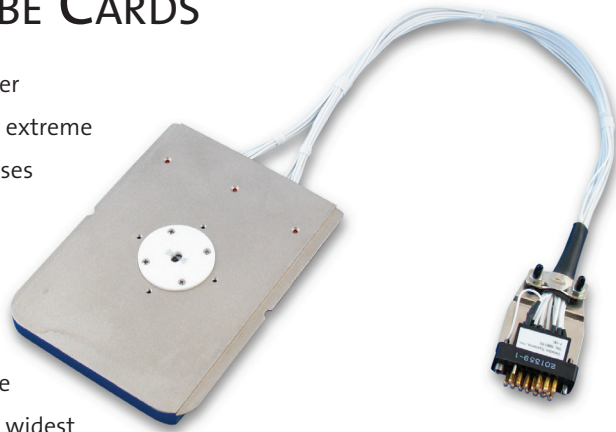


CELADON T40LL SERIES PROBE CARDS

The Celadon T40LL parametric probe card is designed to deliver a fast settling time and low leakage solution, while providing extreme operation over the widest temperature ranges. Relative to losses in the cable and switching, the leakage losses and errors introduced by this value based high performance card are nearly transparent in most applications. This card is designed to deliver performance with a design matched to the most advanced parametric analysis systems available. The probe card is designed to introduce minimal leakage over the widest temperature ranges while retaining its crash resistant properties and low thermal expansion characteristics. Small pad probing is enabled by the combination of ceramic and metal construction, which keeps the probe on the pads while minimizing probe movement at temperature.

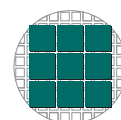


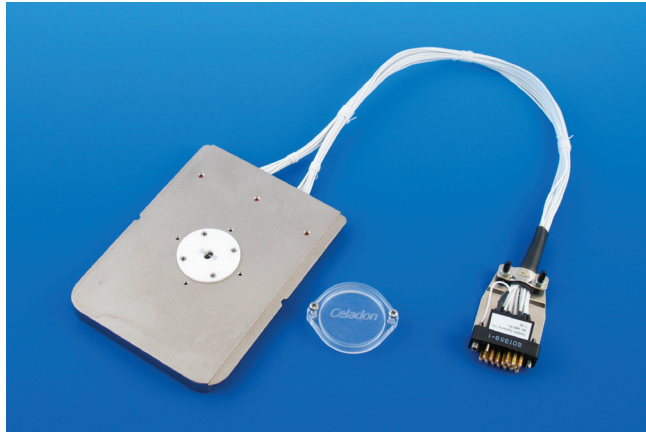
T40LL SERIES ADVANTAGES

- Ceramic and metal construction with solderless connections
- Probe protection with optional crash resistant needles
- Fast settling to allow for fast probing and reduced or no wait states for settling
- Operating from -65°C to 300°C, and 400°C is available on optional cooled model
- Ultra low expansion for use on small pads
- Expansion closely matched to wafer expansion
- Low expansion characteristics allow one probe card to be used over the entire operating range while maintaining alignment
- Low repair cost – each pin separately replaceable – long service life
- Allows the use of one probe card over the entire operating range
- RoHs compliant
- All cable connections are crimped
- Shielded metal housing for noise suppression, mechanical strength and improved low leakage performance.

WAFER PROBING FOR:

- Process Control Monitors
- Low Current FET Measurements for IDSS
- Fine Resolution Measurements
- Low Noise Measurements
- Functional Photodiode Test
- Early Failure Detection for Reliability Measurements
- Device Characterization





PRODUCT DESIGN

The probes are mounted in a precisely fabricated ceramic substrate. Each probe is retained in a protective slot in the ceramic. This protective slot combined with a unique shape allows the probes to maintain alignment. The slot also provides self alignment of probes while providing space for the probes to allow for a controlled over-travel for crash resistance.

