

Accessories Guide for the B1506A Power Device Analyzer / Curve Tracer for Circuit Design

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B1506A Overview

The Keysight B1506A Power Device Analyzer / Curve Tracer for Circuit Design is a complete solution that can help power electronics circuit designers maximize the value of their power electronics products by enabling them to select the correct power devices for their applications. It can evaluate all relevant device parameters under a wide range of operating conditions, including IV parameters such as breakdown voltage and on-resistance, as well as three terminal FET capacitance, gate charge, and power loss.

The B1506A consists of a mainframe and fixture. Its fixture can switch between IV and CV measurement and high, low, and guard outputs for three-terminal FET capacitance measurement.

The following cable set is used to connect the mainframe and fixture; all of these cables are included in the B1506A base configuration.

- Digital I/O cable
- Interlock cable
- Capacitance meter cable
- Composite cable set (Triaxial cables, GNDU cable, and HVSMU cable)

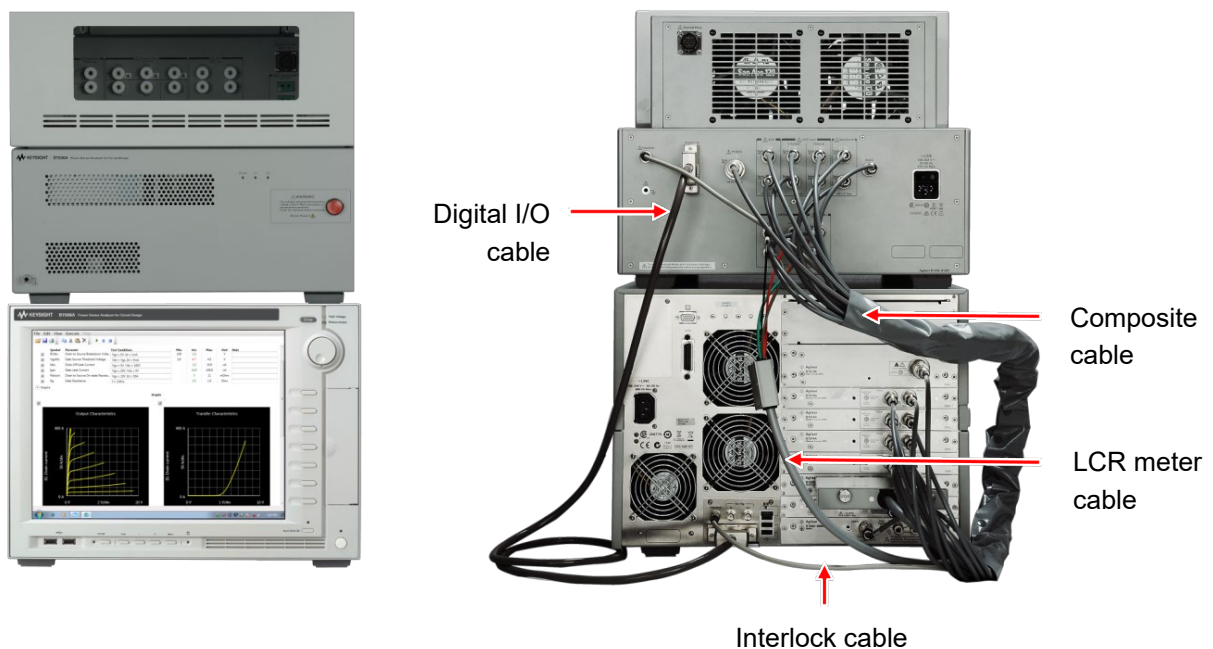


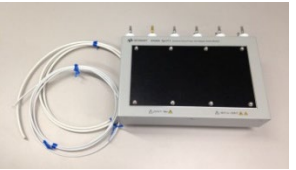






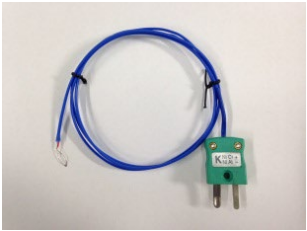
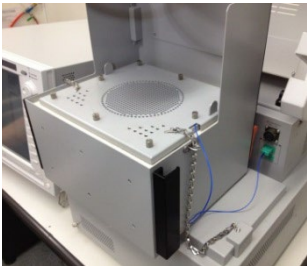
Figure 1. B1506A overview

B1506A Accessories List

The B1506A includes a variety of accessories for measuring DUTs with ease. Except for the thermal test enclosure and universal socket module, all B1506A models come standard with the accessories shown in Table 1. You can also purchase these accessories separately.

