



# DCP-100

## Dual Cold Plate

PRECISION FIXTURE FOR ALL 4 DCP MODES HAS ACCESSORIES  
FOR OTHER THERMAL MEASUREMENTS

### DESCRIPTION

The DCP-100 is a test fixture platform designed to accommodate a variety of different test sections for various thermal measurements. The basic unit with appropriate accessories is specifically designed for validating detailed thermal models according to the four DCP modes outlined by European DELPHI/SEED/PROFIT projects. Optional test sections and instrumentation provide capability for EIA/JEDEC JESD51-8 Junction-to-Board ( $\theta_{JB}$ ), EIA/JEDEC JESD51-13 (preliminary) Junction-to-Case ( $\theta_{JC}$ ), and Thermal Interface Material (**TIM**) thermal conductivity measurements. Also available is a System Cart that provides a convenient mounting surface for the fixture, storage for various fixture accessories, built-in air compressor, recalculating cold-plate coolant instrumentation, and a master power mains control.

The basic DCP-100 unit comes equipped with dual cold plates, one on the top and one on the bottom, that have been specifically designed to minimize thermal gradients across the interface surface. Separate connections to and flow meters for each cold plate enable the user to maintain the same temperature for both plates or to feed liquid at different temperatures to each plate. The cold plates are 12.7 cm (5") on a side, large enough to accommodate the largest semiconductor device packages, have a Type-T thermocouple embedded 12.7 microns (0.005") below the center of the interface circuit. Each cold plate is mounted on an FR4 material to thermally insulate it from the metal components making up the rest of the DCP-100. A gimbaled bottom insures top-to-bottom parallel surface interfacing.

A compressed air cylinder lowers and raises the top cold plate and, with the unit's built-in regulator and pressure monitor, allows the plate to be applied to the test sample with a controlled and repeatable amount of force. Both the top and bottom plate mechanisms are gimbaled to insure that the two plate interface surfaces are parallel to each other. An optional 12-channel thermocouple scanner is built-in to the base unit to monitor the temperature of the cold plates and up to 10 other user-defined points. The scanner can be interfaced to a computer and is supplied with monitoring software.



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Specifications subject to change without notice.

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## FEATURES

- Self-contained for easy setup and operation
- Alignment pins simplify positioning of interchangeable parts
- Flexible design easily adapted to alternative applications
- Optional test sections for  $\theta_{JB}$ ,  $\theta_{JC}$  and TIM testing
- Optional integrated thermocouple scanner has computer interface to simplify data collection
- Digital display for air pressure allows for precise force application
- Safety interlocked covers prevents operator injury

## SPECIFICATIONS

<b>Compressed Air:</b>	<b>Input Pressure</b>	40 psi nominal (60 psi max)
	<b>Connectors</b>	1/4" OD, Quick Connect
<b>Coolant:</b>	<b>Liquid</b>	Mineral-free water or glycol solution
	<b>Flow Rate</b>	45.5 lph (12 gph)
	<b>Connectors</b>	1/4" OD, Quick Connect
<b>Thermocouple:</b>	<b>Type</b>	Type-T
	<b>Quantity</b>	1 for each cold plate
	<b>Connectors</b>	Miniature Plugs (Omega NMP-T or equivalent)
<b>Thermocouple Scanner:</b>	<b>Number of Channels</b>	12
	<b>Type</b>	Type-T
(Applies to DCP-100 only)	<b>Input Connectors</b>	Miniature Jacks
	<b>Display</b>	LCD Digital
	<b>Outputs</b>	Printer (Centronics-compatible parallel) Serial (RS-232C for computer interface)
<b>Size:</b>	<b>Height</b>	53.3 cm (21")
	<b>Width</b>	43.2 cm (17")
	<b>Depth</b>	25.4 cm (10")
<b>Power:</b>	<b>Voltage</b>	100,120, 220, 240 VAC
	<b>Frequency</b>	50/60 Hz
	<b>Current</b>	1 A

## ORDERING INFORMATION

Model Number	Description
<b>DCP-100</b>	<b>Base Unit</b>
<b>DCP-100-01</b>	<b>Base Unit without thermocouple scanner</b> (Customer supplies thermocouple instrumentation)
<b>DCP-100-02</b>	<b>DCP4 Mode Pressure Pins and Insulated Plate</b> Includes 6 magnetized pressure pins
<b>DCP-100-03A</b>	<b><math>\theta_{JB}</math> Test Section</b> Provides interchangeable parts for making measurements in accordance with JESD51-8; supplied with appropriate thermocouples; accepts up to 30 mm square packages
<b>DCP-100-03B</b>	<b><math>\theta_{JB}</math> Test Section</b> Provides interchangeable parts for making measurements in accordance with JESD51-8 standard; supplied with appropriate thermocouples; accepts up to 52 mm square packages

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## ORDERING INFORMATION (continued)

<b>DCP-100-04</b>	<b>TIM Tester Section</b> Provides interchangeable parts for making measurements in accordance with generally accepted industry practices; includes two instrumented heat flux columns (one above and one below the TIM test sample)
<b>DCP-100-05</b>	<b><math>\theta_{JC}</math> Test Section</b> Provides interchangeable parts for making measurements in accordance with proposed JESD51-13 standard; supplied with one instrumented Heat Flux Column – HFC1 (0.25 to 3.75W, add “-1” to model number), HFC2 (1 to 15W, add “-2” to model number), or HFC3 (10 to 160W, add “-3” to model number), two heat collectors (one with embedded thermocouple and one with protruding thermocouple), and calibration heater.
<b>DCP-100-08</b>	<b>Conductive Package Posts</b> Custom designed for specific package style; includes thermocouple mounted under package interface surface (Consult Factory for details)
<b>DCP-100-09</b>	<b>Insulating Package Posts</b> Custom designed for specific package style (Consult Factory for details)
<b>DCP-100-84</b>	<b>TIM Tester Instrumentation</b> A USB-driven instrument with software that operates off the customer’s computer to provide drive, control and measurements of the TIM Tester Section internal heater and temperature sensors with a graphical user interface for collecting, displaying and saving all measurement data.
<b>DCP-100-85</b>	<b><math>\theta_{JC}</math> Test Instrumentation</b> A USB-driven instrument with software that operates off the customer’s computer to provide drive, control and measurements of the $\theta_{JC}$ Test Section internal heater, calibration heater and temperature sensors with a graphical user interface for collecting, displaying and saving all measurement data.
<b>DCP-100-99</b>	<b>System Cart</b> Self-contained wheeled unit for mounting DCP-100 on top with integrated thermoelectric chiller, air compressor, and master Power Main switch below; has drawer for storing optional components.