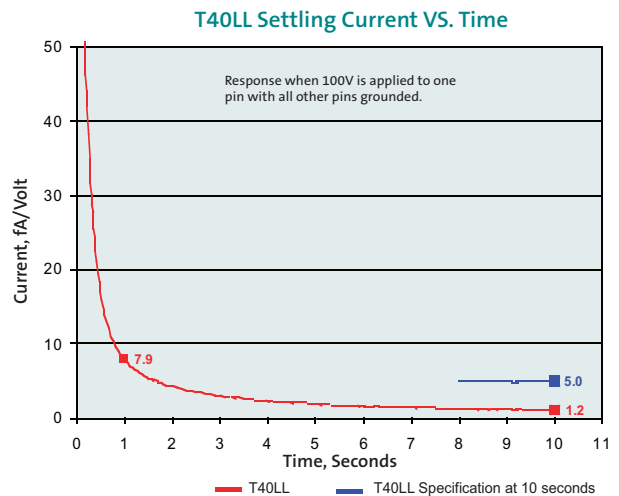
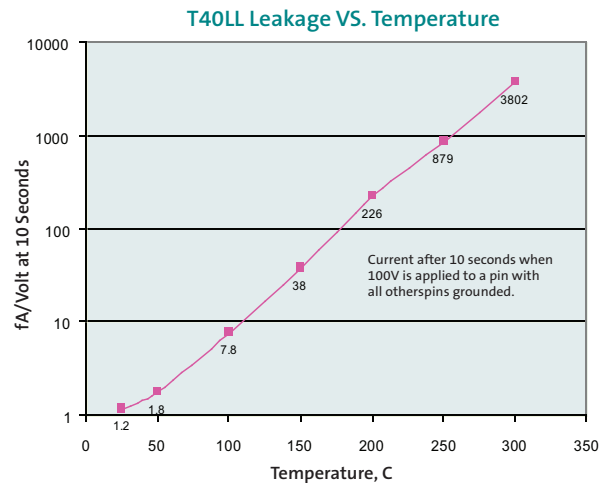
During severe over-travel, the probe retracts into the ceramic body and the wafer may contact the probe card body.

Replacement on the T40LL is performed by pulling the probe out of the slot and body, and then reconnecting a new probe. When replacing the probes, there is no need for solder or epoxy to hold them in alignment position.

The Celadon card has a multicontact coaxial connector on a pigtail. On a pigtail, the connections from each probe are brought out on low-noise high-temperature coaxial cables where the shield of the cable is connected to a guard for parameter analyzing or to ground for capacitance measurements depending upon how the interface extension cable is set up and if triax to bnc adapters are used on the extension cable. The connector is on an extension to make it easier to plug two cables together when mounted on a prober and because multicontact connectors have to be shielded from chuck temperatures that may exceed 200°C. Since no connector hangs below the probe card, the format of using a multicontact cable on an extension allows this card to be used in smaller sized probers, allows for probe card rotation in a Celadon Modular Adapter™ and eliminates the need for edge connectors. Edge connectors when used on probe cards that are too short can break wafers, and dirty contacts increase surface leakage over time.

PERFORMANCE CHARACTERISTICS

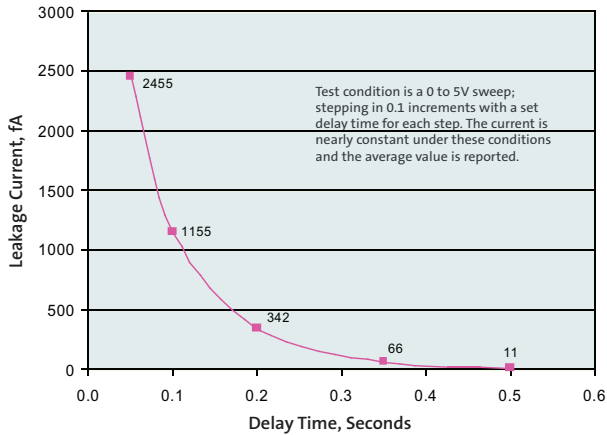
The graph below displays an example of leakage versus temperature for a T40LL. This product normally has less leakage than the device being tested. The 2nd graph shows leakage vs. time to demonstrate how fast the product settles in fempto amps per volt. If one volt is applied, the T40LL will settle to well under the specified 5 fempto amps in 10 seconds. The fast settling time combined with low test voltages allow rapid measurement sequences for fast die-to-die moves. The typical settling time for a one volt change is 1.2 fempto amps in 10 seconds at +25°C.



PERFORMANCE CHARACTERISTICS

(Continued)