Table 1. B1506A accessories list

Model / Option	Description	Picture	Note
B1506AU-F02	Blank silicon plate		Bundled in B1506A. If you need an additional plate, you can purchase with B1506AU-F02.
B1506AU-F10	3-pin inline package socket module		Bundled in B1506A. If you need additional adapters, you can purchase them as B1506AU-F10.
B1506AU-F11	Universal socket module		Bundled in B1506A-H21/H51/H71. This is used for making a custom socket adapter. If you need additional modules, you can purchase them as B1506AU-F11.
B1506AU-F13	Curve tracer socket adapter module		Bundled in B1506A. This is compatible with the curve tracer socket adapter. If you need an additional socket adapter, you can purchase it as B1506AU-F13.
B1506AU-F14	Gate charge socket adapter		Bundled in B1506A-H21/H51/H71. If you need an additional gate charge adapter, you can purchase it as B1506AU-F14.

Model / Option	Description	Picture	Note
N1254A-550	Test leads and connection kit for a thermal test, 20 cm		<p>Bundled in B1506A. If you need more cables, you can purchase them as N1254A-550. These cables can withstand temperatures of up to +250 °C.</p> <p>This kit includes:</p> <ul style="list-style-type: none"> • 200 mm high current cable x2 • 200 mm normal cable x8 • Banana pin adapter x10 • Mini alligator clip x8 • Large clip x2
N1254A-551	Test leads and connection kit for a thermal test, 30 cm		<p>Bundled in B1506A. If you need more cables, you can purchase them as N1254A-551.</p> <p>This kit includes:</p> <ul style="list-style-type: none"> • 300 mm high current cable x2 • 300 mm normal cable x6 • Banana pin adapter x8 • Mini alligator clip x6 • Large clip x2
N1254A-544	Thermocouple, 50 cm, 2ea.		<p>Bundled in B1506A. If you need additional thermocouple cables, you can purchase them with N1254A-544.</p>
B1506A-T01, B1506AU-T01	Thermal test enclosure (Thermostream compatible)		<p>This is an option of B1506A. The thermal test enclosure is also available as an upgrade part.</p>

Measuring TO-Type Package Devices

To measure the TO-package type devices, the B1506A prepares an easy-to-measure environment. The 3-pin Inline Package Socket Module can apply both IV and CV measurements in the test fixture. The gate charge measurement adapter is used for gate charge (Qg) measurement. Both adapters can be easily attached to the fixture.



Figure 2. The inline package socket module

When measuring the IV or CV characteristics of TO-package devices, the B1506AU-F10 Inline Package Socket Module is used.



Figure 3. Gate charge socket adapter

When measuring the Qg characteristics of TO-package devices, the B1506AU-F14 gate charge socket adapter (Qg adapter) is used.

Measuring Module Type Devices

Wire connections within the fixture are necessary for measuring module type devices. The B1506A bundles 20 cm and 30 cm cable sets in the base configuration for this purpose.

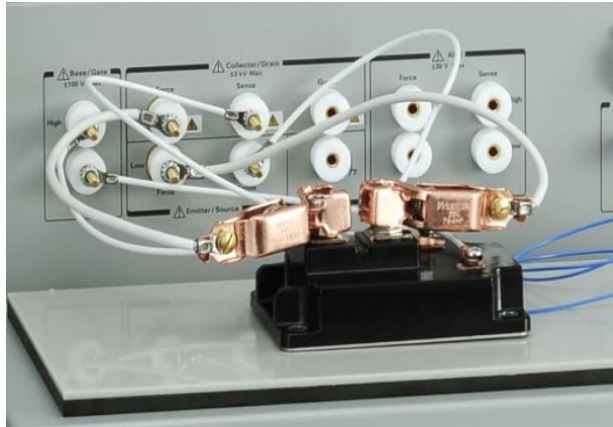


Figure 4. IV and CV measurement for module type device

When measuring the IV and CV characteristics of module type devices, each device terminal is connected to the fixture terminal with a wire. The DUT module is put on the silicon plate.

