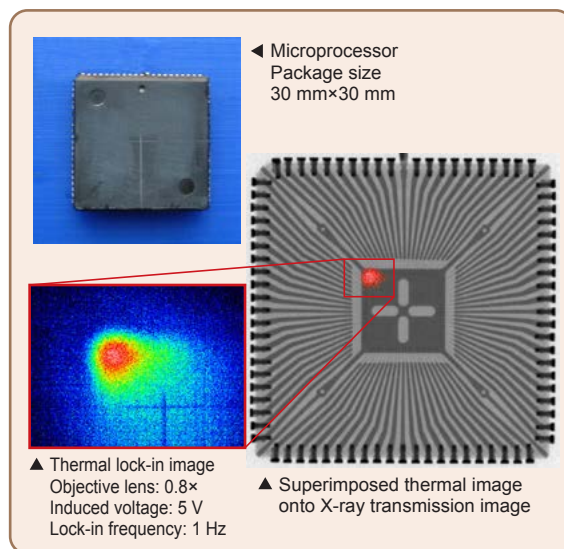


▲ Manual wafer prober

## Applications

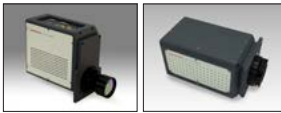
- Metal shorts
- Abnormal via resistance
- Dielectric leakage or breakdown
- Temperature distribution on the device

— Case study: Package device observation —



## Options

### Thermal analysis camera



◀ InSbHS camera  
C9985-05 (Left)  
ThermoDynamicV2 camera  
C9985-07 (Right)

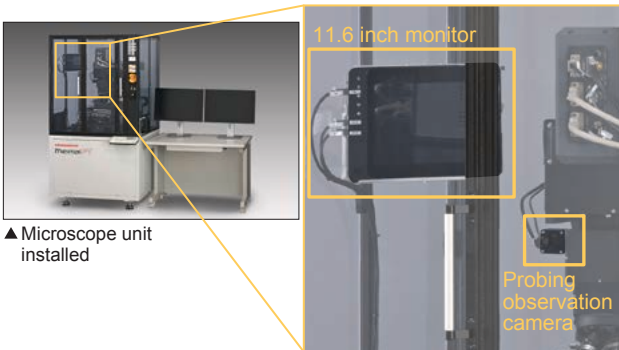
Product name	InSbHS camera	ThermoDynamicV2 camera
Product number	C9985-05	C9985-07
Effective number of pixels	640(H) × 512(V)	
Cooling method	Stirling cycle cooler	
Noise equivalent temperature difference (NETD)	< 25 mK @ 25 °C (20 mK Typical)	
Cooler MTTF	8000 h	14 000 h

### Objective lens

Product name	Product number	N.A.	WD (mm)
Macro lens MWIR 0.29× for Thermal F1	A10159-13	0.048	12
Objective lens MWIR 0.8×	A10159-02	0.13	22
Objective lens MWIR 4×	A10159-03	0.52	25
Objective lens MWIR 8×	A10159-06	0.75	15

### Probing microscope for Thermal F1

Microscope unit for probing can be installed in "Thermal F1".  
11.6 inch monitor makes probing easier.



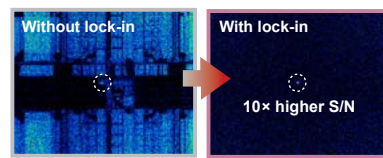
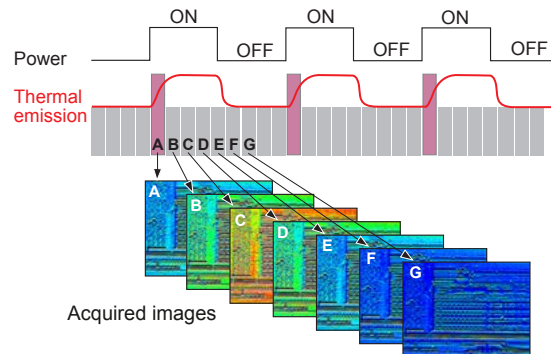
▲ Microscope unit installed

Probing observation camera

Product name	Probing microscope for Thermal F1
Product number	A14323-01
Field of view	1.1 mm×0.6 mm
Monitor size	11.6 inch

### Thermal lock-in unit

Lock-in thermography is a technique that modulates the device power and compares the ON/OFF thermal emission images to eliminate background noise caused by heat diffusion. Using this technique, failure location can be isolated even under low voltage.



◀ Objective lens: 8×  
Power supply voltage: 1.7 V  
Current: 14.5 mA

Product name	Thermal lock-in unit
Product number	C10565-71

### Temperature measurement software

Temperature measurement software displays temperature at each point in thermal image. Feedback of compared result between measured and designed temperature can be utilized to shorten design verification and improve product reliability. It is possible to observe temperature shift caused by change of device operation circumstance. Emissivity differences of observed materials are corrected and emissivity free measurement of temperature distribution is available in FOV.

Product name	Temperature measurement software
Product number	U11389-01

## Specifications and Dimensions

### Dimension and weight

	Width×Depth×Height, Weight
Thermal F1 main unit	960 mm×980 mm×1800 mm, Approx. 500 kg
Operation PC desk	1000 mm×800 mm×700 mm, Approx. 60 kg

### Utility

Line voltage	AC200 V to 240 V ±10 % (50 Hz/60 Hz)
Vacuum	More than 80 kPa (Tube with outer diameter 6 mm) for prober
Compressed air	0.5 MPa to 0.7 MPa (Tube with outer diameter 6 mm)

### Stroke of stage loading optics

X	±50 mm
Y	±50 mm
Z	100 mm

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