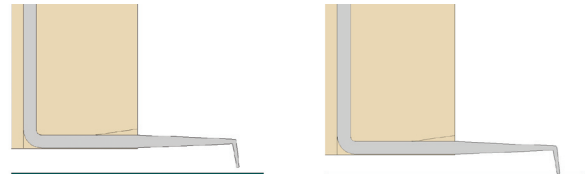
Leakage Current VS. Test Time



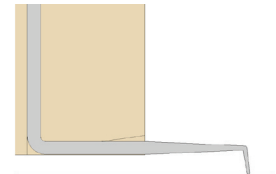
The graph displays how the probe card responds to a 0 to 5 volt stepping in 0.1 volt increments. A parameter analyzer typically has a programmed step size. A delay time at each measurement point must be added to account for card settling performance. If the delay time is too short, then an error will occur due to the high settling leakage current. Quality guarded cables and switching matrices are often used to reduce settling time. If the settling time is too long, test throughput decreases. As an example, if you sweep too fast or don't have enough delay time, it would prevent you from seeing the true Id off current in a sub threshold measurement. A high performance probe card is used to obtain an accurate Fowler Nordheim plot that is unaffected by the probe card settling current. The settling time for a 5 fempto amp measurement would be .5 seconds for 0.1 volt step size. For a 1 pico amp measurement, settling time would be .1 seconds for 0.1 volt step size. For an unguarded probe low performance probe card measuring 1 pico amp, you would allow 5 seconds for a 0.1 volt step size, and with surface leakage, it might never settle down to 1 pico amp per volt.

PROBE CONTACT

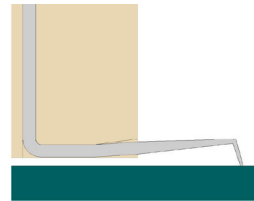
Visit our web site at www.celadonsystems.com for a full animation.



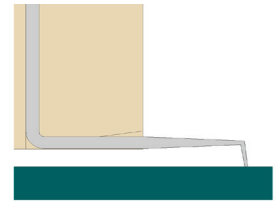
1. Probe before contact.



2. Probe in normal contact with the wafer.



3. Probe card crash, the probe flexes up into the protective slot.



4. Probe back in normal contact with the wafer.

ELECTRICAL CHARACTERISTICS:

- Leakage < 5 fA/Volt from 25°C to 100°C at 10 seconds
- Leakage < 50 fA/Volt from 100°C to 150°C at 10 seconds.
- Leakage < 250 fA/Volt from 150°C to 200°C at 10 seconds
- Leakage < 5 pA/Volt from 200°C to 300°C at 10 seconds

MECHANICAL CHARACTERISTICS:

- Maximum Number of Probes: 50
- Tip Radius Available: 0.0125 mm standard; 0.0063 mm; and 0.025 mm; others available
- Shape: Polished round, and flat available
- Minimum Pitch: 60 micron (probes from both sides)
- Probe Material: Tungsten Rhenium Standard (WRe), Beryllium Copper, other materials available
- X-Y Accuracy: +/-9 micron standard, +/-5 micron available at extra charge
- Z Accuracy: +/-9 micron, +/-5 micron available at extra charge
- Wafer Test Operating Temperature Range: -65°C to 300°C
- Probe Card Storage Temperature Range: -65°C to 150°C
- Weight: 0.5 kg
- Size without Pigtail: 160 x 114 x 15 mm

HOW TO ORDER

Model + Leakage -number of pins (xxx)- - number of sites (sss) -connector type (t) -number of Quasi-Kelvin pins (qqq)

q= Kelvin Connection Type

S or Blank = Single Wire to Each Probe

QK = Quasi-Kelvin – two wires to each probe

K= Kelvin = two probes per pad

T40LL-xx .1-ttt-qq

Probe Card Type

xx= Number of probes from 01-32

1= Number of sites

ttt = Connector Type

AMP = AMP Microcoax Connector

AMC = Advanced Microcoax Connector

CBP = BNC Connector

T3P= Triax

SMB= SMB- mini coax

L8P = COAX Type-8 Plug

ORDERING INFORMATION

- Number of Probes: 1 to 50
- Probe Type is Polished Round Tip: Radius is 0.0125 mm (default); other sizes and shapes are available
- Pigtail Cable Type: Celadon-designed ultra high-performance high-temperature low-noise microcoax, low-triboelectric effect cable
- Cable Length in mm. (from the end of the chassis to the connector)
- Touchdown Sensor Type: No touch down sensor (default), NC (normally closed), INC (isolated normally closed)
- Beam Length in mm: 3.8 mm high Z force, 6 mm crash resistant (default), 7.6 mm SoftTouch™
- Probe Depth in mm: 4.7 mm bottom of the wing to probe tip (default)
- Number of Sites: 1

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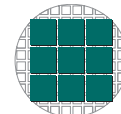
PROBE CARD OPTIONS:

- Product may be made with facing or same side probes depending on layout and pitch
- Product may be wired for Kelvin or Quasi-Kelvin connections
- Crash Resistant Probes

SUGGESTED ACCESSORIES:

Optional external cable, strain relief and heat shields are available upon request or available for specific probes.

- Cable Harness for the Keithley 707 and Agilent E5250 opt 001 matrix. 24 three-lug triax plug connectors, 3.0 meters ultra high-performance low-noise low-leakage triax cables, 26-pin microcoax connector, one ground pin, and one TDS pin compatible with the Cascade Summit prober.



Celadon
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