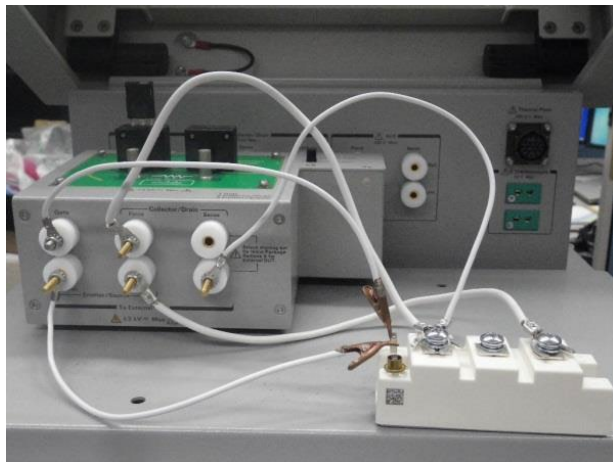
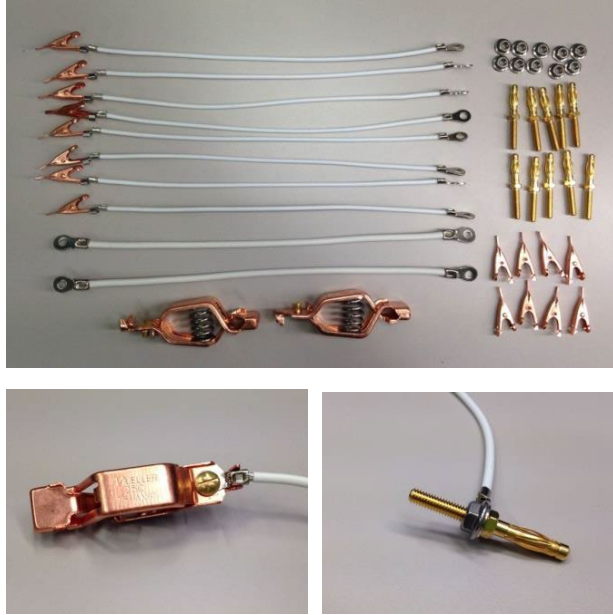


Figure 5. Gate charge measurement for module type device

When measuring the gate charge characteristics of module type devices, each device terminal is connected to the output of the gate charge adapter with a wire.



N1254A-550 and 510 characteristics

- All cables and adapters are applicable up to +250 °C
- Up to 1500A high current cables with lug terminals
- Normal cables with small alligator clip
- Big alligator clips for high current terminals
- Spare alligator clips

Figure 6. N1254A-550 test leads and connection kit for thermal test and example of cable assembly for big alligator clips and lug terminals

Measuring with Curve Tracer Socket Adapter

You can utilize socket adapters designed for the Tektronix 370/371 curve tracer with the B1506AU-F13 curve tracer socket adapter module. The B1506AU-F13 is included with every B1506A model.



Figure 7. B1506AU-F13 Curve tracer socket adapter module

Making a Custom Socket Adapter

For measuring non-TO type devices (ex., SMD), the B1506AU-F11 universal socket adapter can help you make the custom socket adapter module. The B1506AU-F11 is bundled in the B1506A-H21/H51/H71 system configuration. (Not bundled in the B1506A-H20/H50/H70.)

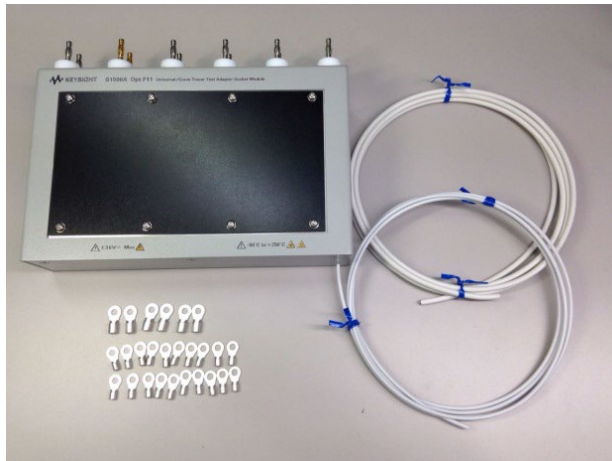


Figure 8. B1506AU-F11 contents

Table 2. Contents list in B1506A-H21/H51/H71 and B1506AU-F11 for making a custom socket adapter

Item	Qty	Comment
B1506-60023: Universal adapter for B1506A	1 ea.	
B1506-61770 (N1254A-552): Test lead for thermal test	1 ea. (2 m)	
B1506-61771 (N1254A-553): 1500A test lead for thermal test	1 ea. (2m)	For high-current path.
0362-1674: Terminal-crimp ring-tongue stud size-8 12-10-AWG uninsulated	6 ea.	For high-current path.
0362-1675: Terminal-crimp ring-tongue stud size-4 16-14-AWG uninsulated	20 ea.	
0515-0390: M4 (T15) pan head screw	11 ea.	

The B1506A-H21/H51/H71 includes a B1506AU-F11 universal socket module. In order to make the custom socket adapter to measure non-TO package devices, you can make the custom socket adapter by using the universal socket module. For more information, please refer to the B1506A manual of “[Creating Your Own Socket Module.](#)”

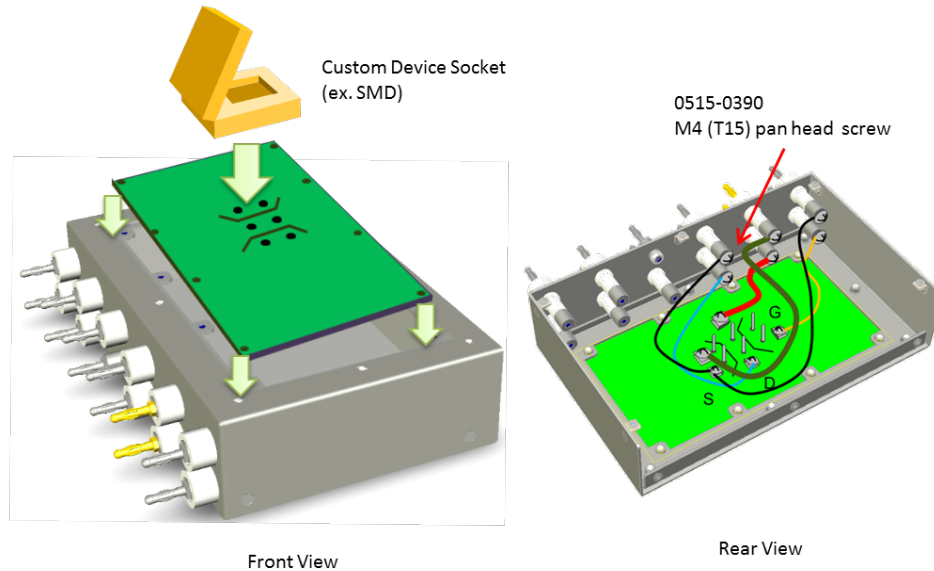
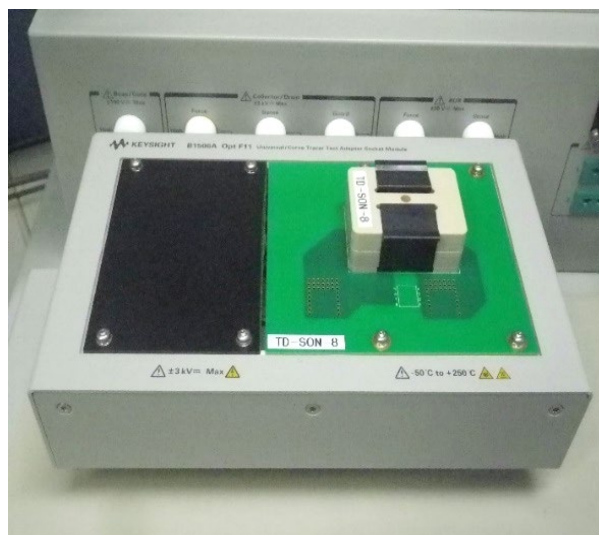


Figure 9. Making a custom socket adapter



- Socket Type: TDSON-8 package
- VDS max: 500 V
- IDS max: 100 A (0.1% duty cycle)
- Leak current
 - Drain-Source Leak: < 1 nA at 500 V
 - Gate-Source Leak: < 10 pA at 20 V
- Temperature rating: Max. 150 °C
- Socket Design and manufacturing
 - [JC Electronics Corporation](#)

Figure 10. Example of custom socket adapter (for TDSON-8 package device)

Thermal Test

The B1506A has two types of thermal test interfaces, thermostream, and thermal plate. Both are sold by inTEST corp.

The B1506A test fixture can attach the inTEST HP-289PM thermal plate without additional options. To use the thermostream, the B1506A-T01 thermal test enclosure option is required.

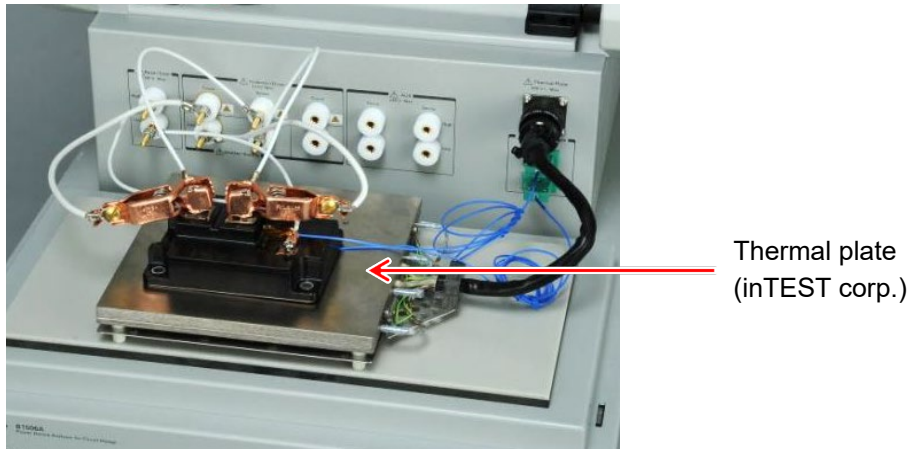


Figure 11. Thermal test with thermal plate

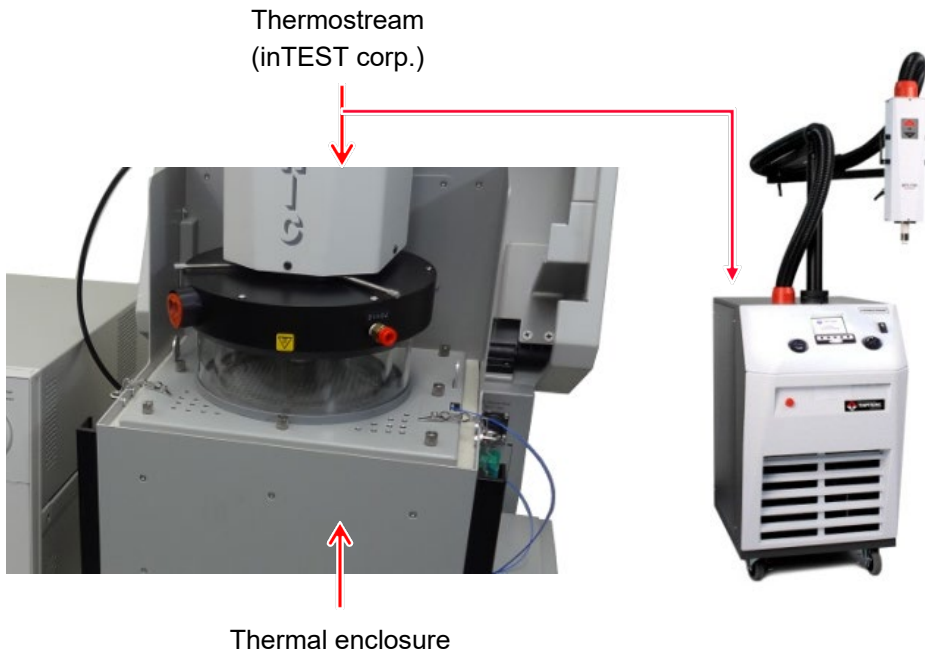


Figure 12. Thermal test with thermal enclosure

The table below lists the accessories that can be used for thermal testing. The thermal test essentially supports the IV and CV measurements but not the gate charge measurement.

Table 3. Accessory Item list for thermal test

Model number	Description	Bundle or option	Room temperature				With thermostream				With thermal plate			
			TO package		Module		TO package		Module		TO package		Module	
			IV/ CV	Qg	IV/ CV	Qg	IV/C V	Qg	IV/C V	Qg	IV/C V	Qg	IV/ CV	Qg
B1506AU-F10	3-pin inline package socket module	Bundle	✓				✓ ¹							
B1506AU-F11	Universal socket module	Bundle in H21/51/71	✓	✓			✓ ²							
B1506AU-F14	Gate charge socket adapter	Bundle in H21/51/71		✓		✓								
N1254A-550/551	Test leads and connection kit for thermal test	Bundle			✓	✓		NA	✓	NA	NA	NA	✓	NA
N1254A-544	Thermo-couple, 50cm, 2ea	Bundle					✓		✓				✓	
B1506A/AU-T01	Thermal test enclosure	Option					✓		✓					

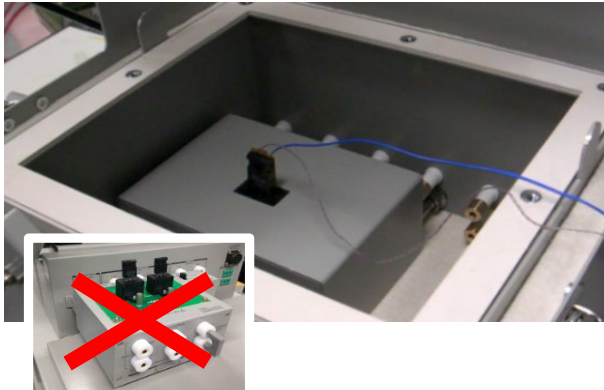
1. 0 °C to +100 °C

2. Depends on the thermal specification of device socket.

Device connection with the B1506A-T01 thermal test enclosure and thermostream

Use B1506AU-F10 inline package socket module

- For TO type packaged device
- 0 °C to +100 °C

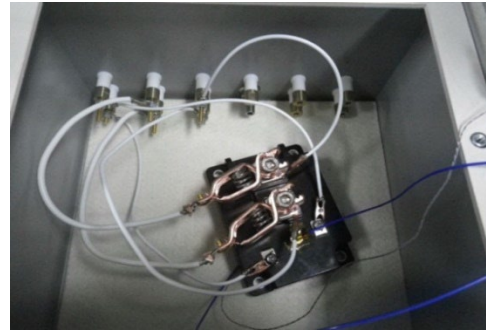


Note that B1506AU-F14 gate charge adapter cannot be used with thermal enclosure.

Figure 13. Device connection for B1506AU-F10 socket module (0 °C to +100 °C)

Using thermal cables

- For module type devices
- For below 0 °C or over +100 °C



N1254A-550 and 551 Test leads and connection kit for thermal test (bundled with B1506A) can be used at temperature of +250 °C.

Figure 14. Device connection for module type devices (below 0 °C or over 100 °C)

Device connection with the thermal plate

Using thermal plate

- Up to +250 °C (depends on thermal plate type)

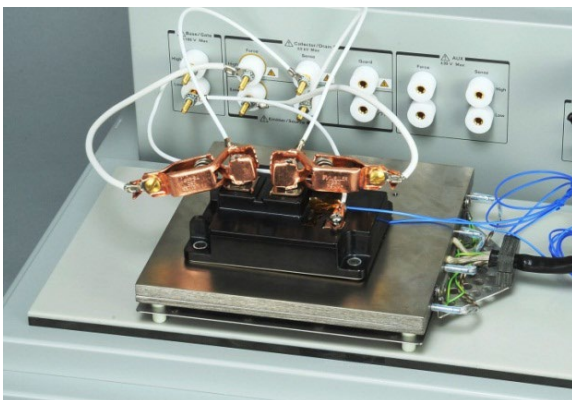
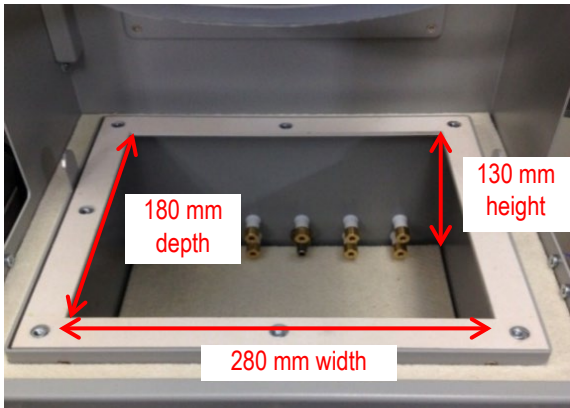


Figure 15. Device connection with thermal plate



Note that Inline package socket module and Qg adapter cannot be used with thermal plate

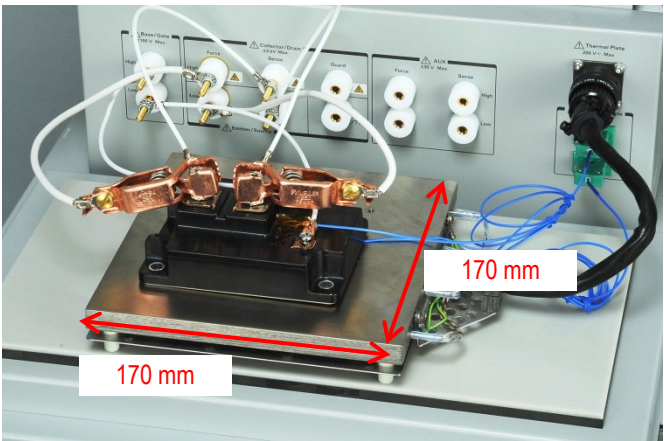
Recommended device size for thermal test solution



	Width (mm)	Depth (mm)	Height (mm)
B1506A/AU-T01 Physical Dimension	280	180	130
Recommended Maximum DUT size (*)	250	140	50

1 Larger size of device may be set to the B1506A-T01, however it depends on the device terminal type and cabling. The device size also impacts the thermal capability for heating and cooling rate. The highest / lowest temperature is decided by the combination of thermal power, thermal efficiency, and thermal capacity, and Keysight cannot guarantee how high / low temperature this system can achieve.

Figure 16. B1506A/AU-T01 physical dimension and recommended device size



inTEST Corp.
HP289-PM ² thermal plate dimension:
170 mm x 170 mm x 30 mm

2 inTEST has several types of thermal plate and can accept custom size order (ex. 240 mm W x 170 mm D)

Figure 17. inTEST HP289-PM thermal plate dimension

B1506A and B1506AU Ordering Information

Model number	Option	Description
B1506A		Power Device Analyzer for Circuit Design
	H20	20A/3kV/Thermal Fixture Package (I-V only)
	H50	500A/3kVThermal Fixture Package (I-V only)
	H70	1500A/3kVThermal Fixture Package (I-V only)
	H21	20A/3kV/C-V/Gate Charge/Thermal Fixture Package
	H51	500A/3kV/C-V/Gate Charge/Thermal Fixture Package
	H71	1500A/3kV/C-V/Gate Charge/Thermal Fixture Package
	T01	Thermal Test Enclosure (Thermostream Compatible)
	UK6	Commercial calibration certificate with test data
	A6J	ANSI Z540-1-1994 Calibration
B1506AU		Upgrade kit for B1506A
	005	20A to 500A Current Upgrade Option for H21
	015	500A to 1500A Current Upgrade Option for H51
	105	20A to 500A Current Upgrade Option for H20
	115	500A to 1500A Current Upgrade Option for H50
	021	Add C-V and Qg to H20 ¹
	051	Add C-V and Qg to H50 ¹
	071	Add C-V and Qg to H70 ¹
	T01	Thermal Test Enclosure (Thermostream Compatible)
	F02	Blank Silicon Plate
	F10	3-pin Inline Package Socket Module
	F11	Universal socket module
	F13	Curve Tracer Test Adapter Socket Module
	F14	Gate Charge Socket Adapter

1. Universal Socket Module (B1506AU Opt F11) and Gate Charge Socket Adapter (B1506AU Opt F14) are not furnished. Order these options if necessary.



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